

# FDI Inflows and Domestic Firms: Adjustments to New Export Opportunities\*

Brian McCaig  
Wilfrid Laurier University

Nina Pavcnik  
Dartmouth College  
BREAD, CEPR, IZA, NBER

Woan Foong Wong  
University of Oregon

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## Abstract

We investigate the long-term effects of export opportunities to a large destination market on multinational affiliates and domestic firms in a low-income host country. The US-Vietnam Bilateral Trade Agreement reduced US import tariffs on exports from Vietnam. Tariff reductions led to entry of foreign and private firms and to employment expansion in formal manufacturing, with foreign entrants contributing most to employment growth. State firms stall employment reallocation through slower contraction. Half of tariff-induced foreign entrant growth is post-entry and exporter-driven. Foreign entrants are from non-US sources, highlighting the importance of studying FDI from multiple source countries in a lower-income host.

Keywords: trade liberalization, employment, foreign direct investment, exporting, firm dynamics, Vietnam

JEL Classification: F13, F14, O14, O19

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\*Contact: bmccaig@wlu.ca, nina.pavcnik@dartmouth.edu, and wfwong@uoregon.edu. We thank Adam Rivard, Colleen Spencer, Hanh Nyugen, Truong Thi Thu Trang, Rebecca Vermette, and Laura Walk for excellent research assistance and Nguyen Viet Phong at the General Statistics Office Vietnam, Edmund Malesky, and John Rand for assistance with understanding the data. We are grateful to the Economic Research Institute for ASEAN and East Asia (ERIA) for support. McCaig thanks the Social Sciences and Humanities Research Council of Canada (SSHRC) for support. An earlier draft was an output from a project funded by the UK Department for International Development (DFID) and the Institute for the Study of Labor (IZA) for the benefit of developing countries. The views expressed are not necessarily those of DFID or IZA. Additionally, we thank Bruce Blonigen, Jiayi Dong, Mark Colas, Anca Cristea, Quoc-Anh Do, Teresa Fort, Isabela Manelici, Peter Morrow, Stefania Garetto, and seminar and conference participants for helpful comments.

# 1 Introduction

Over recent decades, low- and middle-income countries have experienced a remarkable growth in FDI, receiving the majority of global FDI inflows (UNCTAD, 2014). A large literature has examined the implications of FDI inflows for technology transfers, productivity, and wage inequality in host countries (see Harrison and Rodríguez-Clare (2010) and Alfaro (2017) for surveys). Given limited growth of domestic firms in lower-income countries (Hsieh and Klenow, 2014), foreign affiliates could be an important source of jobs during structural transformation. Despite the importance of jobs for livelihoods in lower-income countries, the determinants of foreign affiliate entry and their contribution to employment growth, relative to domestic firms, have been less emphasized (Hjort and Poulsen, 2019; Toews and Vézina, 2022).

Recent trade policy changes, such as the U.S.-China trade war, have renewed interest in how trade policy shapes FDI and supply chains (Conconi et al., 2018; Handley, Kamal and Monarch, 2020; Flaaen and Pierce, 2019). The idea that trade policy can influence FDI has a long tradition in international economics, initially focusing on tariff-jumping motives for FDI (Brainard, 1997), the determinants of intermediates location by multinationals (Yi, 2003; Yeaple, 2003; Hanson, Mataloni Jr and Slaughter, 2005), and more recently on foreign affiliate entry and production in the context of export-oriented production (Tintelnot, 2017; Garetto, Oldenski and Ramondo, 2019). This suggests a potentially important role for trade policy to influence employment opportunities in a host country through foreign affiliates.

We investigate the long run impacts of a large change in trade policy, which reduced the exporting costs to a major export destination, on multinational affiliates and domestic firms in the emerging formal manufacturing sector of a low-income host country. The 2001 U.S.-Vietnam Bilateral Trade Agreement (the BTA) immediately reduced U.S. import tariffs applied to Vietnam, on average from 31.9% to 2.9%, leading to rapid Vietnamese export growth (Figure 1). The institutional features of the BTA provide a setting that allows us to address concerns about industry-specific trade policy changes being endogenous to FDI and other factors. We examine the effects of U.S. tariff reductions on shaping the composition of industry employment through firm entry, exit, and changes in incumbents in Vietnam. Our setting focuses on a single host country and its foreign affiliates from all source countries, not just from the U.S.

Our study makes several contributions. First, we examine the role of foreign affiliates in generating employment in formal manufacturing - which grew almost five fold between 1999 and

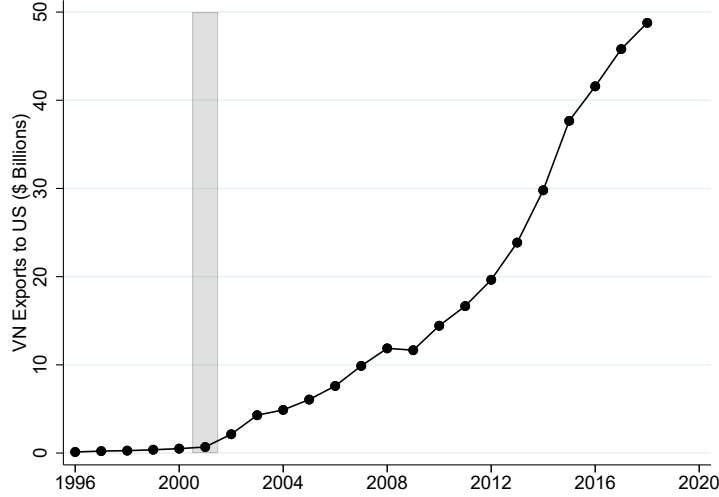


Figure 1: Vietnamese manufacturing exports to the US (billions of USD), 1996 to 2018

2017 (Figure 2) - relative to domestic firms in response to tariff cuts. Tariff cuts varied widely across industries and our study investigates whether these tariff cuts differentially affected employment across foreign-invested enterprises (FDIs), which are almost entirely greenfield, private domestic firms (PRIs), and state-owned enterprises (SOEs).<sup>1</sup> As we discuss in Section 2.3, foreign affiliates tend to have access to “special assets” of multinationals that cannot be easily transferred to unaffiliated firms and better connections to global supply chains relative to domestic firms (Antràs and Yeaple, 2014). We distinguish between private domestic firms and SOEs because politically unconnected domestic firms might be credit constrained or face other barriers to operation relative to SOEs. This leads to SOEs facing artificially lower operating costs or entry barriers relative to private domestic firms. A trade policy change can thus have differential effects on domestic private and state firms (Bai, Jin and Lu, 2019; Berthou et al., 2019; Atkin and Khandelwal, 2020; Khandelwal, Schott and Wei, 2013). In addition, using information on the source countries of foreign investment, we examine whether and how foreign affiliates from different source countries respond to lower tariffs on exports to a key export destination through entry and expansion of employment in a low-income production location. We bring a unique perspective to the literature: one with many FDI source countries, one location of production, and a large policy change in accessing a main export destination.<sup>2</sup>

Second, we investigate the long run impact of an immediate one-time (2001) trade policy

<sup>1</sup>See McCaig and Pavcnik (2018) for a discussion of the reallocation of workers from the informal microenterprise sector to the formal registered sector in response to the U.S. tariff reductions in the short run.

<sup>2</sup>For example, most papers on U.S. multinationals rely on data that covers multinationals (and not domestic firms) and focuses on one source country of FDI, many locations for affiliates, and some export destinations.

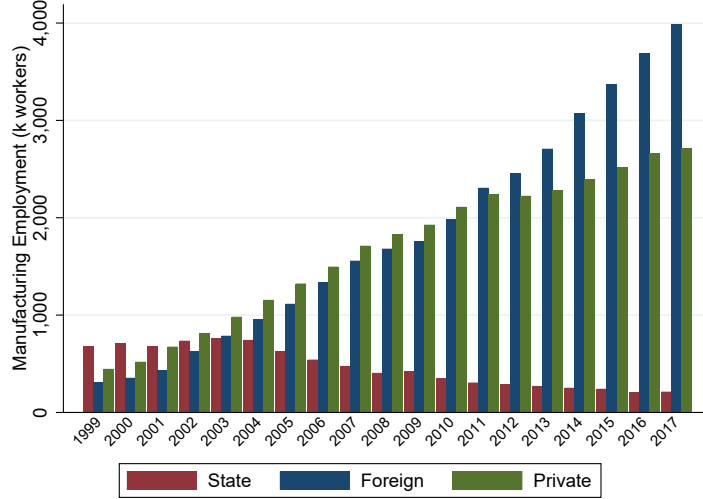


Figure 2: Vietnamese manufacturing employment by ownership, 1999 to 2017

change on employment of firms, spanning a period of 18 years from 1999 to 2017. Long run responses to trade policy could differ from shorter-term ones due to a variety of reasons, such as delayed adjustments of capital or labor, lumpy investment, or if firms face adjustment frictions (Dix-Carneiro and Kovak, 2017; Pierce and Schott, 2016, 2018). The longer term perspective might be of interest given concerns that some of the consequences of trade policy for foreign affiliates might be short lived if multinationals are footloose (Harrison and Scorse, 2010). The long 18-year period enables us to comprehensively track and study the cumulative effects of U.S. tariff cuts on continuing, exiting, and entering firms by ownership, as well as the post-entry employment growth of entering firms.<sup>3</sup> Our period features large FDI and PRI entry in manufacturing, while SOEs retrenched (Figure 2). FDI employment expanded from 307 thousand to 4 million, with entrants accounting for 86% of foreign employment in 2017. Similarly, employment in PRIs grew from 448 thousand to 2.7 million employees with entrants responsible for 87% of private employment in 2017. Vietnam started off with a large state sector within manufacturing, which subsequently contracted. We study how U.S. tariff cuts affected the expansion of formal sector employment across FDIs, SOEs and PRIs through entry, exit, continuers, and post-entry growth.

We find that the number of firms, employment and revenue increase in industries experiencing greater declines in U.S. tariffs, consistent with predictions of neoclassical trade models. Firm entry is an important margin in response to the tariff cuts, primarily driven by foreign and private domestic firms. On the other hand, SOEs observe no tariff-induced firm count change. Furthermore,

<sup>3</sup>We invested considerable time verifying and cleaning the panel of manufacturing firms. See Section A.4 for details.

entering firms account for much of the tariff-induced employment growth. The tariff-induced employment growth among entering firms is concentrated primarily among foreign entrants. Despite tariff-induced private domestic entry, tariff reductions do not contribute to private domestic employment growth. On the other hand, employment in state firms contracts less in high tariff-cut industries. These differences in the response of industry outcomes across foreign firms, private domestic firms and SOEs are consistent with SOEs facing different incentives.

Our results suggest that it is important to consider longer-term effects of a one-time trade policy change. For example, the magnitudes of the cumulative effects of tariff cuts on foreign affiliate entry and employment increase over time and take a while to stabilize. Furthermore, about half of the cumulative tariff-induced growth in within-industry employment share among foreign entrants is due to employment growth after entry and this takes time to materialize. Our findings add to the literature emphasizing longer-term effects of trade policy or FDI (Dix-Carneiro and Kovak, 2017; Méndez-Chacón and Van Patten, forthcoming).

While Vietnam was already open to manufacturing FDI prior to the BTA and had relatively low wages, tariffs on its exports to the U.S.—a large export destination—were high on average at 31.9%. Adding on fixed costs of setting up an affiliate, the variable profits from exporting may not be enough to generate positive total profits prior to the BTA. After the BTA drastically reduced tariffs on Vietnamese exports to the U.S. on average to 2.9%, the increase in variable exporting profits might be sufficient to cover the fixed costs of setting up an affiliate in Vietnam, leading to foreign affiliate entry. Overall, we find that the vast majority of the tariff-cut induced increase in employment in foreign entrants reflects employment growth in exporting foreign affiliates (rather than non-exporters). This further links export opportunities to foreign affiliate entry.

Finally, most of the estimated tariff-induced employment growth of foreign entrants is driven by affiliates of non-U.S. multinationals (mainly from East Asia) rather than affiliates of U.S. multinationals. Consistent with this, the tariff-induced increase in exports to the U.S. is not mainly driven by affiliates of U.S. multinationals, but instead by firms unaffiliated with U.S. multinationals. Foreign affiliates from geographically closer countries with existing regional supply chain linkages might have been better positioned to respond to the tariff cuts (as in Head and Mayer (2019), Antràs et al. (2022)). Focusing solely on the FDI response from U.S. multinationals would have missed much of the foreign affiliate response. This highlights the importance of studying responsiveness of FDI from multiple sources, even in the context of a bilateral trade agreement.

**We place our contributions and results in relationship to the literature.** Our analysis contributes to the literature on how FDI impacts the emergence of formal manufacturing employment in low-income countries.<sup>4</sup> The FDI literature on labor markets in lower-income host countries concentrates mainly on wage inequality among the employed, rather than jobs (Feenstra and Hanson, 1997; Javorcik, 2015; Alfaro-Urenña, Manelici and Vasquez, 2021). The evidence on MNCs and jobs instead comes predominately from high-income countries (Brainard, 1997; Yeaple, 2003; Hanson, Mataloni Jr and Slaughter, 2005; Desai, Foley and Hines, 2009; Muendler and Becker, 2010; Harrison and McMillan, 2011; Boehm, Flaaen and Pandalai-Nayar, 2020; Kovak, Oldenski and Sly, 2021). Foreign affiliates in host countries can be a source of jobs essential for structural transformation, yet the arrival of such jobs is not guaranteed. For example, Diao et al. (2021) notes that many large plants in lower-income countries are capital intensive and don't necessarily generate a lot of jobs, with Athukorala and Tien (2012) expressing a similar concern about foreign firms in Vietnam in the 1990s. We contribute evidence on the trade-policy induced expansion of formal manufacturing employment through foreign entrants in a low-income setting.<sup>5</sup> We most closely relate to Toews and Vézina (2022), who finds job creation through FDI driven by natural resource discoveries, and Hjort and Poulsen (2019), who finds formal job creation in response to the introduction of new technology (fast-speed internet).

We also relate to the literature on the determinants of FDI entry or acquisition and the effects of resource reallocation between foreign and domestic firms in host countries. The literature on the determinants of FDI entry has emphasized the role of selection (Arnold and Javorcik, 2009; Guadalupe, Kuzmina and Thomas, 2012), financial constraints (Alfaro and Chen, 2018; Bilir, Chor and Manova, 2019), and bilateral tax treaties and trade agreements (Blonigen, Oldenski and Sly, 2014; Feinberg and Keane, 2006, 2009). We show that greenfield FDI entry in a low-income host is very responsive to reductions in tariffs on exports to a large export market. Importantly, we do so while addressing the concerns about the endogeneity of trade policy to FDI and other factors (Blanchard, 2007; Blanchard and Matschke, 2015; Blanchard, Bown and Johnson, 2021), by relying on the institutional features of the BTA (as discussed in Sections 2.1 and 4.2).<sup>6</sup> Furthermore,

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<sup>4</sup>This literature in low- and middle-income countries has mainly focused on spillovers from foreign to domestic firms (Harrison and Rodríguez-Clare, 2010; Poole, 2013; Kee, 2015; Newman et al., 2015; Abebe, McMillan and Serafinelli, 2022; Alfaro-Urenña, Manelici and Vasquez, 2022) and the aggregate effects of FDI on growth (Hansen and Rand, 2006).

<sup>5</sup>McCaig and Pavcnik (2018) find short-run trade-induced reallocation of workers from the informal to the formal sector. Our study examines long-term effects of trade policy on foreign affiliates and creation of formal manufacturing employment.

<sup>6</sup>The agreement lowered U.S. tariffs on imports from Vietnam by moving from one pre-existing tariff schedule, Column 2, to another, Most Favored Nation (MFN). Hence, neither U.S. nor Vietnamese industries had an oppor-

we connect the literature on resource reallocation between FDI and domestic firms (Aitken and Harrison, 1999; Alfaro and Chen, 2018; Bao and Chen, 2018) to the literature on firm performance and trade in the presence of politically connected firms (Khandelwal, Schott and Wei, 2013; Bai, Jin and Lu, 2019; Berthou et al., 2019). We find slower contraction of SOEs employment in industries with bigger tariff cuts in a major export market, adding to studies that show that SOEs are less likely to exit due to increased import competition (Brandt et al., 2017; Baccini, Impullitti and Malesky, 2019).

Finally, we relate to the literature on how global supply chains adjust to trade policy changes. Earlier studies have found production reallocation effects across countries in response to trade protection targeting a particular exporter country and industry (Blonigen, 2002; Head and Mayer, 2019; Flaaen, Hortaçsu and Tintelnot, 2020). Most examine intensive margin adjustment among existing firms to trade policy changes.<sup>7</sup> We show that lower tariffs on exports to a large export destination impact foreign affiliate entry and their subsequent employment expansion. This highlights the responsiveness of multinationals to reductions in variable export costs in one host country and the relevance of foreign affiliate extensive and intensive margin adjustment. Most of the estimated tariff-induced employment growth of foreign entrants is driven by affiliates of non-U.S. multinationals (mainly from East Asia) rather than affiliates of U.S. multinationals. Our findings demonstrate the manufacturing-wide effects of foreign affiliate entry and expansion in the host country.

We provide a detailed discussion of the BTA and a conceptual framework in section 2. In section 3, we describe the data and highlight some key facts. We present the empirical methodology and results in sections 4 through 6. Section 7 concludes.

## 2 Institutional and Conceptual Background

We first present background on the BTA and foreign investment in Vietnam. We conclude with a discussion of a conceptual framework.

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tunity to negotiate over industry-specific tariff reductions (McCaig, 2011). The variation in U.S. tariff reductions across industries is strongly correlated with growth of Vietnamese industry exports to the U.S., but not correlated with contemporaneous export demand shocks, export supply shocks, nor pre-existing export growth trends to the U.S. or other trade partners.

<sup>7</sup>Tintelnot (2017) focuses on intensive margin adjustments. Likewise, Head and Mayer (2019) focus on choices of export markets and product lines in response to trade agreements in existing affiliates. Garetto, Oldenski and Ramondo (2019) is an exception.

## 2.1 2001 U.S.-Vietnam Bilateral Trade Agreement

The BTA was implemented on December 10, 2001. The nature of the BTA makes it an excellent setting to study the causal impacts of U.S. tariffs reductions on exports from Vietnam on formal firm entry and employment in Vietnam.

First, the BTA’s main trade policy change was an immediate one-time permanent reduction in tariffs imposed on Vietnamese exports to the U.S. (STAR-Vietnam, 2003; McCaig, 2011). Prior to the BTA, Vietnam already offered MFN tariffs on imports from the U.S.<sup>8</sup> However, Vietnamese exports were subject to the high Column 2 U.S. tariffs, which apply to countries without normal trade relations status with the U.S. The primary trade policy element was to reclassify Vietnamese exports from Column 2 to the Most Favored Nation (MFN) U.S. tariff schedule. With the BTA, the U.S. immediately switched to applying MFN tariffs on imports from Vietnam in December 2001. Thus, the U.S. tariff reductions are less likely to suffer from conventional concerns about tariff reductions being endogenous to industry lobbying, either in the U.S. or Vietnam. Indeed, the U.S. tariff cuts occurred through the movement from one pre-existing tariff schedule—Column 2—which originated with the Tariff Act of 1930 (Pregelj, 2005) and remained very stable before and after the BTA (McCaig, 2011), to another pre-existing tariff schedule—the MFN tariff schedule—which was negotiated among World Trade Organization members in 1995. Hence, the tariff cuts were presented as one package without room for negotiating over tariff reductions for specific industries.

A second key feature of the BTA is that the tariff reductions within manufacturing were large, on average, and varied across industries. We use ad valorem equivalents of the Column 2 and MFN tariff rates that prevailed in 2001 when the BTA was implemented.<sup>9</sup> Across 119 4-digit traded manufacturing industries, the average tariff reduction was 29.0 percentage points, from 31.9 to 2.9 percentage points, with significant variation across industries, ranging from 0 to 63 percentage points. The standard deviation of industry tariff reductions is 15.6 percentage points. Our empirical strategy relies on this variation in tariff reduction sizes across industries.

Third, the U.S. tariff reductions had a large immediate impact on Vietnamese exports to the

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<sup>8</sup>The BTA-induced reductions in Vietnamese tariffs on imports from the U.S. were therefore negligible. See STAR-Vietnam (2003) and McCaig and Pavcnik (2018).

<sup>9</sup>We follow McCaig (2011) and use detailed information on U.S. tariffs for both of these tariff schedules from the U.S. International Trade Commission’s online Tariff Information Center and compute the ad valorem equivalent of any specific tariffs. We then match the tariff lines to industries by the concordance provided by the World Bank via the World Integrated Trade Solution database to construct industry-level tariffs according to 4-digit International Standard Industrial Classification (ISIC) industry nomenclature.

U.S. The U.S. quickly became the most important manufacturing export market, accounting for 24% of Vietnamese manufacturing exports by 2003, becoming the leading export market in 2005 for the rest of the sample period (see detailed discussion in Appendix B.1.1 and Figures B1a to B1c). Prior to the BTA, Vietnam’s key export industries were footwear, food, and apparel (see Figure B2 and related discussion). The U.S. tariff reductions influenced the composition of Vietnamese manufacturing exports to the U.S.. Figure C2 shows the relationship between growth in Vietnamese manufacturing exports to the U.S. between 2000 and 2006 and BTA induced tariff changes across industries. There is a clear positive relationship: Vietnamese industries that experienced the largest decrease in U.S. tariffs saw exports to the U.S. rise more rapidly.<sup>10</sup>

Fourth, we rule out spurious correlation of the U.S. tariff reductions with industry-specific pre-BTA characteristics. For example, there is no relation of tariff cuts across initial industry employment prior to the BTA in year 2000. For visualization purposes only, Figure 3 reports average tariff cuts across 2-digit industries, sorted by their pre-BTA (2000) employment size. The figure clearly indicates that there is no systematic relationship between tariff cuts and initial industry employment. Figure C3 confirms the lack of a statistically significant relationship between pre-BTA employment size and BTA tariff cuts at the 4-digit industry level, with a partial correlation of -10.6 (31.3) using the level of employment and -1.50 (1.33) using the ln of employment.

Additionally, we show that the U.S. tariff reductions are not strongly correlated with initial conditions within formal manufacturing (Figure C4). The partial correlation between the share of 2000 employment within an industry for each ownership type and the change in the U.S. tariff is 0.15, -0.3, and 0.15 for foreign, state, and private firms, none of which are statistically significant at conventional levels. In Section 4.2, we examine in detail the short- and long-run responses of exports to the U.S. to these tariff cuts, as well as perform other specification checks to further confirm that industry tariff cuts are not correlated with industry-specific pre-existing trends, nor contemporaneous global supply and demand shocks, and that export responses to tariffs do not mainly reflect demand or supply conditions in initially larger exporting industries.

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<sup>10</sup>Upon implementation of the BTA, Vietnamese exports of apparel and textiles did not face any import quotas to the U.S. as Vietnam was not subject to the Multi-Fibre Agreement due to being outside of GATT and WTO. As exports of such items were very low under Column 2 tariffs additional quotas were not necessary. In July 2003 a bilateral textile agreement came into force, which imposed quotas on Vietnamese textile and apparel exports to the U.S. The quotas were removed in 2007. In addition, in robustness check we show our main results are not sensitive to inclusion or exclusion of textile or apparel industry nor inclusion or exclusion of controls for quotas.

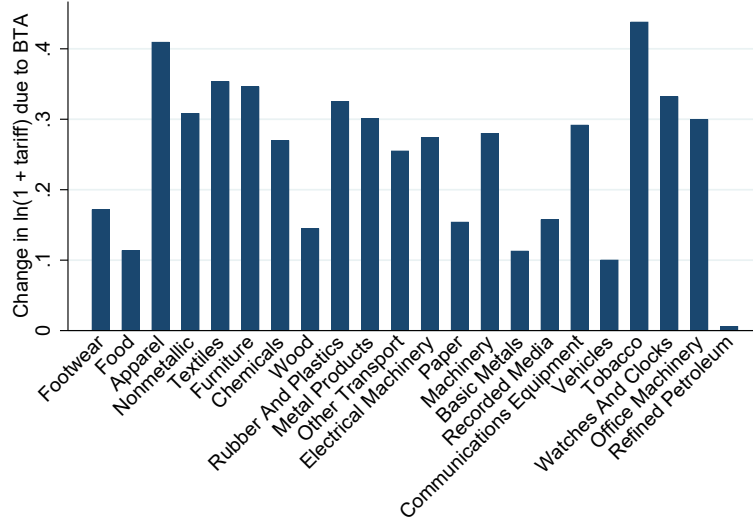


Figure 3: Tariff reductions due to the BTA

*Note:* 2-digit manufacturing industries are sorted by total employment in year 2000 (largest on the left and smallest on the right).

## 2.2 Foreign investment policy

Prior to the BTA, Vietnam was already relatively open to FDI in manufacturing as, following the 1996 Foreign Investment Law, very few manufacturing industries were subject to entry restrictions for foreign investment (tobacco, sugar and alcohol, chemicals, pharmaceuticals, and cement) (Malesky, Gueorguiev and Jensen, 2015).<sup>11</sup> A further amendment in 2000 allowed for automatic registration of export-oriented foreign firms as well as for more power for local governments to reduce administrative hurdles for FDI (Athukorala and Tien, 2012).<sup>12</sup>

In this relatively open foreign investment environment, the number of FDIs in manufacturing grew from 654 to 1048 between 1997 and 2000 (see Table B1 in Appendix Section B.1.4). FDI firms were also growing in terms of their importance for exports prior to the BTA, with their percentage of Vietnamese merchandise exports, excluding crude oil, growing from 17.1 in 1997 to 22.9% in 2000 (Vietnam Customs Handbook, 2017). The vast majority—77% of manufacturing foreign employment (67% of FDI firms) – were wholly-owned foreign enterprises in 2000, highlighting the relative openness of Vietnam to manufacturing FDI prior to the BTA.

The BTA included no industry-specific commitments to FDI investment within manufacturing in Vietnam, but it contained a commitment to open market access for U.S. FDI in services (STAR-Vietnam, 2003) and to eliminate government screening of FDI, removal of all trade-related

<sup>11</sup>See Athukorala and Tien (2012) for a discussion of the first Foreign Investment Law in 1987.

<sup>12</sup>Using data from the Provincial Competitiveness Index surveys (Malesky, Ngoc and Thach, MY), we find little change in the median length of time required to receive an investment license for foreign invested enterprises. It was 30 days for each period 1995-1999, 2000-2004, 2005-2009, 2010-2014, and 2015-2019.

investment measures inconsistent with the WTO, such as local content requirements, and the removal of export performance requirements (Manyin, 2001). The 2006 Unified Investment Law abolished local content and export target requirements and provided foreign investors complete freedom in terms of entry mode (joint venture or full ownership) (Athukorala and Tien, 2012). None of these changes were industry-specific and, as noted above, manufacturing FDI was relatively open even prior to the BTA. By 2017, 95% of manufacturing employment in FDI firms was in wholly owned foreign-invested enterprises.

Finally, the U.S. is a very minor source of manufacturing FDI in Vietnam before and after the BTA. Figure 4 reports the share of FDI employment by source country from 1999 to 2017.<sup>13</sup> Most foreign investment in manufacturing stems from East Asian economies, making up more than 80% of foreign employment during this period (82% in 1999 and 90% in 2017). The most common sources of funding are Taiwan (36%), South Korea (22%), Japan (13%), and Singapore (3%). The U.S. accounted for a relatively small share of source country funding—1.3% in 1999 and 1.5% by 2017. China started as a small source country in 1999, at 0.004%, but grew to 7% by 2017.

## 2.3 Conceptual Framework

Previous sections showed that the primary trade policy change due to the BTA was a reduction in tariffs on exports from Vietnam to a large export destination and these tariff cuts were particularly large in manufacturing. This presents an excellent setting to examine the role of foreign affiliates from all sources, relative to domestic firms, in generating employment in response to tariff cuts in the nascent formal manufacturing sector of a low-income country.

Conventional trade theory suggests that Vietnamese industries that experienced larger U.S. tariff reductions should expand relative to industries with smaller tariff reductions. In addition, these tariff reductions could differentially affect the performance and survival of existing firms as well as the entry decision of new firms within an industry. We start off in a setting with one dimension of firm heterogeneity, productivity, and extend it to additional differences across firms based on ownership.

In a typical Melitz framework (Melitz, 2003; Mrázová and Neary, 2019), firms differ in their productivity or marginal costs within an industry and face fixed costs of exporting. A reduction in the variable costs of accessing export markets is predicted to lead to expansion of the most productive continuing firms and contraction and/or exit of less productive firms due to selection

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<sup>13</sup>The annual enterprise surveys, which we use for the analysis, contain information on funding by source country.

and reallocation. Thus, tariff-induced expansion of industry revenue and employment is expected to be dominated by continuing firms and increased firm exit. In our setting, two additional issues need to be considered. First, lower trade costs of accessing a large export destination provide an impetus for multinationals to adjust their participation in Vietnam. Second, the predictions above might differ in the presence of politically connected firms.

**Entry and expansion of multinational affiliates** Recent studies theoretically and quantitatively examine a broad set of foreign affiliate entry determinants (Garetto, Oldenski and Ramondo, 2019). Multinationals tend to have higher productivity than domestic firms and are therefore better positioned to serve foreign markets through an affiliate (Helpman, Melitz and Yeaple, 2004) or expand their affiliates in host countries to primarily serve third-country export markets (Tintelnot, 2017; Garetto, Oldenski and Ramondo, 2019).<sup>14</sup> The literature on factors contributing to FDI affiliate establishment emphasizes variable trade costs (including trade policy), variable production costs (including wages and the costs of intermediate inputs), and additional fixed costs of setting up a new production facility (Antràs and Yeaple, 2014; Antras and Chor, Forthcoming). While Vietnam was already open to manufacturing FDI prior to the BTA and had relatively low wages (due to its comparative advantage), tariffs on its exports to the U.S. were high on average at 31.9%. With fixed costs of setting up an affiliate and high tariffs on Vietnamese exports to a large export destination, the variable profits from exporting may not be enough to generate positive total profits prior to the BTA. Once tariffs on Vietnamese exports to the U.S. have been drastically reduced, the variable profits from exporting to the U.S. and other countries might be sufficient for the multinational to cover fixed costs of setting up an affiliate in Vietnam, leading to foreign affiliate entry.

Furthermore, multinationals and their foreign affiliates tend to have access to foreign technology, “special assets” that cannot be easily transferred to unaffiliated firms, and connections to GVC networks relative to domestic firms (Antràs and Yeaple, 2014).<sup>15</sup> FDI might also face fewer constraints than domestic firms in factor markets, with better access to international credit markets (Alfaro and Chen, 2018; Bilir, Chor and Manova, 2019). These characteristics might further

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<sup>14</sup>In our setting, we also find that foreign affiliates are on average more productive than SOEs and private firms. Foreign firms are much more likely to be engaged in exporting than either SOEs or PRIs in Vietnam. In 2000, 72% of FDIs reported positive exports as compared to 32% of SOEs and 16% of PRIs. Both FDIs and PRIs have a high share of firms that are very intensively involved in exporting—66% of exporting FDIs and 58% of exporting PRIs report exports worth more than 80% of revenue.

<sup>15</sup>Antràs and Yeaple (2014) reference Hymer (1960) and Helpman (1984) with regards to multinational “ownership of special assets that confer a strategic advantage over indigenous firms in foreign markets...and the need for a direct involvement of the asset owner,” as well as tangible and intangibles of multinational firms.

enable FDIs to expand relative to domestic firms in Vietnam through new entry and expansion of incumbents in response to BTA-induced tariff cuts. The above mechanism does not require FDIs to directly compete with domestic firms in the domestic product market. Even if FDIs are mostly targeting export markets, their tariff-cut induced expansion can increase local labor demand and influence the labor costs for domestic-market-oriented firms.<sup>16</sup>

**Presence of politically connected firms** Many countries, including Vietnam, feature a prominent state-owned sector in manufacturing, which may be associated with distortions induced by preferential access to inputs for the state sector or entry barriers (Mishra, 2011; Khandelwal, Schott and Wei, 2013; Malesky, Gueorguiev and Jensen, 2015).<sup>17</sup> Such preferential treatment might keep politically connected firms protected from new entrants, or subsidize and artificially lower their operating costs.

In the presence of these politically-connected SOEs, entry, exit, and reallocation of activity may be more complex than in standard heterogeneous firms and trade models (Khandelwal, Schott and Wei, 2013; Bai, Jin and Lu, 2019; Berthou et al., 2019). To the extent that SOEs face different market incentives due to distortions, this will differentially influence their entry, exit, and growth/contraction decisions in response to the U.S. tariff reductions, with effects depending on the strength of correlation between firms' political connection and underlying productivity. For example, low productivity SOEs could continue to operate rather than exit if distortions allow them to operate with a positive profit. This could hinder the overall reallocation of economic activity in response to the U.S. tariff reductions.

Our discussion highlights two main ideas, beyond the prediction that the tariff reductions in a large export market are expected to contribute to expansion of employment in the nascent formal manufacturing sector in Vietnam. First, there should be tariff-induced changes in the composition of employment across firms within an industry due to entry, exit, and adjustments of continuers. Second, the extent of entry, exit, and reallocation within industries in response to tariff-cuts is likely to differ by firm ownership, with foreign affiliates potentially better positioned to respond to tariff-cuts than private domestic firms and/or with SOEs adjustments differing due to political connections. This motivates our focus on these three firm types in our empirical work. How firm

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<sup>16</sup>McCaig (2011) and Fukase (2013) find that the BTA-induced tariff cuts increase in wages. McCaig and Pavcnik (2018) find BTA-induced within industry reallocation of workers from informal microenterprises to registered firms.

<sup>17</sup>In Appendix B.1 we discuss the Vietnamese government's policy on state-owned firms. Specifically, there were no industry-specific SOE policies within manufacturing and the main domestic opponents to the BTA were the military, who owned significant assets in services, but they had no ability to influence the size of U.S. tariff reductions.

