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Does FTA Import Utilization Enhance Firm Performance? An Assessment of the Philippine Manufacturing Sector

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Abstract

This study assessed how utilizing free trade agreements (FTAs) in imports affects the performance of Philippine manufacturing firms. It utilized recent developments in differences-in-differences (DID) estimation with multiple time periods and variation in treatment timing. This DID method was applied to a rich Philippine microdata set that integrates the annual firm surveys/censuses with import transactions data. The empirical analysis reveals that the FTA import utilization effects varied across different groups and periods; some estimates did not even have the expected signs. Overall, productivity gains were limited for importers that started to use FTAs. However, the productivity losses observed from quitting FTA use suggest potential long-run productivity gains obtained by consistent FTA users. The results also confirm the trade-facilitating effects of FTAs, as FTA starters consistently experienced substantial import growth. Meanwhile, quitting use only generated short-term adverse effects on firm imports, implying that some importers might have eventually increased their imports from non-FTA partners. Among others, policymakers must prioritize easing FTA procedures, intensify firm support mechanisms, and improve data access and monitoring. The country's ongoing effort in monitoring import surges could be leveraged to also identify sectors that heavily rely on imported intermediate inputs. This could be crucial in facilitating their participation and upgrading in global value chains.

Keywords: free trade agreements, firm performance, import facilitation, difference-in-differences, doubly robust

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List of Acronyms

AANZFTA – ASEAN-Australia-New Zealand FTA

ACFTA – ASEAN-China FTA

AIFTA – ASEAN-India FTA

AJCEP – ASEAN-Japan Comprehensive Partnership

AKFTA – ASEAN-Korea FTA

ASEAN – Association of Southeast Asian Nations

ASPBI – Annual Establishment Survey of Philippine Business and Industry

ATIGA – ASEAN Trade in Goods Agreement

ATT – average treatment effect on the treated

BSP – Bangko Sentral ng Pilipinas

CPBI – Census of Philippine Business and Industry

DBFTA – Doing Business in Free Trade Areas

DID – difference-in-differences

DR – doubly robust

DTI – Department of Trade and Industry

ECN – establishment control number

EFTA – European Free Trade Association

EU – European Union

FOB – free on board

FTA – free trade agreement

GVA – gross value added

GVC – global value chain

IPEF – Indo-Pacific Economic Framework

JPEPA – Japan-Philippines Economic Partnership Agreement

MNC – multinational company

MSMEs – micro-, small, and medium enterprises

NEDA – National Economic Development Authority

OR – outcome regression

PRC – People's Republic of China

PSA – Philippine Statistics Authority

PSCC – Philippine Standard Commodity Classification

PSIC – Philippine Standard Industrial Classification

R&D – research and development

ROK – Republic of Korea

S&T – science and technology

TWFE – two-way fixed effects

RCEP – Regional Comprehensive Economic Partnership

WTO – World Trade Organization

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Neil Irwin S. Moreno[1], Francis Mark A. Quimba[2], and Abigail E. Andrada[3]

1. Introduction

In recent decades, countries have mainly pursued trade liberalization through forging free trade agreements (FTAs). The total number of FTAs has exponentially increased from 22 in 1990 to 354 in 2021, with around 190 agreements involving Asian countries. Much of the rise of FTAs can be attributed to the increasing complexity of 21st century trade, as behind-the-border barriers have become notably significant in production networks. Since the 2000s, established FTAs tend to be more complex and contain provisions on emerging issues, such as competition policy, intellectual property rights, movement of persons and capital, and mutual recognition of professional qualifications and product standards (WTO 2011).

Recognizing their importance in strengthening economic and trade relations, the Philippines has considered FTAs an integral component of the Philippine trade policy. Building on its initial FTA engagements as a member of the Association of Southeast Asian Nations (ASEAN), the Philippines has showed its capacity to advance its interests as an individual party.[4] The Japan-Philippines Economic Partnership Agreement (JPEPA) was the country's first bilateral FTA and remains to be landmark agreement, as it covers several policy areas such as the smooth trans-border flow of people, investments, competition, government procurement, cooperation in science and technology (S&T), human resource development, small and medium enterprises (MSMEs), and environment (Yap et al. 2006). The Philippines also forged an FTA with the European Free Trade Association (EFTA)[5] in 2018, while its bilateral agreement with the Republic of Korea (ROK) was signed in September 2023 (Romero 2023). Moreover, the country has participated in important megaregional agreements, such as the Regional Comprehensive Economic Partnership (RCEP) and Indo-Pacific Economic Framework for Prosperity (IPEF) (Tan 2023, Ochave 2023).

