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# HOW DOES THE LEVEL OF THE ANTI-DUMPING DUTY AFFECT THE TRADE RE-ROUTING PHENOMENON?

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## Abstract

**Purpose.** The practice of trade re-routing, where goods are redirected through intermediary countries to evade anti-dumping duties, poses significant challenges for global trade regulation. While this phenomenon is well-documented, the specific relationship between the intensity of trade re-routing with the level of anti-dumping duties and the involvement of multiple countries has not been fully explored. This study advances the research by investigating the direct correlation between anti-dumping duty levels and the scale of re-routing activities, offering a more nuanced understanding of how varying duty levels influence firms' strategic responses.

**Methods.** Drawing on trade data from 2014 to 2023, we employ econometric analysis to examine how anti-dumping discount fluctuations affect trade volume through third countries.

**Findings.** Our findings reveal that when duty levels are high, firms' incentive for trade re-routing increases, and the phenomenon's intensity rises, with multiple intermediary countries being employed to obscure their trade routes further. The results provide empirical evidence that higher duty levels substantially increase the incentive for trade re-routing. In contrast, lower duties tend to reduce the motivation for such practices.

**Originality.** Focusing specifically on the intensity of the re-routing phenomenon and

the complexity of intermediary involvement in response to duty levels, this study goes beyond existing literature to provide deeper insights into the conditions that drive or mitigate duty evasion tactics.

This research has critical implications for policymakers, as it highlights the limitations of current anti-dumping measures in addressing circumvention. The study underscores the need for more sophisticated detection and prevention mechanisms to counter firms' adaptive strategies, particularly when facing high-duty scenarios. Our findings contribute to the broader trade enforcement discourse by offering theoretical and practical implications for strengthening international trade governance.

**Keywords:** Anti-dumping, trade transshipment, trade re-routing, duty circumvention, anti-dumping duty evasion

**JEL index**: F13, F14, L5

## Introduction

Anti-dumping measures are trade remedies governments impose to protect domestic industries from unfair trade practices. These measures counteract the adverse effects of dumping, which occurs when a foreign company exports goods at a price lower than its production cost or the price in its home market, damaging local industries (Prusa,2021; Bown, 2011). However, in the increasingly interconnected world of international trade, companies have developed ways to circumvent these anti-dumping measures, using a variety of methods to avoid paying duties while remaining undetected by trade authorities. A prominent method of avoiding anti-dumping duties is trade re-routing, where goods are sent through intermediary countries to obscure their true origin and evade duties (Liu & Shi, 2019; Bown, 2013).

Anti-dumping circumvention refers to avoiding anti-dumping duties through various strategies, including falsifying the origins of goods, misclassifying products, or engaging in fraudulent shipping practices. Studies show that circumvention practices such as misclassification, false labeling, and transshipment are methods used by companies to evade anti-dumping duties (Blonigen & Prusa, 2015). For example, firms may misclassify goods under different tariff codes to exploit lower or non-existent duties, is a tactic documented in academic literature (Hamanaka, 2012). Companies may also partially assemble or process goods in countries where anti-dumping duties are lower and then complete the manufacturing process elsewhere, avoiding higher duties (Felbermayr & Sandkamp, 2020). Another common practice is to establish affiliated entities in countries with no or low duties, allowing goods to be exported from these countries at reduced rates (Srivastava, 2019). Circumvention undermines the effectiveness of anti-dumping measures by distorting the competitive market and allowing companies to benefit from unfair pricing (Spicer et al.,

2016). However, it is essential to mention that not all circumvention is done explicitly with the intention of "undermining" regulations, but rather to minimize costs and maintain market access without incurring penalties. This can be seen as more of a financial or competitive strategy rather than outright undermining (Prusa, 2021).

While gaining a competitive advantage by reducing costs is often the primary motivation behind circumvention practices (Ostoni, 2005; Spicer et al., 2016), avoiding barriers to market access is also a major factor (Bown, 2005). Circumvention through re-routing allows firms to continue exporting their goods to targeted countries without facing the financial burden of anti-dumping duties, resulting in unfair competition. This strategy makes it appear that the goods were produced in a country not subject to anti-dumping measures, thereby avoiding duties. Due to the complexity of global supply chains and the involvement of multiple intermediaries, authorities often struggle to trace the true origin of goods (Hasketh, 2010). A notable example of this tactic can be seen in cases involving Chinese steel exports, where goods were transshipped through Vietnam to evade anti-dumping duties in other markets (Liu & Shi, 2019).

The consequences of anti-dumping circumvention extend beyond market competition. Evasion of anti-dumping duties creates significant economic distortions, leading to market flooding with underpriced goods and negatively affecting domestic producers (Blonigen & Prusa, 2015). Domestic companies often suffer from declining sales, shrinking profit margins, and in severe cases, layoffs and closures. This ultimately results in reduced innovation and a lack of investment in the affected industries (Liu & Shi, 2019). In addition, circumventing anti-dumping measures can have adverse effects on product quality and safety. Studies have shown that products rerouted through intermediary countries often fail to meet the safety and quality standards of the destination country (Caselli et al. 2024).

Indicators of circumvention can include unusual shifts in trade flows, such as sudden increases in imports from specific countries or regions, especially those not traditionally part of established supply chains (Barbaglia et al. 2022). Additionally, significant price discrepancies between exported goods and similar products sold in other markets can suggest circumvention (Liu & Shi, 2019). Although the lack of transparency or refusal by companies to provide documentation can raise suspicion, further investigation is usually required to confirm whether these activities involve evasion of anti-dumping duties (Blonigen & Prusa, 2015).

Furthermore, the practice of anti-dumping circumvention undermines the stability of the global trading system. When companies engage in fraudulent tactics to evade trade measures, the credibility of trade rules is compromised, eroding trust among trading partners (Janzen & Broussard, 2014). This can lead to trade disputes, retaliatory tariffs, and the breakdown of international cooperation. Countries with weak customs enforcement or inadequate regulatory frameworks are often targeted as transshipment hubs for circumvention activities (Reese, 2024).

In conclusion, anti-dumping circumvention remains a persistent issue in international trade, with re-routing and transshipment being widely recognized as significant methods

for evading duties (Reese, 2024; Spicer et al., 2016). To effectively address these challenges, policymakers and trade authorities must develop more robust enforcement mechanisms, improve international cooperation, and implement stricter regulations to prevent circumvention. By addressing these practices, authorities can ensure fair competition, protect domestic industries, and maintain consumer safety.

## 1. Literature review

In the international literature, many studies deal with anti-dumping duties and their impact on international trade and the supply chain of goods (Barbaglia et al., 2022; Liu & Shi, 2019; Blonigen & Prusa, 2015). Anti-dumping measures are designed to protect domestic industries from unfair competition but have broader implications for global trade patterns. These measures often lead to economic effects that alter trade flows, disrupt supply chains, and even incentivize companies to develop new strategies to circumvent their duties. In cases where anti-dumping measures are used as a means of protectionism, trade patterns can be distorted, and trade can be diverted away from more efficient producers towards less efficient ones (Brenton, 2000). Also, in cases of retaliation, trade diversion can lead to economic inefficiencies as consumers may have to pay higher prices for goods from less competitive suppliers. Consequently, efficient producers may lose market share (Blonigen and Bawn, 2003).

In particular, four main effects associated with the imposition of anti-dumping duties have been widely studied: trade destruction, trade diversion, trade deflection, and trade depression. Each of these effects highlights different ways in which trade dynamics are altered when anti-dumping duties are imposed, and they are crucial to understanding the broader consequences of such measures on international trade.

The first effect studied in the context of anti-dumping measures is trade destruction, which refers to the direct impact of duties on bilateral trade between two countries. This effect is closely tied to the imposition of anti-dumping duties, as shown by Prusa (1997) and Prusa (2021), who provided strong evidence by examining US anti-dumping duties imposed between 1980 and 1994. Their study found that the imposition of anti-dumping duties led to a 50% decline in imports from the countries targeted by these duties. In the case of the European Union, studies by Lasagni (2000) and Konings, Springael, and Vandenbussche (2001) confirmed the existence of trade destruction for anti-dumping duties imposed between 1985 and 1990, though their findings indicated that the impact of the duties was more limited than in the US. Trade destruction is considered the most immediate and direct effect of anti-dumping measures, as it clearly demonstrates a negative correlation between anti-dumping duties and trade volumes. The imposition of duties leads to a sharp reduction in imports from the targeted countries, which, in turn, distorts the overall trade flow.