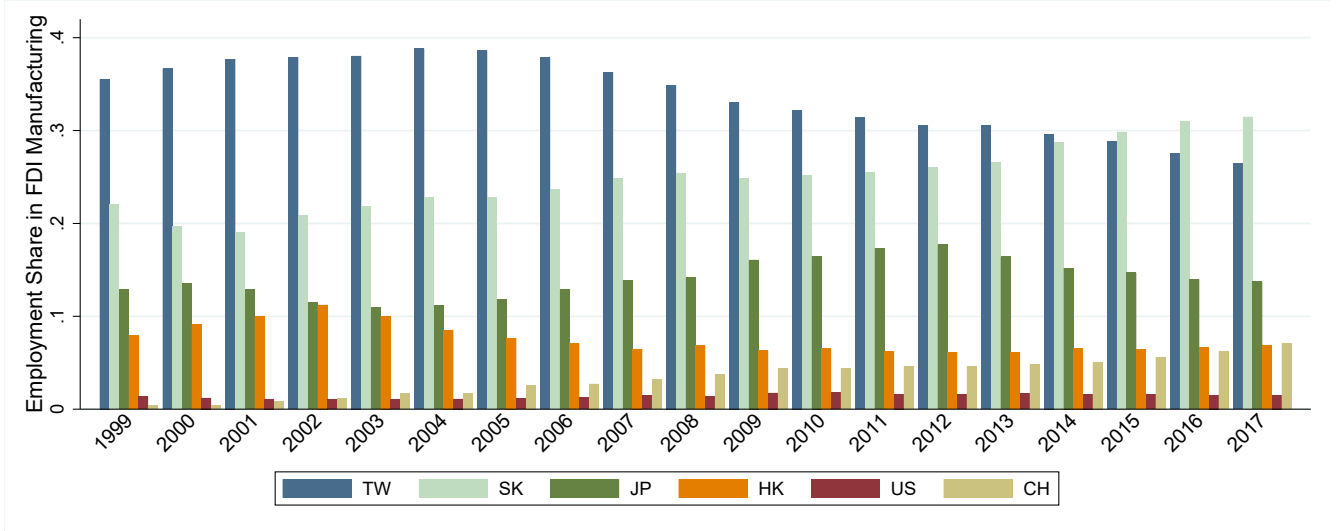


Figure 4: FDI Employment by Source Country, 1999-2017

margins of adjustment contributes to these outcomes is ultimately an empirical question, which we turn to next.

### 3 Data

**Firm-level Data** We use data from the annual enterprise survey conducted by the General Statistics Office (GSO) of Vietnam, covering the years 2000–the first year of the survey–through 2017. This survey covers all businesses in Vietnam registered as an enterprise according to the Enterprise Law. All state, collective, and foreign businesses must register as an enterprise to legally operate in Vietnam. A private business is legally required to register as an enterprise if it has more than 10 workers or operates in more than one location. However, many private businesses with less than 10 workers are registered.<sup>18</sup> The data covers a long period of large expansion of the formal manufacturing sector, contributing to our understanding of the role of trade policy in the expansion and composition of nascent formal manufacturing employment.

The data contain the usual information on the industry of operation at the 4-digit ISIC level, employment, revenue, and fixed assets of the firms, and (for some years) whether (and how much) a firm exports. The surveys contain a number of key variables and features that we use in our analysis. First, we can consistently categorize firms by ownership as state-owned enterprises, foreign-invested enterprises, and private domestic enterprises. Our analysis relies on the initial firm

<sup>18</sup>See law No. 13-1999-QH10. The employment threshold for required registration changed over time. Prior to 2004, there was no employment size threshold (see Decree No. 02/2000/ND-CP) with the threshold specified as 10 or more workers from 2004 onward (see decree No. 109/2004/ND-CP). Unregistered (i.e. informal) firms have on average 1.6 workers (including the owner), well below this threshold (McCaig and Pavcnik, 2021).

ownership.<sup>19</sup> Second, the data for foreign affiliates includes information on the source country of capital, allowing us to measure the main source countries of FDI over time and to examine the responses of FDI to trade policy across all source countries. Third, an important contribution of our study is the improvements of the data, especially tracking of firms over time.<sup>20</sup> The unique firm identifier allow us to track firms over time. This enables us to examine firm exit and entry, as well as changes in performance among continuing firms. Annually, an exiting firm is defined as a firm that operated in  $t$ , but not in  $t + 1$ . An entering firm is defined as a firm that operated in  $t + 1$ , but did not operate in  $t$ . A continuing firm is a firm that operated in  $t$  and  $t + 1$ . We focus on firms in traded manufacturing industries, as indicated by the main industry of operation at a 4-digit ISIC level.<sup>21</sup> In our analysis, we use the industry reported by the enterprise in its first year in the dataset. We distinguish across 122 4-digit manufacturing industries, which is the level at which we link firms to tariffs. In the data appendix, Appendix A, we provide additional detail on the sampling framework and preparation of the data for analysis.

Firm data is available from 2000 (1999 for employment).<sup>22</sup> We therefore use 2-digit industry data from 1995 to 2004 to examine the potential correlation of BTA-induced tariff cuts with pre-existing trends and the consistency of results using this more aggregate data in the post-BTA period. This data comes from various statistical yearbooks and tables from the 1998 Industrial Census produced by the GSO. See Section B.2.

Table 1 presents the summary statistics by firm ownership for years 2000 and 2017. The data includes over 750,000 firm-year observations (over 150,000 unique firms), with the number of firms growing from over 10,100 in 2000 to over 78,000 in 2017. In 2000, FDIs and SOEs on average employ more people compared to PRIs although there are many more PRI firms. FDIs have the highest average revenue per firm followed by SOEs, while PRIs have the lowest by an order of

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<sup>19</sup>Changes in firm ownership mainly occur for SOEs due to privatization. Figure C1 replicates Figure 2 using initial rather than contemporary ownership. It yields a smaller decrease in SOE employment and a smaller increase in private domestic employment owing to SOE privatization. We perform robustness checks of key results with contemporary ownership definition.

<sup>20</sup>See section A.4 for detailed discussion of verifying the tracking of enterprises over time. This is particularly important from 2000 to 2001 and among state-owned enterprises.

<sup>21</sup>The 2000 through 2010 data provide industry codes according to the 1993 Vietnam Standard Industrial Classification while the 2007 through 2017 data provide industry codes according to the 2007 Vietnam Standard Industrial Classification. We use the overlapping years to create a concordance and perform all analysis using the 1993 VSIC codes, which are identical to the International Standard Industrial Classification revision 3 within traded manufacturing.

<sup>22</sup>We observe both the start and end of year employment, and use the end of year information to capture a firm's employment in that year. We use start of year employment in 2000 as a proxy for end of year employment in 1999. This allows us to extend our employment analysis one additional year prior to the BTA for specification checks. In years when the two employment estimates are both available, end of year employment in year  $t - 1$  and start of year employment in year  $t$  are very strongly positively correlated across industries and time.

Table 1: Summary Statistics: Years 2000 and 2017

|              | Foreign                | Private             | State                  | Total                 |
|--------------|------------------------|---------------------|------------------------|-----------------------|
| 2000         |                        |                     |                        |                       |
| Employment   | 342<br>(1,033)         | 67.1<br>(249)       | 461<br>(754)           | 153<br>(511)          |
| Revenue      | 201,295<br>(739,409)   | 13,502<br>(51,526)  | 125,416<br>(338,443)   | 48,994<br>(279,529)   |
| Observations | 1,019                  | 7,596               | 1,497                  | 10,112                |
| 2017         |                        |                     |                        |                       |
| Employment   | 515<br>(1,986)         | 32<br>(270)         | 389<br>(881)           | 84.6<br>(693)         |
| Revenue      | 402,223<br>(5,995,239) | 20,261<br>(226,966) | 338,584<br>(1,886,141) | 62,490<br>(1,895,996) |
| Observations | 7,616                  | 69,817              | 1,307                  | 78,740                |

*Note:* The table reports mean employment and revenue by firm with standard deviations reported in parenthesis. Revenue is measured in millions of 2010 Vietnamese Dong. For comparison purposes, the exchange rate in 2010 was about 18,613 VND per USD according to World Development Indicators.

magnitude. The overall number of firms grows primarily due to an increase in private firms, but the number of foreign firms increased by more than seven fold from about 1,000 to 7,600, while the number of state firms contracts.<sup>23</sup>

**Trade Data** We use international trade data from UN Comtrade for imports from Vietnam reported by Vietnam’s major trading partners, covering 23 years (1996-2018), including 5 years prior to the BTA.<sup>24</sup> In addition to using world exports from Vietnam, we also rely on exports to specific markets. Key markets include the U.S., the E.U., and East Asian partners (South Korea, Japan, China, and Hong Kong). These trading partners make up the majority of Vietnam’s manufacturing exports - 62% in 2000 and 69% by 2017 (see Appendix B.1.1 and Figure B1a).

Two key empirical patterns emerge from firm-level data and inform our empirical analysis.

**Firm entry and exit were important firm-level margins of adjustment from 2000 to 2017.** Table 2 reports the importance of entry and exit in the enterprise sector, overall, and for SOEs, FDIs and PRIs. In this table, exiting firms are defined as firms that operated in 2000,

<sup>23</sup>Since our data tracks firms as ownership changes and we are basing our analysis on initial ownership, the rapid expansion of the number of foreign firms in Table 1 is due entirely to greenfield investment. Additionally, it appears that most new foreign enterprises are the first affiliate in Vietnam for the parent MNC. We can match about half of foreign enterprises from the annual enterprise survey operating in 2017 to data in Orbis. Among those that were matched, the vast majority have a unique global ultimate owner, suggesting they are the only affiliate of the owner operating in Vietnam.

<sup>24</sup>This data is at the 3-digit International Standard Industrial Classification (ISIC) revision 3 code. We conduct our main trade analysis at the 3-digit industry level because many 4-digit industries report no exports to the U.S. prior to the BTA. However, our results are robust at the 4-digit and 2-digit levels.

Table 2: Entry and Exit of Firms between 2000 and 2017

| Share of               | Firms | Revenue | Employment |
|------------------------|-------|---------|------------|
| All ownership types    |       |         |            |
| Exiters                | 0.68  | 0.31    | 0.35       |
| Entrants               | 0.96  | 0.81    | 0.81       |
| Foreign affiliates     |       |         |            |
| Exiters                | 0.41  | 0.24    | 0.24       |
| Entrants               | 0.92  | 0.84    | 0.86       |
| Private domestic firms |       |         |            |
| Exiters                | 0.78  | 0.58    | 0.56       |
| Entrants               | 0.98  | 0.88    | 0.87       |
| State-owned firms      |       |         |            |
| Exiters                | 0.36  | 0.25    | 0.26       |
| Entrants               | 0.27  | 0.32    | 0.24       |

but not in 2017. Entrants are firms that operated in 2017, but not in 2000. 68 percent of firms that operated in 2000 exited by 2017, while 96 percent of firms in 2017 were not in operation in 2000. Exiters and entrants account for a sizable share of employment and revenue, with entrants accounting for 81 percent of employment and 81 percent of revenue in 2017. In addition, entry and exit rates differ widely across ownership. Private domestic firms exhibit the highest entry and exit rates, 98 and 78 percent respectively. FDIs have notably higher entry rates, 92 vs. 27 percent, and similar exit rates, 41 vs. 36 percent, compared to SOEs.

One potential issue is that entry of private domestic enterprises might reflect a new firm and formalization of an existing informal enterprise. Importantly, this issue does not influence the definition of entry for FDIs and SOEs because all FDIs and SOEs are required to register as an enterprise. Formalization among informal businesses in Vietnam, like in other countries, is rare (McCaig and Pavcnik, 2021). To the extent that some of the private entry is driven by formalization of previously informal firms, this changes the interpretation of entry to entail newly created domestic enterprises and newly registered firms that previously operated as a non-registered (i.e. informal) business. Both of these concepts are of interest as there is a large literature in development economics that examines the determinants of formalization or creation of formal jobs. Like most data sources, the annual enterprise data does not provide information on whether a private domestic business previously operated as an informal business. In section [A.5](#) we rely on information from Malesky and Taussig (2009), World Bank Enterprise Surveys, McCaig and Pavcnik (2021), and the reported year of establishment from our survey to evaluate this issue. Overall, this discussion suggests that most of the private domestic firms in the enterprise sector

did not start as informal firms (depending on the method/survey estimates range from 16 to 30% started as informal) and that most of those that did were only in the informal sector for 1 to 3 months (Malesky and Taussig, 2009).<sup>25</sup> This is not the pattern one would expect if most entry into the registered sector would reflect formalization of established informal businesses.

**Post-entry employment growth of foreign entrants** We find that post-entry employment growth, relative to the size at entry, is much larger for foreign entrants than for SOE and private domestic entrants. We examine the importance of post-entry employment growth by comparing employment at entry to post entry growth across foreign, state, and private firms. We focus on the cohort of firms that entered in 2001, the entry cohort that we can follow for the longest post-entry period, and track the surviving members of this entry cohort over time. For each year, we track the mean of employment at entry in 2001 across surviving entrants. This allows us to see whether the surviving entrants are larger on average than those that exit. We also track the mean of contemporary employment across surviving entrants. The difference between the two figures is how much surviving entrants have grown over time. The results are in Figure 5. Figure 5a demonstrates that employment in foreign entrants grows significantly after entry. Foreign entrants that survive are slightly larger, on average, than those that exit, as shown by the dashed blue line. However, this line slopes upward only slightly. It is subsequent growth after entry that drives the large increase in employment among foreign entrants. By 2017, foreign entrants that survive are on average more than 4 times larger in terms of employment than at entry.

Against this backdrop, post-entry employment growth, relative to the size at entry, differs considerably for state and private entrants. State firms are larger on average at entry than foreign firms (Figure 5b) and experience some growth in the first few years following entry, but then the growth declines and the surviving entrants contract relative to initial employment. Private entrants are the smallest on average, and show some post-entry growth, but much less so than for foreign entrants (Figure 5c).<sup>26</sup> Figure 5e summarizes the relative employment growth after entry among surviving entrants across foreign, state, and private, by normalizing their employment at entry at 1. Foreign entrants experience sustained growth relative to state or private entrants: 16 years after entry, a surviving foreign entrant is almost 5 times larger than when it entered and still growing. In contrast, surviving private entrants are only about 1.5 times larger after 16

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<sup>25</sup>Malesky and Taussig (2009) reports the highest rates of private enterprises starting as informal, 60%, but the vast share of these firms only spent 1 to 3 months as unregistered due to the registration process.

<sup>26</sup>Importantly, the slower growth post entry for private is not due to a greater share of initially small entrants among private firms. If we restrict the sample of private entrants to those with 50 or more workers initially, we observe a similar pattern of more limited growth after entry in comparison to foreign entrants (Figure 5d)

years and have stopped growing on average while state entrants are smaller than at entry and declining.<sup>27</sup> Importantly, these longer-term employment pattern differences across firm ownership types motivate our interest in longer-term effects of trade policy in our empirical analysis.



Figure 5: Contemporary and initial employment among surviving entrants, 2001 entry cohort

<sup>27</sup>The slow employment growth among private firms is consistent with patterns documented in other low- and middle-income countries, such as India and Mexico (Hsieh and Klenow, 2014).

## 4 Empirical Approach, Growth by Ownership, and Entry

We begin by highlighting the BTA tariff cuts' first order effects on trade flows and aggregate industry outcomes to show that our findings are consistent with the predictions of traditional trade theory. We then proceed with our analysis at the industry-firm ownership level.

### 4.1 Empirical Methodology

To study the relationship between the BTA industry tariff reductions and industry-level outcomes, we estimate the following regression:

$$Y_{jt} = \sum_{t'=t_0 \setminus 2000}^{t_N} \beta_{t'} \Delta BTA_j \mathbb{1}_{t'} + \lambda_j + \theta_t + \alpha_t C_{jt} + \varepsilon_{jt} \quad (1)$$

where  $Y_{jt}$  is the log outcome for industry  $j$  at year  $t$ ,  $\Delta BTA_j$  is defined as the log of 1+U.S. Column 2 tariff value minus the log of 1+MFN tariff value in industry  $j$ , indicator  $\mathbb{1}_{t'}$  equals one for year  $t'$  where  $t' \in [t_0, t_N]$ ,  $\lambda_j$  is an industry fixed effect, and  $\theta_t$  is a year fixed effect.  $C_{jt}$  are industry-specific time-varying controls for other trade policy changes and include U.S. import quotas applied to clothing and textile imports from Vietnam and China respectively, Vietnam's MFN tariff reductions due to its WTO accession, and China-U.S. exports in year  $t$ .<sup>28</sup> The BTA is implemented in 2001. The base year for outcome changes is year 2000 and the key parameters of interest,  $\beta_{t'}$ , capture the cumulative impact of the BTA tariff cuts on the outcome by each year  $t'$  relative to 2000. A positive value of  $\Delta BTA_j$  represents a tariff cut, so that a positive value of  $\beta_{t'}$  implies an increase in the outcome in response to the U.S. tariff reductions. Standard errors are clustered by industry.

The identification of the causal effect of U.S. tariff reductions on the outcomes of interest in Vietnam consequently relies on the assumption that changes in U.S. tariffs are not correlated with unobserved time-varying industry-level factors. In section 2.1, we discussed that neither U.S. nor Vietnamese industries had the ability to influence the size of the BTA-induced U.S. tariff reductions: the cuts were based on moving Vietnam from one pre-existing tariff schedule to another. We also showed that these industry-level tariff changes are not correlated with baseline industry characteristics such as industry employment and the industry prevalence of the SOEs or FDI firms. Below, we further verify our identifying assumptions.

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<sup>28</sup>These controls are included because they control for immediate trade policy changes in Vietnam in the aftermath of the BTA. However, we show in Section 4.2 that our results are robust to the exclusion and each subsequent inclusion of these controls, as well as omission of each industry (including apparel and textiles, which were affected by the quotas).

## 4.2 Setting the Stage: BTA, Exports, and Industry Outcomes

We first establish that lower import tariffs have first-order effects on Vietnamese exports to the U.S. using pre- and post-BTA data covering 1996 to 2018. We estimate equation (1) with Vietnamese exports to the U.S. as the dependent variable and the coefficients on tariff change  $\beta_t$  are reported in Figure 6.<sup>29</sup> Positive and large estimates after 2001 suggest that tariff cuts are associated with an immediate and large increase in Vietnam’s exports to U.S. over the first six years, with the cumulative effects flattening out but continuing to slightly rise over the long run.

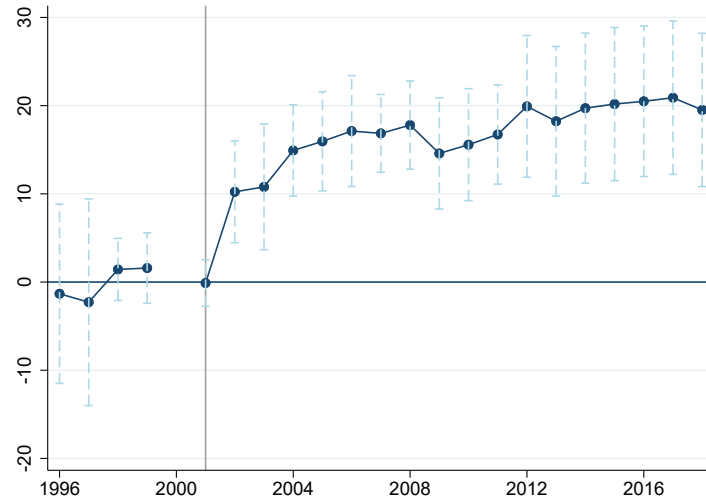


Figure 6: Vietnam Exports to the U.S. and BTA Tariffs, 1996-2018

*Note:* Each point reflects an individual regression coefficient,  $\hat{\beta}_t$ , following equation (1). The BTA was implemented in 2001 (indicated by the gray line) and the base year is 2000. Controls include 3-digit industry FEs, year FEs, the change in Vietnam’s MFN tariffs due to WTO accession, Chinese exports to the U.S. in year  $t$ , and U.S. import quotas on textiles and clothing applied to Vietnam and China respectively. Dashed lines show 95 percent confidence intervals. Standard errors clustered at the 3-digit industry level. Weighted by year 2000 Vietnam exports to the world.

This estimation is also the first in a series of specification checks that confirms that our results are not driven by spurious correlation between industry-specific tariff cuts and pre-existing trends such as industry-specific demand and supply changes. The estimates for years prior to 2001 are small in magnitude and statistically insignificant, ruling out spurious correlation between the BTA induced tariff changes and exports to the U.S. prior to the implementation of the agreement. In addition, the estimates in Figure 6 are robust to the exclusion of industry-specific controls for other trade policy changes taking place during our period of analysis (see Figures C5 and C8a) and to industry aggregation and disaggregation (Panels (a) and (b) respectively in Figure C6). Our results are also not sensitive to the omission of any one industry from estimation, further

<sup>29</sup>We conduct our main analysis of trade flows at the 3-digit industry level because many 4-digit industries report no exports to the U.S. prior to the BTA. Our results are robust to industry aggregation—to 2-digit industries—and disaggregation—to 4-digit industries (Appendix Figure C6).

confirming that they are likely driven by BTA-induced tariff changes rather than by spurious correlation of tariff cuts with simultaneous developments in an influential industry (Figure C7).<sup>30</sup>

Furthermore, to the extent these results would simply be driven by contemporaneous spurious global industry-specific demand on supply shocks, we would expect the U.S. tariff cuts to influence Vietnam’s exports to its major export markets before and immediately after the implementation of the BTA.<sup>31</sup> However, this is not the case. For example, if growing demand for Vietnamese exports in high-income countries is driving our results, we would expect the effect of U.S. specific-tariff cuts to also influence exports to other major high-income trade partners such as the EU. However, when we estimate equation (1) for Vietnam’s exports to the EU as the dependent variable, the coefficients are small in magnitude and statistically insignificant before and in the immediate aftermath of the BTA (Figure 7a). Likewise, the estimates on the U.S. tariff cuts are not correlated with Vietnam’s exports to its major trading partners in East Asia, which also serve as sources of FDI to Vietnam, neither before nor in the immediate aftermath of the BTA’s implementation (Figure 7b).<sup>32</sup> Both of these findings are also robust to the exclusion of industry-specific trade policy controls (Figures C8b and C8c respectively). Given the long period of our analysis after the BTA, we discuss some of the other changes in trade policy that occurred after the implementation of the BTA and show they are unlikely to drive our results (see footnote).<sup>33</sup>

Moving from trade to industry outcomes, we find that the composition of industries in response to the tariff cuts changes consistently with predictions of the neoclassical trade models: Vietnamese industries subject to larger U.S. tariff reductions expand relative to industries with lower tariff cuts. The estimates of the coefficients on tariffs from specification (1) are reported in Figure 8 for three industry outcomes: number of firms, employment, and revenue (Figures 8a, 8b, and 8c respectively). Consistent with the results for exports, the number of firms, employment,

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<sup>30</sup>See Appendix B.1.1 for more detailed discussion of these robustness checks.

<sup>31</sup>In 2000, 31.2% of Vietnam’s manufacturing exports are to East Asian trading partners (South Korea, Japan, Hong Kong, and China), 27.3% to the E.U., and 5.4% to the U.S. See Appendix B.1.1 for detailed discussion.

<sup>32</sup>Taiwan is excluded due to lack of trade data. South Korea, Japan, China, and Hong Kong make up almost 60% of Vietnam’s source funding for FDIs in 2017 (by employment, Figure 4)

<sup>33</sup>In Appendix Section B.1.3 we first show that the BTA tariff changes are substantially larger than tariff changes in other agreements. Most importantly, while factors such as “future” trade policy changes can influence outcomes of interest, they would only potentially affect our results if they are spuriously correlated with industry-specific BTA tariff changes. We proceed to show that industry-specific BTA tariff changes are not correlated with “future” tariff changes with other trade partners. Importantly, our empirical work examining the cumulative annual effects of the U.S. tariff cuts with annual data covering a long period rather than relying on data at the start and end of our period, a period during which multiple agreements take place. To the extent that these agreements would be driving our results, we would expect them to influence the estimated coefficients at the time that these agreements come into effect. However, the magnitude of the effects of the BTA on U.S. exports (as well as other outcomes studied later) is relatively large in the immediate to medium run aftermath of the BTA implementation and we do not observe discrete increases in the magnitude of the coefficients when the other agreements are implemented.

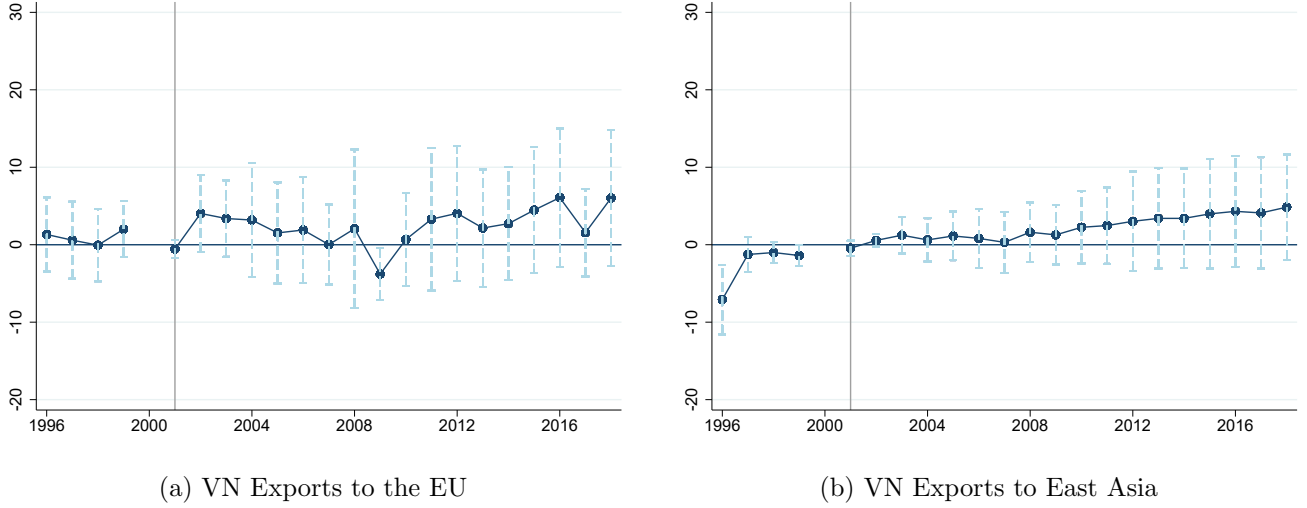


Figure 7: Vietnam exports to key trading partners and BTA tariffs, 1996-2018

*Note:* Each point reflects an individual regression coefficient,  $\hat{\beta}_{it'}$ , following equation (1). The dependent variable in Figure 7a is Vietnamese exports to the European Union (EU15 excluding Belgium and Luxembourg due to lack of data consistency). The dependent variable in Figure 7b is Vietnamese exports to 4 East Asian countries (South Korea, Japan, China, and Hong Kong). Taiwan is excluded due to lack of trade data. The BTA was implemented in 2001 (indicated by the gray line) and the base year is 2000. Controls include 3-digit industry FEs, year FEs, the change in Vietnam's MFN tariffs due to WTO accession, Chinese exports to the US in year  $t$ , and US import quotas on textiles and clothing applied to Vietnam and China respectively. Dashed lines show 95 percent confidence intervals. Standard errors clustered at the 3-digit industry level. Weighted by year 2000 Vietnam exports to the world.

and revenue expand more in industries with bigger tariff cuts. In Appendix section B.2.1, we discuss and confirm that these results hold at the 2-digit industry level after the BTA, but find no relationship between tariffs and industry outcomes in years prior to the BTA.

### 4.3 BTA, Entry and Employment: Differential Impact by Ownership

The discussion in Section 2.3 suggests that the foreign affiliates of multinationals might respond differentially to the effects of lower U.S. tariffs on Vietnamese exports compared to Vietnamese SOEs and private domestic firms. In this section, we investigate the differential impacts of BTA tariff cuts across firm ownerships, by estimating equation (1) individually for each ownership type  $o$  where  $o \in \{FDI, SOE, PRI\}$ . This is equivalent to estimating an augmented version of equation (1) with all ownership types that includes ownership-year and ownership-industry fixed effects and allows for ownership-specific coefficients on tariffs and industry-specific controls  $C_{jt}$ .<sup>34</sup> Our

<sup>34</sup> Our approach is equivalent to estimating the following regression:

$$Y_{jot} = \sum_{t'=t_0 \setminus 2000}^{t_N} \beta_{ot'} \Delta BTA_j \mathbb{1}_{t'} + \lambda_{oj} + \theta_{ot} + \alpha_{ot} C_{jt} + \varepsilon_{jot}$$

where  $Y_{jot}$  is the log outcome for firm type  $o$  in industry  $j$  at year  $t$ ,  $\Delta BTA_j$  is the change in log U.S. tariff applied to VN exports in industry  $j$  before and after the BTA, indicator  $\mathbb{1}_{t'}$  equals one for year  $t'$  where  $t' \in [t_0, t_N]$ ,  $\lambda_{oj}$  is an ownership-industry fixed effect,  $\theta_{ot}$  is an ownership-year fixed effect, and  $C_{jt}$  are industry-specific time-varying controls included in (1).

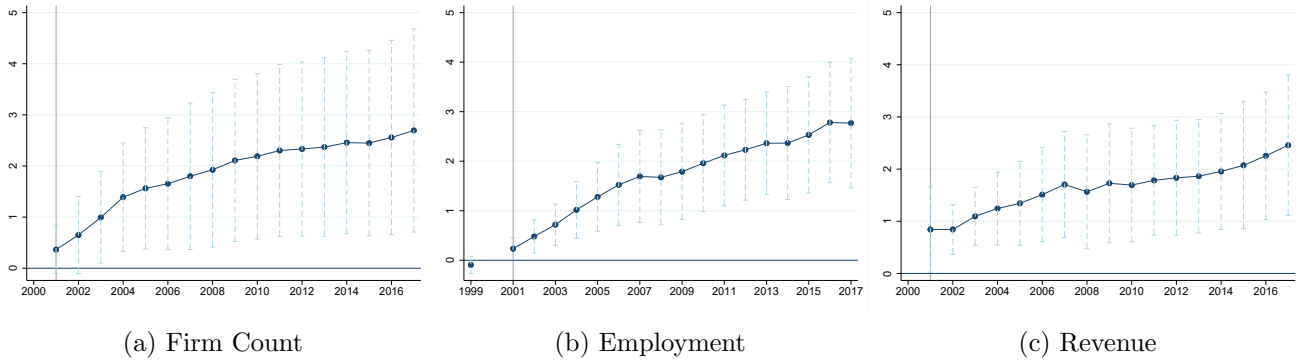


Figure 8: Firm count, employment, revenue and BTA tariffs, 1999-2017

*Note:* BTA was implemented in 2001 (indicated by gray line) and the base year is 2000. 4-digit industry and FEs year FEs are included. Dashed lines show 95 percent confidence intervals. Standard errors clustered at the 4-digit industry level. Weighted by year 2000 employment. Controls included in the regression are the change in Vietnam’s MFN tariffs due to WTO accession, Chinese exports to the US in year  $t$ , and an industry measure of US imports quotas applied to Vietnamese and Chinese exports of textiles and clothing.

approach controls for any ownership-specific secular trends or government policies that might also contribute to the declining presence of SOEs and increases in PRI and FDIs displayed in Figure 2. The key parameters of interest  $\beta_{ot'}$  from equation (1) in this setting capture the cumulative impact of the BTA tariff cuts on the outcome for firm ownership  $o$  at time  $t'$  relative to 2000.

Overall, we find that the industry expansion in the number of firms and employment in response to tariff cuts is predominately driven by FDIs and the effects increase over time. One of the goals of our analysis is to study tariff-cut induced sources of employment expansion in formal manufacturing, through the number and composition of firms by ownership. As we showed in the data section, firm entry and exit are key dimensions of firm adjustment during this period, especially for foreign and private domestic firms. To that end, we first estimate equation (1) for the ln number of firms as a dependent variable for the three ownerships, with estimates of the coefficients on tariffs presented in Figure 9. Tariff cuts are associated with an increased number of FDIs and PRIs. The cumulative positive effect on number of FDI firms levels off 8 to 10 years after the BTA, such that the number of foreign firms grew by approximately 0.48 ln points (62%) in response to the mean U.S. tariff reduction, while the cumulative effect for PRI firms tapers off sooner—four years following the agreement, with gradual increases thereafter. SOEs have much more subdued adjustment in response to tariff cuts in terms of extensive firm margin relative to foreign and private firms. At the onset of the BTA, SOEs accounted for 47% of employment in formal manufacturing. We therefore examine the effects of trade policy on SOEs over a long time period in a setting that starts off with a higher presence of SOEs than in other studies (Khandelwal, Schott and Wei, 2013; Brandt et al., 2017; Baccini, Impullitti and Malesky, 2019). While the number of SOEs is decreasing in aggregate, we find no statistically significant relationship between



Figure 9: Firm count by ownership and BTA tariffs, 2000-2017

*Note:* Each point reflects an individual regression coefficient,  $\hat{\beta}_{ot'}$ , following equation (1) for each ownership type (see footnote 34). The dependent variable is the log annual number of firms in an industry for foreign (Panel (a)), state (Panel (b)), and private (Panel (c)), respectively. The BTA was implemented in 2001 (indicated by the gray line) and the base year is 2000. In separate ownership regressions for each panel, controls include 4-digit industry FEs, year FEs, the change in Vietnam’s MFN tariffs due to WTO accession, Chinese exports to the U.S. in year  $t$ , and U.S. import quotas on textiles and clothing applied to Vietnam and China respectively. Since we estimate equation (1) for each ownership type, this is equivalent to including ownership-year and ownership-industry FEs and allowing for ownership-specific coefficients on tariffs and industry-specific controls. Dashed lines show 95 percent confidence intervals. Standard errors clustered at the 4-digit industry level. Weighted by year 2000 employment.

the tariff cuts and changes in the number of SOEs. The magnitudes of the coefficients for SOEs become slightly positive 8 to 10 years after the BTA, suggesting a smaller contraction in the number of SOEs in high tariff-cut industries, but the magnitudes are substantially smaller than for FDIs and PRIs and insignificant.<sup>35</sup>

**We find substantial firm entry in response to tariff cuts.** Figure 10 reports the estimates of the coefficients on tariff cuts when Equation (1) is estimated with the ln number of entrants in an industry, ln number of foreign entrants, and ln number of private domestic entrants, respectively. We do not separately analyze SOE entry because it is relatively rare, but incorporate that margin in analysis in Section 5. The positive magnitudes of the coefficients suggest that industries with larger tariff cuts observe an increase in entrants (Panel (a)). The cumulative effects of the BTA on entry, particularly of foreign firms, grow for 5-6 years after the BTA, after which they accumulate more slowly, but continue to rise (Figure 10b). We find similar but smaller effects for the private firms (Figure 10c).<sup>36</sup> A small share of private domestic entry could reflect formalization (see discussion in Section 3).

