Honors Thesis: Does Anti-Dumping Follow the Flag?
A political economy model of anti-dumping on a national scale

Jem Ruf

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ABSTRACT

Anti-dumping duties are an interesting — and arguably under-scrutinized — element of trade protection policy. In the United States, anti-dumping cases are filed by domestic industries (the petitioning phase) and investigated jointly by the Department of Commerce and the International Trade Commission (the investigatory phase). The United States government insists that this process is completely unaffected by political (or, in the case of this paper, geopolitical) considerations, but an analysis of the literature and the data suggests otherwise. I contribute three main findings. First, I find with a probit model of ITC preliminary injury decisions that indeed, there may be geopolitical factors "baked into" the AD process. Second, I find that there may be a supply and demand relationship between filings and probability of affirmative injury finding regarding Japan, but there is no evidence for such a relationship regarding China. Third, with respect to the petitioning phase, I find with a Poisson model of annual case filings per-country, per-year, that US firms file more cases against countries that are sanctioned in the year including or immediately after said sanction at the 5% significance level. In other words, firms may respond to periods of geopolitical tension by filing more anti-dumping cases against a geopolitical "enemy." I also pose that this result may be generalizable to total US anti-dumping filings per year, and suggest future avenues for research.

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1. Introduction

Recently, anti-dumping, countervailing duties and safeguards (also known as trade remedies or administered protection) have been at the center of an existential crisis in the WTO. The United States, dissatisfied with the appellate body's rulings on these types of cases, has suspended the reappointment of appellate body officials: thus suspending the body itself (Bown, 2022). This crisis has induced a broader re-evaluation of trade remedies and their role in international trade policy. Specifically, trade remedies are being scrutinized as potential vehicles for countries to retaliate against one another geopolitically under the pretense of economics. Many of these critiques have focused on China, which as Bown (2022) writes, appears to see "trade remedies as one more tool to use to signal displeasure with other, non-economic policies." The instant paper, however, attempts to turn the telescope toward the United States — one of the countries with the most transparent trade remedy processes — and probe the question of whether trade remedies (specifically anti-dumping cases, for which the data is most abundant) are used as a tool for geo-political retaliation.

The reasoning behind the focus on the US follows from Blonigen (2003); if there are retaliatory geo-political elements in the anti-dumping process in a country with transparent investigatory procedures and relatively detailed laws, then likely these geopolitical elements affect other countries. This paper contributes to the literature in several ways. First, this paper synthesizes existing research and proposes a unique framework to analyze the factors that affect the US anti-dumping process on a macro (national) scale, specifically with the intent to parse out potential geopolitical elements in the process, using sanctions against foreign countries as the geopolitical catalyst. [1] Second, I modify the approach of Hansen (1990) who proposed a "supply" and "demand" schema to understand anti-dumping. I analyze the "supply" of protection with a probit model of initial AD injury rulings by the ITC. I analyze "demand" with a Poisson regression model of annual antidumping filings by US industries. Third, the paper analyzes antidumping data from 1980 to 2019, which includes over 1400 individual case filings; much of the previous literature is limited to anti-dumping in the 1980s and 1990s. The analysis of the last twenty years of data complicates some of the earlier conclusions made by researchers regarding

[1] Hansen (1990), mentions the "national" level as a key way to understand trade policies.

the relationships between certain macroeconomic criteria and anti-dumping filings. The paper will begin with the origins of anti-dumping in the United States, and will then focus on the political elements of the anti-dumping process in the ITC initial injury ruling phase and the petitioning (filing) phase. Lastly, the focus will shift towards the analysis of two econometric models: a probit model of ITC decision-making, and a Poisson regression model of annual US cases filed per country per year.

2. (geo)Political origins?

Dumping, according to US Trade Statues, is a form of "international price discrimination, whereby goods are sold in one export market (such as the United States) at prices lower than the prices at which comparable goods are sold in the home market of the exporter, or in its other export markets."[2] Officials in the Department of Commerce and the International Trade Commission (in charge of investigating and remediating cases of dumping) insist that this process is completely apolitical.[3] But to probe the question of the geopolitical nature of anti-dumping processes, it is important to examine the historical contexts in which the process has evolved.

The early rhetoric around anti-dumping was by no means purely focused on the dry economics of the issue. Canada instituted the first anti-dumping law in 1904, when Canadian steel was being underpriced by the US Steel Corporation. The Canadian foreign minister described this dumping as "evil" (Finger, 1991). Indeed, early discussions of dumping depicted the practice as sinister and predatory; the first US anti-dumping law (1916) was a criminal statute with criminal punishments and specified that petitioners must show that the foreign firm had a "predatory intent" to limit or restrain competition (Irwin, 2005).

In the United States, anti-dumping law as we currently know it derives from the Tariff Act of 1921. Britain also created an anti-dumping law in 1921, and Finger (1991) posits that this increase in interest surrounding anti-dumping was partially due to increased hostility toward Germany following World War 1: "combined with the popular conviction that German enterprises were particularly vicious perpetrators of predatory dumping" (p. 9). While the

[2] The US Trade Statues used for this paper was the 1995 edition.
[3]Indeed, the International Trade Commission Website, includes the FAQ question of: What role, if any, does politics play in CVD and AD proceedings? Their answer begins emphatically with: "None."

statutory language of the 1921 law is much more aseptic than its 1916 predecessor — rather than "predatory intent" the standard was "less than fair value" or LFV — it is clear that the 1921 law (the basis of current anti-dumping law) was produced in a geo-politically charged environment.

Indeed, other (more current) changes to the legal framework of anti-dumping have also been produced in geopolitically-charged environments. The Trade Act of 1979 created the modern framework for AD determinations: whereby the investigation and administration of cases are executed jointly by the ITC and the DOC. The impetus for this change, as argued by Baldwin and Moore (1991), was that Congress was dissatisfied with the lack of implementation of protection by the previous administrator of trade remedies: the Treasury Department.[4] Indeed, the desire for more protection was so great that, initially, Congress wanted to exclude from the anti-dumping code "the requirement that imports be the principal cause of material injury"(p. 257). The US was forced to include a material injury clause by other participants in the 1979 Tokyo Round of multilateral trade negotiations of GATT members. With this in mind, it is reasonable to view the material injury requirement as reluctantly-included.

One of the most significant legal changes to the AD process was the 1984 Trade Act, which requires that, in cases where the AD petition involved imports from multiple countries, the ITC cumulates all of these imports to assess the impact on the domestic industry. Knetter and Prusa (1996) found that mandated cumulation "dramatically increased the likelihood that the ITC will grant US industries protection" (p. 26). Price (1985) notes that the cumulation requirement was perceived as a protectionist measure, even as President Reagan touted the bill as an example of America's commitment to free trade. Indeed, as Furse (2022) notes:

> The Reagan administration was particularly alert about maintaining American power in the global economy in the face of Japanese competition (Meinderts 2020). Even as Reagan advocated free trade, the administration and congress enforced trade barriers on imported textiles, auto parts, semiconductors, motorcycles, sugar, and steel.