Following the impact of trade destruction, the literature identifies a second effect called

trade diversion (Cheng, Mi, Coffman, Meng and Chang, 2021). This occurs when imports from countries that are subject to anti-dumping duties are replaced by imports from countries that are not affected by such duties. Krupp and Pollard (1996) provided early empirical support for this effect by studying products in the chemical industry, showing that imports from alternative supplier countries increased for products subject to anti-dumping duties. Prusa (1997, 2021) also found that alongside trade destruction, imports from unaffected countries increased by 40%-60%, reinforcing the idea that anti-dumping measures lead to trade being diverted to countries not subject to these duties. This is a critical insight, as it highlights that while anti-dumping measures may reduce imports from targeted countries, they do not necessarily reduce total imports. Instead, trade flows are diverted to other suppliers, leading to potential market inefficiencies.

The third major effect is trade deflection, which occurs when exporters facing anti-dumping measures in one market seek out alternative markets to sell their goods. Bawn and Crowley (2006) examined US anti-dumping measures imposed on products of Japanese origin between 1992 and 2001 and found evidence of trade deflection. In response to anti-dumping measures, Japanese exporters shifted their focus to third-country markets, leading to an increase in exports to these markets by 7%. Trade deflection is significant because it illustrates how anti-dumping duties can redirect trade flows to other markets, rather than just reducing them. This suggests that while anti-dumping measures may reduce trade between two countries, they do not necessarily reduce the total volume of trade globally. Instead, exporters find new markets, circumventing the impact of the duties.

In addition to trade destruction, diversion, and deflection, trade depression is another effect of anti-dumping measures. In contrast to effects mentioned above, trade depression refers to the overall reduction in trade volumes and economic activity for all countries involved, not just the ones directly targeted by the anti-dumping measures. Bawn and Crowley (2006) observed that anti-dumping duties can reduce the demand for affected products, which leads to a reduction in trade volumes. In their research, they found that exports from countries subject to anti-dumping duties fell by 19%. Moreover, trade depression occurs when domestic producers in the targeted countries refocus on their local markets, reducing the overall level of imports and exports. This, in turn, affects the global trade balance, leading to economic inefficiencies. Trade depression is important because it shows the broader implications of anti-dumping measures on the global trading system.

In summary, the first three effects are interconnected as there is a strong correlation among them and anti-dumping measures. Firstly, the imposition of antidumping duties can lead to trade destruction. As companies divert resources to deal with the administrative burdens and legal complexities associated with anti-dumping investigations, imports from the affected country are expected to decline. Secondly, the destruction effect leads to trade diversion. As companies look for alternative sources to replace the import gap created by the imposition of the duty, a rise in imports from third countries is to be expected. Finally, trade destruction and trade diversion can lead to trade deflection, where exporters redirect surplus quantities to new markets to avoid high anti-dumping duties.

As a result, exports from the affected country to third countries is also expected to rise. It is evident that the imposition of Anti-dumping measures functions as additional cost that leads to reduction in trade volumes. As a result, antidumping measures can contribute to trade depression, impacting both domestic and foreign economies (Silberberger, Slany and Soegaard, 2021). The fourth effect, trade depression falls outside the scope of our research and will not be addressed further, however the rest three effects are directly related to a harmful trade practice called trade re-routing, which is a prerequisite in order to answer our main research question.

Trade re-routing, is closely linked to the effects of trade destruction, diversion, and deflection. Trade re-routing involves redirecting trade flows through intermediary countries to avoid anti-dumping duties, effectively bypassing the duties by obscuring the true origin of the goods (Barbaglia et al. 2022) . Liu and Shi (2019) investigated the evasion of US anti-dumping duties by Chinese exporters using trade re-routing through third countries. They found a strong positive correlation between Chinese exports to third countries and US imports from those same countries, suggesting that re-routing was being used as a circumvention strategy. They support that such an effect is more pronounce for products that are subject to anti-dumping duties than similar products not subject to those duties. This pattern is consistent with trade re-routing as a mean of anti-dumping duty circumvention. Other researchers (Egger and Nelson, 2011) based on a panel data analysis over 1960-2001, find negative and modest effect of anti-dumping duties on trade volume and welfare. Vandenbussche and Zanardi (2010) analyze the overall trade impacts of anti-dumping duties by new adopters over a period of 1980-2000 and they found that the tough users would experience a decline in the total imports not just from the targeted country but from other countries too. The decline reported seems to be affected by the industrial sector.

Trade re-routing can be seen as an extension of trade deflection, where exporters move their goods through countries with lower or no anti-dumping duties. Unlike legal transshipment or re-exporting, which do not involve changing the certificates of origin, trade re-routing often involves fraudulent actions such as falsifying documents to deceive customs authorities and evade duties. This makes trade re-routing an illegal practice, though it is widely used due to its effectiveness in bypassing anti-dumping measures. It is important to notice that trade re-routing is not the same thing as exporting products of one country to another via a third country. In case the certificates of origin do not illegally change, the exporter will pay all the duties imposed by the importing country, including anti-dumping duties. In these cases, the intermediary countries do not affect the custom clearance prosses. Trade re-routing goes further as it involves illegal changing of the documents in order to circumvent those duties. Obviously, this is an illegal action as it intends to deceive authorities to evade anti-dumping duties. In contrast, re-exporting or transshipping are procedures that do not intent to evade anti-dumping and are legal and well-established practices in international trade.

The fact that trader re-routing includes fraud and falsification of documents, does not deter companies from doing so, Liu and Shi (2019) quote examples of companies

that explicitly mention that they are willing to circumvent anti-dumping measures. These companies help with exporting products that are subject to anti-dumping duties to a third country, finishing custom clearance for those products and sending them to warehouses where they get reloaded. They also help to find local factories where the certificates of origin are changed and the products are shipped to their final destination. As these companies offers their assistance obtaining all the required documents, custom authorities in the countries of the final destination usually are not aware of the anti-dumping circumventing practices, thus enforcement is complex and difficult.

There are studies supporting that Chinese companies use countries in Africa in order to comply with quota rules. According to Rotunno, Vezina and Wang (2013) US imposed quotas on a large variety of Chinese clothes, whereas, on the other hand, there are more than 4.000 types of clothes that could be exported from African countries to the US without duties and quotas. Chinese firms took the chance to use these countries to transit their clothes in the US. It should be noticed that the quota hopping practice is not illegal in contrast to anti-dumping circumventing through trade re-routing. However, the mechanism in both cases is quite similar and depicts the effort companies do to overcome trade barriers.

In overall, these trade effects highlight the complex dynamics and potential consequences of anti-dumping measures on international trade. These consequences emphasize the need for careful consideration when implementing such measures to ensure they achieve their stated objectives without causing unnecessary trade disruptions or distorting market dynamics.

This research will build on the existing literature by focusing specifically on the correlation between the level of anti-dumping duties with the intensity of trade re-routing and the involvement of multiple intermediary countries in this process.

Focusing on the relationship between the level of duty and intensity of rerouting, this research aims to contribute new insights into how firms circumvent anti-dumping duties through trade rerouting. The findings of this study will help to better understand how anti-dumping measures can be enforced more effectively and how trade rerouting can be detected and prevented.

## 2. Methodology

The research focuses on trade rerouting as a means of circumventing anti-dumping duties, examining trade destruction, diversion, and deflection effects. It then tests how the level of anti-dumping duties impacts the intensity of trade rerouting and affects the involvement of intermediary countries in rerouting activities.

China is chosen because it is one of the European Union's most important trading partners and one of the main targets of antidumping petitions globally, as 1 in 4 measures, according to WTO, are targeting China. We employ a longitudinal analysis of trade flows,

using data for 26 anti-dumping measures employed between 2014 and 2022 (Appendix 1). These 26 antidumping measures represent the total number of measures imposed by the EU against China over the past decade. Analyzing them helps to fill a gap in international research, which has primarily focused on data from earlier periods. These measures cover 44 specific Harmonized System (HS) codes. The EU has adopted a mandatory eight-digit code system. However, our data concern six-digit product categories to ensure conformity with the other countries' members of the WTO.

