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GLOBAL SUPPLY CHAINS, CURRENCY UNDERVALUATION, AND FIRM PROTECTIONIST DEMANDS

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ABSTRACT

We examine firm participation in global supply chains to help explain a puzzling decline in protectionist demands in the U.S. despite increased import competition and ongoing currency undervaluation. To explain firm responses to undervaluation, we rely on advances in the international trade literature that uncover intraindustry heterogeneity in firm trade and investment activities. We propose that firm foreign direct investments in, and subsequent related party trade with, countries with undervalued exchange rates will lead to fewer antidumping filings. Examining the universe of U.S. manufacturing firms, we find that antidumping petition filers are more internationally engaged than non-filing peers, but conduct less related party trade with filed-against countries. High levels of related-party imports (arm's length imports) from countries with undervalued currencies significantly decrease (increase) the likelihood of U.S. antidumping petitions. Our study highlights the centrality of global supply chains in understanding political mobilization over international economic policy.

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This paper examines the relationships between and among currency undervaluations, investment and trade flows, and trade disputes in the United States from 1982 to 2011. Our motivating puzzle is that, while trade flows into the U.S. have soared, especially from countries with seemingly undervalued currencies, the number of antidumping trade filings by U.S. firms appears to have declined markedly in the past 10 years. (See Figure 1.)

We propose that the rapid expansion of global supply chains by U.S. multinational corporations are at the root of the decreased demands for trade protection—increasing import competition, long run trade deficits, and persistent currency undervaluations notwithstanding. Our explanation draws on new theoretical and empirical research in international trade, which views firm-level differences, rather than industries or factors, as fundamental determinants of trade and international investment activities (Bernard and Jensen 1999, Bernard et al. 2007, 2009, Melitz 2003). We argue that intraindustry heterogeneity in firm integration into global supply chains helps explain political mobilization—or the lack thereof—over international economic policy.

We apply our insights to explain protectionist demands in the specific context of currency undervaluation, one of the most contentious issues in global politics. Scholars have established that both currency undervaluation and increasing import competition are associated with increased antidumping protectionism (Broz and Werfel 2013; Ludema and Mayda 2011).

Extending existing research, we predict intraindustry variation in firm demand for trade protection when faced with import competition from countries with undervalued currencies. In instances where firms have made investments in countries with undervalued exchange rates, these firms' responses range from acquiescence to exploiting undervaluation by producing at lower cost in these countries and engaging in related party (or *intrafirm*) trade with their foreign

affiliates. We do not expect these firms to pursue trade remedies in response to undervaluation by their foreign host countries. Under similar conditions, firms without international operations in these countries and facing resulting import price competition are more likely to either oppose undervaluation and seek political remedy through temporary trade barriers or to invest subsequently in those countries (or to do both).

In sum, our central insight is that firm-specific heterogeneity in investment and related party trading positions in foreign countries drive firm political and economic responses to the economic policies of U.S. trade partners, such as currency undervaluation, and to the U.S. response to these policies. In the context of foreign currency undervaluation and increasing import competition, it is not a firm's sectoral advantages, its industry, or even its international orientation per se that determines its demand for trade protection. Rather, a firm's supply chains in a specific country at a point in time shape its protectionist vs. non-protectionist responses: a salient cleavage divides firms that invest in and source from countries with undervalued currencies versus those that do not.

Our findings from the analysis of firm- and country-level data are consistent with our expectations. Examining the universe of U.S. manufacturing firms, we find that antidumping petition filers are more internationally engaged than non-filing peers, but conduct less related party trade with filed-against countries. We find significant increases in the market share of U.S. firms importing from China, suggesting that organizing a coalition of firms representing the 25 percent threshold of market share for filing an antidumping petition has become increasingly difficult. In country-level regressions, we find that high levels of related-party imports (arm's length imports) from countries with undervalued currencies significantly decrease (increase) the likelihood of U.S. antidumping petitions.

The paper proceeds as follows. The next section explores the political and economic interrelationships between and among international trade and investment, undervalued currencies, and trade disputes. The section after that examines the universe of U.S. firms covered by the economic census to provide descriptive statistics regarding the attributes of firms that file antidumping filings compared to their product market peers and how these evolve over time. We then report the results of panel negative binomial models of antidumping filings in the United States. The final section concludes.

THEORETICAL BACKGROUND

Three broad secular trends in the world economy situate our analysis. First, as tariff rates steadily decline globally, temporary trade barriers (TTBs) have become an important method of trade protection (Mansfield and Busch 1995, Irwin 2005), and antidumping duties are by far the most commonly employed TTB worldwide (Bown 2011). Successful filings can bring significant economic advantage to filers (Bechtel and Sattler 2012).

Second, global supply chains are an important feature of global trade. Firms increasingly engage in so-called vertical, or trade related, FDI, setting up affiliates in foreign countries for the purpose of exploiting relative factor endowments to export or import parts, components and other intermediate inputs at lower cost. By an accounting definition, vertical FDI precedes related party trade, as headquarter firms establish an ownership interest in foreign affiliates from which they import and export. These multinational corporations (MNCs) anchor global supply chains, mediating more than 80 percent of U.S. merchandise exports and imports. This includes, by definition, all related-party trade, and the vast majority of arm's-length transactions (see Bernard, Jensen, and Schott, 2009).

Third, two ideal-type macroeconomic policy strategies regarding export promotion have been influential among emerging market economies in recent decades. As the main example of one, the high performing East Asian economies have been characterized during their rapid growth experiences by active exchange rate management policies that led to currency depreciation and export surges (Page 1994; World Bank 1993). China's sharp rise as a trading nation has coincided with China's use of a similar mix of policies to other East Asian countries in order to facilitate exports. China's currency undervaluation, in particular, has been argued to produce developmental and growth advantages for China, which might serve as a model for other developing countries (Rodrik 2008). The other ideal-type strategy, of which Mexico has been an exemplar, is characterized by extensive participation in bilateral and international trade agreements, open capital markets, and a floating, market determined, exchange rate.[1] The latter strategy limits the use of systematic currency undervaluation as a governmental policy option for export promotion.

We explore the political economy implications of each of these trends below.

The Political Economy of Currency Undervaluation

Exchange rate policies represent an important component of countries' macroeconomic policy portfolios, and a large literature studies the macroeconomic implications of currency valuation. One central finding is that currency *overvaluation* is linked to macroeconomic instability (Fischer 1993) and slower economic growth (Easterly 2005, Rodrik 2008). Relatedly, Dani Rodrik and others have examined the possible positive impact of *undervaluation* on growth. In an influential paper, Rodrik (2008, p. 366) finds "an increase in undervaluation boosts

[1] Mexico has signed free trade agreements with 44 countries, including the United States, Japan, Canada, and the member countries of the European Union (Villareal 2012).

economic growth just as powerfully as a decrease in overvaluation." (See Berg and Miao 2010.)

One plausible mechanism for the line between undervaluation and growth is increased inward FDI and increased exports from MNCs and domestic firms. A depreciated currency makes the value of assets relatively cheaper in foreign currency terms, lowering the costs of investment by foreign firms (Blonigen 1997), and increasing the net worth of foreign bidders relative to domestic investors (Froot and Stein 1991). Furthermore, following the comparative advantage motive for vertical FDI, firms tend to produce abroad where they can take advantage of cheaper inputs (Helpman 1984). A depreciated currency lowers the cost of labor and other host-country inputs relative to production costs in the home country (Goldberg and Klein 1997). For firms that use FDI as a platform for export, a depreciated currency increases the competitiveness of exports (Blonigen 1997).

To illustrate currency undervaluation vs. overvaluation graphically, we refer to Figure 2, which shows the evolution of currency valuations over time for China and Mexico, two of the leading trade partners of the U.S., and countries with very similar factor endowments.[2] (The data will be described in greater detail in the Data Appendix. Somewhat counter-intuitively, the convention in the field is to denote undervaluation with positive numbers and overvaluation with negative numbers. Zero is a neutral valuation.)

For most of the pre-NAFTA period, Mexico's currency was highly *undervalued* relative to the United States. Excluding the period of the Mexican Peso Crisis, the post NAFTA Mexican peso ceased its long-run undevaluation and was on average *overvalued* relative to the U.S. dollar, offering decreased incentives for U.S. FDI and related party imports from Mexico.

[2] See Chiquiar et al. 2008 for a detailed comparison of the factor endowments and the wide range of product market competition between the two economies.

China, in contrast to Mexico's earlier undervaluation, had maintained a strongly *overvalued* currency prior to 1993. Since the 2000s, Chinese has sustained an undervalued exchange rate compared to the Mexican peso's overvaluation, which gives U.S. producers an incentive to invest in and source from China rather than from Mexico.

Currency undervaluation is a particularly attractive policy option for governments because the international trading system under WTO rules does not proscribe countries from engaging in currency undervaluation for the purposes of export promotion (Sanford 2011). "Currency manipulation," at least in cases of undervaluation, is arguably a violation of elements of existing U.S. trade law, which could result in a Section 301 case against the firms of a "currency manipulator" (Morrison and Labonte 2009, 37). However, these elements of U.S. trade law are widely argued to be subsumed under the U.S.'s obligation of WTO membership (Morrison and Labonte 2009, 37-39), limiting U.S. policy options under existing law and international agreements.

Even so, while an undervalued currency may offer economic advantages to exporting nations and their firms, undervaluation risks backlash through other means by foreign trade partners. Some governments, in the extreme, undertake policies to lessen the effects of the depreciations of trading partner currencies through competitive devaluations.[3]

Firms that are harmed by foreign currency undervaluation can pursue three main strategies (Vandenbussche and Viegelahn 2011). One, they can lobby for an increase in the MFN tariff in the event that a tariff overhang exists. Two, firms can lobby for protection by way of increases in administrative trade barriers. Three, firms can pursue temporary trade barriers, such

[3] For example, Brazil, Israel, Japan, New Zealand, Poland, and Switzerland have undertaken monetary or exchange policies targeted at lessening the value of their currencies.

as antidumping investigations.

Options one and two are decreasingly viable, however. For firms in advanced industrialized nations, the difference between applied MNF tariff rates and the bound rates imposed by the WTO (i.e., tariff overhang) is quite low. And, according to the World Bank (Doing Business 2012), countries have significantly reduced administrative trade barriers in recent years, and international pressure to keep administrative barriers low remains strong. Unlike the other two options, temporary trade barriers in general—and antidumping in particular—remain a popular trade remedy among firms around the world.