[4] For en excellent glimpse into criticism of trade remedies in the 1990s see *Down in the Dumps: Administration of Unfair Trade Laws (1991)*

Administered protection (and, more specifically, anti-dumping) is theoretically separate from any political or geopolitical considerations, but the (geo)political contexts of the statutory development of anti-dumping law make it difficult to believe that anti-dumping (henceforth referred to as AD) processes and geopolitics are like oil and water.

3. Material injury: "I know it when I see it."

There are essentially two stages to the anti-dumping process. First, domestic industries file joint petitions with the Department of Commerce and the International Trade Commission. Next, the DOC and ITC investigate the claim. As part of this investigation, the ITC makes a preliminary determination of whether "there is a reasonable indication that an industry in the United States is materially injured or is threatened with material injury, or the establishment of an industry in the United States is materially retarded, by reason of imports of the merchandise which is the subject of the investigation."[5] To obfuscate matters even more, the definition of "material injury" according to section 771(7) of the 1930 Tariff Act is "harm which is not inconsequential, immaterial, or unimportant."[6] As was mentioned earlier, the main economic criterion that the ITC must consider is the causal link between relevant imports and injury to the domestic industry, but in assessing this link the ITC also must consider: "output, sales, market share, profits, productivity, return on investments, utilisation of capacity, cash flow, inventories, employment, wages, growth, ability to raise capital, investment, and any factors affecting the U.S. price" (Shin, 1994). The abundance and diversity of economic indicators has promoted skepticism about whether the material injury determination actually arises from industry-specific economic conditions, or if perhaps material injury is being found based on broader macroeconomic conditions. Indeed, one can imagine that if the ITC *seeks* to find material injury, they, upon examining the 15 variables outlined above, *shall find* material injury. Finger (1991) proposes that this "complexity camouflages opportunity for abuse" (p. 35).

Kaplan (1991) validates this assertion with his finding that "agency [ITC] discretion is paramount: there is no precise formula for when material injury is by reason of dumped imports" (qtd. in Blonigan & Prusa 2001, p. 22). Indeed, Kaplan goes so far as to conclude that the ITC's

[5] *Antidumping and Countervailing Duty Handbook* 2015, II-5.
[6] US Trade Statutes (1995).

approach to determining material injury or the "threat of material injury" is more akin to Justice Stuart Potter's famous definition of pornography: I know it when I see it.

Thus, in addition to the ambiguity of the statutory language regarding material injury, the abundance of economic criteria considered, and the evidence that the ITC's processes are subjective in determining material injury, I submit that the preliminary ITC injury determination is particularly vulnerable to political or geo-political discretion because it is the first step in a multi-layered process. In other words, the ITC may have more "wiggle room" for discretion because the case moves onto the DOC for an initial determination of whether "less than fair value sales" exist; if the DOC disagrees, it will issue a negative ruling, and the ITC is not the last investigating body to make the call; the consequences for overzealousness are thus very small.

Moreover, the ITC commissioners themselves are the ones making the final rulings, after they receive reports from a team of technocrats. Commissioners are usually people who have had experience in government to some degree, and have political affiliations. While many come from technical backgrounds, they are not all economists or statisticians. Indeed, Brook (2007) asks why ITC commissioners (presented with the same technical information) make different decisions, and posits that the individual political affiliation of commissioners may explain this discretionary aspect. Thus, there is considerable question whether the implementation of anti-dumping statutes is as apolitical ITC suggests (Hansen & Prusa, 1997): both on the domestic level, and the national (geopolitical) level.

Several other papers have pointed out the discretionary and political elements of the decision-making process. Hansen (1990) broke ground by analyzing the domestic political factors that influence ITC decision making, finding that industries with representatives on the House Ways and Means committee were more likely to receive protection. Hansen (1990) also proposed that it is important to examine the supply of protection (the rulings of the ITC and the DOC) and the demand for protection (the annual filings by US industries). The logic behind this is that US industries could be filings AD cases selectively, with the notion that they will more likely receive protection. Indeed, there is evidence for this supply/demand relationship between AD filings and ITC rulings. As mentioned earlier, Hansen and Prusa (1997) found that the 1984 cumulation requirement enhanced the probability that the ITC makes affirmative injury determinations (supply). On the demand side, Irwin (2005) finds that the 1984 legal change also

increased annual case filings (since filing more petitions against multiple countries enhanced the probability of affirmative finding).

In addition to verifying Hansen's (1990) result, Hansen & Prusa (1997) expand on this idea, concluding that PAC contributions have a positive effect on an industry's prospects for protection: "Our results imply, at least with respect to trade policy, that even though Congress has statutorily delegated decision making, it retains strong influence over actual policy decisions" (p.23). This logic follows from Hansen's (1990) congressional dominance theory of ITC behavior in which ITC decisions are influenced by Congressional attitudes because the organization is funded and authorized by Congress, and is also part of a broader network of government agencies (p.28).

Thus, I posit that the evidence suggests that, theoretically, there is room for geopolitics to enter the ITC decision-making process. Indeed, Hansen & Prusa (1997) suggest this explicitly: "those filing against countries with which the U.S. has security alliances might find that policymakers are subject to pressure from the State Department and Executive branch to deny protection" (p.2). In other words, it is possible that decision-makers at the ITC are pressured by State Department officials to make injury determinations consistent with pre-existing alliances or (conversely) make injury determinations as geopolitical retaliation.

4. Geopolitical response in the petitioning phase

AD cases in the United States are initiated once the affected industry files a joint petition with the DOC and the ITC. Clearly, the geopolitical aspects of a collection of businesses filing a case against a country are fundamentally different from those described in the "second stage" — in which ITC commissioners are constrained by standards that theoretically must be met (though, as the literature suggests it seems these standards may be flexible enough to allow for geopolitical retaliation). The question for this next section of the paper is whether a period of geopolitical rancor could induce US industries to initiate anti-dumping petitions against the geopolitical "foe" — ostensibly separate from economic conditions that otherwise would lead to an increase in anti-dumping petitions in a given year. An insight by Finger (1991) suggests this is indeed possible: "In the end, 'dumping' has no meaning other than the cumulation of circumstances in which the politics of the immediate problem have exploited the flexibility of the

underlying structure to rationalize action against imports"(p. 28). In other words, would geopolitical events, like Tiananmen Square and its subsequent sanction, deteriorate the brand name of China enough to induce US firms to retaliate in a relatively flexible and low-risk way: initiating an anti-dumping investigation with the DOC and the ITC against China?