The primary data sources for this research are the United Nations Comtrade and the EU Access2Markets databases. These databases provide detailed information on the value of bilateral trade flows, classified by HS codes. The Comtrade database offers annual global trade statistics whereas Access2Markets database provides additional EU-specific information on tariffs, trade barriers, and trade agreements.

The trade partners chosen for the 44 HS codes analyzed are those with significant trade flows between China and the EU and those with the largest quantitative changes in trade flows post and after duty imposition. Our dataset includes annual trade data from the year prior to the imposition of duties (base year) and spans the years after the duties were implemented, capturing both immediate and cumulative effects. The lack of availability on monthly data restricts us to using annual trade data, which may cause a delay in observing the effects of duties imposed near the end of a year.

The analysis of these data helps to identify the destruction effect. For the diversion effect additional data required are the trade flows (imports) for the same HS codes for all trade partners. The positive percentage change relative to the base year adequately describes the substitution process for trade flows from China that were disrupted by the additional duty charges. Also, data on China's exports for the specific products and the corresponding analysis of the percentage changes in relation to the base year is necessary for the justification of the deflection effect as described in international literature.

All these three effects are related to the imposition of an anti-dumping duty. In the next stage of our research we investigate the presence of trade re-routing among the involved trade partners. Specifically, we identify the countries that emerge as major alternative suppliers and the countries that have absorbed the export surplus of the country subject to anti-dumping duties, subsequently, we can test the correlation of trade flows to and from these third intermediary countries. A strong correlation of the third country's imports from the country subject to anti-dumping duties with the same third country's exports to the country that imposed the duties is sufficient evidence of trade re-routing.

Our research goes beyond this focus and examines the correlation between the level of anti-dumping duty with the intensity of the trade re-routing effect and the engagement of multiple intermediary countries. For this reason we test the following hypotheses:

- Hypothesis 1: There is a positive correlation between the level of anti-dumping duties and the intensity of trade re-routing activities.
- Hypothesis 2: As the level of anti-dumping duties increases, the likelihood of using multiple intermediary countries for trade re-routing also increases.

These hypotheses are based on the assumption that higher duties incentivize companies to find ways to minimize costs by circumventing tariffs through the use of alternative trade routes, often involving multiple intermediary countries.

We use SPSS as our primary analytical tool because it can handle large datasets and conduct detailed correlation analyses.

First, in order to examine Hypothesis 1, we will test if the parametric Pearson's Correlation can be implemented, and if it's not, we will use the non-parametric Kendall's Correlation and Spearman's. Regardless, of the method (parametric or non) that will be used, the null hypothesis we'll ultimately test is that there is no linear correlation between duty level and intensity of trade rerouting. In order to use Pearson's Correlation, we will examine two hypotheses:

a) If there are outliers (extreme values), and if so, we will try to erase them from the sample without affecting the result.
b) If the two variables follow the normal distribution.

If one of the above assumptions is not true, then non-parametric methods will be used. Also, in all hypotheses, we consider the level of significance to be 5%.

Next, we will test the second hypothesis. To test if there is indeed an involvement of multiple countries in duty levels, we must first create a new variable, the prices of which will be coded in four levels, each of which will match the number of countries that are being involved. Specifically, we created the ordinal variable Countries, where 0 is the price for "No countries involved," 1 is for "One country involved," 2 is for "Two countries involved," and 3 is for "3 Countries or more involved".

We will test the aforementioned hypothesis by implementing the ordinal logistic regression. This model is appropriate since there is an ordinal dependent variable (number of countries involved) and a continuous independent variable (duty level). The assumptions that must be met in order the regression to be valid are:

1. The dependent variable is measured on an ordinal level
2. The independent variable is continuous, ordinal or categorical
3. No Multi-collinearity - i.e., when two or more independent variables are highly correlated.
4. Proportional Odds - i.e., each independent variable has an identical effect at each cumulative split of the ordinal dependent variable.

If all four assumptions are met, we can conclude that as the level of anti-dumping duties increases, the likelihood of using multiple intermediary countries for trade re-routing also increases.

While this study focuses on the relationship between anti-dumping duties and trade re-routing, other factors, such as geopolitical events (e.g., the Russia-Ukraine conflict) and the COVID-19 pandemic, may influence trade patterns. These factors were excluded to maintain a narrow focus on anti-dumping duties, although they may have some impact on the results.

## 3. Results

At the beginning of this section, we comprehensively examine the three key effects that lead to trade re-routing: trade destruction, diversion, and deflection. These effects are crucial to highlight as they build the framework for understanding how anti-dumping measures alter global trade patterns, resulting in trade re-routing. By analyzing these effects in detail, we can contextualize our research question, which investigates the relationship of the level of anti-dumping duties with the intensity of re-routing activities and the involvement of multiple intermediary countries.

Considering the 44 cases of HS classification codes for which anti-dumping measures have been imposed, we can observe the evolution of bilateral trade flows, especially after the duty is imposed. The international literature suggests that after the enforcement of an anti-dumping measure, the effect on the bilateral trade of the two countries involved is catalytic (Prusa, 2021; Besades & Prusa, 2017; Vandenbusscge & Zanardi, 2010).

In Table 1 we quote data on the effect of the imposition of anti-dumping measures on European imports from China for the 44 sub-category tariff discrimination codes.

**TABLE 1: Percentage change (%) on trade volumes between EU and China after enforcing Anti-dumping duty.**

| | Product Code | In Force since | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 | 2022 | 2023 |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 721050 | 16/11/22 | | | | | | | | -82,23% |
| 2 | 854511 | 07/04/22 | | | | | | | -13,47% | -55,36% |
| 3 | 720299 | 24/03/22 | | | | | | | -18,58% | -25,75% |
| 4 | 731814 | 21/12/20 | | | | | | 56,06% | 92,25% | 30,36% |
| 5 | 731812 | 21/12/20 | | | | | | 46,90% | 50,53% | -21,61% |
| 6 | 285000 | 24/03/20 | | | | | -15,21% | 18,17% | 19,18% | 16,08% |
| 7 | 731822 | 21/02/20 | | | | | -19,63% | 16,41% | 44,74% | -6,17% |
| 8 | 731821 | 21/02/20 | | | | | -10,74% | 19,11% | 28,00% | -1,15% |
| 9 | 731815 | 21/02/20 | | | | | -12,39% | 32,73% | 71,62% | 16,82% |
| 10 | 850231 | 21/10/20 | | | | | 26,37% | 95,95% | 119,12% | -64,12% |
| 11 | 730890 | 21/10/20 | | | | | -10,17% | 18,10% | 67,57% | 76,61% |
| 12 | 730820 | 21/10/20 | | | | | -54,14% | -63,36% | -83,31% | -75,10% |
| 13 | 854470 | 24/09/20 | | | | | -19,38% | -10,52% | -32,67% | -42,57% |
| 14 | 760711 | 14/08/20 | | | | | -6,25% | -31,20% | 7,47% | -51,31% |
| 15 | 760692 | 14/08/20 | | | | | -12,06% | 1,81% | 77,18% | -38,09% |
| 16 | 760691 | 14/08/20 | | | | | -47,25% | -66,02% | 17,96% | -77,78% |
| 17 | 760612 | 14/08/20 | | | | | -29,21% | -33,83% | 171,30% | -30,99% |