Overall, the coefficients on tariffs in Figure 10a, imply an elasticity of entry with respect to tariff of 0.27 in the short run 2 years post-BTA (2003) and 1.47 in the long run after 12 years

<sup>35</sup>The main results in Figure 9 are robust to classifying firms by contemporary ownership rather than time-invariant ownership based on the first year the firm is observed in the data (Appendix Figure C11). The two mainly differ for SOEs due to privatization, with fewer SOEs using contemporary relative to initial ownership (compare Figures 2 and C1). The coefficients on tariff cuts for SOEs are more muted with initial than contemporaneous ownership, suggesting that SOEs are less likely to privatize in industries with bigger tariff cuts.

<sup>36</sup>These results are robust to using contemporary ownership (Appendix Figure C9).

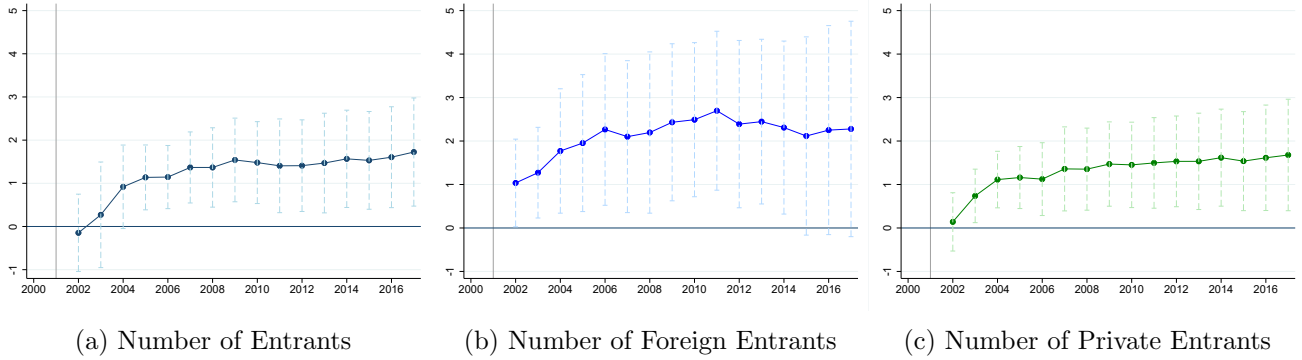


Figure 10: Number of entrants by ownership and BTA tariffs, 2000-2017

*Notes:* In Panel (a), the regression coefficient is  $\hat{\beta}_t$ , following equation (1) and the dependent variable is the log annual number of entrants overall in an industry. We define entry by the first year the firm appears in the dataset after year 2000. In Panels (b) and (c), the regression coefficient is  $\hat{\beta}_{ot}$ , following equation (1) for each ownership type (see footnote 34). The Panel (b) dependent variable is the log annual number of FDI entrants in an industry while the Panel (c) dependent variable is the log annual number of private entrants in an industry. The BTA was implemented in 2001 and the base year is 2001 due to our definition of entry (indicated by the gray line). In Panel (a) and in separate ownership regressions for Panels (b) and (c), controls include 4-digit industry FEs, year FEs, the change in Vietnam’s MFN tariffs due to WTO accession, Chinese exports to the U.S. in year  $t$ , and U.S. import quotas on textiles and clothing applied to Vietnam and China respectively. Since we estimate equation (1) for each ownership type, this is equivalent to including ownership-year and ownership-industry FEs and allowing for ownership-specific coefficients on tariffs and industry-specific controls. Dashed lines show 95 percent confidence intervals. Standard errors clustered at the 4-digit industry level. Weighted by year 2000 employment.

(2013). The estimates are larger for foreign affiliates (Figure 10b), with an elasticity of foreign entry with respect to tariff of 1.27 in the short run (2003), and 2.45 in the long run (2013). Recall that our definition of FDI entry is greenfield. As discussed in the conceptual framework, most models of FDI generally focus on the intensive margin of foreign affiliates (Tintelnot, 2017) or product entry (Head and Mayer, 2019). An important exception is Garetto, Oldenski and Ramondo (2019) which studies the dynamics of multinational entry.<sup>37</sup> Prior to the BTA, Vietnam might not have been as attractive of a production location for foreign affiliates aiming to export because of the large variable trade costs of reaching one of the largest global export destinations, the U.S. Once the U.S. lowered tariffs on exports from Vietnam, lowering the variable costs of exporting, the foreign affiliates were more likely to cover the fixed cost of setting up production in Vietnam. Our analysis highlights the responsiveness of greenfield foreign investment to tariff cuts.

**Tariff cuts are associated with increases in industry-level employment through the effects on FDIs.** The above analysis highlighted that tariff cuts had a differential impact on the entry of foreign firms, relative to PRIs and SOEs. To further examine the sources through which tariff cuts contributed to the expansion of employment in formal manufacturing, we estimate Equation (1) with industry employment as the dependent variable for the three firm ownerships,

<sup>37</sup>In their model, the multinational’s decision of whether to set up an affiliate is driven by the interaction of firm-specific characteristics and multinational costs, as well as persistent aggregate productivity and demand shocks.

with estimates of the coefficients on tariffs presented in Figure 11. Tariff cuts are associated with increased employment in FDIs (Figure 11a).<sup>38</sup> The cumulative positive effect on the number of FDI entrants levels off 8 to 10 years after the BTA, whereas the cumulative effects on FDI employment continue to grow over time, suggesting that employment growth moves from the extensive (firm entry) to intensive margin (post-entry growth). We return to this issue in Section 5.2.

While tariff cuts are associated with increased entry of PRIs and increased number of PRI firms, tariff cuts are not associated with statistically significant increases in industry PRI employment (Figure 11c). The coefficients on tariffs are positive, but small in magnitude and very noisy. The lack of tariff-cut induced employment contribution of PRIs is consistent with the lack of employment growth in domestic firms in lower-income countries (Hsieh and Klenow, 2014).

The positive (albeit noisy) coefficients for SOEs in Figure 11b suggest that SOEs experience a steady, albeit imprecise, smaller contraction in employment in industries with larger tariff cuts.<sup>39</sup> Because SOE aggregate employment is declining, the positive coefficient implies slower declines in SOE employment in high tariff-cut industries. The lack of response of SOEs to tariff cuts in terms of firm count and slower contraction of employment is consistent with SOEs being less responsiveness to trade reform than FDIs, perhaps due to different market incentives discussed in Section 2.3. This is further confirmed by delayed employment reallocation in high tariff-cut industries due to stalled privatization. In particular, the coefficients on tariff cuts in employment regressions for SOEs are more muted with initial than contemporaneous ownership (see Figure C12), suggesting even slower employment declines in high-cut industries due to less privatization in these industries.<sup>40</sup> As such, our findings of slow adjustment of SOE contraction and employment with increased export market access adds to the literature on trade policy and SOEs, where the empirical work has mainly focused on lack of adjustment of SOEs to increased import competition.<sup>41</sup>

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<sup>38</sup>The coefficients on tariffs in 1999 are small and insignificant, confirming the lack of correlation between tariff cuts and pre-existing trends in employment by ownership. In addition, discussion in Appendix B.2.2 and Figure B12 shows that changes in industry employment between 1998 and 2000 by ownership are not correlated with the U.S. tariff reductions using 2-digit industry employment.

<sup>39</sup>When we pool results into 8-year periods, we find a statistically significant positive coefficient in SOE employment from 2009-2017 (Appendix Table B3). See Appendix Section B.4 for further details.

<sup>40</sup>Our employment results are robust to using contemporary ownership information for FDIs and PRIs (Figures C12. For comparison purposes, we also examine the link between tariff cuts and revenue and find differential responses by firm ownership, with the most pronounced (albeit noisy) increase in revenue in foreign firms and decline in PRI revenue (see Figures C10 and C13).

<sup>41</sup>Brandt et al. (2017) and Baccini, Impullitti and Malesky (2019) find that SOEs are not subject to the same competitive pressures due to increased import competition in response to WTO accession in China and Vietnam, with SOEs less likely to exit in response to import tariff cuts relative to domestic firms.



Figure 11: Employment by ownership and BTA tariffs, 1999-2017

*Note:* Each point reflects an individual regression coefficient,  $\hat{\beta}_{ot'}$ , following equation (1) for each ownership type (see footnote 34), where the independent variable is the change in U.S. tariff applied to Vietnamese exports in an industry before and after the BTA ( $\Delta BTA_j$ ). The dependent variable is the log annual employment in an industry for foreign in Panel (a), state in Panel (b), and private in Panel (c). BTA was implemented in 2001 (indicated by the gray line) and the base year is 2000. In separate ownership regressions for each panel, controls include 4-digit industry FEs, year FEs, the change in Vietnam's MFN tariffs due to WTO accession, Chinese exports to the U.S. in year  $t$ , and U.S. import quotas on textiles and clothing applied to Vietnam and China respectively. Since we estimate equation (1) for each ownership type, this is equivalent to including ownership-year and ownership-industry FEs and allowing for ownership-specific coefficients on tariffs and industry-specific controls. Dashed lines show 95 percent confidence intervals. Standard errors clustered at the 4-digit industry level. Weighted by year 2000 employment.

## 5 Employment: Sources of Within-Industry Reallocation

The previous section establishes that tariff cuts lead to large increases in the number of firms (and the number of entrants), especially among foreign and private domestic firms in an industry and that tariff-cut induced employment increases were concentrated mainly in foreign firms. This section systematically examines how the BTA tariff reductions impact changes in the allocation of employment shares within industries across ownership and across margins of firm adjustment status (i.e. continuers, entrants, and exiters). We find that tariff cuts favor entrants, particularly foreign entrants. In addition, ownership matters as tariff cuts favorably impact FDI employment over PRIs, and we find evidence consistent with slower SOE adjustment.

We construct the change in employment shares by firm ownership and status in each industry and year relative to base year 2000, the year prior to BTA implementation. That is,  $\Delta es_{jost} = \frac{E_{jost}}{E_{jt}} - \frac{E_{jos,2000}}{E_{j,2000}}$  where  $E_{jost}$  is total employment in firms of initial ownership  $o$  and status  $s$  in industry  $j$  in year  $t$ , and  $E_{jt}$  is total employment in industry  $j$  in year  $t$ . A continuing firm is defined as one that operates in both year  $t$  and the base year, 2000. We focus on cumulative entry and exit up to year  $t$  relative to 2000. Exiters in year  $t$  are firms that were present in 2000, but not in year  $t$ . Entrants in year  $t$  are firms that appear in year  $t$ , but were not present in 2000.<sup>42</sup>

<sup>42</sup>The change in employment share for exiters (entrants) is necessarily negative (positive) since their employment share in year  $t$  (2000) is 0. The employment share changes sum to 0 in each industry-year. As before, we define a firm's industry and ownership type based on its initial industry and ownership.

We estimate the following specification for each ownership  $o$ , status  $s$ , and  $t > 2000$ :

$$\Delta es_{jost} = \beta_0 + \beta_{ost} \Delta BTA_j + \alpha_{ost} C_{jt} + \varepsilon_{jost} \quad (2)$$

where  $\Delta BTA_j$  is the change in US tariff applied to imports from Vietnam in industry  $j$  before and after the BTA and  $C_{jt}$  is a vector of our usual industry controls.<sup>43</sup> The coefficients on  $\Delta BTA_j$ ,  $\beta_{ost}$ , capture the cumulative BTA impact on the outcome by each ownership-status-year combination,  $ost$ , relative to the base year, 2000. A positive value of  $\Delta BTA_j$  represents a tariff-cut, so that a positive value of  $\beta_{ost}$  implies an expansion in employment share in response to the U.S. tariff reductions. The specification in Equation (2) is similar to our earlier specification, but it is estimated separately for each year relative to the baseline (e.g., 2001 and 2000, 2002 and 2000, etc.). This allows us to update the definition of whether a firm that operated in 2000 is a continuer in year  $t$  or an exiter in year  $t$ . For example, a firm that operates in 2000 and exits in 2006, would be defined as a continuer for years 2001 through 2005 and as an exiter thereafter.

Equation (2) is estimated separately for each ownership-status,  $os$ . This flexibly allows for each ownership-status combination to be on its own time path, allowing, for example, for underlying aggregate differences in patterns of foreign entry or SOE exit. We weight by industry employment in 2000. The estimation results are presented in figures below, which report the series of coefficient estimates of  $\beta_{ost}$ , with 95 percent confidence intervals. Each series of coefficients is estimated from 17 individual regressions for each outcome of interest.

## 5.1 Entry, Exit, and Continuing Firms: Overall and Foreign Firms

The analysis demonstrates that tariff reductions were associated with a shift in within-industry employment shares to foreign firms, to entrants, and particularly to entering foreign firms. We present our findings gradually in three steps, to highlight the importance of tariff-cut induced increases in employment shares of foreign entrants for more aggregate effects.

To begin with, Figure 12 reports the estimates of the coefficients on tariff cuts from equation (2) for the three firm ownerships. The results show a cumulative shift of employment toward foreign firms with tariff cuts. It is important to recall that overall employment in SOEs is contracting during this period. Thus, the positive coefficients on tariff cuts for SOEs reflect slower contraction

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<sup>43</sup>Controls include the change in Vietnam's MFN tariffs due to WTO accession measured as the change in  $\ln$  of  $1+\text{MFN}$  between 2007 and 2013, the change in  $\ln$  Chinese exports to the US in year  $t$  relative to 2000, and industry measures of US imports quotas applied to Vietnamese and Chinese exports of textiles and clothing. We show in Section 5.1 that our results are robust to the exclusion and each subsequent inclusion of these industry-level controls.

of employment shares in SOEs in industries with higher tariff cuts relative to less affected industries. Tariff cuts are also associated with decreased employment share of private firms, although for most years we cannot reject a null effect.<sup>44</sup> The implied cumulative reallocation is considerable. By 2017, relative to an industry that experienced no tariff reduction, an industry that experienced the mean tariff reduction saw the foreign share of employment increase by 8.3 percentage points, SOE share of employment increase by 9.5 percentage points, and the private share decrease by 17.7 percentage points. While the post-BTA effects are large, the point estimates in 1999 in Figure 12 are very close to 0 and statistically insignificant. This confirms that changes in within-industry employment shares by firm ownership prior to the BTA (i.e. between 1999 and 2000) are not correlated with the BTA tariff cuts prior to the implementation of the agreement in 2001, consistent with the lack of pre-existing trends in trade flows and industry outcomes in Section 4.2. Figure B13 further shows that changes in within-industry employment shares by ownership between 1998 and 2000 are not correlated with the U.S. tariff reductions using 2-digit industry employment. See Section B.2.2 for further discussion.

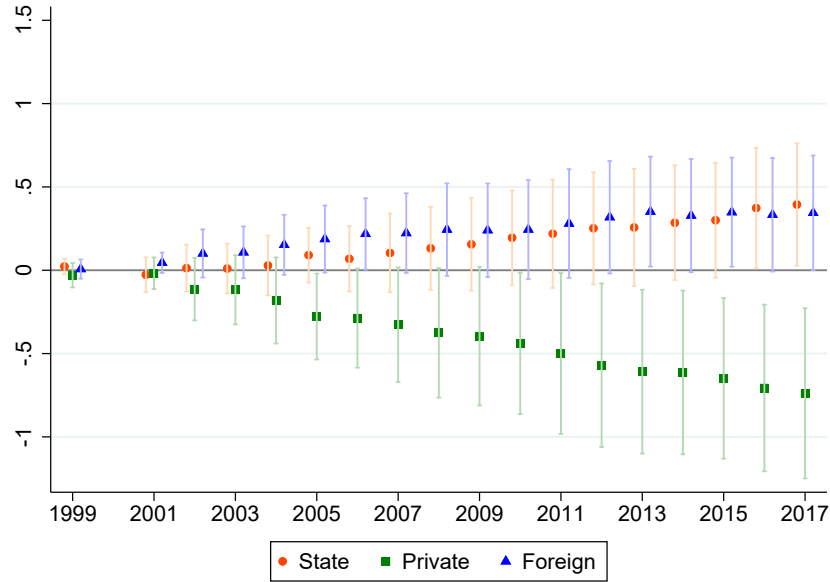


Figure 12: Changes in within-industry employment shares for state, private, and foreign and BTA tariff cuts

*Note:* Each point reflects an individual regression coefficient,  $\beta_{ost}$ , following equation (2). The base year is 2000 and the observations are weighted by 2000 employment. Controls include the change in Vietnam's MFN tariffs due to WTO accession, the change in ln Chinese exports to the US in year  $t$  relative to 2000, and industry measures of US import quotas applied to Vietnamese and Chinese exports of textiles and clothing.

<sup>44</sup>When we pool results into 8-year periods, we find a statistically significant positive coefficient in the shift towards FDI employment share from 2001-2008 and 2009-2017 (Appendix Table B5, Column (1)). We also find a statistically significant negative coefficient in PRI employment share for both 8-year periods (Appendix Table B7, Column (1)). The coefficient in SOE employment share is positive but not statistically significant for both periods (Appendix Table B6, Column (1)). See Appendix Section B.4 for further details.

Second, tariff cuts lead to a pronounced expansion of the within-industry employment share of entrants. Figure 13 reports the estimates of the coefficients on tariff cuts from Equation (2) for continuers, exiters, and entrants (while abstracting from firm ownership). Declines in US tariffs are associated with a large increase in the employment share of entering firms, a decline in the employment share of continuers, and no significant change in the employment share of exiting firms. The mean reduction in  $\ln$  tariffs was 0.24. This implies that entrants in an industry that received the mean tariff reduction expanded their employment share by 7.8 percentage points by 2004, only 3 years after implementation, relative to entrants in an industry that received no tariff reductions. This estimated tariff-cut induced reallocation continued to grow to about 11.8 percentage points by 2009 and then remained relatively unchanged. This increase is offset by declines in the employment share of continuers by 10.9 percentage points respectively by 2009, with no noticeable tariff-induced change in employment share of exiting firms.

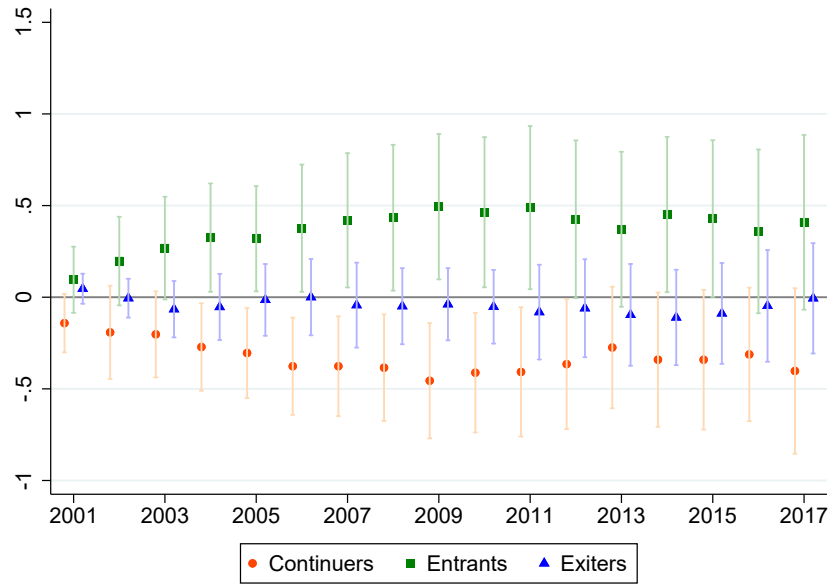


Figure 13: Changes in within-industry employment shares for continuers, entrants, and exiters and BTA tariff cuts

*Note:* Each point reflects an individual regression coefficient,  $\beta_{ost}$ , following equation (2). The base year is 2000 and the observations are weighted by 2000 employment. Controls included in the regression are the change in Vietnam's MFN tariffs due to WTO accession, the change in  $\ln$  Chinese exports to the US in year  $t$  relative to 2001, and an industry measure of US imports quotas applied to Vietnamese exports of textiles and clothing.

Finally, foreign entrants are driving the above tariff-cut induced expansion of employment share among foreign firms and among entrants. Figure 14 displays the estimates of the coefficients on tariff cuts from Equation (2) for foreign continuers, entrants, and exiters. Tariff cuts are associated with a large, sustained increase in employment shares of foreign entrants, a decline in employment share of foreign continuers, and little effect due to foreign exiters. By 2017, relative to an industry

that experienced no tariff reduction, an industry that experienced the mean tariff reduction saw the employment share in foreign entrants grow by 19.3 percentage points. The shift toward foreign entrants occurs as the share of employment in foreign continuers falls by 8.6 percentage points. Hence, the entry of foreign firms is partly offset by the relative contraction (i.e., not expanding as fast as overall industry employment) of continuing foreign firms. These results are not particularly sensitive to the exclusion of industry-specific controls in  $C_{jt}$  in Equation (2) (Appendix Figure C14) nor omission of any one industry (Appendix Figure C15). In Section B.3 and Figures B14 and B15 we also show that the results are robust to alternative definitions of firm entry.

The evidence on tariff-induced shift in employment toward foreign entrants is consistent with the setting discussed in Section 2.3, where a decision to establish an FDI affiliate in a location weighs the variable trade costs of exporting from that destination, variable production costs, and additional fixed costs of setting up a new production facility. As discussed in Section 2.1 Vietnam was already open to manufacturing FDI prior to the BTA, but tariffs on its exports to the U.S., a large export destination, were high on average at 31.9%, relative to US tariffs on its imports from other countries which faced much lower MFN tariffs at 2.9%. Consequently in this setting, Vietnam might not have been as attractive of a production location for foreign affiliates aiming to export because of the large variable trade cost of reaching a key export destination. Once the U.S. lowered tariffs on exports from Vietnam, the foreign affiliates were more likely to cover the fixed cost of setting up production in Vietnam. We provide further evidence on the link between exporting, foreign affiliate entry, and source countries of foreign affiliates in Section 6.

### **Tariff cuts and employment share reallocation for state and private domestic firms**

It is instructive to compare the tariff-cut induced changes in within industry employment shares of foreign affiliates to results for SOEs and PRIs by the three margins of adjustment. Recall from Figure 12, tariff cuts were associated with smaller contraction in the employment share of SOEs (albeit at times noisily estimated) and decreases in employment shares of PRIs. Figures 15a and 15b report the estimates of the coefficients on tariff cuts from Equation (2) for SOEs and PRIs by status, respectively. The magnitudes of the coefficients on tariffs are smaller than for FDI entry and imprecisely estimated.

Recalling that overall employment shares in SOEs is contracting during this period, the positive coefficients on tariff cuts for SOE continuers and exiters reflect slower contraction among continuers and less employment contraction through exit for SOEs in industries with higher tariff cuts relative to less affected industries. For private firms, tariff-induced increased entry of PRIs noted in earlier

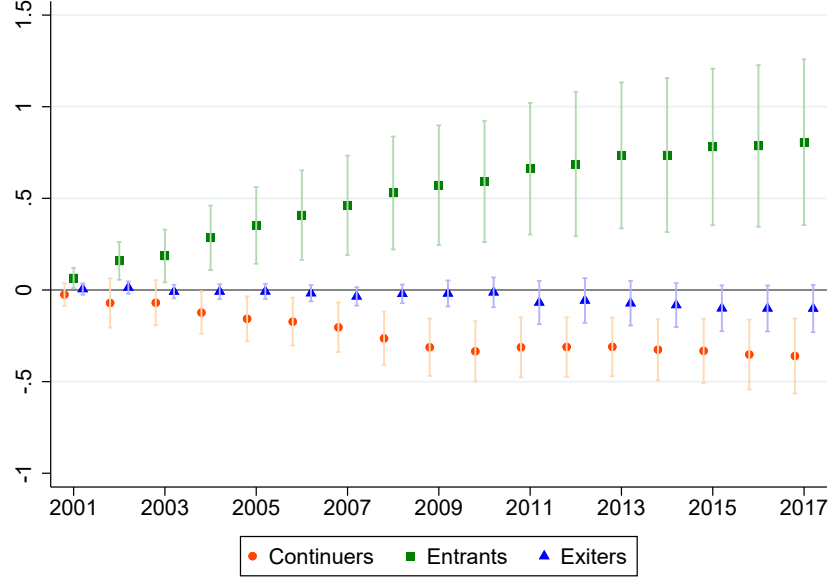


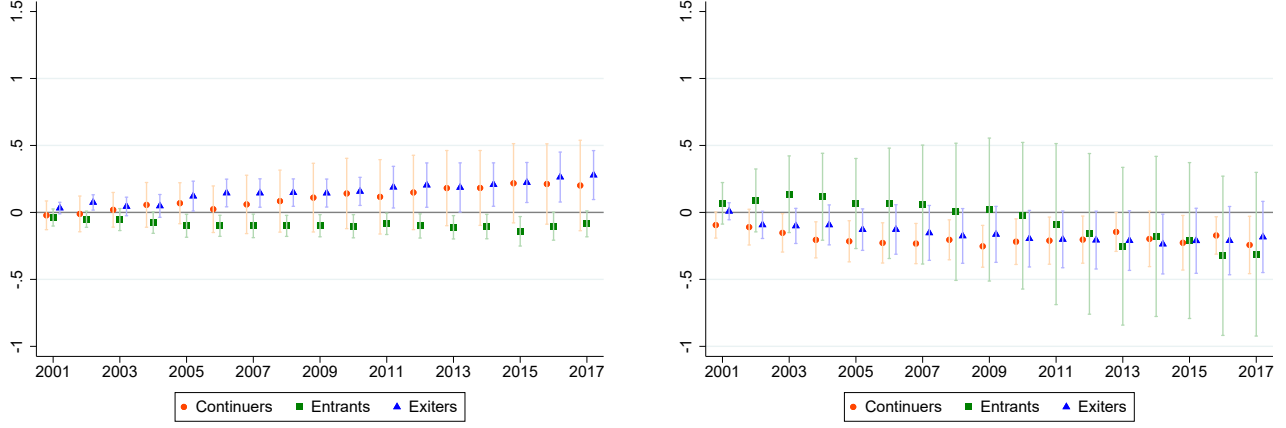
Figure 14: Changes in within-industry employment shares for foreign continuers, entrants, and exiters and BTA tariff cuts

*Note:* Each point reflects an individual regression coefficient,  $\beta_{ost}$ , following equation (2). The base year is 2000 and the observations are weighted by 2000 employment. Controls include the change in Vietnam's MFN tariffs due to WTO accession, the change in ln Chinese exports to the US in year  $t$  relative to 2000, and industry measures of US import quotas applied to Vietnamese and Chinese exports of textiles and clothing.

analysis does not translate into sustained gains in employment shares within industries, relative to foreign firms and SOEs. We show in Figure 15b that tariff cuts induced employment to shift away from private firms due to a combination of declines in employment shares of continuers, entrants, and exiters, albeit each channel is individually imprecisely estimated.<sup>45</sup>

In summary, Table 3 reports the estimated coefficients on the tariff cuts from the end of our period, 2017, which all measure the cumulative effects of tariff cuts relative to 2000. Most importantly, this table highlights the dominant role of tariff-cut induced shifts in the allocation of employment shares toward foreign entrants, over the long run, relative to continuing and exiting firms. This is consistent with the foreign affiliates being potentially best positioned to respond to tariff cuts, as discussed in Section 2.3, contributing to the expanding formal manufacturing. Furthermore, the positive coefficients on tariff cuts for SOE continuers and exiters reflect less employment contraction in incumbents and through exit for SOEs in industries with higher tariff cuts relative to less affected industries. This suggests SOEs might face different incentives than

<sup>45</sup>The negative coefficient on the entry might be puzzling at first. Recall from Section 4 that tariff cuts are associated with increased entry of private firms, but the magnitude of the coefficient is much smaller than for foreign entrants. In addition, the magnitudes of the coefficients on tariff cuts for employment effects for private firms is positive, but substantially smaller in magnitude (and statistically insignificant) than for foreign firms (see Figure 11). Hence the negative coefficients mainly reflect relative expansion of foreign firms (and smaller contraction of SOEs) in high tariff-cut industries rather than an absolute decline in employment among private entrants.



(a) State

(b) Private

Figure 15: Changes in within-industry employment shares for state and private continuers, entrants, and exiters and BTA tariff cuts

*Note:* Each point reflects an individual regression coefficient,  $\beta_{ost}$ , following equation (2). The base year is 2000 and the observations are weighted by 2000 employment. Controls include the change in Vietnam's MFN tariffs due to WTO accession, the change in  $\ln$  Chinese exports to the US in year  $t$  relative to 2000, and industry measures of US import quotas applied to Vietnamese and Chinese exports of textiles and clothing.

Table 3: Employment share reallocation coefficients in 2017

|            | All                | Foreign              | State               | Private              |
|------------|--------------------|----------------------|---------------------|----------------------|
| Continuers | -0.403*<br>(0.228) | -0.360***<br>(0.103) | 0.201<br>(0.170)    | -0.243**<br>(0.108)  |
| Entrants   | 0.409*<br>(0.240)  | 0.806***<br>(0.228)  | -0.086*<br>(0.049)  | -0.312<br>(0.308)    |
| Exiters    | -0.006<br>(0.152)  | -0.101<br>(0.065)    | 0.279***<br>(0.092) | -0.183<br>(0.134)    |
| Total      |                    | 0.345**<br>(0.173)   | 0.394**<br>(0.185)  | -0.739***<br>(0.258) |

*Note:* \*  $p < 0.1$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$ . Each coefficient represents an estimate of  $\beta_{ost}$  from equation (2) using the change in employment share between 2000 and 2017.

private and foreign firms.

## 5.2 Long Term Effects on FDIs: Entry vs Subsequent Growth

The results suggest that industries with higher tariff cuts experience increases in employment mainly through foreign entrants, with the cumulative effects of tariff cuts increasing over longer time periods. Given the sizable long run post-entry employment growth among FDI entrants (recall Figure 5a), we examine how within-industry employment shifted strongly toward foreign entrants in higher tariff cut industries.

In particular, we analyze how much of the effects of tariff cuts on the change in the employment share of foreign entrants is driven by the effect of tariffs on employment size at entry versus on post-

entry employment growth. We decompose the employment share change  $\Delta es_{jost}$  into the change in the employment share due to initial employment at entry and due to subsequent changes to employment after entry. A specific example will help clarify the approach. Consider employment in industry  $j$  in year  $t$  accounted for by firms of ownership type  $o$  that have entered since 2000. The quantity  $E_{jost}$  is the sum of initial employment in the year of entry plus subsequent changes  $E_{jost} = E_{jost} - E_{jost^e} + E_{jost^e}$  where we use the subscript  $t^e$  to denote the year of entry. Hence, for entrants we can rewrite the change in employment share as:  $\Delta es_{jost} = \left( \frac{E_{jost} - E_{jost^e}}{E_{jt}} \right) + \left( \frac{E_{jost^e}}{E_{jt}} - \frac{E_{jos,2000}}{E_{j,2000}} \right)$  where the first bracketed term captures the change in employment since the year of entry and the second bracketed term measures the change in the employment share due to initial entry. In other words, if entrants did not grow after initial entry, the change in employment share would only be due to the second bracketed term.

We estimate equation (2) for foreign entrants, with the above two components as dependent variables separately, thereby decomposing the foreign entrant coefficients in Figure 14 into these two components. Figure 16a shows the estimates of the tariff cut effects that operate through the contribution of initial employment (second bracketed term, above decomposition) and Figure 16b shows the estimates that operate through the contribution of growth after entry (first bracketed term in the decomposition above). The effects through employment at entry dominate initially, but plateau in terms of contribution to reallocation around 2009 or 2010. The large magnitude of the effects through employment at entry suggests that the affiliates start big, which is consistent with Garetto, Oldenski and Ramondo (2019). The effects of tariff cuts through subsequent growth among foreign entrants start off smaller in magnitude, but continue to expand the overall contribution of foreign entrants to within industry employment reallocation post 2010, stabilizing by 2015. By 2017 more than half of the effects of tariff cuts are due to post-entry employment growth. This highlights the importance of studying adjustment of firm employment over a long period and the importance of tariff-induced post-entry employment growth among foreign entrants.

## 6 Foreign Entrants, Exports, and Sources of Capital

The literature on factors contributing to FDI affiliate establishment emphasizes variable trade costs (including trade policy), variable production costs (including wages and the costs of other inputs), and additional fixed costs of setting up new production facilities. As discussed in Section 2.1, Vietnam was already open to manufacturing FDI prior to the BTA, but tariffs on its exports to the U.S., a large export destination, were high on average at 31.9%, relative to U.S. tariffs

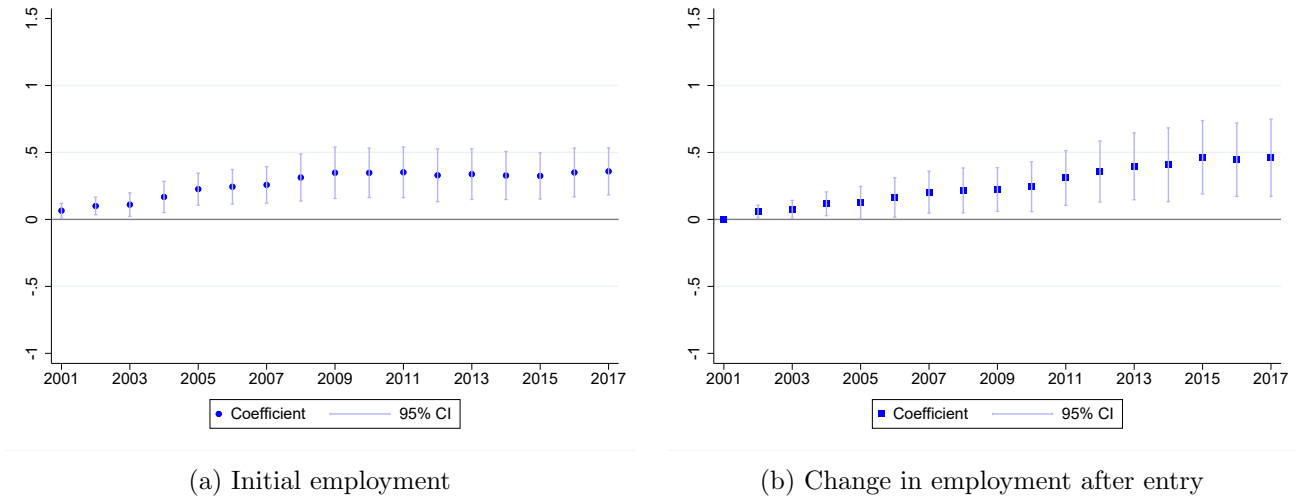


Figure 16: Decomposing changes in within-industry employment shares for foreign entrants by initial and subsequent employment and BTA tariff cuts

*Note:* Each point reflects an individual regression coefficient,  $\beta_{ost}$ , following equation (2). The base year is 2000 and the observations are weighted by 2000 employment. Controls include the change in Vietnam's MFN tariffs due to WTO accession, the change in  $\ln$  Chinese exports to the US in year  $t$  relative to 2000, and industry measures of US import quotas applied to Vietnamese and Chinese exports of textiles and clothing.

on its imports from other countries which faced much lower MFN tariffs at 2.9%. Consequently in this setting, despite low wages, Vietnam might not have been as attractive of a production location for foreign affiliates aiming to export because of the large variable trade cost of reaching this key destination. Our results in previous sections show that the reductions in U.S. tariffs on Vietnamese exports were associated with the entry and employment expansion by affiliates of foreign multinationals.