In this context, anti-dumping investigations would be analogous to mini-sanctions imposed by private entities without any real economic consequences. It seems that there is some anecdotal evidence that supports this hypothesis.

5. Anecdotal evidence for the use of anti-dumping measures as geopolitical retaliation

Gallup poll data on the unfavorability of China is a useful way to the American public's perception of China. In other words, poll data can allow us to examine whether antidumping filings may be related to general "negative sentiment" against a country.

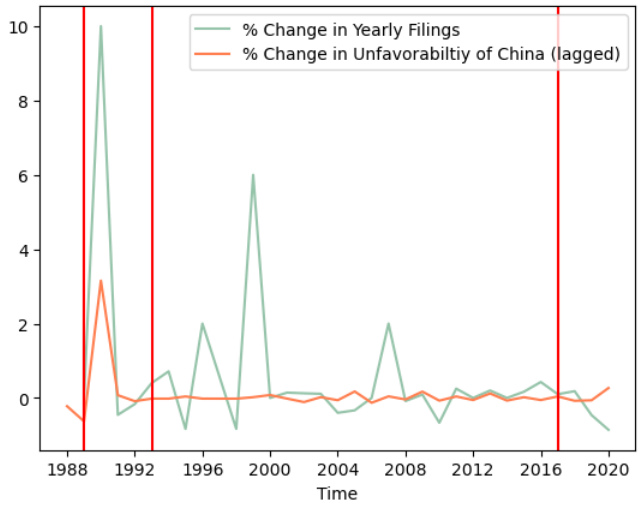

Figure 1: Unfavorability of China & Yearly Filings against China (US, 1988-2020). *Source: Gallup & World Bank AD Database*

Figure 1 displays the percent change in yearly US AD filings against China, and the percent change in the unfavorability of China in the US. There seems to be a somewhat elastic relationship between the two variables. Additionally, the vertical red lines display years in which the US government sanctioned China: 1989, 1993, and 2017. Notably, not all of the sanction years seem to precipitate a spike in unfavorability and thus anti-dumping filings, but the spikes in 1989 and 1993 indicate that sanction years may be a useful measure of geopolitical tension with

China. However, the question is whether sanctions may be a valid measure of tension that translates into increased anti-dumping activity beyond the case study of China. In other words, does a US sanction induce geopolitical tension that thus causes US firms to react to the "opponent" country?

There is evidence that, indeed, geopolitical risk is relevant to overall business activity. Cavalla and Iacoviello (2018) find that geopolitical risk (as measured by the frequency of news articles of select news sources in the US and the UK about geopolitical risk) negatively impacts several macroeconomic factors, including employment. Given that Irwin (2005) finds that unemployment and annual US AD filings are positively related, there is a possible relationship between geopolitical tension, employment, and anti-dumping filings.

To test the relationship between overall unfavorability and AD filings, I regressed the log of annual AD filings against China on the log of total unfavorability of China (lagged by one year).The resulting coefficient measures the elasticity of antidumping filings to the previous year's percentage of poll respondents who said China was either very or somewhat unfavorable. The elasticity is 1.322 with a p-value of 0.0113. While one couldn't justify this as a causal relationship, it certainly provides anecdotal evidence that anti-dumping petitions may reflect some overall dissatisfaction with another country, which in turn may be catalyzed by periods of geopolitical tension (for the purposes of this paper, measured by US sanctions against foreign countries).

6. Explanatory Variables

The variables specified in this model are broken up into three categories that I believe are relevant to a political economy analysis of the supply and demand of antidumping measures on the national level.

Sanction Variables

First, as mentioned previously, I hypothesize that sanctions would be a useful variable to consider as a measure of geopolitical tension between the US and another country. On the side of "supplying" protection, I posit that sanctions could affect the ITC's initial determinations of injury (because the ITC is a bureaucratic arm of the government and could possibly be affected

by a sanction administered by another, closely-related, government bureaucracy: the US Department of Treasury). On the demand side of protection, I posit that US industries could react to the geopolitical tension produced by sanctions and thus file more anti-dumping cases against a sanctioned country, perhaps because US industries also believe that the ITC would be more likely to find evidence of material injury from a recently-sanctioned country.

The data used to create these variables was compiled by a team at Drexel University. The dataset includes the sanction year, the sanctioned and sanctioning countries, and the types of sanctions: arms, military, financial, travel, and other. To create the sanction variable I decided to consider the first five years immediately after the US has sanctioned a country. I broke up this time window into 3 brackets (0-1 years post-sanction, 2-3 years post-sanction, and 4-5 years post-sanction) and created new variables in the data set. In this model, I've included the 0-1 group as "**post_sanction**", and combined the other two groups into the "**after_sanction**" variable. I propose that this is a salient way to examine the data because, at least logically, the years including or immediately after sanctions would ostensibly be the most geopolitically tense. Indeed, we would expect any effect of the sanction on either AD petitions or the probability of an affirmative preliminary injury finding to attenuate with time. Moreover, simply creating a binary variable that takes a value of 1 if the country in question has been sanctioned by the US at some point in time would overlap considerably with other country-specific variables of interest, like non market economy status.

Since I am interested in sanctions as measures of particularly geopolitically-tense moments, the first bracket (labeled "post_sanction") is the bracket of interest. (For example, it seems the year immediately after Tiananmen Square was the most fraught geopolitically in terms of relations between the US and China, as measured by a 300% increase in "unfavorability of China" in 1990). The first bracket contains all anti-dumping cases that fall within 0-1 years of a sanction year (50 observations).[7] The second bracket contains all AD cases that fall within 2-3 years of a sanction (52 observations). The third bracket contains all AD cases that fall within 4-5 years of a sanction (56 observations). Figure 2 shows the country composition of the

[7] To assure that the data is actually measuring a potential impact of a sanction or its concurrent geopolitical tension, when examining the individual cases that fell within the year of a sanction, I verified that each case was filed either after the specific sanction date, or after the geopolitical event that caused the sanction.

post_sanction group and the number of AD cases filed against each country in the year including or immediately after a sanction.

Country	**# of cases in the post_sanction group**
China	30
France	6
Taiwan	4
Indonesia	2
Canada	2

Figure 2: Post sanction group (1980-2019). *Source: Global Sanctions Database and World Bank AD database*

Broadly, here are the countries comprising the sanctioned group (all countries that have received AD cases within five years of a US sanction against them): France, Chile, Poland, Iran China, Yugoslavia, Romania, Thailand, Taiwan, Indonesia, India, Iraq, Belarus, Ireland,Canada, Pakistan, Ukraine, Colombia, South Africa, Turkey.

