Why Trade and FDI Should Be Studied Together*

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Abstract

Global value chains have knit trade and foreign direct investment (FDI) together as firms' engagement in one activity inextricably depends on the other. Yet, most IPE scholarship fails to consider the two simultaneously. We offer an integrated theory that explains why trade's distributional consequences depend on firms' strategic decisions about FDI. Combining customs data on Vietnamese firm exports and FDI data on MNCs' greenfield projects in Vietnam since 2003, we find that FDI alters the host country's subsequent trade profiles. Specifically, Vietnamese exports of products related to FDI increased by 200% compared to other similar products within four years of initial investments. We also find that these products enjoyed deeper tariff cuts in the recent bilateral trade agreement between Vietnam and South Korea. These findings suggest that multinational firms not only affect the composition of trade but also create new political cleavages in trade politics that go beyond country borders.

Key Words: foreign direct investment, global production networks, multinational corporations, trade politics

*We thank Quang L. Trinh for his excellent research assistance. The crosswalk between various industry and product categories as well as the measurement strategy described in this paper can be implemented via an open-source software package, `concordance`, available at `https://cran.r-project.org/package=concordance`.

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1 Introduction

One of the most critical developments in the global economy in the past half-century is the enormous growth in intra-firm trade, related-party trade, and intermediate goods trade driven by fragmented global production (Yi, 2003; Bernard et al., 2010, 2012).[1] For example, over 50% of U.S. goods imports from Organisation for Economic Co-operation and Development (OECD) countries were intra-firm in 2009 (Lanz and Miroudot, 2011). Meanwhile, related-party trade accounted for 43.2% of total U.S. goods imports/exports as of 2019.[2] Intermediate inputs also represent a significant part of global trade. For the majority of OECD countries, more than half of their exports stem from products traded in the context of global value chains (GVCs) (De Backer and Miroudot, 2014). The primary driving force behind the global trade environment's transformation is the expansion of cross-country firm-level activities and global production networks established by multinational corporations (MNCs) that encompass both developed and developing nations. In fact, MNCs are estimated to account for 80% of global trade as of 2010 (UNCTAD, 2013).

Despite the inseparable links between international trade and foreign direct investment (FDI) through the activities of MNCs, most international political economy (IPE) scholarship has considered the two firm-level activities separately.[3] The dominant theoretical frameworks in the political economy of trade literature tend to discount how MNCs' location choices may reshape technological differences across countries and, in turn, the product composition of imports and exports. For example, factor-, industry-, and even firm-centered IPE theories either explicitly or implicitly assume that *foreign* multinational corporations do not alter the domestic distribution of production technologies or political coalitions when it comes to trade policymaking (e.g., Ohlin, 1933; Rogowski, 1987; Hiscox, 2002a; Rodrik, 1995; Kim, 2017). Meanwhile, influential studies on the political economy of FDI often overlook how the current distribution of foreign investments will

[1] Intra-firm trade consists of trade between parent companies and their affiliates abroad. In contrast, related-party trade may include transactions between firms that are linked through ownership outside of firm's boundaries.

[2] See `https://www.census.gov/foreign-trade/Press-Release/related_party/index.html`.

[3] See Pandya (2016) for a systematic review and the critique. For notable exceptions, see Baccini, Pinto, and Weymouth (2017); Anderer, Dür, and Lechner (2020). Note that while Büthe and Milner (2008, 2014) explicitly examine the link between FDI and trade agreements, their focus was mainly at the country-dyad /country level, as opposed to the firm level.

reshape future bilateral/multilateral trade relationships and political coalitions across different factors of production within host countries (e.g., Li, Resnick et al., 2003; Jensen, 2008; Pandya, 2014b; Owen, 2015).

In this study, we offer an integrated theory that explains why trade's distributional consequences depend on firms' strategic decisions about FDI. We argue that understanding trade politics according to factor endowments or factor specificity within country borders has become increasingly obsolete as firms that participate in global production can fundamentally change these two dominant building blocks of the IPE theories. Specifically, we contend that MNCs reshape the distribution of production technologies both within and across countries. Therefore, trade profiles—the product composition of imports and exports—are conditional on FDI. Furthermore, we argue that MNCs not only affect trade patterns and policies between the host-home country pair (e.g., Blanchard and Matschke 2015; Blanchard, Bown, and Johnson 2016), but also between the host country and other nations *beyond* dyadic relations.[4] By simultaneously driving global trade and FDI through supply chains, MNCs and their foreign affiliates have become key political actors in shaping global trade policies (Manger, 2012; Baldwin, 2016; Bown et al., 2020). Hence, we anticipate that FDI alters host countries' subsequent trade profiles both at the extensive (i.e., number of new products traded) and intensive margins (i.e., trade volumes). We also expect the FDI distribution in the host country to shape future trade policy outcomes between the host and its trade partners.

To test this argument, we construct a novel firm-level dataset that directly links FDI and trade activities in Vietnam—one of the most rapidly growing economies with significant increases in inward FDI and changing local political dynamics (Malesky, 2008; Malesky, Gueorguiev, and Jensen, 2015). In fact, Vietnam attracted over $143 billion in cumulative FDI over the past 10 years across various manufacturing industries, ranging from textiles to automobile parts to the electronics industry (US Department of State, 2020). Hence, Vietnam provides an ideal laboratory to simultaneously examine the links between FDI and trade patterns that are related to global production. Focusing on Vietnam also solves a key empirical challenge. Data linking firms to products are generally confidential and unobservable to researchers, and such challenges have

[4]See Erikson, Pinto, and Rader (2014) for the importance of considering relationships beyond country-pairs in International Relations research.

prohibited scholars from studying trade and FDI together.[5] Vietnamese customs data help us overcome this challenge. We parse through a massive amount of Vietnamese customs data and identify the exact Harmonized System (HS) codes of products traded by individual firms. We then link the local exporting/importing firms in the customs data to a set of MNCs with new greenfield FDI projects in Vietnam since 2003 based on proprietary fDi Markets data.[6]

We also develop various research tools to navigate between trade and FDI activities that, unfortunately, have been recorded based on distinct classification schemes, e.g., HS codes for internationally traded products and NAICS (North American Industry Classification System) codes for categorizing investment decisions. Using the concordances between diverse sets of nomenclatures, we obtain measurements of key determinants of trade and FDI, such as product-differentiation (Rauch, 1999; Broda and Weinstein, 2006) and upstreamness/downstreamness (Antràs et al., 2012; Antràs and Chor, 2013), at various levels of aggregation.[7] To promote future research at the intersection of trade and FDI, we consolidate these tools into an automated pipeline and make it freely available as an R package, `concordance`, at the Comprehensive R Archive Network (`https://cran.r-project.org/package=concordance`).

Using our data and measurements, we empirically evaluate two particular channels through which trade and FDI are related. First, we investigate whether the host country's trade profiles change due to prior foreign investments. To account for a potential selection bias whereby MNCs choose to invest in Vietnam given its pre-existing trade environment and political institutions, we use the difference-in-differences (DiD) identification strategy combined with a matching estimator (Imai, Kim, and Wang, 2020). Specifically, we match each product exported by an MNC with other products similar in terms of various pre-FDI characteristics, such as their trade volumes, levels of product differentiation and upstreamness, and the number of destination or origin countries. Second, we examine whether products that are linked to FDI tend to enjoy deeper trade liberalization. We use the Tobit estimator to account for the censoring of tariff rates at zero while

[5]See Baccini, Pinto, and Weymouth (2017) for a notable study using confidential data on US firms from the Bureau of Economic Analysis (BEA).

[6]The data covers all countries and sectors worldwide and is one of the most comprehensive database on greenfield investments available. See `https://www.fdimarkets.com/`.

[7]The package provides a set of utilities for matching products in different classification codes and versions, such as HS, NAICS, Standard International Trade Classification (SITC), and International Standard Industrial Classification (ISIC).

parametrically adjusting for the aforementioned product-specific characteristics.

Three main findings emerge. First, we find that FDI substantially alters the extensive margin of trade in host countries. In particular, we find that countries with more inward greenfield manufacturing FDI tend to expand the number of unique products they export in subsequent periods. Second, we find that FDI directly affects the intensive margins of trade. Compared to other similar Vietnamese products, the export volume of products related to MNCs and their affiliates increased up to 200% within four years of initial investments. Finally, we find that Vietnamese products linked to MNCs' FDI projects in Vietnam enjoy an approximately 9% to 35% larger tariff cut than other similar products outside of GVCs in the subsequent 2015 bilateral free trade agreement (FTA) between South Korea and Vietnam.

Our findings provide new theoretical angles to the study of IPE. First, simultaneously studying trade and FDI allows us to deepen our understanding of the political economy of these activities in ways that might be missed when studying each on its own. For example, trade profiles across countries can no longer be explained solely by factor endowments—they also substantially depend on where and how much FDI flows. In turn, while FDI is drawn to destinations that hold locational (Helpman, 2006) or institutional advantages (Henisz, 2000; Jensen, 2003, 2008; Li, Resnick et al., 2003; Pandya, 2014a; Pinto, 2013), the supply chain networks that MNCs establish upon entry can offer them strong influence over trade and FDI policy environments (Manger, 2012; Blanchard and Matschke, 2015; Blanchard, Bown, and Johnson, 2016; Johns and Wellhausen, 2016).

Second, the political and economic effects of FDI and trade are no longer confined to dyadic relationships. In addition to changing trade profiles between the host and the home country, FDI can also affect trade profiles between the host country and third parties. This is because MNCs may invest in a host country as a way to access large third-party markets. To facilitate such access, MNCs may also seek to influence host country trade policies toward the third party, or vice versa.

Third, political cleavages over trade may increasingly fall along the lines of global value chains instead of factor ownership (Scheve and Slaughter, 2001; Mayda and Rodrik, 2005), occupation (Owen and Johnston, 2017), or sector (Hiscox, 2002b). Host country firms integrated into GVCs (e.g., MNCs' subsidiaries, upstream suppliers, and downstream distributors) are in a better position to reap the benefits of trade liberalization than those that are not. This suggests that

an individual's ties with MNCs and their GVCs may matter more than the individual's factor ownership, occupation, or sector when explaining trade policy preferences.

The paper is organized as follows. In the next section, we identify two main channels through which FDI might affect trade patterns and policies. One is a technology-based channel in which FDI increases host country productivity, generating differences in the extensive and intensive margins of trade. The other channel is political: global production networks will create new political cleavages between firms within vs. outside of the GVCs. Next, we overview our data collection efforts and provide detailed descriptions of our Vietnamese firm-level data. We then discuss our empirical strategy and main findings concerning two related questions: (1) Do FDI projects affect host countries' trade patterns? (2) Do products that are linked to FDI projects get larger tariff cuts? Finally, we conclude with the implications of our research for the trade and FDI literature.