The government aims to leverage FTAs as a key driver of the country's economic growth, by pursuing bilateral agreements with prospective partners such as the European Union (EU), as well as Latin American countries (Talavera 2022, Salting 2023). In addition, developing a sound FTA strategy continues to be a key policy area for the Philippines. Under the Philippine Development Plan 2023-2028, the government will pursue high-impact FTAs that would support industrial development and attract foreign investments. Increased focus will be given to negotiations with countries at the technological frontier, to complement the country's science, technology, and innovation-driven industrial policy. Advancing purposive, assertive, and forward-looking FTA strategies was deemed crucial in facilitating trade and improving the global position of Philippine export sectors. The government is looking at institutionalizing efforts that would define sector- and market-specific opportunities, grant access to trade data,

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[4] The ASEAN bloc has FTAs with the People's Republic of China (PRC), Japan, Republic of Korea (ROK), India, Australia and New Zealand, and Hong Kong.
[5] The EFTA consists of Iceland, Liechtenstein, Norway and Switzerland.

assess potential high-impact FTAs, promote FTA utilization among exporters, and provide safety nets to sectors that would be affected by the trade agreements (NEDA 2023).

With the Philippines committed to deepening its FTA engagement, the economic benefits of entering and utilizing FTAs have become a matter of debate among policymakers and sectoral groups. For instance, agriculture stakeholders have been against ratifying the RCEP, as they perceived that the sector has not benefited from current Philippine FTAs. In this regard, this paper aims to assess the impact of FTAs on the performance of Philippine firms, to serve as a guide for policymakers in ensuring that the country's FTA strategy would aid the country's pursuit of a sustainable and inclusive post-pandemic recovery.

This study also intends to contribute to the budding empirical literature on firm-level effects of using FTAs, by taking advantage of a rich microdata set that merges the Philippines' annual establishment survey/census data with the universe of trade transactions. The analysis was limited to the causal effects of FTA use in imports, since data on imports were noted to be more accurate than on exports (Yotov et al. 2016, Quimba et al. 2022). Moreover, it attempts to exploit the recent developments in difference-in-differences (DID), a widely used method in impact evaluation. The empirical analysis in this study employs a doubly robust DID estimator, proposed by Sant'Anna and Zhao (2020). The estimator was applied in a setting with multiple time periods, variation in treatment timing, and the parallel trends assumption holding potentially after conditioning on observed covariates (Callaway and Sant'Anna 2021). The results of the DID regressions reveal that the FTA import utilization effects were heterogeneous across different groups and periods, in terms of magnitude and statistical significance—some estimates did not even have the expect signs. However, productivity gains from utilizing preferential tariffs were generally limited; instead, FTAs were shown to increase import activities among Philippine manufacturing firms.

The rest of the paper is organized as follows: Section 2 reviews related literature on the Philippine FTA engagement, and firm-level impacts of FTA utilization; Section 3 presents the data sources and the empirical methodology in examining the causal effect of FTA use on firm performance; Section 4 reports and discusses the estimation results; Section 5 provides the conclusion and recommendations.

2. Review of Related Literature

2.1. FTA Utilization of the Philippines

The existing Philippine FTAs have already exhibited substantial tariff reduction during the 2010s, as noted by Quimba et al. (2022). Except for the ASEAN-India FTA (AIFTA), all FTAs have reduced the tariff rates of more than 95 percent of their respective tariff lines. In most Philippine FTAs, the bulk of the eligible tariff lines already have their respective tariff rates eliminated. Looking at Table 1, ATIGA and AKFTA registered the highest percentages of zero tariff lines in 2010. Throughout the decade, AJCEP, JPEPA, and AANZFTA exhibited the most frequent increases in eliminated tariff lines. By 2020, four FTAs had eliminated at least 90 percent of the tariff lines.

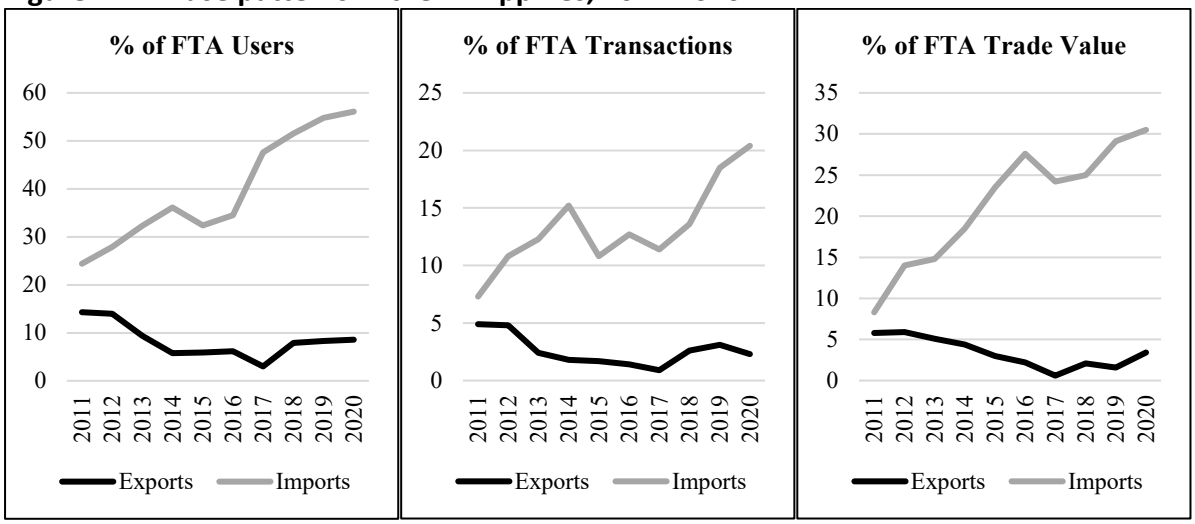
Table 1. Zero tariff lines (% of total tariff lines, by FTA)