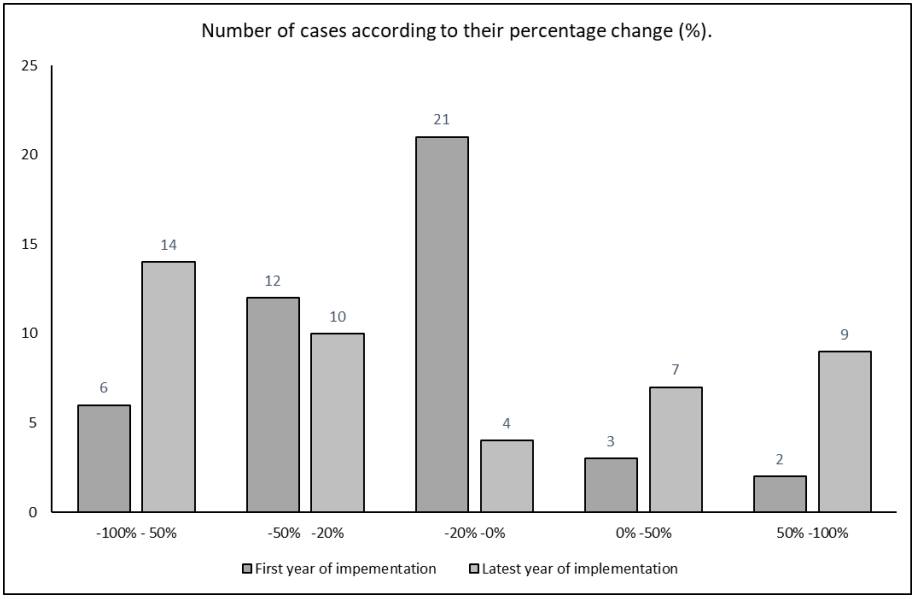
| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| 18 | 760611 | 14/08/20 | | | | | -66,51% | -80,71% | -29,45% | -83,74% |
| 19 | 761090 | 14/02/20 | | | | | -11,16% | 14,66% | 56,53% | 29,09% |
| 20 | 760810 | 14/02/20 | | | | | -19,02% | -57,00% | -19,34% | -49,81% |
| 21 | 760820 | 14/02/20 | | | | | -26,49% | -46,82% | -26,45% | -44,42% |
| 22 | 760429 | 14/02/20 | | | | | -41,40% | -70,00% | -48,03% | -64,92% |
| 23 | 760421 | 14/02/20 | | | | | -18,73% | -52,58% | -43,61% | -62,26% |
| 24 | 390530 | 29/09/20 | | | | | -42,37% | -33,58% | 61,63% | -41,13% |
| 25 | 701990 | 06/04/20 | | | | | -17,34% | 7,25% | 42,23% | 0,52% |
| 26 | 870870 | 04/03/20 | | | | | -43,62% | -29,56% | -18,24% | -33,44% |
| 27 | 871160 | 18/01/19 | | | | 12,27% | 22,14% | 64,69% | 99,66% | 17,97% |
| 28 | 401212 | 11/08/17 | | | -28,12% | -80,99% | -87,11% | -99,62% | -95,48% | -16,73% |
| 29 | 401120 | 11/08/17 | | | -46,66% | -68,03% | -74,80% | -65,98% | -46,61% | -53,31% |
| 30 | 722611 | 14/08/17 | | 92,62% | 489,57% | 11,47% | 503,95% | 921,94% | 1886,43% | 1684,53% |
| 31 | 722511 | 30/10/15 | | -26,63% | -57,33% | -70,58% | -56,64% | -6,20% | 104,04% | 217,73% |
| 32 | 732599 | 10/12/16 | -12,11% | -4,35% | 8,72% | 11,18% | -18,49% | -5,10% | 28,65% | 4,28% |
| 33 | 732510 | 10/12/16 | -7,12% | -8,51% | -33,06% | -39,44% | -57,55% | -29,78% | -4,01% | -31,71% |
| 34 | 730419 | 13/02/16 | -35,95% | -62,86% | -67,00% | -63,68% | -54,41% | -72,85% | -19,12% | 83,09% |
| 35 | 730429 | 13/02/16 | -0,54% | -9,28% | 12,59% | 134,19% | 63,47% | -26,80% | 232,37% | 1096,76% |
| 36 | 730439 | 13/02/16 | -17,44% | -22,62% | 18,12% | -17,27% | -27,05% | -19,00% | 101,67% | 167,11% |
| 37 | 730459 | 13/02/16 | -27,21% | -60,43% | -60,38% | -62,29% | -64,26% | -52,01% | 5,30% | -0,43% |
| 38 | 722540 | 13/02/16 | -67,50% | -93,94% | -89,41% | -92,44% | -94,64% | -92,78% | -85,65% | -83,31% |
| 39 | 720890 | 13/02/16 | -64,38% | 394,11% | -83,76% | -45,37% | -88,07% | -62,58% | -2,69% | -67,33% |
| 40 | 720851 | 13/02/16 | -37,35% | -99,33% | -98,69% | -98,09% | -99,83% | -99,94% | -81,70% | -90,46% |
| 41 | 720852 | 13/02/16 | -52,69% | -99,57% | -97,40% | -98,87% | -98,90% | -99,70% | -96,77% | -98,23% |
| 42 | 730723 | 29/10/15 | -7,14% | -30,95% | -36,49% | -29,40% | -36,43% | -24,95% | 39,37% | 56,62% |
| 43 | 292429 | 30/05/15 | -14,82% | -25,05% | -20,87% | -4,73% | 0,04% | 5,32% | 87,74% | 115,75% |
| 44 | 210690 | 30/05/15 | -0,81% | 18,86% | 34,42% | 63,95% | 46,46% | 85,66% | 150,62% | 119,27% |

*Source: calculations based on the Access to Market database.*

The percentage change in imports has been calculated using the year prior to the imposition of the anti-dumping duty as the base year, with values expressed in US dollars. Our analysis shows that in the majority of cases (39 out of 44), a significant reduction in imports is confirmed, with an average decrease of 20%.

In Graph 1, the 44 cases under investigation are illustrated, showing the distribution of their percentage change between the first year (short-run) and the latest year after the measure was implemented (long-run).

**Pic.1: Destruction effect – Percentage change (%) on the first and the latest year of Anti-dumping duty implementation.**




*Source: Calculations are based on the Access to Market database.*

For all product classification codes under review, the measures have remained in force from the time of their initial imposition until the present day. The data shows that the impact of these measures are not limited to the first year after enforcement. Instead, the effect endures, though with diminishing intensity in subsequent years, as long as the measures are still in effect. In Graph 1, we see that in 28 out of 39 cases with a negative effect in the first year stay negative in the subsequent years too. Furthermore, the number of cases that seem unaffected rises from 5 to 16, although they are still far fewer than those with ongoing negative trade flows.

In the few cases where anti-dumping duties appeared to have no significant impact, explanations can be found in the international literature (Blonigen & Prusa, 2015). These instances generally involve new product categories, which are still in the early stages of their product life cycles (for the last decade such products are solar panels and electric bicycles). In these cases, accurately determining both demand and fair pricing is challenging, making it difficult to impose a duty level sufficient to curb dumping.

In the next part of our research, we provide evidence on the diversion effect. As mentioned in the literature review, it refers to cases where imports from countries subject to anti-dumping duties are replaced by imports from other countries not subject to such duties (Hoai et al., 2017; Miranda, 2013). The research by Krupp and Pollard (1996) found early

empirical support on the trade diversion effect, who found that imports from alternative import sources rose for most products subject to anti-dumping duties.

Table 2 presents the countries that experienced an increase in their exports to the EU following the imposition of the anti-dumping duty (diversion effect) and simultaneously are countries where the surplus Chinese production, which could no longer be exported to the EU, was redirected (deflection effect).

