

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 interaction between multinational affiliates in a host country, domestic firms, and new export opportunities. The 2001 US-Vietnam Bilateral Trade Agreement dramatically reduced US tariffs applied to imports from Vietnam. We find significant entry responses to tariff cuts, driven by foreign and private domestic firms. Conventional data, which focuses on firms above certain size cut-offs, would significantly understate tariff-induced entry of private domestic firms and overstate the relative entry response of foreign firms. Second, entering firms—rather than incumbents—account for much of the tariff-induced employment growth, particularly foreign entrants. Despite tariff-induced private domestic entry, these firms do not contribute to employment growth, while state firms stall this growth through lower exit rates. Third, longer-term cumulative effects of trade policy matter. About half of the tariff-induced employment share growth among foreign entrants is due to post-entry growth. Fourth, post-entry employment growth is driven by exporting foreign firms, further highlighting the link between foreign affiliate entry and new export opportunities. This employment and export growth is not driven primarily by intra-firm trade of U.S. multinationals. Focusing solely on the response from U.S. multinationals would miss how FDI generally respond to trade policy in Vietnam, highlighting the importance of studying the longer-term effects of FDI from multiple sources in a lower-income host.

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

*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 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.

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 the lack of growth of domestic firms in lower-income countries (Hsieh and Klenow, 2009, 2014), foreign affiliates are emerging as an important source of jobs for structural transformation. Despite the importance of jobs for livelihood in lower-income countries, the determinants of foreign affiliate entry and their subsequent employment growth, especially relative to domestic firms, has been less emphasized.

The idea that trade policy can influence the entry of foreign affiliates has a long tradition in international economics, initially focusing on tariff-jumping motives for FDI (Brainard, 1997; Blonigen, 2002), with recent interest in broader determinants of foreign entry (Garetto, Oldenski and Ramondo, 2019). There is an on-going debate about how important changes in trade policy are for FDI, value added trade, and fragmentation of production (Yi, 2003; Feinberg and Keane, 2006, 2009; Johnson and Noguera, 2017). The link between trade policy and FDI activities has been relatively elusive (Brainard, 1997; Antràs and Yeaple, 2014), with only a few studies finding that within firm trade is sensitive to variation in trade cost (Yeaple, 2003; Hanson, Mataloni Jr and Slaughter, 2005).¹ The presence of politically-connected firms further influences how trade reforms affect entry, exit, and the allocation of employment across firms, potentially deterring the entry and expansion of more productive or higher-quality firms (Atkin and Khandelwal, 2020; Bai, Jin and Lu, 2019; Berthou et al., 2019).²

In this paper, we investigate the long-term interaction between multinational affiliates, domestic firms, and new export opportunities in a low-income host country. The 2001 US-

¹The sensitivity of input sourcing to trade policy has been confirmed by recent literature, which examines the effects of tariffs on intermediate goods sourcing and how firms adjust sourcing strategies in response to changes in trade protection, including the recent U.S.-China trade war (Conconi et al., 2018; Handley, Kamal and Monarch, 2020; Flaaen and Pierce, 2019; Bown and Zhang, 2019; Blanchard, Bown and Johnson, 2021).

²Several recent trade agreements, including the Comprehensive and Progressive Agreement for Trans-Pacific Partnership (CPTPP), explicitly include provisions concerning state owned enterprises.

Vietnam Bilateral Trade Agreement (the BTA) led to an immediate and large reduction in US import tariffs applied to Vietnam, which led to rapid Vietnamese export growth (Figure 1). We examine the effects of a trade policy change on firm entry, exit, incumbents, and employment in Vietnam. Our setting focuses on a single host country that experienced large declines in variable costs of accessing a large world export market and focuses on foreign affiliates from multiple sources of FDI, beyond those just from the U.S.

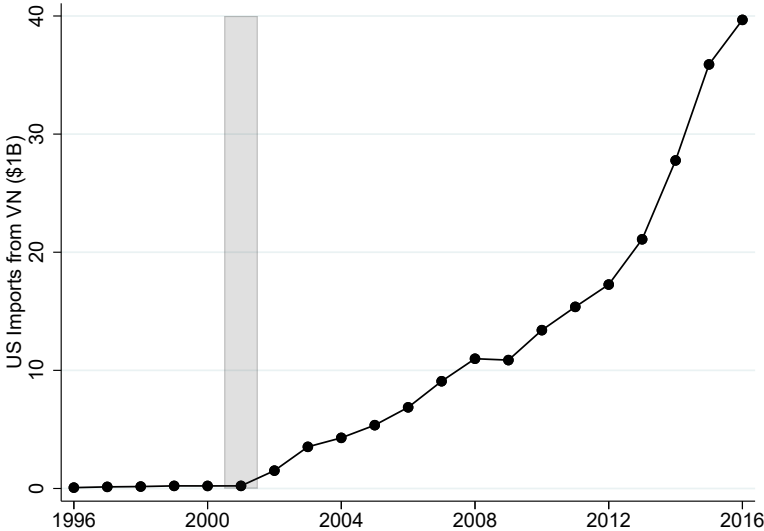


Figure 1: Vietnamese Manufacturing Exports to the U.S. (billions of USD), 1996 to 2016

Our study makes several contributions. First, we examine the role of foreign affiliates in generating employment relative to domestic firms. Our study differentiates between the effects of trade policy on foreign-invested enterprises from all sources (FDIs), private domestic firms (PRIs), and state-owned enterprises (SOEs). Politically unconnected domestic firms might be credit constrained and face other barriers to operation relative to SOEs, particularly in low-income countries with a large state sector. SOEs 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; Pincus, 2015; Baccini, Impullitti and Malesky, 2019; Brandt, Kambourov and Storesletten, 2019; Wen, 2019). Such preferential treatment might artificially lower the operating costs of SOEs relative to private domestic firms, leading to lower productivity SOEs taking market share from more productive firms. Likewise, entry barriers might reduce competition. The distortions could therefore be exacerbated

in response to a trade policy change (Bai, Jin and Lu, 2019; Berthou et al., 2019; Baqaee and Farhi, 2019; Atkin and Khandelwal, 2020). Importantly, our data captures firms of all ownership types, regardless of their size in the registered formal manufacturing sector in Vietnam. This enables us to not just track the responses of large incumbents or exporters, but to comprehensively examine the effects of trade policy on all registered firms.³

Second, we investigate the longer term impact of a one-time trade policy reform on firms, spanning a period of 18 years from 1999 to 2017. Longer run responses to trade policy could differ from shorter-term ones due to slow capital adjustments or if firms, especially those with no political connections, face adjustment frictions (Dix-Carneiro and Kovak, 2017). Importantly, a longer horizon allows us to examine firm employment growth after entry in response to tariff cuts.

Third, we can comprehensively track and study the cumulative effects of new export opportunities on continuing, entering, and exiting firms by ownership. Formal manufacturing employment grew almost 5 fold in Vietnam between 1999 and 2017. Our period features large FDI and domestic private entry, while SOE retrenched (Figure 2). FDI employment expanded from 21 percent in 1999 to 58 percent in 2017 (307 thousand employees to 3.9 million), while the number of FDI firms more than quadrupled. Similarly, employment in PRIs grew from 31 to 39 percent, expanding from 448 thousand to 2.7 million employees. At the start of our sample, Vietnam had a large state sector within manufacturing initially, but this gradually declined. In 1999, SOEs accounted for 47 percent of employment in formal manufacturing in Vietnam (681 thousand employees), but this decreased to only about 3 percent of employment (212 thousand employees) in 2017. We study this reallocation and expansion of economic activity from SOEs to FDI and PRI that is driven by the BTA. Our setting enables us to examine the effects of trade policy over a period that starts off with a higher presence of SOEs than in other studies (Khandelwal, Schott and Wei, 2013; Hsieh and Song, 2015; Brandt et al., 2017; Baccini, Impullitti and Malesky, 2019; Brandt, Kambourov and Storesletten, 2019).

³For example, Brandt et al. (2017) focuses on all Chinese state-owned industrial firms and non-state-owned firms who have more than 5 million RMB worth of sales. Khandelwal, Schott and Wei (2013) focus on exporters. If we focused on just exporters, we would only be capturing up to 70% of revenue and employment in our data.

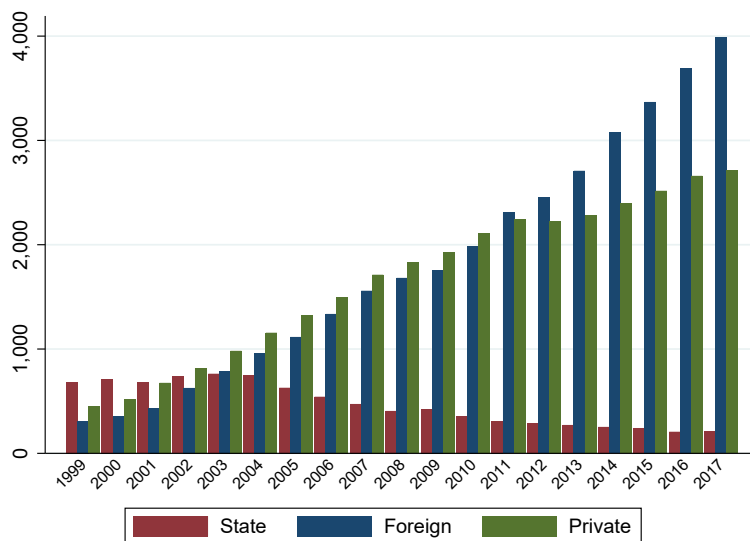


Figure 2: Vietnamese Manufacturing Employment by Ownership Type (thousands of workers), 1999 to 2017

We find that the dynamics of changing industry sizes are consistent with predictions of neoclassical trade models, as resources and revenue allocate toward industries experiencing greater declines in variable export costs, and with the effects growing over time. However, firm-specific factors, particularly those of foreign affiliates, provide a much more nuanced understanding of the sources of industry adjustment.

We find that firm-entry is an important margin in response to the tariff cuts, primarily driven foreign and private domestic firms. The firm-entry elasticity estimate is 1 with respect to tariffs in the short run (2 years after the tariff change), and 1.5 in the longer run (12 years after initial tariff change). Our analysis is based on all registered firms, regardless of their size, and highlights the importance of using comprehensive data: The entry of small private firms (those that enter with fewer than 10 workers) tends to be more responsive to tariff cuts than the entry of larger private firms. Using data that only captures firms above a certain size cut off would significantly understate tariff-induced entry of private domestic firms and overstate relative entry elasticity of foreign firms. On the other hand, SOEs initially observe no firm count change for 8-10 years after the BTA, but the relative number of SOEs increases with larger tariff cuts thereafter. This reflects slower exit of SOEs from industries with higher tariff cuts than from industries with lower cuts. The delayed response of SOEs is consistent

with delayed adjustments to trade reform either due to political connections or due to slow adjustments of capital (Dix-Carneiro and Kovak, 2017).

Second, entering firms—rather than incumbents—account for much of the tariff-induced employment growth. We find important differences in the response of industry outcomes across ownerships, suggesting that these different ownership types face different market incentives. The tariff-induced employment growth among entering firms is concentrated primarily among the foreign entrants. This is consistent with complexities of foreign affiliate entry (Garetto, Oldenski and Ramondo, 2019). Despite tariff-induced private domestic entry, these firms do not contribute to employment growth. On the other hand, state firms stall this growth through lower exit rates. Interestingly, part of the reason why tariff cuts are not associated with the reallocation of employment through exit is that while lower tariff cuts are associated with drops in employment share for exiting foreign and domestic firms, they are actually associated with increased within-industry SOE employment share. This highlights politically connected firms stalling the reallocation process: as the government is faced with the overall shrinking size of the state sector, it might cherry pick which SOEs to restructure versus which SOEs to close or privatize (Hsieh and Song, 2015; Song, Storesletten and Zilibotti, 2011).

Third, longer-term cumulative effects of trade policy matter. 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. This is consistent with other recent studies that highlight the importance of longer-term effects of trade or FDI (Dix-Carneiro and Kovak, 2017; Méndez-Chacón and Van Patten, forthcoming). Most of this is driven by post-entry employment growth in exporting foreign firms, further highlighting the link between foreign affiliate entry and new export opportunities. Our results are consistent with the responsiveness of gross and value-added exports between countries to the signing of a regional trade agreement (Johnson and Noguera, 2017).

Finally, most of this export growth stems from trade that is unrelated to U.S. multinationals. Focusing solely on the FDI response from the U.S. multinationals would miss how foreign affiliates and multinationals generally respond to trade policy in Vietnam. This highlights the importance of studying longer-term effects of FDI from multiple sources in a

lower-income host.

Our analysis contributes to the literature on the impact of FDI in low- and middle-income countries. This literature has predominantly focused on spillovers from foreign to domestic firms (Harrison and Rodríguez-Clare, 2010; Poole, 2013; Kee, 2015; Newman et al., 2015; Bajgar and Javorcik, 2020; Crescenzi and Limodio, 2021; Alfaro-Ureña, Manelici and Vasquez, 2022), and the aggregate effects of FDI on growth (Hansen and Rand, 2006). The FDI literature that focuses on labor markets in lower income host countries concentrates mainly on wage inequality and wage premia among the employed, rather than jobs (Feenstra and Hanson, 1997; Javorcik, 2015; Alfaro-Ureña, Manelici and Vasquez, 2021). The evidence on MNCs and jobs comes predominately from high-income parent countries (Brainard, 1997; Yeaple, 2003; Hanson, Mataloni Jr and Slaughter, 2005; Desai, Foley and Hines, 2009; Muendler and Becker, 2010; Harrison and McMillan, 2011; Kovak, Oldenski and Sly, 2021). Foreign affiliates in host countries can not just be a source of capital and exports, but also 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.

Our study focuses on trade-policy induced jobs across foreign affiliates and domestic firms in a host country and is thus most closely related to Hjort and Poulsen (2019), which examine the effects of fast-speed internet on jobs. We show that trade policy-induced FDI entry is not just a source of capital and exports, but also a source of “good jobs,” aiding structural transformation of the labor market.⁴ We highlight the differences in job accumulation for foreign affiliates relative to domestic firms, the importance of entry and exit of firms in this process, and the longer-term effects of this dynamic.

We also relate to the literature on the effects of selection and resource reallocation between foreign and domestic firms in host countries (see Aitken and Harrison (1999), Alfaro and Chen (2018), and Bao and Chen (2018)) and the determinants of FDI entry or acquisition. The literature has emphasized the role of selection (Arnold and Javorcik, 2009; Guadalupe, Kuzmina and Thomas, 2012) and financial constraints factors (Alfaro and Chen, 2018; Bilir,

⁴McCaig and Pavcnik (2018) have shown that the reallocation of workers from the informal to the formal sector occurred because of worker movements from the informal sector rather than informal firms formalizing. This current study examines how this expansion of formal manufacturing occurred.

Chor and Manova, 2019). Part of this literature examines the impact of bilateral tax treaties, tariffs, and trade agreements on foreign entry (Blonigen, Oldenski and Sly, 2014; Feinberg and Keane, 2006, 2009). We focus on the trade-policy-induced effects on entry, incumbents, and exit and incumbent growth in a host country. Our results suggest that increased access to a large export market (the U.S.) may be an important mechanism for promoting FDI entry in a host country. Importantly, we do so while addressing the the endogeneity of trade policy and FDI (Blanchard, 2007; Blanchard and Matschke, 2015; Blanchard, Bown and Johnson, 2021). The institutional features of the BTA allows us to overcome concerns about the endogeneity of trade policy and FDI (as discussed in Section 2.1).⁵

Our results highlight the differential responses of foreign affiliates, relative to domestic firms and the role of politically connected firms. We show that reallocation or post-entry growth might be stalled by politically connected firms. In doing so, our research links the literature on FDI to the emerging literature on firm performance and trade in the presence of politically connected firms. There is currently no consensus in the literature whether trade reforms raise or reduce industry efficiency in this context (Atkin and Khandelwal, 2020; Bai, Jin and Lu, 2019; Berthou et al., 2019). On one hand, trade reforms can reduce SOE’s export market shares by providing new market access to efficient but constrained firms who are not politically connected (Khandelwal, Schott and Wei, 2013). On the other hand, SOEs are not subject to the same competitive pressures and less likely to exit due to increased import competition (Brandt et al., 2017; Baccini, Impullitti and Malesky, 2019).⁶ Our analysis focuses on the effects of increased market access rather than increased import competition and highlights the important role of foreign affiliates in the adjustment, which trumps the sluggish response of SOEs. Additionally, our data captures the responses of registered firms of all sizes over a long period, which enables us to capture (cumulative) effects on firm entry

⁵The 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 opportunity to negotiate over industry-specific tariff reductions (McCaig, 2011). Importantly, the tariff reductions are not correlated with contemporaneous export demand shocks, export supply shocks, or pre-existing export growth trends (McCaig and Pavcnik, 2018). However, the variation in U.S. tariff reductions across industries is strongly correlated with growth of Vietnamese industry exports to the U.S. (Figure B1).

⁶Ha, Kiyota and Yamanouchi (2016) report that misallocation of resources did not diminish following WTO accession within Vietnam.

and exit dynamics due to potentially delayed capital adjustment documented in Dix-Carneiro and Kovak (2017), as well as post-entry growth of firms.

Finally, we relate to the recent empirical literature on how global value chains adjust to trade policy changes, a literature that has predominately focused on the effects of tariffs on intermediate goods sourcing (see Conconi et al. (2018); Flaaen and Pierce (2019); Bown and Zhang (2019); Handley, Kamal and Monarch (2020); Blanchard, Bown and Johnson (2021)). We contribute by focusing on a single host country, multiple sources of FDI, and studying FDI jointly with domestic firms. This enables us to examine the impact of trade cost reduction on the extensive entry margin of foreign affiliates and their subsequent employment growth, which is a major policy concern in lower-income settings.

Importantly, our results emphasize the responsiveness of all sources of FDI to trade policy changes in a host country, rather than focusing on FDI from one country (such as the U.S.). This occurs in part due to export platforms (Tintelnot, 2017). Earlier studies have found production reallocation effects across countries in response to trade protection targeting a particular exporter country (Blonigen, 2002) and/or at an industry level (see Flaaen, Hortaçsu and Tintelnot (2020)). Our study highlights how multinationals from third countries can influence the host country's access to global export markets. Focusing solely on the response of FDI from the U.S. multinationals to BTA-induced tariff cuts would have missed much of the foreign affiliate responses.

We provide a detailed discussion of the BTA in section 2. In section 3, we summarize a conceptual framework and describe the data in section 4. Subsequently, we present the empirical methodology and results in sections 5 through 8. Section 9 concludes.

2 U.S.-Vietnam Bilateral Trade Agreement

In this section we present background information on the BTA and foreign investment in Vietnam. Additionally, we discuss other significant trade policy changes during the same time period as well as the Vietnamese government's reform policy on state-owned firms in section [B.2](#).