We provide further evidence that the observed association between tariff cuts, FDI entry, and subsequent employment growth among foreign entrants is closely linked to exporting, particularly of FDI firms, and discuss the origin countries of FDI that are driving these responses.

### Exporters drive tariff cut-induced increase in employment share of foreign entrants

Figure 17 decomposes the estimates of the tariff coefficients from equation (2) for foreign entrants in Figure 14 into exporters and non-exporters for years where data on exporter status is available.<sup>46</sup> If entering foreign firms are not influenced by the BTA tariff cuts through exporting, we would expect the coefficient on tariffs to be small in magnitude and statistically insignificant for exporter entrants (or similar in magnitude to non-exporters). Instead, we find that the coefficients on tariffs for the exporter entrants are similar in magnitude to the tariff coefficients on the overall foreign

<sup>46</sup>Exporting status is based on year  $t$ . The annual enterprise survey does not report firm-level exports by destination country and the Vietnam Customs office does not share transaction-level import and export data with researchers.

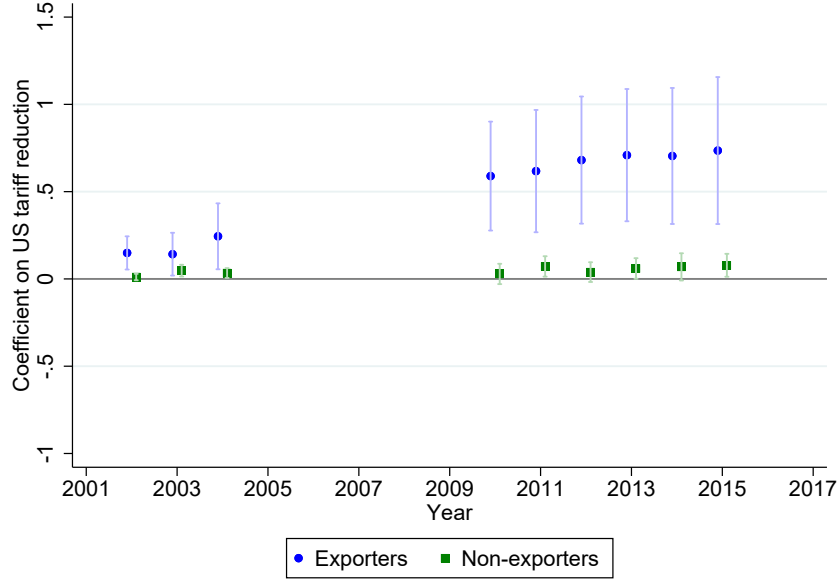


Figure 17: Changes in foreign entrant employment shares for exporters and non-exporters and BTA tariff cuts

*Note:* Each point reflects an individual regression coefficient,  $\beta_{ost}$ , following equation (2). Exporter status is only observed for a subset of years. The base year is 2000 and the observations are weighted by 2000 employment. Controls include the change in Vietnam's MFN tariffs due to WTO accession, the change in  $\ln$  Chinese exports to the US in year  $t$  relative to 2000, and industry measures of US import quotas applied to Vietnamese and Chinese exports of textiles and clothing.

entrants from Figure 14, while the coefficients for non-exporter entrants are small in magnitude and mostly statistically insignificant.<sup>47</sup>

This pattern is also consistent with the post-entry employment growth in foreign firms being concentrated among the exporters. Appendix Figure C16 repeats the analysis from Figure 5a by separately tracking initial and post entry employment of the cohort of foreign firms that entered in 2001, split into those that exported in 2002 and those that did not export.<sup>48</sup> At time of entry there is a relatively small difference in mean employment. However, the cumulative employment growth after entry is much stronger for foreign firms that are exporting in 2002 than for those

<sup>47</sup>The use of overall exporter status (rather than status as an exporter to U.S.) might potentially be problematic because it does not provide direct evidence that these exporters export to the U.S. To the extent the exports to the U.S. do not play a role in exporting for FDI entrants, we would expect the magnitude of the coefficient on tariffs for exporters to be small in magnitude and statistically insignificant. However, the coefficients are large in magnitude and statistically significant. This is consistent with regression results in Figure 6, which illustrated with industry-level data, Vietnamese exports expanded due to US tariff cuts, with the cumulative effects increasing over time. Furthermore, in Appendix B.1.2, we use the 2009 Vietnam Technology and Competitiveness Survey, which includes information on exporting by destination for a subsample of foreign and private firms from the annual enterprise survey, and show that almost a quarter of foreign firms that export (accounting for 41% of workers in foreign firms) list the U.S. as either their primary or secondary export market.

<sup>48</sup>We focus on exporter status in 2002 because that is the first year in which firms report exporting status. We find similar results for entry and export cohorts of other years (Figure C17). In particular, this pattern holds for the 2001 entry cohort based on exporting in 2004 or not, the 2001 entry cohort based on exporting in 2010 or not, and the 2005 entry cohort based on exporting in 2010 or not.

that are not, with the difference increasing over time.

**Sources of FDI responding to trade policy change in a host country** While the source country of FDI in a host country is often not observed, our data contains this information. We find that the tariff-induced employment expansion is due to foreign affiliates from countries other than the U.S., highlighting the importance of studying the responsiveness of all sources of FDI, even if one of the source countries is the large export destination experiencing the trade policy change. The information on the source country of FDI in our data indicates that non-U.S. multinationals account for most of manufacturing FDI in Vietnam prior to the BTA (as noted in Figure 4 earlier). When we separately estimate the tariff cut effects on employment share changes of foreign entrants by U.S. and non-U.S. sources of FDI in equation (2), most of the effects are driven by affiliates of non-U.S. multinationals. Figure 18 decomposes employment share of foreign entrants from Figure 14 into U.S. and non-U.S. sources of FDI and shows that tariff declines are mainly associated with increased employment in FDI entrants of non-U.S. sourced FDI, with U.S.-sourced FDI playing only a very minor role. Appendix Figure C18 presents the decomposition by Japan, South Korea, Taiwan, and other FDI source countries and shows that FDI from Japan and South Korea accounts for most of the tariff-cut induced employment share reallocation toward foreign entrants.

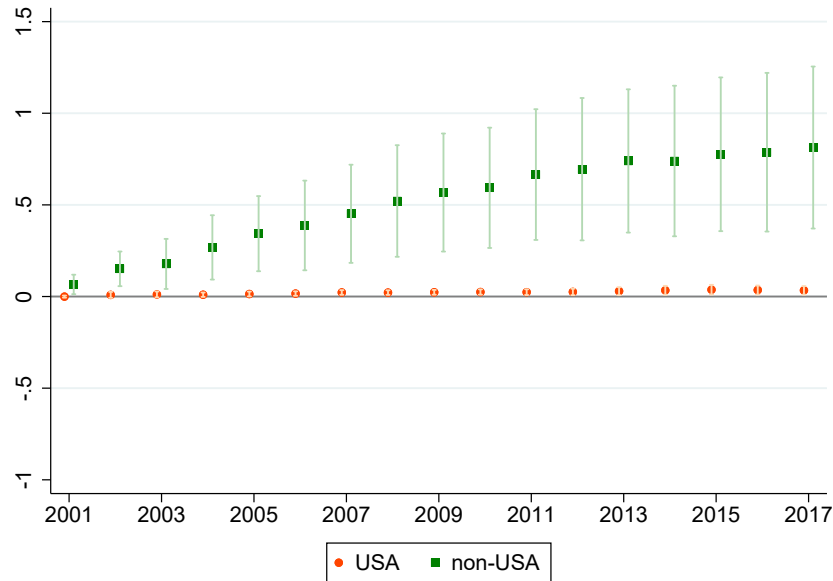


Figure 18: Changes in foreign entrant employment shares for US and non-US source FDI and BTA tariff cuts, 2000-2017

*Note:* Each point reflects an individual regression coefficient,  $\beta_{ost}$ , following equation (2). The foreign entrant is defined as US and non-US based on the FDI source country. The base year is 2000 and the observations are weighted by 2000 employment. Controls include the change in Vietnam's MFN tariffs due to WTO accession, the change in  $\ln$  Chinese exports to the US in year  $t$  relative to 2000, and industry measures of US import quotas applied to Vietnamese and Chinese exports of textiles and clothing.

Consistent with tariff-induced expansion of employment in non-U.S. FDI affiliates, we show that the tariff-induced increase in exports to the U.S. is not mainly driven by affiliates of U.S. multinationals.<sup>49</sup> Using data from Antras (2015), Figure 19a reports the share of Vietnam’s manufacturing exports to the U.S. from affiliates of U.S. multinationals (i.e. related party trade) and from non-U.S. affiliated firms (i.e non-related party trade). The non-U.S. affiliated firms make up the majority of Vietnamese exports to the U.S. from 2000-2011. In 2000, non-U.S. affiliated firms account for 96.2% of exports while U.S. affiliates account for only 3.8%. By 2011, the share of exports by non-U.S. affiliates decreases slightly to 83.1% while U.S. affiliates account for 16.9% (13.3 and 2.7 billion dollars respectively). This is consistent with low shares of FDI from the U.S. throughout the period (Figure 4).<sup>50</sup> Figures 19b and 19c examine the tariff cut effects on Vietnamese exports to the U.S. from Figure 6 by estimating equation (1) separately for exports from U.S. and non-U.S. affiliates. While lower tariffs are associated with increased exports for both affiliated and non-affiliated firms, the coefficients on tariffs in the affiliated firms sample are smaller in magnitude and less precise. The coefficients on tariffs from firms that are not affiliated with U.S. multinationals are always statistically significant and larger in magnitude over time (Figure 19c). Jointly, these three figures show that most of the increase in BTA-tariff induced exports stem from non-U.S. affiliated trade. Focusing solely on the response of FDI from U.S. multinationals to the BTA-induced tariff cuts would miss much of how foreign firms and multinationals respond in terms of entry, employment and exports when facing lower export variable costs to a large destination market.

As discussed in Section 2, the most common sources of FDI to Vietnam during this period are Taiwan, South Korea, and Japan. These East Asian countries make up the majority share of FDI sources before and after the trade agreement (82% in 1999 and 90% in 2017, Figure 4). Once the agreement reduced the tariffs on Vietnam’s exports to a key export destination, Vietnam became a

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<sup>49</sup>Categorized by the Census Bureau as related party trade, these transactions include trade by U.S. companies with their subsidiaries abroad as well as trade by U.S subsidiaries of foreign companies with their parent companies. See notes in Figure 19 for more information.

<sup>50</sup>The lack of export destination data precludes us from quantifying the exact contribution of non-U.S. FDI firms (relative to private firms and SOEs) to non-affiliate exports to the U.S. Although private firms and SOEs also export, we show in Appendix B.1.2 that FDI firms play a substantially larger role in exporting, including exporting to the U.S.. This is due to higher propensity to export, higher export intensity, and exporting more immediately upon the start of operations relative to domestic private firms and SOEs. As we show and discuss in Appendix B.1.2, 65-75% of foreign firms export (accounting for 90% of workers in foreign firms) and 66% of foreign exporters export at least 80% of their sales. In addition, foreign entrants are much more likely to start exporting in the first year of operation, with 85% of them reporting exporting within one year from the start of operations. The corresponding numbers are substantially lower for private domestic firms. That, combined with the evidence above on the importance of exporting FDI in explaining the trade-induced increase in employment among FDI entrants, suggest that FDI entry from third countries plays an important role.

more attractive production country and foreign affiliates from geographically closer countries with existing regional supply chain linkages might have been better positioned to respond to the tariff cuts (see, for example Head and Mayer (2019), Antràs et al. (2022)). Our findings are related to studies that have found production reallocation effects across countries in response to trade policy, focusing on a particular industry (see Flaaen, Hortaçsu and Tintelnot (2020) for evidence from the washing machine market, Head and Mayer (2019) for cars, and Blonigen (2002)). We show the impact of trade policy changes on the entry and subsequent employment expansion of FDI affiliates in a host country, highlighting the role of affiliates of multinationals from third countries in a manufacturing-wide setting.<sup>51</sup>

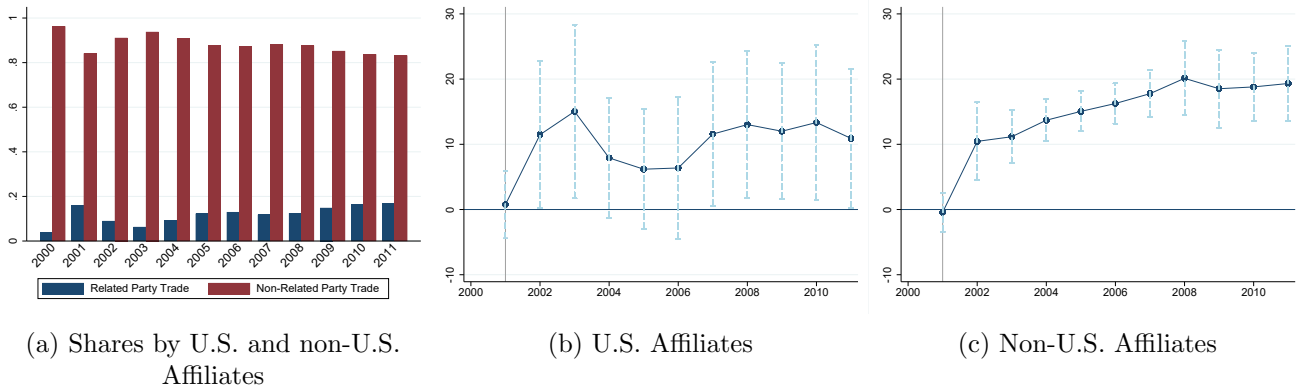


Figure 19: Vietnam-U.S. exports by U.S. and non-U.S. affiliates and BTA tariffs, 2000-2011

*Note:* Panel (a) reports the share of Vietnamese manufacturing exports to the U.S. by U.S. and non-U.S. affiliates. Exports by U.S. affiliates are also known as Related Party Trade. These are transactions which includes any person directly or indirectly owning, controlling, or holding with power to vote,  $\geq 5\%$  of the outstanding voting stock or shares of any organization and such organization (U.S. Census Bureau). In Panels (b) and (c), each point reflects an individual regression coefficient,  $\hat{\beta}_t$ , following equation (1). In Panel (b), the dependent variable is log Vietnamese exports to the U.S. from U.S. affiliates. In Panel (c), the dependent variable is log Vietnamese exports to the U.S. from non-U.S. affiliates (Non-Related Party Trade). BTA was implemented in Dec 2001, as indicated by the gray line, and the base year is 2000. Controls include 3-digit industry FEs, year FEs, the change in Vietnam's MFN tariffs due to WTO accession, the change in ln Chinese exports to the US in year  $t$  relative to 2000, and US import quotas on textiles and clothing applied to Vietnam and China respectively. Dashed lines show 95 percent confidence intervals. Standard errors clustered at the 3-digit industry level. Weighted by year 2000 total Vietnamese exports to the US.

**Tariff cuts induce export growth to other countries in the long run** The BTA initially led to increases in Vietnamese exports to the U.S. in industries with bigger tariff cuts. However, over time, Vietnamese export growth in industries with bigger tariff cuts also expands to the rest of the world, highlighting the longer-term effects of trade policy. Figure 20 reports the coefficients on tariff cuts from estimating equation (1) for Vietnamese total world exports, Panel (a), and Vietnamese total world exports less the U.S., Panel (b). The coefficients on tariffs in Panel (b) increase in magnitude and become statistically significant about 10 years after the implementation of the BTA. While this is beyond the scope of the current paper, these results on Vietnam's exports

<sup>51</sup>Tintelnot (2017) focuses on intensive margin adjustments. Likewise, Head and Therier (2019) focus on choices of export markets and product lines in response to trade agreements in existing affiliates.

to the world without the U.S. are consistent with the presence of scale spillovers to other markets. In addition, this pattern of tariff-induced export expansion is consistent with (1) the foreign entry responses and (2) the subsequent longer-term employment growth responses in foreign entrants to tariff cuts in Section 5.2.

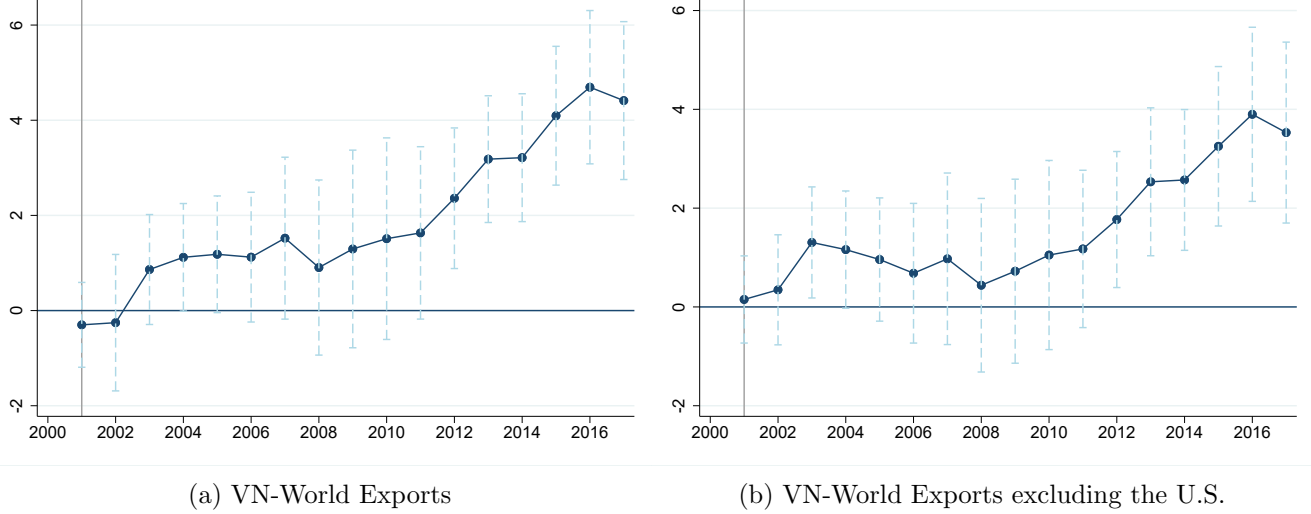


Figure 20: Vietnam-World exports including and excluding the US and BTA tariffs, 2000-2017

*Note:* Each point reflects an individual regression coefficient,  $\hat{\beta}_{it}$ , following equation (1). In Panel (a), the dependent variable is log Vietnamese exports to the world in an industry. In Panel (b), the dependent variable is Vietnamese exports to the world in an industry excluding the U.S. BTA was implemented in 2001, as indicated by the gray line, and the base year is 2000. Controls include 3-digit industry FEs, year FEs, the change in Vietnam’s MFN tariffs due to WTO accession, Chinese exports to the US in year  $t$ , and US import quotas on textiles and clothing applied to Vietnam and China respectively. Dashed lines show 95 percent confidence intervals. Standard errors clustered at the 3-digit industry level. Weighted by year 2000 Vietnamese exports to the world.

Overall, this section further highlights the importance of tariff-induced export opportunities in a key export destination encouraging foreign entry and subsequent employment growth in foreign entrants and the important role played by third country parties in this process.

## 7 Conclusion

Recent changes in trade policy have renewed the interest in how trade policy shapes global supply chains and foreign direct investment. Our study focuses on a particular slice of global supply chains: a lower-income host country facing tariff declines in reaching a large export market. Our analysis highlights the impact of this policy change on FDI—from multiple sources—and the interaction between foreign, private domestic, and state-owned firms. Overall, our analysis emphasizes that firm entry and firm ownership are important factors for understanding the short and long-term impacts of lower trade costs of reaching export markets. We find that foreign and private domestic firms primarily drive the firm-entry margin in response to tariff cuts.

Second, entering firms account for much of the observed employment growth in response to

tariff cuts. The tariff-induced employment growth among entering firms is concentrated primarily among the foreign entrants. Despite tariff-induced private domestic entry, these entrants do not contribute to overall employment growth. We acknowledge that the question remains as to why these private domestic firms enter small and do not subsequently grow. On the other hand, state firms stall the reallocation through lower contraction of incumbents and less exit in industries with bigger tariff cuts. Our analysis shows that from a perspective of a lower-income host country, the employment growth due to FDI entry is not just a source of capital and exports, but also a source of formal sector jobs.

About half of the tariff-induced growth in employment share among foreign entrants is due to employment growth after entry, which takes substantial time to materialize. Shorter-term analysis would have missed the longer-term cumulative effects of trade policy. Most of this is driven by post-entry employment growth in exporting foreign firms, further highlighting the link between foreign affiliate entry and BTA-induced export opportunities. Finally, most of this export growth stems primarily from trade not related to U.S. multinationals. Focusing solely on the response of FDI from the U.S. multinationals to BTA-induced tariff cuts would have missed much of how foreign multinationals responded to export opportunities from Vietnam. This highlights the importance of studying FDI from several sources in a lower-income host setting.

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# A Data Appendix

In this appendix we provide additional details on the enterprise data. Specifically, we describe (1) the sampling framework, (2) consistency of our key variables over time, (3) creation of consistent ownership codes over time, (4) steps taken to clean and prepare the data for analysis, (5) and corrections made to the panel of firms, particularly between 2000 and 2001, but also for other years. One of the contributions of our analysis is that we devoted significant effort working with the GSO to verify the matching of enterprises over time in the data.<sup>52</sup>

## A.1 Sampling framework

We use annual data on enterprises collected by the General Statistics Office (GSO) of Vietnam for the years 2000 through 2017. The survey covers all businesses registered as an enterprise under Vietnam’s Enterprise Law.<sup>53</sup> All state-owned, foreign-invested, and collective businesses must legally register as an enterprise, but private businesses may legally operate either as an enterprise or as a household business.<sup>54</sup> Private businesses must register as an enterprise if they have more than ten workers or operate in more than one location.<sup>55</sup> Thus, although registration as an enterprise is not required for small, private businesses, some of those businesses nonetheless register as enterprises and are included in the sample.

Starting with the survey covering the 2003 calendar year, the GSO split the population of enterprises into two groups: those that receive the full length questionnaire and those that receive a shorter questionnaire. All state enterprises, foreign enterprises, collectives and large private enterprises continued to receive the full length questionnaire. A subset of small private enterprises received the complete questionnaire and the remaining small private enterprises received the short questionnaire. The short questionnaire consistently collected information on ownership, industry, employment, and unique firm identifiers, the most important variables in our analysis.

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<sup>52</sup>We are very thankful to Hanh Nguyen for careful translation of the Enterprise Survey Plans for surveys used in our analysis.

<sup>53</sup>See law No. 13-1999-QH10.

<sup>54</sup>Household businesses operate under a different legal framework than enterprises. For example, they are not required to follow formal accounting rules nor to provide social insurance contributions on behalf of their workers. Thus, they are usually considered as informal businesses relative to enterprises. See Malesky and Taussig (2009), McCaig and Pavcnik (2018), and McCaig and Pavcnik (2021) for further discussion on differences between enterprises and household businesses.

<sup>55</sup>See decrees No. 02/2000/ND-CP of 3 February 2000 and No. 109/2004/ND-CP of 2 April, which describe household business and enterprise registration requirements during our study period for private businesses.

## A.2 Consistency of main variables over time

The most important variables for our analysis are employment, industry, and ownership. All questionnaires, both the full length and the short versions for listed enterprises, consistently ask about end of year employment in the enterprise. Hence, this variable is consistently asked of all enterprises in all years.

**Industry:** The industry of affiliation is reported using two different industry classifications, which we concord at a 4-digit level to obtain a consistent industry classification over time. For years 2000 through 2010 it is reported according to the 1993 version of the Vietnam Standard Industrial Classification (VSIC). The classification is closely based on revision 3 of the International Standard Industrial Classification (ISIC). Within manufacturing, they are identical. We use the 4-digit codes. In some surveys, it appears as though some ad hoc refinement was introduced in the codes. For example, according to both VSIC 1993 and ISIC revision 3, code 1810 is for "wearing apparel, except for fur apparel," with no disaggregation at the 4-digit level relative to the 3-digit level code 181. However, sometimes we observe disaggregation such as 1811 and 1819. In cases like these we replace the invalid codes with the correct associated 4-digit code.

From 2007 through 2017, the industry codes are based on the 2007 version of VSIC, which is based on revision 4 of ISIC. Again, within manufacturing they are identical. We convert the 4-digit 2007 VSIC codes to 4-digit 1993 VSIC codes in two steps. First, we use the official concordance from ISIC revision 4 to revision 3. Second, in instances in which one 4-digit VSIC 2007 code matches with more than one 4-digit VSIC 1993 code, we make use of the years 2007 through 2010 in which both codes are reported. We match the 4-digit VSIC 2007 code with the most commonly matched 4-digit VSIC 1993 code in these overlapping years.

**Ownership:** Firm ownership is described using 12 to 14 detailed ownership codes. We group these ownership codes into three broad ownership categories: state, private domestic, and foreign. The detailed ownership codes have changed slightly over time, but can consistently be aggregated into the three broad categories.<sup>56</sup> We consistently define *state* as encompassing central SOEs, local SOEs, state limited liability companies, and joint stock and limited liability companies with >50% state capital. We define *private domestic* as encompassing private limited liability companies, collectives, private enterprises, partnerships, joint stock companies without state capital, and joint stock and limited liability companies with  $\leq 50\%$  state capital. We define *foreign* as encompassing

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<sup>56</sup>The data we received from the GSO for 2000 and 2001 reported the detailed ownership codes according to the codes and descriptions for 2000 and 2001 respectively as well as according to the codes and descriptions for 2002. We use the 2002 detailed codes and descriptions.

100% foreign owned and joint ventures with either state or domestic private firms.

### A.3 Removing 2002 entrants from the 2001 data

The 2002 survey, which collected data about firm performance in 2001, also included questions about performance in the first six months of 2002. As such, the survey includes some firms that did not operate as an enterprise in 2001, but only began operating as an enterprise in the first six months of 2002.

There were originally 56,551 firms in this survey. Of these, 5,438 report 0 or missing employment at both the start and end of 2001. Most of these firms reported being established in 2002 (84.3%) or 2001 (14.1%). Note that the year of establishment is not necessarily the same as the year that the firm registered as an enterprise or began operations. We drop these firms from the 2001 dataset.

### A.4 Verifying the panel

The data allows us to track enterprises over time using a unique identifier (the variable *madn*).<sup>57</sup> Annually, an exiting firm is defined as a firm that operated in  $t$ , but not in  $t + 1$ . An entering firm is defined as a firm that operated in  $t + 1$ , but did not operate in  $t$ . A continuing firm is a firm that operated in  $t$  and  $t + 1$ . In this section, we discuss various checks we performed on the panel, further validating our definition of firm entry and exit.

**Non-unique enterprise identifiers:** Between 2000 and 2010, the number of non-unique enterprise identifiers within a year was small. We visually inspected all of these instances and manually changed the identifier to either a completely new identifier value or to match the value of another enterprise if applicable. From 2011 onward, the number of non-unique enterprise identifiers grew significantly and we implemented the following procedure to identify unique enterprises. First, a significant number of non-unique identifiers were due to a data entry error, whereby an entire observation was entered more than once in a given year. In these instances, we drop all but one observation per enterprise per year. Second, many of the non-unique identifiers occur in enterprises that have different taxcode ids. We therefore use the enterprise taxcode id and location information to assign a unique identifier if the enterprise is an entrant or to match the

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<sup>57</sup>We can alternatively match enterprises using their reported taxcode (*ma\_thue*), as was done in Baccini, Impulitti and Malesky (2019). We prefer *madn* because the raw variable includes fewer observations with non-unique or missing values for most years. From 2014 onward, the taxcode includes fewer observations with non-unique values and we at times use this information to improve the matching of enterprises over time. See detailed description below.

enterprise over time and thus assign the enterprise identifier used for the same enterprise in previous years. After these procedures, enterprises accounting for no more than 2 percent of manufacturing employment in any year have non-unique identifiers. We drop these observations.

**2000-01 panel:** We use additional confidential data from the GSO to validate the year-to-year firm matches. This only made a significant difference in the definition of entry and exit in 2000-01 panel. Initially, 67.2% of enterprises from 2000 could be matched with enterprises in 2001. In the subsequent years, the year-to-year matches increased substantially to between 81.8% and 85.4%. Before coding firm entry and exit, we used additional confidential data made available to us by the GSO to look for additional potential matches between 2000 and 2001. With this information, an additional 6,557 enterprises are matched between 2000 and 2001 using a matching algorithm based on restrictive criteria described below. This increases the percentage of 2000 enterprises matched with 2001 enterprises from 67.2 to 82.9. The importance of this procedure for the 2000-01 panel is potentially not surprising given that the GSO started collecting this data in 2000. We employed the following matching algorithm, with the number of additionally matched enterprises at each step listed in parentheses:

1. Perfectly matched based on province, district, ward, start year, ownership, and tax code (2,032),
2. Perfectly matched based on province, district, ward, start year, ownership, phone number, and owner's name (1,358),
3. Perfectly matched based on province, district, ward, ownership, phone number, and owner's name (908),
4. Perfectly matched based on province, district, ward, and phone number (957),
5. Perfectly matched based on province, district, ownership, phone number, and owner's name (217),
6. Perfectly matched based on province, district, ward, ownership, and owner's name matches within one character (1,085).

We performed this check for all enterprises, regardless of whether they are in manufacturing.

**Visual inspection of entry and exit of all large manufacturing enterprises:** We define enterprise entry and exit based on our ability to track an enterprise over time. However,

it is possible that an enterprise was incorrectly assigned a new identifier between two successive years even though it is a continuing enterprise. If so, this would lead to both a false instance of exit and entry. We begin with two examples.

Example #1: A centrally owned SOE in the printing industry (VSIC1993 code 2221) appears to exit after 2000. Another centrally owned SOE in the printing industry appears to enter in 2001. The firms have the same tax code (other than the additional digit all tax codes have in 2000 relative to 2001), are both located in province 101, district 9, ward 29, and have the same address and fax number. The exiting firm has 107 employees and 6138 million VND in capital at the end of 2000. The entering firm has 107 employees and 6131 million VND in capital at the start of 2001. Together, we take these similarities as strong evidence that this is the same firm and give it the same firm identifier.

Example #2: A locally owned SOE manufacturing footwear (VSIC1993 code 1920) appears to exit after 2001. A locally owned SOE in wholesale (VSIC1993 code 5190) appears to enter in 2002. The entering firm's secondary industry is footwear manufacturing, while the exiting firm's secondary industry is wholesale (VSIC1993 code 5149). The firms are both located in province 101, district 1, ward 3, and have the same listed start year, address, fax number, phone number, director, and email address. The exiting firm has 563 employees and 13282 million VND in capital at the end of 2001. The entering firm has 570 employees and 13382 million VND in capital at the start of 2002. Together, we take these similarities as strong evidence that this is the same firm and give it the same firm identifier.

We used a combination of visual inspection and algorithms to look for instances of false exit and entry as in the examples above. This procedure also ensures that SOEs that are privatized, including partial privatization, are not coded as an exit nor as an entry during the process of (partial) privatization. The following example is typical of SOEs that appear to exit due to privatization.

Example #3: A centrally owned SOE operating in industry 2912 appears to exit after 2003. A joint stock company with state capital share 50% in industry 2912 appears to enter in 2004. Both firms are in the same ward, have the same address, report the same start year, and report the same value of capital for end of year in 2003 and start of year in 2004. Together, these similarities suggest that this is the same firm that underwent partial privatization and give it the same firm identifier.

All manufacturing state enterprises that exited or entered between 2000 and 2010 were visu-

ally inspected. Due to the larger number of foreign and private enterprises, we prioritized visual inspection based on the largest enterprises in terms of employment. All foreign and private manufacturing enterprises with at least 1000 employees at exit were visually examined. In addition, we developed an algorithm for identifying instances of false exit and entry among smaller foreign and private enterprises using combinations of information on location, taxcode, phone number, and ownership.

**Confirming existing panel enterprises:** We also reviewed existing matches of enterprises over time. In particular, we visually inspected instances where the taxcode changed over time, but the identifier did not. We did this for all enterprises in manufacturing.

**Summary of changes to enterprise identifiers:** In conclusion, we provide a summary in Table A1 of the changes to enterprise identifiers by year, based on all the procedures discussed above. The table focuses on enterprises with manufacturing as their initial industry. We categorize observations by initial ownership as in our main sample used for analysis. In our main analysis, we drop all observations for which the identifier was non-unique after all the data cleaning steps taken. The share of enterprises with a changed firm identifier is higher among state than either private or foreign. This is due to a number of reasons. First, as there was much less entry of state enterprises, any changes due to initial matching mistakes between 2000 and 2001 will persist for a greater share of state enterprises. 32.3% of changes for state enterprises are due to initial mismatches between 2000 and 2001. Second, 21.7% of the state firm identifier changes happen when there was a change in ownership, for example due to (partial) privatization or due to change in ownership within the state sector, such as from 100% central SOE to a state limited liability company. A further 14.5% of changes were due to instances in which the taxcode of the state enterprise changed without any change in ownership. Fourth, 19.2% of the changes occurred when the enterprise was absent in the dataset for a year or more and then reappeared with a new firm identifier despite being observably the same enterprise. Lastly, 12.4% of the changes were due to other reasons.