**TABLE 2: Trade Diversion & Deflection - Three main import substitution countries**

| | Classification Code | | | |
|---|---|---|---|---|
| 1 | 210690 | Indonesia | Canada | Sri Lanka |
| 2 | 285000 | South Africa | India | Malaysia |
| 3 | 292429 | India | United States | Turkey |
| 4 | 390530 | Serbia | Singapore | Japan |
| 5 | 401120 | Vietnam | Malaysia | Indonesia |
| 6 | 401212 | Thailand | India | Malaysia |
| 7 | 701990 | Bosina Herzegovina | Vietnam | Morocco |
| 8 | 720299 | Brazil | Turkey | Thailand |
| 9 | 720851 | South Korea | India | Indonesia |
| 10 | 720852 | South Korea | Indonesia | India |
| 11 | 720890 | Canada | South Korea | Serbia |
| 12 | 721050 | Vietnam | Vietnam | Philippines |
| 13 | 722511 | Japan | Brazil | India |
| 14 | 722540 | Ukraine | India | Turkey |
| 15 | 722611 | India | Serbia | Turkey |
| 16 | 730419 | Brazil | Ukraine | Thailand |
| 17 | 730429 | Singpore | Russia | Ukraine |
| 18 | 730439 | Thailand | Georgia | Azerbaijan |
| 19 | 730459 | United States | Ukraine | Belarus |
| 20 | 730723 | Malaysia | Thailand | Israel |
| 21 | 730820 | Turkey | Vietnam | Malaysia |
| 22 | 730890 | Turkey | Bosnia Herzegovina | Vietnam |
| 23 | 731812 | Malaysia | Vietnam | Philippines |
| 24 | 731814 | Indonesia | Vietnam | Turkey |

| | | | | |
|---|---|---|---|---|
| 25 | 731815 | India | UAE | Vietnam |
| 26 | 731821 | India | South Korea | Mexico |
| 27 | 731822 | India | Turkey | Thailand |
| 28 | 732510 | Tunisia | Vietnam | South Korea |
| 29 | 732599 | South Korea | Norway | Vietnam |
| 30 | 760421 | South Korea | India | Bosnia Herzegovina |
| 31 | 760429 | India | UAE | Malaysia |
| 32 | 760611 | Turkey | India | Indonesia |
| 33 | 760612 | Saudi Arabia | Indonesia | Malaysia |
| 34 | 760691 | Hong Kong | South Korea | Indonesia |
| 35 | 760692 | Saudi Arabia | India | UAE |
| 36 | 760711 | South Korea | Thailand | Malaysia |
| 37 | 760810 | Serbia | Bosnia Herzegovina | Ethiopia |
| 38 | 760820 | Egypt | Serbia | Vietnam |
| 39 | 761090 | Vietnam | Tunisia | Russia |
| 40 | 850231 | Turkey | Vietnam | Morocco |
| 41 | 854470 | Tunisia | Morocco | Indonesia |
| 42 | 854511 | India | Ukraine | Malaysia |
| 43 | 870870 | Morocco | Vietnam | Brazil |
| 44 | 871160 | Malaysia | Indonesia | Turkey |

*Source: Calculations are based on the Access to Market database.*

Both cases are suspicious and worth investigating for the possibility of trade re-routing. The set of countries appearing in Table 2 are countries that experienced an increase in trade volumes with China and the EU. It is also interesting that the countries that appear most often in the table are neighboring countries. In the international literature, it has been pointed out that, apart from geographical proximity, the similar culture or language, as well as the business culture and ethics of each country, can be of decisive importance (Nouwen, 2018; Liu and Shi, 2019).

We observe that in 16 out of 44 cases, India was one of the directly involved countries, showing clear increase in its exports to the EU and its imports from China. Other neighboring countries, such as Vietnam (15 times), Malaysia (11 times), Indonesia (10 times), South Korea (9 times) and Thailand (7 times), also appear in the list frequently. Turkey, with 11 times, and Serbia, with 5 times, also stand out on the list, despite their lack of geographic or cultural proximity to China.

Economic and regulatory factors may play a key role in Turkey and Serbia's increased

involvement. With its strategic location bridging Europe and Asia, Turkey offers a favorable environment for transshipment activities due to its advanced infrastructure and deep trade relations with the EU and non-EU countries. Turkey's Customs Union agreement with the EU may also facilitate trade flows, even if indirectly involved in re-routing activities. Similarly, Serbia, which benefits from favorable trade agreements and investment incentives for foreign businesses, could leverage its position as a transit hub. Additionally, both countries might provide more relaxed regulatory frameworks or oversight mechanisms, which could explain their frequent appearances on the list. This observation aligns with the notion that countries with less stringent customs enforcement or more flexible trade policies can be strategically used to circumvent stricter frameworks imposed by the WTO or the EU.

The following Table (Table 3) shows how the correlation of the diversion and deflection effects leads to the rerouting phenomenon.

**TABLE 3: Correlation coefficient on EU imports from third countries and Chinese exports to the same third countries.**

| | Classification Code | Correlation of the Eu imports from the named country and the Chinese exports to the same named country. (Trade Re-routing) – only for given product HS codes. | | |
|---|---|---|---|---|
| 1 | 731815 | India | UAE | Vietnam |
| | | 0,61 | 0,47 | 0,36 |
| 2 | 731821 | Mexico | South Korea | India |
| | | 0,85 | 0,21 | 0,07 |
| 3 | 761090 | Vietnam | Russia | Tunisia |
| | | 0,69 | 0,58 | 0,04 |
| 4 | 720890 | South Korea | Serbia | Canada |
| | | 0,41 | 0,12 | -0,12 |
| 5 | 720851 | Indonesia | India | South Korea |
| | | 0,97 | 0,79 | 0,48 |
| 6 | 720852 | Indonesia | South Korea | India |
| | | 0,92 | 0,71 | 0,24 |
| 7 | 871160 | Turkey | Indonesia | Malaysia |
| | | 0,84 | 0,81 | 0,71 |
| 8 | 870870 | Morocco | Vietnam | Brazil |
| | | 0,95 | 0,80 | -0,35 |
| 9 | 701990 | Vietnam | Morocco | Bosina Herzegovina |

| | | | | |
|---|---|---|---|---|
| | | 0,80 | 0,32 | 0,04 |
| 10 | 732599 | Norway | Vietnam | South Korea |
| | | 0,43 | 0,29 | 0,22 |
| 11 | 401120 | Vietnam | Malaysia | Indonesia |
| | | 0,93 | 0,76 | 0,74 |
| 12 | 401212 | India | Thailand | Malaysia |
| | | -0,18 | -0,19 | -0,27 |
| 13 | 730419 | Thailand | Ukraine | Brazil |
| | | 0,72 | 0,71 | -0,24 |
| 14 | 722540 | India | Turkey | Ukraine |
| | | 0,84 | 0,40 | -0,10 |
| 15 | 730459 | Ukraine | United States | Belarus |
| | | -0,11 | -0,33 | -0,42 |
| 16 | 730439 | Georgia | Thailand | Azerbaijan |
| | | 0,65 | -0,13 | -0,28 |
| 17 | 730429 | Ukraine | Russia | Singpore |
| | | 0,26 | 0,07 | -0,37 |
| 18 | 730723 | Malaysia | Israel | Thailand |
| | | 0,86 | 0,74 | 0,63 |
| 19 | 732510 | Vietnam | South Korea | Tunisia |
| | | 0,76 | 0,53 | 0,01 |
| 20 | 210690 | Canada | Sri Lanka | Indonesia |
| | | 0,93 | 0,93 | 0,60 |
| 21 | 292429 | India | Turkey | United States |
| | | 0,91 | 0,76 | 0,33 |
| 22 | 722511 | Brazil | India | Japan |
| | | 0,70 | 0,70 | -0,62 |
| 23 | 722611 | India | Turkey | Serbia |
| | | 0,87 | 0,37 | -0,29 |
| 24 | 390530 | Serbia | Japan | Singapore |
| | | 0,92 | 0,53 | 0,31 |
| 25 | 760421 | Bosnia Herzegovina | South Korea | India |
| | | 0,82 | 0,80 | 0,70 |