2.1 Background

Trade and investment relations between the United States and Vietnam have a fairly unique history. Following the U.S.-Vietnam War, the U.S. imposed a trade embargo on Vietnam. This lasted until 1994 when diplomatic relations were restored. 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. These tariff rates are punitively high on many goods. The primary trade policy element of the 2001 BTA was to reclassify Vietnamese exports from Column 2 to the Most Favored Nation (MFN) or Normal Trade Relations (NTR) tariff schedule.

The unique nature of the BTA makes it an excellent setting for evaluating the causal impacts of improved foreign market access. First, as described in *STAR-Vietnam* (2003) and *McCaig* (2011), the BTA featured a large reduction in U.S. tariffs on imports from Vietnam, but negligible reductions in Vietnamese tariffs on imports from the U.S. Prior to the BTA, Vietnam already offered MFN tariffs on imports from the U.S., whereas the U.S. applied Column 2 tariffs to imports from Vietnam. When the BTA was implemented on December 10th, 2001, the U.S. immediately switched to applying MFN tariffs on imports from Vietnam.⁷ 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 member 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

⁷The BTA required Vietnam to reduce import tariffs on approximately 250 (out of approximately 6000) 6-digit HS agricultural and manufactured food products. As these tariff cuts were small in comparison to the U.S. tariff cuts and only affected a relatively small number of products, we do not discuss them in detail. As part of the BTA, Vietnam was required to implement various regulatory and legal changes over a period of 10 years following the implementation of the BTA. These included commitments to improve market access in services such as banking and telecommunication, intellectual property rights, and protection of foreign direct investment (*STAR-Vietnam*, 2003).

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, as calculated by McCaig (2011).⁸ Across 119 traded manufacturing industries at the 4-digit level, the average tariff reduction was 29.0 percentage points, from 31.9 to 2.9 percentage points. The average reduction hides significant variation across industries. The standard deviation of industry tariff reductions is 15.6 percentage points, ranging from no tariff reduction in coke oven products to a 63.0 percentage point reduction in watches and clocks. In addition, there is also significant variation in the sizes across these industries. There is significant variation in the tariff cuts across initial industry employment prior to the BTA in year 2000 (Figure 3). For example, the footwear industry was the largest employer (300,000 workers) but was subjected to a higher tariff cut compared to the smallest employer, the coke oven products industry (805 workers). Our empirical strategy relies on this variation in tariff reduction sizes across industries.

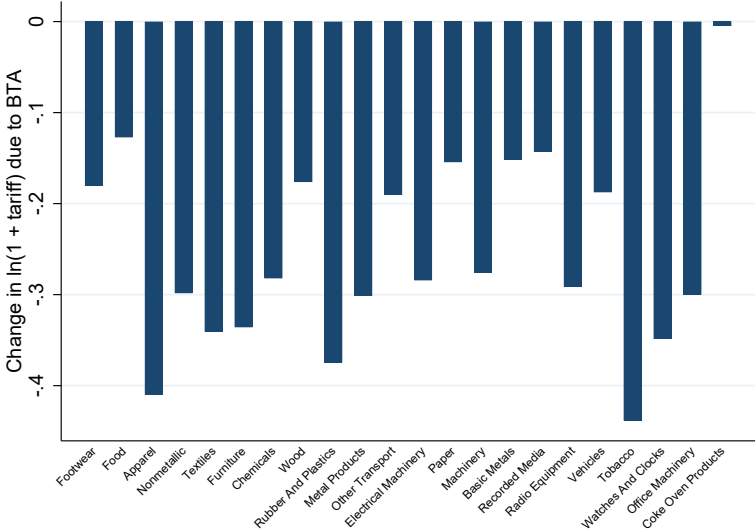


Figure 3: Tariff reductions due to the BTA

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

⁸McCaig (2011) uses 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 computes the ad valorem equivalent of any specific tariffs. He then matches 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 3-digit ISIC industry nomenclature. We follow the same procedure by 4-digit ISIC industries.

The U.S. tariff reductions had a large impact on Vietnamese exports to the U.S. (McCaig, 2011; McCaig and Pavcnik, 2018; Fukase, 2013). Figure 1 shows the dramatic break in trend of Vietnamese manufacturing exports to the U.S. immediately following the onset of the BTA. The U.S. quickly became the most important manufacturing export market, accounting for 26.1 percent of Vietnamese manufacturing exports by 2004. By value, the top industries of Vietnamese manufacturing exports to the U.S. in 2004 are wearing apparel; production, processing, and preservation of meat, fish, fruit, vegetables, oils and fats; knitted and crocheted fabrics and articles; footwear; and furniture. Together, these five industries accounted for 87.9 percent of manufacturing exports to the U.S. in 2004. Apparel alone accounted for 45.0 percent.⁹

The U.S. tariff reductions also influenced the composition across industries of Vietnamese manufacturing exports to the U.S. Figure B1 shows the relationship between growth in Vietnamese manufacturing exports to the U.S. between 2001 and 2004 and BTA induced tariff changes across 2-digit ISIC industries. There is a clear negative relationship: Vietnamese industries that experienced the largest decrease in U.S. tariffs saw exports to the U.S. rise more rapidly. McCaig and Pavcnik (2018) has documented that this pattern of industry export growth was not due to global demand shocks.

Previous work by McCaig and Pavcnik (2018) has shown that the BTA tariff reductions are not correlated with industry levels or trends. For example, the tariff reductions are not strongly correlated with the skilled labor intensity of an industry or the share of informal sector workers within the industry prior to the BTA. Additionally, we show that the U.S. tariff reductions are not strongly correlated with initial conditions within formal manufacturing (Figure 4). 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.

Thus, the BTA represents an excellent empirical setting. The tariff reductions had a large impact on aggregate exports, induced more rapid export growth in industries that

⁹Upon 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.

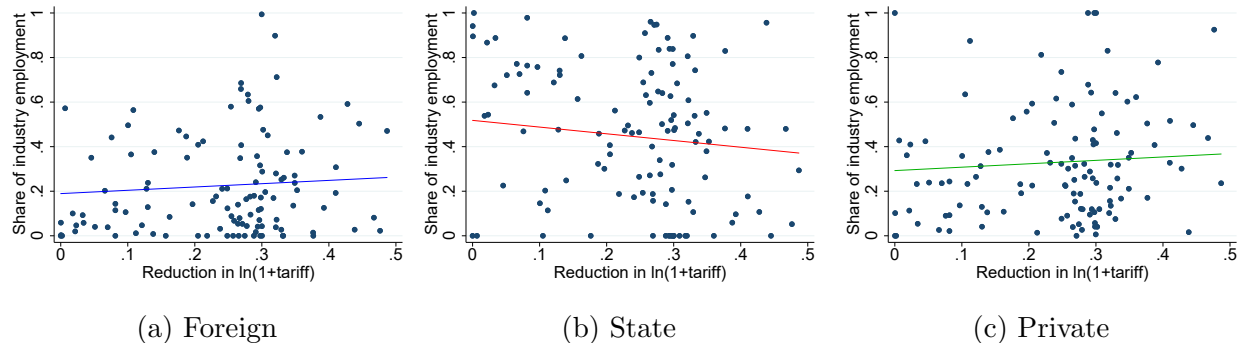


Figure 4: Correlation between the initial within industry employment shares for each ownership type and their corresponding industry-level BTA tariff cuts

experienced greater tariff cuts, were not subject to industry lobbying, and are uncorrelated with pre-existing trends and levels.

2.2 Foreign-invested enterprises prior to the BTA

Very shortly after the onset of *Doi Moi* in 1986, Vietnam passed its first law on foreign investment in 1987 and it allowed for three types of foreign investment: business cooperation contracts, joint ventures, and wholly owned foreign firms (Athukorala and Tien, 2012). A subsequent amendment in 1996 allowed for joint ventures with private partners and made it easier for projects to be licensed. In the second half of the 1990s, FDI became increasingly concentrated within manufacturing, despite a temporary slowdown during the Asian Financial Crisis. Following the slowdown, 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. In 2006, the unified Investment Law, which covered all enterprises, not just FDIs, offered foreign investors complete freedom in terms of entry mode (joint venture or full ownership) and abolished local content requirements and export target requirements (Athukorala and Tien, 2012).

The number of FDIs in manufacturing was growing prior to the BTA (Table B2). They were also growing in terms of their importance for exports. Between 1997 and 2000, their percentage of Vietnamese merchandise exports, excluding crude oil, grew from 17.1 to 22.9% (Vietnam Customs Handbook, 2017).

From matching the manufacturing FDI firms with source country funding, we find that

foreign investment was predominantly coming from East Asia and make up about 80% of foreign employment during this period (79% in 1999 and 85% in 2017, Figure 5). Based on the 982 manufacturing FDIs in 2000 that we can match, the most common sources of funding are Taiwan (36%), South Korea (19%), Japan (14%), and Singapore (3%). Most of this foreign investment is going into wholly-owned foreign enterprises. In 2000, 67% of FDIs were wholly owned (699 firms), while 26% were joint ventures with SOEs (271 firms) and the remaining 7% were joint ventures with PRIs (75 firms). By 2017, 93% of FDIs were wholly owned (7,542), only 1% were joint ventures with SOEs (88 firms), and 6% were joint ventures with PRIs (483 firms). The U.S. accounted for a relative small share of source country funding—1.3% in 1999 and 1.6% by 2017. China started as a small source country in 1999, at 0.004%, but grew to 7% by 2017.

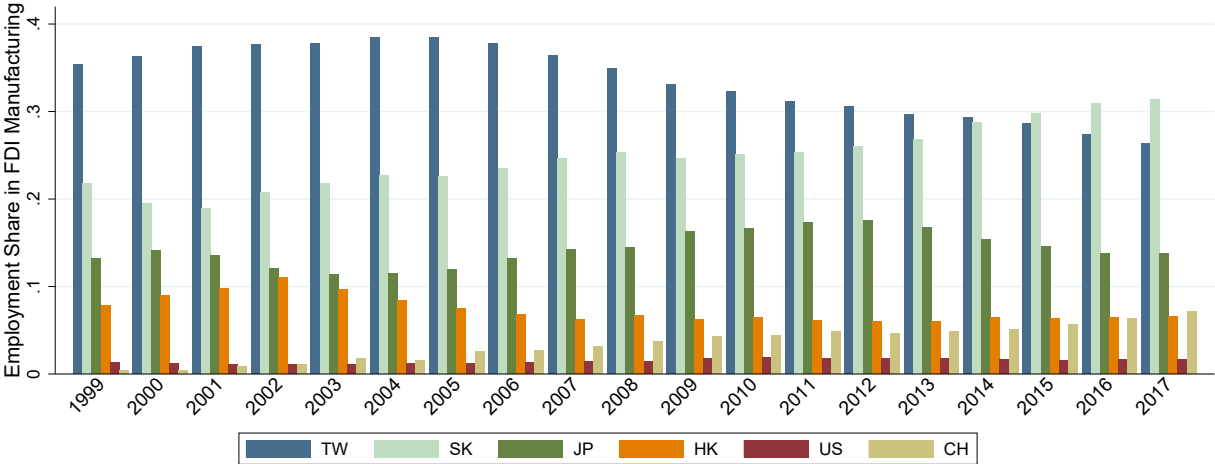


Figure 5: FDI Employment by Source Country

The BTA made no sector specific changes to FDI investment within manufacturing. However, the BTA did have some provisions related to foreign investment. Government screening of foreign investment was to be eliminated by 2006. This includes all trade-related investment measures that are inconsistent with the WTO, such as local content requirements, and the removal of export performance requirements (Manyin, 2001). Many of these requirements were accomplished with the Unified Investment Law that came into force in 2006.

3 Conceptual Framework

The primary change in trade policy due to the BTA was a reduction in U.S. tariffs applied to imports from Vietnam. Conventional trade theory suggests that industries that experienced larger tariff reductions should expand relative to industries that received smaller tariff reductions. We briefly describe why these tariff reductions could differentially affect the performance and survival probability of existing firms and 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 variable costs of accessing the export market is predicted to lead to expansion of the most productive continuing firms and contraction and/or exit of the least productive firms due to selection and reallocation.¹⁰ Thus, tariff-induced expansion of industry revenue and employment is expected to be dominated by continuing firms, increased firm exit, and less firm entry. These predictions serve as the basis for our empirical approach in section 5.

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 global supply chains in Vietnam. Recent studies examine theoretically and quantitatively a broad set of determinants of foreign affiliate entry (Garetto, Oldenski and Ramondo, 2019) and there is an on-going debate about the implications of trade policy for FDI, value added trade, and fragmentation of production (Brainard, 1997; Yi, 2003; Antràs and Yeaple, 2014; Johnson and Noguera, 2017; Antras and Chor, Forthcoming; Antras, Fort and Tintelnot, 2017). With lower costs of accessing a key export market, multinationals can benefit from lower wages by expanding their affiliates in Vietnam, including through export platform FDI (Tintelnot, 2017).¹¹ Multinationals tend to have higher productivity than domestic

¹⁰Mrázová and Neary (2019) show that the selection effects in Melitz style models are very robust to functional form assumptions and market structure, requiring supermodularity of the profit function in marginal production costs and market access costs (export).

¹¹Foreign firms are much more likely to be engaged in exporting than either SOEs or PRIs in Vietnam. In 2000, 73% 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—45% of exporting FDIs and over 60% of exporting PRIs report exports worth more than 95% of revenue. This high export intensity

firms (Helpman, Melitz and Yeaple, 2004).¹² 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).¹³ FDI might also not face some of the same constraints as domestic firms in factor markets, with better access to international credit markets (Alfaro and Chen, 2018; Bilir, Chor and Manova, 2019).¹⁴

These characteristics might further enable FDI to expand relative to domestic firms in Vietnam (through new entry and expansion of incumbents) in response to lower tariffs on imports to the U.S. This might lead to an increase the number of foreign affiliates in that country, which can additionally crowd out the less productive firms (Tintelnot, 2017), leading to within industry increase in employment in foreign affiliates.¹⁵ The above mechanism does not require FDI to directly compete with domestic firms in the domestic product market. Even if FDI are mostly targeting export markets, the increased labor demand within these firms increases the labor costs for domestic-market oriented firms.¹⁶

The second issue to consider is that the predictions above in the Melitz style models might differ with some politically connected firms. Many countries, including Vietnam, feature a prominent state-owned sector in manufacturing (see, for example, Hsieh and Klenow (2009) for China), which may be associated with distortions induced by preferential access to inputs for the state sector or entry barriers (Mobarak and Purbasari, 2006; Mishra, 2011; Khandelwal, Schott and Wei, 2013; Pincus, 2015; Brandt, Kambourov and Storesletten, 2019). Such preferential treatment might keep politically connected firms protected from

is similar to patterns in China (Lu, 2010; Dai, Maitra and Yu, 2016).

¹²In our empirical setting, foreign affiliates are on average are more productive than both the SOEs and private firms.

¹³Antràs 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,” and tangible and intangibles of multinational firms.

¹⁴Using three World Bank Enterprise Surveys, we find that foreign firms are more likely to (1) report international markets as their main market (56% vs 24% for state, 21% for private), and (2) report access to finance as not an obstacle (65% vs 29% for state, 39% for private).

¹⁵Aitken and Harrison (1999) focuses on an alternative crowd out mechanism: that increases in foreign ownership negatively affect the productivity of wholly domestically owned firms in the same industry via a scale effect.

¹⁶McCaig (2011) finds that the BTA is associated with an increase in wages. McCaig and Pavcnik (2018) find within industry reallocation of workers from the informal microenterprise sector to the registered firms in response to the BTA, suggesting the reallocation of labor at a more aggregate level is responsive to the BTA.

new entrants or subsidize and artificially lower their marginal costs.

In the presence of these politically-connected SOE firms, trade reforms could raise or reduce resource reallocation and industry efficiency. For example, to the extent that industries that initially feature a large share of SOEs are industries with more politically motivated entry barriers, they may be less responsive than other industries to declines in variable export costs. At the firm level within industries, reduced barriers to accessing export markets can reduce SOE's export market shares by eliminating distortions and/or providing new market access to efficient but constrained firms (including new entrants) who are not politically connected (Khandelwal, Schott and Wei, 2013). On the other, less productive SOEs who are sufficiently connected or subsidized might push out relatively more productive firms without preferential treatment and exacerbate the misallocation in the economy in response to export liberalization—resulting in a less efficient allocation of resources across firms (Bai, Jin and Lu, 2019; Berthou et al., 2019).¹⁷

Overall, these differing barriers that different firm ownership-types face might affect how reallocation works and we can shed light on this empirically. In particular, our setting raises two interesting questions: First, how do trade policy reforms affect the entry of FDIs? And second, to the extent that FDIs entry increases due to tariff cuts, which domestic firms are crowded out—the SOEs or PRIs?

Given the presence of different firm types, a reduction in U.S. tariffs on imports from Vietnam will have slightly more nuanced predictions than in a simple model with only one dimension of heterogeneity—productivity. First, the entry cutoff will rise and second, export platform FDIs will enter. Existing FDIs with foreign technology are more productive overall (in Vietnam) and would crowd out some of the SOEs and private firms. As such, there would be a reallocation of employment towards FDIs particularly within industries with higher tariff cuts. Note that this reallocation would happen regardless of whether the SOEs are more politically connected and therefore have more favorable operating conditions compared to

¹⁷Bai, Jin and Lu (2019) evaluates how firm-level revenue distortions change the impact of trade on productivity and welfare, and how much trade has contributed to Chinese growth in a decomposition exercise. Berthou et al. (2019) investigates the impact of trade on aggregate welfare and productivity for 14 European countries by focusing on marginal cost-level distortions that are correlated with productivity. In the context of import liberalization, connected firms can be protected from rising import competition (Brandt et al., 2017; Baccini, Impullitti and Malesky, 2019).

private firms. However, the tariff reduction would also allow for relatively more productive private firms to expand and export. This potentially creates two opposing effects: the first effect is that if the FDI crowds out more SOEs relative to private firms resulting in a more efficient allocation of firms compared to before the BTA; while the second effect is that FDI crowds out more private firms relative to SOEs, potentially resulting in an even less efficient allocation of firms compared to before the BTA. The first effect would result in a net efficiency gain from the BTA while the latter would result in the opposite.

This result is central to the recent and emerging quantitative literature on trade and misallocation mentioned above which establishes that typical trade liberalization predictions are more nuanced in the presence of a variety of distortions. Distortions can mask a firm's true productivity—a firm could be producing in the market not because it is inherently productive but because it is sufficiently subsidized. These highly subsidized firms will export and expand at the cost of other more productive but less subsidized firms. When the selection effect in the Melitz-type model is no longer based solely on productivity but instead productivity and distortions, trade may lower the average productivity of firms.