## A.5 Entry or formalization of informal private domestic firms?

In this section we provide further discussion of an important issue related to entry in our dataset, namely whether private entry is being driven by previously informal firms registering as an enterprise. It is possible that some of the private domestic entrants are simply entrants into the enterprise sector and had previously been operating not as an enterprise, but as an individual

Table A1: Share of enterprises with a changed identifier

| Year  | All owners |         | State   |         | Private |         | Foreign |         |
|-------|------------|---------|---------|---------|---------|---------|---------|---------|
|       | N. obs.    | Changed | N. obs. | Changed | N. obs. | Changed | N. Obs. | Changed |
| 2000  | 10,112     | 0.097   | 1,497   | 0.124   | 7,596   | 0.097   | 1,019   | 0.057   |
| 2001  | 11,598     | 0.015   | 1,444   | 0.102   | 8,850   | 0.002   | 1,304   | 0.005   |
| 2002  | 14,172     | 0.019   | 1,445   | 0.154   | 11,090  | 0.003   | 1,637   | 0.007   |
| 2003  | 16,153     | 0.022   | 1,391   | 0.206   | 12,835  | 0.004   | 1,927   | 0.010   |
| 2004  | 19,417     | 0.024   | 1,396   | 0.271   | 15,764  | 0.004   | 2,257   | 0.010   |
| 2005  | 22,809     | 0.021   | 1,376   | 0.280   | 18,851  | 0.004   | 2,582   | 0.011   |
| 2006  | 25,408     | 0.020   | 1,380   | 0.285   | 21,074  | 0.004   | 2,954   | 0.013   |
| 2007  | 29,265     | 0.019   | 1,412   | 0.286   | 24,427  | 0.004   | 3,426   | 0.015   |
| 2008  | 36,284     | 0.017   | 1,405   | 0.301   | 31,029  | 0.004   | 3,850   | 0.018   |
| 2009  | 42,627     | 0.015   | 1,436   | 0.304   | 36,984  | 0.004   | 4,207   | 0.020   |
| 2010  | 45,943     | 0.015   | 1,417   | 0.299   | 40,098  | 0.004   | 4,428   | 0.021   |
| 2011  | 52,438     | 0.014   | 1,426   | 0.307   | 46,096  | 0.004   | 4,916   | 0.022   |
| 2012  | 54,711     | 0.014   | 1,422   | 0.306   | 48,285  | 0.004   | 5,004   | 0.022   |
| 2013  | 56,813     | 0.013   | 1,375   | 0.300   | 50,077  | 0.004   | 5,361   | 0.023   |
| 2014  | 60,626     | 0.055   | 1,344   | 0.298   | 53,446  | 0.051   | 5,836   | 0.042   |
| 2015  | 64,846     | 0.055   | 1,349   | 0.300   | 57,175  | 0.050   | 6,322   | 0.044   |
| 2016  | 71,431     | 0.043   | 1,281   | 0.295   | 63,120  | 0.039   | 7,030   | 0.040   |
| 2017  | 79,565     | 0.037   | 1,311   | 0.281   | 70,511  | 0.033   | 7,743   | 0.035   |
| Total | 714,221    | 0.029   | 25,107  | 0.260   | 617,310 | 0.020   | 71,804  | 0.026   |

*Notes:* The sample of enterprises is those operating in manufacturing in their first year in the dataset. Ownership is based on the enterprise's reported ownership in its first year in the dataset.

business (we refer to these as informal household businesses). As discussed in section 3, not all private domestic firms are required to register to operate. Consequently, some of the entry into the enterprise sector could reflect formalization.

How much is this an issue in our data? Importantly, this does not influence the definition of entry for FDIs and SOEs because all FDIs and SOEs are required to register as an enterprise. Formalization among informal businesses in Vietnam, like in other countries, is rare. Using a panel dataset on informal businesses, McCaig and Pavcnik (2021) find only 1.5 to 2% of informal businesses formalized in the period 2006-08 to 2016-18 conditional on survival between successive surveys (two years apart). Using the same dataset, formalization among manufacturing businesses varied between 0.8 and 1.5%. To the extent that some of the private entry is driven by formalization of previously informal firms, this changes the interpretation of entry to entail newly created domestic enterprises and newly registered firms that previously operated as a non-registered (i.e. informal) business. Both of these concepts are of interest as there is a large literature in development economics that examines the determinants of formalization or creation of formal jobs.

The annual enterprise data does not provide information on whether a private domestic business previously operated as an informal business. We rely on other evidence to evaluate this option for interpretation of entry for private domestic firms.

First, Malesky and Taussig (2009) find that most newly registered private enterprises spent very little time in the informal sector. They examine the likelihood of a registered private domestic enterprise having started as an informal business using a survey conducted as part of the 2007 Provincial Competitiveness Index survey.<sup>58</sup> 40% of the firms report starting directly in the registered sector. While they find that around 60% of the surveyed private enterprises started as an informal business, most newly registered private enterprises that started as informal spend very little time in informality. In particular, firms established in 2000 spend on average 3 months in informality between establishment and registration, while the firms established in 2001 through 2006, spend 1 month or less.<sup>59</sup> Hence, this potentially reflects that these firms always planned to register, but that the process takes some time. This is not the pattern one would expect if most entry into the registered sector would reflect formalization of established informal businesses. Additional estimates are available from the 2009 and 2015 World Bank Enterprise Surveys for Vietnam. Among private manufacturing firms that registered in 2001 or later, 16% reported starting as an informal business.

Second, we examine whether the entry date for a private domestic entrant (as defined above) corresponds to the date at which a firm started operating. This gives us another indication of what share of private domestic firms start directly in the enterprise sector, as the overlap or proximity of those dates suggest that the firm started operating as a registered firm. For some of the years in the annual enterprise survey, we can compare the entry year (as computed above) to a reported start year of the firm.<sup>60</sup> We find that 58% of private domestic entrants report starting the same start year as the year of entry. Data inspection suggests that the GSO may in some cases miss the entry year by one year due to delays in the GSO updating its list of enterprises through communication with the tax office (i.e. the newly established firm is first being surveyed during its first full calendar year of operation instead of during the first calendar year in which it operates). One potential correction is to address entrants that report positive start of year employment in the first year that they appear in the enterprise dataset and simultaneously report starting prior to the year of entry. This data pattern may be consistent with the enterprise beginning operations

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<sup>58</sup>This survey uses registered firms as the sampling framework.

<sup>59</sup>Note that this is for businesses in all sectors, not just manufacturing.

<sup>60</sup>Information on the start year is available in 2002, 2005, 2007-10, 2012-13, and 2017.

in the previous year. In these instances, we can take start of year employment in entry year  $t$  as an estimate of end of year employment in year  $t - 1$  and define year  $t - 1$  as the enterprise's start year. With this adjustment, 70% of private domestic enterprises report the same starting year of operation as the adjusted entry year.

Overall, this discussion suggests that most of the private domestic firms in the enterprise sector did not start as informal firms and that some of those that did were only shortly in the informal sector (1 to 3 months). This is not the pattern one would expect if most entry into the registered sector would reflect formalization of established informal businesses.

## A.6 Mean and median employment entry size

In this section, we provide further details on employment entry size by ownership and make comparisons to entry employment sizes of private domestic firms from other datasets within Vietnam and from other countries.

Median entry size of private domestic enterprises was 15 in 2001 and dropped to about 5 later in the sample. Mean entry size was 45 at the start of the sample, dropping to 15 by the end. Note that these sizes are substantially smaller than entry size of FDI and SOE entrants, with median entry size of around 200 and 50, respectively.

Based on the discussion in section A.5, the private entrants may be influenced by businesses that are registering as an enterprise after initially spending time as an informal business. We check how much this might influence employment size at entry by restricting the sample of entrants to those that report the exact same start year as the first year that the enterprise first appears in the enterprise data. The mean and median employment for private entrants restricted to those that report starting in the same year as they first appear in the enterprise data is very similar.

We also provide evidence on employment at entry in private enterprises for Vietnam and Bangladesh, Cambodia, China, and Indonesia using data from the World Bank Enterprise Surveys in Table A2. The estimates show two things. First, the estimates for Vietnam are comparable to our estimates derived from the Vietnamese enterprise data, albeit larger in the WBES data. Second, the WBES estimates for Vietnam are similar to those for other nearby countries that similarly have a large number of export-oriented firms in manufacturing.

Lastly, for comparison purposes, we provide estimates of employment at entry for China and Indonesia from their firm data for private domestic firms. Estimates provided by Krisztina Kis-Katos suggest that the average employment at entry for private entrants in Indonesia's formal

Table A2: Employment at entry for private firms

| Country    | No. obs. | Mean | Median |
|------------|----------|------|--------|
| Bangladesh | 739      | 106  | 20     |
| Cambodia   | 173      | 40   | 5      |
| China      | 1255     | 34   | 11     |
| Indonesia  | 687      | 26   | 8      |
| Vietnam    | 1003     | 44   | 14     |

*Note:* The estimates are from various World Bank Enterprise Surveys: 2013 for Bangladesh, 2007, 2013 and 2016 for Cambodia, 2012 for China, 2015 for Indonesia, and for 2009 and 2015 for Vietnam.

manufacturing sector varied over the period 2002 to 2014 from a low of 54 to a high of 271 workers on average. Note that the Indonesian manufacturing survey has an employment cutoff of 20 workers for inclusion in the survey. Estimates using Chinese data provided by Feicheng Wang suggest private sector manufacturing entrants had 32 workers on average (median 16) in the 2004 entry cohort covered by the 2004 economic census. Estimates from the industrial survey, which has a minimum capital threshold of 5 million RMB for inclusion, suggest mean employment at entry varied from 96 to 198 workers across the 1998 through 2007 entry cohorts.

## B Appendix

### B.1 Additional Background

We provide further background information including (i) Vietnam’s major export markets and industries, (ii) the importance of foreign firms for exports and the intensity of exporting among exporting foreign firms, (iii) other trade policy changes during the same period as the BTA, (iv) and the Vietnamese government’s reform policy on state-owned firms.

#### B.1.1 Overall patterns of exports

This section overviews Vietnam’s major export markets and industries, in addition to further highlighting the quick ascent of the US as a key destination for Vietnam’s manufacturing exports in the aftermath of the BTA. This discussion informs our choices of the falsification and specification checks to rule out spurious correlation between industry-specific BTA tariff cuts and industry-specific demand or supply shocks.

Figure B1a reports the share of Vietnam’s manufacturing exports by major markets, which in total account for 74 to 84% of Vietnam’s manufacturing exports from 2000 to 2017. Several interesting facts emerge. First, prior to the BTA in 2000, Vietnam’s most important export markets for manufacturing were the EU, Japan, and ASEAN, accounting for 28%, 21%, and 15% of total manufacturing exports respectively.<sup>61</sup> The US accounted for only 5% of Vietnam’s manufacturing exports in 2000. Second, after the implementation of the BTA in 2001, the US rapidly increased in importance to 24% of Vietnam’s manufacturing exports by 2003, overcoming the EU in 2005 to become the leading export market for the rest of the sample period. This rise in relative importance of the US as an export destination occurred during a period of overall export expansion, as indicated in Figures B1b and B1c. Figure B1b highlights the disproportionate expansion of exports to the US in the short to medium run aftermath of the BTA, in comparison to other high-income export markets such as the EU or countries that are major source of FDI (Japan, South Korea). Figure B1c, which reports absolute exports by major destinations from 2000 to 2017, highlights the key role of the US as an export destination throughout our sample period. Third, for most of our sample period, China is substantially smaller export destination than the US, EU and Japan, especially from 2000 to 2010. China only accounted for less than 5%

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<sup>61</sup>We use the EU15 for a consistent definition of EU countries before and after the BTA. ASEAN consists of Brunei, Cambodia, Indonesia, Lao, Malaysia, Myanmar, Philippines, Singapore, and Thailand.

of Vietnamese exports until 2010, passing 10% share in 2016, then quickly increasing its presence to the third largest export destination between 2016 and 2017.

The information on major trading partners, along with the information on the sources of FDI, informs our falsification and robustness analysis discussed in Section 4.<sup>62</sup> Those results show that first-order effects of the BTA on Vietnam’s exports to the US are not driven by spurious correlation of industry-specific BTA tariff cuts and potential contemporaneous supply and demand shocks affecting Vietnamese industries in world markets. As we discuss in detail in section 4.2, we find no statistically significant correlation of industry-specific BTA-tariff cuts with trade flows to the EU, nor major export markets in East Asia that also serve as sources of FDI to Vietnam (Japan, South Korea, Hong Kong, and China) prior to the implementation of the agreement, nor in the immediate aftermath of the agreement (Figures 7a and 7b).<sup>63</sup> These results provide further evidence that our results are not driven by spurious correlation of industry-specific supply and demand shocks with BTA-induced tariff changes prior to or right after the agreement’s implementation.

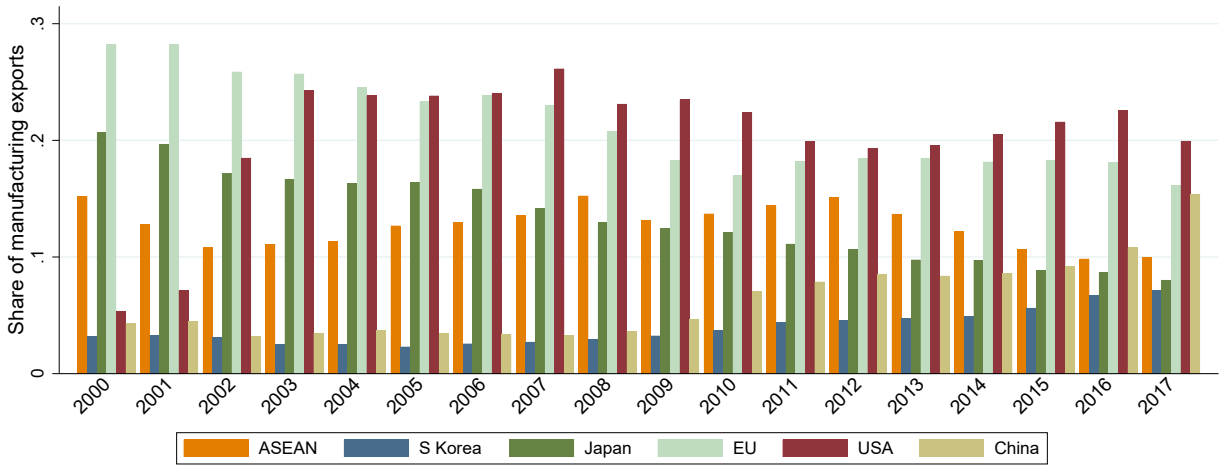
Our main findings on the effects of BTA-induced tariff cuts on U.S. exports are not driven by a particular industry. Figure B2 reports the share of Vietnam’s manufacturing exports by two-digit industry. To begin with, in 2000, Vietnam’s manufacturing exports were concentrated in food and beverages (27.0%), garments (19.2%), and footwear (18.6%). The composition of exports by industry changed between 2000 and 2017. By 2017, each of these three industries had become less important (7.7, 10.0, and 9.4% respectively) while communications equipment (e.g., smartphones), 23.5%, and machinery and equipment, 10.2%, became relatively more important. Hence, the growth in manufacturing exports during this period is not simply a story of textiles, garments, and footwear. In addition, we conduct further specification checks to rule out that our results are not driven by industry-specific demand or supply shocks in industries that accounted for a large share of employment or exports in early 2000. In particular, our estimates of the effects of the BTA on U.S. trade flow in Figure 6 are not sensitive to one-by-one exclusion of 3-digit industries. We estimate equation (1), excluding a 3-digit industry one by one and reporting the coefficients on tariff change  $\beta_{it}$  for 2006 and 2016 in Panels (a) and (b) of Figure C7 (the omitted industries on the x-axis are ordered by total Vietnam exports to the world in 2000). The reported coefficients always include the overall baseline estimate within its confidence intervals and are similar in magnitude. Same applies for our findings on the effect of BTA on FDI entry

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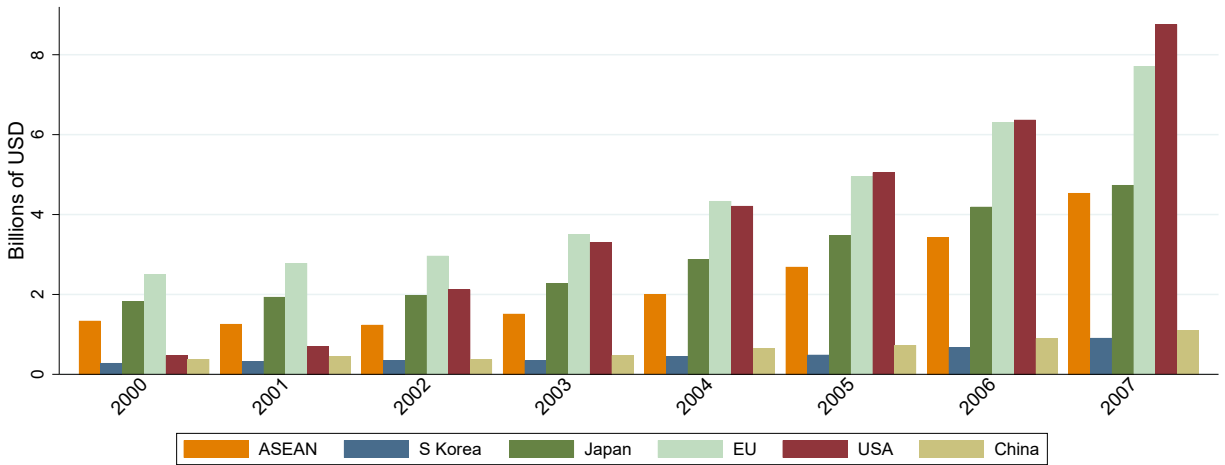
<sup>62</sup>There is only limited availability of industry-level Vietnam-ASEAN bilateral trade flows prior to 2001.

<sup>63</sup>Taiwan, while a major source of FDI capital to Vietnam is not an important export destination. According to Vietnam Customs Handbook (2017), it accounts for 1.2% percent of exports in 2017).

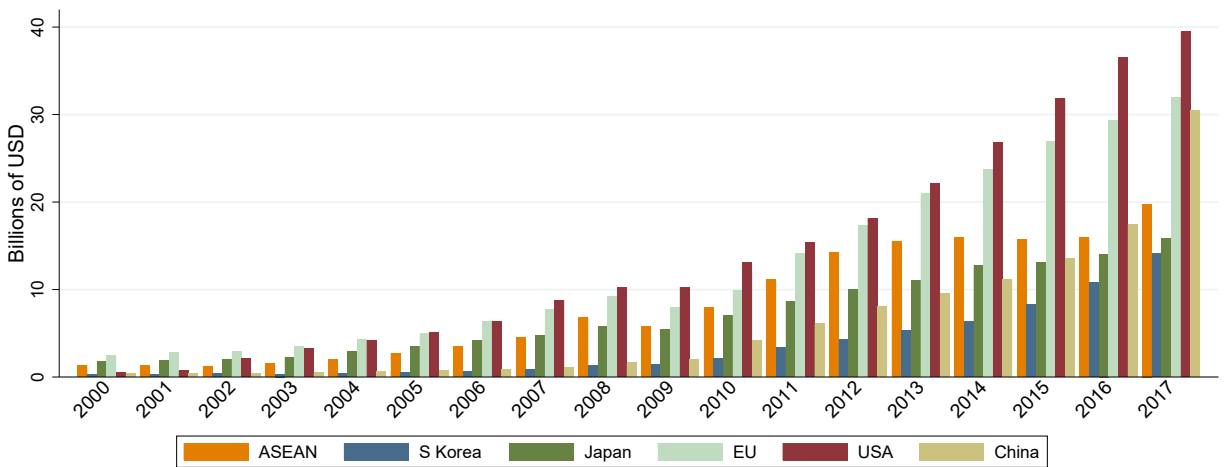
(and employment share). In addition, we show that the effects of BTA-induced tariffs on exports to the U.S. are robust to industry aggregation to two-digit ISIC and disaggregation to four-digit ISIC. We estimate equation (1), at the two-digit and four-digit industry level and report the coefficients on tariff change  $\beta_{t'}$  in Panels (a) and (b) respectively in Figure C6. Tariff cuts are associated with increased exports after the implementation of the BTA at the 2- and 4-digit ISIC level, confirming the main results at the 3-digit level in Figure 6.



(a) Share



(b) Value, 2000 to 2007



(c) Value, 2000 to 2017

Figure B1: Vietnam's manufacturing exports by major market

*Note:* The data is from UN Comtrade and is based on Vietnam's reported exports at the 6-digit HS level. The HS data was converted to 4-digit ISIC industries using concordances from World Integrated Trade Solutions (WITS) and manufacturing is based on ISIC nomenclature.

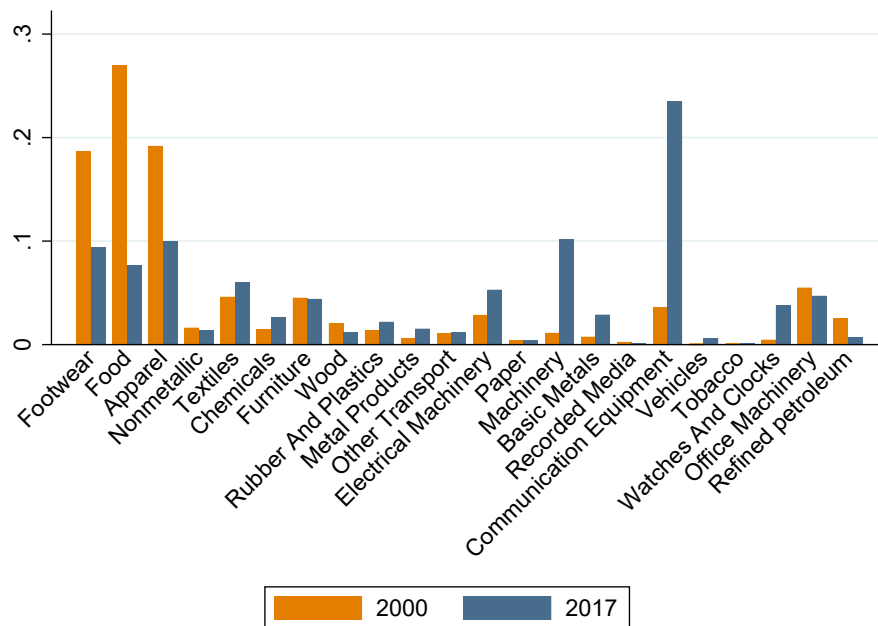


Figure B2: Share of Vietnam's manufacturing exports by industry

*Note:* The data is from UN Comtrade and is based on Vietnam's reported exports at the 6-digit HS level. The HS data was converted to 4-digit ISIC industries using concordances from World Integrated Trade Solutions (WITS) and manufacturing is based on ISIC nomenclature. The reported industries are based on 2-digit ISIC revision 3. Industries are sorted by total employment in 2000 (largest on the left and smallest on the right).

### B.1.2 Firm-level exports: Importance of foreign firms for exports

In this section, we provide further evidence on the importance of foreign firms for manufacturing exports in Vietnam. Foreign-invested firms have been important producers of exports and their importance has grown during our sample. According to Vietnam Customs Handbook (2017), foreign enterprises accounted for 22.9% of total exports in 2000, their share grew rapidly to 33.3% in 2004, three years after the BTA, and continued to grow to 70.9% by 2017. Our analysis below, which focuses on manufacturing exporting, consistently finds that foreign firms tend to be more engaged in exporting than SOEs and private firms, that conditional on exporting foreign firms are more intensive in exporting, and that foreign entrants are more likely to start exporting within a year of the start of their operation than private domestic firms. We also provide further evidence that the U.S. is a key export destination for foreign and private domestic firms alike.

First, foreign firms are more likely to export than SOEs or private domestic firms. Figure B3 reports the share of firms that export (by ownership category) using firm-level information from the annual enterprise surveys.<sup>64</sup> 65-75% of foreign firms are involved in exporting, as compared to 30% of state firms and 5-20% of private firms. The importance of export participation among foreign firms is even more pronounced when taking into account the larger size of exporters than non-exporters. In 2002, 93.3% of workers in foreign firms were in exporting firms as compared to 62.6% in private and 60.8% in state. By 2013, this had remained relative unchanged for foreign (89.7%) and state (62.3%) but had fallen considerably to 41.0% for private.

Second, conditional on exporting, foreign firms tend to be more export intensive as measured by exports as a share of firm sales. This analysis is based on the information from the 2009 Vietnam Technology and Competitiveness Survey (VTCS), which surveyed a subsample of about 7,600 firms from the annual enterprise survey.<sup>65</sup> Consistent with the data from the enterprise survey foreign firms are more likely to export, with 72% of foreign enterprises reported exporting, as compared to 20% of private domestic firms. Figure B4 shows that conditional on exporting, many enterprises are intensive exporters. 66% of foreign firm exporters export at least 80% of their sales, as compared to 58% of private domestic firms. When weighted by employment these

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<sup>64</sup>The annual enterprise surveys include information on exporting in 2000, 2002, 2004, and 2010-2015. However, non-response is not uncommon. The years with the lowest non-response rates were 2002 (1.0% for foreign, 5.1% for private, and 7.6% for state) and 2013 (8.2% for foreign, 1.6% for private, and 9.6% for state).

<sup>65</sup>In addition to the regular enterprise questionnaire, we rely on additional questions from the VTCSs given in this additional questionnaire related to exporting and importing. The survey included 5,925 private and 1,714 foreign enterprises in manufacturing. These enterprises employed about 43% of all workers in private domestic manufacturing and 48% of all workers in foreign manufacturing. The enterprises included in the VTCS were larger on average than those that were not.

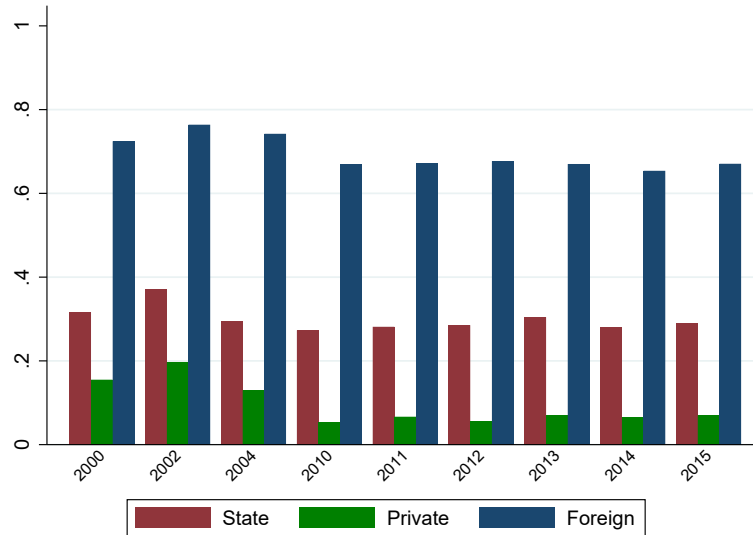
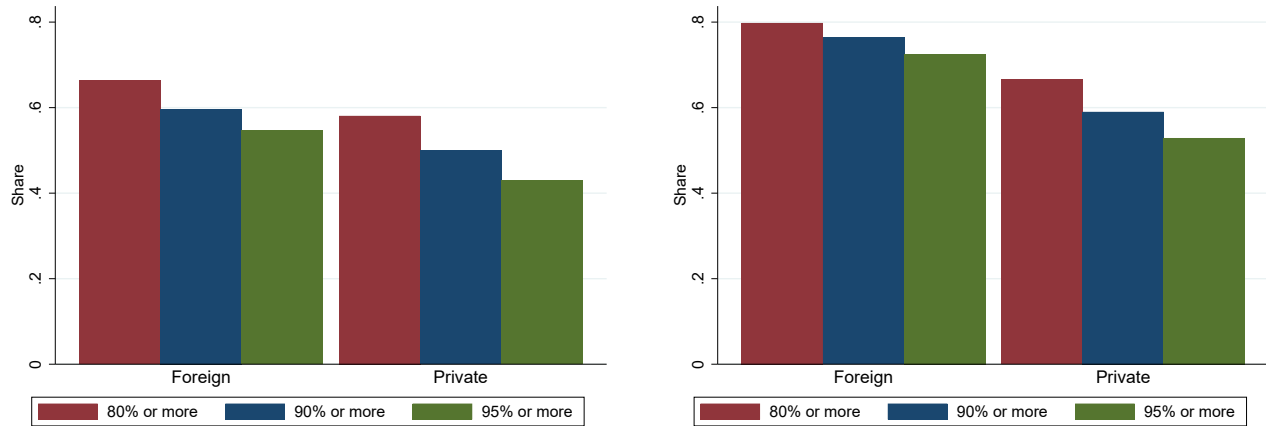


Figure B3: Share of firms that export

*Note:* We assume that firms that do not respond to the question about exporting are non-exporters. This may lead to an underestimate of the number of firms engaged in exporting. The years with the highest share of firms responding to the export participation questions are 2002, 2004, 2013, and 2015.

increase to 80% and 67% for foreign and private domestic enterprises respectively.



(a) Unweighted

(b) Employment weighted

Figure B4: Share of enterprises by export to sales ratio, 2009

*Note:* The data is from the 2010 Vietnam Technology and Competitiveness Survey which was done in conjunction with the 2010 Vietnam enterprise survey and collected information for the 2009 calendar year. The category 80% or more includes firms in the other two categories and the category 90% or more includes firms in the 95% or more category.

Third, foreign exporters are much more likely to start exporting in the first year of their operation (and within one year of starting) than private domestic firms. To the extent that firms entered a market with the goal of exporting, one would expect them to start exporting soon after they start operating. The VTCS asks when did the enterprise begin exporting to its current top three export destinations. Hence, if the enterprise originally started exporting to a different

country than is in its current top three markets, we will not observe that start year. To overcome this issue, we focus on enterprises that reported starting operations in 2001 or later and report the share of exporters that starting exporting in the same year as their start year, within one year, and within two years. Figure B5 shows the results. Among foreign exporters, almost 60% were exporting in their first year of operation. This increases to 66% when weighting by employment. For private exporters, in contrast, a much lower share of enterprises were born with exporting, only 35 and 39% without and with weighting. Within one year of starting, over 85% of foreign exporters were exporting or 91% when weighted by employment. Hence, a very large share of these exporting enterprises, particularly foreign, began exporting very quickly.

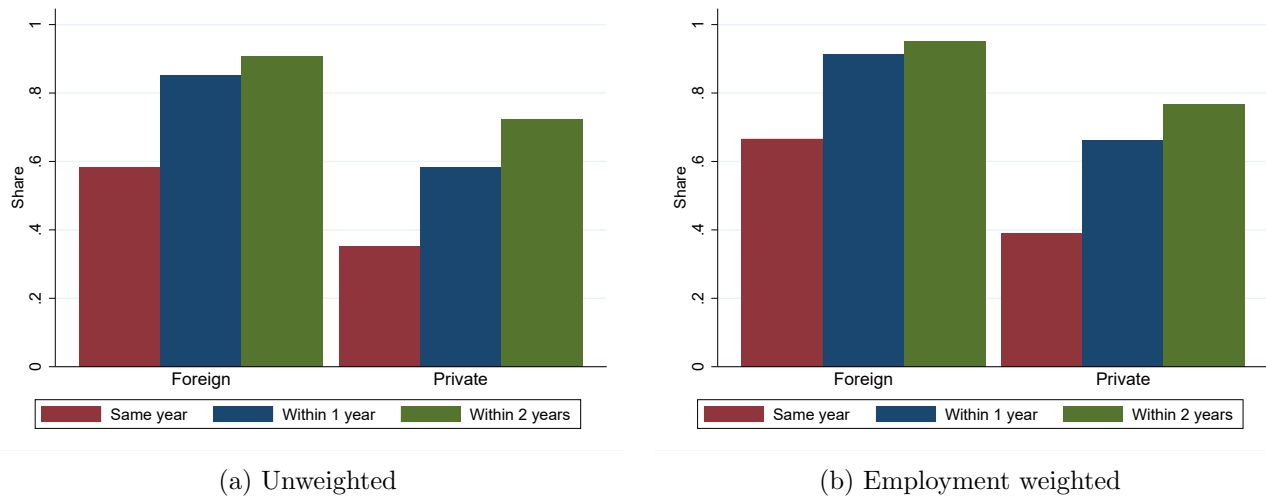


Figure B5: Year that exporting starts relative to start year

*Note:* The data is from the 2010 Vietnam Technology and Competitiveness Survey which was done in conjunction with the 2010 Vietnam enterprise survey and collected information for the 2009 calendar year. The category within 2 years includes firms in the other two categories and the category within 1 year includes firms in the same year category.

Finally, the survey confirms that the U.S. is a key export destination for foreign and private domestic firms. The VTCS asked exporters about their primary and secondary export market. 23% of foreign firms that export and 24% of private domestic firms that export list the US as either their primary or secondary export market. The importance of the U.S. as an export destination increases when weighted by employment, with 41% of workers in foreign firms and 38% of workers in private domestic firms that export working in a firm that reports the U.S. as a primary or second export market.

In summary, this analysis highlights that while the U.S. is a key export destination for foreign and private domestic exporters, foreign firms are more likely to export than private firms and foreign firms are exporting more intensively and begin exporting more immediately upon the start of the operations than private domestic firms. This highlights the importance of foreign firms for

exporting in Vietnam.

### B.1.3 Other significant changes in trade policy

In Section 4, we establish that industry-specific BTA tariff reductions are not correlated with pre-existing trends in trade flows and likely do not reflect spurious correlation with other industry demand or supply factors. Given the long period covered in our analysis after the implementation of the BTA, we briefly discuss some of the other changes in trade policy that occurred after the implementation of the BTA. We focus on episodes of export liberalization involving Vietnam’s most important trading partners and Vietnam’s import tariff changes. The analysis and discussion below highlights that the U.S. specific BTA tariff changes are substantially larger than tariff changes in other agreements (i.e. averaging a 30 percentage point drop in tariffs in a key export destination in one year relative to at most a 17 percentage point average import tariff decline in these trade agreements). Most importantly, while factors such as “future” trade policy changes can influence outcomes of interest, they would only potentially affect our results if they are spuriously correlated with industry-specific BTA tariff changes. The analysis below shows that industry-specific BTA changes are not correlated with “future” tariff changes with other trade partners. Importantly, our empirical work examines the cumulative annual effects of the U.S. tariff cuts with annual data covering a long period rather than simply relying on data at the start and end of our period, a period during which multiple agreements take place. To the extent that these agreements would be driving our results, we would expect them to influence the estimated coefficients at the time that these agreements come into effect. However, the magnitude of the effects of the BTA on U.S. exports is relatively large in the short to medium run aftermath of the BTA implementation, levels off thereafter, and we do not observe discrete increases in the magnitude of the coefficients when the other agreements are implemented.