NME variable

If one closely examines the sanctioned group, however, it is clear to see that a substantial number of the countries have been considered/or are currently considered non-market economies. While the ITC technically doesn't consider NME status in its preliminary injury finding, it will still be an important variable to control for in the final probit model (Roberts, 2008). Indeed, if the NME variable is statistically significant for the entire group, this could be evidence that, contrary to the ITC's claims, NME status does factor into the preliminary decision-making process. Thus, NME status is included in the final model as a binary variable with the following country list: Armenia, Azerbaijan, Belarus, China, Georgia, Moldova, Russia, Tajikistan, Turkmenistan, Uzbekistan, Vietnam, USSR and East Germany.[8]

[8]This list was taken from the ITC's website.

Non-NATO Variable

The next variable of interest relates to a hypothesis made by Hansen and Prusa (1997) but that has yet to be tested explicitly: that filings against countries with security alliances against the US may be less likely to be ruled as affirmative than filings against countries outside of these security alliances. To test this, I created a variable labeled "**non_nato**" which takes a value of 1 if the country in the year of the filings is not a member of the NATO alliance and 0 if the country is a member of NATO. The decision to focus on the NATO alliance stems from the fact that NATO is arguably the US's most important and largest alliance: and one that advances the military, economic and strategic interests of the US. The list of NATO countries is as follows: Belgium, Canada, Denmark, France, Iceland, Italy, Luxembourg, Netherlands, Norway, Portugal, United Kingdom, Greece, Turkey,Germany, Spain, West Germany. Of course, any country outside of this list will be labeled Non-Nato. Hansen and Prusa (1997) defined a similar variable in their paper, though they did so based on what they defined as "Western Europe": UK, Ireland, Netherlands, Belgium, Luxembourg, France, West Germany, Austria, Switzerland, Spain, Portugal and Italy. They found that Western European countries were indeed less likely to be found to have materially injured US industries. I posit, however, that the use of the NATO alliance is a more systematic way to parse out potential country-wide biases in the ITC's process. Even though there is significant overlap between the variables, the addition of countries like Turkey, Greece, Canada and Norway in the NATO variable adds geographic variation to the list. Thus, instead of an ambiguously-defined "Western Europe" this paper presents NATO country members: a list of countries that all US government agencies are aware of, and that have great practical and symbolic significance to the United States. Figure 3 shows the top 5 subjects of AD petitions in the non-NATO group.

Country	Number of Cases
China	232
Japan	126
South Korea	96
Taiwan	81
Brazil	60

Figure 3: Top five AD recipients: Non-NATO (1980-2019). *Source: World Bank AD database*

7. The importance of country effects on the post-sanction variable

It is hypothesized that country-specific effects are going to have a substantial impact on the sanction variables: the idea being that the country composition of the sanctioned-countries would be a confounding variable when attempting to isolate the effect of the sanction year. To investigate this, differences in means tests were constructed for the average proportion of affirmative preliminary injury decisions in each category.

Control: 0.823088	**0-1 years from sanction**	**2-3 years from sanction**	**4-5 years from sanction**	**0-5 years after sanctions (overall)**
Excluding NATO members	0.950***	0.8571	0.8695	0.888**
With NATO members	0.880*	0.779	0.8214	0.824

Figure 4: Proportion of prelim. injury decisions (1980-2019). *Source: World Bank AD database & Drexel*
*Stars indicate significance for difference in means test between the specified proportion and the total average proportion (given in the top left-hand corner). * signifies significance at 10% level; ** at the 5% level; and *** at the 1% level.*

The results for the 0-1 year (post-sanction) group excluding NATO members is statistically different from the control group at the 1% significance level, and the result for the overall group excluding NATO members is significant at the 5% significance level. The direction

of the effect is also consistent with the hypothesis that the proportion of affirmative decisions would be greater for a Non-NATO country post-sanction than a NATO country post-sanction.

Next, I applied the same methodology to the average US cases filed per country per year.

Control: 2.0712	**0-1 years from sanction**	**2-3 years from sanction**	**4-5 years from sanction**	**0-5 years after sanctions (overall)**
Excluding NATO members	3.15*	2.111	2.50	2.580*
With NATO members	2.976*	2.116	2.15	2.436

Figure 5: Average cases per country, per year (1980-2019). *Source: World Bank AD database & Drexel*

Though the significances of the difference in means tests do not match perfectly with those of the ITC preliminary injury proportions, the direction of the effect is consistent. We see that the post-sanction group sees an increase in cases filed per year, which is greater when excluding NATO members from the sample. It is clear country variables will be important controls to isolate the effect of the post_sanction variable.

The final country-related variables included in the models are country specific for China and Japan. The logic behind this is that both countries are non-NATO, and both have been the subjects of many anti-dumping investigations throughout the years. Additionally, China factors heavily in the post-sanction group (as evidenced by Figure 3). It seems prudent to control for any country specific factors regarding China and Japan.

8. Macroeconomic variables

The next step in specifying variables is to include relevant macroeconomic controls. The motivation for this is to see whether the ITC or US industries are affected by broad macroeconomic factors that affect the US as a whole and would, at least in theory, be only tenuously related to the industry-specific conditions of an AD case. Said macroeconomic variables have been suggested to be determinants of either aggregate anti-dumping filings by US

industries, or have been demonstrated to increase the probability of affirmative findings by the ITC. I include both types of macroeconomic controls in both models to analyze whether there are any consistencies across the ITC initial injury determinations and the AD filings by US industries.

In his study of US AD and CVD (countervailing duty) filings activity, Leidy (1997) finds three statistically significant aggregate determinants of yearly US AD filings: unemployment rate (positively associated), the real effective exchange rate (positively associated), and capacity utilization (negatively associated). Knetter and Prusa (2000) study the four most prolific users of anti-dumping (Australia, Canada, the EU and the US) and find that domestic GDP growth rates are negatively associated with annual anti-dumping filings while domestic currency appreciations are positively associated with anti-dumping filings: offering evidence that, when domestic currency appreciates, the foreign firm's price increase is less than domestic currency appreciation, making the foreign good cheaper ceteris paribus.

Overall, these macroeconomic effects on annual AD filings reflect that anti-dumping is potentially used to retaliate against foreign firms for domestic economic conditions that are obviously beyond the control of foreign entities (Knetter & Prusa, 2000). Following from Autor et al. (2016), I also propose that macroeconomic variables such as import penetration could be a relevant element of annual AD filings, through a geopolitical mechanism — since Autor et al. (2016) found that Chinese import penetration had a significant political manifestation in increasing Republican vote shares during the 2016 election. In other words, I propose that even increased import penetration on a macro scale may catalyze US industries to file increased amounts of AD petitions against, and that the underlying mechanism of this reaction may have a political nature.