	ATIGA	AKFTA	AJCEP	AIFTA	JPEPA	ACFTA	AANZFTA
2012	98.63	88.10	58.89	3.47	62.02	86.84	78.05
2013	98.63	88.10	66.92	3.47	70.28	86.84	88.72
2014	98.63	88.10	67.13	3.47	71.82	86.84	88.72
2015	98.63	88.10	67.14	3.47	71.83	86.85	92.90
2016	98.63	88.10	67.14	3.47	71.83	86.85	92.90
2017	98.63	88.10	68.86	3.47	73.53	86.85	92.93
2018	98.63	88.10	92.88	3.47	97.46	86.85	93.22
2019	98.63	88.10	92.88	55.79	97.46	86.85	93.35
2020	98.63	88.10	92.88	73.74	97.46	86.85	94.43

Note: ATIGA = ASEAN Trade in Goods Agreement; AKFTA = ASEAN-Korea FTA; AJCEP = ASEAN-Japan Comprehensive Economic Partnership; AIFTA = ASEAN-India FTA; JPEPA = Japan-Philippines Economic Partnership Agreement; ACFTA = ASEAN-China FTA; AANZFTA = ASEAN-Australia-New Zealand FTA
Source: Lifted in full from Quimba et al. (2022, p.5)

Despite the substantial liberalization under FTAs, firm utilization in exports still needs to improve. Throughout the 2010s, FTA partners accounted for around half of Philippine exports. However, the country's export sector failed to take advantage of the preferential tariffs, as overall utilization of FTAs in exports showed a generally decreasing trend throughout the 2010s (Quimba et al. 2022). FTA utilization in imports, on the other hand, had a more promising trend in the previous decade. While the shares of FTAs in all import indicators decreased in some years, they were still able to exhibit an upward trend throughout the 2010s. By 2020, imports under FTAs already covered 30 percent of total import value and 20 percent of the total number of import transactions, and FTA users accounted for 56 percent of Philippine importers.[6] However, import utilization rates from leading import sources such as Japan, South Korea, and Singapore have been low (Quimba et al. 2022).

Figure 1. FTA use patterns in the Philippines, 2011-2020



Source: Authors' calculations based on the trade transactions data.

Table 2 shows the distribution of firms by the rate of FTA use (i.e. percentage share of FTA imports in total import value). It is interesting to note that there was a shift in the distribution of FTA import users, between importers that barely used FTAs (0-20%) and those with at least

[6] Quimba et al. (2022) defined an FTA export (import) user as a firm with at least one export (import) transaction under any FTA scheme.

80 percent FTA use rate. During the first four years of the decade, more than 30 percent of the users were seldom users, while the total share of exclusive users ranged around 11-25 percent. By the second half of the decade, the exclusive users already surpassed the seldom users in percentage share; almost half of the import users in 2020 were exclusive users. Completely exclusive users—those whose import activities were entirely under FTA schemes—significantly contributed to this trend; in 2020, 20.0 percent of the FTA import users were already importing completely under FTAs. This reinforces the notion that FTA use has become an integral part of many firms' import activities.

Table 2. Distribution of FTA Import Users, by FTA Use Rate

	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
0% < FTA ≤ 20%	42.5	34.9	37.8	34.4	26.1	22.1	22.9	20.7	19.0	17.8
20% < FTA ≤ 40%	19.8	15.1	14.0	14.5	13.7	13.5	15.5	13.5	11.9	11.4
40% < FTA ≤ 60%	17.0	14.2	12.1	13.1	13.3	12.6	15.9	13.5	11.1	11.0
60% < FTA ≤ 80%	9.3	12.7	12.3	12.6	13.6	14.5	18.5	17.6	13.5	12.9
80% < FTA ≤ 100%	4.3	12.9	13.7	14.7	20.6	23.6	16.8	21.6	25.6	26.8
FTA = 100%	7.1	10.2	10.1	10.7	12.8	13.7	10.4	13.1	18.9	20.0
Total	**4,652**	**5,814**	**6,713**	**7,010**	**6,458**	**6,462**	**7,094**	**8,222**	**9,150**	**9,005**

Source: Authors' calculations based on the trade transactions data.

Philippine traders have also exhibited notable trends in terms of changing import activity status. Table 3 shows that the bulk of traders have been inactive importers—non-importers that did not also import in the previous year—and their percentage share has gradually increased throughout the 2010s. However, it is also interesting to note that the share of consistent users of FTA schemes—FTA users that continued to use in the succeeding year—has had an increasing trend as well. This suggests that importers that successfully utilize FTAs are likely to possess the necessary capabilities to consistently take advantage of the preferential tariffs. However, the trends could also imply that majority of the importers struggle to consistently engage in import activities.