| | | | | |
|---|---|---|---|---|
| 26 | 760429 | India | UAE | Malaysia |
| | | 0,89 | 0,71 | 0,06 |
| 27 | 760820 | Serbia | Egypt | Vietnam |
| | | 0,73 | 0,37 | -0,38 |
| 28 | 760810 | Serbia | Ethiopia | Bosnia Herzegovina |
| | | 0,61 | 0,01 | -0,23 |
| 29 | 760611 | India | Turkey | Indonesia |
| | | 0,09 | 0,05 | -0,35 |
| 30 | 760612 | Malaysia | Saudi Arabia | Indonesia |
| | | 0,71 | 0,33 | 0,28 |
| 31 | 760691 | Indonesia | South Korea | Hong Kong |
| | | 0,48 | 0,14 | -0,37 |
| 32 | 760692 | UAE | India | Saudi Arabia |
| | | 0,53 | -0,14 | -0,27 |
| 33 | 760711 | Thailand | Malaysia | South Korea |
| | | 0,85 | 0,84 | 0,76 |
| 34 | 854470 | Indonesia | Morocco | Tunisia |
| | | 0,91 | 0,71 | -0,13 |
| 35 | 730820 | Vietnam | Malaysia | Turkey |
| | | 0,64 | 0,23 | 0,05 |
| 36 | 730890 | Vietnam | Turkey | Bosnia Herzegovina |
| | | 0,30 | -0,39 | -0,41 |
| 37 | 850231 | Turkey | Vietnam | Morocco |
| | | 0,21 | -0,16 | -0,25 |
| 38 | 731812 | Vietnam | Philippines | Malaysia |
| | | 0,61 | 0,58 | 0,02 |
| 39 | 731814 | Indonesia | Vietnam | Turkey |
| | | 0,89 | 0,50 | -0,74 |
| 40 | 731822 | Turkey | Thailand | India |
| | | 0,77 | 0,71 | 0,51 |
| 41 | 285000 | India | South Africa | Malaysia |
| | | 0,66 | 0,54 | 0,02 |

| | | | | |
|---|---|---|---|---|
| 42 | 720299 | Thailand | Brazil | Turkey |
| | | 0,95 | 0,94 | 0,93 |
| 43 | 854511 | India | Ukraine | Malaysia |
| | | 0,65 | 0,51 | -0,15 |
| 44 | 721050 | Philippines | Malaysia | Vietnam |
| | | 0,57 | 0,02 | -0,17 |

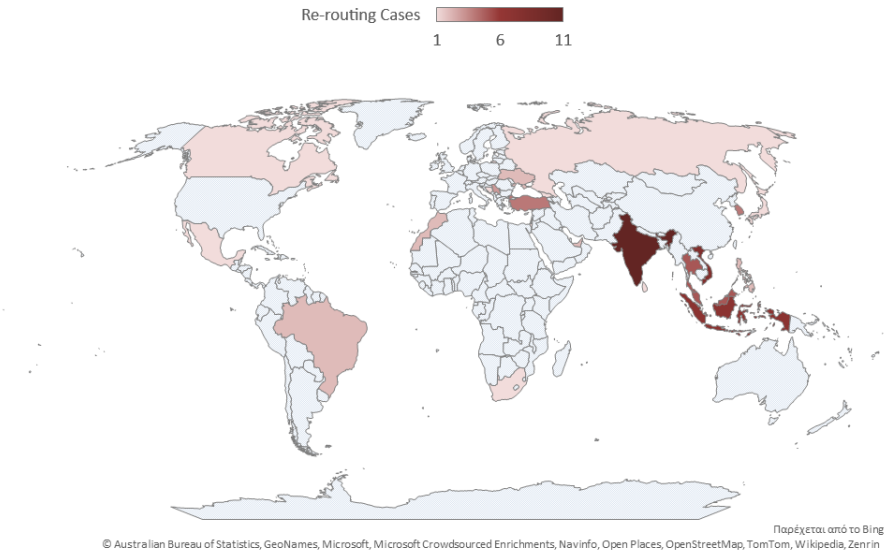
*Source: calculations based on the Comtrade database.*

Our research suggests that anti-dumping actions against China lead to a strong positive correlation between EU imports from third countries and Chinese export to the same third countries. The cases where China's exports to a third country are positively correlated with that same third country's exports to the EU clearly demonstrate the circumvention of the rules of international trade in order to illegally bypass tariff barriers, which are aimed at countering the phenomenon of dumping. The results of our analysis is based on countries mentioned in Table 2 and confirms that among those countries involved in diversion and deflection effect there is a number of cases that are actively related to rerouting phenomenon and plays the role of the intermediary country that is willing to facilitate the evasion of the antidumping duty imposed by the EU authorities.

According to our analysis there are 24 out of 44 case where there is at least one country with very high correlation coefficient, higher that 0,7. That means that at least one country is used as an intermediary to channel the exact same goods into the European market, but free from the anti-dumping duties imposed. In 16 out of the 24 cases mentioned above there are two countries with high correlation coefficient, and also for 5 cases there are at least three countries willing to facilitate trade re-routing, contributing to the circumvention of fair trade.

In the following graph (Graph 2) we can see all the countries engaged in trade re-routing between China and EU concerning the 44 HS classification codes under investigation with correlation coefficient more than 0,5.

Pic 2: **Countries involved in Re-routing activities - Chinese export to EU.**




*Source: calculations based on the Comtrade database.*

| **Involved Country and re-routing Cases per Country** | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| India | 11 | South Korea | 4 | Philippines | 2 | Georgia | 1 | South Africa | 1 |
| Vietnam | 8 | Turkey | 4 | UAE | 2 | Israel | 1 | Sri Lanka | 1 |
| Indonesia | 7 | Serbia | 3 | Ukraine | 2 | Japan | 1 | | |
| Malaysia | 5 | Brazil | 2 | Bosnia Her. | 1 | Mexico | 1 | | |
| Thailand | 5 | Morocco | 2 | Canada | 1 | Russia | 1 | | |

There are 66 instances where a country is engaged in trade re-routing activities, with a correlation coefficient exceeding 0,5. Our analysis suggests that 22 countries actively participate in re-routing trade from China to the EU. Some countries are consistently involved, while others participate more sporadically. Notably, neighboring countries, particularly India and those from Southeast Asia, emerge as the most frequent participants in these activities. This trend highlights the strategic geographic positioning and established trade networks that likely facilitate their recurring involvement in trade rerouting practices and are in line with findings in related researches (Nouwen, 2018; Liu and Shi, 2016).

In the following table (Table 4) the level of duties has been adjusted to be used in the calculations. In particular, for duties with the possibility of imposing two extreme rates,

a high rate, and a low rate, we have considered those who are not required to provide supporting documents. There are measures that provide preferential customs duties if all safeguards are taken. Also, for the duties expressed in monetary value per piece or per weight (and not as a percentage rate on the import price), an adjustment was made to be comparable with the other data and is expressed in a percentage rate based on the average import price in Europe.

**TABLE 4: Duty level (%) correlation to Trade Re-routing.**

| | Duty Level (%) | Classification Code | 1st higher correlation | 2nd higher correlation | 3rd higher correlation |
|---|---|---|---|---|---|
| 1 | **88,00%** | 854470 | 0,91 | 0,71 | -0,13 |
| 2 | **86,50%** | 731821 | 0,85 | 0,21 | 0,07 |
| 3 | **86,30%** | 731814 | 0,89 | 0,50 | -0,74 |
| 4 | **86,30%** | 731822 | 0,77 | 0,71 | 0,51 |
| 5 | **79,00%** | 401120 | 0,93 | 0,76 | 0,74 |
| 6 | **74,90%** | 854511 | 0,65 | 0,51 | -0,15 |
| 7 | **74,00%** | 720851 | 0,97 | 0,79 | 0,48 |
| 8 | **74,00%** | 720852 | 0,92 | 0,71 | 0,24 |
| 9 | **74,00%** | 722540 | 0,84 | 0,40 | -0,10 |
| 10 | **73,70%** | 720890 | 0,41 | 0,12 | -0,12 |
| 11 | **73,00%** | 390530 | 0,92 | 0,53 | 0,31 |
| 12 | **69,00%** | 701990 | 0,80 | 0,32 | 0,04 |
| 13 | **67,00%** | 730723 | 0,86 | 0,74 | 0,63 |
| 14 | **62,00%** | 871160 | 0,84 | 0,81 | 0,71 |
| 15 | **59,00%** | 210690 | 0,93 | 0,93 | 0,60 |
| 16 | **59,00%** | 292429 | 0,91 | 0,76 | 0,33 |
| 17 | **55,00%** | 730419 | 0,72 | 0,71 | -0,24 |
| 18 | **55,00%** | 730459 | -0,11 | -0,33 | -0,42 |
| 19 | **55,00%** | 730439 | 0,65 | -0,13 | -0,28 |
| 20 | **55,00%** | 730429 | 0,26 | 0,07 | -0,37 |
| 21 | **50,70%** | 720299 | 0,95 | 0,94 | 0,93 |
| 22 | **46,00%** | 721050 | 0,57 | 0,02 | -0,17 |
| 23 | **39,60%** | 731812 | 0,61 | 0,58 | 0,02 |
| 24 | **39,60%** | 731815 | 0,61 | 0,47 | 0,36 |
| 25 | **38,10%** | 732510 | 0,76 | 0,53 | 0,01 |