The evidence regarding macroeconomic factors and ITC injury *determinations* is less clear — though, notably, few studies have examined the last 20 years of AD data. Baldwin and Steagall (1993), however, found several important results. First, they found that the annual percentage change in GDP is statistically significant in affecting the probability of an affirmative finding by the ITC (negatively associated); this lends credence to the hypothesis that the ITC would be more likely to grant protection to US industries in a time of general macroeconomic instability. Furthermore, Baldwin and Steagall (1993) found that the ratio of total imports to

consumption (import penetration) increased the probability of an affirmative ITC injury ruling in AD and CVD cases. They concluded that:

> "The finding that the ratio of all imports (rather than just unfair imports) to consumption is significantly associated with affirmative decisions does not seem consistent with the logic behind the trends analysis. High levels of unfair imports to consumption together with increases in this ratio suggest a causal relationship between unfair imports and material injury, but there seems to be no good economic reason why the degree of openness in an industry, by itself, should be related to material injury" (p.22).

Studying just China, Zeng and Liang (2010) find that export dependence on China (exports to China as a percentage of GDP) have a significantly negative association with the probability of an affirmative finding in either the DOC or the ITC. According to their logic, this makes sense, since greater export dependence on China reflects greater retaliatory capacity on the part of China.

Synthesizing the above-mentioned research, I have compiled relevant macroeconomic variables that will be included in both the annual AD case filings model and the ITC decision model. The unemployment rate (UR), the annual GDP growth rate (gdp_growth), nominal US currency index (dollar_index), capacity utilization index, total import penetration (imports of goods and services as a percentage of GDP), and total export dependence (exports of goods and services as a percentage of GDP).[9] All these variables are annual values for the years 1980-2019, since those are the years for which the anti-dumping data is available. The macroeconomic variables are lagged by one year, with the reasoning that, since I am using yearly data it would be prudent to link the previous year's macroeconomic data to any given year of AD activity.

[9] Organization for Economic Co-operation and Development, Unemployment Rate: Aged 15-64: All Persons for the United States; U.S. Bureau of Economic Analysis, Real Gross Domestic Product; Board of Governors of the Federal Reserve System (US), Nominal Major Currencies U.S. Dollar Index (Goods Only) (The nominal US currency index is a weighted average of the foreign exchange value of the US dollar against a broad subset of currencies including the Euro Area, Canada, Japan, United Kingdom, Switzerland, Australia, and Sweden. This value is indexed at 1979=100, since the available anti-dumping data begins in 1979); Board of Governors of the Federal Reserve System (US), Capacity Utilization: Total Index; U.S. Bureau of Economic Analysis, Shares of gross domestic product: Imports of goods and services; U.S. Bureau of Economic Analysis, Shares of gross domestic product: Exports of goods and services.

Antidumping Data

The anti-dumping data set used in this analysis is one compiled by Bown (2007) in the World Bank Anti-Dumping Database. This database provides each anti-dumping case filed by the United States between 1980 and 2019, the final anti-dumping duty administered, the investigated country, and the preliminary findings of the ITC and the DOC.

8. Methodology

To model preliminary injury determinations made by the ITC, I use a probit model, whereby the dependent variable, Y_i takes a value of 1 if the preliminary injury determination by the ITC is affirmative and Y_i =0 if otherwise. Each case has a preliminary injury determination, thus focusing on the ITC injury determinations is also useful for its abundance of data (over 1400 observations since 1980, according to this dataset). A probit model specifically was chosen because of its use in the context of ITC decision making: allowing us to understand what factors enhance/or decrease the probability of an affirmative preliminary injury finding.

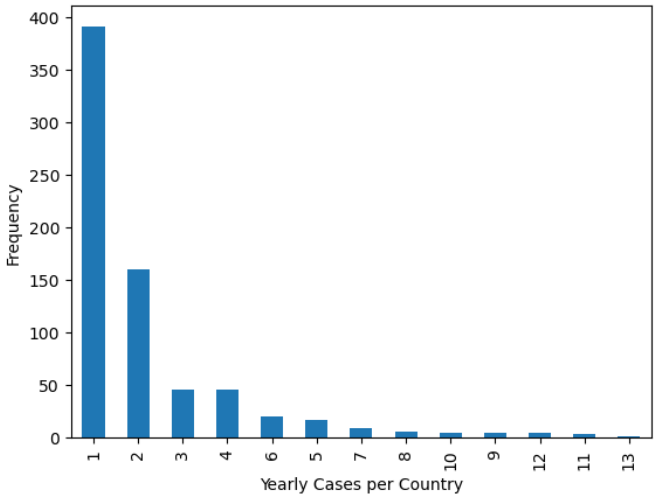

Figure 6: Frequency Histogram of Yearly Cases Per Country (1980-2019). *Source: World Bank AD database*

To model annual anti-dumping filings by US industries, I use a simple Poisson regression model, where the dependent variable Y_{it} is defined as the yearly anti-dumping cases filed against

country *i* in year *t*. The Poisson regression is preferable to an OLS model because the data are count data and the dependent variable, as evidenced by figure 6, is not normally distributed. This methodology is similar to the one employed by Irwin (2005) to model annual US anti-dumping filings. Irwin uses a negative binomial regression, which is a variation on the Poisson model, but is relatively more flexible. To test whether a negative binomial regression should have been used in this case, I checked the "dispersion" of the Poisson model by dividing the residual deviance by the degrees of freedom, and found a ratio of 1.0191. I also verified that the log-likelihood in the final Poisson model was higher than that of the negative binomial regression, suggesting the Poisson model fits better. This is sufficient to conclude that the Poisson model is not too overdispersed, and thus there is no need in this context to use the negative binomial regression.

The results reported for the probit model are the marginal effects of each variable, which allows us to interpret the coefficients as marginal effects on the probability of an affirmative preliminary injury decision. In other words, the coefficient on Non-Nato in model three can be interpreted as a country that is not in the NATO alliance has a roughly 4.6% greater probability of receiving an affirmative injury finding compared to a country that is in NATO.[10]

For the Poisson model of annual filings per country, the coefficients can be interpreted as the difference in the logs of expected counts for a one-unit change in the predictor variable, ceteris paribus.[11]

[10] Probit Regression | Stata Annotated Output
https://stats.oarc.ucla.edu/stata/dae/probit-regression/#:~:text=Probit%20regression%2C%20also%20called%20a,linear%20combination%20of%20the%20predictors

[11] Poisson Regression | Stata Annotated Output
https://stats.oarc.ucla.edu/stata/output/poisson-regression/#:~:text=We%20can%20 interpret%20the%20 Poisson,the%20model%20are%20held%20constant