2 Theorizing the Effects of FDI on Trade Politics

We offer a theory that explains the effects of FDI on trade environments and trade policymaking. Specifically, we focus on whether MNCs' FDI activities change subsequent trade patterns in host countries, and whether FDI-related (or downstream) products enjoy lower trade barriers in markets beyond the host-home country pair. Thus, our focus complements existing research that finds that MNCs prefer and disproportionately benefit from liberal trade policy (Milner, 1988; Baccini, Pinto, and Weymouth, 2017; Osgood, 2018).

2.1 MNCs Expand Trade Margins

We begin by investigating how FDI will affect trade profiles both at the extensive margin and intensive margin. That is, prior FDI by MNCs will alter the subsequent variety of products as well as trade volumes exported by the host country. We posit that these effects will materialize even beyond the specific host-home country pair.

FDI as a Source of Comparative Advantage. Our theory is based on the empirical observation that trade flows are shaped by *firms'* transnational investment activities that rapidly reorganize factors of production globally. Developing nations no longer rely exclusively on exporting raw materials and labor-intensive goods when it comes to international trade. Rather, they

increasingly produce and export sophisticated downstream manufactured products by combining cheap labor and land with massive foreign capital.

For example, Vietnam is now the second largest cellphone exporter in the world after China, exporting $35.5 billion in 2019. Why has Vietnam risen as a top producer of cellphones, a capital-intensive product, given its relative abundance in labor? One of the main reasons is that, SAMSUNG, a South Korean conglomerate, has made significant greenfield and R&D investments in Vietnam since its first plant opened in Bac Ninh province in 2008, which altered the industry structure in Vietnam. It is worth noting that South Korea—the home country of SAMSUNG—is only the world's 8th largest exporter of cellphones in 2019, with merely around 10% of Vietnam's export volume. These examples show how trade profiles reflect FDI patterns that dynamically evolve rather than the static production factors countries are innately endowed. Thus, we expect that FDI serves as a new source of comparative advantage expanding host countries' trade margins.

We illustrate our argument based on the canonical Ricardian model developed by Dornbusch, Fischer, and Samuelson (1977). To focus on the implications of FDI on the margins of trade, we adopt this framework with a single factor of production: labor.[8] We assume that there are two countries (H and W) that produce a continuum of goods denoted by $z \in [0, 1]$.[9] Without loss of generality, we order the products according to host country H's comparative advantage. Specifically, the smaller the value of z, the more efficient H is in producing the good z than the rest of the world W. We denote $a(z)$ and $a^*(z)$ as the amount of labor required to produce commodity z by H and W, respectively. We can then denote the relative productivity between H and W by:

$$A(z) \equiv \frac{a^*(z)}{a(z)}, \tag{1}$$

where $A(z)$ is a decreasing function of z.[10] That is, $A(z)$ takes a higher value if H is relatively more productive in producing the commodity. Suppose that the price of good z in a competitive equilibrium is $p(z)$.[11] Then, it is straightforward to show that there exists a product $\tilde{z}$ such that

[8] In the Ricardian model, multiple factors can be seen as substitutes in the production function.

[9] Dornbusch, Fischer, and Samuelson (1977)'s model has been further extended to a more complex settings in which researchers consider more than two countries (Eaton and Kortum, 2002; Costinot, 2009; Costinot, Donaldson, and Komunjer, 2012).

[10] This is because we assumed that H has a comparative advantage in producing smaller z.

[11] That is, every country takes the price as given.

H produces and exports all products $z < \tilde{z}$, while W specializes in producing all products $z > \tilde{z}$.

Next, we consider a simple demand structure whereby the two countries have identical and homothetic Cobb-Doublas demand functions, where $b(z)$ denotes the Cobb-Douglas elasticities: $\int_0^1 b(z)dz = 1$. Under this demand structure, we can re-express $b(z)$ in terms of the ratio of expenditure spent on commodity z to income:

$$b(z) = \frac{p(z)c(z)}{wL} = \frac{p^*(z)c^*(z)}{w^*L^*} \tag{2}$$

where $c(z)$, w, and L denote the consumptions of good z, wage, and labor endowment in H, respectively, while the variables with asterisks denote the analogous quantities for W. Let us denote by $\theta(\tilde{z}) \equiv \int_0^{\tilde{z}} b(z)dz$ the fraction of income spent on goods produced by H, i.e., $z \in [0, \tilde{z}]$. Then, by trade balance, the relative wage between H and W can be written as:

$$B(\tilde{z}) \equiv \omega = \frac{w}{w^*} = \frac{\theta(\tilde{z})}{1 - \theta(\tilde{z})} \left(\frac{L^*}{L} \right). \tag{3}$$

Note that the relative wage $B(z)$ can be interpreted as global demand for H's labor, and it is increasing in z, as $\theta(\tilde{z})$ increases when z increases.

Figure 1 shows that this canonical model is useful to understand the expansion of products that are produced by the host country. As noted above, the competitive equilibrium under the set up is that the host country H produces all products $z < \tilde{z}$, while the other country W specializes in producing all the other products $z > \tilde{z}$. Suppose that the relative productivity of H increases with FDI. Then, $A(z)$ moves upward towards $A^*(z)$ as the relative productivity of H compared to W increases. This will then change the equilibrium such that H expands the set of products that it produces and exports from $\tilde{z}$ to z^{FDI} as indicated by the red arrow.

While the evidence on direct technological spillovers from foreign firms to local firms is still mixed (e.g., Helpman, Melitz, and Yeaple, 2004; Alfaro et al., 2004; Alfaro, Kalemli-Ozcan, and Sayek, 2009; Ashraf, Herzer, and Nunnenkamp, 2016), we argue that MNCs and their local affiliates themselves enjoy significant increases in their productivity. As Figure 1 illustrates, this will result in the expansion of the set of products that are exported by host countries. Furthermore, given economies of scale, an increase in the volume of production will further yield savings in production costs. This discussion generates two conditional hypotheses. First, we anticipate that countries with more FDI inflows will begin to export more products compared to other countries with a similar level of prior engagements in international trade (Hypothesis 1). Moreover, we expect

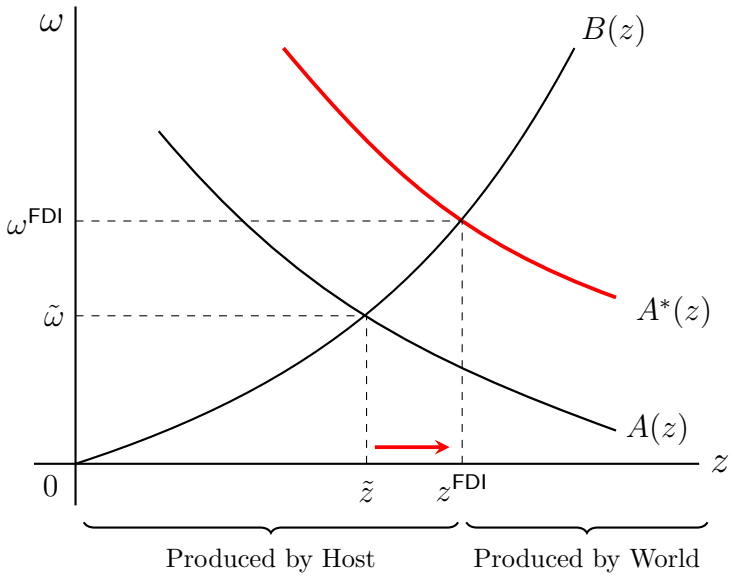

Figure 1: **Expansion of the Product Profile after FDI**. This figure illustrates the consequences of domestic production as a result of foreign investments following the Ricardian framework developed by Dornbusch, Fischer, and Samuelson (1977). Specifically, it shows that the set of products produced by the host country expands from $\tilde{z}$ to z^{FDI} as the relative production productivity of the host country increases following foreign investments, i.e., shift from $A(z)$ to $A^*(z)$. It also shows that the relative wage of the host country increases.

that the volume of downstream (upstream) exports (imports) from/by host countries that are associated with FDI will also expand over time (Hypothesis 2).

2.2 New Political Cleavages Along the Lines of GVCs

A large literature on the political economy of international trade has focused on trade policy preferences among domestic actors. These *preference-based theories* derive domestic actors' demand for trade policy based on the income distributional consequences of free trade or trade protection.[12] In this study, we build on this framework but argue that the growth of MNCs' global production networks calls for significant revisions. First, as discussed in the previous section, the relative endowment of production factors in any given country may change abruptly due to MNCs' global investment activities. This implies that the income implications of trade liberalization will depend

[12]To be sure, the scholarly literature on the political economy of international trade is vast. Many scholars have made important contributions to highlight the significance of political institutions that aggregate individual preferences differently, and international institutions that provide information and a forum for dispute resolution. See Milner (1999) for a broader review of the literature.

not only on the innate distribution of domestic factors of production but also on the constantly changing nature of trade and new employment opportunities due to foreign investments. That is, factors of production should be assumed to be fully mobile and understood as being determined endogenously by the presence of FDI rather than *immobile between* countries as assumed by the canonical Heckscher-Ohlin model upon which conventional IPE theories were built.[13]

Second, we contend that global supply chains create new political cleavages between firms that are part of the supply chain and those that are not. Specifically, we argue that firms integrated into supply chains will have common interests beyond their own sector. Take the Trump administration's tariffs on steel and aluminum in 2018 as an example. The trade politics stemming from the tariff was no longer between exporting and import-competing firms within the steel industry. Instead, the tariffs created political cleavages between the top U.S. steel producers (e.g., United States Steel Corp) and various other industries that rely on steel as an input and saw increases in production costs (Tita and Mauldin, 2020). According to the LobbyView database (Kim, 2018), businesses that raised concerns about the tariffs range from MNCs in the U.S. auto industry such as the Ford Motor Company and Honda North America, to American food and beverages companies such as Kraft Heinz, to firms in the consumer goods industry such as the Procter and Gamble Company, and even to trade associations in the retail industry such as the National Retail Federation.[14]

Finally, and related to the previous point, we argue that studies on trade politics must consider the political activities of MNCs not only in their home country but also in their host countries. In fact, it is widely believed that MNCs have become key *political* actors that can reshape domestic and international politics. Recently, U.S. Senators Marco Rubio (R-FL) and Elizabeth Warren (D-MA) introduced the bipartisan legislation *United States Pharmaceutical Supply Chain Review*

[13]Note that there will be no differences in *relative* factor abundance if capital is fully mobile between countries. Therefore, the Heckscher-Ohlin model assumes that factors can move freely only across industries within countries.