Table 3. Change in Firms' Import and FTA User Status

t-1		t		2012	2013	2014	2015	2016	2017	2018	2019	2020
Import	FTA	Import	FTA									
No	No	No	No	49.7	47.9	49.4	49.4	51.3	58.1	64.2	63.3	63.3
No	No	Yes	No	11.4	9.7	8.5	11.0	8.2	3.4	3.7	3.0	2.1
No	No	Yes	Yes	1.8	1.9	1.8	1.9	1.8	2.1	3.1	2.7	2.1
Yes	No	No	No	8.8	10.3	10.9	9.9	10.6	11.7	3.2	2.7	3.2
Yes	No	Yes	No	16.3	15.7	13.4	12.3	14.0	10.6	10.2	10.5	9.9
Yes	No	Yes	Yes	2.9	3.3	3.0	1.8	1.6	1.6	1.8	1.9	1.6
Yes	Yes	No	No	0.9	1.5	2.0	2.0	1.7	1.2	1.6	1.6	2.4
Yes	Yes	Yes	No	1.6	1.9	2.2	2.8	1.7	1.2	1.1	1.2	1.6
Yes	Yes	Yes	Yes	6.5	7.9	8.8	8.9	9.1	10.1	11.1	13.2	13.8

Source: Authors' calculations based on the trade transactions data. The percentage shares are based on the number of firms with at least one import transaction during the 2011-2020 period.

2.2. FTAs and Firm Performance

Existing theoretical and empirical literature has established a two-way relationship between trade and performance, explained by the hypotheses of self-selection and learning-by-doing. The self-selection hypothesis signifies that more productive firms have a higher tendency to

engage in international trade, due to additional costs such as transportation and marketing expenses (Clerides et al. 1998; Bernard and Jensen 1999). On the other hand, the learning-by-doing hypothesis suggests that participating in international trade could generate additional performance gains, through various channels such as knowledge spillovers and technology transfers, increased competition, and access to quality inputs (Holmes and Schmitz 2001, Wagner 2007, Criscuolo and Timmis 2017).

Discussions on learning by importing mainly focus on productivity gains from utilizing imported intermediate inputs. Criscuolo and Timmis (2017) noted that firms importing inputs gain access to other input varieties that are potentially difficult to obtain in the domestic market. Access to a wide range of foreign inputs, especially those of higher quality, could facilitate knowledge and technology transfers. Wagner (2012) posited that utilizing these high-quality imported inputs could enhance the firms' competitive advantage, as they can specialize on production segments where they strongly perform. This could result in improved production efficiency, lower production costs, and, subsequently, additional productivity gains (Amiti and Konings 2007, Halpern et al. 2015).

The self-selection and learning-by-doing hypotheses could be extended to FTA use among traders. Hayakawa (2015) suggested that FTA utilization could affect firm performance by reducing the market price of exporters' products in the importing FTA partner. This creates additional demand for the traded products. Importers could also benefit from preferential duty savings from using FTAs. Trading firms are then compelled to hire more workers as a response to the increase in trade activities. Moreover, trade facilitation under FTAs further stimulates technology transfer (Maskus 2016, Kreinin and Plummer 2012). However, traders must consider even greater additional costs in using FTAs. Firms need to invest in capability building to gain the necessary knowledge on FTA use procedures. Moreover, the processes tend to be tedious and complex, resulting in administrative and compliance costs (Aldaba et al. 2015, Wignaraja et al. 2011). Demidova and Krishna (2008) theoretically demonstrated the self-selection of traders in FTA utilization; in particular, less productive firms only use general tariffs since they cannot afford to cover the additional costs in using FTAs.

Empirical studies have presented inconclusive findings on the performance effects of FTA use. Hayakawa (2015) observed that, among Japanese-affiliated firms in the ASEAN, India, and Oceania regions; FTA use did not increase the export and import volumes, and employment of users. However, the share of local inputs in total inputs increased under FTAs. Analyzing the impact of industrial policy on the productivity of Thai manufacturing firms, Jongwanich and Kohpaiboon (2020) found that FTA-led trade liberalization in Thailand, proxied by tariff margins, had statistically non-significant effects on firm productivity.

Meanwhile, Koo (2021) examined the effects of FTA use on the export activities of Korean MSMEs. Aside from effects on direct exports, the paper examined the effects of FTA policies on indirect exports—domestic inputs on exports through industrial input-output linkages. Results indicate that, while generally positive, the direct export effects of FTAs on MSMEs were smaller than those on large firms. Effects were also found to be heterogeneous across industries, and MSMEs benefited from the positive effects of FTA use on indirect exports, more than large firms. Thus, considering both the direct and indirect export effects, the study contended that the premium of large firms in the export effects of FTA could actually be smaller.

In the Philippine context, research studies have mainly focused on their trade creation effects (see, for example, Quimba and Barral 2021). Quimba et al. (2020) attempted to analyze the impact of FTAs on the performance of Philippine industries, in terms of gross value added (GVA), employment, wage, and productivity growth. Specifically, it estimated the direct effects of FTA imports in a particular industry, as well as the effects of FTA imports in related industries (network effects). The findings show that the direct effects of FTA imports significantly accelerated the growth of industries, in terms of GVA and labor productivity. However, the study also found that FTAs had negative direct effects on employment, albeit dampened by the employment growth caused by shocks on downstream industries.