9. Findings:

Dependent Var: Annual AD Filings per country	(1)	(2)	(3)
Intercept	**0.7310**	**0.6937**	**-0.6535**
	(0.028)	(0.051)	(2.040)
post_sanction	**0.41*** **	**0.1925**	**0.2557** **
	(0.121)	(0.123)	(0.125)
after_sanction	**0.0730**	**-0.0812**	**-0.0553**
	(0.088)	(0.090)	(0.092)
China		**1.558*** **	**1.5579*** **
		(0.152)	(0.152)
Japan		**0.8228*** **	**0.823*** **
		(0.097)	(0.097)
NME		**-0.282** **	**-0.2598** *
		(0.140)	(0.140)
Non NATO		**-0.138** **	**-0.1253** **
		(0.0634)	(0.064)
UR			**0.0423**
			(0.029)
capacity_utilize			**0.003**
			(0.019)
dollar_index			**0.0069** **
			(0.003)
export_penetration			**0.0419**
			(0.051)
gdp_growth			**-0.0181**
			(0.024)
import_penetration			**-0.0116**
			(0.031)
N	709	709	709
Pseudo R2	0.01	0.331	0.3553

Standard errors in parentheses.
* p<.1, ** p<.05, ***p<.01

Dependent Var: Preliminary Injury Determination	(1)	(2)	(3)
post_sanction	**0.47*** **	**0.1092**	**0.0158**
	(0.09)	(0.075)	(0.063)
after_sanction	**0.33*** **	**0.0013**	**-0.0421**
	(0.053)	(0.043)	(0.037)
China		**-0.0805**	**-0.0656**
		(0.088)	(0.076)
Japan		**0.0581**	**0.0678** *
		(0.044)	(0.038)
NME		**0.204*** **	**0.1563** **
		(0.082)	(0.070)
Non Nato		**0.2637*** **	**0.0462** **
		(0.012)	(0.022)
UR			**0.0052**
			(0.008)
capacity_utilize			**-0.0008**
			(0.002)
dollar_index			**-0.0006**
			(0.01)
export_penetration			**-0.0006**
			(0.01)
gdp_growth			**0.0124** *
			(0.007)
import_penetration			**0.0206*** **
			(0.007)
N	1498	1498	1498
Log Likelihood	-999.86	-727.34	-666.41

Standard errors in parentheses.
* p<.1, ** p<.05, ***p<.01

10. Discussion of relevant variables

Given that there is expected to be significant multicollinearity among the variables in both models which would inflate the standard errors of the regression coefficients, I conducted Wald tests of joint significance tests on the following groups of variables: the sanction variables, the country-specific variables(NME, Non_NATO, Japan and China) and the macroeconomic variables. For the Poisson model of filings per country per year, I found that the sanction variables were jointly significant at the 10% level (p=0.0849), while the other two categories of variables are jointly significant at the 1% significance level: a p-value of essentially 0 for the country variables and p-value of 0.00018 for the macro variables.

For the probit model of preliminary ITC determinations, I found that the sanction variables were jointly insignificant (p-value=0.48). The country group and macro variables, however, were significant at the 1% level: the two p-values were essentially zero.

In the probit model (3), the coefficient on GDP growth is positive and significant at the 10% significance level, which is contrary to what Baldwin & Steagall (1993) found regarding safeguard cases and somewhat contrary to intuition. We'd expect that positive economic growth would be inimical to the protectionist sentiment that might induce a greater likelihood of an affirmative AD injury finding; put simply, we'd expect a negative relationship between economic growth and the probability of affirmative AD injury findings. However, when I reduced the dataset to the years Baldwin & Steagall (1993) studied (1980-1990), I found a negative and statistically significant relationship between GDP growth and annual AD filings. Thus, it is possible that in the years since 1990 the relationship between GDP and affirmative ITC rulings has changed.

Also in the probit model (3), the coefficient on import penetration is positive and highly statistically significant. This corroborates what was found in Baldwin & Steagall (1993). This result has some interesting implications; if an increase in the aggregate ratio of imports to GDP increases the probability of an affirmative injury finding in the succeeding year, then it seems there is some doubt as to whether the ITC makes determinations solely based on case-specific economic data.

In the Poisson model (3), I found that the lagged nominal dollar index value was indeed, positive and significant at the 5% level — which verifies what was found in Leidy (1997) and

Irwin (2005). The coefficient on the unemployment rate is positive (though not significant at the 10% level) which verifies Irwin's (2005) and Leidy's (1997) findings. However, regarding the other variable that Leidy found to be significant (capacity utilization) there isn't much correspondence in my model. The analysis I can offer here is that, since the dependent variable is the annual US ad cases filed *per country* (not total annual AD cases filed by the United States, which is what Leidy examined), the effects are much smaller, and the variance in the data is much larger. This is a limitation of my approach: to be able to include country-specific effects, I had to analyze the yearly filings *per country,* and not annual US filings, full stop.

Indeed, as the tests of joint significance between the categories of variables demonstrate, there are some consistencies in the explanatory power of the types of variables across the models: country-specific variables and macroeconomic variables being significant. On a comparative level, however, there are some very interesting differences in the results between the country-specific effects in the ITC (probit) model and the annual filings (Poisson) model. In other words, at a disaggregated level, the differences between the coefficients in the two models (both in their signs, magnitudes, and significance) prompt some interesting questions about the nature of the supply and demand relationship between AD filings and ITC rulings. Some of these differences may even point to the different ways that these two elements of the AD process respond to events like sanctions, macroeconomic conditions and national security alliances.

For example, the significance and magnitude of the post_sanction coefficient in the filings model is notable. The fact that the post_sanction coefficient in the filings model is larger in magnitude and significance compared to the ITC model may have implications regarding structural differences in how private industries may use an AD case filing to respond to a sanctioned country, versus how a government bureaucracy rules on an AD case when the subject country is sanctioned. An intuitive analysis of this difference is that US industries aren't constrained by any sort of decision-making protocol when filings an AD case. The ITC, on the other hand, does have specific processes by which they make their preliminary injury determinations. Now, the extent to which the ITC's protocol follows the statutes is questionable, but the simple fact that a US industry can just file a case against a foreign competitor in a period of geopolitical tension seems to support the observed difference in effect of the post_sanction

variable. This intuition is also supported by the observation stated earlier that yearly case filings are significantly elastic (1.322) with respect to unfavorability of China as measured by poll data.

First, the difference in sign between the coefficient on non-NATO members between the filings model and the ITC model is notable. Why is it that lack of membership in a security alliance would have a statistically significant (positive) effect on the probability of affirmative injury ruling, but has a negative effect for the annual AD filings filed by US industries?

When looking at the positive non-NATO effect for the ITC model, one argument to explain this result is that the country composition of the Non-Nato group (even when controlling for non market economy status, and China and Japan) is such that those countries are simply more likely to dump in ways that cause injury under the ITC guidelines. In other words, the mere fact that a country is or isn't in NATO doesn't have an effect on the probability of affirmative decisions; rather the nature of the countries that make up the non-NATO group induces a higher probability of affirmative injury finding.