[14]For example, Honda North America lobbied concerning "Steel and Aluminum Tariffs" (`https://disclosurespreview.house.gov/ld/ldxmlrelease/2019/Q4/301127901.xml`). Kraft Heinz lobbied to "exempt food packaging from 232 tariffs on aluminum and steel imported from China" (`https://disclosurespreview.house.gov/ld/ldxmlrelease/2019/Q4/301124715.xml`). The Procter and Gamble Company lobbied for tariff exemptions for steel used in its razor blades (Naidu, 2018). The National Retail Federation lobbied to "Communicate retail views on the importance of international trade and the global value chain" and to "Oppose Section 232 Steel and Aluminum Tariffs."

Act (S.4191, 116th Congress) "to conduct a study on the United States' overreliance on foreign countries and the impact of *foreign direct investment* [emphasis added] on the U.S. pharmaceutical industry and DNA analysis industries." The main concern is that the U.S. "has critical vulnerabilities and supply chain risks" due to significant foreign control of U.S. based pharmaceutical companies.[15] Indeed, there exist ample empirical evidence that multinational corporations benefit disproportionately from liberal trade policy (Milner, 1988; Baccini, Pinto, and Weymouth, 2017; Osgood, 2018) and hold significant political power to affect trade policy outcomes (Schattschneider, 1935; Manger, 2012; Blanchard and Matschke, 2015; Blanchard, Bown, and Johnson, 2016).

However, current scholarship has not been able to directly evaluate whether trade policies towards the products that are related to *foreign* multinationals and their domestic downstream partners are significantly different from the policies towards comparable goods that are produced by domestic firms outside of GVCs. For instance, the "Protection for Sale" model (Grossman and Helpman, 1994) assumes that only domestic industries can affect domestic trade policies. We posit that multinational corporations are one of the primary political actors that affect host countries' policymaking even towards trading partners beyond their home country. Consider the steel and aluminum tariffs example again. While the Lobbying Disclosure Act of 1995 was aimed at monitoring federal lobbying practices by domestic political entities, foreign MNCs do lobby through their "domestic" subsidiaries. Numerous multinational automotive manufacturers, such as Toyota Motor North America, Honda North America, Volkswagen Group of America, and the Hyundai Motor Company, lobbied to demand trade liberalization and to oppose Section 232 investigations into imports of autos and auto parts. Again, the demands to reduce trade barriers on steel and aluminum products come from MNCs in various industries: among many others, Michelin North America, a French multinational tire manufacturer, and Covestro, a German chemical manufacturer, also lobbied to reduce the tariffs.

Taken together, we expect strong political coalitions to form along MNCs' global production chains that demand trade liberalization, and thus host governments have incentives to push for more liberal trade policies on products that are directly linked to MNCs' FDI activities as well as their downstream products when negotiating with its trade partners (Hypothesis 3).

[15] See press release at `https://www.rubio.senate.gov/public/index.cfm/press-releases?ContentRecord_id=7AC0F5BC-6146-4E40-A859-A4C7B357007A`

3 Data

This section describes how we linked firms' FDI and trade activities and constructed our data set. We begin by highlighting the key empirical challenges researchers face when constructing such data. We then discuss how we overcome these challenges utilizing Vietnamese customs data and granular information on greenfield investments. Lastly, we explain how we concord between different classification schemes and obtain measures of product-level characteristics.

3.1 Greenfield FDI and Trade in Vietnam

Several factors have constrained researchers from investigating FDI and trade simultaneously. Most importantly, granular firm-level data on their investments and international engagements are often unavailable to researchers. Firms do not publicly disclose their international transactions at the product-level out of concerns that their competitors could take advantage of the information and undercut their prices or even deter their market entry.[16] In addition, the lack of standard industry- and product-level classification systems puts enormous constraints on connecting FDI and trade activities even when such data are available to researchers. For example, the U.S. uses the North American Industry Classification System (NAICS) to categorize domestic business establishments (including FDI), whereas the standard tariff nomenclature for internationally traded products is the Harmonized System (HS). Again, this is because firms do not necessarily disclose the set of specific products associated with their investment decisions. Finally, even if one collected firm- and product-level data and linked trade and FDI systematically using concordance tables, methodological issues related to potential selection bias abound. Firms may make their investment decisions based on the host country's existing political institutions (Henisz, 2000; Jensen, 2003, 2008; Li, Resnick et al., 2003; Pandya, 2014a; Pinto, 2013; Nunn and Trefler, 2014) or commitments to protect investments (Büthe and Milner, 2008). In particular, firms' decisions to outsource or produce in-house may depend on the type of products they make (upstream or downstream) and the severity of the hold-up problems they face (Antràs, 2015).

[16] Limited access to restricted data is available for some countries such as "The Longitudinal Firm Trade Transactions Database (LFTTD)" from the U.S. Census Bureau (Bernard et al., 2007). See also Baccini, Pinto, and Weymouth (2017) for a notable study using confidential data on U.S. MNCs from BEA, which is limited only to U.S. citizens.

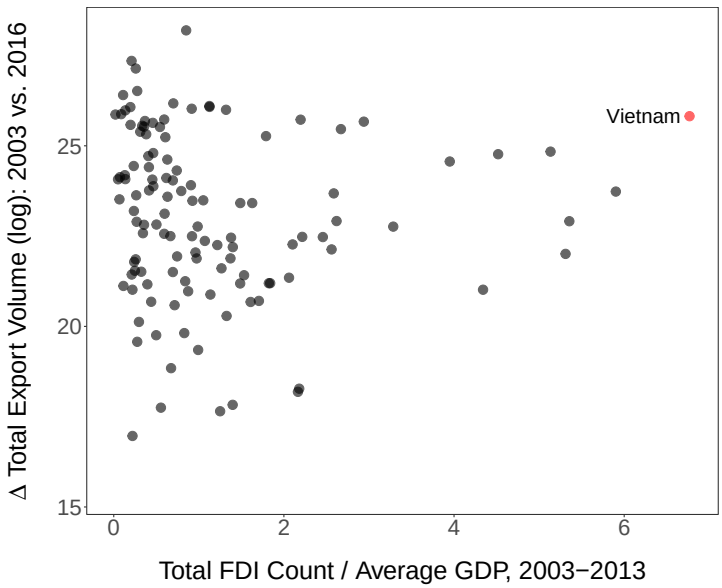

Figure 2: **Greenfield FDI and Growth in Export Volumes**. This figure plots the change in a country's trade volume between 2003 and 2016 (y-axis) against the total number of greenfield FDI projects it received between 2003 and 2013 normalized by its average GDP (x-axis).

We overcome these challenges by focusing on Vietnam and greenfield FDI, a type of FDI in which MNCs establish new production facilities or offices in a different country. As discussed earlier, the case of Vietnam offers an ideal setting to study the connection between FDI and trade given its growth in economic activities. We focus on greenfield FDI because it is the main mode of FDI inflow for developing countries (Antràs and Yeaple, 2014). Furthermore, it allows us to more directly investigate the relationships between foreign investments and subsequent trade as they tend to introduce dramatic changes in production technologies, such as new facilities and production lines, that are consistent with our theoretical framework.[17]

Vietnam has become one of the top recipients of greenfield FDI and an integral part of GVCs. According to fDi Intelligence (Financial Times), Vietnam was by far the top ranked emerging economy in their *Greenfield FDI Performance Index* in 2014 and 2015, receiving around 6.5 times more greenfield FDI compared to the size of its economy (Financial Times, 2016). Meanwhile, the volume of Vietnamese trade also exponentially increased over this period. As shown in Figure 2,

[17]Another common form of FDI is cross-border mergers and acquisitions (M&A), where firms acquire existing companies in the host country. One fast-growing area of research is studying how investment incentives, patterns and consequences vary across different types of FDI, such as M&A, greenfield and venture capital (Nocke and Yeaple, 2007; Pandya and Leblang, 2017; Davies, Desbordes, and Ray, 2018).

Vietnam scores high on both its total number of greenfield FDI projects relative to the size of its economy (x-axis) and its growth in total export volume between 2003 to 2016 (y-axis). Additionally, Vietnam has actively sought preferential trade agreements after it joined the World Trade Organization (WTO) in 2007. Table A.2 in the Appendix shows that Vietnam is now deeply embedded in a network of multiple bilateral free trade agreements and regional trade agreements.

Anecdotal evidence abound on how FDI affected Vietnam's trade profile. For example, crude petroleum used to be the largest source of exports for Vietnam in 2000 (OEC, 2020). Following an influx of greenfield investments in textile by MNCs from Taiwan (e.g., Tainan Spinning), Japan (e.g., Teijin Frontier), and South Korea (e.g., Youngone) in the early 2000s, textile became the largest export industry in Vietnam by 2010. By 2019, MNCs' subsidiaries in Vietnam accounted for 70% of textile and garment export revenues (Nguyen, 2020). Similarly, following Samsung's greenfield investments in the late 2000s, electronics and communication equipment became the top export industry in Vietnam by 2018. In 2017, Samsung alone accounted for almost a quarter of Vietnam's total exports (The Economist, 2019).

3.2 Linking Greenfield FDI and Trade Data

Greenfield FDI Data. We link project-level greenfield FDI data, which contains NAICS information, to trade volume/tariff data at the HS 6-digit product level. We rely on fDi Markets for the FDI data, which covers all reports of new cross-border greenfield projects since 2003. The data is currently the most comprehensive and reliable source of greenfield FDI available, and also used by UNCTAD in their annual *World Investment Report*.[18]

There are multiple benefits of using this data. First, we are able to focus specifically on the greenfield type of FDI more consistent with our theory. However, compared to aggregate country-level FDI flows that can be calculated from the balance of payments or M&As that involve the announcement of two separate firms, observing greenfield FDI is more difficult as the investment activity occurs strictly within a firm's boundary. The data thus enables researchers to examine an understudied type of FDI. Second, fDi Markets provides data at the project-level, and includes detailed information such as the name, location, and industry of the parent/subsidiary, as well as project-specific business activities, the estimated number of jobs created, and capital invested.

[18]See `https://unctad.org/topic/investment/world-investment-report`. The data has also been used in multiple academic studies (including Andrews, Leblang, and Pandya, 2018; Jung, Owen, and Shim, Forthcoming).