Numerous studies have, in fact, found a strong link between domestic (home county) real exchange rate appreciation vis-à-vis trade partners[4] and subsequent trade disputes (Broz and Werfel 2013, Copelovitch and Pevehouse 2011, Irwin 2005, Knetter and Prusa 2003, Oatley 2010). The central inference of these papers is that AD filings represent the protectionist response by particular industries to undervaluation among trade partners. In particular, Broz and Werfel (2013) show that the pass-through of exchange rate movements to prices, which varies systematically by industry, correlates with industry responses to domestic real exchange rate fluctuations.

[4] With the exception of Knetter and Prusa (2003), existing studies of the effects of domestic currency fluctuations on antidumping petitions rely on indexes of real effective exchange rates, which capture the average of bilateral real exchange rates, weighted by trade volumes. This approach is useful for examining the effects of aggregate domestic currency appreciation relative to all trade partners, but it leaves the direct effects of undervaluation of specific foreign currencies unexplored. Copelovitch and Pevehouse (2011) study the relationship between bilateral undervaluation and governments' decisions to file trade disputes at the WTO.

We propose to extend the literature by considering firm participation in global production networks. In particular, we expect that foreign direct investments in countries with undervalued currencies will condition firm political responses to foreign currency undervaluation, leading to intraindustry variation in demand for trade protection.

Heterogeneous Firms, Global Production Networks, and Firm Demand for Protection

A standard treatment in the broader literature on trade protection has been to consider demands for protection in the context of industries or sectors of the economy. This approach builds on trade models that assume that firms are homogeneous within sectors, leading to the inference that trade affects all firms in a given sector or industry in the same way. Models that adopt a two-factor Heckscher-Ohlin framework with Stolper-Samuelson distributional effects predict sectoral cleavages over international economic policy (Rogowski 1987). Models that assume costly intra-industry factor mobility along the lines of Ricardo-Viner imply homogeneous trade policy preferences among firms in the same sector. Neither approach explains well the observed intra-industry variation in protectionist demands, or inter-temporal changes in a given firm's economic and political responses to undervaluation.

To gain new insights, we draw on recent advances in the economics of international trade, which sees firms, not industries or sectors, as the central mediators of international commerce. The "heterogeneous firm" trade models emerged out of research by Bernard and Jensen (1995, 1999), who were some of the first authors to exploit micro datasets to study variation in exporting (and later importing) behavior at the plant- and firm-level. These studies show that exporters are rare, larger, more productive, and more capital-intensive than non-exporters. Melitz's (2003) model advanced a theoretical explanation by showing that only the largest and most productive firms can generate sufficient profits to cover positive fixed exporting

costs; thus productivity helps explain why firms self-select into trade. Subsequent research finds that multinational corporations—firms with global affiliates—are yet larger and more productive than firms that strictly export (Tomiura 2007, Yeaple 2009).

We build on this new research and prior work on the trade preferences of international firms to provide a more detailed picture of the protectionist demands of businesses. We examine, in particular, variation in foreign direct investment positions in, and the resulting intrafirm trade flows from, countries with undervalued exchange rates. We expect that firm-level investment and intrafirm trade help explain economic and political responses to changes in international economic conditions.

Specifically, we argue that the internationalization of firms into countries with undervalued currencies explains variation in firm demand for trade protection. Our argument extends Milner (1988) and Nollen and Quinn (1993), who show that increases in firm international economic orientation, in addition to industry location, reduce demands for import protection. While it is well known that internationally-oriented firms are particularly susceptible to exchange rate fluctuations (Campa and Goldberg 1997) our paper is, to our knowledge, the first to argue that heterogeneity in firm investment and the resulting heterogeneity in global trade and supply chains shape firm responses to currency undervaluation.[5]

In particular, we argue that firms engaged in foreign direct investment and the fragmentation of production for the purpose of producing parts, components, or services at lower cost from abroad are likely to not oppose undervaluation by countries in their supply chains.

[5] Broz and Werfel (2013) investigate and find weak support for the proposition that firms in industries with a greater share of inputs sourced from abroad are more likely to file AD disputes when the real effective exchange rate appreciates.

Their lack of opposition may derive from the material benefits they accrue from a depreciated foreign currency, which include cheaper foreign assets, more competitive platform exports, and cheaper imported intermediates. That is, all else equal, firms that rely on foreign inputs from countries with undervalued currencies will see profitability increases if domestic real appreciation reduces their production costs. As a result, firms that source from countries with undervalued currencies will be unlikely to engage their home governments for trade remedies when confronted with relatively cheap imports from countries pursuing undervaluation.

In contrast, firms that do not expand into markets with undervalued real exchange rates may be harmed by foreign currency undervaluation, especially if they compete with relatively cheaper imports from countries with undervalued currencies (Campa and Goldberg 1997). As a result, these firms, sometimes large and internationally-oriented, will be more likely to pursue protectionist remedies, such as antidumping, in the face of import competition.[6] (See Gawande, Hoekman, and Cui 2013 for the development of a related argument in the context of seven large emerging market countries.)

At the country-level, we expect more filings against firms in countries with undervalued bilateral real exchange rates, though we expect this effect to be conditional on countries' integration into global supply chains. Integrated countries will face fierce opposition to undervaluation among firms that are not invested in, and thus not benefiting from, their weak currency. We proxy for integration using measures of FDI and intrafirm trade.

While we expect this pattern to hold probabilistically across U.S. trade partners, antidumping filings and trade disputes with China are likely to represent a special case as China

[6] Analyzing antidumping filings in Canada, Ludema and Mayda (2011) find that Canadian firms that compete against Chinese imports are the ones seeking protection.

is labeled a "non-market economy" under both the terms of China's accession to the WTO and its prior treatment under U.S. trade legislation (Messerlin 2004).[7] Over the past three decades, U.S. antidumping petitions against China account for 13.8% of all filed disputes. The large direct investments by U.S. MNCs in China and the resulting supply chains and related party trading with China will change the political calculus of these participant firms regarding temporary trade protection through antidumping duties. MNCs with export-platform operations in China benefit from low cost intermediate goods produced and final goods assembled in China; firms without such operations that compete with Chinese exports will be harmed by an undervalued Yuan.

EMPIRICAL ANALYSIS

Characteristics of Antidumping Petition Filers

Our hypothesis is that firms that are engaged in trade with a country, particularly related-party trade with their foreign affiliates, will be less likely to file antidumping petitions. We compare filers to non-filers in the same product market for evidence that filers are different. We focus specifically on the relative size of filers, their overall international engagement (imports

[7] See Rumbaugh and Blancher (2004). As they note (2004, 8), under the WTO agreement, "other members can invoke "non-market economy" provisions to determine dumping cases for 15 years following [China's] accession." In antidumping cases, being labeled a non-market economy makes "it much easier to reach a positive finding in an antidumping investigation." The methods for determining the 'dumping margin' and the remedies in the context of non-market economies are discussed in detail in Prusa and Vermulst 2013, 219-23. Vietnam is the other country that the U.S. labels as a nonmarket economy.

and exports), and their engagement with the country against which they file (in terms of arms'-length trade and related-party trade).

We consider AD filings in the United States, where individual firms, groups of firms, and labor unions, representing at least 25% of U.S. production of a product, initiate the investigations by filing a petition with the Department of Commerce (DOC). International Trade Administration (ITA) of the DOC next determines whether foreign goods have been sold at less than fair value ("dumped"), defined as a price below that which they are sold in the home market or below an estimate of average total cost. Our data source for both AD petitions and the preliminary ITA rulings is the May 2012 update of the Global antidumping Database (GAD-USA.xls - Bown 2012).[8] (The Data Appendix describes the data sources and defines several of the variables in greater detail.)

Our source of firm-level data is the Census Bureau Linked/Longitudinal Firm Trade Transaction Database (LFTTD), covering the universe of firms in the scope of the economic census.[9] The LFTTD links individual U.S. trade transactions to U.S. firms using a longitudinal database of U.S. enterprises that tracks almost all private sector firms in the United States. (This is, to our knowledge, the first use of these data in the political science literature. See the Data Appendix for a description of the data. See Bernard, Jensen, and Schott (2009) for applications.)

The results are presented in Table 1. A total of 559 organizations, including firms, trade associations, unions, and other organizations, filed antidumping petitions over the period 1993-2009. We are able to match 425 of these organizations to the Census Bureau's Business Register, an excellent match rate of 76 percent considering that not all filers are private sector firms.

[8] For applications of the data, see Pierce (2011) and Bown and Crowley (2013a,b).

[9] Our analysis begins in 1993 because this is the first year LFTTD data is available.

Firms that file antidumping petitions are relatively large within their industries, having an average rank of the 88th percentile in terms of employment within their product market industry (line 1). The large size of filers within their industry may make assembling the coalition of 25 percent of U.S. production easier. Anti-dumping petition filers are generally engaged in international trade, being above the median in terms of value of merchandise exports and merchandise imports: filing firms have an average rank of 74th percentile in terms of exports and 68th percentile in terms of imports (lines 2 and 3, respectively). In contrast to expectations derived from prior studies of firm trade preferences, we find that the average antidumping filing (or protectionist) firm is an internationally engaged firm.

Table 1. Filer Characteristics at Date of Filing
Pooled 1993-2009

		Prevalence of Activity (indicator [0,1])		Rank within Industry (of value)	
	N = 425	Mean	Std Dev	Mean	Std Dev
1	Employment*	5871	12860	0.88	0.19
2	Export	0.75	0.43	0.74	0.38
3	Import	0.68	0.47	0.68	0.42
4	Related-Party (RP) Export	0.59	0.49	0.61	0.45
5	Related-Party (RP) Import	0.52	0.50	0.55	0.46
6	Export to Contemporaneous AD country in same HS4 product	0.29	0.45	0.36	0.45
7	Import from Contemporaneous AD country in same HS4 product	0.25	0.43	0.33	0.44
8	RP Export to Contemporaneous AD country in same HS4 product	0.12	0.32	0.21	0.37
9	RP Import from Contemporaneous AD country in same HS4 product	0.12	0.33	0.21	0.38

In terms of trade within the product category with the country that the firm files against, we find, perhaps not surprisingly, that antidumping filers are below the median in terms of

overall imports and exports. Anti-dumping filers are in only the 36th percentile in terms of exports (within product category to the target of the petition) and only 33rd percentile in terms of imports (within product category from the target) (lines 6 and 7, respectively).