The result that US industries don't seem to file more AD cases per year against Non-NATO countries, when controlling for Japan and China, complicates this logic. In other words, the lack of consistency of the Non-NATO effect across the annual filings of dumping cases and the bureaucratic administration of said cases makes one question whether, for ITC determinations, the non-NATO effect is solely attributable to the country composition of that group, or if there is some element to the ITC decision making process that may take into account the NATO alliance in ways that private US industries don't.

US industries, however, do have country-specific patterns of filing behavior, just not the same patterns as the ITC. The positive China effect on annual anti-dumping filings is highly significant and large in magnitude, whereas the China effect on the probability of affirmative injury ruling is negative and insignificant. The coefficient on Japan in the filings model is positive, relatively large and significant at the 1% level, and the coefficient in the ITC model is also relatively large in magnitude and significant at the 10% level. Thus, it is interesting that, with respect to Japan, there may be a supply/demand effect.

The last point of comparison are the coefficients on the NME variable. In the filings model, this coefficient is negative and not statistically significant. In the ITC model, however, the coefficient is positive, large in magnitude, and significant at the 5%. This disparity is notable for

several reasons. First, the "NME" designation is known to be used by the ITC and DOC in their investigation and adjudication of dumping decisions. And previous research has shown that NME designated countries receive higher dumping margins, because the NME status allows the DOC to use surrogate country prices and constructed values. However, the ITC is not supposed to factor into account NME designations to make their preliminary injury determinations and, according to the analysis of Roberts (2008), there is no NME bias in the initial injury determinations of the ITC; thus the statistically significant result on the NME variables in the ITC model is interesting, because it points to a bias against NME designated countries even in a part of the AD process when that designation is not purported to apply.

11. Robustness Check: a different measure of geopolitical tension

As mentioned earlier, I question whether the use of sanction years is a truly appropriate measure of geopolitical tensions. Thus, to verify the robustness of the result regarding the effect of US sanction years on US anti-dumping filings against the sanctioned country, I examined the measure of geopolitical risk compiled by Caldara and Iacoviello (2022): in which the index is constructed by taking the share of news articles mentioning adverse geopolitical conditions. They found this index to be relevant to macro-economic outcomes, and, crucially, that "The aggregate GPR index correlates well with listed firms' own perceptions of geopolitical risks, which we construct from mentions of geopolitical risks in 135,000 firms' earnings calls, inspired by Hassan et al. (2019" (p. 1196). Thus, to verify the result that firms seem to be filing more anti-dumping cases against countries that have been recently sanctioned by the United States (which, I propose, flows through a geopolitical retaliatory mechanism), I believe this index is a highly useful tool.

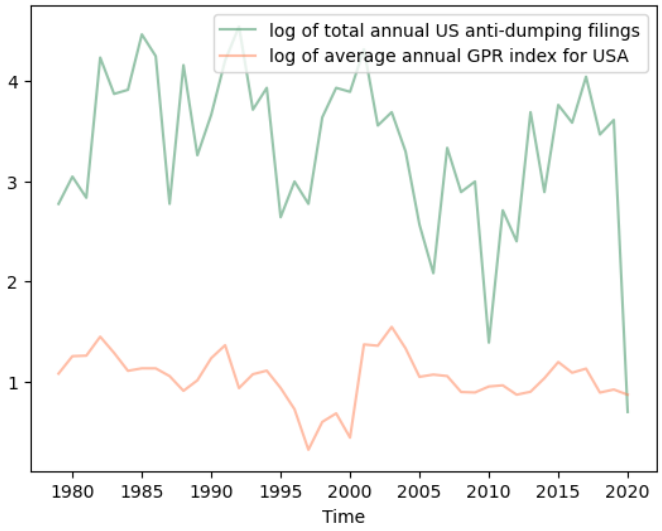

Figure 7: US GPR vs US AD Filings (1980-2020). *Source: https://www.matteoiacoviello.com/gpr.htm & World Bank*

Figure 7 hints at a possible relationship between the two variables; the correlation coefficient between annual US case filings and the average annual US geopolitical risk index is 0.2825.

To more concretely model the effect of the geopolitical risk index, I used a negative binomial model where the dependent variable is the aggregate US anti-dumping filings per year. A negative binomial model is needed here because (contrary to the previous data) the annual AD filings data is significantly over-dispersed: the mean is ~37.62 and the variance is ~484. This methodology was employed by Irwin (2005), who found that the most significant determinants of aggregate US AD activity from 1947 to 2002 were the lagged (log) exchange rate, the unemployment rate, and a dummy variable taking a value of 1 for years post 1984 and 0 for years pre 1984 (as mentioned earlier, this represents the Trade Act of 1984 which required the ITC to cumulate imports when determining injury). I included these variables in analyzing the anti-dumping data studied in this paper (from 1979-2019). The dependent variable is annual US anti-dumping filings, and the variable of interest "GPRHC_USA" measures the average annual historical geopolitical risk index specific to the US (where each observation is monthly).

Dependent Var: Yearly AD Filings	
Intercept	1.4634
	(10.2001)
GPRHC_USA	0.1456
	(0.2659)
log_import_pen	-1.3988
	(1.2362)
UR	-0.0593
	(0.1197)
log_exchange	1.1385
	(1.6885)
trade_act	0.4561
	(0.6334)
N= 40	Standard errors in ().

Figure 8: Negative Binomial Model (1980-2020). *Source: https://www.matteoiacoviello.com/gpr.htm* & World Bank

There are several things to note with these findings. First, the number of yearly observations in the data set is relatively low (40), which, in addition to the overdispersion of the dependent variable, explains the larger standard errors. Moreover, the coefficients on import penetration and the unemployment rate do not confirm Irwin's (2004) findings. I posit that this can be attributed to the fact that the data analyzed here was from 1979-2019, not Irwin's broader timeline: 1947-2002. Indeed, as I previously demonstrated, expanding the data set to include the last twenty years seems to change the relationship between macroeconomic variables and AD filings that were relevant during other time periods studied — namely the 1980s. Moreover, the positive coefficients on the Trade Act 1984 and the log US nominal exchange rate (indexed to 100 in 1979) confirms Irwin's findings. Indeed, it seems the lack of statistical significance in this model could be remediated by applying it to Irwin's historical dataset (where the Trade Act 1984 variable was significant at the 10% level).

Notably, however, the coefficient on the geopolitical risk is positive. While not statistically significant, this is an encouraging result given the small sample size. I posit that the positive coefficient in this model, and the statistically significant effect of the sanction variable on yearly case filings per country, permits us to conjecture that there may be a generalizable relationship between periods of geopolitical volatility and anti-dumping filings. Another avenue for further research would be to measure, using the Caldara and Iacoviello (2022) index to

measure bi-lateral geopolitical tension, and further exploring the relationship between anti-dumping filings and geopolitics on a country specific level. I also posit that, to increase sample size, it would be useful to look at anti-dumping filings across a pool of countries with similar economic structures and anti-dumping filing patterns, similar to the methodology employed by Knetter and Prusa (2000). Finally, as mentioned previously, I think applying the historical GPR index to Irwins historical anti-dumping dataset would be a fruitful avenue for further research.