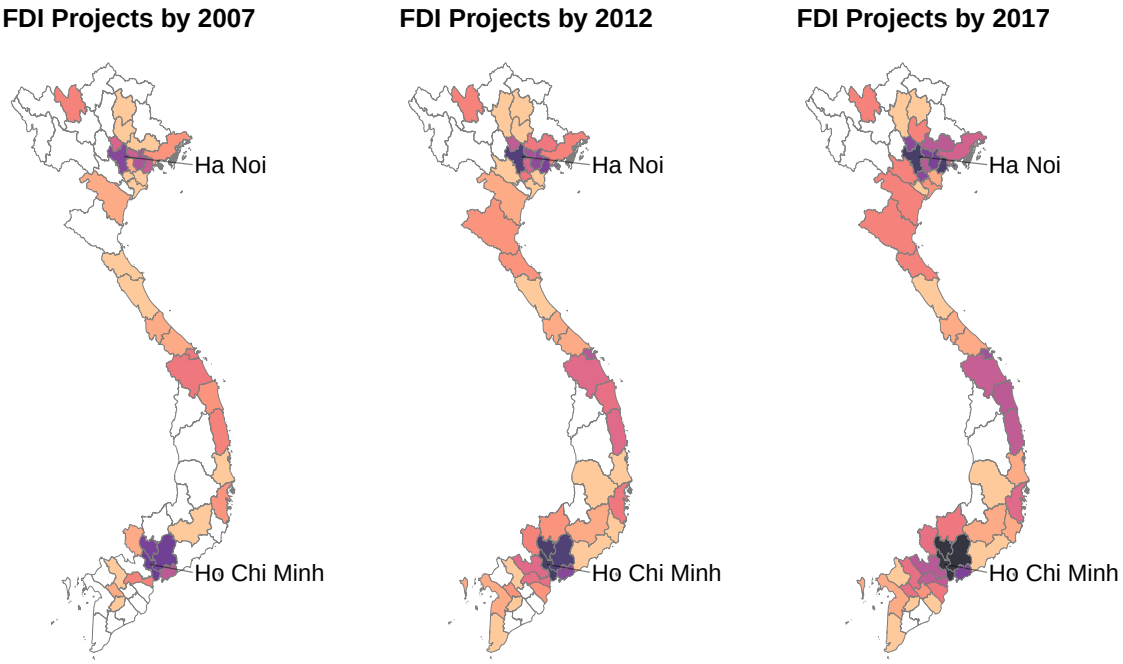

Figure 3: **Increasing Manufacturing Greenfield FDI Projects in Vietnam, 2003–2017**. The color scale corresponds to the number of total new greenfield FDI projects (cumulative) observed in each province between 2003 and 2007 (left), between 2003 and 2012 (center) and between 2003 and 2017 (right). The shading is proportional to the logged cumulative count.

In Vietnam, fDi Markets records 3,260 projects between 2003 and 2017.[19] Among these projects, we focus on 1,180 FDI projects related to *manufacturing* in our analyses (see Figure 3). This is because we are mainly interested in FDI that is likely to affect a host country's export profile, rather than FDI engaging in service activities and targeting the host country's domestic market (e.g. finance, construction, and retail). We classify a project as *manufacturing* if it meets the following two criteria: (1) fDi Markets codes its investment activity as "manufacturing," and (2) its assigned NAICS code falls under "Manufacturing" according to the NAICS classification (i.e., 2-digit NAICS codes 31, 32, or 33). This ensures that we are using a conservative definition of manufacturing that excludes greenfield investment activities that are simply establishing sales or marketing offices for goods in the manufacturing industry but does not actually involve production.

[19]To be more conservative in counting FDI projects, we only use data up to 2017. fDi Markets codes projects based on news announcements, and some projects may not realize. While fDi Markets does follow up and remove such projects, it can take some time for this to happen. Therefore, instead of using data on all projects reported up to the current date, we choose only to use data up to 2017.

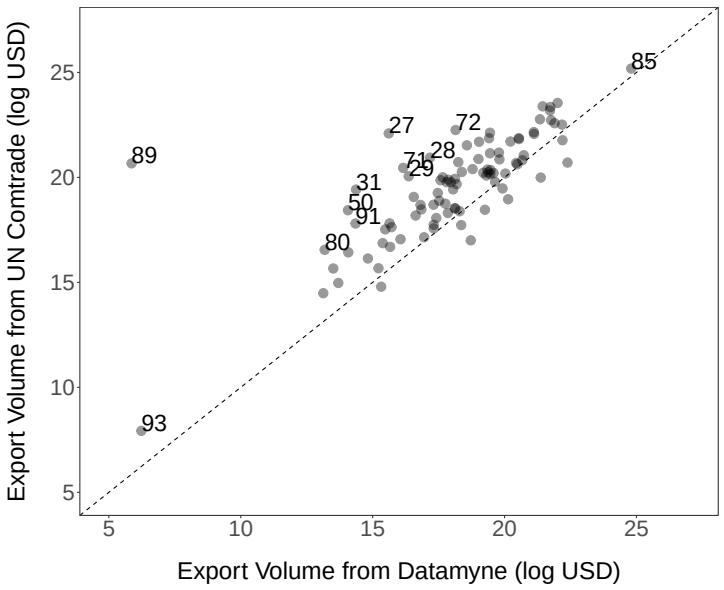

Figure 4: **Validating Vietnamese Customs Data Against UN Comtrade Data, 2018**. This figure plots 2018 log export volumes at the HS 2-digit level from UN Comtrade data (y-axis) against those obtained through Datamyne's export declarations (x-axis). Data from the two sources are largely consistent as most products fall along the 45 degree line. The only exceptions are HS 89 (Ships, boats and floating structures) and security-sensitive products.

Customs Data. To study the effect of these FDI projects on trade profiles and trade liberalization in Vietnam, we map each of these projects to internationally traded goods utilizing Vietnamese customs data provided by Datamyne.[20] The data contains records of all export declarations that went through Vietnamese ports, including detailed information such as exporter/importer firm names, product HS codes at the 8-digit level, and invoice value between January 2018 and April 2020. With this declaration-level data, we are able to observe the set of products each firm exported from Vietnam. The top five exporters in 2018 identified in this customs data include Intel Products (a subsidiary of Intel, headquartered in the U.S.), Samsung Electronics (South Korea), Fuhong Precision Component (a subsidiary of Focus PC Enterprises, Hong Kong), AAC Technology (Hong Kong-listed Apple supplier (Financial Times, 2019)), and New Wing Interconnect Technology (subsidiary of Hon Hai Precision Electronics, Taiwan).

To be sure, data missingness is often a concern when relying on customs declarations. Thus, we check whether the Vietnamese customs data are consistent with existing measurements of trade

[20] A commercial database available at `https://www.datamyne.com/`

volume. Figure 4 shows that export volumes from the customs data are indeed consistent with those obtained from UN Comtrade at the aggregated HS 2-digit product level, with only a few exceptions involving shipbuilding industries (HS 89) and security-sensitive products.

Matching firm names across multiple data sources is another challenging task. Although the customs data comes with the exporting firm names, they are often only available in Vietnamese, while firm names in fDi Markets are in English. What makes the task even more challenging is that firm names are not necessarily consistent within/across the two datasets (e.g. 'British American Tabacco' vs. 'BAT') and that many similar firm names exist (e.g. 'Samsung' and 'Samsun CSA'). Furthermore, firm names may also change over time (e.g. 'Matsushita' to 'Panasonic'). To address these issues, we carefully matched individual firm names between the FDI data and the customs data manually. Using the exporter-name search function in Datamyne, we searched for firm names that appeared in fDi Markets data. When there were multiple results in the customs data that contain our search term, we Google-searched each of these exporter names to make sure that they were linked to the MNC of interest. With this method, we were able to find export products for 269 MNCs that were involved in 363 manufacturing FDI projects.

Although this approach allows an exact matching of HS products to each firm, there are several limitations. First, the customs data is limited to the years after 2018. For FDI projects in the earlier years, for which customs data is unavailable (before 2017), we make an assumption that firms were exporting the same products that they exported after 2018. While not ideal, we contend that this assumption is relatively reasonable as establishing firm-specific production facilities involves substantial sunk costs and thus MNCs have incentives to maintain similar production operations. Second, matching exporter names to MNCs may not completely capture all the exporting products from these firms. For example, although Nike has been heavily producing in Vietnam, we do not observe Nike's name in exporter records. This is likely because Nike is exporting through multiple local contracting firms. Indeed, one of Nike's contracting firms, Tae Kwang Vina, appears in the customs data as one of the top exporters in footwear. In this regard, the estimates that we present in Section 4 can be seen as conservative.

Downstream Exports Data Our theory predicts that FDI affects trade flows along the entire production chain. Hence, we link greenfield FDI to trade data by identifying each export product that is downstream to a given FDI project using fine-grained Input-Output tables from the U.S.

Bureau of Economic Analysis (BEA).[21] Specifically, we match FDI project-specific 3-digit NAICS codes to BEA codes, obtain a list of downstream products at the NAICS 6-digit level based on the IO tables, and then concord the NAICS codes to HS 6-digit codes. Although this approach matches each FDI project to a relatively large set of HS 6-digit products (1,772 on average), it can complement the customs data approach by capturing FDI-related products that are exported through contracting firms and thus overlooked as we noted above. Overall, FDI-trade linkages based on the two approaches are largely consistent—the downstream approach covers, on average, 82% of the HS 6-digit products obtained based on customs data.

4 Empirical Findings

In this section, we present our empirical analyses of the data introduced in Section 3. We first describe how new FDI projects transformed the host country's trade profile, both in extensive and intensive margins of trade. We then show that products associated with the investments in Vietnam made by MNCs from various home countries between 2003 and 2014 enjoyed deeper tariff cuts in the 2015 bilateral free trade agreement between Vietnam and South Korea, even when compared to other similar products.

4.1 Effects of FDI on Trade Profiles

4.1.1 Extensive Margin

We begin by evaluating whether developing countries with more inward FDI are more likely to experience a significant expansion in their extensive margin of trade. To operationalize the extensive margin, we trace the change in the number of unique HS 6-digit products exported by 96 developing countries between 2003 and 2017. In doing so, we link each product to the 2017 version of the HS nomenclature in order to ensure the comparability across time and space.