Our discussion of the conceptual framework highlights two main ideas. First, there should be a reallocation of output and inputs across firms within an industry in relation to firm productivity. The underlying conceptual framework also generates predictions regarding the productivity of entering and exiting firms, relative to the incumbents. Second, the extent of reallocation across firms may be influenced by firm ownership. In our subsequent empirical analysis, we examine differential effects across industries and ownership types within industries in response to the BTA.

4 Firm Data

Our firm data come from the annual enterprise survey conducted by the General Statistics Office (GSO) of Vietnam. This survey covers all businesses in Vietnam registered as an enterprise according to the Enterprise Law.¹⁸ All state, collective, and foreign businesses must register as an enterprise to legally operate in Vietnam. Private businesses, however,

¹⁸See law No. 13-1999-QH10.

have the option of registering as a household business or as an enterprise. A private business is legally required to be registered as an enterprise if it has more than 10 workers or operates in more than one location, but this does not mean that all private enterprises have 10 or more workers. Indeed, many private enterprises have less than 10 workers. We use data for the years 2000 through 2017, which spans the date of implementation of the BTA and allows for a long-term analysis following the implementation of the BTA.

The data contain a number of features important for our study. First, the data 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. Second, the ownership type of the firm is reported in a manner that allows us to consistently categorize firms as state-owned enterprises, foreign-invested enterprises, or private domestic enterprises, including collectives. Hence, we can examine differential effects of the BTA by ownership. Third, the data contain information on the industry of operation, revenue, employment, and fixed assets of the firms. In the data appendix we provide additional detail on the sampling framework and preparation of the data for analysis.

We focus on firms in traded manufacturing industries, as indicated by the main industry of operation.¹⁹ We have over 740,000 firm-year observations, with the number of firms growing from 10,285 in 2000 to over 85,000 in 2017 across 122 traded manufacturing industries at the 4-digit level. Table 1 presents the summary statistics of the different ownership types for years 2000, 2010, and 2017. In 2000, FDIs and SOEs employ more people compared to PRIs although there are many more PRI firms. FDIs have highest average revenue per firm followed by SOEs while PRIs have the lowest by several orders of magnitude. The overall number of firms grows from 10,288 to 44,958 between 2000 and 2010, primarily due to an increase in private firms, but the number of foreign firms increased by more than fourfold from 1,041 to 4,489, while the number of state firms contracts by more than half from 1,536 to 682. From 2010 to 2017, the number of firms almost doubles to 83,481 which is again driven by private and foreign firms while the state firms further contracts to 458. While

¹⁹The 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.

state firms in 2010 and 2017 have the same number of employees on average as in 2000, these remaining firms have higher average revenues relative to FDIs and PRIs. We can track 39,618 continuing firms between 2000 and 2017.

Table 1: Summary Statistics: Years 2000 and 2017

Year 2000	Foreign	Private	State	Total
Revenue	203,148 (736,732)	13,542 (51,434)	127,453 (342,121)	49,685 (280,311)
Employment	342 (1,024)	67.6 (259)	466 (765)	155 (517)
Observations	1,041	7,708	1,528	10,277
Year 2017	Foreign	Private	State	Total
Revenue	394,270 (5,913,470)	23,700 (264,077)	533,022 (2,585,199)	61,156 (1,839,233)
Employment	508 (1,965)	35.9 (212)	465 (802)	82.4 (652)
Observations	7,843	75,547	460	83,350

Note: 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. Standard deviation is reported in paranthesis.

Firm entry and exit played an important role over the period of the BTA. Table 2 reports the importance of entry and exit in the enterprise sector, overall, and for SOEs, FDIs and PRIs. Exiting firms are defined as firms that operated in 2000, but not in 2017. Likewise, entrants are defined as firms that operated in 2017, but did not operate in 2000. 65 percent of firms that operated in 2000 no longer operated by 2010, while over 90 percent of firms in 2010 were not in operation in 2000. Exiters and entrants not only account for a large share of firms, but also a sizable share of revenue and employment. In particular, entrants account for 73 percent of employment and 68 percent of revenue in 2017.

If all types of firms faced similar entry barriers and had similar underlying productivity distributions, the model of heterogeneous firms predicts similar entry and exit rates across different firm types. Yet, Table 2 suggests that entry and exit rates differ widely across SOEs, FDIs, and PRIs. Private domestic firms exhibit the highest entry and exit rates, 84 and 98 percent respectively. SOEs have notably lower entry rates, 27 vs. 93 percent, and

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

Share of	Firms	Revenue	Employment
All ownership types			
Exiters	0.65	0.36	0.42
Entrants	0.92	0.68	0.73
State-owned firms			
Exiters	0.49	0.33	0.38
Entrants	0.27	0.34	0.23
Foreign affiliates			
Exiters	0.46	0.31	0.31
Entrants	0.93	0.85	0.87
Private domestic firms			
Exiters	0.84	0.68	0.67
Entrants	0.98	0.93	0.92

higher exit rates, 49 vs. 46 percent, compared to FDIs. The differences in entry and exit rates among the SOEs, relative to private firms and FDI firms, are consistent with differences in the fixed cost of entry and exit across firm types and with existence of distortions that vary across firm types and affect a firm's choice of entry and exit. They are also consistent with a decline in the fixed cost of entry for FDI firms in the aftermath of the BTA.

5 Empirical Approach, Industry Growth by Ownership, and Entry

Based on the conceptual framework and overview of the BTA, we begin our empirical analysis by investigating the relationship between the U.S. tariff reductions and industry-level outcomes in Vietnam's formal manufacturing sector. This analysis briefly highlights the first order effects of the BTA on trade flows and aggregate industry outcomes and sets the stage for the subsequent industry-firm ownership level analysis. Our setting enables us to examine the evolution of industry and firm outcomes in response to the BTA over a longer time period than is usually possible with firm-level data from low-income countries.

5.1 Research Design and Identification

To study the relationship between the BTA 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 outcome for industry j at year t , ΔBTA_j is defined as the log of US Column 2 tariff value minus the log of MFN tariff value at the industry j level, indicator $\mathbb{1}_{t'}$ equals one for year t' where $t' \in [t_0, t_N]$, λ_j is an industry fixed effect, and θ_t is a year fixed effect. 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 . Standard errors are clustered at the industry level. The base year for outcome changes is year 2000 and the key parameters of interest, $\beta_{t'}$, capture the cumulative BTA impact on the outcome by each year t' , relative to 2000. The BTA is implemented in 2001.

The identification of the causal effect of U.S. tariff reductions on 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 in detail the unique political economy of the BTA-induced U.S. tariff reductions. In particular, neither U.S. nor Vietnamese industries had an ability to influence the size of tariff reductions based on the movement of U.S. imports from Vietnam from one pre-existing tariff schedule, Column 2, to another, MFN. Furthermore, McCaig and Pavcnik (2018) show that the U.S. tariff cuts are not correlated with industry-specific global demand shocks for Vietnamese exports during this period nor with pre-existing industry-specific trends in Vietnamese exports to the U.S., E.U., or worldwide. Importantly, we also find that industry tariff changes are not correlated with baseline industry characteristics such as the industry prevalence of the SOEs or FDI firms (Figure 4).

5.2 Setting the Stage: BTA, Exports, and Industry Growth

We first establish that lower import tariffs have first-order effects on Vietnamese export flows to the US using UN Comtrade data for US imports from Vietnam using pre- and post-BTA data covering 1996 to 2018.

Because our firm-level data is only available starting in 2000, this estimation also has the added benefit of establishing a longer pre-BTA period—acting as a placebo test that shows that the BTA tariff changes are not correlated with changes in outcomes of interest prior to the implementation of the agreement. The estimation is conducted at the 3-digit industry level and the coefficients on tariff change β_{ν} are reported in Figure 6.²⁰ The estimates for years prior to 2001 confirm that the BTA induced tariff changes were not correlated with imports to the US prior to the implementation of the agreement. Those regression coefficients are small in magnitude and statistically insignificant. This suggests that industry-specific pre-existing trends are not influencing our results. However, positive and large estimates after 2001 suggest an immediate and large surge in US imports from Vietnam, which then flattens out but continues to grow over the medium run.

Next we focus on Vietnamese industries and find that the industries subject to larger US tariff reductions expand relative to industries with lower tariff cuts. The industry-level event study estimates of the coefficients on tariffs from specification (1) are reported in Figure B2 for three industry outcomes: number of firms (Panel a), employment (Panel b), and revenue (Panel c). Consistent with the pattern of exports (figure 6), number of firms, employment, and revenue expands more in industries with bigger tariff cuts. Overall, the composition of industries changes consistently with predictions of the neoclassical trade models, as resources and revenue allocate toward industries experiencing greater declines in variable export costs.

²⁰We conduct the analysis at the 3-digit industry level because many 4-digit industries report no exports to the US prior to the BTA. We don't expect industry aggregation to change our qualitative findings. For example, our findings are in line with the results in McCaig and Pavcnik (2018), who conduct the analysis at the 2-digit industry level.

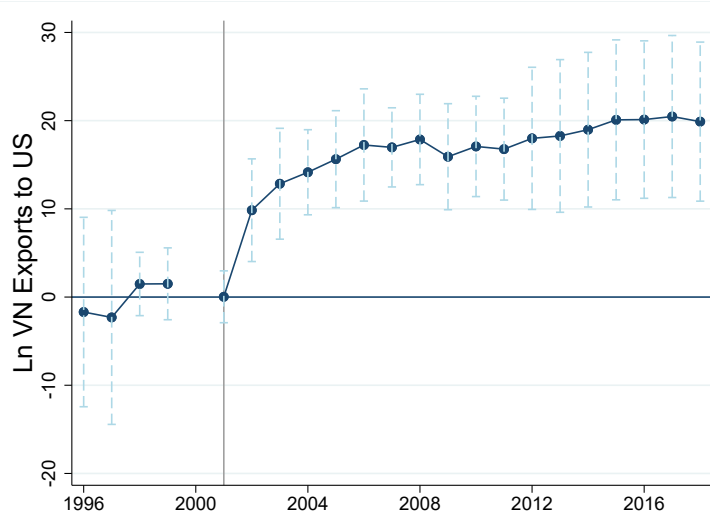


Figure 6: Vietnam Exports to the US (1996-2018)

Note: Each point reflects an individual regression coefficient, $\hat{\beta}_{t'}$, following equation (1), where the independent variable is the change in US tariff applied to Vietnamese exports in an industry before and after the BTA (ΔBTA_j). The dependent variable is the log annual Vietnamese exports to the US. Positive coefficients imply larger export values in industries facing larger tariff reductions. BTA was implemented in Dec 2001 and the base year is 2001 due to our definition of entry (indicated by the gray line). Controls include 4-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 2001, 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. *Source:* UN Comtrade.

5.3 Differential Impact by Ownership and Importance of Data Encompassing All Firms

We find important differences in the response of industry outcomes across firm ownership types to the BTA. We estimate a version of equation (1) augmented to investigate differential impacts across firm ownership types o where $o \in \{FDI, SOE, PRI\}$:

$$Y_{jot} = \sum_{t'=t_0 \setminus 2000}^{t_N} \beta_{ot'} \Delta BTA_j \mathbb{1}_{t'} + \lambda_{oj} + \theta_{ot} + \alpha_{ot} C_{jt} + \varepsilon_{jot} \quad (2)$$

where Y_{jot} is the outcome for firm type o in industry j at year t , ΔBTA_j is the change in US tariff applied to VN exports in industry j before and after the BTA, indicator $\mathbb{1}_{t'}$ equals one for year t' where $t' \in [t_0, t_N]$, λ_{oj} is an ownership-industry fixed effect, and θ_{ot} is an ownership-year fixed effect. Inclusion of these 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 displayed in Figure 2. 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 . Standard errors are clustered at the industry level. As before, year 2000 is the base year while the BTA implementation year is 2001 and the key parameters of interest, $\beta_{ot'}$ capture the cumulative BTA impact on the outcome by each firm ownership-year ot' , relative to 2000.

This analysis yields two key findings. First, the industry expansion following tariff cuts is predominately driven by FDIs and private domestic firms over SOEs and is sustained over time. We focus on the estimates of the coefficients on tariffs for number of firms for the three ownership types (Figure 7). We find that the dynamics of the tariff effects differ for each of these firm types. Both the FDIs and PRIs are key contributors to the increases in industry-level firm count, with the PRIs being the main drive of the initial increase in firm count in industries with larger tariff cuts. The cumulative positive effect on number of FDI firms levels off 8 to 10 years after the BTA, while the cumulative effect for PRI firms tapers off sooner—three years following the agreement. On the other hand, SOEs in industries with bigger tariff cuts initially observe no change in firm count in response to tariff cuts in 8-10 years after the BTA, but the (relative) number of SOE firms in industries with bigger tariff cuts increases relative to number of SOEs in less affected industries starting at 8 to 10 years following the BTA.

Note that these patterns of adjustments are not driven by secular differential trends across firm types because our specification in this section includes ownership-year fixed effects. During this time period, the aggregate number of SOE firms and SOE employment is falling. The increase in the number of SOE firms in response to tariff cuts does not mean that these industries experience SOE entry. Instead, the tariff cuts are associated with an increased number of SOE firms because the number of firms in industries with larger tariff cuts is decreasing by less than in less affected industries.²¹ Given that these SOE dynamics are

²¹There is currently no consensus in the literature whether trade reforms raise or reduce industry efficiency in this context (Atkin and Khandelwal, 2020; Bai, Jin and Lu, 2019; Berthou et al., 2019). On one hand, trade reforms can reduce SOE’s export market shares by providing new market access to efficient but constrained firms who are not politically connected (Khandelwal, Schott and Wei, 2013). Khandelwal, Schott and Wei (2013) find that SOE exporters in China lose export market share when inefficiently allocated export quotas on clothing and textiles are removed due to the end of the Agreement on Textiles and Clothing. On the other hand, SOEs are not subject to the same competitive pressures due to increased import competition

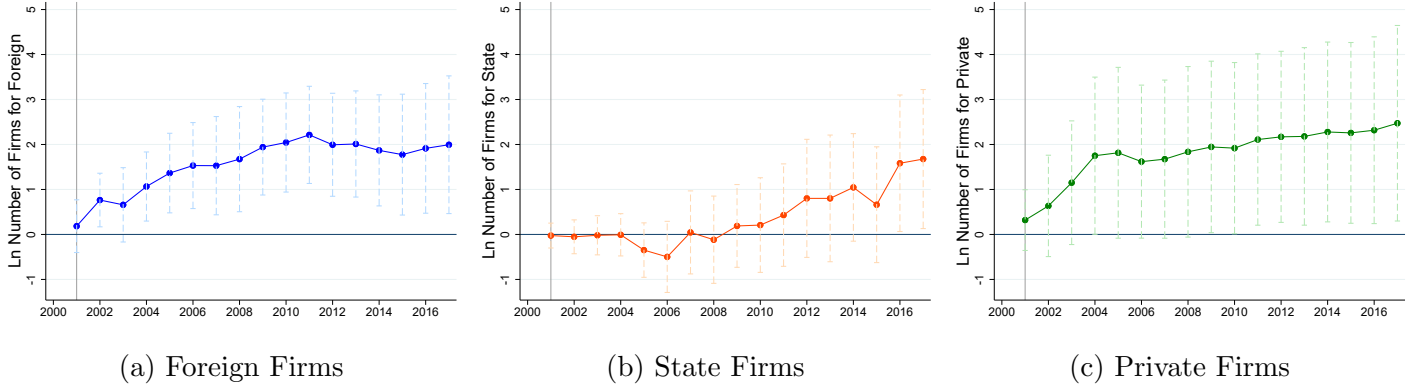


Figure 7: Changes in industry-level firm count due to BTA by ownership-types

Note: Each point reflects an individual regression coefficient, $\hat{\beta}_{ot}$, following equation (2), where the independent variable is the change in US tariff applied to Vietnamese exports in an industry before and after the BTA (ΔBTA_j). In Panel (a), the dependent variable is the log annual number of FDI firms in an industry. In Panel (b), the dependent variable is the log annual number of SOE firms in an industry. In Panel (c), the dependent variable is the log annual number of PRI firms in an industry. Positive coefficients imply larger number of firms in industries facing larger tariff reductions. BTA was implemented in Dec 2001 and the base year is 2001 due to our definition of entry (indicated by the gray line). Controls include 4-digit ownership-industry FEs, ownership-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 2001, 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 4-digit industry level. Weighted by year 2000 employment.

driven by firm exit, the delayed response of SOEs in terms of firm count (and employment and revenue) is consistent with delayed adjustments to trade reform due to slow adjustments of capital in Dix-Carneiro and Kovak (2017).

Second, we find that including all firms—regardless of size—matters for understanding the full impact of BTA. In our analysis above we use data that covers all registered firms regardless of their employment or revenue size. Most conventional firm-level data often only cover firms above a certain size cut-off, such as 10 employees. To examine whether such cut-offs influence the findings, we focus solely on larger firms with more than 10 employees and repeat the above analysis. Focusing solely on larger firms with a size cutoff of 10 employees, we see that the BTA has a much more muted impact on these larger private firms (Panel (b) compared to Panel (a), Figure 8). This highlights one of the main contribution of our analysis: with size cutoffs, we would miss the BTA’s impact on small private firms. The BTA does generate domestic entry of small private firms and this result is an important part

in response to WTO accession in China and Vietnam (Brandt et al., 2017; Baccini, Impullitti and Malesky, 2019), with SOEs less likely to exit in response to import tariff cuts relative to domestic firms. Ha, Kiyota and Yamanouchi (2016) report that misallocation of resources did not diminish following WTO accession within Vietnam. Our analysis focuses on the effects of increased market access rather than increased import competition.

of its impact. We now focus on this entry margin.