When we examine where in the distribution antidumping filers are in terms of related-party trade in the product category with the target country, we find that they are quite small relative to other participants in their industry. They are in only the 21st percentile in terms of related-party exports (within product category to the target of the petition) and the 21st percentile in terms of related-party imports (within product category from the target of the petition). The relatively large standard deviations suggest that many firms have zero related party imports and exports with the country against which they file. Antidumping filers, on average, have much smaller supply chain relationships with target countries in the product categories in which they file. The first column reports the share of firms engaged in the various types of trade. Only 12 percent of filers had either related-party exports to or related-party imports from the country filed against.

Table 1 also reports the incidence of filing firms' engagement in international activity (first column). Most filers export (75 percent) and import (68 percent) and more than 50 percent are engaged in related party trade. (This is a much higher level of international engagement than the manufacturing sector where overall fewer than 10 percent of manufacturing firms import or export.) In contrast, only between a quarter and a third are engaged in exporting or importing with the country filed against and only 12 percent are engaged in related party trade. Filers are internationally engaged, but not with the countries in the products they file against.

We further examine how filing firm characteristics evolve over time. We take the sample of firms that file in the 1993-1997 period and examine their characteristics in 1993 and in 2009.

Table 4 presents the characteristics of the sample in 1993. The sample is the 48 firms that filed in the 1993-1997 period and survived to 2009 (of a total of 89 filers 1993-1997). Table 2 presents the same firm characteristics for the 48 survivors in 2009.

We focus on the comparison of the filing firms' trade activity with Mexico and China. This is a particularly salient comparison because, as noted earlier, Mexico and China have similar factor endowments and compete across a wide range of similar products, but have pursued very different strategies *vis a vis* international trade. Mexico has largely allowed its currency to float and has pursued an open trading policy with the rest of North America (as well as Japan and the member countries of the European Union). China has maintained an under-valued currency and has arguably pursued an export-led economic development policy that encourages foreign direct investment and the resulting related party trades.

[Table 2 here]

Comparing the 1993 and 2009 statistics Table 2, we see that there have been significant changes in the filing firms' engagement with China in particular. Rows 2 and 3 show that these firms' overall international engagement, as measured by the share of firms that export or import, has actually declined over time. In contrast, these firms' engagement with Mexico and, particularly, with China has increased. In 1993, only 17 percent of the AD filers had related-party imports from China. In 2009, almost half (48 percent) had related-party imports from China. The share of firms importing from China in general also shows significant increases over the period, increasing from 33 percent to 63 percent.

Anti-dumping filing firms engagement with Mexico also increased, but by less from a higher initial level. In 1993, 31 percent of AD filing firms had related-party imports from

Mexico; in 2009, the share had increased to 42 percent. The share of firms with imports in general increased from 46 percent to 56 percent.

We interpret these simple statistics as evidence supporting the notion that filing firms have changed the location of their global supply chains to take advantage of economic opportunities (including an undervalued currency).

Filing firms are not the only firms to have changed the locations of their supply chains. Table 3 presents evidence on how much more prevalent investments in China have become over time. The table presents the employment weighted (as a proxy for market share) mean of indicator variables showing engagement in international trade with China and Mexico for firms in industries that had an AD filing between 1993-1997 and those in industries that did not. In 1993 in industries that had an AD filing 1993-1997, we see that firms accounting for 22 percent of employment had RP imports from China. Firms with any direct imports from China accounted for 41 percent of 1993's employment. In 2009, firms with imports from China accounted for 60 percent of employment in industries that had AD filings 1993-1997. Firms with RP imports from China accounted for 41 percent of employment – a significant increase in the market share of firms with investments in China. In contrast, the changes in importing from Mexico are much smaller. These results demonstrate that firms in AD industries increased their investments in China significantly more than in Mexico.

Table 3 also shows the same data for industries that did not have an AD filing 1993-1997. While starting from a lower level of engagement with China, firms in these industries exhibit similar trends.

[Table 3 here]

The increase in firms with investments in China, and the associated significant increase in the market share of firms with investments in China, is important because a requirement for a successful AD filing is filers need to collectively represent 25 percent of activity in the product being filed against. As the share of economic activity accounted for by firms with investments in China grows, it becomes increasingly difficult to organize a coalition of firms representing 25 percent of production of the product.[10]

For more direct evidence on the relationship between undervaluation and changes in investment, we examine whether U.S. multinationals change their investment in countries with undervalued currency, paying particular attention to affiliates that are vertical (the affiliate exports to the U.S. parent) vs. horizontal (the affiliate does not export) using confidential survey data on the global operations of U.S. multinationals, collected by the Bureau of Economic Analysis.[11] Using detailed sales data at the foreign affiliate level, we create variables to capture the overall presence of MNC affiliates in foreign countries, as well as the presence of vertical and horizontal affiliates specifically. (See the appendix for details on the construction of these variables.)

We link the total number of each affiliate type with our country-level measure of undervaluation, which we average and lag for the five years leading up to and including each

[10] The threshold requirements for an antidumping filing involve the support of producers of 25% of either the total volume or value of the production of the ´domestic-like product.´ For a detailed description, see http://ia.ita.doc.gov/petitioncounseling/pcp-industry-support.html

[11] See N. Jensen (2013) for applications of the BEA data.

benchmark survey.[12] (The derivation of the undervaluation index is detailed in the Data Appendix.) We include a lagged dependent variable to capture initial conditions and to better isolate the response to currency undervaluation in the host country. Specifically, we estimate the following model using ordinary least squares:

$$Affiliates_{it} = \alpha + \beta Affiliates_{it-1} + \delta Underval_{it-1} + \gamma Year + \varepsilon_{it} \quad \textbf{(1)}$$

where $Affiliates$ represents the logged number of affiliates[13] in country *i* in benchmark year *t*, for separate affiliate types; *t-1* indicates the (5 year) period lag. We also estimate a model where the dependent variable is change in affiliates as a function of undervaluation and year fixed effects.

[Table 4 here]

Table 4 reports the results of simple models of the affiliate counts regressed on undervaluation and the lagged number of affiliates (top panel) and models of changes in affiliate counts regressed on undervaluation (bottom panel). Our results suggest a positive and statistically significant relationship between undervaluation and affiliate presence for each type of foreign affiliate (except non-exporting, horizontal affiliates in column 5). The magnitude effects are largest for related party affiliates. The results provide suggestive evidence that undervaluation is particularly attractive to firms conducting vertical, rather than horizontal, FDI.

[12] For example, the average values of the covariates between1990-1994 are linked to the 1994 benchmark. We also experimented with one-year lags and the results were very similar.

[13] We add one to the total number of affiliates before taking logged values so that countries with zero affiliates are not excluded from the analysis.

Currency Undervaluation, Trade Flows, and Anti-Dumping Filings at the Country Level

To conduct our country level analysis, we link the antidumping petitions to country-specific variables to generate a unique cross-national time-series dataset that includes a number of theoretically informed country characteristics that vary annually. Subject to data availability, our sample includes all countries in the world for which currency undervaluation data are available, for either 1982-2011 or 1997-2011 (depending on the models specified). A major advantage of our approach is that our explanatory variables are specific to countries outside the U.S. In contrast to the majority of studies, which model AD filings as a function of filing country and industry characteristics, we precisely match exchange rate, investment and other macroeconomic data to the countries named (and not named) in the AD disputes.

We report the estimates of the country-level determinants of antidumping filings by U.S. firms over either 1982-2011 or 1997-2011. In terms of the dependent variable, we count the number of antidumping petitions filed in the U.S. against each country, for each year in our sample. We also assess, as dependent variables, the number of cases per country-year, where antidumping petitions were granted, and the number of cases where the petitions were denied.

One main independent variable in our analysis captures real currency undervaluation for all countries in our sample. We generate bilateral real exchange rates, unique to each country-year in our sample, to more precisely capture the association between a particular country's real undervaluation relative to the U.S. dollar, and the likelihood of trade disputes against that particular country. (For further details of the measurement of undervaluation, please see the Data Appendix.)

We include several indicators of a country's openness to foreign direct investment flows. One is an indicator for capital account openness from Quinn and Toyoda (2008): countries with

open capital accounts have limited capacity to restrict U.S. foreign direct investment, which is likely to lessen the likelihood of antidumping filings. We also include an indicator for whether a country has a bilateral investment treaty with the U.S. We propose that firm value chains will influence anti-dumping filings, and both capital account openness and a bilateral investment treaty with the U.S. are likely to enable or enhance vertical integration by U.S. firms.

We attempt to gauge the presence of U.S.-based global production networks by incorporating measures of intrafirm (or related party) and arm's-length imports from each country into the U.S. as a share of U.S. GDP, 1996-2010.[14] Intrafirm trade captures the degree to which MNCs have made vertical FDI in each country and rely on the country for vertically integrated inputs, while arm's length imports indicate that the source of the imported product is an unaffiliated party.

We control for a host of variables identified in the literature as correlates of trade disputes and of our main explanatory variables. The Polity 2 index measures democracy: prior studies have found that democracy to be a positive correlate of trade disputes (Busch 2000, Rosendorff 2005, and Sattler and Bernauer 2011); GDP per capita proxies for wealth and overall institutional quality, both of which are positive correlates of trade disputes (Knetter and Prusa 2003, Sattler and Bernauer 2011). In the models where data for U.S. intrafirm trade data are not available, we include a measure of the bilateral trade balance with the U.S. as a share of U.S. GPD, with positive numbers indicating a U.S. trade surplus with the other country.

Since the initiation of an AD filing requires firms to evaluate the material injury that they have suffered, we expect a non-trivial delay between real exchange rate movements and the

[14] We note that the data do not allow us to differentiate between imports by U.S.-based parent firms from affiliates abroad and imports by U.S.-based affiliates from foreign-based parent firms.

dependent variable. We therefore introduce all of our regressors with a one-year lag, except for GDP/capita, which we lag three years in keeping with the estimation choice in Knetter and Prusa (2003, 9). (The timing of the GDP lag among 1, 2, and 3 lags is not consequential.)

The yearly count of anti-dumping disputes, our main dependent variable, ranges from zero to a maximum of 12. The variable is strongly skewed, with about 85% of the observations equaling zero. The mean (.19) is exceeded by the variance (.70), a strong signal of overdispersion.