3. Methodology and Data

3.1. Data Sources

The study utilized a firm-level panel data set that integrates the universe of Philippine trade transactions and the annual survey/census of Philippine establishments, both provided by the Philippine Statistics Authority (PSA). The trade transactions data set provides the trader code, the 10-digit Philippine Standard Commodity Classification (PSCC) code of the product traded, the country of destination/origin, the free on board (FOB) value in US dollars (US$), and insurance and freight costs. More importantly, the data contains information on the specific tariff scheme used for each transaction. Meanwhile, the Annual Establishment Survey of Philippine Business and Industry (ASPBI) and Census of Philippine Business and Industry (CPBI) of the PSA contain valuable information on firm characteristics (e.g. ownership, employment), as well as various aspects of firm operations (e.g. revenues, value added). These indicators allow for the calculation of various performance indicators, such as labor productivity.

The linking of the data sets was originally a joint initiative of the PSA and a consortium between the University of the Philippines and Erasmus University of Rotterdam in 2013. In this project, the 1991-2012 trade transactions panel was matched with the 1996-2012 survey/census data (Balaoing-Pelkmans 2017). This paper built on this important development by conducting the merging of the trade and survey/census data sets for the period 2012-2019.[7]

The merging of the trade transactions data with the ASPBI/CPBI data was conducted by matching the trader codes with the establishment control numbers (ECN) in the ASPBI/CPBI. The PSA provided a concordance table, consisting of more than 11,000 ECN-trader matches, which served as the basis for the merging. Prior to merging, the trade transactions were aggregated by trader code and year, generating firm-level imports, as well as total value of imports under FTAs.

The merging of the two data sets substantially excluded firms in the sample. Table 2 shows that the 2012-2019 survey/census panel data consists of 45,010 observations. Merging with the imports data retained only 28.7 percent of the observations. Looking at the sectoral distribution of firms, it can be observed that the most notable differences between the original survey/census data and the matched data were in the food manufacturing and electronics sectors. Food products accounted for 22.6 percent of the total number of observations. After matching with imports data, the percentage of food manufacturing observations decreased 12.5

[7] The PSA did not conduct the ASPBI in 2011, while firm-level data for 2020 were not yet available when this study was conducted.

percent. In contrast, the share of electronics sectors noticeably increased from 4.9 percent in the survey/census data to 11.3 percent in the matched panel data.

Table 4. Distribution of Firm Observations by Manufacturing Sector, 2012-2019

2-digit PSIC Code	Description	ASPBI/ CPBI	Merged with Imports
C10	Food Products	22.6	12.5
C11	Beverages	2.5	0.5
C12	Tobacco Products	0.3	0.4
C13	Textiles	3.6	3.5
C14	Wearing Apparel	6.5	6.4
C15	Leather and Related Products	2.3	1.7
C16	Wood and Wood Products	3.3	2.2
C17	Paper and Paper Products	2.9	3.7
C18	Printing and Reproduction of Recorded Media	3.1	1.3
C19	Coke and Refine Petroleum Products	0.4	0.4
C20	Chemicals and Chemical Products	5.5	5.9
C21	Pharmaceutical Products	1.1	1.4
C22	Rubber and Plastic Products	6.6	9.5
C23	Other Non-metallic Mineral Products	4.3	3.1
C24	Basic Metals	3.6	4.5
C25	Fabricated Metal Products	6.8	8.0
C26	Computer, Electronic and Optical Products	4.9	11.3
C27	Electrical Equipment	3.1	4.9
C28	Machinery and Equipment nec	3.3	4.1
C29	Motor Vehicles, Trailers and Semi-trailers	2.3	4.4
C30	Other Transport Equipment	1.3	1.8
C31	Furniture	3.3	2.8
C32	Other Manufacturing	4.1	4.6
C33	Repair and Installation of Machinery and Equipment	2.4	1.0
	Total	**45,010**	**12,899**

Source: Authors' calculations based on the ASPBI/CPBI and the trade transactions data.

Indicators in Philippine Peso (PhP) were deflated using the implicit price index, obtained from the National Income Accounts of the PSA. The index is disaggregated by 2-digit PSIC code and based on 2018 prices. Meanwhile, trade indicators in US$ were first converted to PhP using the annual average exchange rates from the Bangko Sentral ng Pilipinas (BSP) database, before being deflated using the implicit price index.

3.2. Empirical Methodology

This study investigated the causal effects of FTA import utilization on the performance of Philippine manufacturing firms. It identified FTA import users following the definition used by Quimba et al. (2022): firms having at least one import transaction under any FTA scheme. The analysis focused on evaluating the learning-by-doing hypothesis, wherein using FTAs in imports led to an increase in labor productivity, defined as the value added per worker. The trade-enhancing effects of FTAs were also assessed, particularly the ability of FTAs to facilitate firm import activities.

The empirical analysis was conducted by employing a difference-in-differences (DID) method. The canonical DID design identifies the average treatment effect on the treated (ATT) by

comparing the difference in pre- and post-treatment outcomes of the treated (i.e. non-users in time *t-1* switching to users in time *t*) and control (i.e. non-users in both *t-1* and *t*) groups. Under the parallel trends assumption—in the absence of treatment, the average outcomes of treated and control groups would exhibit parallel paths over time—the ATT is measured as the difference between the average change in outcomes of the treated group, and the average change of the control group.