**Changes in foreign market access:** Figure B6 displays the average manufacturing tariffs faced by Vietnamese exports to the EU, Japan, and China, three of its other (potential) major export markets during this period. The tariffs applied by the EU and Japan were low throughout this period. In contrast, China’s tariffs applied against Vietnam fell due to a combination of reductions in its MFN tariffs following WTO accession and reductions negotiated as part of the ASEAN-China trade agreement.<sup>66</sup> As discussed in B.1.1, China’s share accounted for less than 5% of Vietnam’s exports up to 2010. Most importantly, Figure B7 demonstrates that Chinese tariff

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<sup>66</sup>The agreement came into force in July 2005.

reductions on Vietnam's exports between 2000 and 2011 are not significantly correlated with the US BTA tariff reductions, with a partial correlation of 0.060 (standard error 0.079).

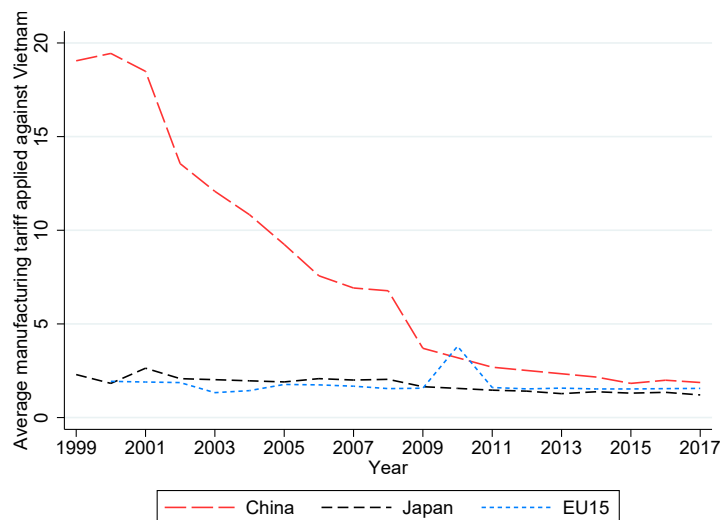


Figure B6: Average manufacturing tariff applied against Vietnam

*Note:* The average is a simple average over industry tariffs reported by 4-digit ISIC revision 3 industries. The industry tariffs were sourced from the World Integrated Trade Solution database and are themselves simple averages of the effectively applied HS product tariffs.

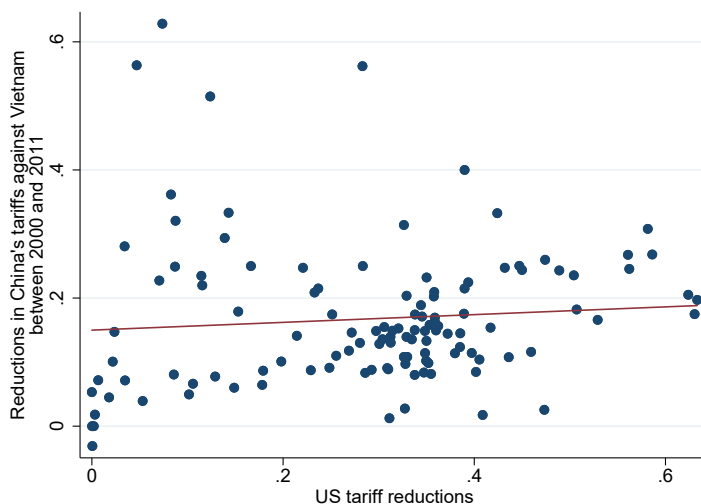


Figure B7: Reductions in Chinese tariffs against Vietnam versus US tariff reductions

*Note:* The data for Chinese tariffs is from World Integrated Trade Solutions. They were converted from 6-digit HS to 4-digit ISIC revision 3 industries using concordances from WITS. Each 4-digit industry tariff is a weighted average of 6-digit HS tariffs where the weights are total Chinese imports by 6-digit HS product. The change in Chinese tariffs applied against Vietnam is calculated as China's MFN tariff in 2000 minus China's tariffs applied against ASEAN members in 2011. The US tariff reduction is calculated as the Column 2 tariff minus the MFN tariff in 2001.

As Figure B6 shows, there was no significant change in the overall trade policy structure that Vietnam faced when exporting to the EU during this period. However, Vietnam's two largest export industries to the EU, footwear and clothing, faced anti-dumping duties and quantitative

quotas, respectively. From 2006 through 2011, the EU applied a 10% anti-dumping duty on footwear with leather uppers. For clothing and textiles, from 1 January 1993 through to 31 December 2004, Vietnamese exports to the EU were subject to quantitative restrictions. These quantitative restrictions were removed as of 1 January 2005 due to the 2004 bilateral agreement between Vietnam and the EU as part of Vietnam's WTO accession negotiations.<sup>67</sup> As discussed and indicated in Panels (a) and (b) of Figure C7 our main findings are quantitatively similar when we exclude the industries most heavily affected by changes in EU trade policy.

**Domestic import tariff liberalization:** Figure B8 shows the average manufacturing import tariff applied by Vietnam to ASEAN members, China, Japan, and the overall MFN tariff rate. To begin with, these are tariffs that influence imports arriving to Vietnam rather than export market access. With the exception of import tariff reductions against ASEAN members, import tariff declines occur after 2006, several years after negotiation and implementation of the BTA. For example, WTO mandated import tariff reductions begin in 2007 and are largely completed by 2013. Liberalization with China begins in 2007 and extends to about 2015. Tariffs on imports from Japan start to fall relative to MFN rates in 2012.<sup>68</sup>

These additional agreements would potentially confound the effect of the BTA only if they were correlated with BTA-induced industry tariff cuts. This is not the case. Figure B9 shows Vietnam's various import tariff reductions against the BTA-mandated US tariff reductions. The US tariff reductions are not correlated with the changes in Vietnam's import tariffs during this time. The partial correlations are small in magnitude and statistically insignificant. They are 0.04 for Vietnam's MFN import tariff changes between 2013 and 2006, 0.05 for changes in import tariffs with ASEAN (2006-2001), 0.17 for import tariff changes against China as part of ASEAN (2015-2006), and 0.07 for import tariff changes facing Japan (2017-2012).

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<sup>67</sup>The product categories covered by the export restrictions included yarns; woven fabrics; knitted or crocheted fabrics; knitted or crocheted clothing and clothing accessories; clothing and clothing accessories, not knitted or crocheted; and other made-up textile goods.

<sup>68</sup>Vietnam became a member of ASEAN in July 1995. As part of ASEAN's Common Effective Preferential Tariff scheme for the ASEAN Free Trade Area, Vietnam began reducing tariffs applied to ASEAN members. As a member of ASEAN, Vietnam became a member of two subsequent trade agreements between ASEAN and China and ASEAN and Japan. ASEAN also signed important trade agreements with India and South Korea. However, we focus the discussion on Vietnam's most important trading partners.

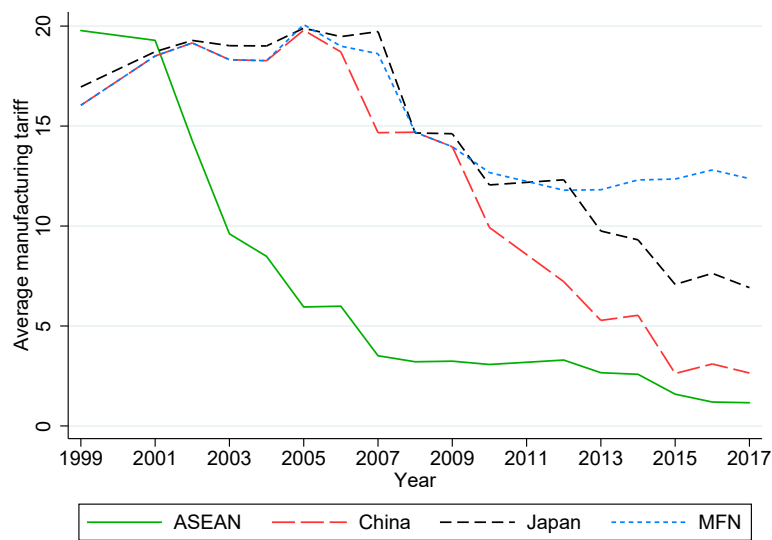
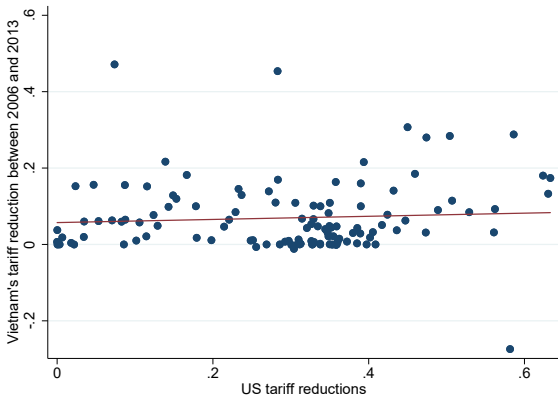
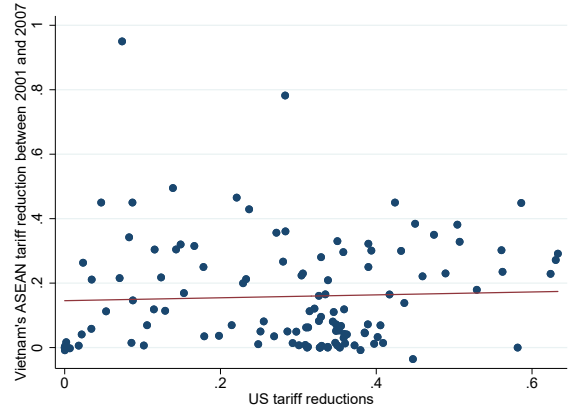


Figure B8: Vietnam's average manufacturing tariff

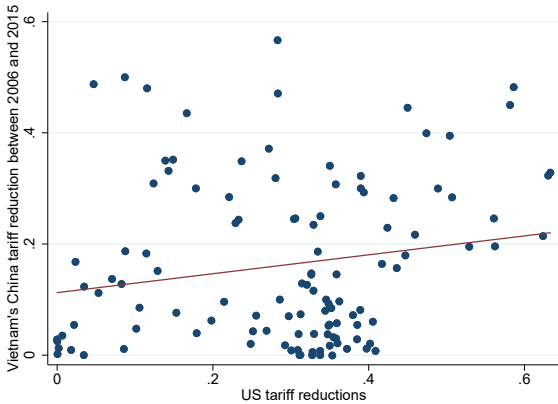
*Note:* The average is a simple average over industry tariffs reported by 4-digit ISIC revision 3 industries. The industry tariffs were sourced from World Integrated Trade Solution database and are themselves simple averages of the effectively applied HS product tariffs.



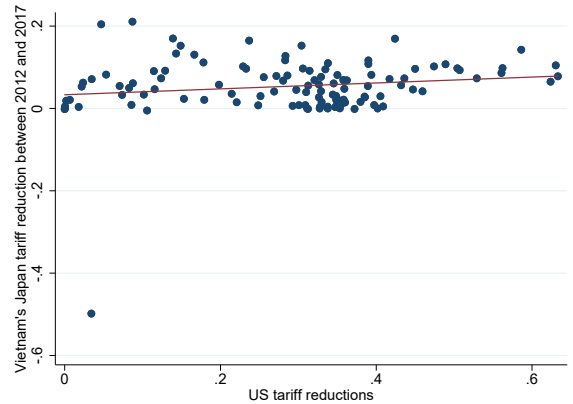
(a) MFN



(b) ASEAN



(c) China



(d) Japan

Figure B9: Vietnam's tariff reductions for various trade partners versus BTA-mandated US tariff reductions

*Note:* The data for Vietnam's tariffs is from World Integrated Trade Solutions. They are effectively applied rates by trading partner by 4-digit ISIC revision 3 industry. The change in Vietnam's tariffs applied against each trading partner is calculated as the tariff in the earlier year minus the tariff in the later year. The US tariff reduction is calculated as the Column 2 tariff minus the MFN tariff in 2001.

#### B.1.4 State-owned enterprises prior to the BTA

This section briefly summarizes reforms of SOEs prior to the BTA. It highlights that these reforms were not systematically industry-specific and thus unlikely spuriously correlated with the industry-specific BTA induced tariff cuts, which occurred by a move of Vietnam between two pre-existing U.S. tariff schedules.

The SOE reforms were initiated by *Doi Moi* in 1986 and their pace has been gradual. Reforms throughout the late 1980s and 1990s were centred around improving the incentives faced by SOEs. These included the introduction of a profit-based accounting system, shifting from a quantity to profit targets, providing managers with greater autonomy over inputs and prices, the elimination of direct subsidies, allowing SOEs to form joint ventures, and removing restrictions on importing and exporting rights (Van Arkadie and Mallon, 2004). In addition, in the early 1990s, many locally owned, small SOEs were rapidly liquidated or merged, followed by little such activity for the rest of the 1990s. Despite the reforms, liquidations, and mergers in the 1990s, remaining SOEs were less efficient than non-state enterprises and a process of equitization, divestment, and mergers and acquisitions picked up paced in the early 2000s (Mishra, 2011).

Table B1 reports the number of manufacturing SOEs operating in Vietnam in several years prior to the BTA.<sup>69</sup> The number of SOEs within manufacturing fell slowly, with the decline largely due to a reduction in the number of local SOEs and the number of central SOEs remained essentially unchanged.<sup>70</sup>

Our empirical analysis, which examines the effects of trade policy on the SOEs, takes place in a setting that starts off with a larger SOE share of manufacturing employment than in related work on international trade and politically connected firms (see Khandelwal, Schott and Wei (2013), Brandt et al. (2017), Baccini, Impullitti and Malesky (2019)). The SOEs account for 45% of formal manufacturing employment at the start of our sample, as compared to 12.5 to 24% in related work. At that time, SOEs operated across almost all 4-digit industries, as shown in panel (b) of Figure C4, which depicts the share of SOE employment in an industry against the industry-specific BTA tariff cut. Importantly, as discussed in section 2.1, we find no statistically significant relationship between pre-BTA industry employment share of SOEs and industry-specific tariff cuts. The lack

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<sup>69</sup>The data reported in Table B1 comes from a series of annual statistical yearbooks published by the General Statistical Office of Vietnam. The yearbooks contain some outcomes of interest at the 2-digit industry level, which we have digitized and use in pre-BTA analysis.

<sup>70</sup>Vietnam has two broad categories of SOEs, those owned by the national or central government and those owned by local (typically provincial) governments.

of correlation is not surprising given that, while military leaders, a strong force in Vietnamese politics, were opposed to the BTA, fearing the consequences for the military’s commercial interests in telecommunications and other sectors largely outside manufacturing (Manyin, 2001), they could not have influenced industry-specific tariff cuts within manufacturing. The tariff cuts reflect tariff changes due to the U.S. moving Vietnam from one pre-existing tariff schedule to another.

Table B1: Number of manufacturing enterprises, 1997 to 2001

| Ownership    | 1997 | 1998 | 1999 | 2000 | 2001 |
|--------------|------|------|------|------|------|
| Foreign      | 654  | 865  | 940  | 1048 | 1425 |
| SOEs         | 1645 | 1619 | 1581 | 1429 | 1340 |
| Central SOEs | 506  | 520  | 523  | 483  | 505  |
| Local SOEs   | 1139 | 1099 | 1058 | 916  | 835  |

*Source:* Various annual statistical yearbooks produced by the General Statistical Office of Vietnam

## B.2 Pre-BTA Industry Trends and BTA tariff cuts

In this section we examine whether BTA-tariff cuts are spuriously correlated with industry trends prior to the implementation of the BTA. The annual enterprise surveys, which we use in our main analysis, become available in 2000. Consequently, our pre-trend analysis relies on industry-level (and industry-firm ownership) data at the 2-digit industry level collected from a series of annual statistical yearbooks published by the General Statistics Office of Vietnam (2006) and summary tables from the 1998 Industrial Census provided by the GSO.<sup>71</sup> Our analysis consistently shows that industry-level trends and industry-ownership trends leading up to the implementation of the BTA were not correlated with the subsequent US tariff reductions.

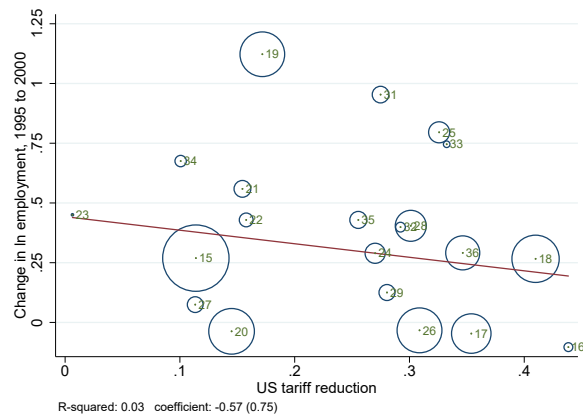
### B.2.1 Industry employment changes prior to the BTA and BTA tariff cuts

We first examine whether changes in industry employment prior to the BTA are related to the subsequent US tariff reductions. Information on employment by 2-digit manufacturing industry is available starting in 1995 from a series of annual statistical yearbooks published by the GSO which we digitized. In Figure B10 we plot the change in  $\ln$  employment within an industry (calculated as  $\ln$  employment in 2000 -  $\ln$  employment in year  $t$ ) versus the U.S. tariff reduction (calculated the same way as in the main text). We provide a line of best fit and weight the line of best fit using industry employment in 2000, as we do in our main specifications. The bubble size represents the

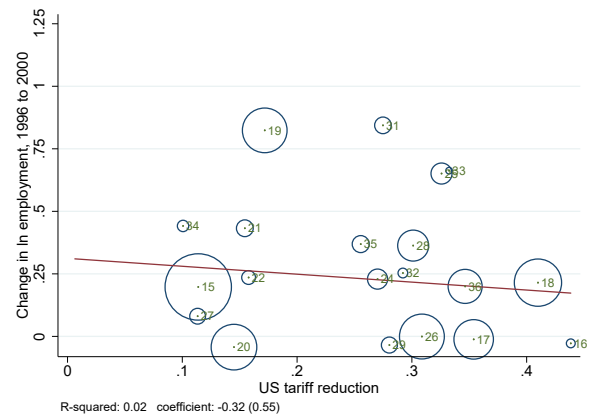
<sup>71</sup>The micro data from the 1998 Industrial Census is not available.

relative weight of the industry. All five scatterplots demonstrate that the U.S. tariff reductions explain little of the variation in change in industry employment prior to the BTA and that the partial correlation is very close to 0.

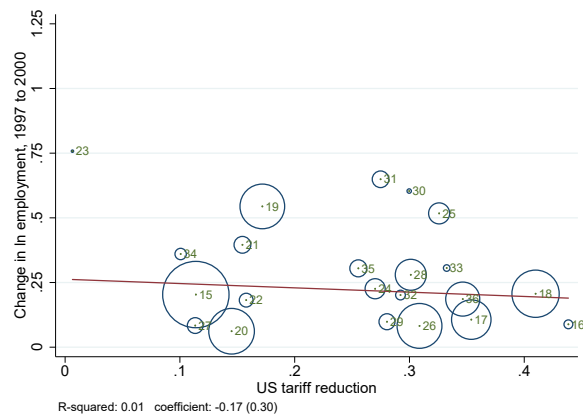
For comparison purposes, we perform the same analysis at the two-digit industry level between 2000 and year  $t$  for years 2001 through 2004. Figure [B11](#) shows that after the BTA, bigger tariff cuts are positively associated with changes in industry employment and the US tariff reductions becoming increasingly positively related as time passes. These results at the 2-digit level are consistent with the evidence on the relationship between tariffs and industry employment at the 4-digit level in the main text in panel (b) of Figure [8](#).



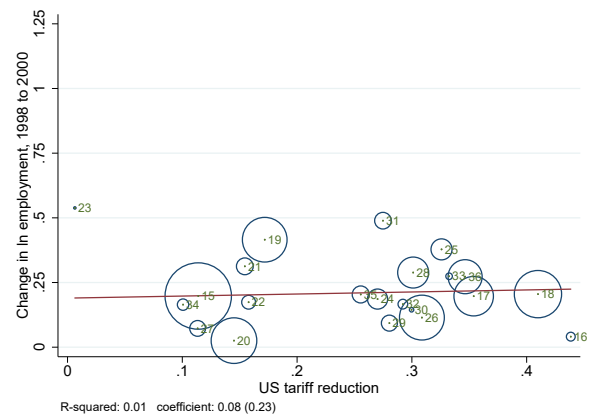
(a) 1995 to 2000



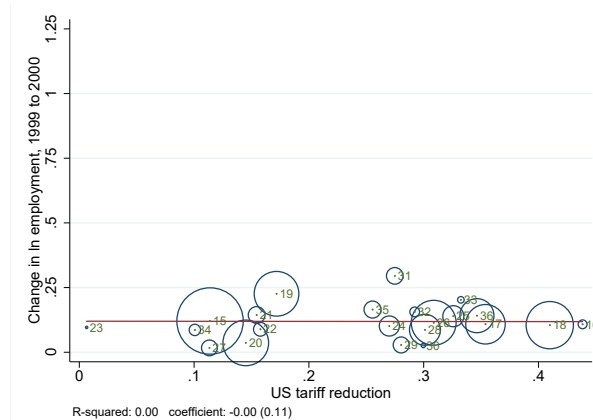
(b) 1996 to 2000



(c) 1997 to 2000



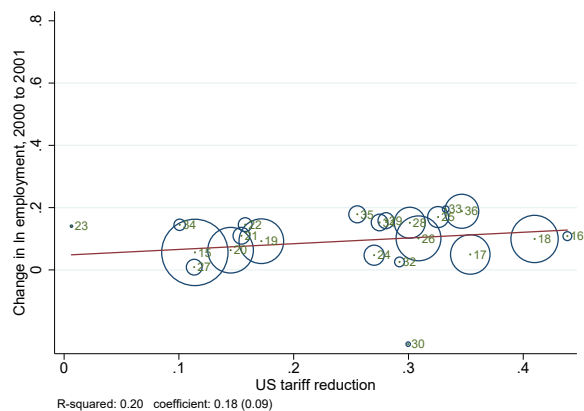
(d) 1998 to 2000



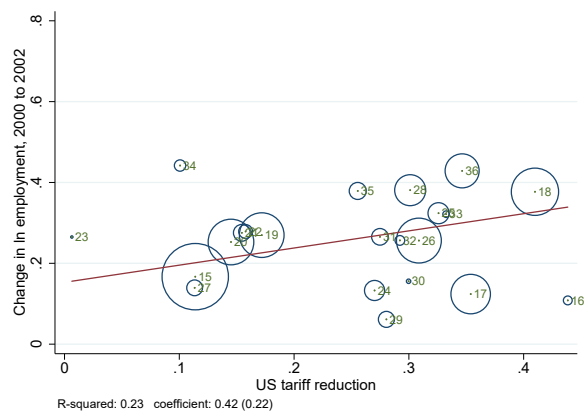
(e) 1999 to 2000

Figure B10: Change in industry employment prior to the BTA and BTA tariff cuts

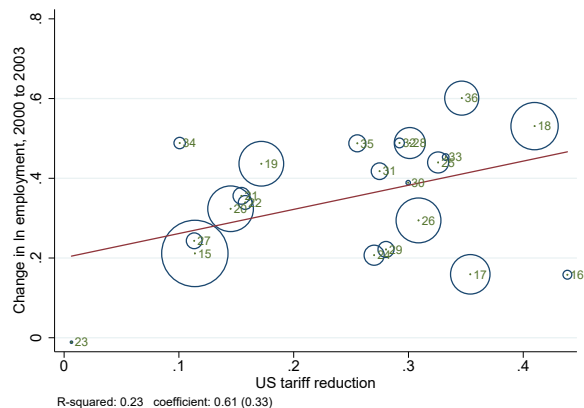
*Note:* The data on industry employment comes from various statistical yearbooks produced by the GSO and are available by 2-digit industry. The change in ln employment is calculated as ln employment in 2000 minus ln employment in the indicated year. The U.S. tariff reduction is calculated as  $\ln(1 + \text{Column 2}) - \ln(1 + \text{MFN})$ . The line of best fit is weighted by industry employment in 2000.



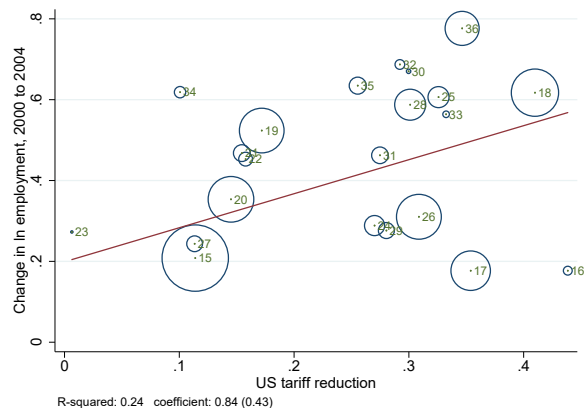
(a) 2000 to 2001



(b) 2000 to 2002



(c) 2000 to 2003



(d) 2000 to 2004

Figure B11: Change in industry employment immediately after the BTA and BTA tariff cuts

*Note:* The data on industry employment comes from various statistical yearbooks produced by the GSO and are available by 2-digit industry. The change in ln employment is calculated as ln employment in the indicated year minus ln employment in 2000. The U.S. tariff reduction is calculated as  $\ln(1 + \text{Column 2}) - \ln(1 + \text{MFN})$ . The line of best fit is weighted by industry employment in 2000.

### B.2.2 Industry employment changes by ownership prior to the BTA

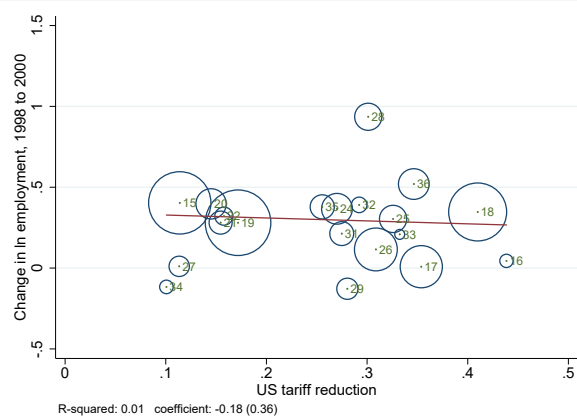
We next examine whether changes in industry employment by ownership prior to the BTA are related to the subsequent US tariff reductions. Industry level employment data disaggregated by firm ownership types is only available in 1998. This data is based on tables published from the 1998 Industrial Census and provided to us by the GSO. The ownership data is reported by three broad categories: state, private, and foreign.<sup>72</sup> We combine this data from 1998 with industry employment estimates from the firm data in 2000.

We begin the analysis by looking at changes in ln employment between 1998 and 2000 for each ownership. Figure B12 shows the results for state, private, and foreign. We see little evidence that the changes in ln employment between 1998 and 2000 are related to subsequent BTA tariff reductions for state and private. For employment in foreign, we find a statistically significant but negative relationship—the opposite direction of our results report post-BTA in section 4. This suggests that our post-BTA results for growth in employment in foreign may be an underestimate given the negative relationship between 1998 and 2000.

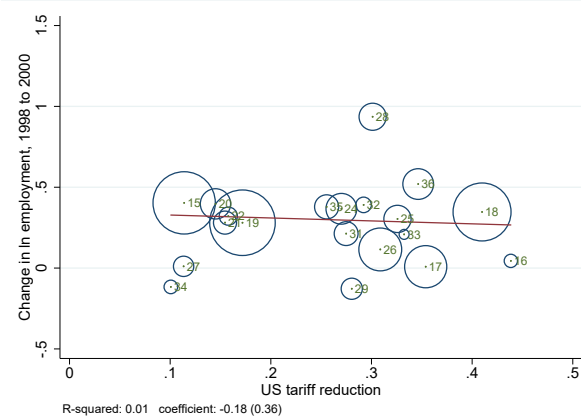
We also examine the changes in employment shares within industry by ownership, as in section 5. We plot the change in the within-industry employment share between 1998 and 2000 relative to the subsequent US tariff reduction. The within-industry employment share is calculated as employment in ownership  $o$  divided by total employment in the industry. The change is calculated as the 2000 share minus the 1998 share. The results, shown in Figure B13, consistently show no relationship between the US tariff reductions and changes in the within-industry ownership employment shares.

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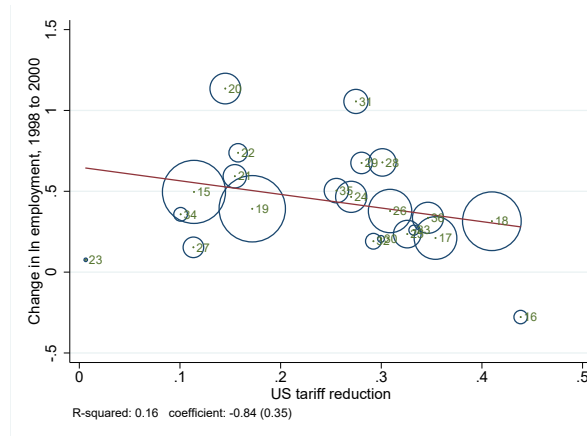
<sup>72</sup>These definitions match up very well with the ownership definitions from the annual enterprise survey we use in our main analysis. The only difference is that all joint stock companies, regardless of the state's ownership share, were defined as private for the purposes of these tables. Employment in joint stock companies represented only 2% of total employment in formal manufacturing in 1998. Hence, our inability to disaggregate joint stock companies by the state's ownership share is not likely to be very important. To be consistent in the definition of ownership across the two data sources, we employment the same broad ownership categories as in the 1998 Industrial Census.



(a) State



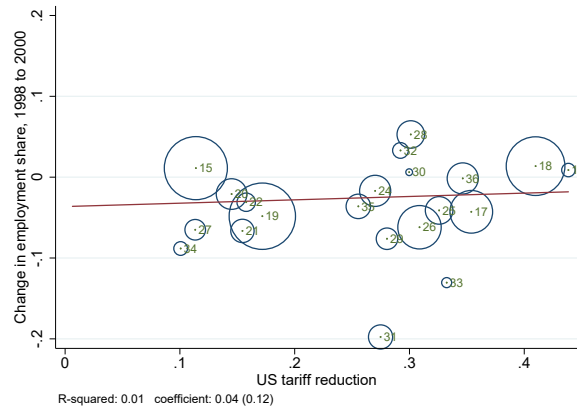
(b) Private



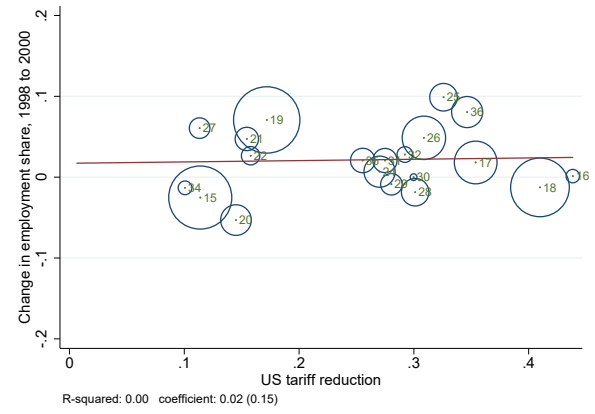
(c) Foreign

Figure B12: Change in industry employment by ownership prior to the BTA and BTA tariff reductions

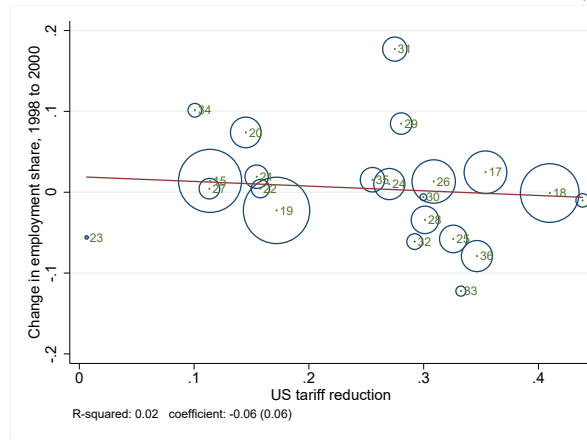
*Note:* The data on industry employment by ownership in 1998 comes from tables produced by the GSO from the 1998 Industrial Census and are available by 2-digit industry. Industry employment in 2000 is calculated from the 2000 enterprise survey. The vertical axis displays the change in ln employment for the indicated ownership which is calculated as ln employment in 2000 minus ln employment in 1998. The U.S. tariff reduction is calculated as  $\ln(1 + \text{Column 2}) - \ln(1 + \text{MFN})$ . The line of best fit is weighted by industry employment in 2000.



(a) State



(b) Private



(c) Foreign

Figure B13: Change in within-industry employment shares by ownership prior to the BTA (2000-1998) and BTA tariff reductions

*Note:* The data on industry employment by ownership in 1998 comes from tables produced by the GSO from the 1998 Industrial Census and are available by 2-digit industry. Industry employment in 2000 is calculated from the 2000 enterprise survey. The vertical axis displays the change in the within-industry employment share of the indicated ownership which is calculated as the ratio of employment in ownership  $o$  in industry  $j$  to total employment in industry  $j$  in 2000 minus the similar ratio for 1998. The U.S. tariff reduction is calculated as  $\ln(1 + \text{Column 2}) - \ln(1 + \text{MFN})$ . The line of best fit is weighted by industry employment in 2000.

### B.3 Robustness to alternative firm entry year

Our main definition of entry is consistent with the usual definition of entry in firm-level data sets (i.e. based on the panel nature of the data rather than a reported start date, which is less commonly available).

For some years of our data, the survey also reports the start of operations for a firm. As noted in Section A.5, there are some discrepancies in the reported start year and the first year the enterprise appears in the data. The discrepancy may be due to a number of issues. First, as discussed previously, for private enterprises it may be due to starting in the informal sector and then subsequently transitioning to the enterprise sector. However, this explanation is unique to private enterprise as both state and foreign firms are required to be registered as an enterprise. Hence, this explanation cannot explain why foreign and, in particular, state enterprises report a start year prior to appearing in the dataset. Second, it may be due to delays in the GSO updating its list of enterprises through communication with the tax office. Third, it may be due to confusion over how to respond to the question. This could apply in instances where an establishment decision or registration certificate was obtained prior to starting operations. Or it could be due to changes in ownership, most commonly privatization, within the enterprise over time.