To address overdispersion in the data, we follow the literature in assuming that the data are generated by a negative binomial random variable. (See Hilbe 2011 for a discussion.) Additional diagnostics, including a Vuong (1989) test, suggest that a zero inflated negative binomial model is most appropriate due to the very large number of zeros relative to other values.[15] To account for prevalence of zero-value observations, investigators use zero inflated binomial models (ZINB hereafter), estimating a first stage model using a control for the zeros.[16] (Copelovitch and Pevehouse 2011 and Sattler and Bernauer 2011 adopt either the same or related approaches in controlling for the 'excess' zeros found in bilateral trade disputes data.) We relax the assumption of i.i.d standard errors, allowing for country-level clustering (i.e. intra-country correlation). We use the prior number of trade disputes to control for possible country-specific omitted variables, and we enter year fixed effects (γ, t).

The full model estimated for the longest available data is:

[15] Following the estimation of a Poission baseline model, we find that a deviance goodness of fit test suggests that the Poisson distribution is also not appropriate due to overdispersion.

[16] We use trade disputes lagged three years as the predictor for overdispersion. The estimates are done in STATA 11 using the ZINB command with standard errors clustered by country.

$$Disputes_{i,t} = ß_0 + ß_1(Disputes_{i,t-1}) + ß_2(Undervaluation_{i,t-1}) + ß_3(GDP/Per\ Capita_{i,t-3})$$

$$+ ß_4(Polity_{i,t-1}) + ß_5(Capital\ Account\ Openness_{i,t-1}) + ß_6(Bilateral\ Investment\ Treaty_{i,t-1})$$

$$+ ß_7(Bilateral\ Trade\ Balance_{i,t-1}) + \gamma, t + \varepsilon_{i,t} \qquad t=1982\text{-}2011,\ i=109\text{-}113 \qquad \textbf{(2)}$$

To test our argument with regard to firms and their value chains, we estimate a version of **(2)**, substituting Arm's Length and Related Party Imports data for the Bilateral Trade Balance, and adding appropriate interaction terms with undervaluation:

$$Disputes_{i,t} = ß_0 + ß_1(Disputes_{i,t-1}) + ß_2(Undervaluation_{i,t-1}) + ß_3(GDP/Per\ Capita_{i,t-3})$$

$$+ ß_4(Polity_{i,t-1}) + ß_5(Capital\ Account\ Openness_{i,t-1}) + ß_6(Bilateral\ Investment\ Treaty_{i,t-1})$$

$$+ ß_7(Arm's\ Length\ Imports/GDP_{i,t-1}) + ß_7(Related\ Party\ Imports/GDP_{i,t-1})$$

$$+ ß_7(Arm's\ Length{*}Undervaluation_{i,t-1}) + ß_7(Related\ Party{*}Undervaluation_{i,t-1})$$

$$+ \gamma, t + \varepsilon_{i,t} \qquad t=1997\text{-}2011,\ i=109\text{-}113 \qquad \textbf{(3)}$$

Models (2) and (3) are re-estimated separately with the number of country year Affirmations of anti-dumping filings and Negations of anti-dumping filings as dependent variables.

The models in Table 5 represent the longest available sample of anti-dumping filings. The models in Table 6 contain theoretically relevant variables, especially indicators of related party and arm's length imports to the U.S., but the sample is limited to 1997-2011.

The models reported in Table 5 estimate the relationship between bilateral real exchange rate undervaluation and AD disputes for all non-banking center countries excluding China. China is analyzed separately because, as noted above, it is categorized under U.S. trade law as a

"Non-Market Economy."[17] The initiation and adjudication of disputes for a non-market economy differ from cases involving market economies. (See the discussion in Tatelman 2007.)

The results in column 1 suggest that undervaluation increases the number of trade disputes, which is similar to prior findings in the literature. In particular, a one-standard deviation increase in undervaluation increases the number of AD filings by about 1.5.

[Table 5 here]

We find, to our knowledge uniquely, that greater openness to international capital flows and the presence of a bilateral investment treaty with the U.S. are associated with *reduced* likelihoods of anti-dumping filings. Both open capital markets and a bilateral investment treaty enable FDI investment by U.S. firms in the host country, a point to which we return below. While the control variables are not the main focus we find, consistent with other studies, that U.S. firms are more likely to file antidumping disputes against firms in countries that are more democratic, wealthier, and with whom the U.S. has a trade deficit.

How well do the estimates in the column 1 fit the data? We examine the predictions of column 1 in Figure 3, which shows actual trade disputes and the predicted number of trade disputes based on the zero-inflated negative binomial estimates reported in column 1. Figure 3 shows that model 1 generates a very close approximation between predicted and observed trade disputes, 1982-2011.[18]

[17] Empirically, we find the parameter estimates for China to be quite different from the rest of the sample and this parameter heterogeneity also leads us to present analyses of China separately.

[18] Some scholars have found that trade disputes are largely driven by the steel and metal industries (e.g., Broz and Werfel forthcoming). We explore this finding by restricting the sample

The results in Table 6 explore the core theory about the relationship between and among undervaluation, trade flows, and trade disputes. Specifically, we examine how arms'- length and related party export shares relate to trade disputes in the context of undervalued currencies.

The sample is necessarily shorter owing to the unavailability of related party and arms'-length trade data from the U.S. Bureau of the Census before 1996. The model in column 1 in Table 5 is re-estimated on the shorter sample (column 4 in Table 5) to assess whether the parameter estimates differ owing to changes in the length of the sample. The signs, magnitudes, and levels of statistical significance of the parameter estimates are similar between column 1 (1982-2011) and column 4 (1997-2011).

The estimates reported in column 1 of Table 6 indicate that the unconditional relationship between related party imports is positive: countries from which U.S. intrafirm imports represent a higher share of U.S. GDP are more likely to incur trade disputes. Our theory, however, proposes an interactive effective between and among trade flows and undervaluation. We report interactions between the trade shares and undervaluation in the remaining columns of Table 6. The results in columns 2 (with trade shares and the interactions with undervaluation and 3 (with full covariates additionally added) are consistent with the hypothesis that firm participation in international production networks mediates the relationship between undervaluation and protectionist demands. In particular, we find that undervaluation increases or decreases the likelihood trade disputes depending on the composition of imports. Undervaluation is associated with an increased likelihood of antidumping filings against countries from which more arms' length U.S. imports originate, and with fewer disputes against countries from which U.S. related

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to non-metal and metal disputes, defined as HS codes 72-83. The relationship between undervaluation and disputes is similar across those subsamples.

party imports represent a greater share of U.S. GDP. Figure 4 displays the predicted effects of increasing related party trade on trade disputes, given undervaluation. With related party imports at levels of roughly 4 billion U.S. dollars and beyond, the likelihood of a trade dispute with the U.S. drops below one trade dispute per year, asymptotically approaching zero thereafter.

In column 4, we substitute U.S. inward FDI for related party trade under the assumption that FDI precedes U.S. intrafirm imports. The intuition is that related party imports arise (in some sense by accounting identity) from U.S. foreign direct investment in the host country or foreign direct investment in the U.S. Our results indicate that FDI lessens trade disputes in the context of undervaluation controlling for the effects of arm's length imports into the U.S.

Do the forces that influence antidumping filings influence the affirmation or negation of the filings? The results in Columns 2 and 3 in Table 5 and columns 5 and 6 in Table 6 address the granting or denial of the trade disputes (respectively) using the same county-year ZINB panel models. The parameter estimates for the Affirmation (dumping granted) models (columns 2 and 5 in Tables 5 and 6, respectively) have identical signs and levels of statistical significance as the parameter estimates for antidumping filings and are very similar in magnitude. The same forces at work in filing antidumping petitions are associated with the affirmation of these filings.

In contrast, the parameter estimates for the Negations models reported in columns 3 (Table 5) and 6 (Table 6) are very different from the antidumping filings models. Of key interest is that neither the arm's length or related party variable nor undervaluation nor any of the interaction terms emerged as being close to statistically significant. A key correlate of a Negation is whether the U.S. ran a trade surplus with the targeted country.

We investigate the China case explicitly and report the results in Table 7. We estimate negative binomial models since the Vuong test does not indicate the presence of excess zeroes.

The results indicate that increased arms' length imports from China are associated with increases in trade disputes, while related party imports are strongly negatively correlated with filings. Figure 5 demonstrates the substantive impact of the main independent variables based on the results from model 3 of Table 7, and Figure 6 shows that our model closely predicts actual antidumping petitions by U.S. firms against China.

CONCLUSION

Relying on recent advances in the international trade literature, we present a new explanation for firm protectionist demands in the context of persistent currency undervaluation and increasing import competition. Unlike existing research, we rely on neither alignments of factor of production, nor sectoral cleavages nor firm international orientation per se. Rather, we argue that the specific locations of global supply chains at points in time explain firm responses to undervaluation.

We explore our arguments relying on both micro-level firm and macro-level national data. Consistent with our argument, we document a negative relationship between related party trade—our proxy for participation in global supply chains—and antidumping disputes in the context of undervaluation using both the firm-level and national-level data.

Our examination of the universe of U.S. manufacturing firms finds that the standard distinction between domestically oriented firms and internationally oriented firms in understanding trade disputes is not analytically useful in this context. Firms that file for trade remedies are much larger in terms of employment than are industry peers in the same six digit industry. Further, they are more internationally engaged in imports and exports than the median firm in their industry. Where they differ from their peers is in the levels of related party trading originating in

countries against whose firms they file. Filing firms are internationally engaged, but their supply chains do not generally include activities in countries against whom they file. We also find that currency undervaluation is associated with increases in the number of MNC affiliates in a country, particularly for foreign affiliates that export back to the U.S. MNC parent (vertically integrated affiliates). We find broad increases in U.S. firms' engagement with China (and far smaller changes in engagement with Mexico). The rising share of economic activity accounted for by firms with investments in China makes organizing a coalition representing 25 percent of activity in a product market increasingly difficult.

At the country level, we find that the effects of currency undervaluation on antidumping filings are a non-linear function of the economic importance of the countries against whose firms are being filed, as measured in terms of levels of related party trade and arm's length trade. High levels of arm's length imports into the U.S. in the presence of high levels of undervaluation are associated with increased disputes. In contrast, high levels of related party trading sharply diminish the likelihood of trade disputes with the U.S. We find the same measures are associated with the likelihood of the petition winning.