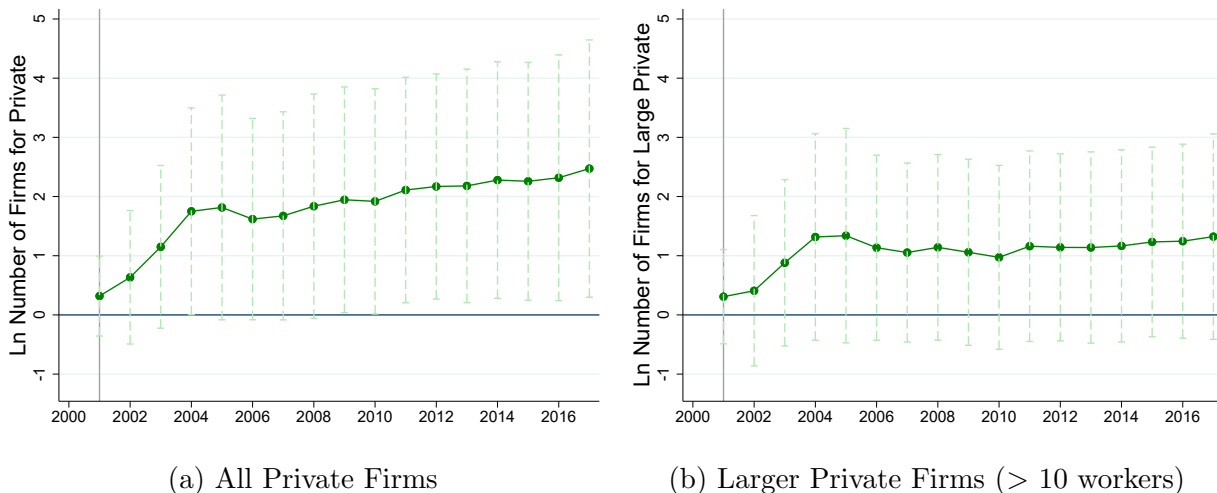


Figure 8: Changes in industry-level outcomes due to BTA for private firms: before and after excluding small firms

Note: Each point reflects an individual regression coefficient, $\hat{\beta}_{ot,t}$, following equation (2), where the independent variable is the change in US tariff applied to Vietnamese exports in an industry before and after the BTA (ΔBTA_j). In Panel (a), all firms are included (replicated from Panel (c), Figure 7). In Panel (b), observations of firms with less than 10 employees are excluded. Positive coefficients imply larger number of firms in industries facing larger tariff reductions. BTA was implemented in Dec 2001 and the base year is 2001 due to our definition of entry (indicated by the gray line). Controls include 4-digit ownership-industry FEs, ownership-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 2001, 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 4-digit industry level. Weighted by year 2000 employment.

5.4 Impact of BTA on Entry: Across Ownerships for All Firms

We find substantial entry into Vietnam manufacturing in response to the BTA (Panel (a), Figure 9). Larger tariff cut industries experience more entrants, mainly driven by foreign and private firms. 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 (Panel (b), Figure 9). We find similar but smaller effects for the private firms (Panel (c), Figure 9). This extensive margin adjustment in response to trade policy—the initial as well as subsequent responses—can be a source of sizable welfare gains from trade liberalization.

We observe an increase in firm entry rates due to the trade policy. This is in contrast to most of the extensive margin literature which focuses on just entry to exporting. Including all firm types, we find an elasticity of entry with respect to tariff of 0.93 in the short run 2

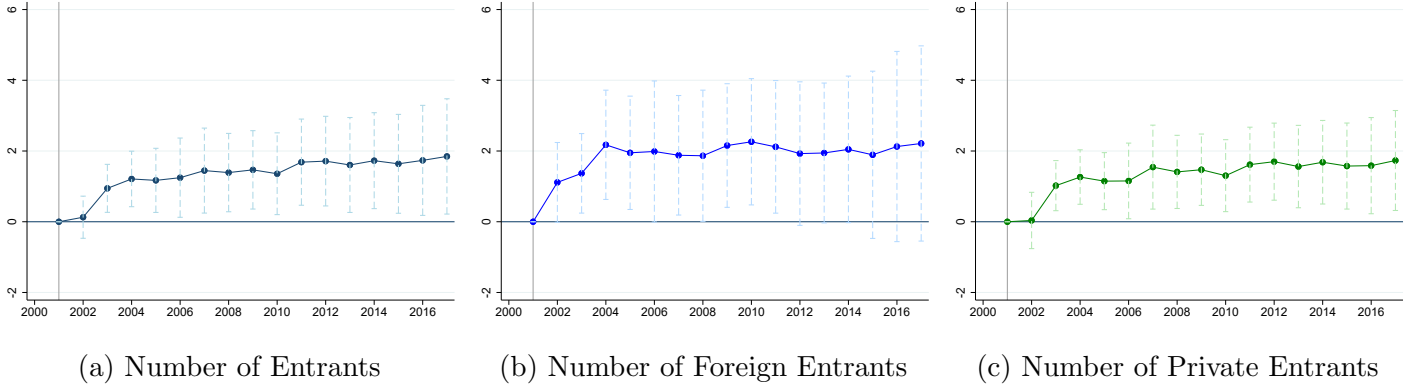


Figure 9: Number of Entrants Overall and by Ownership, 2000-2017

Notes: Each point reflects an individual regression coefficient, where the independent variable is the change in US tariff applied to Vietnamese exports in an industry before and after the BTA. 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 Panel (b), the regression coefficient is $\hat{\beta}_{ot}$ following equation (2) and the dependent variable is the log annual number of FDI entrants in an industry. In Panel (c), the regression coefficient is $\hat{\beta}_{ot}$ following equation (2) and the dependent variable is the log annual number of private entrants in an industry. Positive coefficients imply larger number of entrants in industries facing larger tariff reductions. BTA was implemented in Dec 2001 and the base year is 2001 due to our definition of entry (indicated by the gray line). In Panel (a), controls include 4-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 2001, and US import quotas on textiles and clothing applied to Vietnam and China respectively. In Panels (b) and (c), 4-digit ownership-industry FEs and ownership-year FEs are included as well as the same set of controls mentioned previously. Dashed lines show 95 percent confidence intervals. Standard errors clustered at the 4-digit industry level. Weighted by year 2000 employment.

years post-BTA (2003), and 1.5 in the long run after 12 years (2013). These elasticities are for all firms with no firm size cutoff (Panel (a), Figure 10). With a 10-worker firm-size cutoff, we find that the short and long run entry elasticities decline to 0.8 and 1.3 respectively.

As mentioned earlier, we find that small private domestic firms are more responsive to these tariff cuts. With size cutoffs, we would miss the BTA’s impact on the entry of small private firms. For the private firms, the entry elasticity declines from 1 and 1.46 to 0.8 and 1 at the 10-worker cutoff, and converges at the 20-worker cutoff (Panel (b), Figure 10). We find that firm size cutoffs significantly understate tariff-induced entry of private domestic firms and overstates the relative entry elasticity of foreign to private domestic firms.

We discuss these findings relative to the literature. The high entry rates of exporting firms as a result of trade liberalization has been quantitatively shown to have significant welfare benefits (Caliendo et al., 2017; Melitz and Redding, 2014; Balistreri, Hillberry and Rutherford, 2011; Cherkashin et al., 2015). We estimate the magnitude of this margin empirically by showing an increase in the number of foreign firm entries which are primarily export platforms. We find an elasticity of export entry with respect to tariff of 1.3 in the

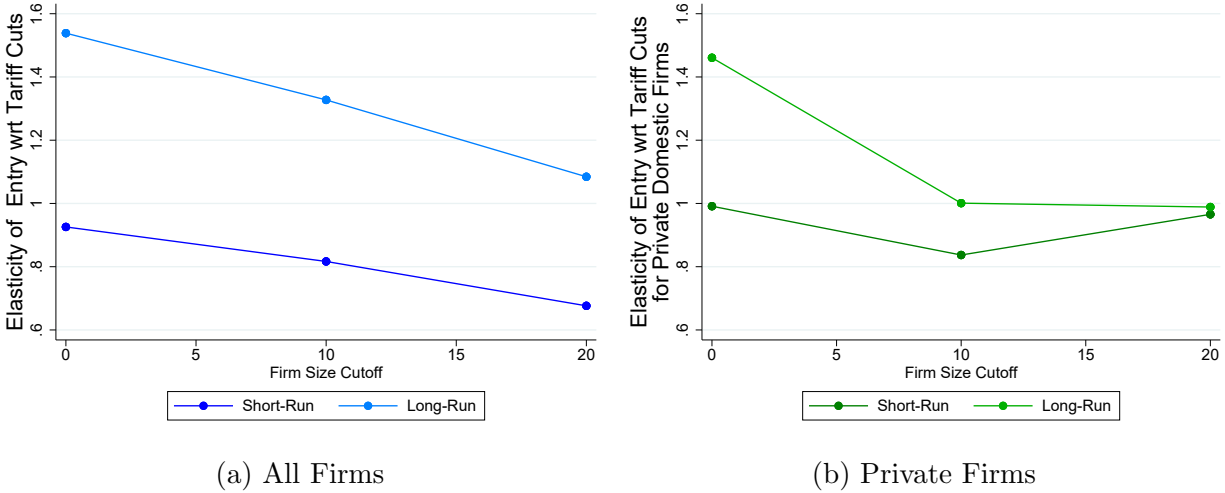


Figure 10: Elasticity of Entry in response to BTA with Firm Size Cutoffs

Note: Both panels report the elasticity of entry across different firm size cutoffs: no size cutoff, and cutoff sizes of 10 workers and 20 workers; and for the short run (year 2003, 2 years after the BTA) and long run (year 2013, 12 years after the BTA). Panel (a) reports the elasticity for all firms while Panel (b) reports the elasticity for private firms. The short run and long run elasticities with no size cutoff in Panel (a) correspond to the coefficients in Panel (a), Figure 9 for the respective years. Similarly, this applies for the elasticities for the private firms in Panel (c), Figure 9.

short run (2003), and 2 in the long run (2013, Figure B4). This extensive margin increase in firms lead to additional product variety which then increases consumer welfare.

After initial firm entry immediately following the BTA, we continue to observe subsequent entry afterwards. This is also true on the exporting/export platform entry front. Current trade models generally do not predict this phenomena. An important exception is Garetto, Oldenski and Ramondo (2019) which studies the dynamics of multinational entry. In their model, the multinational’s decision of whether to set up an affiliate or export platform is driven by the interaction of firm-specific characteristics and multinational costs, as well as persistent aggregate productivity and demand shocks. We control for these firm-type and aggregate trends with firm-type-and-time fixed effects, and yet we continue to see entry and exporting entry.

Additionally, the foreign firms in Vietnam are primarily export platforms which accounts for a substantial foreign output share of multinational firms (Tintelnot, 2017). We show and empirically identify the impact of trade policy changes on the entry of export platforms in a host country.²²

²²Tintelnot (2017) focuses on intensive margin adjustments and abstracts away from entry.

The firm entry margin we highlight here is important for understanding capital investment. We find that the majority of capital is invested during a firm’s entry. Figure 11 shows average capital per firm for the 2001 entry cohorts of foreign and private firms. For both the foreign and private panels we report two series respectively. The first series plots the mean capital in 2001—the year of entry—in each subsequent year for the entrants that survive (initial capital). Comparing initial capital between foreign and private firms (blue dashed lines), we find that foreign firms on average enter with significantly more capital than private firms. For both types of firms, the entrants that survive started with more capital than the average entrant, as evidenced by both upward sloping initial capital lines. We also plot contemporary capital reported in each year among the surviving entrants for both firm types (we deflate by the GDP deflator from World Development Indicators). These series fluctuate, but on average follow the initial capital series (red solid lines). In other words, capital invested at entry is the majority of capital in the surviving entrants. Hence, understanding entry is critical for understanding capital investment.

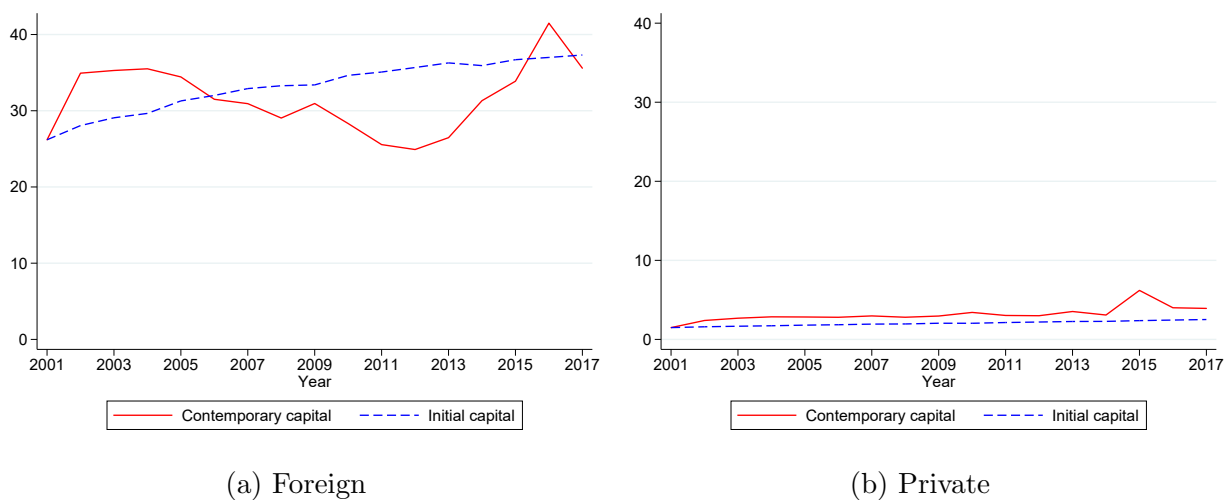


Figure 11: Contemporary vs initial capital among 2001 entrants

Note: Nominal capital is deflated using the GDP deflator from World Development Indicators. Initial capital shows the average value of real capital in 2001 in each year among the surviving entrants. Contemporary capital shows the average value of capital in the current year among surviving entrants.

Overall, we find that FDIs are a key contributor to the increases in industry-level employment and revenue (Figures 12 and B5 respectively). While the cumulative positive effect on number of FDI firms levels off 8 to 10 years after the BTA, the cumulative effects on

FDI employment and revenue effects continue to grow over time, suggesting that employment and revenue growth move from the extensive (firm entry) to intensive margin. Finally, compared to FDIs, PRIs experience smaller magnitude of the employment increase and no differential response in revenue in industries with larger tariff cuts. While the number of small PRIs are more responsive to tariff cuts, these firms don't have a significant impact on overall employment and revenue due to their small size (Panels (b) and (c), Figure B3). SOEs experience a steady (relative) increase in employment in industries with larger tariff cuts, but the SOEs response is delayed relative to FDI response. Tariff reductions lead to SOE revenue increases, but the estimates are noisy. Overall, these results illustrate that firm types respond differently to tariff cuts, motivating analysis into the within-industry dynamics in the next subsection.



Figure 12: Changes in industry-level employment due to BTA by firm-types

Note: Each point reflects an individual regression coefficient, $\hat{\beta}_{otv}$, following equation (2), where the independent variable is the change in US tariff applied to Vietnamese exports in an industry before and after the BTA (ΔBTA_j). In Panel (a), the dependent variable is the log annual FDI employment in an industry. In Panel (b), the dependent variable is the log annual SOE employment in an industry. In Panel (c), the dependent variable is the log annual PRI employment in an industry. Positive coefficients imply larger employment in industries facing larger tariff reductions. BTA was implemented in Dec 2001 and the base year is 2001 due to our definition of entry (indicated by the gray line). Controls include 4-digit ownership-industry FEs, ownership-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 2001, 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 4-digit industry level. Weighted by year 2000 employment.

6 Employment: Sources of Within-Industry Reallocation

Analyses in the previous section indicate that U.S. tariff cuts lead to large changes in the number of firms, and, at times, corresponding changes in employment and revenue, across industries and firm types. We next examine whether BTA-induced tariff reductions impact changes in the allocation of resources and market shares within industries as predicted by heterogeneous firm trade models. Counter to these predictions, we find that tariff cuts favor entrants over incumbents. In addition, firm-type matters as tariff cuts favorably impact FDI firms over PRI, with no net response by SOEs.

We focus on employment shares across margins of firm dynamic adjustment (incumbents, entrants, and exiters) and ownership within each industry. We follow the approach of Khandelwal, Schott and Wei (2013) extended to multiple years and to all firms (exporters and non-exporters). To the extent that not all firms export, the inclusion of employment from all firms captures a broader definition of resource reallocation.²³ We construct the change in employment shares by continuers, entrants, and exiters within each industry j and each year t relative to 2000, the year prior to BTA implementation. These employment share changes sum to 0 in each industry-year. A continuing firm is defined as one that operates in both year t and the base year, 2000. Exiters in year t are firms that were present in 2000, but not in year t . Their change in employment share is necessarily negative since their employment share in year t is 0. Entrants are firms that appear in year t , but were not present in 2000. Their change in employment share is necessarily positive since their employment share in 2000 is 0. This definition thus examines cumulative entry and exit up to year t relative to 2000. Additionally, we can further decompose changes in within-industry employment shares into that accounted for within each ownership type o . We define a firm's ownership type based on the initial ownership of the firm in the sample.

$$\Delta es_{jost} = \frac{E_{jost}}{E_{jt}} - \frac{E_{jos,2000}}{E_{j,2000}} \quad (3)$$

²³Throughout our period exporters account for about 70% of manufacturing employment.

where E_{jost} is total employment in firms in industry j of ownership o and status s (continuer, entrant, exiter) in year t , and E_{jt} is total employment in firms in industry j in year t .

We estimate the following model for each ownership type o , each firm status (continuer, entrant, exiter) s , and each $t > 2000$:

$$\Delta es_{jost} = \beta_0 + \beta_{ost} \Delta BTA_j + \alpha_{ost} C_{jt} + \varepsilon_{jost} \quad (4)$$

where ΔBTA_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 industry controls.²⁴ 2000 is the base year and the key parameters of interest, β_{ost} , capture the cumulative BTA impact on the outcome by each ownership-status-year combination, ost , relative to 2000. This specification 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, but then as an exiter thereafter. Note that the change in US tariff is measured as the Column 2 tariff minus the MFN tariff. As such, a positive value of β_{ost} represents an expansion in employment share in response to the U.S. tariff reductions.

The model is estimated in differences and separately for each ownership-status, os , combination. This flexibly allows for each ownership-status combination to be on its own time path. This ensures that aggregate foreign entry or aggregate state exit are not biasing our estimates of the effect of the BTA tariff cuts on within-industry employment share changes. We weight by industry employment in 2000.

The results are summarized in the following figures, which report the coefficients on U.S. tariffs estimated from each two-year differenced model along with 95 percent confidence intervals. Note that each series of coefficients is estimated from 17 individual regressions for each outcome of interest.

²⁴Controls 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.

6.1 Entry, Exit, and Continuing Firms: Overall and Foreign Firms

In this subsection we demonstrate the shift in employment shares to entrants, to foreign firms, and particularly to entering foreign firms.

In Figure 13, we first pool over ownership types (i.e., ignore ownership type) and examine the reallocation of employment in response to tariff cuts across continuers, exiters, and entrants relative to 2000. 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 change in the employment share due to 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 9.9 percentage points by 2004, only 3 years after implementation, relative to entrants in an industry that received no tariff reductions. This reallocation continued to grow to about 13.3 percentage points by 2010. This increase is offset by declines in the market share of continuers by 8.1 percentage point by 2004 and 12.5 percentage points respectively by 2010. The results for continuers are counter to the predictions of conventional heterogeneous firms and trade models. These models predict increased allocation of resources to continuers, because they tend to be more productive and thus better positioned to benefit from an expansion in export markets in response to lower tariffs.

Figure 14 focuses on the effects on the tariff-induced employment share changes across the three ownership types. The results show a shift of employment toward foreign firms at the expense of private firms within industries, although for most years we cannot reject a null effect. For both foreign and private firms, the implied 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 11.2 percentage points and the private share decrease by 12.1 percentage points.