| | | | | | |
|---|---|---|---|---|---|
| 26 | **37,00%** | 722511 | 0,70 | 0,70 | -0,62 |
| 27 | **37,00%** | 722611 | 0,87 | 0,37 | -0,29 |
| 28 | **32,00%** | 761090 | 0,69 | 0,58 | 0,04 |
| 29 | **32,00%** | 760421 | 0,82 | 0,80 | 0,70 |
| 30 | **32,00%** | 760429 | 0,89 | 0,71 | 0,06 |
| 31 | **32,00%** | 760820 | 0,73 | 0,37 | -0,38 |
| 32 | **32,00%** | 760810 | 0,61 | 0,01 | -0,23 |
| 33 | **31,50%** | 285000 | 0,66 | 0,54 | 0,02 |
| 34 | **30,00%** | 760711 | 0,85 | 0,84 | 0,76 |
| 35 | **24,60%** | 760612 | 0,71 | 0,33 | 0,28 |
| 36 | **22,60%** | 401212 | -0,18 | -0,19 | -0,27 |
| 37 | **22,00%** | 870870 | 0,95 | 0,80 | -0,35 |
| 38 | **19,20%** | 730820 | 0,64 | 0,23 | 0,05 |
| 39 | **15,50%** | 732599 | 0,43 | 0,29 | 0,22 |
| 40 | **14,30%** | 760692 | 0,53 | -0,14 | -0,27 |
| 41 | **14,30%** | 760691 | 0,48 | 0,14 | -0,37 |
| 42 | **14,30%** | 760611 | 0,09 | 0,05 | -0,35 |
| 43 | **7,50%** | 730890 | 0,30 | -0,39 | -0,41 |
| 44 | **7,50%** | 850231 | 0,21 | -0,16 | -0,25 |

*Source: Calculations are based on the Comtrade database.*

Testing the first Hypothesis, we see that the parametric Pearson's Correlation cannot be implemented as the assumption that the aforementioned variables follow the normal distribution must be rejected (the p-value (Sig.) for both variables is less than 5%). Specifically, we have that p-value=0,046<0,05 for the tariff level, and for the Correlation, p-value=0,003<0,05). Consequently, we can't use the parametric Pearson's Correlation so we will continue with the non-parametric Kendall and Spearman correlations. In the following table (Table 5) we see the results for the non-parametric correlations.

**TABLE 5: Non-parametric Kendall and Spearman correlations.**

| Correlations | | | | |
|---|---|---|---|---|
| | | | Tariff level | Correlation with 1 country |
| Kendall's tau_b | Tariff level | Correlation Coefficient | 1,000 | ,366** |
| | | Sig. (2-tailed) | . | ,001 |
| | | N | 41 | 41 |
| | Correlation with 1 country | Correlation Coefficient | ,366** | 1,000 |
| | | Sig. (2-tailed) | ,001 | . |
| | | N | 41 | 41 |
| Spearman's rho | Tariff level | Correlation Coefficient | 1,000 | ,504** |
| | | Sig. (2-tailed) | . | ,001 |
| | | N | 41 | 41 |
| | Correlation with 1 country | Correlation Coefficient | ,504** | 1,000 |
| | | Sig. (2-tailed) | ,001 | . |
| | | N | 41 | 41 |
| **. Correlation is significant at the 0.01 level (2-tailed). | | | | |

As we can see, Kendall's and Spearman's correlations have indicated a statistically significant positive correlation between Tariff level and Correlation with one country. Specifically, Kendall's correlation coefficient is 0,366, which shows a low tense positive correlation and p-value=0,001<0,05. Thus, we reject the null hypothesis that there is no linear correlation. Respectively, Spearman's correlation is 0,504, indicating a middle-class correlation and p-value = 0,001<0,05. Thus, we reject again the null hypothesis.

Finally, we run an ordinal logistic regression to test the second Hypothesis that as the level of anti-dumping duties increases, the likelihood of using multiple intermediary countries for trade re-routing increases. We notice that most cases of duty level fall into one and two countries involved, while the no countries involved level and the three or more countries have fewer cases than the other two. Also, we test the null hypothesis that there's no statistically significant improvement in the fit of the final model (i.e., the model that

contains the full set of predictors) relative to the intercept-only model (i.e., the null model). Still, we reject it since p-value=0,001<0,05. This indicates that the predictors fit well in the final model (Table 6).

**TABLE 6: Model Fitting Information.**

| Model Fitting Information | | | | |
|---|---|---|---|---|
| Model | -2 Log Likelihood | Chi-Square | df | Sig. |
| Intercept Only | 98,771 | | | |
| Final | 88,101 | 10,670 | 1 | ,001 |
| Link function: Logit. | | | | |

The previous conclusion is enhanced as well from the Pearson and Deviance tests, which test the null hypothesis that the model is a good fit for the data since there is no significant result from the chi-square test because p-value=0,2>0,05 and p-value=0,673>0,05 (table 7).

**TABLE 7: Model Fitting Information.**

| Goodness-of-Fit | | | |
|---|---|---|---|
| | Chi-Square | df | Sig. |
| Pearson | 90,407 | 80 | ,200 |
| Deviance | 73,839 | 80 | ,673 |
| Link function: Logit. | | | |

Also, the Pseudo R-Squared shows how much improvement in the prediction has been made, based on the predictors in comparison to the null model. For the ordinal logistic regression we use the value of McFadden which is 0,09, meaning that there is 9% improvement in the full model (Table 8).

**TABLE 8: Pseudo R-Square.**

| Pseudo R-Square | |
|---|---|
| Cox and Snell | ,215 |
| Nagelkerke | ,231 |
| McFadden | ,090 |
| Link function: Logit. | |

For the parameter estimates, the null hypothesis that is being tested is that there is no association between the response (Countries involved) and the predictor (Duty Level). From the test we found that the null hypothesis is being rejected and thus the Duty Level is a significant positive predictor in the model (p-value=0,002<0,05). For every one unit increase of the duty level, there is a predicted increase of 4,007 in the log-odds of a country to be in a higher category of how many countries are involved. This means that if country gets a higher duty it is most likely that this country is involved with two other countries in re-routing.(Table 9).

**TABLE 9: Parameter estimates.**

| Parameter Estimates | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | Estimate | Std. Error | Wald | df | Sig. | 95% Confidence Interval | |
| | | | | | | | Lower Bound | Upper Bound |
| Threshold | [Countries = ,00] | ,266 | ,632 | ,177 | 1 | ,674 | -,973 | 1,505 |
| | [Countries = 1,00] | 1,896 | ,689 | 7,566 | 1 | ,006 | ,545 | 3,246 |
| | [Countries = 2,00] | 3,839 | ,864 | 19,755 | 1 | ,000 | 2,146 | 5,532 |
| Location | DutyLevel | 4,007 | 1,294 | 9,586 | 1 | ,002 | 1,470 | 6,543 |
| Link function: Logit. | | | | | | | | |

The ordinal logistic regression model assumes that the relationship between all independent variables is the same "across all possible comparisons" involving the dependent variable—referring to Proportional Odds. The test of parallel lines examines this particular null hypothesis and reveals that the hypothesis can't be rejected since the result is non-significant. Thus, we interpret the results to mean the assumption is satisfied (p-value=0,942>0,05, Table 10).

**TABLE 10: Test of Parallel Lines.**

| Test of Parallel Lines[a] | | | | |
|---|---|---|---|---|
| Model | -2 Log Likelihood | Chi-Square | df | Sig. |
| Null Hypothesis | 88,101 | | | |
| General | 87,983 | ,119 | 2 | ,942 |
| The null hypothesis states that the location parameters (slope coefficients) are the same across response categories. | | | | |
| a. Link function: Logit. | | | | |

Therefore, all four assumptions made in the beginning are met. Thus, we can conclude that as anti-dumping duties increase, the likelihood of using multiple intermediary countries for trade re-routing also increases.