Given that we are examining the cumulative effects of a policy that occurred at one point in time, it is unlikely that our results would be particularly sensitive to small changes in entry year. In addition, the above measurement error would need to be industry-specific and correlated with the tariff cuts. Nonetheless, we consider robustness of our main results reported in Figures 14, 15a, and 15b in section 5 to two alternative definitions of entry.

First, we use an adjusted year of entry in the following way. For some entrants, they report both positive start of year employment in the first year they appear in the dataset and they report a start year prior to the first year they appear in the dataset. For these enterprises that first appear in the dataset in year  $t$  we redefine their entry year as  $t - 1$  and use start of year employment in year  $t$  as an estimate of end of year employment in year  $t - 1$ . We then replicate the main results from section 5 using this dataset with adjusted years of entry and estimated end of year employment in the adjusted entry year. The results are shown in Figure B14 and are extremely similar to our main results.

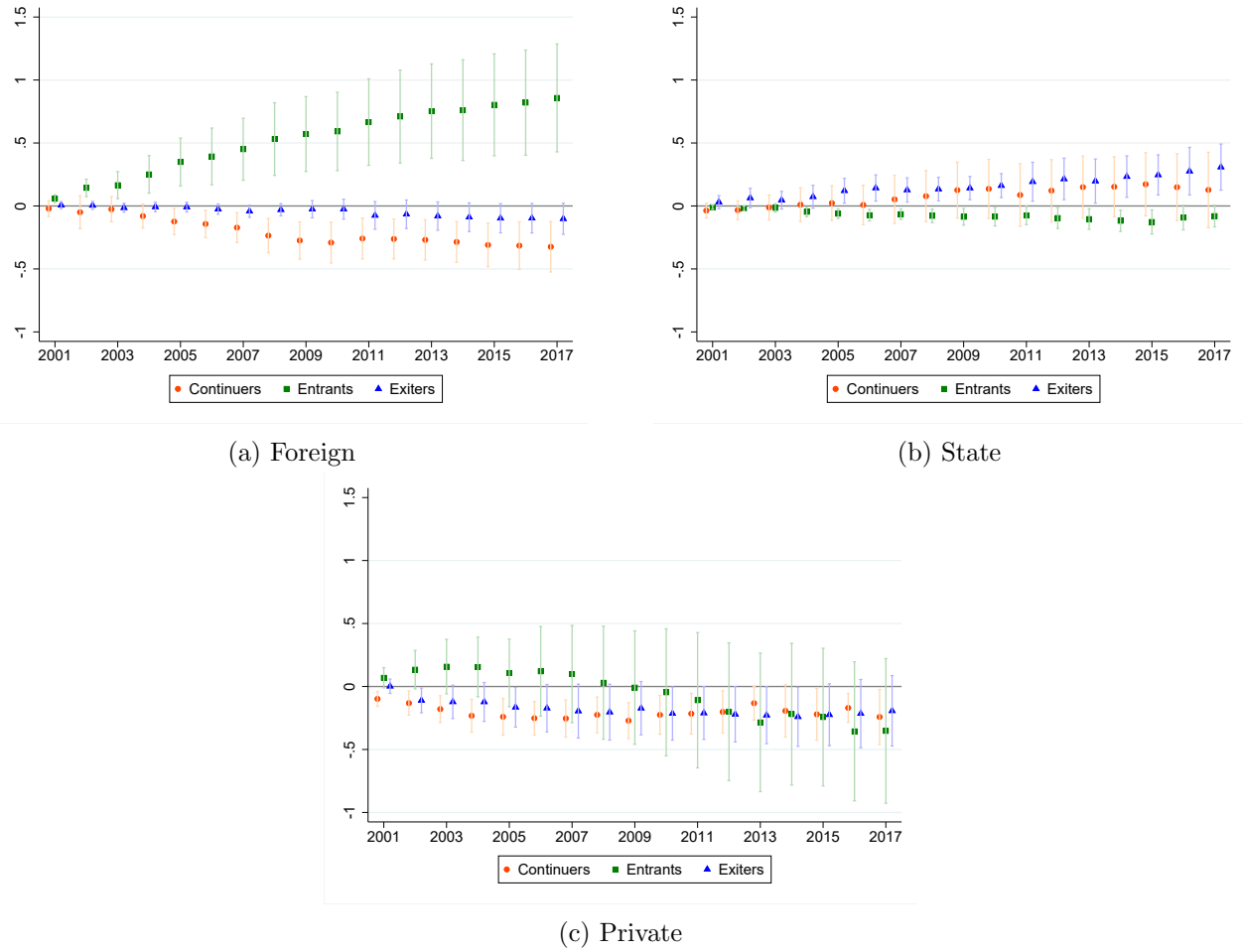
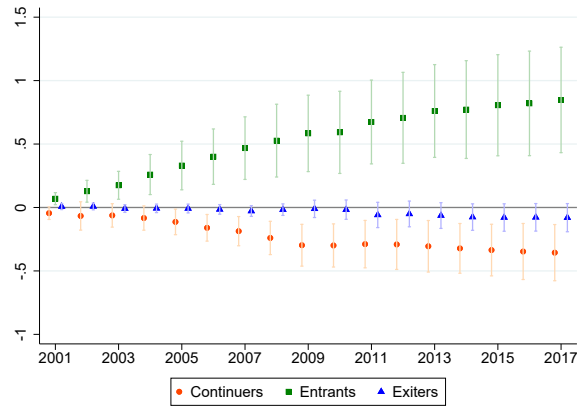


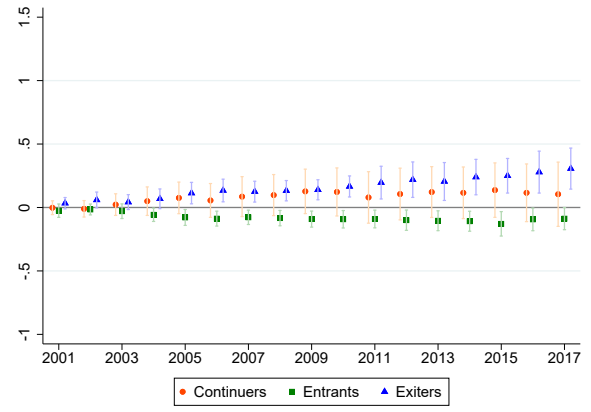
Figure B14: Change in within-industry employment shares by ownership post BTA using adjusted year of entry

*Note:* Each point reflects an individual regression coefficient,  $\beta_{ost}$ , following equation (2). The base year is 2000 and the observations are weighted by 2000 employment. Controls include the change in Vietnam's MFN tariffs due to WTO accession, the change in ln Chinese exports to the US in year  $t$  relative to 2000, and industry measures of US import quotas applied to Vietnamese and Chinese exports of textiles and clothing. For entrants that report positive employment at the start of the year in the first year we observe them in the dataset, we assign their start year as being one year earlier and their end of year employment in that year as equal to their start of year employment in the following year.

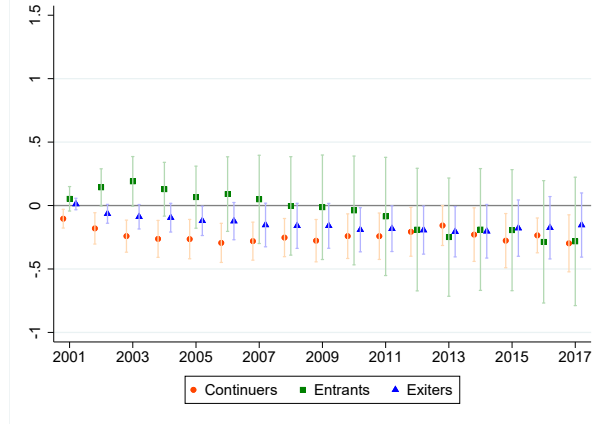
A second approach is to take the minimum reported start year as the actual entry year (i.e., assume there is no reporting error in the minimum reported start year). Since we do not observe employment for the enterprise prior to the year it enters the dataset, we use end of year employment in its first year in the dataset as an estimate for end of year employment for all years between measured entry and assumed entry based on the minimum reported start year. The results are shown in Figure B15 and they again are very similar to our main results.



(a) Foreign



(b) State



(c) Private

Figure B15: Change in within-industry employment shares by ownership post BTA using adjusted year of entry based on minimum reported start year

*Note:* Each point reflects an individual regression coefficient,  $\beta_{ost}$ , following equation (2). The base year is 2000 and the observations are weighted by 2000 employment. Controls include the change in Vietnam's MFN tariffs due to WTO accession, the change in  $\ln$  Chinese exports to the US in year  $t$  relative to 2000, and industry measures of US import quotas applied to Vietnamese and Chinese exports of textiles and clothing. We record each firm's start year as the minimum reported start year across all years that the firm appears in the dataset.

## B.4 Pooled Regression Results

All specifications in the main text estimate year-by-year cumulative effects of the tariff declines, allowing the coefficients on tariffs to differ every year. In this subsection, we investigate the relationship between the U.S. tariff reductions and industry-level outcomes with specifications that pool some of the regression coefficients. In particular, we begin by estimating the following pooled regression model:

$$Y_{jt} = \Phi_1 \Delta BTA_j \mathbb{1}_{t=[2001,2008]} + \Phi_2 \Delta BTA_j \mathbb{1}_{t=[2009,2017]} + \lambda_j + \theta_t + \alpha_t C_{jt} + \varepsilon_{jt} \quad (3)$$

where  $Y_{jt}$  is industry  $j$ 's outcome in year  $t$  (e.g., ln firm count, ln employment, and ln revenue),  $\Delta BTA_j$  is the decrease in log US tariff applied to imports from Vietnam in industry  $j$  before and after the BTA, indicator  $\mathbb{1}_{t=(2001,2008)}$  equals one for years 2001-2008, indicator  $\mathbb{1}_{t=(2009,2017)}$  equals one for years 2009-2017,  $\lambda_j$  is industry fixed effects, and  $\theta_t$  is year fixed effects.  $C_{jt}$  are industry-specific controls for other trade policy changes and include US import quotas applied to clothing and textile imports from Vietnam and China respectively, Vietnam's MFN tariffs due to its WTO accession, and China-US exports in year  $t$ . BTA implementation year is 2001 and pre-BTA years 1999-2000 are the base years for the outcome changes. As such, the parameters of interest,  $\Phi_1$  and  $\Phi_2$ , estimate the impact of U.S. tariff reductions on the outcome variable for years 2001-2008 and 2009-2017, respectively, relative to the base years.

We begin by examining ln firm count, ln employment, and ln revenue for all ownership types, as reported in Table B2. We follow our analysis in the main text and conduct this analysis at the 4-digit industry level and all standard errors are clustered at the 4-digit industry level. First, we find that U.S. tariff reductions are associated with an increase in industry firm counts, employment, and revenue in years 2001-2008 relative to the base years. Second, the magnitude of these increases grows in the longer term from 2009-2017. This growth is consistent with our year-by-year results as well as traditional theories of international trade that predict the expansion of industry size in response to new exporting opportunities.

As is the case in the main analysis in Section 4, we find important differences in the response of industry outcomes when we focus on different ownership types. We estimate a version of equation (3) for each of the three ownership types  $o$  where  $o \in \{FDI, SOE, PRI\}$  :

$$Y_{jot} = \Phi_{1o} \Delta BTA_j \mathbb{1}_{t=(2001,2008)} + \Phi_{2o} \Delta BTA_j \mathbb{1}_{t=(2009,2017)} + \lambda_{jo} + \theta_{ot} + \alpha_{ot} C_{jt} + \varepsilon_{jot} \quad (4)$$

here  $Y_{jot}$  is the outcome for ownership type  $o$  in industry  $j$  at year  $t$ ,  $\Delta BTA_j$  is the change in

Table B2: Pooled regression at the industry level, 1999-2017

|                                | (1)                 | (2)                 | (3)                 |
|--------------------------------|---------------------|---------------------|---------------------|
|                                | Firm Count          | Employment          | Revenue             |
| Tariff Cuts $\times$ 2001-2008 | 1.299**<br>(0.548)  | 1.079***<br>(0.304) | 1.271***<br>(0.339) |
| Tariff Cuts $\times$ 2009-2017 | 2.401***<br>(0.910) | 2.327***<br>(0.544) | 1.967***<br>(0.559) |
| Observations                   | 2087                | 2087                | 2087                |
| R-squared                      | 0.97                | 0.98                | 0.98                |

Note: \*  $p < 0.1$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$ . Following equation (3), the first row reflects the regression coefficient  $\hat{\Phi}_1$  while the second row reflects the regression coefficient  $\hat{\Phi}_2$ . All regressions include year fixed effects and industry fixed effects. Standard errors clustered at the 4-digit industry level. Weighted by year 2000 employment.

log US tariff applied to imports from Vietnam in industry  $j$  before and after the BTA, indicator  $\mathbb{1}_{t=(2001,2008)}$  equals one for years 2001-2008, indicator  $\mathbb{1}_{t=(2009,2017)}$  equals one years 2009-2017,  $\lambda_{jo}$  is industry and ownership fixed effects, and  $\theta_{ot}$  is year and ownership fixed effects. The inclusion of ownership-year fixed effects controls for any firm-type-specific secular trends or government policies that might also contribute to the declining presence of SOEs and increases in PRI and FDIs.  $C_{jt}$  are industry-specific controls for other trade policy changes and include US import quotas applied to clothing and textile imports from Vietnam and China respectively, Vietnam's MFN tariffs due to its WTO accession, and China-US exports in year  $t$ . Similar to the previous specification, BTA implementation year is 2001 and pre-BTA years 1999-2000 are the base years for outcome changes. Hence, the coefficients  $\Phi_{1o'}$  and  $\Phi_{2o'}$  capture the BTA impact on outcomes for ownership  $o'$  during years 2001-2008 and 2009-2017 respectively relative to base years.

In Table B3 we report estimates of differential effects of the BTA across ownership types. Similar to the previous specification, in the years immediately after the BTA, foreign firms are significantly expanding in firm count and employment relative to the base year, 2000 (first and second panels, Column (1), Table B3). Foreign revenue is positively increasing but is noisy (third panel, Column (1), Table B3). In the subsequent period, FDI firms numbers, employment, and revenue continue to increase and are larger in magnitude. In the years immediately after the BTA, State firms experience a small but insignificant decline in numbers with increases in employment and revenue (Column (3) across all three panels, Table B3). In subsequent years, SOE firms count, employment, and revenue experience positive growth but the coefficients are insignificant. PRI firms numbers are expanding in response to the U.S. tariff reductions initially and experiences a larger and statistically significant increase subsequently. However, its employment growth is noisy

as is its revenue outcomes.

Table B3: Pooled regression by ownership-type, 1999-2017

|                                | (1)                 | (2)                | (3)                |
|--------------------------------|---------------------|--------------------|--------------------|
| Firm Count                     | Foreign             | Private            | State              |
| Tariff Cuts $\times$ 2001-2008 | 1.171***<br>(0.390) | 1.431*<br>(0.795)  | 0.00447<br>(0.134) |
| Tariff Cuts $\times$ 2009-2017 | 2.033***<br>(0.570) | 2.469**<br>(1.171) | 0.307<br>(0.272)   |
| Observations                   | 1953                | 2062               | 1850               |
| R-squared                      | 0.98                | 0.97               | 0.99               |
| <hr/>                          |                     |                    |                    |
|                                | (1)                 | (2)                | (3)                |
| Employment                     | Foreign             | Private            | State              |
| Tariff Cuts $\times$ 2001-2008 | 1.295**<br>(0.546)  | 0.212<br>(0.569)   | 0.331<br>(0.259)   |
| Tariff Cuts $\times$ 2009-2017 | 2.353***<br>(0.827) | 0.755<br>(0.916)   | 1.024*<br>(0.550)  |
| Observations                   | 1953                | 2062               | 1850               |
| R-squared                      | 0.98                | 0.98               | 0.98               |
| <hr/>                          |                     |                    |                    |
|                                | (1)                 | (2)                | (3)                |
| Revenue                        | Foreign             | Private            | State              |
| Tariff Cuts $\times$ 2001-2008 | 0.625<br>(0.984)    | 0.273<br>(0.581)   | 0.955**<br>(0.428) |
| Tariff Cuts $\times$ 2009-2017 | 1.669<br>(1.149)    | -0.206<br>(0.916)  | 1.443**<br>(0.688) |
| Observations                   | 1951                | 2059               | 1850               |
| R-squared                      | 0.96                | 0.96               | 0.94               |

*Note:* \*  $p < 0.1$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$ . Following equation (4), the first row reflects the regression coefficient  $\hat{\Phi}_{1o}$  while the second row reflects the regression coefficient  $\hat{\Phi}_{2o}$  for each ownership type  $o$  labelled in each column (Foreign, Private, and State). All regressions include year and ownership fixed effects, and industry and ownership fixed effects. Standard errors clustered at the 4-digit industry level. Weighted by year 2000 employment.

Finally, we estimate the pooled impact of the U.S. tariff reductions on changes in within-industry reallocation based on regression model (2). We pool all employment share changes relative to 2000 and interact the U.S. tariff reductions with two time periods, 2001 to 2008 and 2009 to 2017. Table B4 estimates the reallocation of employment in response to the BTA across continuers, exiters, and entrants relative to year 2000. In the years immediately after the BTA, we find that industries with higher cuts in U.S. tariffs experience a significant increase in the the employment share of entering firms relative to lower tariff cut industries. The employment shares

of continuing and exiting firms decline instead but are noisy. In subsequent years, the employment share of entrants continue to increase significantly while the shares of continuers and exiters also decrease but are noisy.

Table B4: Pooled employment share decomposition regressions, all owners

|                              | (1)                 | (2)                | (3)                 |
|------------------------------|---------------------|--------------------|---------------------|
|                              | Continuers          | Entrants           | Exiters             |
| Tariff Cuts $\times$ 2001-08 | -0.289**<br>(0.116) | 0.312**<br>(0.146) | -0.0227<br>(0.0776) |
| Tariff Cuts $\times$ 2009-17 | -0.357**<br>(0.168) | 0.422**<br>(0.208) | -0.0645<br>(0.126)  |
| Observations                 | 1954                | 1954               | 1954                |

*Note:* \*  $p < 0.1$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$ . We estimate a pooled version of equation (2) where we interact the US tariff reductions with two time periods, 2001 to 2008 and 2009 to 2017. All regressions include year fixed effects, the change in Vietnam's MFN tariffs due to WTO accession interacted with year fixed effects, the change in ln Chinese exports to the US in year  $t$  relative to 2000, and industry measures of US import quotas applied to Vietnamese and Chinese exports of textiles and clothing interacted with year fixed effects. Standard errors are clustered at the 4-digit industry level. Weighted by year 2000 employment.

Table B5 examines the tariff-induced employment share for foreign firms. Column (1) shows increases in the employment share of all foreign firms in industries with higher tariff cuts, initially and in subsequent years although the estimates are noisy. Columns (2) to (4) examine the responses of the employment share of foreign continuers, entrants, and exiters respectively to the BTA tariff cuts. We find that this overall increase in the foreign employment share is driven by a significant increase in foreign entrant employment share, initially and subsequently after the BTA (Column (3)). Foreign exiters are also significantly decreasing in employment share initially and subsequently (Column (4)). The employment share shift away from continuers was initially after the BTA, but subsequent decreases are statistically significant (Column (2)).

We further decompose the post-entry growth of foreign entrants into the change in employment share due to initial employment at entry and due to subsequent changes to employment after entry. Initially after the BTA, initial entry is more important than subsequent growth (columns (5) and (6) respectively, Table B5). However in subsequent years, more than half of the effect is driven by subsequent growth from foreign entrants (Column (6)).

Table B6 examines the tariff-induced employment share change for state firms. Column (1) shows a relative increase in the employment share of all state firms in higher tariff cut industries initially and in subsequent years although the estimate is noisy. Columns (2) to (4) examine the tariff cut responses of the employment share of SOE continuers, entrants, and exiters respectively. Immediately after the policy, we find a significant decrease in the employment share of entrants and increase in share of exiters in higher cut industries. Continuer shares increase but is noisy.

Table B5: Pooled employment share decomposition regressions, foreign

|                              | (1)<br>All          | (2)<br>Continuers     | (3)<br>Entrants      | (4)<br>Exiters      | (5)<br>Entr-Init     | (6)<br>Entr-Chan     |
|------------------------------|---------------------|-----------------------|----------------------|---------------------|----------------------|----------------------|
| Tariff Cuts $\times$ 2001-08 | 0.171**<br>(0.0855) | -0.139**<br>(0.0544)  | 0.320***<br>(0.0861) | -0.0111<br>(0.0191) | 0.191***<br>(0.0479) | 0.129***<br>(0.0471) |
| Tariff Cuts $\times$ 2009-17 | 0.303*<br>(0.160)   | -0.324***<br>(0.0798) | 0.693***<br>(0.197)  | -0.0673<br>(0.0535) | 0.339***<br>(0.0913) | 0.358***<br>(0.119)  |
| Observations                 | 1954                | 1954                  | 1954                 | 1954                | 1954                 | 1954                 |

Note: \*  $p < 0.1$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$ . We estimate a pooled version of equation (2) where we interact the US tariff reductions with two time periods, 2001 to 2008 and 2009 to 2017. All regressions include year fixed effects, the change in Vietnam's MFN tariffs due to WTO accession interacted with year fixed effects, the change in ln Chinese exports to the US in year  $t$  relative to 2000, and industry measures of US import quotas applied to Vietnamese and Chinese exports of textiles and clothing interacted with year fixed effects. Standard errors are clustered at the 4-digit industry level. Weighted by year 2000 employment.

In subsequent years, exiters continue to see a significant share increase in higher cut industries. Entrant shares continue to decrease while continuer share increases but are noisy. Given that SOE dynamics are driven by firm exit (state firm employment is decreasing over this period), we find delayed state employment share responses in industries with higher tariff cuts. SOE entrants are entering slower in higher cut industries relative to less affected industries, while SOE exits are increasing in the opposite industries—with lower tariff cuts.

Table B7 examines the tariff-induced employment share for private firms. Column (1) shows significant decreases in the employment share of all private firms in industries with higher tariff cut, initially and in subsequent years. Columns (2) to (4) examine the responses of the employment share of private continuers, entrants, and exiters respectively to the BTA tariff cuts. The overall decrease in private employment shares is driven by a significant decrease in continuers, initially after the BTA and subsequently (Column (2)). The employment share of private exiters is also significantly decreasing immediately after the BTA while its subsequent decrease is noisy. The private entrant share is imprecisely estimated.

Table B6: Pooled employment share decomposition regressions, state

|                              | (1)<br>All         | (2)<br>Continuers  | (3)<br>Entrants      | (4)<br>Exiters       |
|------------------------------|--------------------|--------------------|----------------------|----------------------|
| Tariff Cuts $\times$ 2001-08 | 0.0550<br>(0.0868) | 0.0339<br>(0.0785) | -0.0705*<br>(0.0369) | 0.0916**<br>(0.0370) |
| Tariff Cuts $\times$ 2009-17 | 0.269<br>(0.164)   | 0.172<br>(0.140)   | -0.111**<br>(0.0464) | 0.208***<br>(0.0727) |
| Observations                 | 1954               | 1954               | 1954                 | 1954                 |

Note: \*  $p < 0.1$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$ . We estimate a pooled version of equation (2) where we interact the US tariff reductions with two time periods, 2001 to 2008 and 2009 to 2017. All regressions include year fixed effects, the change in Vietnam's MFN tariffs due to WTO accession interacted with year fixed effects, the change in ln Chinese exports to the US in year  $t$  relative to 2000, and industry measures of US import quotas applied to Vietnamese and Chinese exports of textiles and clothing interacted with year fixed effects. Standard errors are clustered at the 4-digit industry level. Weighted by year 2000 employment.

Table B7: Pooled employment share decomposition regressions, private

|                              | (1)<br>All          | (2)<br>Continuers     | (3)<br>Entrants   | (4)<br>Exiters     |
|------------------------------|---------------------|-----------------------|-------------------|--------------------|
| Tariff Cuts $\times$ 2001-08 | -0.226*<br>(0.122)  | -0.184***<br>(0.0645) | 0.0617<br>(0.167) | -0.103<br>(0.0723) |
| Tariff Cuts $\times$ 2009-17 | -0.572**<br>(0.238) | -0.206**<br>(0.0829)  | -0.161<br>(0.289) | -0.205*<br>(0.113) |
| Observations                 | 1954                | 1954                  | 1954              | 1954               |

*Note:* \*  $p < 0.1$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$ . We estimate a pooled version of equation (2) where we interact the US tariff reductions with two time periods, 2001 to 2008 and 2009 to 2017. All regressions include year fixed effects, the change in Vietnam's MFN tariffs due to WTO accession interacted with year fixed effects, the change in  $\ln$  Chinese exports to the US in year  $t$  relative to 2000, and industry measures of US import quotas applied to Vietnamese and Chinese exports of textiles and clothing interacted with year fixed effects. Standard errors are clustered at the 4-digit industry level. Weighted by year 2000 employment.

# C Supplementary Tables and Figures

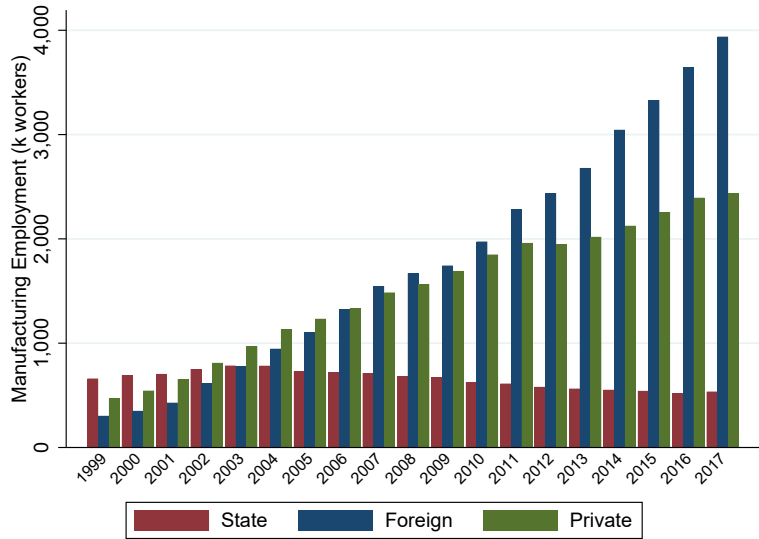


Figure C1: Vietnamese Manufacturing Employment by Initial Ownership Type, 1999 to 2017

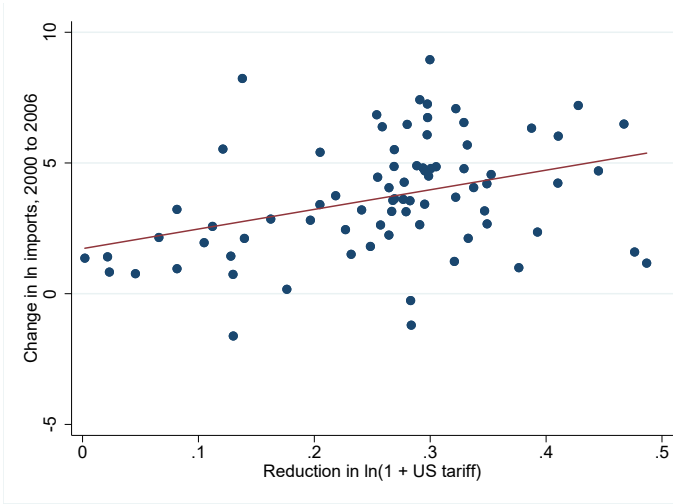
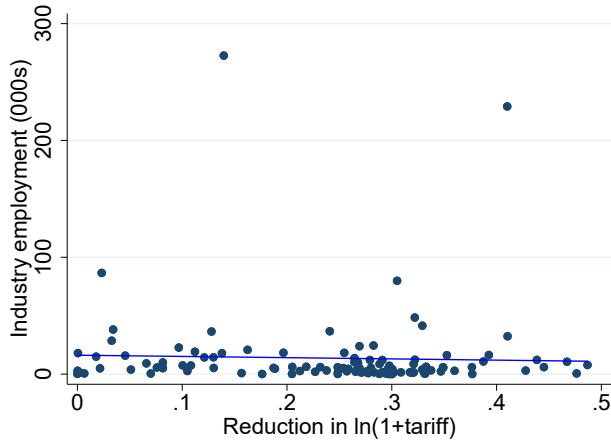
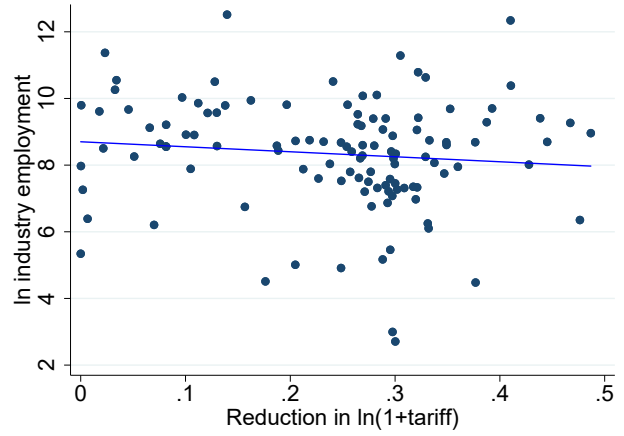


Figure C2: Growth of Vietnamese manufacturing exports to the U.S. 2000 to 2006 BTA tariff reductions  
*Note:* Each point represents a 3-digit ISIC revision 3 industry.



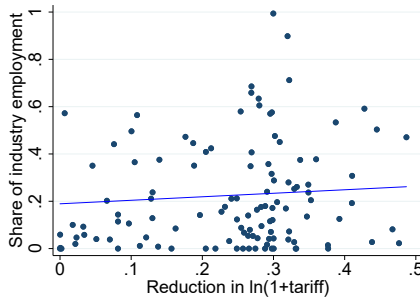
(a) Level of initial employment



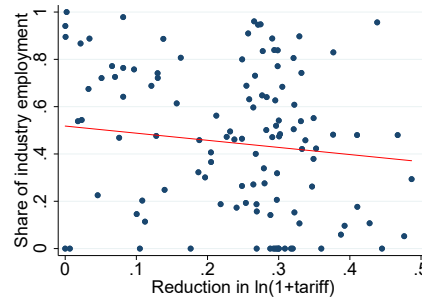
(b) Ln of initial employment

Figure C3: Initial industry employment and US tariff reductions

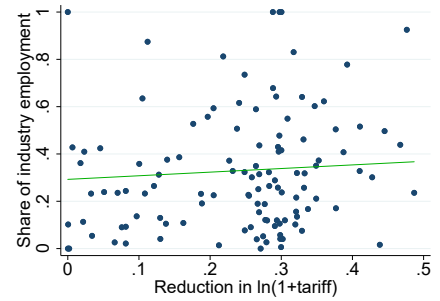
*Note:* Both figures show the relationship between 4-digit industry employment in 2000 and the US tariff reductions. Panel (a) uses the level of employment and the partial correlation is -10.6 (31.3). Panel (b) uses the ln of employment and the partial correlation is -1.50 (1.33).



(a) Foreign

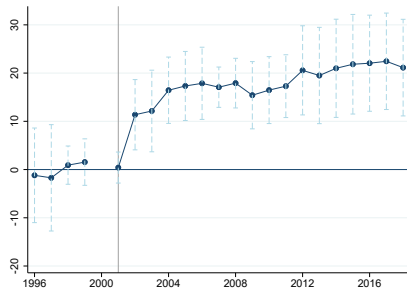


(b) State

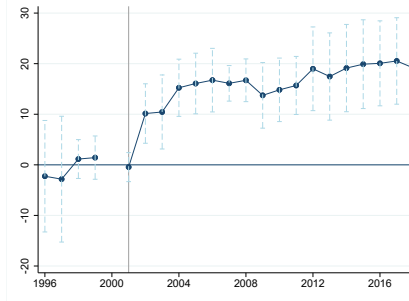


(c) Private

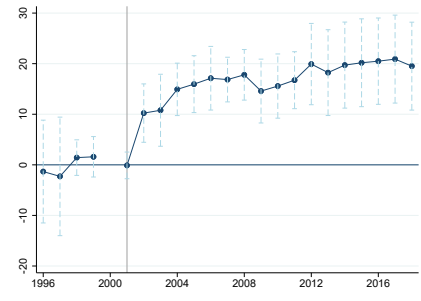
Figure C4: Correlation between the initial within industry employment shares for each ownership type and their corresponding industry-level BTA tariff cuts



(a) Controls: US import quotas



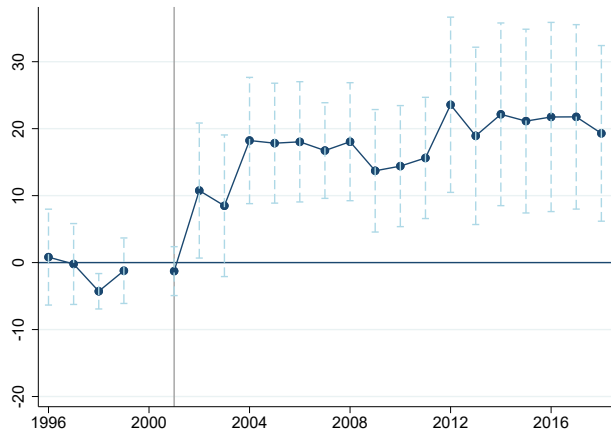
(b) Controls: US import quotas and Vietnam's MFN tariffs



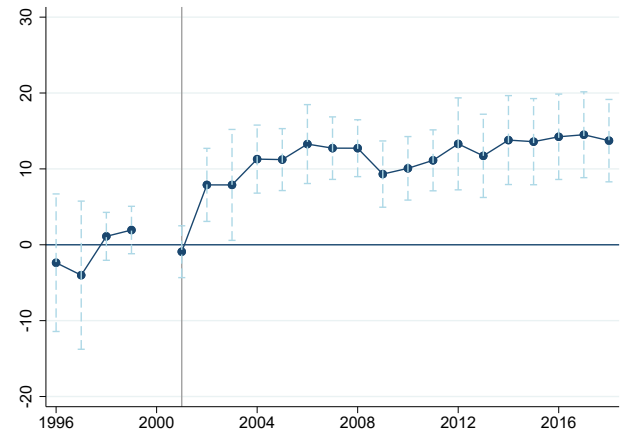
(c) Full controls: US import quotas, Vietnam's MFN tariffs, and Chinese-US exports

Figure C5: Vietnam exports to the US and BTA tariffs, 1996-2018: Robustness to Controls

*Note:* The BTA was implemented in 2001 (indicated by the gray line) and the base year is 2000. All Panels are estimated at the 3-digit ISIC industry-level with industry-level FEs and year FEs. Panel (a) controls for US import quotas on textiles and clothing applied to Vietnam and China respectively. Panel (b) controls for US import quotas on textiles and clothing applied to Vietnam and China respectively as well as the change in Vietnam's MFN tariffs due to WTO accession. Panel (c) reproduces Figure 6 for Vietnam exports to the US which controls US import quotas on textiles and clothing applied to Vietnam and China respectively, the change in Vietnam's MFN tariffs due to WTO accession, and Chinese exports to the US in each year. Dashed lines show 95 percent confidence intervals. Standard errors clustered at the industry level. Weighted by year 2000 Vietnam exports to the world.