However, it is important to note that switching from non-user to user could occur in different years; thus, the analysis would cover more than two time periods and variations in treatment timing. Previous studies have largely conducted two-way fixed effects (TWFE) regressions in DID setups with multiple time periods. However, the use of the TWFE model in identifying the ATT poses issues in the context of heterogeneous treatment effects and variation in treatment timing. Goodman-Bacon (2021) noted that TWFE models would include comparisons between firms that switched FTA user status at an earlier time and those that switched late. These comparisons would adversely affect the estimation of the ATT, since the earlier switchers would be included in the control group. Moreover, in the presence of heterogeneous effects, these comparisons could lead to the violation of the parallel trends assumption.

To avoid the issues arising from TWFE models, this study adopted the strategy proposed by Callaway and Sant'Anna (2021).[8] It entails a DID setup with multiple time periods, consisting of *T* years and *G* treatment groups (in terms of timing of treatment). The method breaks down the multiple time period setup into many two-periods and two-groups cases, allowing for the ATT estimation for each treatment group and time period. This disaggregated causal parameter, called the group-time average treatment effect, denotes the average effect for treatment group *g* at time *t*, where a treatment group is defined by the time when units were first treated. This strategy that the early switchers would not be included as controls in estimating the ATT on late-switcher groups. The group-time average treatment effect is expressed by the following:

$$ATT(g,t) = \mathbf{E}[Y_t(g) - Y_t(0)|G_g = 1], for\ t \geq g$$

where Y_t is the outcome variable and G_g is a binary variable that is equal to one if a unit is first treated in period *g*.

The group-time ATTs highlight treatment effect heterogeneity across different groups, time periods, and lengths of treatment exposure. Moreover, this strategy allows for the aggregation of multiple group-time ATTs, allowing researchers to obtain various aggregated causal parameters, while avoiding the common issues of TWFE models. The aggregated ATT is denoted by the following general form:

$$ATT^{agg} = \sum_{g \in G} \sum_{t=2}^{T} w(g,t) \cdot ATT(g,t)$$

where $w_{g,t}$ is a weight assigned to group *g* and time *t*. The weights are based on the precision of the estimates, as well as the size of the group—larger weights are assigned on group-time ATTs with more observations.

[8] The strategy was conducted in STATA using the "csdid" package of Rios-Avila et al. (2021).

This study conducted the DID strategy of Callaway and Sant'Anna (2021) using the doubly robust (DR) estimator. In some cases, the plausibility of the parallel trends assumption might be satisfied only after conditioning on observed covariates. This might hold true for FTA use and firm performance, since the self-selection hypothesis implies that various characteristics, which could also influence performance changes, are not balanced between firms that started using FTA and those that remained as non-users. In such cases, there are two widely used procedures to estimate the ATT: the outcome regression (OR) and inverse probability weighting (IPW) approaches. Sant'Anna and Zhao (2020) proposed that, instead of using either of the two approaches, the OR and IPW estimators be combined to form the doubly robust estimator.

Conducting the DR approach first entailed the use of propensity scores to generate weights that would balance a set of observed characteristics between the treatment and control groups.[9] For a certain treatment group *g*, the propensity scores were estimated through a logistic regression of the treatment variable on a set of pre-treatment covariates. The propensity score is thus denoted by

$$p(\boldsymbol{X}_{i,g-1}) \equiv \Pr(G_i = g|\boldsymbol{X}_{i,g-1}) = \Phi(\beta \boldsymbol{X}_{i,g-1}) \quad \forall\, i|G_i \geq g$$

where $p(\boldsymbol{X}_{i,g-1})$ is the true, unknown propensity score; $\boldsymbol{X}_{i,g-1}$ is the vector of observed covariates at time *g-1* (i.e. pre-treatment period), G_i denotes the period when a unit was first treated. The estimated propensity scores were then used to compute for the weights, using the following formula:

$$\omega_{i,g}(x) = \begin{cases} 1 & if\ G_i = g \\ \dfrac{\hat{p}(\boldsymbol{X}_{i,g-1})}{1 - \hat{p}(\boldsymbol{X}_{i,g-1})} & if\ G_i > g \end{cases}$$

where $\hat{p}(\boldsymbol{X}_{i,g-1})$ is the estimated propensity score. The formula shows that the treated group consists of importers that first used FTAs in period *g*, while the control group includes never-users, and importers that became users some time after period *g* (i.e. not yet treated units).[10]

The weights were then integrated into the OR estimator. The importance of the outcome regression in estimating the ATT lies in generating estimates for the potential outcome for the treated group in the post-treatment period, had they not been treated. To conduct the OR estimator, a regression of the difference in outcomes—weighted by $\omega_{i,g}(x)$—was run for the untreated group only:

$$\gamma_{i,t} = \Delta Y_{i,t} = Y_{i,t} - Y_{i,g-1} = \gamma_{\omega,t}(x) + \nu_i \quad \forall\, i|G_i > g \quad weighted\ by\ \omega_{i,g}(x)$$

The estimates from the regression were then used to make a prediction of the untreated difference in outcomes for the treated group. The predicted values were then integrated in the DID formula for the ATT:

$$\widehat{ATT}_{DR} = \mathbf{E}\left(\Delta Y_{i,t} \middle| G_{i,g} = 1\right) - \mathbf{E}(\hat{\gamma}_{\omega,t}(x)|G_i = g)$$

[9] The propensity score is the conditional probability of assignment to treatment, given a set of observed covariates (Rosenbaum and Rubin 1983).
[10] It is also possible to limit the control group to only never-users (i.e. $G_i = \infty$).

where $\hat{\gamma}_{\omega,t}(x)$ is the predicted difference in outcomes for the treated unit *i*, assuming it did not receive the treatment in period *g*.