## 4. Discussion

Our research findings indicate that the level of those duties directly influences the intensity of the re-routing phenomenon in response to antidumping duties. Specifically, the rerouting phenomenon becomes more intense when the antidumping duty is high. However, when the antidumping duty is low, the re-routing phenomenon may be less intense or even absent. Also, when the antidumping duty is high, multiple countries are more likely to be involved in rerouting activities.

Our research underscores that when antidumping duties are set at higher levels, companies are more likely to explore alternatives, such as rerouting, to mitigate the financial impact of these duties. This phenomenon is driven by the substantial cost savings realized by avoiding high duties. As duty rates increase, the incentive for rerouting grows, leading to a more pronounced occurrence of this practice. Several reasons contribute to this pattern. First, when antidumping duties are high, the financial incentives for rerouting become more significant. Though rerouting involves extra costs and risks, such as transportation and logistics expenses, potential legal consequences, and the need for more complex supply chains, companies are more likely to absorb these costs when the savings from avoiding high duties outweigh them.

Conversely, when antidumping duties are lower, the financial incentive for rerouting weakens. The potential cost savings may not justify the risks and logistical complexities involved in such cases. As a result, the incidence of rerouting diminishes or may not occur at all. This variation in company behavior reflects firms' rational calculus when confronted with trade barriers. When the costs of rerouting, such as transportation, logistics, and legal risks, outweigh the relatively low antidumping duty, companies become more financially viable to simply pay the duty or seek other markets for their products.

## 5. Limitations

The limitations in research related to anti-dumping duties primarily concern the reliability of trade flows between involved countries. These challenges include intentional or accidental misclassification of products, falsification of product origin, and manipulation of goods' values (e.g., underpricing), which can distort trade data and obscure the accuracy of research results that rely on trade volumes and values.

The complexity and multifaceted nature of accurately classifying products in international trade, which poses significant challenges for customs officials and trade authorities,

is crucial. Proper classification requires a deep understanding of the product's characteristics, components, and intended use, as well as familiarity with the varying classification systems used across different countries.

Moreover, the falsification of product origin and trade value can further hinder research efforts. Customs officials, while guided by specific rules, may need to make discretionary decisions based on incomplete or ambiguous information. This subjectivity introduces the risk of accepting false information about the products, either unintentional or deliberate, leading to errors in tariff application and trade compliance.

Given the substantial financial consequences that classification, origin, and value errors can have in international trade, these limitations represent major hurdles for current and future research. Addressing these issues is essential to improving the accuracy of research data in the field.

## 6. Directions for future research

One potential area for future research is to investigate the extent to which companies intentionally misclassify products to evade higher antidumping duties. By strategically categorizing goods under different codes, companies can reduce costs and undermine trade regulations to ensure fair competition. Research could focus on how prevalent this practice is in industries most impacted by antidumping measures and how it affects trade compliance. Future studies could also focus on assessing the current state of international collaboration in combating misclassification and exploring ways to foster more robust cooperation between customs authorities. This includes examining the role of information sharing, cross-border communication, and joint enforcement efforts in detecting and addressing misclassification cases. By identifying weaknesses in existing systems, future research can contribute to the development of more resilient and efficient enforcement strategies aimed at reducing errors and combating intentional misclassification in global trade.

## 7. Conclusion

Companies, as rational economic units, are primarily motivated by the objective of profit maximization. Their decision-making processes is, therefore, heavily influenced by a careful assessment of the costs, risks, and potential benefits of their actions. This reflects the idea that companies will only adopt strategies like re-routing when the expected benefits, such as cost savings or improved market access, are greater than the risks and expenses involved.

This research highlights the correlation between the level of anti-dumping duties with the intensity of trade re-routing activities and the potential involvement of multiple countries. In conclusion, our analysis shows that higher anti-dumping duties tend to escalate the

complexity and involvement of intermediary countries in the re-routing process. The study confirms that, when anti-dumping duties increases, companies are more likely to engage in sophisticated re-routing practices to evade these financial barriers. This behavior is driven by the potential cost savings that outweigh the associated risks and logistical complexities, allowing firms to maintain access to international markets despite the imposed duties.

## 8. Scientific and practical implementations

From a scientific perspective, this research contributes to the existing literature by quantifying the impact of anti-dumping duties on re-routing practices and identifying key factors, such as duty level and intermediary country involvement. In terms of practical implementation, the findings offer crucial insights for policymakers. The study suggests that anti-dumping measures should be designed with careful consideration of duty levels to minimize the risk of trade re-routing. Setting anti-dumping duties too high may incentivize evasive practices, while lower, well-calibrated duties could reduce the incentive for circumvention. Additionally, strengthening international cooperation and enhancing enforcement mechanisms are essential to effectively counter re-routing activities and ensure compliance with global trade regulations.

By addressing these challenges, trade authorities can promote fair competition, protect domestic industries, and enhance the integrity of the international trading system. This research serves as a foundation for future policy development to improve the detection and prevention of anti-dumping duty evasion.

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Appendix 1

| | Investigation number | Initiation date | Subject product | HS Section | HS code |
|---|---|---|---|---|---|
| 1 | AD683 CN | 24/09/2021 | Electrolytic chromium coated steel | XV | 721050 |
| 2 | AD680 CN | 17/02/2021 | Certain graphite electrode systems | XVI | 854511 |
| 3 | AD679 CN | 18/02/2021 | Calcium silicon | XV | 720299 |
| 4 | AD676 CN | 21/12/2020 | Certain Iron or Steel Fasteners | XV | 731814, 731812, 731822 731821, 731815 |
| 5 | AD674 CN | 21/10/2020 | Steel wind towers | XV | 850231, 730890, 730820 |
| 6 | AD673 CN | 22/10/2020 | Aluminium converter foil | XV | 760711 |
| 7 | AD669 CN | 24/09/2020 | Optical fibre cables | XVI | 854470 |
| 8 | AD668 CN | 14/08/2020 | Aluminium flat-rolled products | XV | 760692, 760691, 760612 760611 |
| 9 | AD664 CN | 14/02/2020 | Aluminium extrusions | XV | 761090, 760810, 760820 760429, 760421 |
| 10 | AD658 CN | 12/08/2019 | Certain hot rolled stainless steel sheets and coils | XV | - |
| 11 | AD654 CN | 30/07/2019 | Certain polyvinyl alcohol (PVA) | VII | 390530 |
| 12 | AD653 CN | 21/02/2019 | Certain woven and/or stitched glass fibre fabrics | XIII | 701990 |
| 13 | AD652 CN | 15/02/2019 | Steel road wheels | XVII | 870870 |
| 14 | AD643 CN | 20/10/2017 | Electric bicycles | XVII | 285000, 871160 |
| 15 | AD640 CN | 11/08/2017 | New and retreaded tyres for buses or lorries | VII | 401212, 401120 |
| 16 | AD639 CN | 09/12/2016 | Certain corrosion resistant steel | XV | - |
| 17 | AD637 CN | 10/12/2016 | Certain cast iron articles | XV | 732599, 732510 |
| 18 | AD632 CN | 13/02/2016 | Certain seamless pipes and tubes of iron | XV | 730419, 730429, 730439 730459 |
| 19 | AD631 CN | 13/02/2016 | Heavy plates of non-alloy or other alloy steel | XV | 720890, 720851 |
| 20 | AD630 CN | 13/02/2016 | Hot-rolled flat products of iron, non-alloy or other alloy steel | XV | 720852, 722540 |
| 21 | AD622 CN | 29/10/2015 | Stainless steel tube and pipe butt-welding fittings, whether or not finished | XV | 730723 |

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|---|---|---|---|---|---|
| 22 | AD620 CN | 14/05/2015 | Cold-rolled flat steel products | XV | - |
| 23 | AD621 CN | 30/05/2015 | Aspartame | VI | 292429 |
| 24 | AD611 CN | 04/09/2014 | Acesulfame potassium (ACE-K) | VI | 210690 |
| 25 | AD608 CN | 14/08/2014 | Grain-oriented flat-rolled products of silicon electrical steel (GOES) | XV | 722511, 722611 |
| 26 | AD607 CN | 26/06/2014 | Stainless steel cold-rolled flat products | XV | - |