Figure 5 shows a positive relationship between (1) the total number of manufacturing greenfield FDI projects (x-axis) and (2) the expansion in the extensive margin of trade regarding new exported products (y-axis). This pattern is consistent with Hypothesis 1 and illustrates how FDI can quickly reshape host countries' trade profiles. For example, Vietnam was initially the 59th exporter among the 89 countries with any export record of electronic integrated circuits (HS

[21] `https://apps.bea.gov/industry/xls/io-annual/Supply_2007_2012_DET.xlsx`

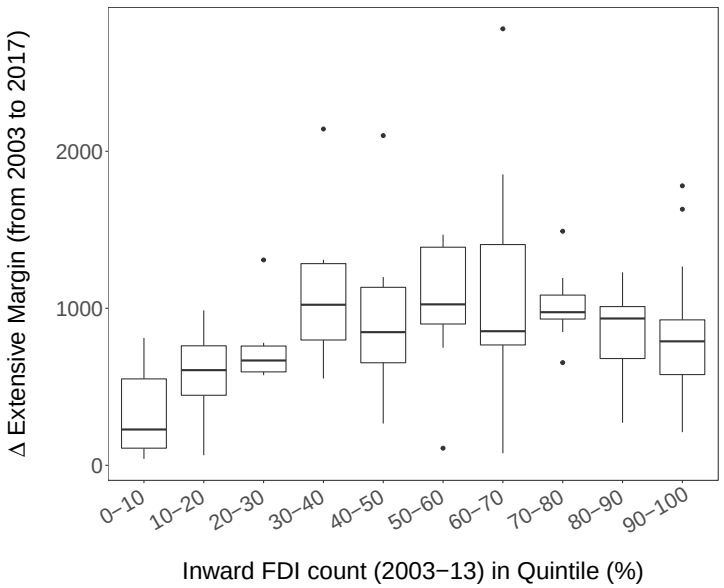

Figure 5: **Cumulative FDI and Expansion in Extensive Margins**. This graph shows a positive relationship between total inward FDI projects (by quintile) and increases in extensive margins of trade (HS 6-digit export products between 2003 and 2017) among 96 developing countries, especially for countries below the 80th percentile in inward FDI.

854231). In fact, the product rarely appeared in Vietnam's export record until 2005. By 2011, just in 5 years, Vietnam rose to the 23rd (among 120 exporters) and has continued to grow since then. This coincides with the timing when Intel Products Vietnam was established in 2006. By 2017, Vietnam became the worlds' 10th largest exporter of the product.

To be sure, the expansion of extensive margins should depend on the baseline number of exported goods and other economic factors. In fact, Figure 5 shows a weaker relationship between inward FDI and the extensive margin growth for countries with a large number of FDI projects (above the 80 percentile). These countries, such as China, India, and Brazil, tend to have large economies and less room for expansion as they already exported a wide variety of products in 2003. To address this issue, we conduct a regression analysis that controls for the underlying level of the extensive margin (the number of unique export products) in the baseline year. Table 1 presents the estimated effects of total FDI count on the expansion of extensive margins. We find that a 1% increase in FDI projects in a developing country is associated with 1.1 unique products newly exported from that country (columns (2) and (4)). This positive relationship is robust to alternative specifications and measurements, such as using the UNCTAD's total volume of inward FDI as the independent variable (columns (3) and (5)), or using a wider window for counting

	Δ Extensive Margin (New HS 6 digit Products in 2017 vs. 2003)				
	(1)	(2)	(3)	(4)	(5)
FDI count (log)	46.78*	116.19***		109.86*	
	(25.95)	(40.71)		(61.04)	
FDI volume (log)			95.06***		22.94
			(34.30)		(59.22)
Extensive Margin in 2003		−0.13**	−0.07	−0.14**	−0.09*
		(0.06)	(0.05)	(0.06)	(0.05)
GDP (log)				72.74	119.67
				(64.25)	(78.36)
Population (log)				−73.29	−44.31
				(45.97)	(45.25)
Constant	698.48***	702.19***	99.36	179.52	−1,365.95
	(103.77)	(101.77)	(257.72)	(1,150.57)	(1,008.42)
Observations	96	96	103	95	103
R^2	0.03	0.08	0.08	0.10	0.10
Adjusted R^2	0.02	0.06	0.06	0.06	0.06

Table 1: **Effects of Manufacturing Greenfield FDI on the Change in Extensive Margin**. This table shows that higher levels of FDI is associated with a larger increase in the unique set of HS 6-digit products exported from the country. Columns 1, 2, and 4 use total FDI project counts from fDi Markets as the independent variable, while columns 3 and 5 use the sum of FDI inflow volume obtained from UNCTAD. The stars represent the statistical significance of each coefficient at the following level: *p<0.1; **p<0.05; ***p<0.01.

baseline versus closing extensive margins (see Table A.3).

4.1.2 Intensive Margin

Next, we evaluate the effect of new FDI projects on the intensive margin of trade utilizing our product-level trade and FDI data from Vietnam.

Difference-in-Differences One main concern when examining the product-level effect of FDI on export volume is that MNCs may choose to invest in a country given its pre-existing trade environment and political institutions, leading to a potential selection bias. To address this concern, we use a DiD identification strategy combined with a matching method (Imai, Kim, and Wang, 2020).

Our product-year panel data set consists of 5,385 unique HS 6-digit products across 15 years (2003–2017). The outcome variable Y_{it} is the annual export volume of product i in year t from Vietnam to the world. The treatment variable X_{it}^{*} is a dichotomous variable indicating whether

there has been at least one new greenfield investment associated with product i prior to year t, since the beginning of our study in 2003. Formally, $X^*_{it} = \mathbb{1}\{\sum_{t'=2003}^{t} X_{it'} > 0\}$, where X_{it} denotes the total number of greenfield FDI associated with product i in year t. In other words, we consider the very first year of investment related to product i, while taking the "staggered adoption" approach for our estimation. This is because we are interested in analyzing the long-term effects of FDI as exports tend to grow gradually over time once a manufacturing facility is established. Note that this will return a conservative estimate of the effect of FDI because products associated with greenfield investments made before 2003 are considered to be unrelated to FDI given that fDi Markets data starts in 2003.

For each treated product i whose treatment status changes from 0 to 1 in year t, we create a set of control products i' based on the history of treatment status:

$$\mathcal{M}_{it} = \{i' : i' \neq i, X_{i't'} = 0 \ \forall t' \leq t\}. \tag{4}$$

That is, we compare each FDI-associated product against a set of other products with no connections to greenfield investments. To make a tighter comparison, we restrict and refine this matched set based on their similarity in pre-treatment covariates. First, we draw products from those in the same HS 2-digit category. For example, the control set for product HS 854231 (electronic integrated circuits) consists of other similar products within the HS 85 category. Second, we put heavier weights on products that are similar regarding the following pre-treatment characteristics: *trade volume*, *product differentiation*, *intermediateness*, *upstreamness/downstreamness*, *mean export volume* across all exporting countries (log), *traded volume in the rest of the world* (log), and the *number of importing/exporting countries*.[22]

Note that constructing product-specific covariates requires researchers to carefully navigate across various classification systems. For example, Rauch (1999) classifies each 4-digit Standard International Trade Classification (SITC) code by whether it is "differentiated" or not. Building on Rauch's classification, we measure the level of *Product-differentiation* for each HS 6-digit product by matching HS codes to SITC codes and then computing the share of matched codes that are classified as "differentiated." To measure *Upstreamness/Downstreamness*, we rely on the estimates from Antràs et al. (2012) and Antràs and Chor (2013) for 40 countries between 1995 and 2011.

[22]The variables product differentiation and intermediateness are time-invariant.

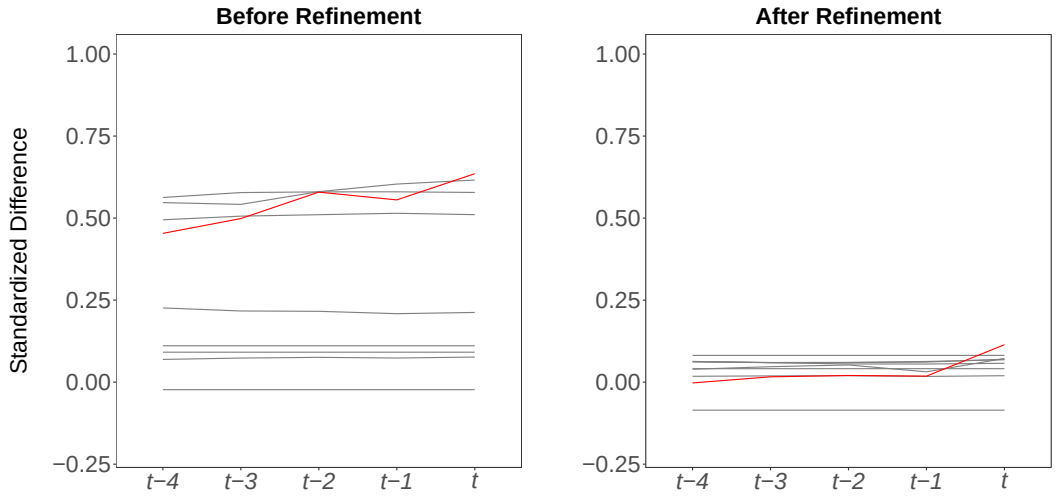

Figure 6: **Improving Matches Using the CBPS Weighting Method**. This figure shows the average covariate balance (standardized difference) between each treated unit and control units (y-axis) at each pre-treatment period (x-axis). Compared to matching only on HS 2-digit codes as shown in the left panel, the right panel demonstrates that standardized differences shrink substantially when further applying the CBPS weighting method to control units.

Since these estimates were computed at the International Standard Industrial Classification (ISIC) 2-digit level, we match HS 6-digit codes to ISIC 2-digit codes and then computed weighted average of the estimates for each of our HS products.[23] We calculate *Intermediateness* based on the share of HS 6-digit codes that include either the word "part(s)", "intermediate", or "component" in its description.

Given the matched set for each FDI-related product, we then use the following DiD estimator to evaluate the effect of FDI on the changes in the intensive margin of trade:

$$\hat{\beta} = \frac{1}{\sum D_{it}} \sum_{i \in I} \sum_{t=L+1}^{T-F} D_{it} \left\{ (Y_{i,t+F} - Y_{i,t-1}) - \sum_{i' \in \mathcal{M}_{it}} w_{i',t} (Y_{i',t+F} - Y_{i',t-1}) \right\} \tag{5}$$

where $D_{it} = 1$ if X^*_{it} changed from 0 to 1 in year t, L represents the number of years for which we match treatment history (lag), and F is the future year we estimate the effects for (lead). We weight each control unit using the weights $w_{i',t}$ obtained by the covariate balancing propensity score (CBPS) (Imai and Ratkovic, 2014) method that balances the full set of covariates and the lagged dependent variable.