A second point to note from Figure 14 is the lack of correlated pre-trends in the year 1999, prior to the implementation of the BTA.²⁵ For all three ownership types in 1999, the

²⁵For all years except 1999 we use the end of year employment reported by firms. However, since 2000 is the first year of firm data, we use start of year employment in 2000 as a proxy for end of year employment in 1999. We do this to extend our data to one additional year prior to the BTA. The two employment estimates, end of year employment in year $t - 1$ and start of year employment in year t are very strongly

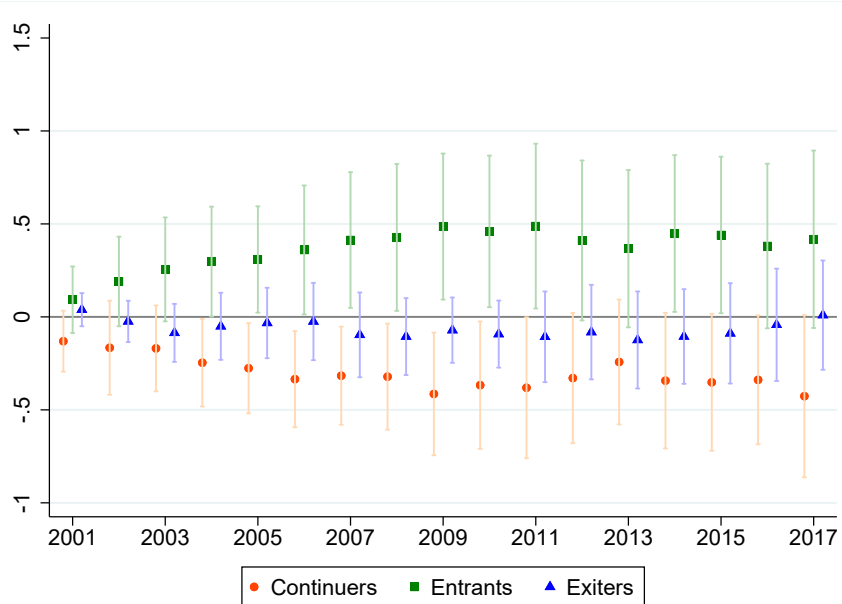


Figure 13: Changes in within-industry employment shares for continuers, entrants, and exitters in response to BTA tariff cuts

Note: 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.

point estimates are very close to 0 with small confidence intervals, suggesting that changes in within-industry employment shares by ownership type prior to the BTA are not correlated with the BTA tariff cuts.

We now turn to reporting the results by ownership-status combinations. Figure 15 displays the results for foreign continuers, entrants, and exitters. We find a large, sustained effect on employment reallocation toward foreign entrants, a shift away from foreign continuers, and little effect due to foreign exitters. 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 17.0 percentage points. The shift toward foreign entrants occurs as the share of employment in foreign continuers falls by 6.4 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.

positively correlated across industries and time.

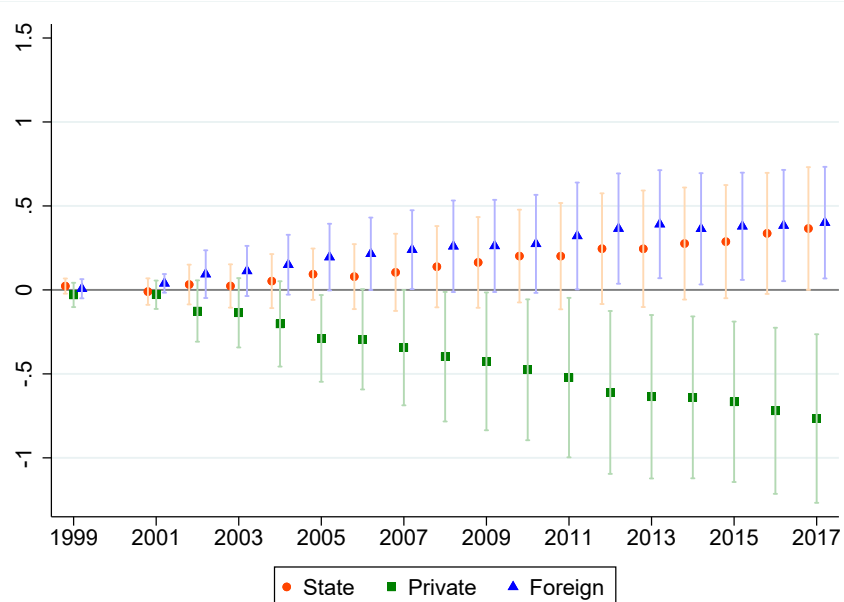


Figure 14: Changes in within-industry employment shares for state, private, and foreign in response to BTA tariff cuts

Note: 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.

6.2 Employment Reallocation for State and Private Domestic Firms

Figure 16 shows that employment shares did not shift toward state continuers or entrants, while there is a slight increase due to exiters.²⁶ Recall that overall state firms are exiting and hence the positive coefficient on state exiters implies the employment reductions due to state exit were larger in small tariff cut industries than in larger tariff cut industries. By 2017, the implied magnitudes for the mean industry tariff reduction is 4.8 percentage points for exiters.

Finally, for private firms, we show in Figure 17 that the aggregate employment shift away from private firms was due to a combination of continuers, entrants, and exiters, albeit each is imprecisely estimated. During this period there is large entry of private firms, but in terms of employment they are entering the industries that received smaller tariff cuts.

In Table 3 we report the coefficients for the end of our period, 2017. The most striking

²⁶We use a firm’s initial ownership such that a continuing state firm that privatized is not classified as an exiter, but as a continuer.

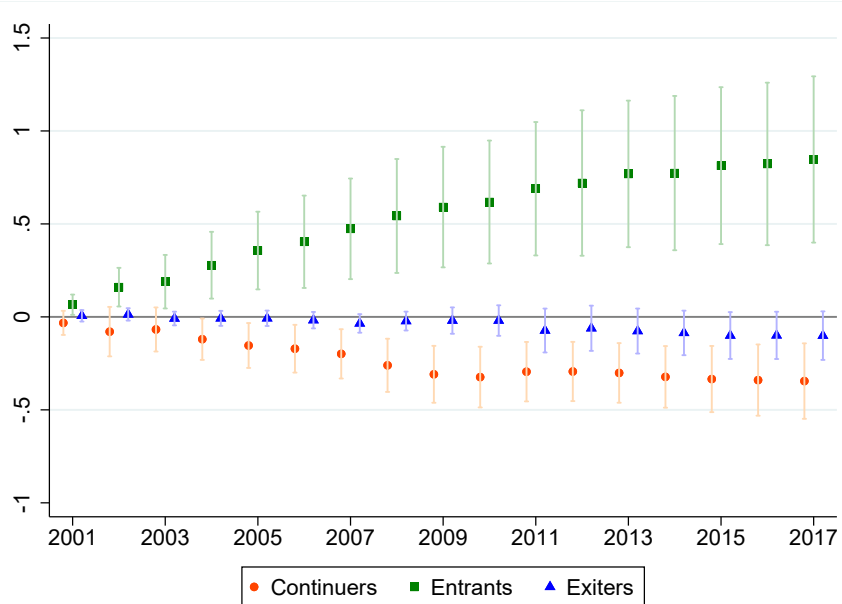


Figure 15: Changes in within-industry employment shares for foreign continuers, entrants, and exiters in response to BTA tariff cuts

Note: 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.

results of the ownership-status decompositions of changes in employment shares in response to the BTA tariff reductions are (i) the expansion of foreign entrants, (ii) the relative contraction of foreign continuers, (iii) the exit of state employment in low tariff cut industries relative to high tariff cut industries (although imprecisely estimated), and (iv) the loss of employment share for each type of private firm. The growth of foreign entrant employment is consistent with responsiveness of gross and value-added exports between countries to the signing of a regional trade agreement (Johnson and Noguera, 2017), suggestive of a link with MNCs supply chains. Interestingly, trade-induced increased entry of PRIs noted in earlier analysis does not translate into sustained gains in employment shares within industries.

Part of the reason why tariff cuts are not associated with the reallocation of employment through exit is that while higher tariff cuts are associated with drops in employment share for exiting FDIs and PRIs, they are actually associated with increased within-industry employment share due to exit of SOEs. This owes to the fact that SOEs experience larger exit in industries with lower tariff cuts relative to more affected industries. Finally, counter

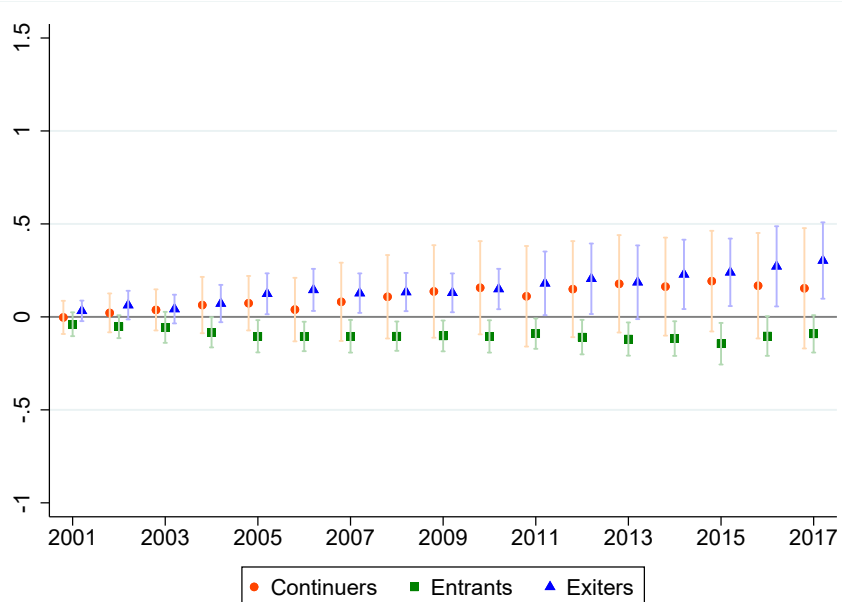


Figure 16: Changes in within-industry employment shares for state continuers, entrants, and exiters in response to BTA tariff cuts

Note: 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.

to the predictions of heterogeneous firms models, tariff cuts are associated with declines in the employment share of continuers. This is particularly true for foreign and private firms, although the latter effect is not statistically different from zero.

Table 3: Employment share reallocation coefficients in 2017

	All	Foreign	State	Private
Continuers	-0.43	-0.35	0.15	-0.24
Entrants	0.42	0.85	-0.09	-0.34
Exiters	0.01	-0.10	0.30	-0.19
Total	0.00	0.40	0.37	-0.77

Note: Bolded terms indicates statistical significance at 95%.

7 Long Term Effects: Entry vs Subsequent Growth

In this section, we seek to better understand why employment within industries shifted strongly toward foreign entrants in higher tariff cut industries. To do so, we begin by

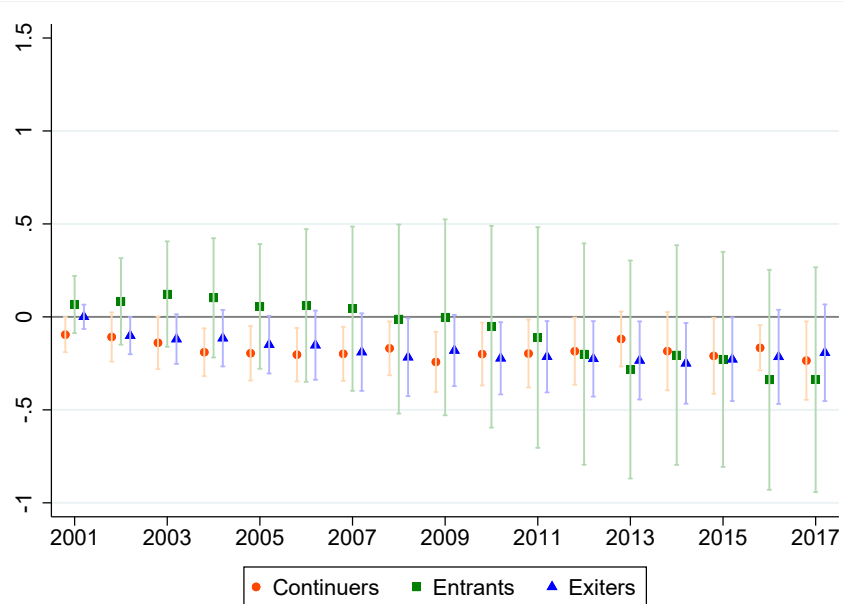


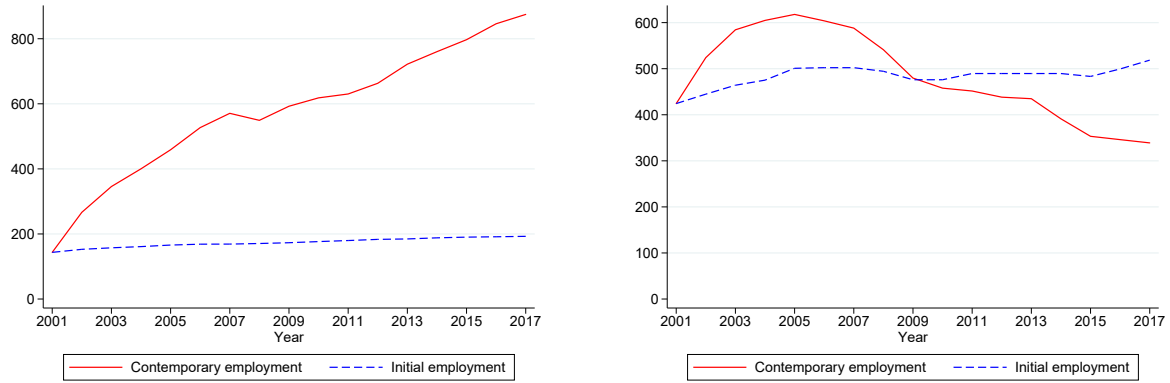
Figure 17: Changes in within-industry employment shares for private continuers, entrants, and exiters in response to BTA tariff cuts

Note: 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.

examining aggregate entry and growth after entry across state, private, and foreign firms. We then return to our regression analysis of within-industry employment shares and decompose foreign entry into initial employment at entry and the subsequent change in employment.

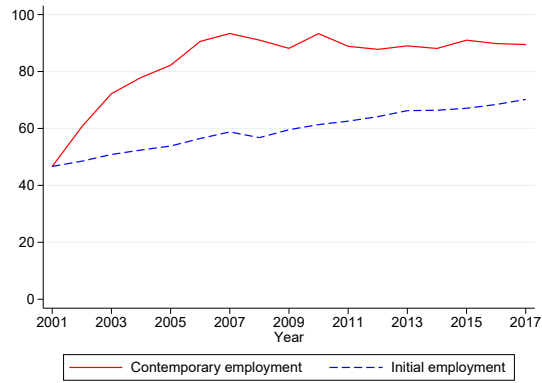
We begin by focusing on the cohort of firms that entered in 2001. We then track the surviving members of this entry cohort over time. For each year, we plot the mean of initial employment in 2001 across surviving entrants. This allows us to see whether the surviving entrants are larger on average than those that exit. Second, we plot the mean of contemporary employment across surviving entrants. The difference between the two figures is how much surviving entrants have grown over time. Figure 18a demonstrates that foreign entrants grow 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 when they entered.²⁷



(a) Foreign

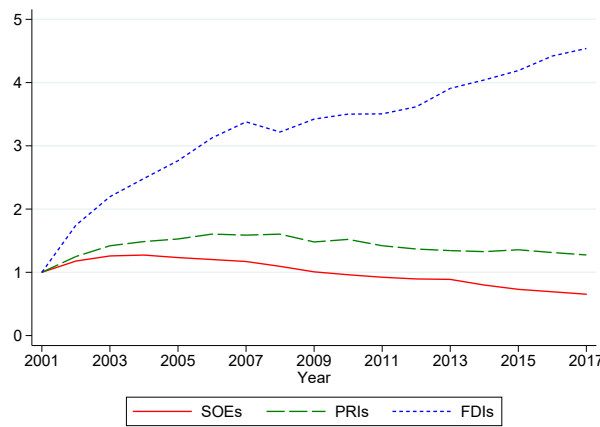
(b) State



(c) Private



(d) Private, initially 50 or more workers



(e) Contemporary employment relative to initial employment

Figure 18: Contemporary and initial employment among surviving entrants, 2001 entry cohort

²⁷Although not reported in the paper, this pattern of rapid growth after entry among surviving foreign entrants is not unique to the 2001 entry cohort. We observe this for all foreign entry cohorts.

In contrast, we see very different aggregate trends for employment growth after entry among state and private entrants. State firms are larger on average at entry than foreign firms (Figure 18b) 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.²⁸

Private entrants are the smallest on average, and show some post-entry growth, but much less so than for foreign entrants (Figure 18c). Note that the slower growth post entry for private is not due to a greater share of initially small entrants. 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 18d).

Lastly, Figure 18e shows the relative growth after entry among surviving entrants across foreign, state, and private. From the previous figures, it divides the contemporary employment series by the initial employment series. Once presented this way, it is clear that 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 years and have stopped growing on average while state entrants are smaller than at entry and declining.

These aggregate patterns suggest that post-entry growth differs considerably across ownership types. In response to the BTA, we observed that within-industry employment shares shifted strongly to foreign firms that entered following the BTA. We can decompose this adjustment 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 equation (3) as:

$$\Delta es_{jost} = \left(\frac{E_{jost} - E_{jost^e}}{E_{jt}} \right) + \left(\frac{E_{jost^e}}{E_{jt}} - \frac{E_{jos,2000}}{E_{j,2000}} \right) \quad (5)$$

²⁸More recent entry cohorts of state firms similarly show little evidence of sustained growth after entry and many cohorts show a decline similar to the 2001 entry cohort.

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.

In Figure 19 we apply this decomposition to the change in employment share accounted for by foreign entry. We focus on foreign entry due to its overall importance for employment reallocation within industries in response to the BTA and the large post-entry growth of aggregate employment in foreign entrants. Panel (a) shows the contribution of initial employment and Panel(b) shows the contribution of growth after entry. Initial entry plateaus in terms of contribution to reallocation around 2009 or 2010. However, post 2010, it is subsequent growth among foreign entrants that continues to expand the overall contribution of foreign entrants to within industry employment reallocation. By 2017, both margins contribute about equally to the overall change in employment share toward foreign entrants. This result highlights the importance of studying adjustment over a long period and highlights the importance of firm growth among foreign entrants for long-run adjustment.