Our paper contributes to the literature on firm political and economic behavior in the context of changes in the international political economy by demonstrating that protectionist demands are highly linked to firm supply chains. Once firms have investment or trade positions in countries, trade disputes become less likely, even in the context of currency undervaluations. Given the rapid expansion of global supply chains, our findings offer a partial explanation for the decline in antidumping filings. The current round of semi-competitive 'currency undervaluations' need not lead to increased trade disputes.

Data Appendix

Anti-Dumping Petition Data

Our data source for AD petitions is the May 2012 update of the Global Anti-dumping Database (GAD-USA.xls - Bown 2012). Coverage includes all antidumping petitions filed in the U.S. since 1980, including the name of the petitioner, a detailed product code corresponding to the product(s) under investigation, the country host of the firm against which the dispute is filed, and the date of the initiation of the investigation. [1] We also consider the outcomes of these filings, also from Bown (2012). We take the preliminary dumping decisions, and code separately affirming (denoted with "A"=1, all others 0) and negating (denoted with "N"=1, all others 0). Each variable is summed by country year.[2]

Firm and Intra-Industry Level International Engagement Data

To examine the behavior of individual firms in an industry context, we use the U.S. Linked/Longitudinal Firm Trade Transaction Database (LFTTD), which links individual U.S. trade transactions to U.S. firms using a longitudinal database of U.S. enterprises that tracks almost all private sector firms in the United States. (For more information on the LFTTD, see Bernard, Jensen, and Schott (2009).) For each export and import transaction, we observe the ten-digit Harmonized System classification, the (nominal) value and quantity shipped, the shipment date, the destination or source country, the transport mode, and whether the transaction takes place at "arm's length" or between "related parties". Export partners are "related" if either party owns, directly or indirectly, 10 percent or more of the other party. For imports, the ownership

[1] The GAD lists data from 1980 onward as being available, although data for 1979 for the U.S. are available in the file.

[2] From column "J" in Bown 2012 in GAD-USA.xls.

cutoff is 6 percent.

We match the antidumping firm filings data compiled by Bown (2012) to the Census Bureau's Business Register using the name of the filing organization. (Some of the filers are not firms; filing organizations include, e.g., labor organizations, farm produce coops, and cities.) Once the antidumping filing firms are matched to the Business Register, we use a common identifier to match to the LFTTD and the Census Bureau's Longitudinal Business Database (LBD). The LBD contains information on industry and employment for almost all private sector establishments in the U.S. (See Jarmin and Miranda (2002) for more information.) The combination of the LBD and the LFTTD allow us to construct a detailed and comprehensive picture of U.S. firms' domestic operations and international trade relationships.

We classify firms into product markets based on the 6-digit NAICS industry that the firm is active in which it has the most employment (using information from the Census Bureau's Longitudinal Business Database) for each year. All firms are classified into a single 6-digit industry.

Restricting the sample to the manufacturing sector, we determine the percentile ranking of each firm within its 6-digit NAICS industry along several dimensions for each year.[3] We construct two sets of measures for firms. The first is the share of firms that engage in a particular

[3] The North American Industrial Classification System (NAICS) is used to classify producers based on the production technology used in the establishment. The Harmonized System (HS) is used to classify products in international trade. Unfortunately, the two systems are distinct systems with little structural similarity. We classify firms at the 6-digit NAICS level to obtain fairly narrow company comparisons. We compare imports and exports of products at the 4-digit level as this is the level we thought the AD filing data we most detailed and still reliable.

activity, e.g. exporting with a country that had an antidumping petition filed against it. We also construct the rank of each firm within its 6-digit NAICS industry in terms of the value of a particular activity, e.g. the rank of the firm within its industry in terms of its related-party (RP) imports from China. The measures include the employment, exporting or total merchandise export value, importing or total merchandise import value, merchandise exports in the 4-digit HS product category to the country that is filed against, merchandise imports in the 4-digit HS product category to the country that is filed against, and related party exports and imports in the 4-digit HS category to/from the country that is filed against. We also report engagement with China and Mexico.

U.S. Multinational Corporation Affiliate Data

We rely on confidential firm-level data from the Bureau of Economic Analysis (BEA) quinquennial Benchmark Surveys of U.S. Direct Investment Abroad. The International Investment and Trade in Services Survey Act requires that owners of foreign affiliates[4] detail the balance sheets, income statements and international transactions of their affiliates. As a result of the confidentiality assurances and the penalties for noncompliance, the coverage is considered nearly complete and the accuracy of the responses is high. We use detailed affiliate-level data from the 1994, 1999, 2004, and 2009 benchmark surveys. The affiliate-level data allow us to decompose affiliate sales to a variety of buyers, including the U.S. parent, the host country, and other foreign affiliates.[5] In particular, we construct the following variables to represent different types of investment for each country-benchmark year:

[4] Any U.S. person with direct or indirect ownership of ten percent or more of the voting securities of a foreign business during the benchmark fiscal year owns a foreign affiliate.

[5] The data on foreign affiliate sales broken down by destination are collected for majority-owned affiliates only.

- Total affiliates: the total number of affiliates of U.S. MNCs
- Related-party exporters: the total number of affiliates that export to the U.S. parent or to other foreign affiliates (vertical affiliates)
- Exporters to headquarters: the total number of affiliates that export to the U.S. parent (vertical affiliates)
- Exporters: the total number of affiliates that report positive exports
- Non-Exporters: the total number of affiliates that do not report positive exports (horizontal affiliates)

Computing Undervaluation vis-à-vis the U.S.

The real exchange rate can be thought of as the price of tradables relative to non-tradables. Our bilateral real exchange rate index captures the unique yearly value of a country's goods, relative to those in the U.S. at the prevailing nominal exchange rate. To generate our index, we rely on price level data from the Penn World Tables (Heston et al. 2012). In particular, we compute:

$$RERunadj_{it} = \ln(XRAT_{it}\,/PPP_{it}). \qquad \textbf{(x)}$$

We adjust for two well-known determinants of the real exchange rate. First, to account for the Balassa-Samuelson effect (i.e., that relative prices of nontradables tend to increase with country wealth), we adjust for GDP/capita, $GDPPC_{it}$. Second, following the IMF (2012), our index captures capital controls using data from Quinn and Toyoda (2008). (See Quinn, Schindler and Toyoda 2011 for a review of indicators of financial globalization.) Our undervaluation index is the residual ε_{it} of the following regression:

$$RERunadj_{it} = \alpha + \beta \ln GDPPC_{it} + \delta CAOPEN_{it-1} + \gamma_t + \varepsilon_{it} \qquad \textbf{(x)}$$

where γ_t is a year fixed effect term, and $CAOPEN_{it-1}$ is the Quinn/Toyoda capital controls index for country *i* in year *t-1*. [6]

Following Lane and Milessi-Ferretti 2007, we exclude banking center/tax haven countries from the analyses because the exchange rate valuations and trade data for these countries are affected by the tax allocation strategies of multinational companies as much or more than the economic fundamentals of those countries.[7] (See also Gravelle 2013.)

[6] The data for five countries for years in which those countries experienced hyperinflation during war or civil unrest are excluded owing to unreliable PWT data: Iraq during the first Gulf War, Ghana during its civil war, Zimbabwe during hyperinflation, and Georgia (1995) and Nicaragua (1988). The estimation results are unaffected by the inclusion or exclusion of these cases.

[7] In this study, the countries omitted because of their designations as "tax haven" banking centers include the Bahamas, Bahrain, Barbados, Hong Kong, Ireland, Luxembourg, Panama, Singapore, and Switzerland. See Gravelle 2013 (p.3) for a list of countries with a "tax haven" designation. All of the results reported here are substantively unaffected by the exclusion or inclusion of the data for these countries.

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Figure 1. Imports, Exports and Total Anti-dumping Filings by Firms in the U.S., 1982-2011

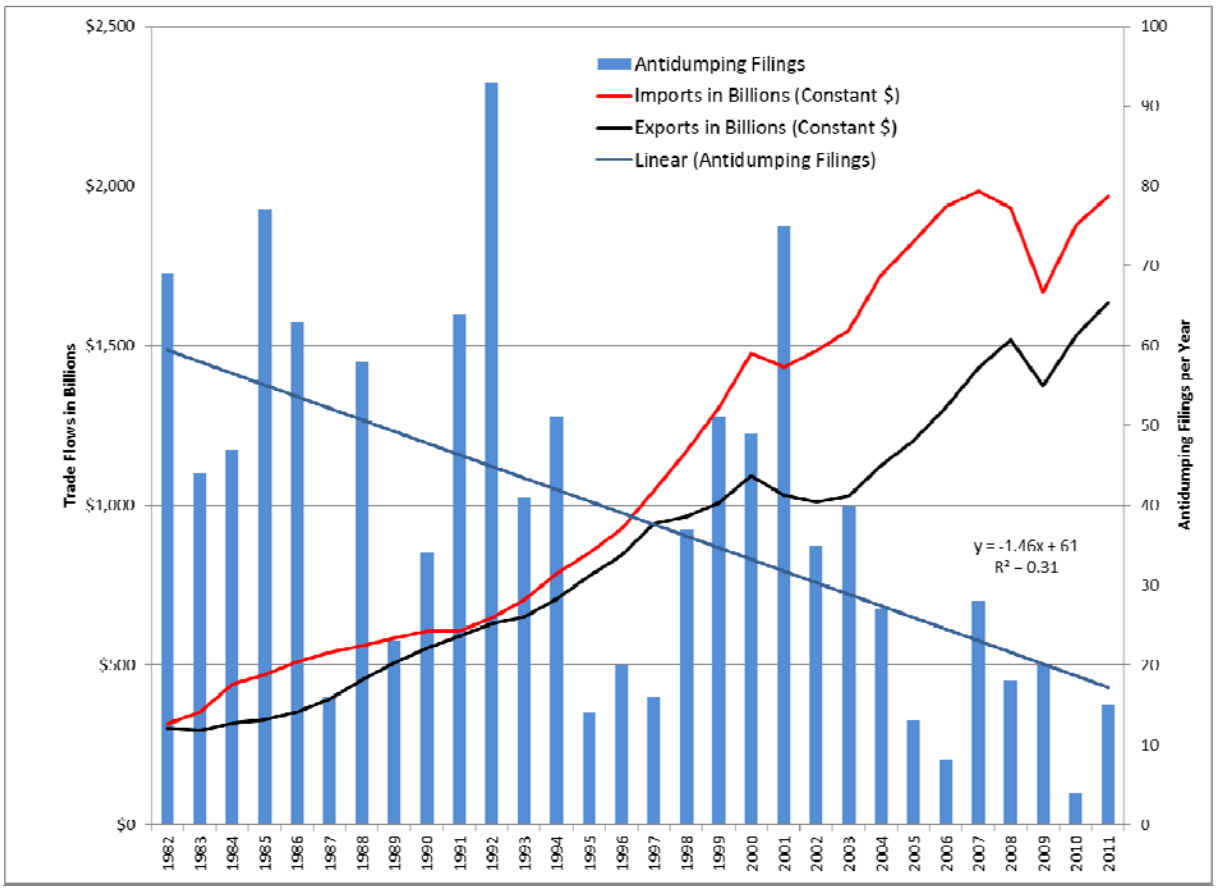

Figure 2. Real Exchange Rates of Mexican Peso and Chinese Yuan Relative to the U.S. Dollar, 1975-2010.