Figure 6 shows that the proposed refinement method significantly improves the balance between

[23]Since our panel extends beyond 2011, we use 2011 estimates for all subsequent years

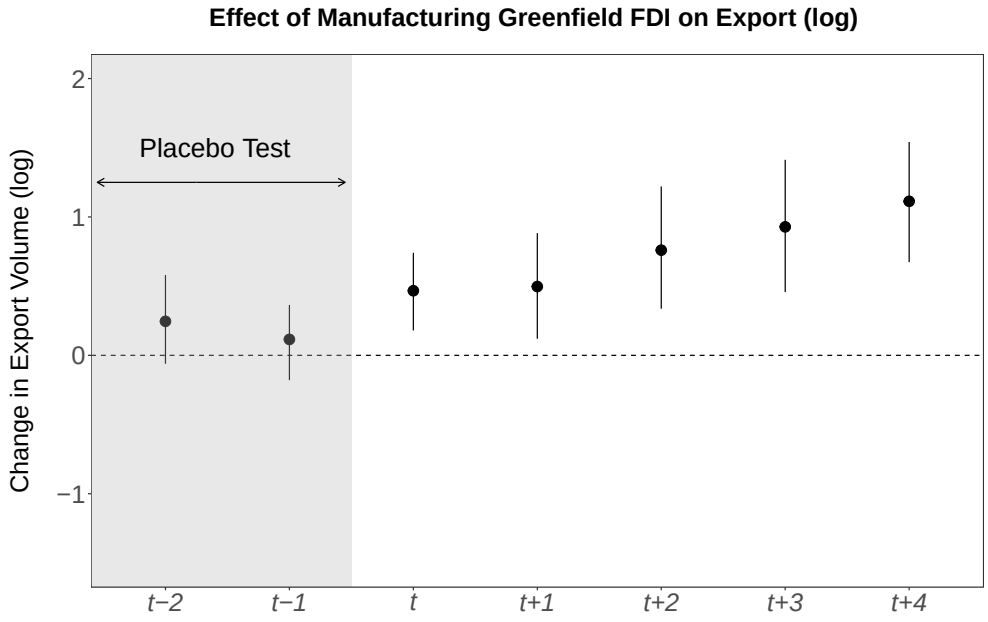

Figure 7: **Effects of Greenfield FDI on Exports**. This figure shows the estimated effect of a new manufacturing greenfield FDI project on the log export volume of the associated HS 6-digit product at $t + k$, $k \in \{0, 1, 2, 3, 4\}$. The vertical bars represent 95% confidence intervals. We find that a new manufacturing greenfield FDI project is estimated to lead to increases in exports of the associated HS 6-digit products by up to 204.3% within 4 years.

the products associated with FDI projects and those that are not. The left panel shows that there exist substantial differences between the two types of goods before the refinement. In fact, the mean differences for some of the covariates, such as the *number of importing countries*, exceed 0.6 standard deviations in terms of their respective variability. Furthermore, without the refinement, the outcome variable (solid red line) shows an increasing trend, suggesting a potential violation of the parallel trend assumption. In contrast, the right panel shows that mean covariate differences, including those for the outcome variable, are substantially smaller after the refinement, with relatively flat changes across the four pre-treatment periods. These results further justify the DiD identification strategy.

Figure 7 presents the estimated effects of a new manufacturing greenfield FDI project at time t on the exports of the associated products in the subsequent years (from t to $t + 4$). Consistent with Hypothesis 2, we find a substantial increase in the intensive margin of FDI-related products. Moreover, we find that the effects are persistent and grow steadily over time. A new manufacturing greenfield FDI project results in an increase in exports of the associated HS 6-digit products by 59.3% at time t, 64.3% at time $t + 1$, 113.6% at time $t + 2$, 152.9% at time $t + 3$ and, 204.3% at

time $t+4$ (all compared to $t-1$). To ensure the validity of the parallel trend assumption, we also conducted a placebo test. Here, we estimate the effect of greenfield investment at time t on the differences in trade volume in the pre-treatment periods at $t-1$ and $t-2$. As expected, we find small and imprecisely estimated effects on the pre-treatment export volume (see the shaded region in Figure 7).

Robustness Checks with Linear Regression To gauge the robustness of our findings, we use OLS instead of the DiD approach and show that the positive effect of FDI on export volume holds under various model specifications. For each period $t+F$, we estimate:

$$Y_{i,t+F} = \beta X^*_{it} + \sum_{l=1}^{L} \tau_l Y_{i,t-l} + \sum_{l=1}^{L} \delta_l \mathbf{Z}_{i,t-l} + \alpha_i + \gamma_t + \epsilon_{it}$$

where $Y_{i,t+F}$ is the log export volume of product i at time $t+F$, the variable X^*_{it} denotes FDI projects that are associated with product i at time t (operationalized in several ways below), the variables $Y_{i,t-l}$ and $\mathbf{Z}_{i,t-l}$ are lagged export volume and covariates for each pre-treatment period (from $t-4$ to $t-1$ with $L=4$), and α_i and γ_t are HS 2-digit and year fixed effects, respectively.

We check the robustness of our findings under different operationalizations of the treatment. One limitation with the previous DiD approach is that it only allows binary treatments. With more flexibility under the OLS regression, we consider the effect of cumulative FDI counts ($X^{\text{cum}}_{i,t} = \sum_{t'=2003}^{t} X_{it'}$). We consistently find positive effects of FDI on export volume with this alternative operationalization. For instance, we find that a 30% increase in cumulative FDI counts at time t is associated with a 160% increase in export volumes at time $t+1$. Meanwhile, the results also generally hold under binary treatment operationalizations (both cumulative and non-cumulative, see the top part of Table A.4). Lastly, we also consider FDI's effect on a broader set of downstream products, as discussed in Section 3. Again, we find that the positive effect of FDI on trade grows consistently over time under various operationalizations of the treatment (see the bottom part of Table A.4)

Overall, we find that new greenfield FDI projects lead to increased exports of FDI-associated products from Vietnam to the world. Together with the cross-country evidence on the extensive margin, the finding supports our theory that greenfield investments change both the extensive and intensive margins of trade for host countries.

4.2 Effects of FDI on Trade Liberalization

We turn to estimate the effect of FDI on Korea's product-level tariff cuts for Vietnamese exports in the 2015 Korea-Vietnam FTA.[24] Specifically, we fit the Tobit model below to our data:

$$
\begin{aligned}
Y_i^* &= \alpha_i + \beta X_i + \delta \boldsymbol{Z}_i + \epsilon_i \\
Y_i &= \begin{cases} 0 & \text{if } Y_i^* \leq 0 \\ Y_i^* & \text{if } Y_i^* > 0 \end{cases}
\end{aligned} \tag{6}
$$

where the outcome variable Y_i^* now measures the log mean tariff rate cut for HS 6-digit product i exported from Vietnam to South Korea. To measure tariff cuts, we rely on product-level tariff data from Barari and Kim (2020) and calculate the difference between the prior Most Favored Nation (MFN) tariff rate for Vietnamese HS 10-digit product exports and South Korea's preferential rate for the same products in 2017 after the FTA went into force.[25] We then compute the mean tariff cuts at the HS 6-digit level to facilitate consistent product comparisons across countries, and log transform ($log(x+1)$) the measure to reduce the influence of extreme values in the analysis. The outcome variable Y_i is left-censored at zero (i.e., no cuts in tariff rates), and larger positive values indicate greater tariff cuts. Note that the outcome variable is time-invariant and thus our analysis is cross-sectional. Again, the variable X_i represents our key predictor: greenfield manufacturing FDI projects in Vietnam that are associated with HS 6-digit product i. Similar to the previous section, we link products to FDI projects based on customs data and downstream data. We also create both continuous and binary versions of the key predictor. The variable α_i represents industry fixed-effects at the HS 2-digit level to account for industry-level characteristics that may affect both FDI inflows and tariff cuts. The variables $\boldsymbol{Z}_i$ represent an array of industry-level pretreatment controls discussed in the previous section.

We fit several versions of the Tobit model described in equation (6) to our data. First, we divide the period before the FTA was signed (2003–2014) into 3-year windows: 2003–2005, 2006–2008,

[24]The FTA was signed on May 5th, 2015, and entered into force on December 20th, 2015. See `https://investmentpolicy.unctad.org/international-investment-agreements/treaties/treaties-with-investment-provisions/3587/korea-republic-of---viet-nam-fta-2015-`.

[25]Barari and Kim (2020) compiles product-level tariff data from UNCTAD's Trade Analysis Information System (TRAINS) and the World Bank's World Integrated Trade Solution (WITS) database.

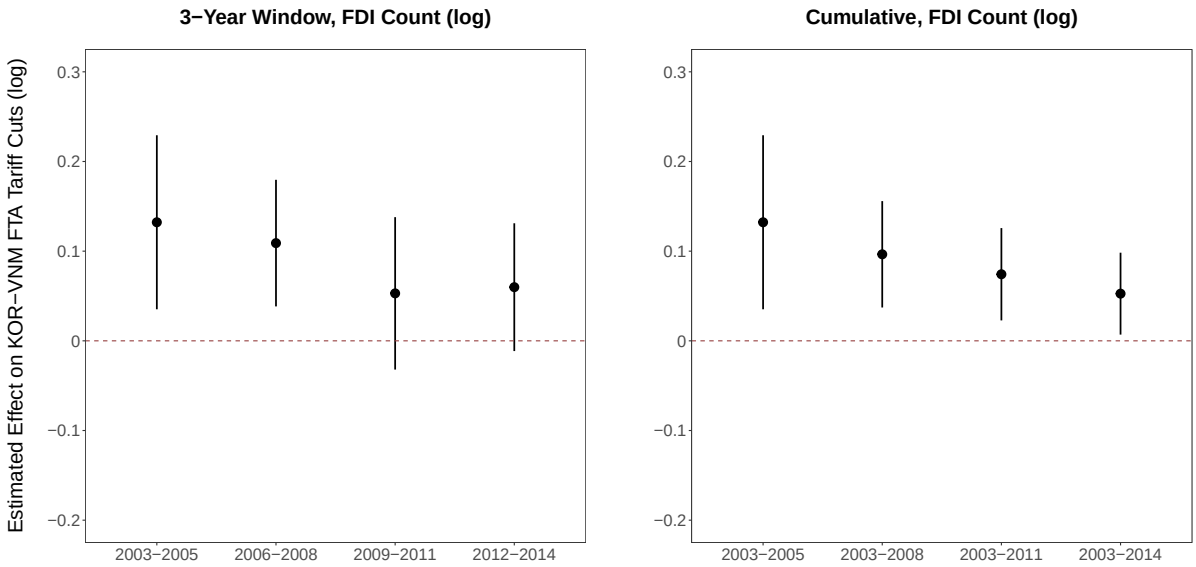

Figure 8: **The Effect of FDI on Tariff Cuts: Customs Data**. This figure shows that Vietnamese products that are linked to more greenfield manufacturing FDI projects in Vietnam enjoy larger tariff cuts from Korea after the 2015 FTA, with stronger effects among products tied to earlier MNC investments. The panels present point estimates and 95% confidence intervals.