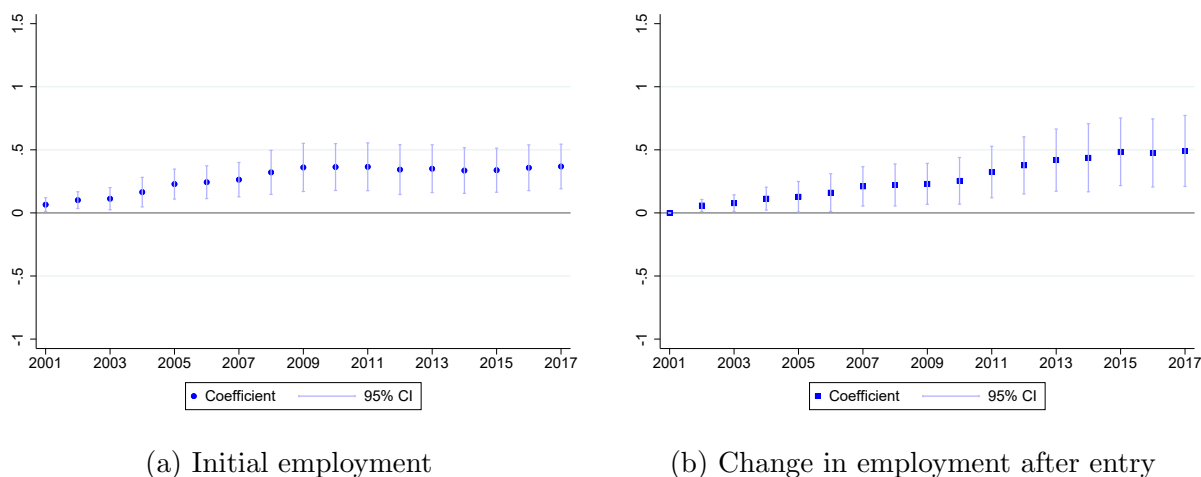


Figure 19: Decomposing foreign entry into employment at entry and subsequent changes in employment

Note: The figures plot the coefficient on the change in \ln US tariffs from. Dashed lines show 95 percent confidence intervals. Weighted by year 2000 employment.

8 Foreign Entrants, Sources of Capital, and Exports

In this section we further highlight the close association between foreign entry, employment expansion, and BTA-induced export opportunities. As discussed in section 2.1, the main policy change in the BTA are tariff reductions in the U.S.. Vietnam was already open to manufacturing FDI prior to the BTA, but tariffs were too high in the U.S., a large export destination. As Figure 6 illustrated, Vietnamese exports expanded due to US tariff cuts, with the cumulative effects increasing over time. The observed association between tariff cuts, entry, and subsequent employment growth among foreign entrants is closely linked to the cumulative response of exports.

To begin with, the tariff cut-induced increase in the employment share among foreign entrants from Figure 15 is driven almost entirely by foreign firms that are exporting. Figure 20 follows up on the regression results from Figure 15, decomposing the effects of tariffs on employment share of foreign entrants into exporters and non-exporters for years where data on exporter status is available.²⁹ We find that the coefficient on the exporters entrants is similar in magnitude to the coefficient on the overall foreign entrants, while the coefficient on non-exporter entrants is small in magnitude and for the most part statistically insignificant.

This pattern is also consistent with the post-entry growth in foreign firms being concentrated among the exporters. Figure 21 repeats the analysis from Figure 18a 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. We focus on exporter status in 2002 because that is the first year in which firms report exporting status. First, at time of entry there is a relatively small difference in mean employment, about 170 versus 103 workers. However, the cumulative employment growth after entry is much stronger for firms that are exporting in 2002 than for those that are not, with the difference increasing over time.³⁰

Second, the tariff-induced increase in exports to the US is mainly driven by exports from foreign firms that are not affiliates of U.S. multinationals. Instead they are affiliates of multinationals from 3rd party countries such as Taiwan and South Korea. Panels (a) and (b)

²⁹Exporting status is based on year t .

³⁰We also see similar results for entry and export cohorts of other years.

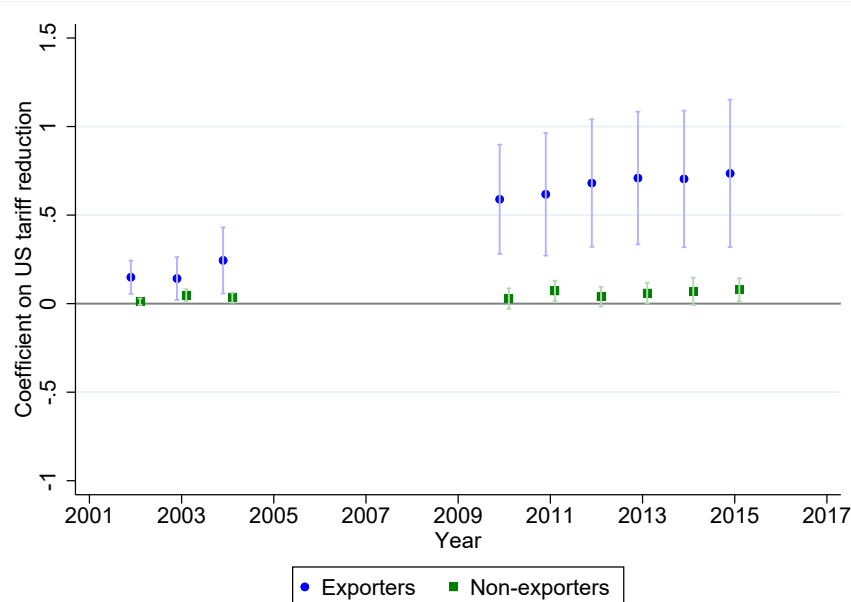


Figure 20: Changes in foreign entrant employment shares for exporters and non-exporters in response to BTA tariff cuts

Note: 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.

in Figure 22 decompose the effects of tariffs on Vietnamese exports to the US from Figure 6 into exports from U.S. affiliates and exports from non-U.S. affiliated trade (i.e non-related party trade). The figures show that most of the increase in exports stem from non-U.S. affiliated trade. Note that the most common source of FDI to Vietnam during this period is Taiwan and South Korea, with East Asian countries making up the majority share at about 80% (79% in 1999 and 85% in 2017, Figure 5). The U.S. accounts for a small share of FDI throughout the period (1.3% in 1999 and 1.6% by 2017). This highlights the importance of examining the responsiveness of all sources of FDI to trade policy changes in a host country rather than focusing on FDI from one country, such as the U.S., even in the case of a bilateral trade policy including the U.S.. Focusing solely on the response of FDI from the U.S. multinationals to BTA-induced tariff cuts would have missed much of how foreign firms and multinationals respond when facing lower export variable costs to a large destination market. Despite low wages, Vietnam might not have been an attractive destination for foreign affiliates prior to the BTA, due to Vietnamese exports facing high tariffs in a key

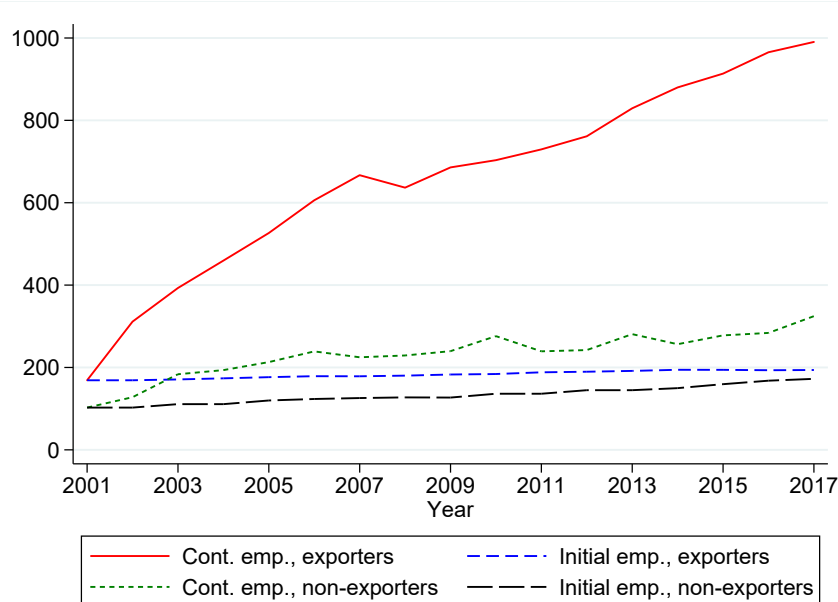


Figure 21: Employment growth for 2001 foreign entry cohort by export status

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.

destination market, the U.S. Once the U.S. tariffs on Vietnam were reduced, foreign affiliates responded by entering Vietnam. Earlier studies have found production reallocation effects across countries in response to trade policy targeting a particular exporter country at an industry level (See Flaaen, Hortaçsu and Tintelnot (2020) for evidence from the washing machine market and Blonigen (2002)). Our study highlights the role of multinationals from third countries.

Finally, the BTA mainly leads to initial increases in Vietnamese exports to the U.S. in industries with bigger tariff cuts. However, over time, Vietnamese export growth also expands to other countries, highlighting the importance of studying the longer-term effects of trade policy. Figure 23 reports the coefficient of tariff cuts on Vietnamese total world exports, Panel (a) and Vietnamese total world exports less the United States, Panel (b). Vietnam’s exports to the world without the U.S. shows presence of scale spillovers to other markets about 7-8 years after the initial change. This pattern of export expansion is consistent with foreign entry and subsequent employment growth in foreign entrants.

Overall, this section further highlights the importance of tariff-induced export opportu-

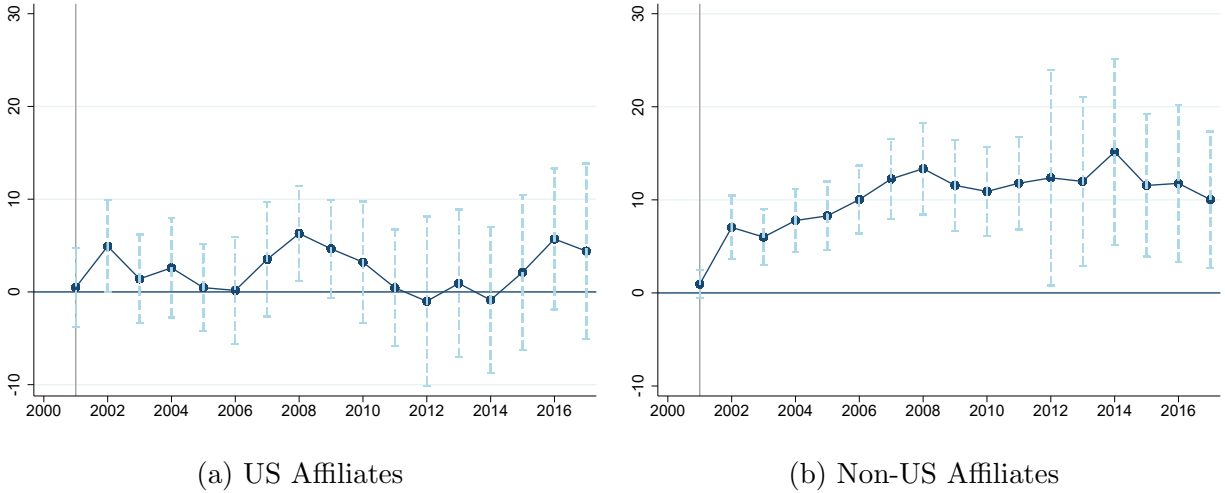


Figure 22: VN-US Exports from US and non-US Affiliates, 2000-2017

Note: Each point reflects an individual regression coefficient, $\hat{\beta}_{it}$, following equation (1), where the independent variable is the change in US tariff applied to Vietnamese exports in an industry before and after the BTA (ΔBTA_j). In Panel (a), the dependent variable is log Vietnamese exports to the US from US affiliates, 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). In Panel (b), the dependent variable is log Vietnamese exports to the US from non-US affiliates (Non-Related Party Trade). Positive coefficients imply larger Vietnamese exports in industries facing larger tariff reductions. BTA was implemented in Dec 2001, as indicated by the gray line, and the base year is 2000. Controls include 4-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 4-digit industry level. Weighted by year 2000 total Vietnamese exports to the US.
Source: Census Bureau.

nities in encouraging foreign entry and subsequent employment growth in foreign entrants and the important role played by 3rd country parties in this process.

9 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 GVCs: 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 firm-entry is an important margin in response to tariff cuts in this setting,

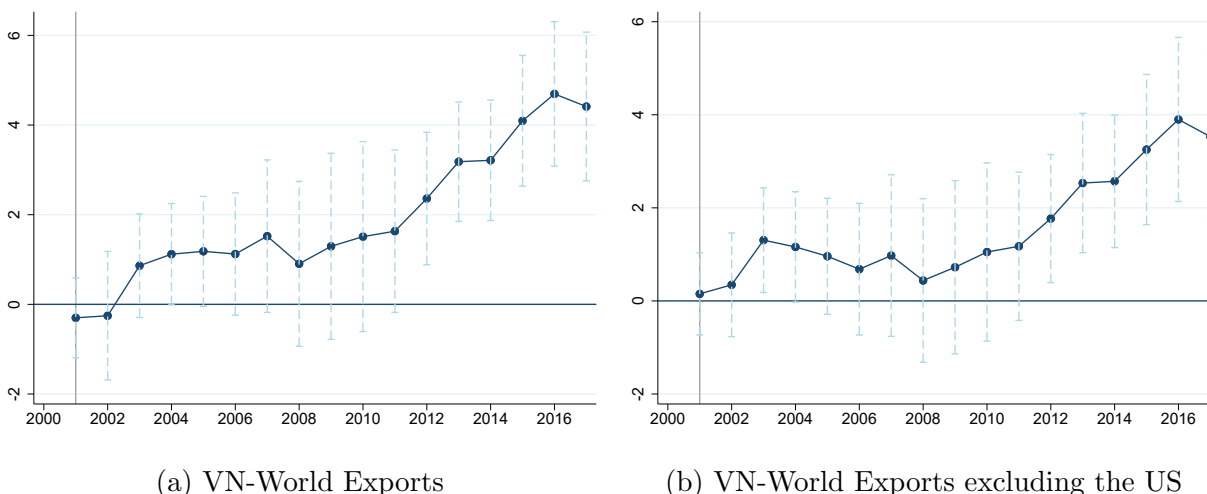


Figure 23: VN-World Exports including and excluding the US, 2000-2017

Note: Each point reflects an individual regression coefficient, $\hat{\beta}_{it}$, following equation (1), where the independent variable is the change in US tariff applied to Vietnamese exports in an industry before and after the BTA (ΔBTA_j). 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 US. Positive coefficients imply larger Vietnamese exports in industries facing larger tariff reductions. 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 Vietnamese exports to the world. *Source:* UN Comtrade.

primarily driven by foreign and private domestic firms. Conventional data, which only focuses on firms above a certain size cut off, would significantly understate tariff-induced entry of private domestic firms and overstate relative entry elasticity of foreign firms.

Second, entering firms—rather than incumbents—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 but do not subsequently grow. On the other hand, state firms stall the reallocation through lower exit rates 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 potential source of capital and exports, but also potential source of “good 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 firms and multinationals responded to export opportunities from Vietnam. This highlights the importance of studying longer-term effects of 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) changes in 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.

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.³¹ 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. Private businesses must register as an enterprise if they have more than ten workers or operate in more than one location.³² 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.

As the number of private enterprises grew rapidly over time, the GSO stopped giving all enterprises the full length questionnaire. Instead, the population of enterprises was split into two groups: those that would receive the full length questionnaire and those that would receive a shorter questionnaire, typically only a page or two. Starting with the 2004 survey, which collected information for the 2003 calendar year, all state enterprises, foreign enterprises, and collectives received the full questionnaire. Additionally, all large private enterprises also received the complete questionnaire, while a subset of small private enterprises received the complete questionnaire and the remaining small private enterprises received the short questionnaire.³³ However, this partitioning of small private enterprises only applies in provinces with a large number of private enterprises. The number of provinces included in

³¹See law No. 13-1999-QH10.

³²See 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.

³³These small private enterprises are typically referred to as listed enterprises.

the short version of the questionnaire grew as did the size cutoff, with the cutoff varying by province and year.³⁴

Our period of analysis also overlaps with multiple establishment censuses conducted in Vietnam. The establishment census has a broader scope as it collects information on many of Vietnam’s millions of businesses that are not registered as an enterprise. These censuses were conducted in 2002, 2007, 2012, and 2017, collecting information for the previous year. In these years, the small private enterprises that were not selected to receive the full length enterprise survey were not given a short version of the enterprise survey, but instead filled out the establishment census questionnaire.

Firms can be followed over time based on a unique firm identifier. However, a small number of observations features a non-unique firm identifier. Since these firms account for less than 3 percent of total revenue and no more than 2 percent of total employment, we remove these observations from the sample.

A.2 Consistency of data over time

The key variables we employ in our analysis, employment, revenue, and capital, have remained fairly consistently defined over the questionnaires. In particular, all questionnaires, both the full length and the short versions for listed enterprises, consistently ask about end of year employment in the enterprise. However, there are slight changes to questions related to revenue and capital.

A.3 Ownership classification

Table [A1](#) provides a complete list of the various ownership codes used in the years 2000 through 2010. We report the original ownership codes and descriptions from 2000 and 2001. Note, however, that the GSO often distributes the data with ownership codes for 2000 and 2001 that have been changed from the original responses in an effort to make the codes more consistent over time.

³⁴We are very thankful to Hanh Nguyen for careful translation of the Enterprise Survey Plans for surveys used in our analysis.

Table A1: Ownership types by year

Ownership type	2000	2001	2002	2003- 04	2005- 06	2007- 10	Consistent
Central SOE	1	1	1	1	1	1	1
Local SOE	2	2	2	2	2	2	2
Central state LLC	x	x	6	3	3	3	3
Local state LLC	x	x	7	4	4	4	3
LLC with 1 state member	x	6	x	x	x	x	3
LLC with 2+ state members	x	8	x	x	x	x	3
JSC or Private LLC with state capital>50%	x	x	x	x	5	5	5
JSC with state capital>50% LLC	x	x	9	5	x	x	5
Private LLC or Private LLC with state capital<50%	6	x	x	x	x	x	3\9
Private LLC	x	x	x	x	9	9	9\15
Private LLC with 1 member	x	x	8	9	x	x	9
Private LLC with 2+ mem- bers	x	7	x	x	x	x	9
Private LLC with 2+ mem- bers	x	9	x	x	x	x	9
Collective	3	3	3	6	6	6	6
Private enterprise	4	4	4	7	7	7	7
Partnership company	5	5	5	8	8	8	8
JSC without state capital	8	11	11	10	10	10	10
JSC with state capital<50%	x	x	10	11	11	11	11
JSC with state capital 100% foreign	7	10 ^a	x	x	x	x	TBA
Foreign with state partner	9	12	12	12	12	12	12
Foreign with state partner	10	13 ^a	13	13	13	13	13
Foreign with collective part- ner	11	x	x	x	x	x	14
Foreign with other partner	12	14 ^a	14	14	14	14	14
Contracted business cooper- ation	13	x	x	x	x	x	TBA

Note: The table displays the number assigned to the ownership description in that particular year where year refers to the year of the data. An "x" indicates that description was not available in the indicated year. JSC denotes a joint stock company and LLC denotes a limited liability company.