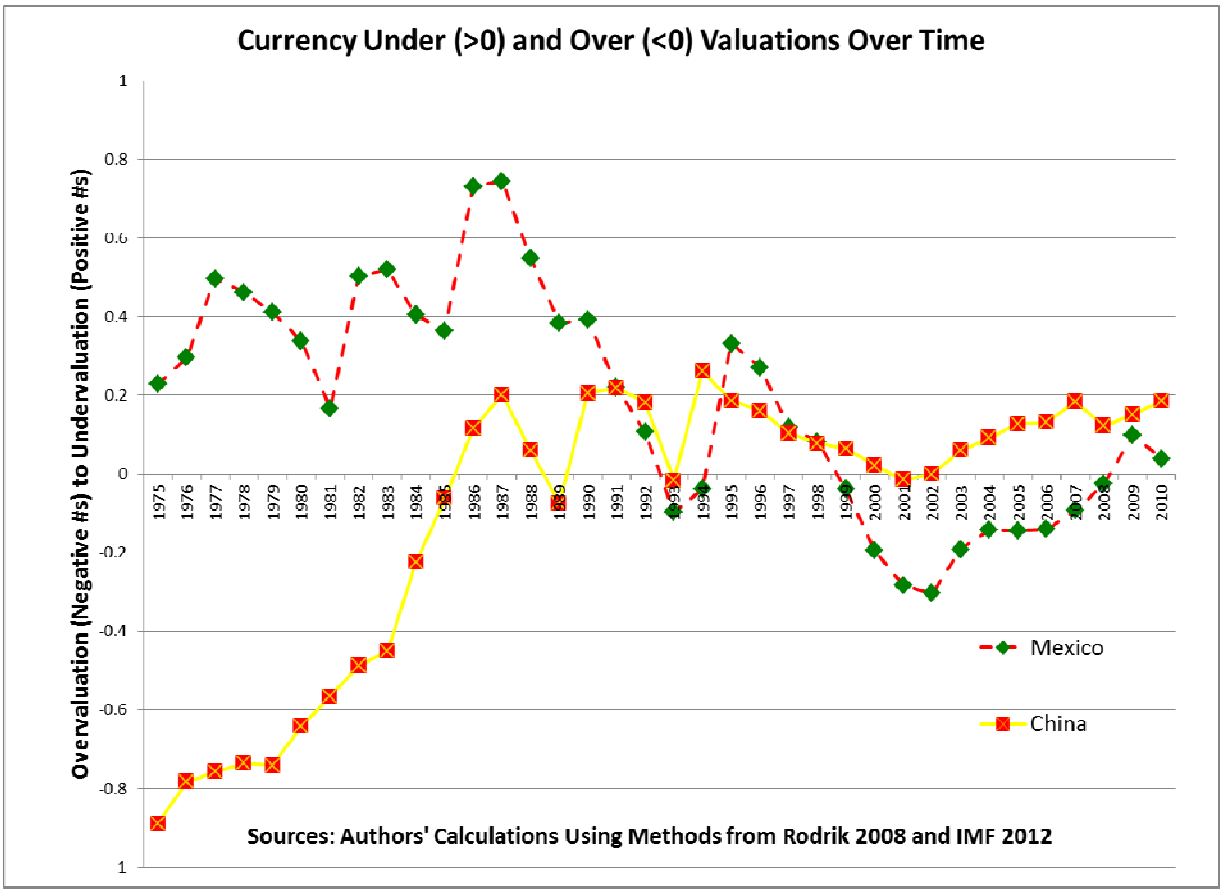

Figure 3. Actual vs. Predicted Trade Disputes.
Derived from results in model 1, Table 5.

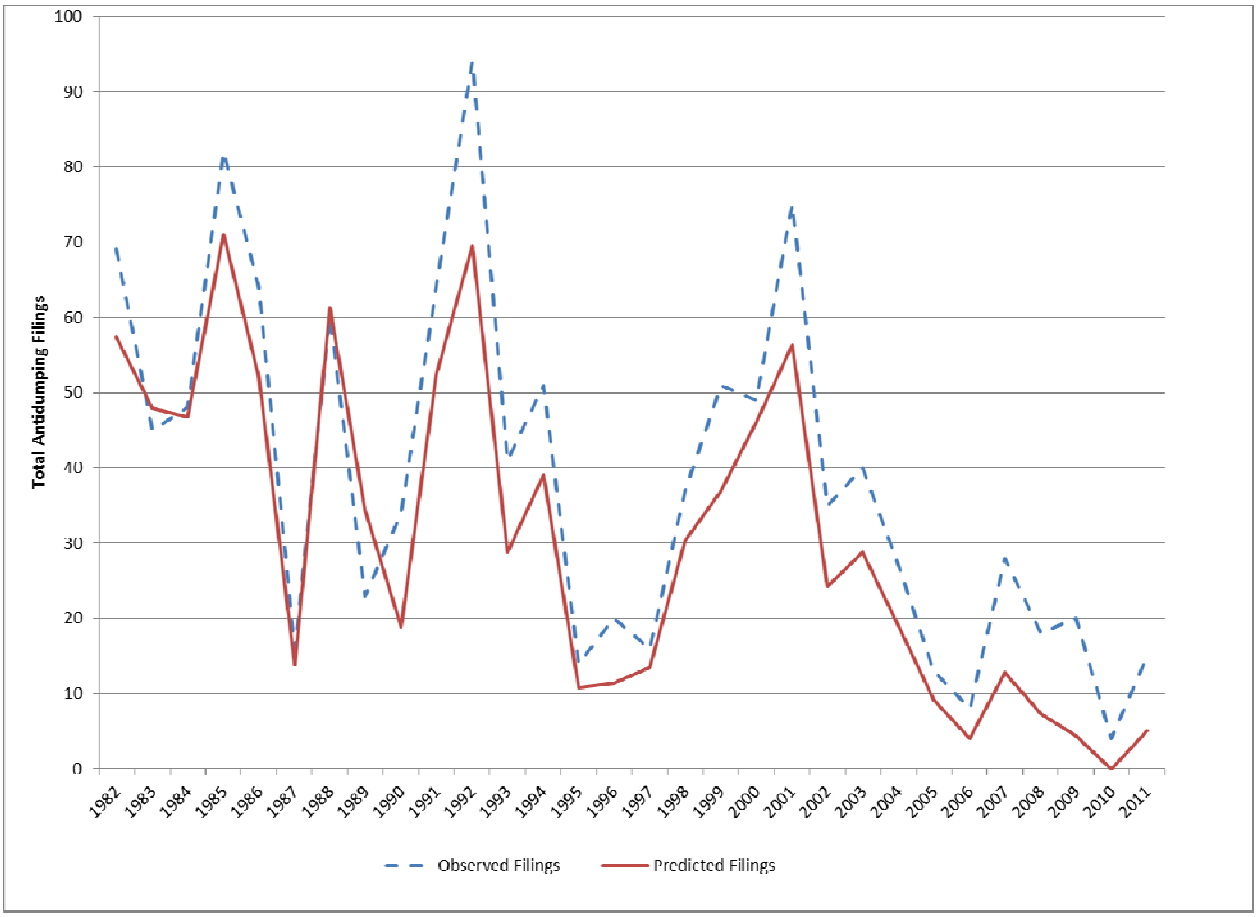

Figure 4. Predicted Anti-dumping Petition Filings.
Derived from results in model 3, Table 6.