2009–2011, and 2012–2014. For each time period, we construct predictors and controls pertaining to the period of focus. This approach allows us to examine whether the timing of FDI matters and to rule out any sorting effects (e.g., observing positive correlations when MNCs invest in Vietnam in anticipation of potential FTA signing). Second, we divide pre-FTA years into 3-year cumulative time periods: 2003–2005, 2003–2008, 2003–2011, and 2003–2014. Again, we create the relevant right-hand-side covariates and fit the same model to the data for each period. Results here provide insights about the size of the effects over various time periods.

Using customs data, we find that HS 6-digit Vietnamese products that are linked to more greenfield manufacturing FDI projects in Vietnam enjoy larger tariff cuts from Korea after the 2015 Korea-Vietnam FTA. Furthermore, we find more pronounced tariff-cutting effects among products tied to earlier FDI projects. As shown in the left panel of Figure 8, a 1% increase in the number of linked FDI projects between 2003 and 2005 is associated with a 0.13% larger tariff cut (95% C.I. = 0.035 to 0.230). In contrast, the same increase in linked FDI projects between 2012 and 2014 is only associated with a 0.06% larger tariff cut, and the association is imprecisely estimated (95% C.I. = -0.011 to 0.131). Such results suggest that our findings are not simply driven by sorting effects. Instead, the results are more consistent with the argument that

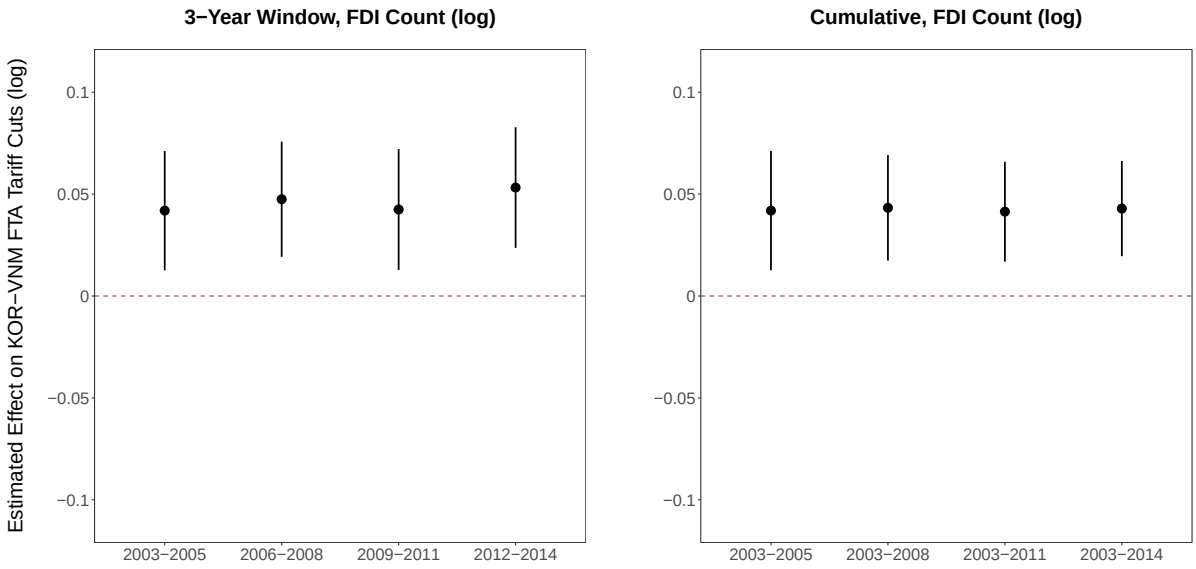

Figure 9: **The Effect of FDI on Tariff Cuts: Downstream Data**. This figure shows that Vietnamese downstream products that are linked to more greenfield manufacturing FDI projects in Vietnam enjoy larger tariff cuts from Korea after the 2015 FTA, with largely stable effects across time. The panels present point estimates and 95% confidence intervals.

first-mover MNCs are likely to have a more established supply chain network in Vietnam, which represents a larger lobbying coalition (Manger, 2012) and stronger influence over FTA negotiations between Vietnam and Korea.

Results based on cumulative time periods show a similar trend. The right panel of Figure 8 shows that the tariff-cutting effect of FDI shrinks as we include more recent years in the estimation. Nevertheless, we still find that, for the overall period before the Korea-Vietnam FTA (2003–2014), a 1% increase in the number of linked FDI projects is associated with a 0.05% larger tariff cut (95% C.I. = 0.007 to 0.098). Meanwhile, results based on a binary version of our key predictor indicate that FDI-linked products enjoy an approximately 9% larger tariff reduction during this overall period (see last row of column (2) of Table B.2 in the Appendix).[26]

Turning to the downstream approach, we find that HS 6-digit Vietnamese products that are downstream to more greenfield manufacturing FDI projects in Vietnam also enjoy larger tariff cuts from Korea after the FTA. For example, the left panel of Figure 9 shows that a 1% increase in the number of FDI projects between 2003 and 2005 a downstream product is linked to is associated with a 0.042% larger subsequent tariff cut (95% C.I. = 0.013 to 0.071) from Korea

[26] $(\exp(0.084) - 1) \times 100 = 8.77$

for the product after the FTA. Here, the effect appears to be mostly stable across time periods (left panel) and cumulatively over time (right panel), which contrasts our findings using customs data. Nevertheless, that tariff-cutting effects already existed nearly ten years before the signing of the Korea-Vietnam FTA suggests limited support for potential sorting effects between MNC investment decisions and subsequent tariff cuts. Overall, estimates based on a binary version of FDI and the entire period 2003–2014 suggest that FDI-downstream products enjoy an around 34.98% larger tariff cut after the FTA, which is a sizable effect (see the last row of column (4) in Table B.2 in the Appendix).

In short, we find that host-country products that are tied to MNCs and their FDI projects receive larger tariff cuts from host-country's trade partners, even when comparing products that are quite similar. These findings support Hypothesis 3 that host countries push to liberalize trade barriers on behalf of MNCs who hold strong political influence through their global supply chains. Lastly, the findings above are robust to different model specifications (see Figure B.1 and Figure B.2 in the Appendix) and time-frames (see Figure B.1 and Figure B.2 in the Appendix).

5 Concluding Remarks

Many scholars have contributed significantly to our understanding of the determinants of trade preferences and MNCs' location choices. While it is well-known that MNCs are important political actors in trade policymaking, the prevailing theoretical frameworks in the political economy of trade still rely mainly on the assumption that trade patterns and preferences reflect the innate differences in countries' underlying factor endowments. On the other hand, the literature on the politics of FDI tends to focus on the determinants of firms' investment decisions while being generally silent about the subsequent implications of foreign investments on international trade and trade politics outcomes, which may, in turn, affect future FDI decisions. Such gaps in the literature have led scholars to argue that we should "recast the separate study of trade and FDI into the study of global production in which trade and FDI are inextricably linked" (Pandya, 2016). We contribute to this effort by directly relating the two distinct firm-level activities, i.e., FDI and trade.

The new data set we offer reveals highly detailed information about the connections between the two activities. We find that greenfield FDI fundamentally alters the host country's trade

profile regarding the number of newly exported products and their trade volumes. We also find that MNCs' presence affects the host country's trade negotiation with, and market access to, other third-party nations beyond the host and home country pairs. Specifically, we find that Vietnamese export margins significantly expanded due to the increased FDI from various countries. Moreover, the products exported by these MNCs received significantly deeper tariff cuts in the bilateral FTA between Vietnam and South Korea.

More research can be conducted on the implications of these findings. As a spur to this research, we offer some initial speculations here. For one, the composition of foreign investments across industries can be a promising way to obtain more accurate measures of domestic trade preferences. We expect local labor, foreign capital, and their partners in the GVCs to form a political coalition that demands open trade and monetary policies. In this regard, the conventional view that emphasizes political cleavages either along factoral or sectoral lines within country boundaries is obsolete at best. As such, scholars should evaluate the distributional consequences of trade within and outside of GVCs. Additionally, by clearly revealing substantial differences in trade policies towards goods produced and exported by MNCs compared to other domestically produced products, our study highlights that trade policymaking goes far beyond national and product boundaries. Perhaps most ambitiously, future research should strive to close the gap between FDI and international trade by directly incorporating network structures formed by MNCs and their upstream and downstream partners/products.

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Appendix A Effects of FDI on Trade Profiles

A.1 Additional Information

Statistic	N	Mean	St. Dev.	Median	Min	Max
Export volume (log)	75,792	8.768	6.621	10.8	0	24
FDI (cumulative binary, Customs)	75,792	0.115	0.319	0	0	1
FDI (cumulative count, Customs)	75,792	0.387	2.042	0	0	101
FDI (cumulative binary, Downstream)	75,792	0.903	0.295	1	0	1
FDI (cumulative count, Downstream)	75,792	199.611	193.004	141	0	1,180
ROW export (log)	75,792	20.042	1.848	20.096	6.738	28.045
Mean export (log)	75,792	15.780	1.564	15.780	6.046	23.433
No. of exporting countries	75,792	8.094	13.922	2	0	122
No. of importing countries	75,792	10.420	9.819	8	0	101
Upstreamness	74,660	2.202	0.631	2.271	1.221	3.644
Downstreamness	74,660	2.471	0.274	2.476	1.724	2.996
Intermediateness	75,792	0.067	0.249	0	0	1
Differentiation (Rauch-N)	72,905	0.606	0.481	1.000	0.000	1.000
Homogeneous goods (Rauch-W)	72,905	0.070	0.252	0.000	0.000	1.000

Table A.1: **Summary Statistics: Panel Data for the Intensive Margin Analysis**

Name	Entry Into Force
Association of Southeast Asian Nations (ASEAN) FTA: Vietnam accession	1995
Association of Southeast Asian Nations (ASEAN) FTA: Laos and Myanmar accession	1997
Association of Southeast Asian Nations (ASEAN) FTA: Cambodia accession	1999
United States-Vietnam	2001
Association of Southeast Asian Nations (ASEAN)-China	2005
Association of Southeast Asian Nations (ASEAN)-China on Services	2007
Association of Southeast Asian Nations (ASEAN)-Japan	2008
Association of Southeast Asian Nations (ASEAN)-Korea on Services	2009
Japan-Vietnam	2009
Association of Southeast Asian Nations Australia New Zealand FTA (AANZFTA)	2010
Association of Southeast Asian Nations (ASEAN): Trade in Goods (ATIGA)	2010
Association of Southeast Asian Nations (ASEAN)-India	2010
Association of Southeast Asian Nations (ASEAN)-Korea	2010
Chile-Vietnam	2014
Korea-Vietnam	2015

Table A.2: **FTAs Signed by Vietnam Between 1995 and 2015**

A.2 Extensive Margin

	Δ Extensive Margin (New HS 6-Digit Products in 2015–2017 versus 2003–2005)				
	(1)	(2)	(3)	(4)	(5)
FDI count (log)	−5.84	101.34**		60.94	
	(26.58)	(40.17)		(62.31)	
FDI volume (log)			94.92***		17.17
			(31.40)		(51.84)
Extensive Margin in 2003–2005		−0.19***	−0.15***	−0.21***	−0.18***
		(0.06)	(0.05)	(0.06)	(0.05)
GDP (log)				139.13**	145.15**
				(62.96)	(72.19)
Population (log)				−103.11**	−58.22
				(43.55)	(40.86)
Constant	824.21***	938.67***	270.10	−580.39	−1,506.31
	(102.93)	(103.52)	(222.18)	(1,158.29)	(952.62)
Observations	107	107	115	104	115
R^2	0.0005	0.10	0.09	0.15	0.12
Adjusted R^2	-0.01	0.09	0.07	0.12	0.09

Table A.3: **Manufacturing Greenfield FDI and Change in Extensive Margins: Three-Year Window**. Compared to Table 1, the outcome here is the number of new export product codes in 2015–2017 compared to 2003–2005. The stars represent the statistical significance of each coefficient at the following level: *p<0.1; **p<0.05; ***p<0.01.