12. Conclusions

This paper has attempted to show that there are geopolitical cleavages observed in the antidumping process: on both a theoretical and quantitative level. The result that non-market economy status (even when controlling for China and Japan) significantly increases the probability of affirmative injury decisions by the ITC is important because NME status, on paper, shouldn't (statutorily) factor into preliminary injury determinations. Next, the result that non-NATO status enhances the probability of affirmative injury (when controlling for the other country variables), even while US firms don't seem to file more cases against non-NATO countries per year, points to a potential systemic bias against countries that don't fall into the NATO member list. It is difficult to argue that this bias is solely due to a country's NATO membership. The countries that aren't or are in the NATO alliance are going to have ostensibly different economies, and produce different types of goods, with different implications for whether they cause material injury to US industries. Nevertheless, the fact that this result falls on the cleavages of a security alliance demonstrates the multi-directional relationship between economic structures and security alliances. It is also significant that overall import penetration (with a one-year lag) is associated with enhanced probability of affirmative preliminary injury decisions — this demonstrates that foreign companies may be punished for US macroeconomic conditions that, while probably affecting industry-specific conditions, are not directly the fault of foreign firms.

Lastly, the result that US industries file more cases against countries that have been sanctioned by the US in the year the case was filed or the succeeding year at the 5% significance

level is notable. While not as large as the country-specific coefficients, the result still may point to a relationship between sanctions, periods of geopolitical tension, and anti-dumping filings.

In sum, I conjecture that the regression models demonstrate that the analysis of the supply and demand for administered protection on the national level deserves more research attention, especially in the age where private companies have increasing geopolitical power (as evidenced by the reaction of private firms to the war in Ukraine).

Indeed, I believe the results contradict what the ITC and DOC insist: that the anti-dumping process is completely removed from (geo)political elements.

References

Autor & Dorn & Hanson & Majlesi, 2016. "Importing Political Polarization? The Electoral Consequences of Rising Trade Exposure," NBER Working Paper No.22637

Blonigen, Bruce (2003, April). “Evolving Discretionary Practices of U.S. Antidumping Activity.” NBER Working Paper No. 9625.

Blonigen and Prusa (2001). “Antidumping”. NBER Working Paper No. 8398

Baldwin and Moore (1991). In *Down in the Dumps: Administration of the Unfair Trade Laws*. Edited by Boltuck & Litan. Brookings.

Baldwin and Seagall (1993). “An Analysis of Factors Influencing ITC Decisions in Antidumping, Countervailing Duty and Safeguard Cases.” NBER Working Paper No. 4282.

Bown, P. (2022, January 18). “Trump ended WTO dispute settlement: Trade remedies are needed to fix it.” PIIE.

Bown, Chad P. (2011). “Taking Stock of Antidumping, Safeguards and Countervailing Duties, 1990-2009,” *The World*

Caldara, Dario and Matteo Iacoviello (2018). Measuring Geopolitical Risk. International Finance Discussion Papers 1222.

Felbermayr, G., A. Kirilakha, C. Syropoulos, E. Yalcin, and Y.V. Yotov, 2020. “The Global Sanctions DataBase,” *European Economic Review*, Volume 129.

Finger, M., (1991). "The origins and evolution of antidumping regulation," Policy Research Working Paper Series 783, The World Bank.

Furse T. (2022) Forward to the 1980s: US strategic trade in the world order. Int Polit. 2022; 59(4):597–615. doi: 10.1057/s41311-021-00319-y.

Gallup. (2022, March 18). “China.” Gallup.com. Retrieved May 13, 2022, from https://news.gallup.com/poll/1627/china.aspx

Hansen, &. Prusa (1997). “Economics and politics: An empirical analysis of ITC decision-making.” *Review of International Economics* 5(2). 230-245.

Hansen & Prusa (1995). “Cumulation and ITC Decision Making: The Sum of its Parts is Greater than the Whole.” NBER Working Paper No. 5062

Hansen, W. (1990). The International Trade Commission and the Politics of Protectionism. *American Political Science Review, 84*(1), 21-46. doi:10.2307/1963628

Irwin, D. (2005). “The Rise of U.S. Antidumping Actions in Historical Perspective.” NBER Working Paper No. 10582.

Kirilakha, A., G. Felbermayr, C. Syropoulos, E. Yalcin and Y.V. Yotov, 2021. "The Global Sanctions Data Base: An Update that Includes the Years of the Trump Presidency," in *The Research Handbook on Economic Sanctions*. Edited by Peter A.G. van Bergeijk.

Knetter & Prusa (2000). “Macroeconomic Factors and Antidumping Filings: Evidence from 4 Countries.” NBER Working Paper No. 8010.

Leidy, M. P. (1997). Macroeconomic Conditions and Pressures for Protection under Antidumping and Countervailing Duty Laws: Empirical Evidence from the United States. *Staff Papers (International Monetary Fund)*, *44*(1), 132–144. https://doi.org/10.2307/3867500

Organization for Economic Co-operation and Development, Unemployment Rate: Aged 15-64: All Persons for the United States [LRUN64TTUSA156N], retrieved from FRED, Federal Reserve Bank of St. Louis.

Gąsiorowski & Polachek (1982). Conflict and Interdependence: East-West Trade and Linkages in the Era of Detente. *Journal of Conflict Resolution*, *26*(4), 709–729.

Pollins, B. M. (1989). “Does Trade Still Follow the Flag?” *American Political Science Review*, *83*(2), 465–480. http://doi.org/10.2307/1962400

Price, Joseph (1985) The Trade and Tariff Act of 1984: An Analytical Overview, 19 INT'L L. 321. https://scholar.smu.edu/til/vol19/iss1/15

Roberts, M. (2008). *The U.S.-China Trade Relationship: Explaining U.S. anti-dumping duties on China*. King Center on Global Development. Retrieved April 26, 2023, from https://kingcenter.stanford.edu/publications/working-paper/us-china-trade-relationship-explaining-us-anti-dumping-duties-china

Shin (1994) “The Nature of US Antidumping Cases in the 1980s” OECD.

Savage, R., and K. W. Deutsch (1960). "A Statistical Model of the Gross Analysis of Transaction Flows." Econometrica 28:551-72.

Temporary Trade Barriers Database. World Bank. (n.d.). Retrieved May 13, 2022, from https://www.worldbank.org/en/data/interactive/2021/03/02/temporary-trade-barriers-database

Zeng, K., & Liang, W. (2010). US antidumping actions against China: the impact of China’s entry into the World Trade Organization. *Review of International Political Economy*, *17*(3), 562–588. http://www.jstor.org/stable/25746505