It is important to acknowledge that this strategy of Callaway and Sant'Anna (2021) operates in a staggered treatment adoption setup, wherein once units are treated, they remain treated in the succeeding periods. Thus, the sample is limited to importers that switched from non-user to user some time within the 2012-2019 period, and consistently used FTAs until 2019, and importers that were non-users throughout the period. Since the survey/census panel data is unbalanced (i.e. not all firms were observed for all years), basing the identification of treated and control observations solely on the matched data could be misleading. Thus, the authors based the selection of observations from the trade transactions data, since it encompasses the entire history of trade activities conducted by Philippine firms.

For the pre-treatment covariates, this study utilized indicators that were largely based on the findings of Quimba et al. (2022). They found that firm capability, as well as knowledge and experience in international trade, significantly influence a trader's decision to use FTAs. Thus, this study included labor productivity, capital intensity as proxies for firm capability, while trade experience was represented by the extent of import and export activities. Other characteristics, such as age, foreign ownership, MSME status, and average wage were also included as additional controls in the propensity score model. In addition, the study considered the presence of knowledge and technology transfer in the trade-performance nexus. It then used indicators on research and development (R&D) expenditures and employment to proxy for a firm's involvement in innovation activities and technology adoption. Industry fixed effects were also incorporated to account for industry-level factors. A detailed explanation of the covariates is shown in Appendix 1.

4. Analysis and Discussion

4.1 Effects of FTA Import Utilization

This study examined the learning-by-doing hypothesis in using FTAs, by looking at the effects of FTA use in the performance and trade activities of Philippine importers. Table 5 shows the estimates of all group-time ATTs on labor productivity, for each treatment cohort. Having the earliest treatment among the treatment cohorts, the 2013 cohort had the largest number of group-time ATTs, as they could be observed up to six years after their first FTA use. The estimated group-time ATTs show the heterogeneity of FTA use effects across treatment cohorts and periods, in terms of magnitude, significance, and sign. It can be observed that the 2017, 2018, and 2019 cohorts did not have any significant ATTs during the period, possibly due to the limited post-treatment periods observed for these groups.

The rest of the treatment cohorts, however, only had significant ATTs in one or two years. First-time users in 2015 exhibited a 53.9-perecent increase in productivity during the first year. These firms once again had much larger productivity gains after three years, averaging at 46,186.1 percent. On the other hand, the 2016 cohort had a significant increase of 168.4 percent in productivity, one year after consistently using FTAs. While their average productivity diminished—albeit non-significant—in the following year, import users in the 2016 cohort again had greater productivity in 2019 due to using preferential tariffs, around 2770.3 percent compared to non-users. The group-time ATTs also show that FTA use led to lower productivity for some firms, though most of the negative estimates were not statistically significant.

However, the productivity of firms from the 2014 cohort were lower by 43.7 percent than non-users after two years, significant at the 95-percent level.

Table 5. Group-time ATTs on Labor Productivity, Starting FTA Use

Treatment Cohort	2013 (1)	2014 (2)	2015 (3)	2016 (4)	2017 (5)	2018 (6)	2019 (7)
g = 2013	0.090	0.026	-0.013	0.233	-0.128	-0.055	-0.196
	(0.157)	(0.151)	(0.107)	(0.171)	(0.158)	(0.164)	(0.284)
g = 2014		-0.077	-0.140	-0.575**	0.267	-0.188	0.655
		(0.188)	(0.227)	(0.270)	(0.239)	(0.273)	(0.847)
g = 2015			0.431*	0.026	0.512	6.137**	1.820
			(0.261)	(0.322)	(0.382)	(2.923)	(7.461)
g = 2016				-0.051	0.987**	-0.292	3.357***
				(0.286)	(0.466)	(0.555)	(1.014)
g = 2017					0.100	0.104	
					(0.257)	(0.229)	
g = 2018						0.040	0.174
						(0.258)	(0.495)
g = 2019							0.069
							(0.320)

Note: This table reports the group-time ATTs on labor productivity, by period of first FTA use. The outcome variable is the natural logarithm of labor productivity. The control group (i.e. non-users) consisted of never-users and firms that had not yet used in period *t*. Overall, the estimation of group-time ATTs involved 5,326observations. For all group-time ATTs, the period *g-1* served as the pre-treatment period. Standard errors are in parentheses. Significance at the 90, 95, and 99 percent are indicated by *, **, and ***, respectively.