A.3 Intensive Margin

	Customs Data		
	Cumulative Binary	Binary	Cumulative Count (log)
	(1)	(2)	(3)
t	0.475	-0.166	0.272
	(0.081)	(0.142)	(0.075)
$t+1$	0.527	0.207	0.281
	(0.118)	(0.231)	(0.121)
$t+2$	0.452	0.591	0.212
	(0.15)	(0.154)	(0.153)
$t+3$	0.32	0.752	0.08
	(0.195)	(0.204)	(0.202)
$t+4$	0.36	0.98	0.114
	(0.227)	(0.242)	(0.245)

	Downstream Data		
	Cumulative Binary	Binary	Cumulative Count (log)
	(1)	(2)	(3)
t	0.29	0.329	0.026
	(0.242)	(0.231)	(0.032)
$t+1$	0.563	0.636	0.042
	(0.367)	(0.352)	(0.046)
$t+2$	0.683	0.67	0.03
	(0.391)	(0.384)	(0.056)
$t+3$	0.923	0.849	0.038
	(0.454)	(0.439)	(0.065)
$t+4$	1.067	1.077	0.063
	(0.506)	(0.478)	(0.073)

Table A.4: **Manufacturing Greenfield FDI and Change in Export Volumes**. The coefficients in the tables are based on the OLS specification. The results for pre-treatment covariates and fixed effects (HS 2-digit product or year) are omitted to ease presentation. Standard errors are clustered at the HS 2-digit code. Results in the top table are based on HS 6-digit products matched from the customs data. Results in the bottom table are based on HS 6-digit products matched using the downstream approach and input-output tables.

Appendix B Effects of FDI on Trade Liberalization

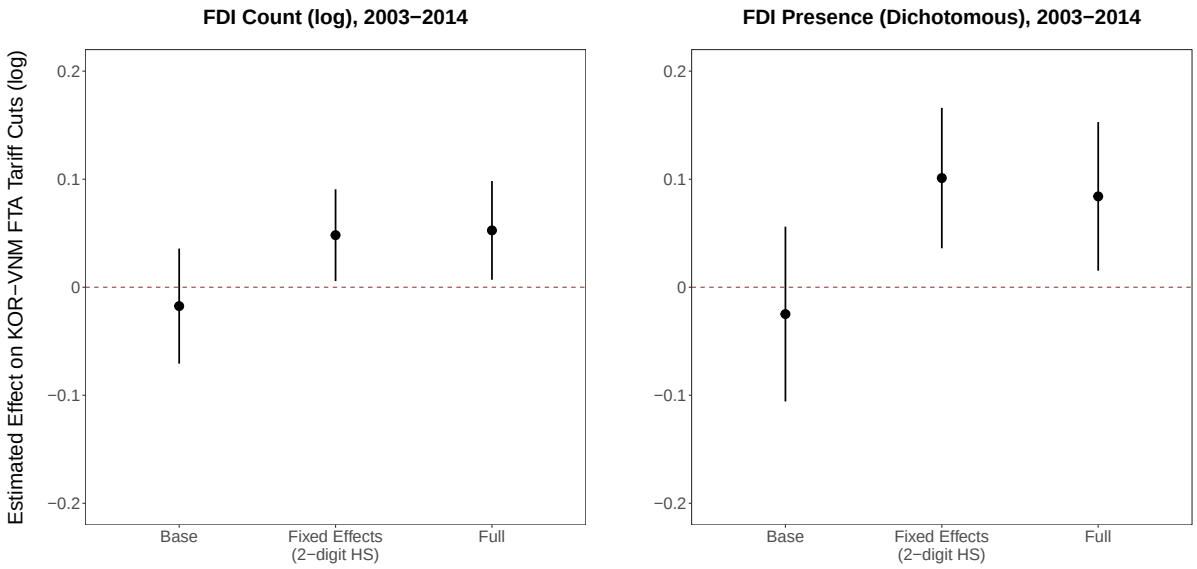

Figure B.1: **Customs Data: The Effect of FDI on Tariff Cuts**. This figure presents point estimates and 95% confidence intervals. The left panel shows results based on the log count of FDI projects while the right panel presents results based on a binary measure of FDI presence. Base models include FDI as the only predictor. Fixed Effects models add 2-digit HS code fixed effect. Full models further include an array of pre-treatment covariates discussed in the main text.

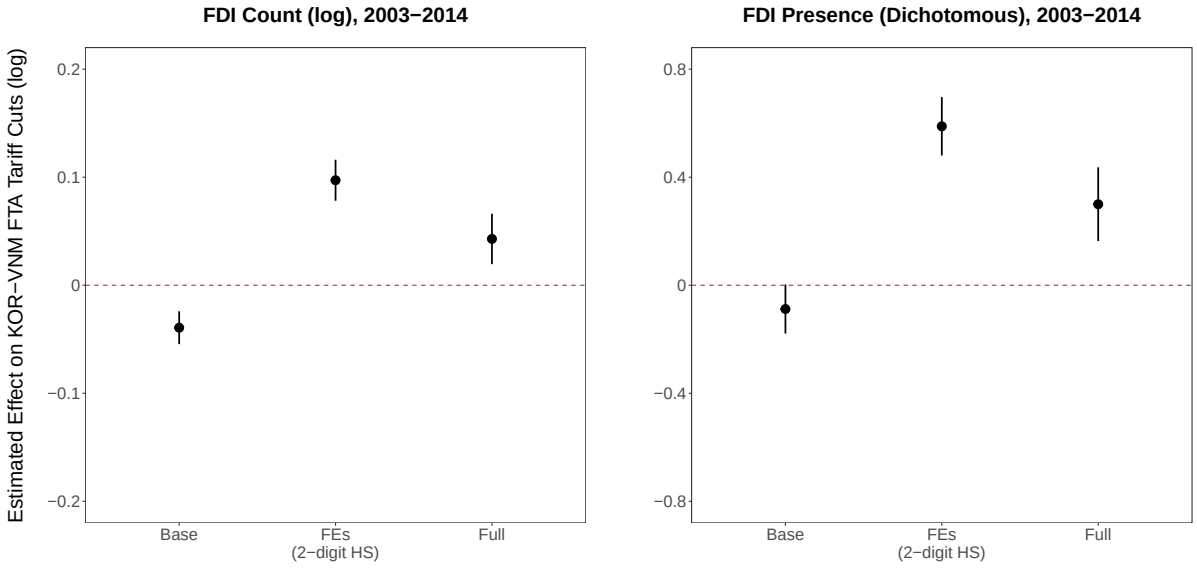

Figure B.2: **Downstream Data: The Effect of FDI on Tariff Cuts**. This figure presents point estimates and 95% confidence intervals. The left panel shows results based on the log count of FDI projects while the right panel presents results based on a binary measure of FDI presence.

	Customs Data				Downstream Data			
	Count	Binary	Count	Binary	Count	Binary	Count	Binary
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
2003–2004	0.137	0.146			0.041	0.311		
	(0.063)	(0.063)			(0.016)	(0.073)		
2005–2006	0.161	0.119			0.046	0.319		
	(0.053)	(0.048)			(0.016)	(0.073)		
2007–2008	0.101	0.073			0.052	0.303		
	(0.041)	(0.044)			(0.015)	(0.072)		
2009–2010	0.045	0.038			0.045	0.317		
	(0.05)	(0.047)			(0.016)	(0.072)		
2011–2012	0.157	0.121			0.044	0.319		
	(0.057)	(0.053)			(0.017)	(0.069)		
2013–2014	0.042	0.088			0.057	0.31		
	(0.04)	(0.043)			(0.016)	(0.069)		
2003–2006			0.13	0.116			0.043	0.315
			(0.041)	(0.044)			(0.014)	(0.073)
2007–2010			0.07	0.064			0.048	0.31
			(0.033)	(0.039)			(0.014)	(0.072)
2011–2014			0.038	0.075			0.057	0.309
			(0.04)	(0.04)			(0.016)	(0.069)

Table B.1: **The Effect of FDI on Tariff Cuts by 2 or 4-Year Windows**. This table presents Tobit regression estimates based on the full model specification (2-digit HS fixed effects and pre-treatment covariates). Standard errors are in parentheses. The dependent variable is product-level tariff cuts (log) in the KOR-VNM FTA. Columns under "Count" presents results based on the log count of new greenfield manufacturing FDI projects. Columns under "Binary" show results based on a binary measure of FDI presence.

	Customs Data		Downstream Data	
	Count	Binary	Count	Binary
2003–2004	0.137	0.146	0.041	0.311
	(0.063)	(0.063)	(0.016)	(0.073)
2003–2006	0.13	0.116	0.043	0.315
	(0.041)	(0.044)	(0.014)	(0.073)
2003–2008	0.096	0.084	0.043	0.293
	(0.03)	(0.038)	(0.013)	(0.072)
2003–2010	0.074	0.074	0.042	0.299
	(0.027)	(0.036)	(0.013)	(0.072)
2003–2012	0.065	0.074	0.043	0.3
	(0.026)	(0.036)	(0.012)	(0.07)
2003–2014	0.053	0.084	0.043	0.3
	(0.023)	(0.035)	(0.012)	(0.07)

Table B.2: **The Cumulative Effect of FDI on Tariff Cuts**. This table presents Tobit regression estimates based on the full model specification (2-digit HS fixed effects and pre-treatment covariates). Standard errors are in parentheses. The dependent variable is product-level tariff cuts (log) in the KOR-VNM FTA. Columns under "Count" presents results based on the log count of new greenfield manufacturing FDI projects. Columns under "Binary" show results based on a binary measure of FDI presence.