As can be seen from the table, many ownership descriptions are consistently identified across all eleven years, even if the associated code changes across years. These includes central SOEs, local SOEs, collectives, private enterprises, partnership companies, 100% foreign enterprises, and joint ventures between foreign and state firms. In other cases, it is easy to create a consistent definition by aggregating over two or more separate descriptions.

For example, the 2000 data separated foreign joint ventures between collectives and other partners whereas all subsequent years classified foreign joint ventures as other (i.e., non-state) partners. Similarly, in 2001, the ownership types distinguished between state limited liability companies that had 1 or 2+ state members whereas all subsequent years distinguished between state limited liability companies owned by the central government versus local governments. We merge these categories together into state owned limited liability companies.

The table also shows that some harder decisions needs to be made in terms of how best to create consistent ownership classifications over time. We subsequently describe each of these decisions.

In 2000 and 2001, the questionnaires distinguished between joint stock companies with no state investment and joint stock companies with state investment. However, in subsequent years the questionnaires split the joint stock companies with state capital into those with less than or equal to 50% state capital versus those with more than 50% state capital. In 2000, we have no additional data for which we can make this distinction, but in 2001 there was an additional question that asked what share of capital came from the state if the enterprise was a JSC with state capital. We use this share to split the same according to the 50% threshold used in subsequent surveys. For the JSC companies in 2000 with state capital, we use the 2001 information, where available. For the remaining JSC with state capital in 2000 we

We merge together joint stock companies and private limited liability companies that have more than 50% state capital.

The 2000 data does not distinguish between state and private limited liability companies. It simply identifies them all as limited liability companies. There are 10,495 out of 42,307 (24.8%) firms assigned this code in 2000. Within manufacturing, there are 2,414 out of 10,333 (23.4%) firms identified as a limited liability company. In terms of employment, they represent 14.7% and 20.1% of total employment and manufacturing employment respectively. We use two approaches. First, for firms that are part of the 2000-2001 panel, we use their ownership code in 2001 to backcast their ownership in 2000. Of the 10,495 limited liability firms in 2000, 8,347 are present in the 2001 data and the vast majority of these are private

limited liability companies (8,102 or 97.1%). Only 65 (0.8%) are listed as a state limited liability company. The remaining 180 firms are spread across other ownership categories in 2001. We assign these as private limited liability companies in 2000. For the remaining 2,148 limited liability companies in 2000 that are not operating in 2001, we have to decide whether they are a private or state limited liability company without any further information specific to that firm. Since the vast majority of limited liability companies are private based on the 2000-01 panel, we assume that the remaining non-panel limited liability companies in 2000 are all private limited liability companies.

Starting in 2005, the ownership descriptions were combining a private limited liability company with a private limited liability company that had state capital <50%. Additionally, the questionnaire asked what percentage was state capital. This allows us to separate wholly private limited liability companies from those that have some state capital.

A.4 State ownership versus state control

While many of the ownership categories are obvious in terms of whether state, foreign, or private is the correct classification, other categories are less clear. For example, starting in the 2007 survey collecting data for 2006, the survey asked whether the state controlled the enterprise for joint stock companies with less than 50% state capital. Of the 1,360 joint stock companies with less than 50% state capital, the mean state capital is 29% and about 20% of these firms report that the state controls the enterprise. Hence, although the state may not be the majority owner, it may still have significant influence. Moreover, numerous enterprises that are joint stock companies with less than 50% state capital began as fully state owned and were partially privatized. This is similar to the situation in China (Hsieh and Song, 2015).³⁵

³⁵In the current version, we have included joint stock companies with less than 50% state capital in our SOE category when running our empirical specifications. Table A2 presents the summary statistics for this categorization. However, preliminary results suggest differences among SOE types in responding to the BTA and we plan to investigate this further in the future.

A.5 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 set of firms includes some firms that were not actually operating 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 the 2001 dataset. Of these, 6,270 firms report:

1. 0 or a missing value for employment at the start of 2001,
2. 0 or a missing value for assets at the start and end of 2001,
3. 0 or a missing value for revenue in 2001,
4. 0 or a missing value for employee income in 2001,
5. 0 or a missing value for taxes arising in 2001, and
6. 0 or a missing value for taxes paid in 2001.

Most of these firms reported being established in 2002 (74.4%) or 2001 (22.7%). Note that the year of establishment is not necessarily the same as the year that the firm registered as an enterprise or began operations. By comparison, only 71 firms in 2002 fit this set of conditions and no firms in 2000 do. We subsequently drop these firms from the 2001 dataset.

A.6 Tracking firms over time

The data feature a panel component that allows us to track firms over time using the firm identifier. Based on all firms in the data with a unique identifier (using the variable `madn`), regardless of industry, initial inspection revealed that 67.2 percent of firms from 2000 could be match with firms in 2001, but in the subsequent years this increased substantially to between 81.8 and 85.4 percent. We used additional confidential data made available to us by the GSO to look for additional matches between 2000 and 2001. We employed the following algorithm, with the number of matched firms at each step listed in parentheses:

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

In total, an additional 6,557 firms are matched between 2000 and 2001 using these fairly restrictive criteria. This increases the percentage of 2000 firms matched with 2001 firms from 67.2 to 82.9. The latter is much more consistent with the matching rate between subsequent surveys.

Between other years, we found no evidence of widespread missing matches. However, we systematically examined all instances of exit and entry by state firms for possible incidences of false exit being attributed to a change in the firm identifier (*madn*). This appeared most commonly when an SOE was going through an ownership transition, such as partial equitization or complete privatization. In these cases, we assign the original firm identifier to the firm for all observations. As such, an SOE that privatizes is not recorded as an SOE exit and simultaneously as a private entrant, but rather as an ownership transition. Below is an example of one instance.

Table [A2](#) reports on the number of SOE exits in the data based on the originally reported firm identifier (*madn*) and the number that we corrected.

We subsequently extended this visual inspection to the entry and exit of all foreign firms and to all large private enterprises. As the number of exits and entries of small private firms

was too many for visual inspection, we developed an algorithm for identifying instances of false exit and entry among private enterprises.

Table A2: Summary Statistics with broader SOE definition: Years 2000 and 2010

Year 2000	FIEs	PRIs	SOEs	Total
Revenue	97,714 (354,368)	6,016 (23,458)	59,355 (158,897)	23,896 (134,762)
Employment	342 (1,024)	64 (254)	452 (745)	155 (517)
Fixed Assets	70,681 (273,465)	1,513 (6,581)	18,224 (71,353)	11,206 (94,065)
Observations	1,041	7,588	1,659	10,288
Year 2010	FIEs	PRIs	SOEs	Total
Revenue	247,599 (1200159)	22,316 (318,365)	387,110 (2079015)	54,775 (598,227)
Employment	441 (1,643)	46.9 (195)	449 (719)	97.2 (578)
Fixed Assets	69,829 (305,568)	4,839 (41,468)	133,182 (1247632)	14,834 (232,545)
Observations	4,489	39,241	1228	44,958

Note: Revenue and Assets are measured in millions of Vietnamese Dong.

B Appendix

B.1 Additional Tables and Figures

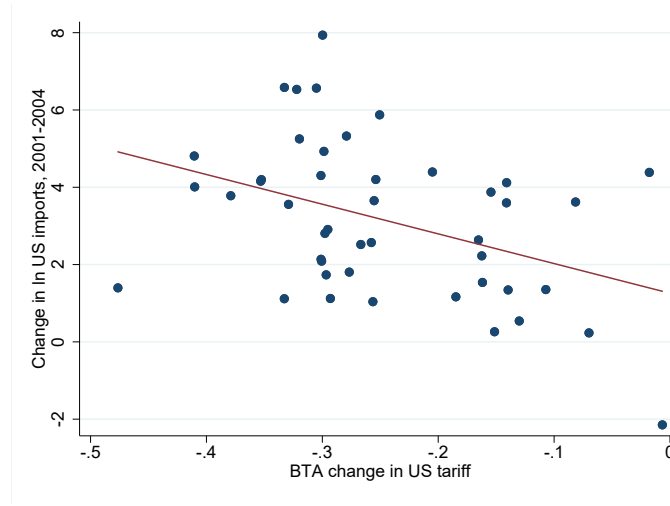


Figure B1: Growth of Vietnamese manufacturing exports to the U.S. versus BTA tariff changes by industry

Note: Each point represents a 3-digit ISIC revision 3 industry.

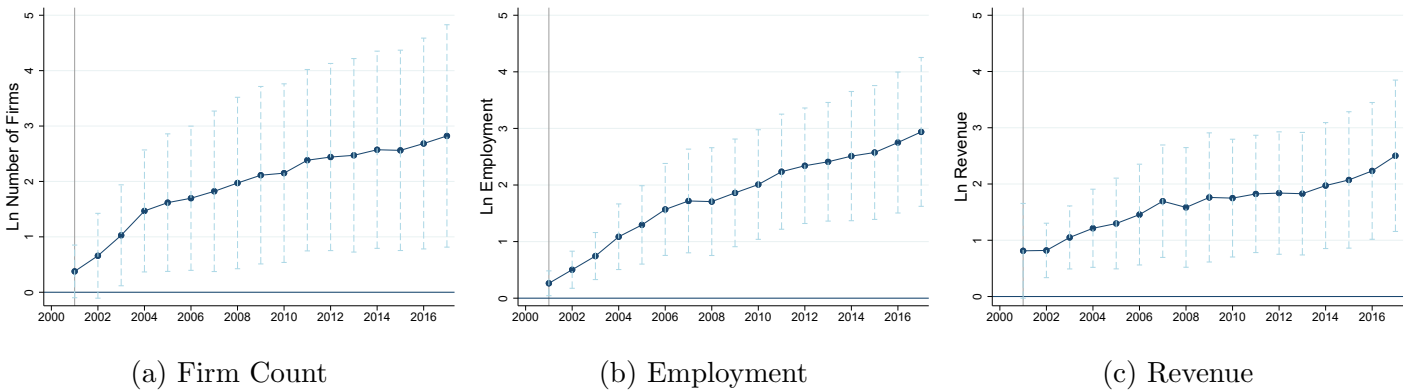


Figure B2: Changes in industry-level outcomes due to BTA

Note: BTA was implemented in Dec 2001 and the base year is 2000 (indicated by gray line). 4-digit industry and 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, 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 and Chinese exports of textiles and clothing. See Table B1 for regression results.

Table B1: Changes in industry-level outcomes due to BTA

	(1)	(2)	(3)
	Number of Firms	Employment	Revenue
Tariff \times 2001	0.281 (0.205)	0.224 (0.109)	0.870 (0.345)
Tariff \times 2002	0.432 (0.329)	0.369 (0.199)	0.906 (0.291)
Tariff \times 2003	0.840 (0.409)	0.614 (0.289)	1.251 (0.414)
Tariff \times 2004	1.256 (0.464)	0.984 (0.425)	1.383 (0.534)
Tariff \times 2005	1.290 (0.524)	1.114 (0.484)	1.561 (0.624)
Tariff \times 2006	1.289 (0.577)	1.423 (0.583)	1.725 (0.719)
Tariff \times 2007	1.377 (0.643)	1.580 (0.608)	1.928 (0.777)
Tariff \times 2008	1.499 (0.694)	1.547 (0.618)	1.808 (0.785)
Tariff \times 2009	1.748 (0.722)	1.756 (0.578)	2.518 (0.752)
Tariff \times 2010	1.829 (0.718)	1.953 (0.585)	2.294 (0.780)
Tariff \times 2011	1.989 (0.718)	1.995 (0.619)	1.993 (0.785)
Tariff \times 2012	2.099 (0.737)	2.137 (0.650)	2.074 (0.795)
Tariff \times 2013	2.159 (0.778)	2.130 (0.686)	1.941 (0.819)
Tariff \times 2014	2.266 (0.809)	2.144 (0.753)	1.904 (0.822)
Tariff \times 2015	2.245 (0.859)	2.228 (0.772)	1.878 (0.918)
Tariff \times 2016	2.299 (0.871)	2.295 (0.787)	1.796 (0.912)
Tariff \times 2017	2.515 (0.919)	2.501 (0.840)	1.901 (1.032)
Observations	1006	1006	1004
R^2	0.979	0.978	0.978

Note: BTA was implemented in Dec 2001 and the base year is 2000. 4-digit industry and year FEs are included. 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, 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 and Chinese exports of textiles and clothing.

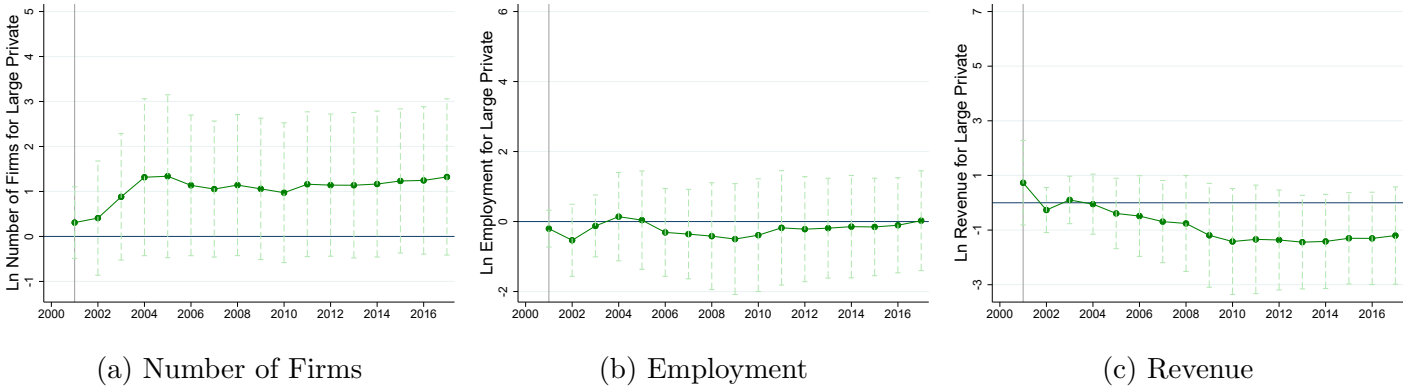


Figure B3: Changes in industry-level outcomes due to BTA for private firms after excluding small firms

Note: Observations of firms with less than 10 employees are excluded. BTA was implemented in Dec 2001 and the base year is 2001 (indicated by gray line). 4-digit industry and 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, 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 and Chinese exports of textiles and clothing.

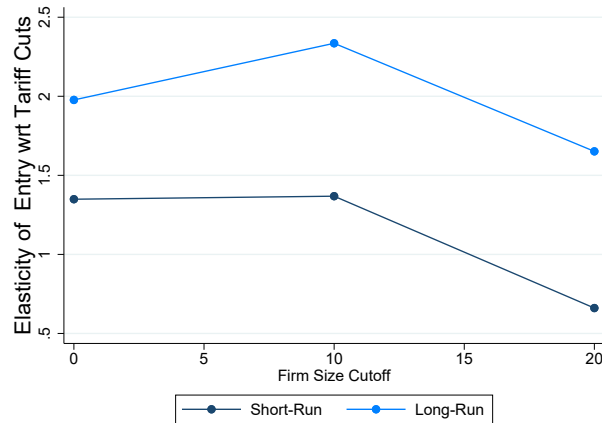


Figure B4: Elasticity of Entry in response to BTA with Firm Size Cutoffs: Foreign Firms

Note: This figure reports the elasticity of entry for foreign firms across different firm size cutoffs: no size cutoff, and cutoff sizes of 10 workers and 20 workers; and for the short run (year 2003) and long run (year 2013). The short run and long run elasticities with no size cutoff correspond to the coefficients in Panel (b), Figure 9 for the respective years.

B.2 Additional Background on the BTA

Here we discuss other significant trade policy changes during the same time period as the BTA, and the Vietnamese government’s reform policy on state-own firms.



Figure B5: Changes in industry-level revenue due to BTA by firm-types

Note: BTA was implemented in Dec 2001 and the base year is 2001 (indicated by red line). 4-digit industry and 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, 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 and Chinese exports of textiles and clothing.

B.2.1 Other significant changes in trade policy

Given the long period covered in our analysis, it is worth briefly describing some of the other significant changes in trade policy during this period. We restrict our focus to episodes of either large domestic trade policy changes or those involving Vietnam’s most important trading partners.

Domestic trade liberalization: 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.³⁶ Vietnam also joined the World Trade Organization (WTO) in January 2007. Vietnam’s accession agreement mandated the reduction of Vietnam’s Most Favored Nation (MFN) tariffs over time.

Figure B6 shows the average manufacturing tariff applied by Vietnam to ASEAN members, China, Japan, and the overall MFN tariff rate. Tariffs on ASEAN members fall rapidly between 2001 and 2007. Liberalization with China begins in 2007 and extends to about 2015. WTO mandated tariff reductions begin in 2007 and are largely completed by 2013.

³⁶ASEAN also signed important trade agreements with India and South Korea. However, we focus the discussion on Vietnam’s most important trading partners.

Tariffs on imports from Japan start to fall relative to MFN rates in 2012.

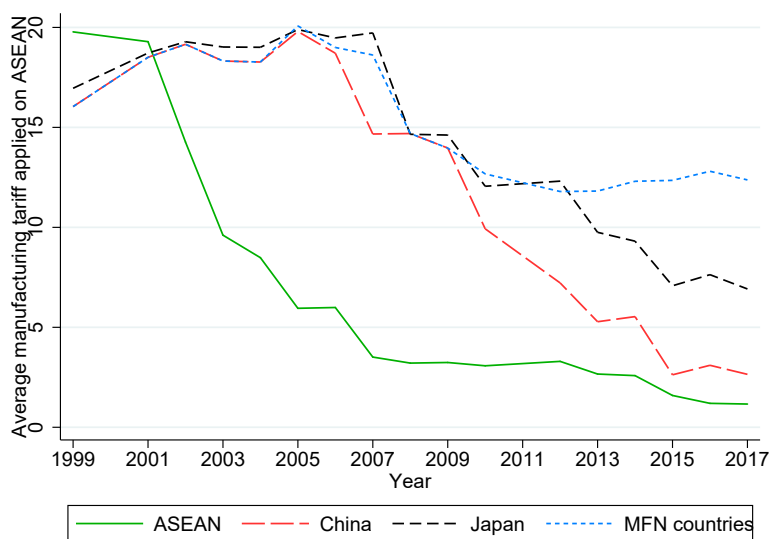


Figure B6: Average manufacturing tariff applied on ASEAN

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 shows Vietnam’s various tariff reductions against the BTA-mandated US tariff reductions. The patterns consistently show that the US tariff reductions are not strongly correlated with various episodes of domestic trade liberalization within Vietnam during this time. The most strongly correlated episode is Vietnam’s reductions of tariffs applied to imports from China.