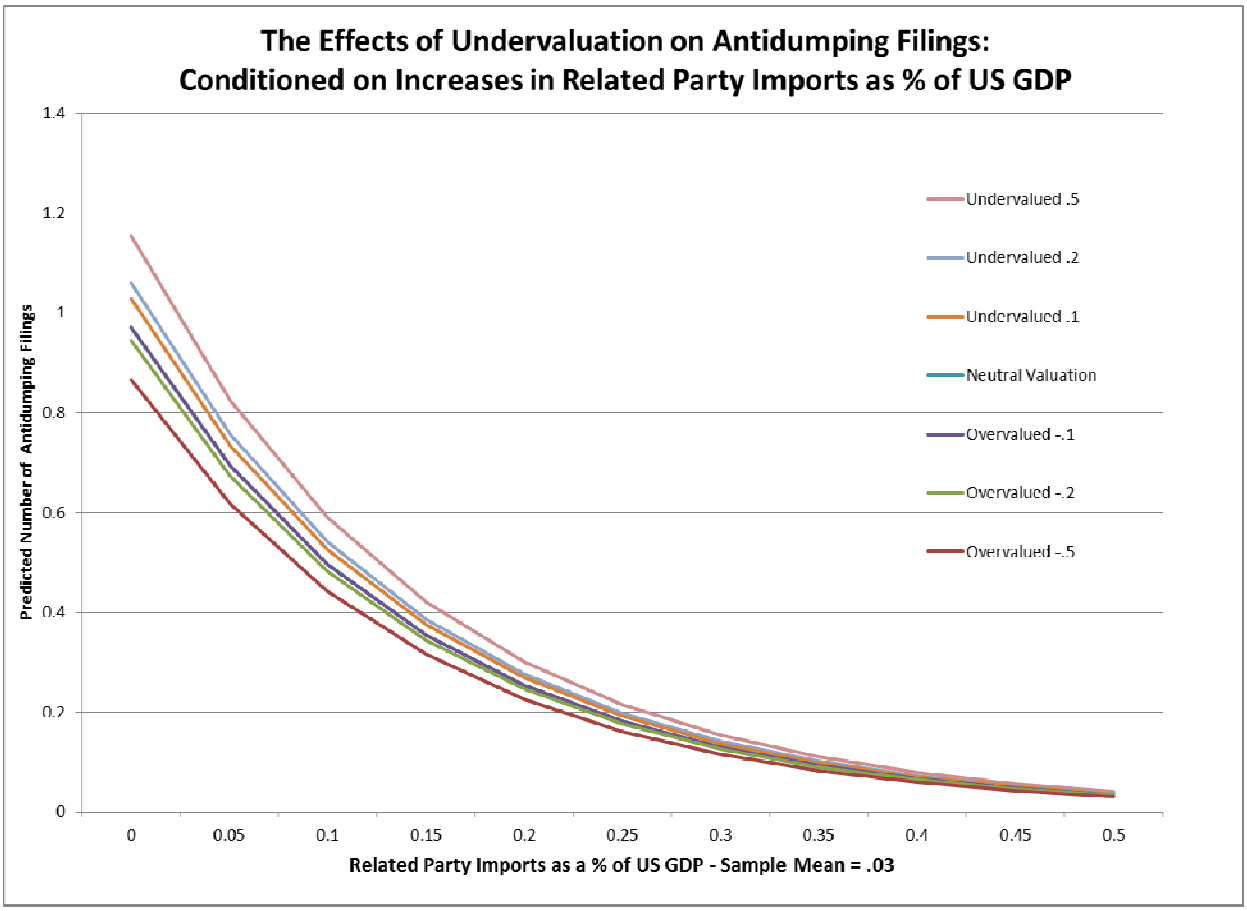

Figure 5. Predicted Anti-dumping Petition Filings.
Derived from results in model 3, Table 7 (China only).

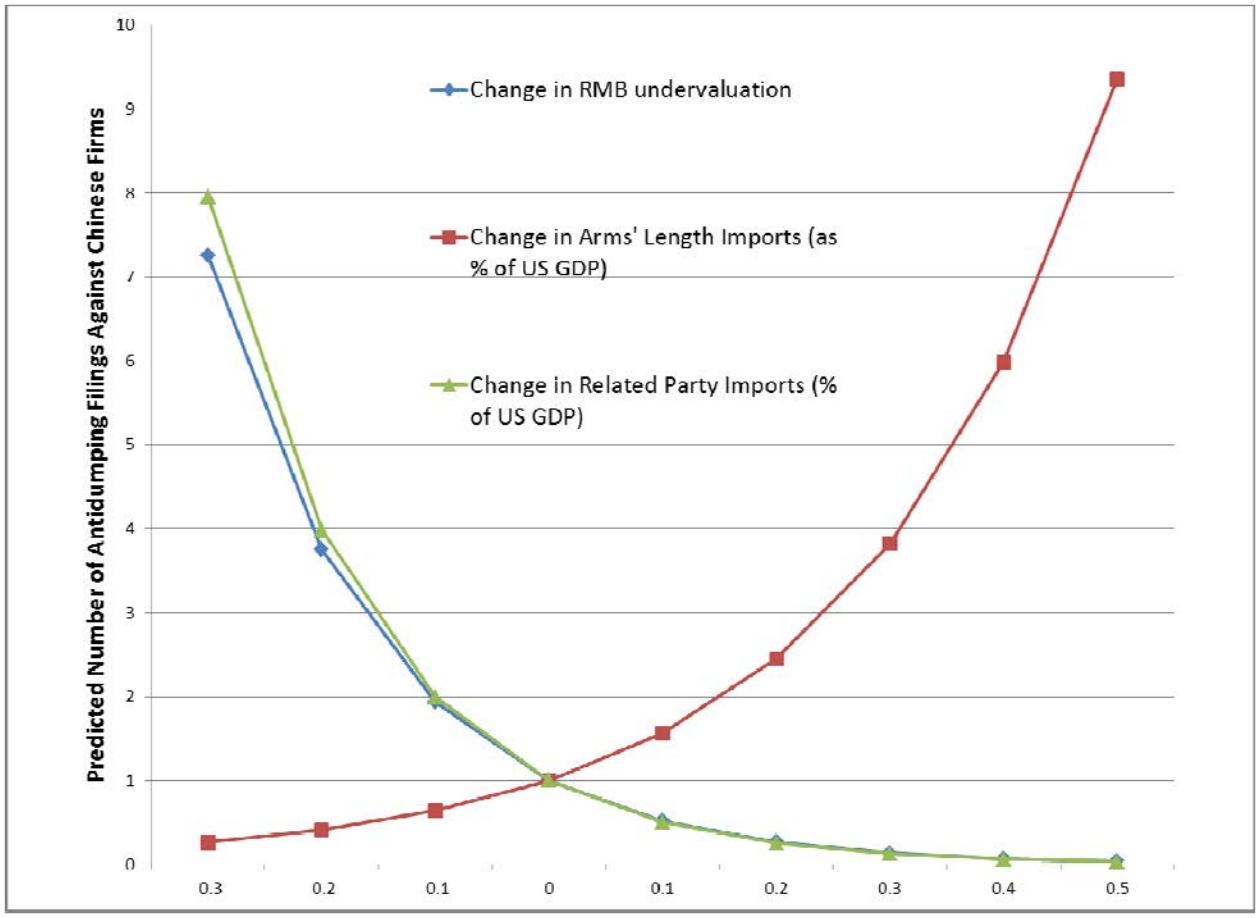

Figure 6. U.S. Anti-dumping Filings Against China. Observed and Predicated. Derived from results in model 3, Table 7.

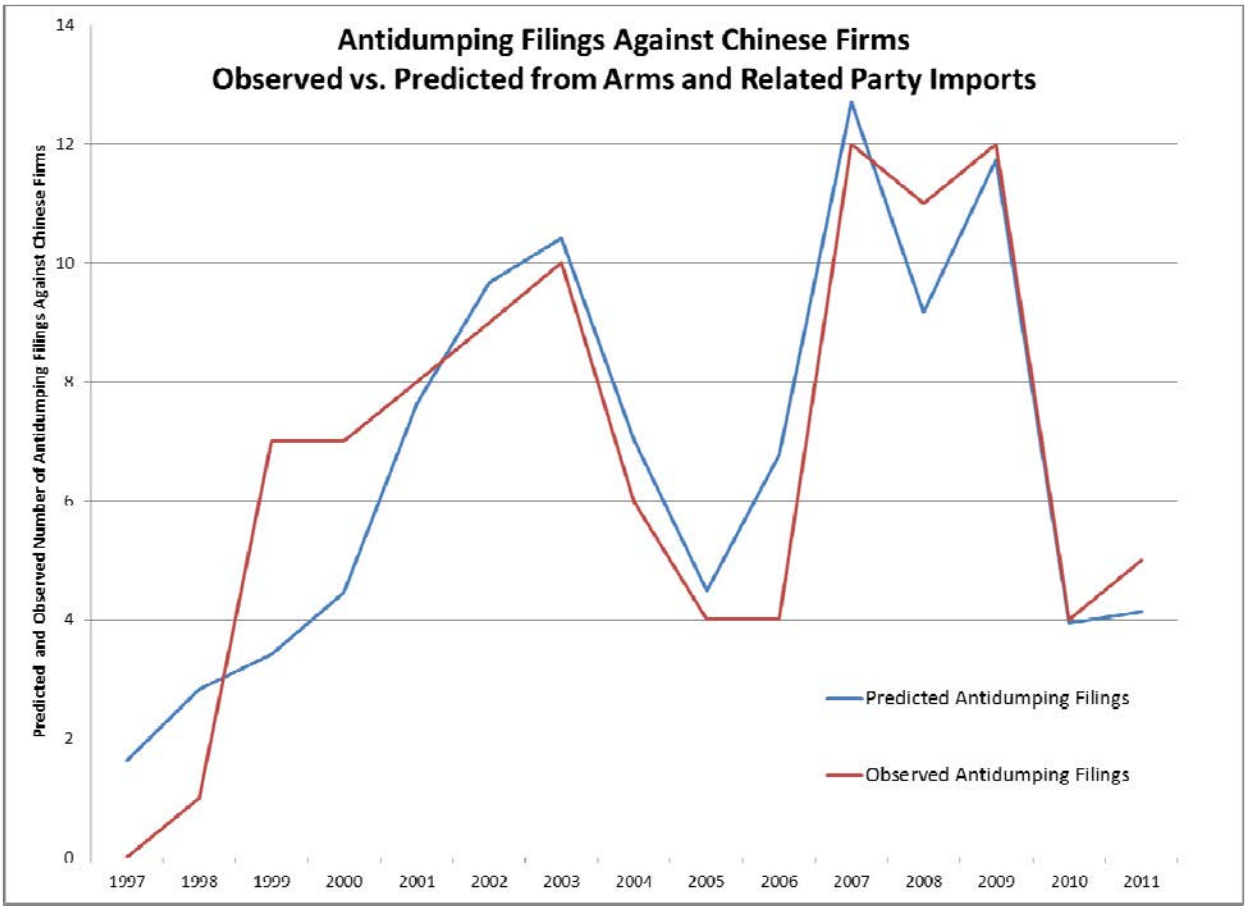

Table 2. Characteristics of Firms Filing Anti-Dumping Petitions 1993-1997 that Survive to 2009