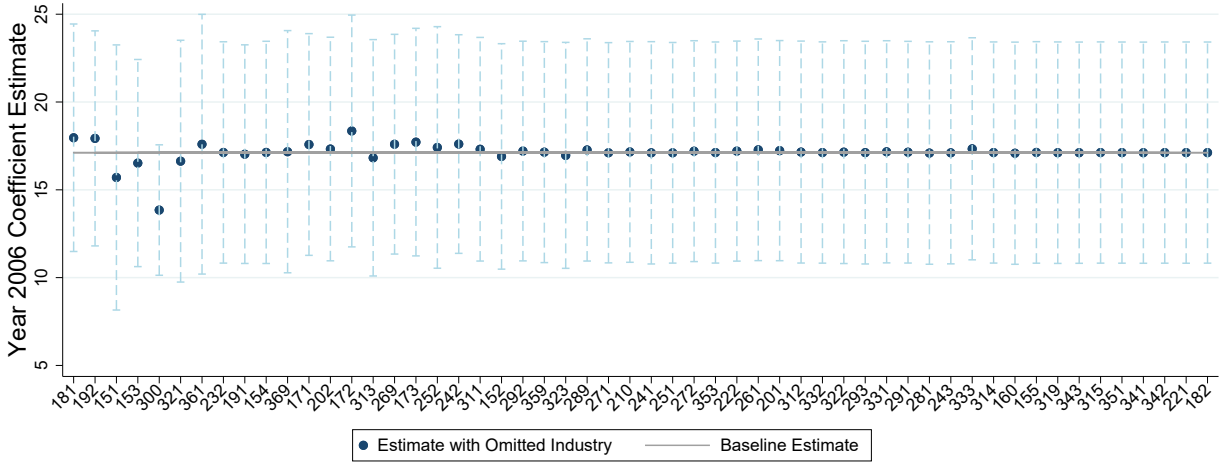
(a) 2-digit ISIC Industries



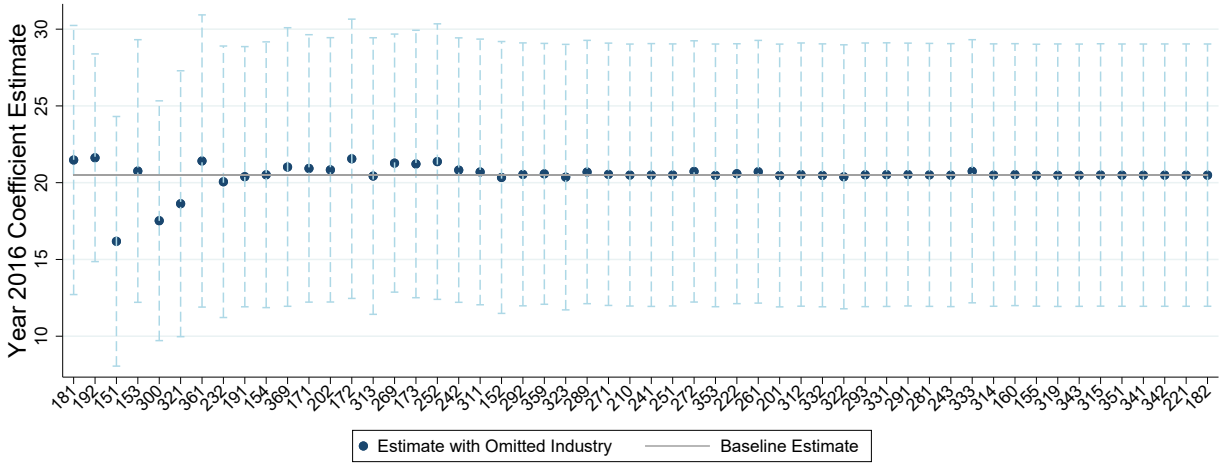
(b) 4-digit ISIC Industries

Figure C6: Vietnam exports to the US and BTA tariffs at 2- and 4-digit ISIC Industries, 1996-2018

*Note:* Each point reflects an individual regression coefficient,  $\hat{\beta}_{it}$ , following equation (1). The BTA was implemented in 2001 (indicated by the gray line) and the base year is 2000. Panel (A) is estimated at the 2-digit ISIC industry-level while Panel (B) is estimated at the 4-digit level. Correspondingly, this applies to the industry-level controls and clustering of standard error as well. Controls include industry-level FEs, year FEs, the change in Vietnam's MFN tariffs due to WTO accession, Chinese exports to the US in year  $t$ , and US import quotas on textiles and clothing applied to Vietnam and China respectively. Dashed lines show 95 percent confidence intervals. Standard errors clustered at the industry level. Weighted by year 2000 Vietnam exports to the world.



(a) Year 2006 Coefficient Estimate



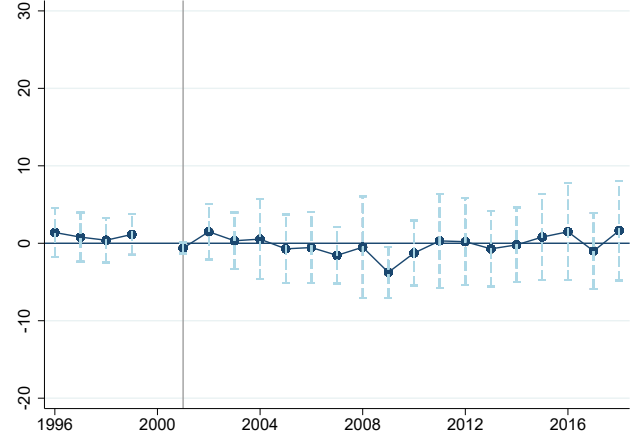
(b) Year 2016 Coefficient Estimate

Figure C7: Estimate of Vietnam exports to the US and BTA tariffs with each industry omitted

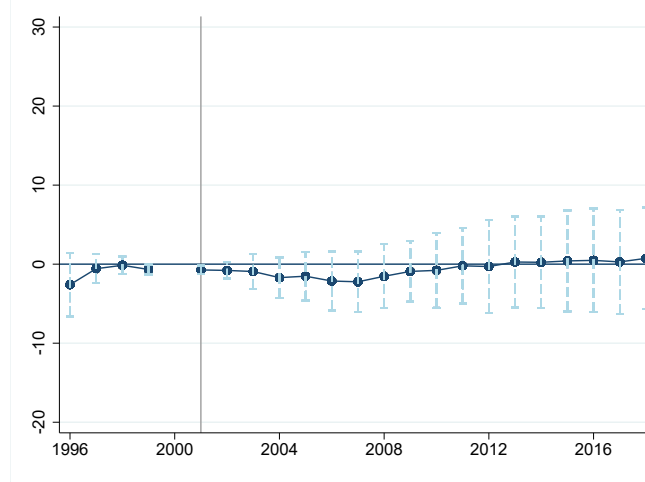
*Note:* Each point reflects an individual regression coefficient,  $\hat{\beta}_{it}$ , following equation (1), for year 2006 (Panel (a)) and year 2016 (Panel (b)), where each 3-digit industry on the x-axis is removed respectively. The 3-digit industries are sorted by total Vietnamese exports to the world in year 2000 (largest on the left and smallest on the right). Controls include industry-level FEs, year FEs, the change in Vietnam's MFN tariffs due to WTO accession, Chinese exports to the US in year  $t$ , and US import quotas on textiles and clothing applied to Vietnam and China respectively. Dashed lines show 95 percent confidence intervals. Standard errors clustered at the industry level. Weighted by year 2000 Vietnam exports to the world.



(a) VN Exports to the US, without controls



(b) VN Exports to the EU, without controls



(c) VN Exports to East Asia, without controls

Figure C8: Vietnam exports to key trading partners and BTA tariffs without controls, 1996-2018

*Note:* Each point reflects an individual regression coefficient,  $\hat{\beta}_{it}$ , following equation (1). Figure C8a reproduces Figure 6 for Vietnam exports to the US but without controls (detailed below). The dependent variable in Figure C8b is Vietnamese exports to the European Union (EU15 excluding Belgium and Luxembourg due to lack of data consistency). Figure C8c is the same estimation as in Figure 7b but without controls. The dependent variable in Figure C8c is Vietnamese exports to 4 East Asian countries (South Korea, Japan, China, and Hong Kong). Taiwan is excluded due to lack of data consistency. Figure C8b is the same estimation as in Figure 7a but without controls. The BTA was implemented in 2001 (indicated by the gray line) and the base year is 2000. Controls include 3-digit industry FEs, year FEs, the change in Vietnam's MFN tariffs due to WTO accession, Chinese exports to the US in year  $t$ , and US import quotas on textiles and clothing applied to Vietnam and China respectively. Dashed lines show 95 percent confidence intervals. Standard errors clustered at the 3-digit industry level. Weighted by year 2000 Vietnam exports to the world.

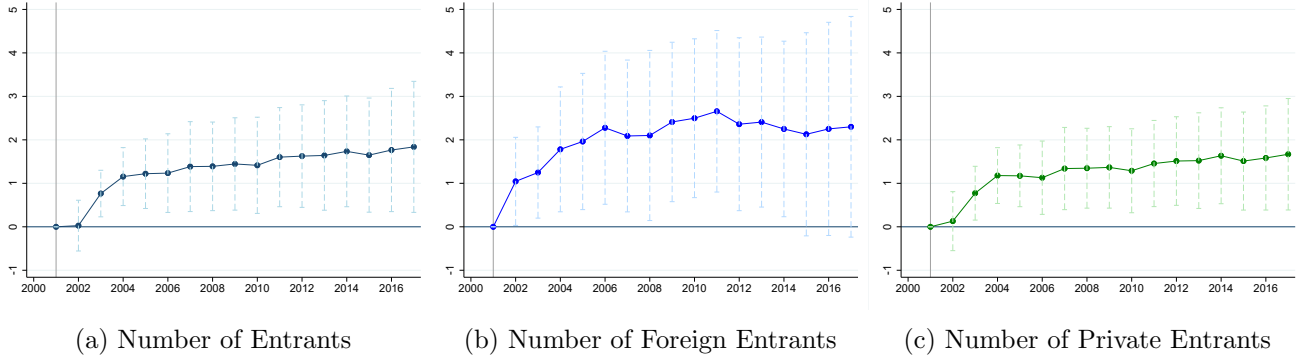


Figure C9: Number of entrants by contemporary ownership and BTA tariffs, 2000-2017

*Notes:* In Panel (a), the regression coefficient is  $\hat{\beta}_{it'}$  following equation (1) and the dependent variable is the log annual number of entrants overall in an industry. We define entry by the first year the firm appears in the dataset after year 2000. In Panels (b) and (c), the regression coefficient is  $\hat{\beta}_{ot'}$  following equation (1) for each ownership type (see footnote 34) and the Panel (b) dependent variable is the log annual number of FDI entrants in an industry while the Panel (c) dependent variable is the log annual number of private entrants in an industry. The BTA was implemented in 2001 and the base year is 2001 due to our definition of entry (indicated by the gray line). In Panel (a) and in separate ownership regressions for Panels (b) and (c), controls include 4-digit industry FEs, year FEs, the change in Vietnam's MFN tariffs due to WTO accession, Chinese exports to the U.S. in year  $t$ , and U.S. import quotas on textiles and clothing applied to Vietnam and China respectively. Since we estimate equation (1) for each ownership type, this is equivalent to including ownership-year and ownership-industry FEs and allowing for ownership-specific coefficients on tariffs and industry-specific controls. Dashed lines show 95 percent confidence intervals. Standard errors clustered at the 4-digit industry level. Weighted by year 2000 employment.

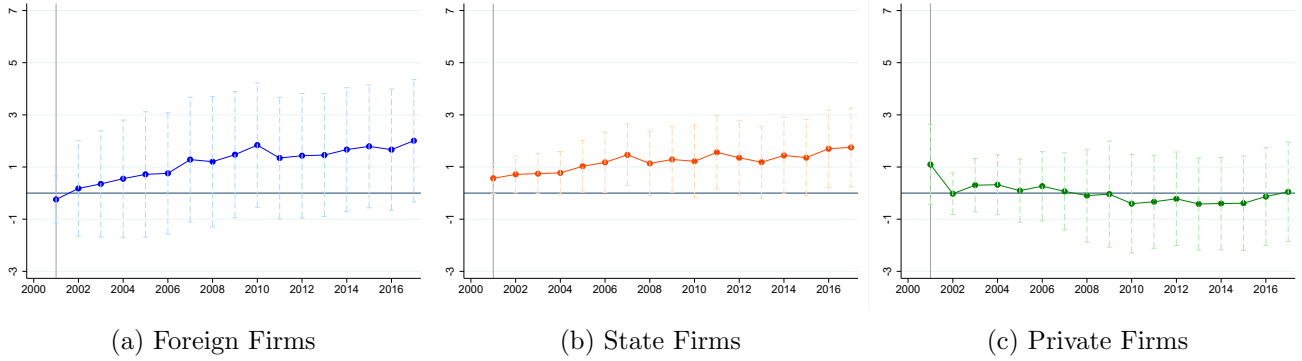
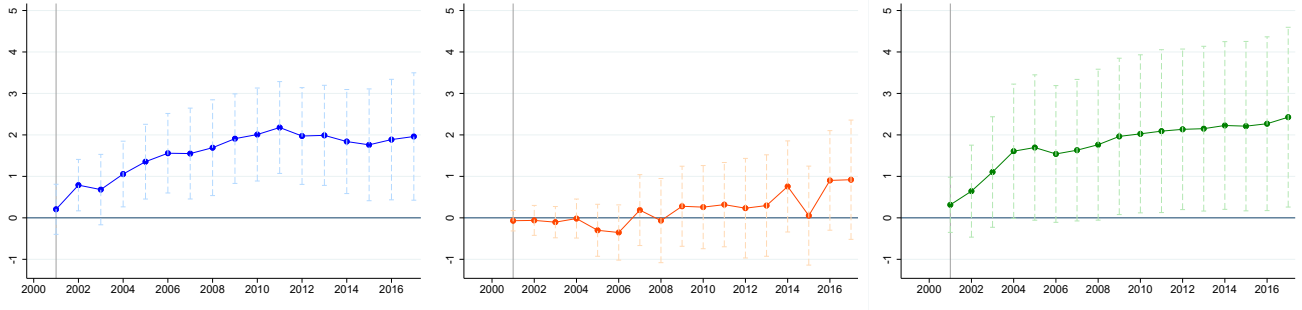


Figure C10: Revenue by ownership and BTA tariffs, 2000-2017

*Note:* Each point reflects an individual regression coefficient,  $\hat{\beta}_{ot'}$ , following equation (1) for each ownership type (see footnote 34). The dependent variable is the log revenue in an industry for foreign (Panel (a)), state (Panel (b)), and private (Panel (c)), respectively. BTA was implemented in 2001 (indicated by gray line) and the base year is 2000. In separate ownership regressions for each panel, controls include 4-digit industry-ownership FEs, ownership-year FEs, the change in Vietnam's MFN tariffs due to WTO accession, Chinese exports to the US in year  $t$ , and US import quotas on textiles and clothing applied to Vietnam and China respectively. Since we estimate equation (1) for each ownership type, this is equivalent to including ownership-year and ownership-industry FEs and allowing for ownership-specific coefficients on tariffs and industry-specific controls. Dashed lines show 95 percent confidence intervals. Standard errors clustered at the 4-digit industry level. Weighted by year 2000 employment.



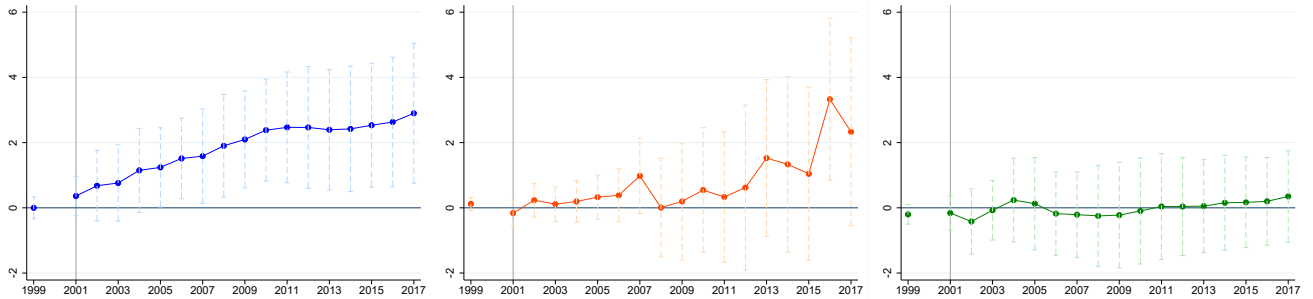
(a) Foreign Firms

(b) State Firms

(c) Private Firms

Figure C11: Firm count by contemporary ownership and BTA tariffs, 2000-2017

*Note:* Firm-types are contemporary, as opposed to what was reported when the firms were initially observed. Each point reflects an individual regression coefficient,  $\hat{\beta}_{ot'}$ , following equation (1) for each ownership type (see footnote 34). The dependent variable is the log number of firms in an industry for foreign (Panel (a)), state (Panel (b)), and private (Panel (c)), respectively. The BTA was implemented in 2001 (indicated by gray line) and the base year is 2000. In separate ownership regressions for each panel, controls include 4-digit industry FEs, year FEs, the change in Vietnam's MFN tariffs due to WTO accession, Chinese exports to the U.S. in year  $t$ , and U.S. import quotas on textiles and clothing applied to Vietnam and China respectively. Since we estimate equation (1) for each ownership type, this is equivalent to including ownership-year and ownership-industry FEs and allowing for ownership-specific coefficients on tariffs and industry-specific controls. Dashed lines show 95 percent confidence intervals. Standard errors clustered at the 4-digit industry level. Weighted by year 2000 employment.



(a) Foreign Firms

(b) State Firms

(c) Private Firms

Figure C12: Employment by contemporary ownership and BTA tariffs, 1999-2017

*Note:* Firm-types are contemporary, as opposed to what was reported when the firms were initially observed. Each point reflects an individual regression coefficient,  $\hat{\beta}_{ot'}$ , following equation (1) for each ownership type (see footnote 34). The dependent variable is the log employment of firms in an industry for foreign (Panel (a)), state (Panel (b)), and private (Panel (c)), respectively. The BTA was implemented in 2001 (indicated by gray line) and the base year is 2000. In separate ownership regressions for each panel, controls include 4-digit industry FEs, year FEs, the change in Vietnam's MFN tariffs due to WTO accession, Chinese exports to the U.S. in year  $t$ , and U.S. import quotas on textiles and clothing applied to Vietnam and China respectively. Since we estimate equation (1) for each ownership type, this is equivalent to including ownership-year and ownership-industry FEs and allowing for ownership-specific coefficients on tariffs and industry-specific controls. Dashed lines show 95 percent confidence intervals. Standard errors clustered at the 4-digit industry level. Weighted by year 2000 employment.



Figure C13: Revenue by contemporary ownership and BTA tariffs, 2000-2017

*Note:* Firm-types are contemporary, as opposed to what was reported when the firms were initially observed. Each point reflects an individual regression coefficient,  $\hat{\beta}_{ot'}$ , following equation (1) for each ownership type (see footnote 34). The dependent variable is the log annual revenue in an industry for foreign (Panel (a)), state (Panel (b)), and private (Panel (c)), respectively. The BTA was implemented in 2001 (indicated by gray line) and the base year is 2000. In separate ownership regressions for each panel, controls include 4-digit industry FEs, year FEs, the change in Vietnam's MFN tariffs due to WTO accession, Chinese exports to the U.S. in year  $t$ , and U.S. import quotas on textiles and clothing applied to Vietnam and China respectively. Since we estimate equation (1) for each ownership type, this is equivalent to including ownership-year and ownership-industry FEs and allowing for ownership-specific coefficients on tariffs and industry-specific controls. Dashed lines show 95 percent confidence intervals. Standard errors clustered at the 4-digit industry level. Weighted by year 2000 employment.

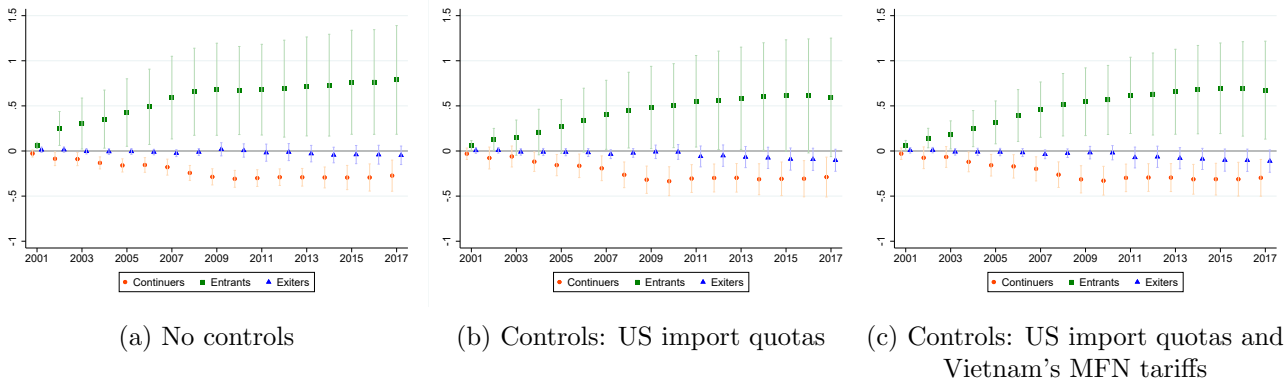
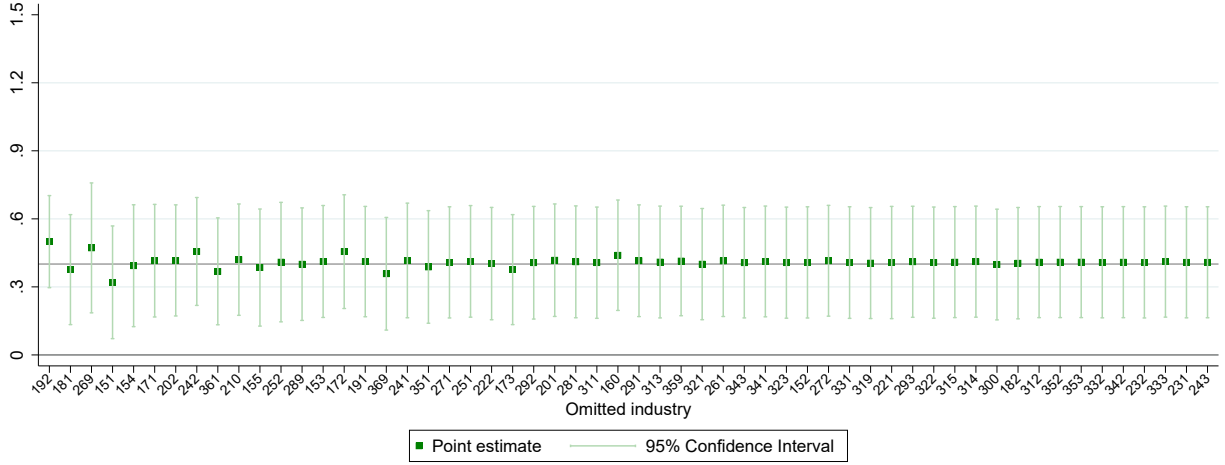
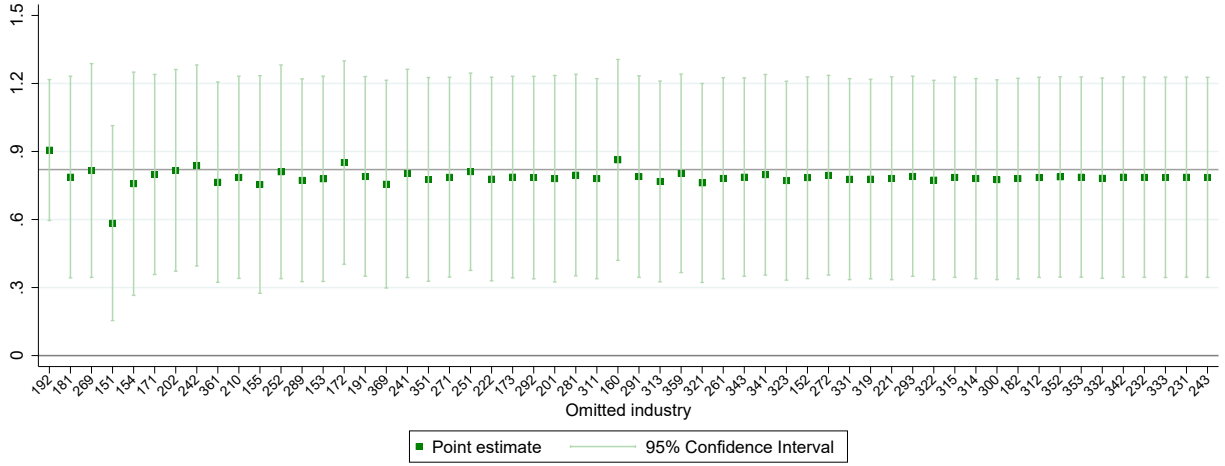


Figure C14: Changes in within-industry employment shares for foreign continuers, entrants, and exiters and BTA tariff cuts: Robustness to Controls

*Note:* The figures show the coefficients from estimating equation (2). The base year is 2000 and the observations are weighted by 2000 employment. All regressions are estimated at the 4-digit ISIC industry level with industry FEs and year FEs. Panel (a) includes no additional controls. Panel (b) controls for US import quotas on textiles and clothing applied to Vietnam and China respectively. Panel (c) controls for US import quotas on textiles and clothing applied to Vietnam and China respectively as well as the change in Vietnam's MFN tariffs due to WTO accession. Dashed lines show 95 percent confidence intervals. Standard errors clustered at the industry level.



(a) Year 2006 Coefficient Estimate



(b) Year 2016 Coefficient Estimate

Figure C15: Estimate of change in employment share of foreign entrants and BTA tariffs with each industry omitted

*Note:* Each point reflects an individual regression coefficient,  $\beta_{ost}$ , following equation (2), for year 2006 (Panel (a)) and year 2016 (Panel (b)), where each 3-digit industry on the x-axis is removed respectively. The 3-digit industries are sorted by total employment in year 2000 (largest on the left and smallest on the right). The base year is 2000 and the observations are weighted by 2000 employment. Controls include the change in Vietnam's MFN tariffs due to WTO accession, the change in  $\ln$  Chinese exports to the US in year  $t$  relative to 2000, and industry measures of US import quotas applied to Vietnamese and Chinese exports of textiles and clothing.

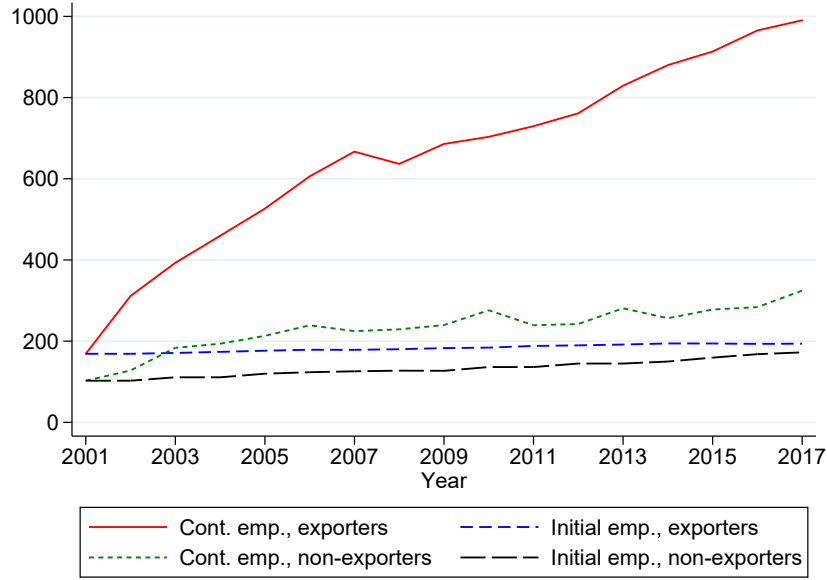


Figure C16: Employment growth for 2001 foreign entry cohort by export status

*Note:* The figure shows contemporary employment and initial employment among foreign firms that enter in 2001 and that have survived to each year  $t$ . The entry cohort is split based on export status in 2002. We use export status in 2002 since this information is not available in 2001.



(a) 2001 Entrants by 2004 Export Status    (b) 2001 Entrants by 2010 Export Status    (c) 2005 Entrants by 2010 Export Status

Figure C17: Employment growth for foreign entry cohort by export status, multiple years

*Note:* Panel (A) shows contemporary employment and initial employment among foreign firms that enter in 2001 and that have survived to each year  $t$ . The entry cohort is split based on export status in 2004. Panel (B) shows contemporary employment and initial employment among foreign firms that enter in 2001 and that have survived to each year  $t$ . The entry cohort is split based on export status in 2010. Panel (C) shows contemporary employment and initial employment among foreign firms that enter in 2005 and that have survived to each year  $t$ . The entry cohort is split based on export status in 2010.

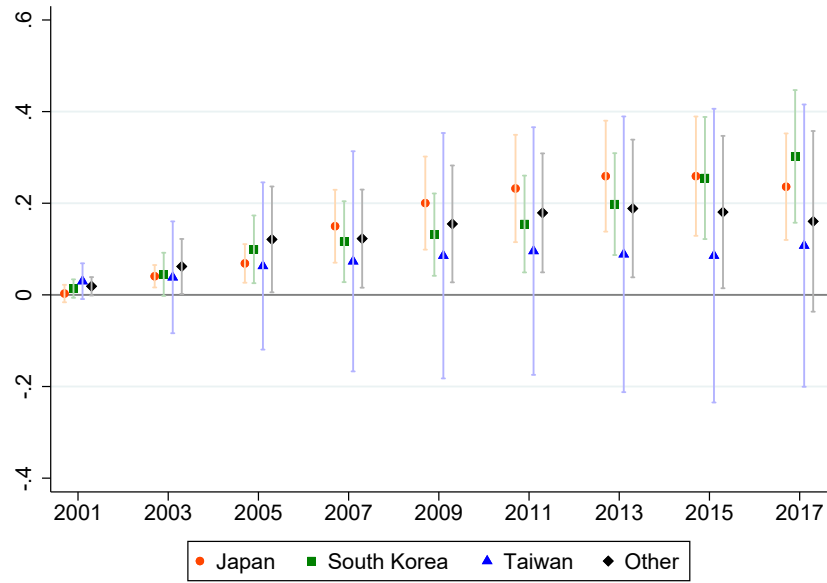
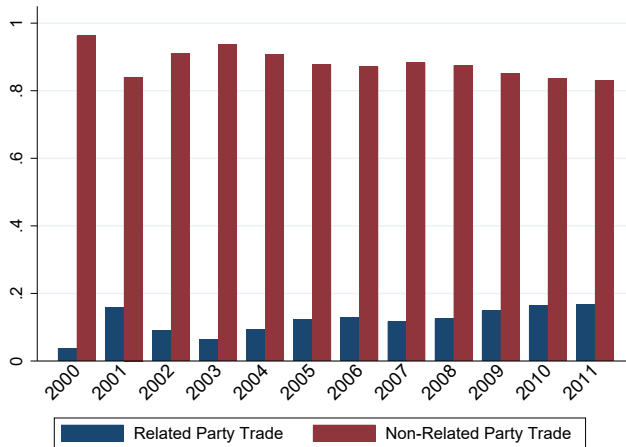
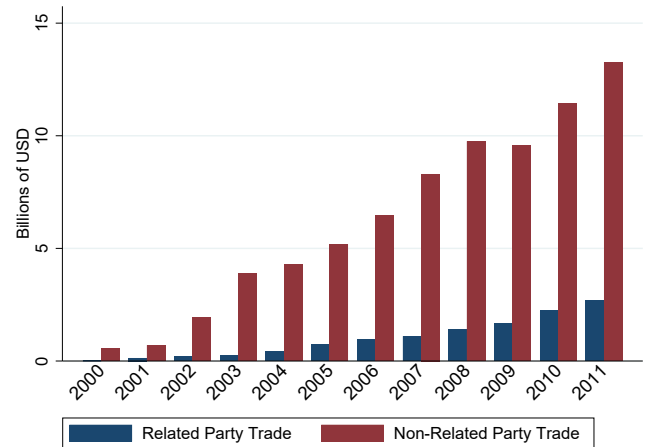


Figure C18: Changes in foreign entrant employment shares for Japan, South Korea, Taiwan, and other FDI source countries and BTA tariff cuts, 2000-2017

*Note:* Each point reflects an individual regression coefficient,  $\beta_{ost}$ , following equation (2). Foreign entry is split based on the FDI source country. The base year is 2000 and the observations are weighted by 2000 employment. Controls include the change in Vietnam's MFN tariffs due to WTO accession, the change in  $\ln$  Chinese exports to the US in year  $t$  relative to 2000, and industry measures of US import quotas applied to Vietnamese and Chinese exports of textiles and clothing.



(a) Shares



(b) Levels (Billions of USD)

Figure C19: Vietnam-US Exports from US and non-US Affiliates, 2000-2011

*Note:* Panel (a) reports the share of Vietnamese exports to the US by US and non-US affiliates. Exports by US affiliates are also known as Related Party Trade. These are transactions which includes any person directly or indirectly owning, controlling, or holding with power to vote,  $\geq 5\%$  of the outstanding voting stock or shares of any organization and such organization (US Census Bureau). Panel (b) reports the levels of these exports.