Changes in foreign market access: Figure B8 displays the average manufacturing tariffs faced by Vietnamese exports to China, the EU, and Japan, three of its other 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. Figure B9 demonstrates that Chinese tariff reductions on Vietnam between 2000 and 2010 are mildly positively correlated with the US BTA tariff reductions.

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 indus-

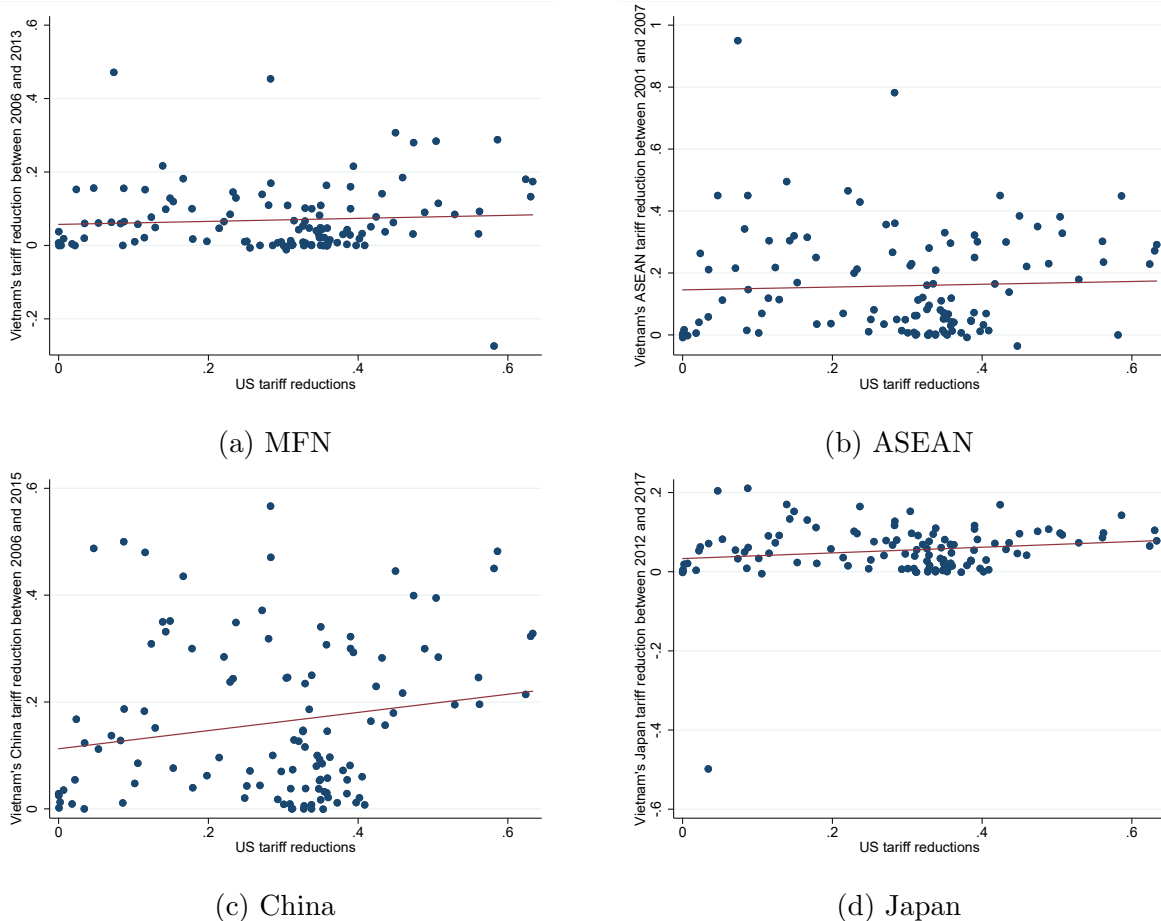


Figure B7: Vietnam’s tariff reductions for various trade partners versus BTA-mandated US tariff reductions

tries 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.³⁷

³⁷The 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. We have collected lists of each product category as well as the underlying 8-digit Common Nomenclature product associated with the category throughout the period. In on-going work we are creating industry measures of exposure to the EU quotas to be used as controls. Our current estimates are quantitatively similar when we exclude the most heavily affected industries by changes in EU trade policy: footwear, apparel, and knitted and crocheted fabrics and articles.

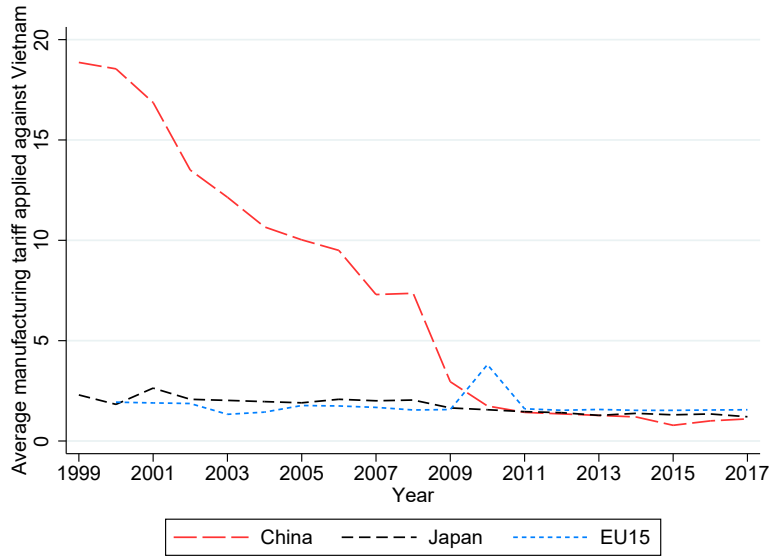


Figure B8: Average manufacturing tariff applied against Vietnam

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.

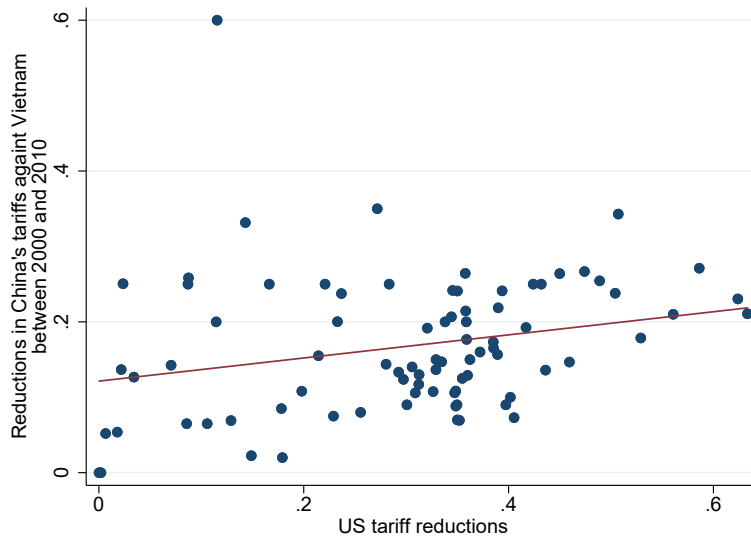


Figure B9: Reductions in Chinese tariffs against Vietnam versus US tariff reductions

B.2.2 State-owned enterprises prior to the BTA

The pace of SOE reform 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). Despite these reforms, the government consistently maintained that the state sector would play a leading role in the Vietnamese economy.

In the early 1990s there was a period of rapid liquidation and mergers among mostly locally owned, small SOEs, 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).

In the years leading up to the BTA, the number of SOEs within manufacturing fell slowly (Table B2).³⁸ Vietnam has two broad categories of SOEs, those owned by the national or central government and those owned by local governments, typically provinces, but sometimes lower administrative levels as well. The fall in the number of SOEs in the years prior to the BTA is largely due to a reduction in the number of local SOEs as the number of central SOEs remained essentially unchanged.

Table B2: Number of manufacturing enterprises, 1997 to 2001

Ownership	1997	1998	1999	2000	2001
Foreign SOEs	654	865	940	1048	1425
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.3 Pooled Regression Results

Based on the conceptual framework and overview of the BTA, we begin our empirical analysis by investigating the relationship between the U.S. tariff reductions and industry-level

³⁸This data reported in Table B2 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 and we are currently in process of digitizing this data. Future revisions will use this data for pre-BTA analysis.

Table B3: Employment by Industry- and Ownership-Type: Pooled Regression 1999-2017

	(1)	(2)	(3)
	Foreign	Private	State
Tariff Cuts \times 2001-2008	1.153 (0.560)	-0.118 (0.547)	0.445 (0.296)
Tariff Cuts \times 2009-2017	2.550 (0.888)	-0.0302 (0.753)	1.934 (0.972)
Ownership-Year FE	Y	Y	Y
Ownership-Industry FE	Y	Y	Y
Observations	1934	2061	1645
R-squared	0.98	0.98	0.92

Note: Following equation (6), the first row reflects the regression coefficient $\hat{\Phi}_1$ while the second row reflects the regression coefficient $\hat{\Phi}_2$, where the independent variable is the change in US tariff applied to Vietnamese exports in an industry before and after the BTA (ΔBTA_j). Positive coefficients imply larger employment levels in industries facing larger tariff reductions.

BTA was implemented in Dec 2001 and the base year is 2001 due to our definition of entry (indicated by the gray line). Controls include 4-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 2001, and US import quotas on textiles and clothing applied to Vietnam and China respectively. Standard errors clustered at the 4-digit industry level. Weighted by year 2000 employment.

outcomes in Vietnam’s formal manufacturing sector. We estimate the following pooled regression model:

$$Y_{jt} = \Phi_1 \Delta BTA_j \mathbf{1}_{t=[2001,2008]} + \Phi_2 \Delta BTA_j \mathbf{1}_{t=[2009,2017]} + \lambda_j + \theta_t + \alpha_t C_{jt} + \varepsilon_{jt} \quad (6)$$

where Y_{jt} is industry j ’s outcome in year t (e.g., ln firm count, ln employment, and ln revenue), ΔBTA_j is the decrease in log US tariff applied to VN imports in industry j before and after the BTA, indicator $\mathbf{1}_{t=(2002,2006)}$ equals one for years 2002-2006, indicator $\mathbf{1}_{t=(2007,2010)}$ equals one for years 2007-2010, λ_j is industry fixed effects, and θ_t is year fixed effects. BTA implementation year 2001 and pre-BTA year 2000 are the base years for the outcome changes. As such, the parameters of interest, β_1 estimates the BTA’s impact on the outcome variable for years 2002-2006 while β_2 estimates the BTA’s impact on the outcome for years 2007-2010 relative to the base years.

The year fixed effects control for aggregate, sector-wide adjustments in industry outcomes that coincide with the implementation of the BTA. Similarly, the industry fixed effects control for all time-invariant unobserved industry characteristics that might independently influence

the outcome variables. Hence, the main parameters of interest, β_1 and β_2 , are identified by changes in U.S. tariffs over time within industries. A positive coefficient means that the reduction in U.S. tariffs induced an increase in the associated outcome variable.

The identification of the causal effect of U.S. tariff reductions on 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, we discussed in detail the unique political economy of the BTA-induced U.S. tariff reductions. In particular, neither U.S. nor Vietnamese industries had an ability to influence the size of tariff reductions based on the movement of U.S. imports from Vietnam from one pre-existing tariff schedule, Column 2, to another, MFN. Furthermore, McCaig and Pavcnik (2018) show that the U.S. tariff cuts are not correlated with industry-specific global demand shocks for Vietnamese exports during this period nor with pre-existing industry-specific trends in Vietnamese exports to the U.S., E.U., or worldwide. Importantly, as shown in section 2, industry tariff changes are not correlated with baseline industry characteristics such as the industry prevalence of the SOEs or FDI firms.

We begin by examining ln firm count, ln employment, and ln revenue for all ownership types, as reported in table B4. We initially restrict the data to years 2000-2006 (odd-numbered columns) and then to all years (even-numbered columns). We conduct the analysis at the 4-digit industry level and all standard errors are clustered by industry. First, we find that U.S. tariff reductions are associated with an increase in industry firm counts, employment, and revenue in years 2000-2006 relative to the base years. Second, the magnitude of these increases grow in the medium term from 2007-2010. This growth is consistent with traditional theories of international trade that predict the expansion of industry size in response to new exporting opportunities.

We find important differences in the response of industry outcomes when we focus on different ownership types. We estimate a version of equation (6) augmented to investigate differential impacts across ownership types o where $o \in \{FIE, SOE, PRI\}$:

$$Y_{jot} = \beta_{1o'} \sum_{o'} \Delta BTA_j \mathbf{1}_{o't=(2002,2006)} + \beta_{2o'} \sum_{o'} \Delta BTA_j \mathbf{1}_{o't=(2007,2010)} + \lambda_{jo} + \theta_{ot} + \varepsilon_{jot} \quad (7)$$

Table B4: Pooled regression at the industry level

	ln Firm Count		ln Employment		ln Revenue	
	(1)	(2)	(3)	(4)	(5)	(6)
$\Delta BTA * (2002 - 2006)$	1.21 (0.33)	1.21 (0.33)	0.82 (0.24)	0.82 (0.24)	0.66 (0.26)	0.66 (0.25)
$\Delta BTA * (2007 - 2010)$		1.99 (0.52)		1.41 (0.41)		0.84 (0.47)
Industry FE	Y	Y	Y	Y	Y	Y
Year FE	Y	Y	Y	Y	Y	Y
Observations	823	1295	823	1295	823	1295
R^2	0.96	0.96	0.98	0.97	0.96	0.95

Note: Robust standard errors in parentheses adjusted for 122 4-digit industries. Outcome variables are aggregated to the 4-digit industry level. Weighted by year 2000 employment.

here Y_{jot} is the outcome for ownership type o in industry j at year t , ΔBTA_j is the change in log US tariff applied to VN imports in industry j before and after the BTA, indicator $\mathbb{1}_{o't=(2002,2006)}$ equals one for ownership o' and years 2002-2006, indicator $\mathbb{1}_{o't=(2007,2010)}$ equals one for ownership o' and years 2007-2010, λ_{jo} is industry and ownership fixed effects, and θ_{ot} is year and ownership fixed effects. Similar to the previous specification, BTA implementation year 2001 and pre-BTA year 2000 are the base years for outcome changes. Hence, the coefficients $\beta_{1o'}$ and $\beta_{2o'}$ capture the BTA impact on outcomes for ownership o' during years 2002-2006 and 2007-2010 respectively relative to base years.

In Table B5 we report estimates of differential effects across ownership types. Similar to the previous specification, We initially restrict the data to years 2000-2006 (odd-numbered columns) and then to all years (even-numbered columns). In the years immediately after the BTA, FIE firms are expanding in numbers and employment relative to the base years. FIE revenue is positively increasing but is noisy. In the subsequent period, FIE firms numbers, employment, and revenue continue to increase and is larger in magnitude. In the years immediately after the BTA, SOE firms experience a small but insignificant decline in numbers with increases in employment and revenue. The increase in SOE revenue immediately after the BTA may be due to the closure of the least productive SOEs. 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 increase subsequently. However, its employment growth is noisy as is its revenue outcomes.

Table B5: Pooled regression at the industry and ownership level

	ln Firm Count		ln Employment		ln Revenue	
	(1)	(2)	(3)	(4)	(5)	(6)
<i>FIE</i> * ΔBTA * (2002 – 2006)	0.95 (0.34)	0.95 (0.34)	1.20 (0.61)	1.20 (0.61)	0.43 (0.50)	0.43 (0.50)
<i>SOE</i> * ΔBTA * (2002 – 2006)	-0.002 (0.18)	-0.001 (0.18)	0.55 (0.24)	0.55 (0.24)	1.10 (0.50)	1.10 (0.49)
<i>PRI</i> * ΔBTA * (2002 – 2006)	1.42 (0.52)	1.44 (0.52)	0.65 (0.62)	0.65 (0.61)	0.042 (0.56)	0.05 (0.56)
<i>FIE</i> * ΔBTA * (2007 – 2010)		1.61 (0.38)		1.98 (0.86)		1.22 (0.68)
<i>SOE</i> * ΔBTA * (2007 – 2010)		0.55 (0.57)		1.2 (0.78)		1.61 (1.09)
<i>PRI</i> * ΔBTA * (2007 – 2010)		2.1 (0.68)		0.24 (0.76)		-0.99 (1.18)
Industry & Ownership FE	Y	Y	Y	Y	Y	Y
Year & Ownership FE	Y	Y	Y	Y	Y	Y
Observations	2277	3612	2277	3612	2277	3612
R^2	0.97	0.97	0.97	0.96	0.92	0.91

Note: Robust standard errors in parentheses adjusted for 122 4-digit industries. Outcome variables are aggregated to the 4-digit industry level. Weighted by year 2000 employment.

Table B6: Pooled employment share decomposition regressions, all owners

	(1)	(2)	(3)
	Continuers	Entrants	Exiters
US tariffs, 2001-08	-0.178 (0.0995)	0.294* (0.123)	-0.117 (0.0630)
US tariffs, 2009-17	-0.303 (0.162)	0.374* (0.183)	-0.0712 (0.102)
Observations	1971	1971	1971

Standard errors in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table B7: Pooled employment share decomposition regressions, state

	(1)	(2)	(3)	(4)
	All	Continuers	Entrants	Exiters
US tariffs, 2001-08	0.159 (0.0810)	0.109 (0.0698)	-0.0531* (0.0211)	0.103* (0.0451)
US tariffs, 2009-17	0.231 (0.132)	0.142 (0.116)	-0.0680 (0.0418)	0.157* (0.0728)
Observations	1971	1971	1971	1971

Standard errors in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table B8: Pooled employment share decomposition regressions, private

	(1)	(2)	(3)	(4)
	All	Continuers	Entrants	Exiters
US tariffs, 2001-08	-0.244* (0.123)	-0.160** (0.0542)	0.0804 (0.133)	-0.164* (0.0701)
US tariffs, 2009-17	-0.466* (0.228)	-0.189* (0.0727)	-0.156 (0.256)	-0.121 (0.108)
Observations	1971	1971	1971	1971

Standard errors in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table B9: Pooled employment share decomposition regressions, private

	(1)	(2)	(3)	(4)	(5)	(6)
	All	Continuers	Entrants	Exiters	Entr-Init	Entr-Chan
US tariffs, 2001-08	0.0852 (0.104)	-0.127 (0.0681)	0.267** (0.0830)	-0.0551* (0.0257)	0.142*** (0.0395)	0.125* (0.0508)
US tariffs, 2009-17	0.236 (0.178)	-0.256** (0.0782)	0.599** (0.188)	-0.107* (0.0436)	0.224** (0.0689)	0.374** (0.125)
Observations	1971	1971	1971	1971	1971	1971

Standard errors in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$