Characteristics of 1993-1997 Filers that Survive to 2009								
		1993				2009			
		Prevalence		Industry Rank		Prevalence		Industry Rank	
		(indicator [0,1])		(of value)		(indicator [0,1])		(of value)	
	N = 48	Mean	Std Dev	Mean	Std Dev	Mean	Std Dev	Mean	Std Dev
1	Employment*	11118	17820	0.93	0.14	7557	11401	0.94	0.13
2	Export	0.88	0.33	0.85	0.33	0.83	0.38	0.82	0.37
3	Import	0.79	0.41	0.77	0.40	0.77	0.42	0.76	0.42
4	Related-Party (RP) Export	0.69	0.47	0.68	0.46	0.71	0.46	0.70	0.45
5	Related-Party (RP) Import	0.65	0.48	0.63	0.47	0.67	0.48	0.66	0.47
6	Export to China	0.46	0.50	0.46	0.49	0.67	0.48	0.66	0.47
7	Import from China	0.33	0.48	0.33	0.46	0.63	0.49	0.62	0.48
8	RP Export to China	0.17	0.38	0.17	0.37	0.40	0.49	0.40	0.49
9	RP Import from China	0.17	0.38	0.17	0.37	0.48	0.50	0.48	0.50
10	Export to Mexico	0.63	0.49	0.62	0.48	0.67	0.48	0.66	0.47
11	Import from Mexico	0.46	0.50	0.46	0.49	0.56	0.50	0.56	0.49
12	RP Export to Mexico	0.33	0.48	0.33	0.47	0.52	0.50	0.52	0.50
13	RP Import from Mexico	0.31	0.47	0.32	0.46	0.42	0.50	0.42	0.49

Table 3. Share of Employment at Internationally Engaged Firms for Industries without and with AD Filings 1993-1997

	Firm Characteristics within Industries without AD Filings 1993-1997 and Industries with AD Filings 1993-1997 Weighted by Employment							
		without an AD filing 1993-1997				**with an AD filing 1993-1997**		
		1993		2009		1993		2009
		Prevalence (indicator [0,1])		Prevalence (indicator [0,1])		Prevalence (indicator [0,1])		Prevalence (indicator [0,1])
		Mean	Std Dev	Mean	Std Dev	Mean	Std Dev	Mean	Std Dev
1	Employment*	30458	652166	15161	230346	24584	387623	14052	208621
2	Export	0.66	3.55	0.64	3.35	0.84	4.81	0.78	4.42
3	Import	0.60	3.67	0.59	3.43	0.79	5.38	0.75	4.65
4	Related-Party (RP) Export	0.56	3.72	0.54	3.47	0.74	5.76	0.69	4.94
5	Related-Party (RP) Import	0.48	3.75	0.49	3.49	0.66	6.20	0.59	5.28
6	Export to China	0.36	3.60	0.48	3.48	0.56	6.50	0.60	5.25
7	Import from China	0.35	3.56	0.49	3.48	0.41	6.45	0.60	5.26
8	RP Export to China	0.18	2.88	0.33	3.27	0.29	5.92	0.33	5.03
9	RP Import from China	0.18	2.86	0.38	3.38	0.22	5.46	0.41	5.28
10	Export to Mexico	0.46	3.74	0.55	3.47	0.64	6.29	0.70	4.90
11	Import from Mexico	0.38	3.63	0.42	3.44	0.55	6.52	0.52	5.36
12	RP Export to Mexico	0.31	3.46	0.41	3.43	0.47	6.54	0.52	5.36
13	RP Import from Mexico	0.28	3.36	0.33	3.28	0.37	6.32	0.38	5.20

Table 4. Undervaluation and MNC Investment
(Results based on Data from Bureau of Economic Analysis)

	(1)	(2)	(3)	(4)	(5)
Dependent variable:	Total Affiliates	Related-Party Exporters	Exporters to Headquarters	Exporters	non-Exporters
Lagged DV	0.969**	0.977**	0.988**	0.970**	0.976**
	(0.014)	(0.014)	(0.018)	(0.015)	(0.014)
Undervaluation	0.212**	0.257**	0.221*	0.189	0.077
	(0.081)	(0.088)	(0.107)	(0.104)	(0.088)
Constant	0.943**	-0.099*	0.115*	0.064	1.117**
	(0.081)	(0.048)	(0.049)	(0.059)	(0.071)
Observations	368	368	368	368	368
R-squared	0.947	0.935	0.917	0.934	0.932
Countries	123	123	123	123	123
Dependent variable:	ΔTotal Affiliates	ΔRelated-Party Exporters	ΔExporters to Headquarters	ΔExporters	Δnon-Exporters
Undervaluation	0.275**	0.305**	0.244*	0.249**	0.122
	(0.064)	(0.078)	(0.096)	(0.088)	(0.071)
Constant	0.840**	-0.149**	0.096*	-0.003	1.050**
	(0.050)	(0.040)	(0.041)	(0.047)	(0.052)
Observations	368	368	368	368	368
R-squared	0.382	0.620	0.618	0.555	0.663
Countries	123	123	123	123	123

Note: The table reports the results of OLS estimates of the logged number and changes in the logged number of foreign affiliates of U.S. multinationals. The sample is the population of U.S. multinationals with majority owned affiliates taken from the quinquennial benchmark surveys over the period 1994-2009. All models include year dummies. **p<.01, *p<.05.

Table 5. Bilateral Real Exchange Rate Undervaluation and Trade Disputes, 1980-2011

	(1)	(2)	(3)	(4)
	All product filings	dumping granted	dumping denied	1997-2011 sample
$Disputes_{t-1}$	0.269***	0.181**	0.171**	0.195**
	(0.074)	(0.072)	(0.082)	(0.098)
$Undervaluation_{t-1}$	0.805***	0.828***	0.462	1.002***
	(0.243)	(0.223)	(0.405)	(0.302)
$GDP/capita_{t-3}$	0.564***	0.430***	0.68***	0.455***
	(0.158)	(0.147)	(0.26)	(0.161)
$Polity_{t-1}$	0.053**	0.048**	-0.017	0.096***
	(0.023)	(0.024)	(0.041)	(0.034)
Bilateral Trade $Balance_{t-2}$	-1.169***	-1.53***	1.212**	-1.92***
	(0.275)	(0.303)	(0.59)	(0.489)
Capital Account $Openness_{t-1}$	-0.010**	-0.009**	-0.006	-0.19***
	(0.004)	(0.004)	(0.09)	(0.006)
Bilateral Invest $Treaty_{t-1}$	-0.616**	-0.565**	-0.587	-0.9***
	(0.314)	(0.264)	(1.092)	(0.304)
First-stage				
$Disputes_{t-3}$	-16.107***	-1.808***	-3.32***	-17.0***
	(2.816)	(0.649)	(0.231)	(0.558)
$Disputes_{t-4}$		-2.396***		
		(0.572)		
Log-likelihood	-1345.717	-1001.4	-154.81	-549.13
Observations	2798	2716	2798	1472
Countries	109	109	109	109
Vuong statistic	3.74	4.63	17.63	2.75

Note: The table reports the results of panel zero-inflated negative binomial estimates of annual bilateral antidumping filings in the United States (model 1), and dumping claim granted (model 2) and claims denied (model 3), where the grant or the denial is coded as a 1 and all other cases are coded as zeros. Model 4 examines filings over the period 1997-2001. The variables are defined in the text.

Table 6. Undervaluation, Imports, and Trade Disputes

	(1)	(2)	(3)	(4)	(5)	(6)
				Investment	dumping granted	dumping denied
$Disputes_{t-1}$	0.269***	0.196***	0.147**	0.241***	0.133	0.010
	(0.091)	(0.063)	(0.071)	(0.073)	(0.090)	(0.211)
$Undervaluation_{t-1}$	0.395	-0.489*	0.081	0.470	0.258	-0.485
	(0.256)	(0.279)	(0.388)	(0.348)	(0.477)	(1.078)
U.S. Arm's Length $Imports_{t-1}$	0.757	4.126***	4.471***	3.526***	4.541***	2.833
	(0.653)	(1.271)	(1.599)	(1.195)	(1.757)	(4.240)
U.S. Related Party $Imports_{t-1}$	0.966***	0.282	-0.068		-0.839	-1.383
	(0.350)	(0.482)	(0.596)		(0.910)	(2.665)
$Undervaluation_{t-1}$ x		-6.442***	-7.603***		-8.094***	-2.770
U.S. Related Party $Imports_{t-1}$		(1.861)	(2.449)		(2.989)	(9.463)
$Undervaluation_{t-1}$ x		22.433***	24.508***	6.248*	22.445***	23.782
U.S. Arm's Length $Imports_{t-1}$		(5.234)	(7.121)	(3.211)	(8.437)	(25.447)
$GDP/capita_{t-3}$			0.557***	0.439***	0.631***	1.123**
			(0.120)	(0.132)	(0.132)	(0.567)
$Polity_{t-1}$			0.071**	0.075**	0.079**	-0.063
			(0.028)	(0.035)	(0.036)	(0.115)
Capital Account $Openness_{t-1}$			-0.019***	-0.020***	-0.022***	-0.027
			(0.005)	(0.006)	(0.006)	(0.020)
Bilateral Investment Treaty			-0.444	-0.708**	-0.457	-16.846***
			(0.299)	(0.316)	(0.343)	(0.539)
U.S. Inward FDI_{t-1}				-137.936		
				(84.055)		
$Undervaluation_{t-1}$ x U.S. Inward FDI_{t-1}				-408.022*		
				(235.290)		
First-stage	-16.915***	-17.109***	-16.301***	-16.552***	-17.097***	-2.615***
$Disputes_{t-3}$	(0.446)	(0.397)	(0.486)	(0.501)	(0.575)	(0.698)
Log-likelihood	-583.651	-565.603	-528.109	-528.340	-414.919	-44.729
Observations	1580	1580	1472	1337	1472	1472
Countries	113	113	109	108	109	109
Vuong statistic	3.242	3.079	2.397	2.327	2.007	2.358

Note: See notes to the prior table.

Table 7. Undervaluation, Imports, and Antidumping Filings against Chinese Firms

	(1)	(2)	(3)
$Disputes_{t-1}$		0.072*	0.008
		(0.040)	(0.034)
$Undervaluation_{t-1}$	1.610**	0.743	-6.607**
	(0.639)	(0.687)	(2.719)
U.S. Arms' Length $Imports_{t-1}$			4.473***
			(1.336)
U.S. Related Party $Imports_{t-1}$			-6.914**
			(2.944)
Constant	1.578***	1.212***	-0.254
	(0.147)	(0.252)	(0.609)
Log-likelihood	-85.097	-82.363	-31.347
Observations	33	32	15

Note: The table reports the results of negative binomial estimates of annual antidumping filings against China by complainants in the United States. The independent variables are country-year values corresponding to China. The undervaluation index is defined in the text; higher values indicate greater real exchange rate undervaluation relative to the U.S. dollar. Related imports and arm's length imports measure U.S. imports from China by affiliated and unaffiliated parties, respectively, as a share of U.S. GDP.