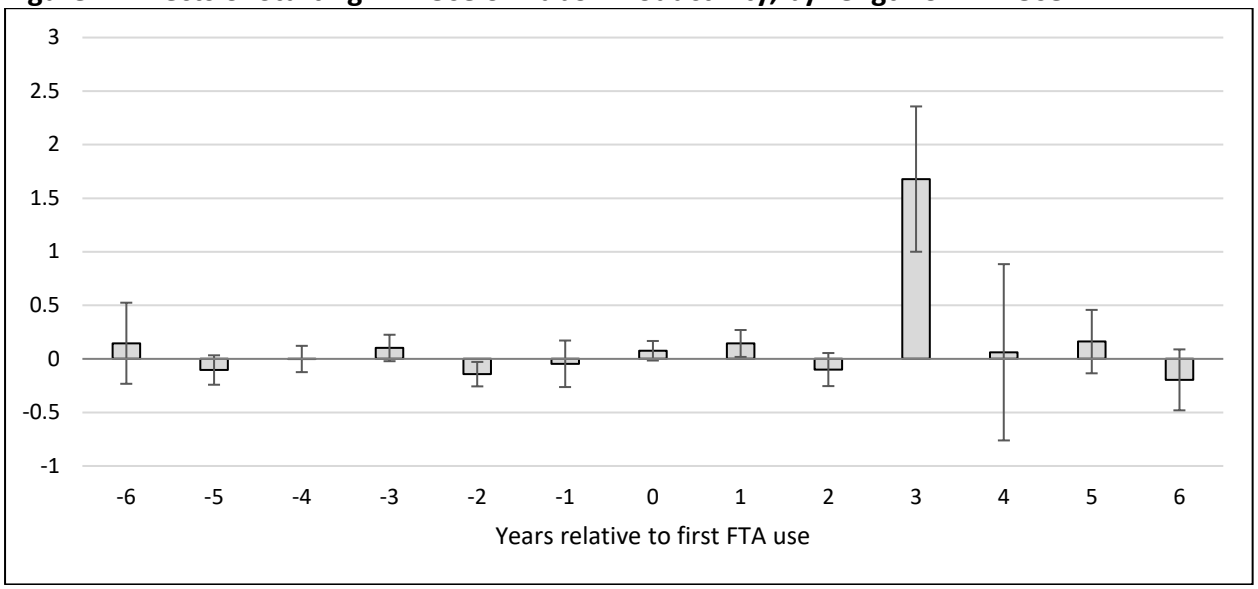
The group-time ATTs were then aggregated to obtain event-study-type estimates that would provide information on the dynamic effects of FTA use on firm productivity. Figure 2 shows the results of the event-study analysis on the productivity effects of FTA use. On the average, the effects of FTA use on labor productivity were not statistically significant in almost all lengths of use, suggesting that learning-by-doing might not strongly hold in the context of FTA use. The only notable ATT could be observed in period 3, which implies that three years of consistent FTA use resulted in FTA starters having 435.8 percent higher productivity than non-users.

As noted in the previous section, parallel trends is an important underlying assumption in the DID strategy. This ensures that the ATT does not include other changes not related to the treatment. Thus, empirical studies usually evaluate the parallel trends assumption to ensure internal validity of their DID estimates. While they merely provide "suggestive evidence" and do not directly confirm that parallel trends assumption holds, statistical tests for parallel trends could still be important in supporting the plausibility of the assumption (Huntington-Klein 2022).

One of the most common strategies is testing of pre-treatment trends, which verifies whether both treated and control groups exhibited parallel trends before treatment. This study tested the conditional parallel trends, by employing the placebo test in evaluating pre-treatment trends. The test would merely conduct the doubly robust DID estimation only for pre-treatment periods. Thus, the ATTs must be non-significant for all pre-treatment periods, to imply the plausibility of conditional parallel trends. The group-time ATTs for pre-treatment periods are shown in the panel A of Appendix 2. Significant ATTs were observed in one period for the

2015-2018 cohorts, which might affect the internal validity of the DID estimates. However, looking at the aggregated pre-treatment ATTs shown in Figure 2 (found in periods -1 to -6), the estimates were non-significant. Overall, the results of the placebo test support the plausibility of conditional parallel trends in the context of starting FTA use and firm productivity.

Figure 2. Effects of Starting FTA Use on Labor Productivity, by Length of FTA Use



Note: This figure reports the average treatment effects on labor productivity, by length of consistent FTA use. The bars represent the coefficients, while the error bars illustrate the standard errors.

This study also assessed the trade-facilitating effects of using FTAs. Table 6 shows all the group-time ATTs on total firm imports. As in the case of firm productivity, the ATTs considerably varied across treatment cohorts and periods. However, the later-treated cohorts (i.e. 2017, 2018, 2019) did not experience significant increases in total import value within the 2012-2019 period. For the other cohorts, consistent FTA use generally yielded substantial import growth. The 2013 cohort exhibited significant estimates for all post-treatment periods, with the greatest effect occurring in 2018 (526.5%). On the other hand, despite having a contemporaneous effect of 383.0 percent, the 2014 cohort exhibited a decreasing effect over time—by 2018, the ATT was already non-significant. Meanwhile, the 2015 and 2016 cohorts only had significant import growth in the first three years of using preferential tariffs.

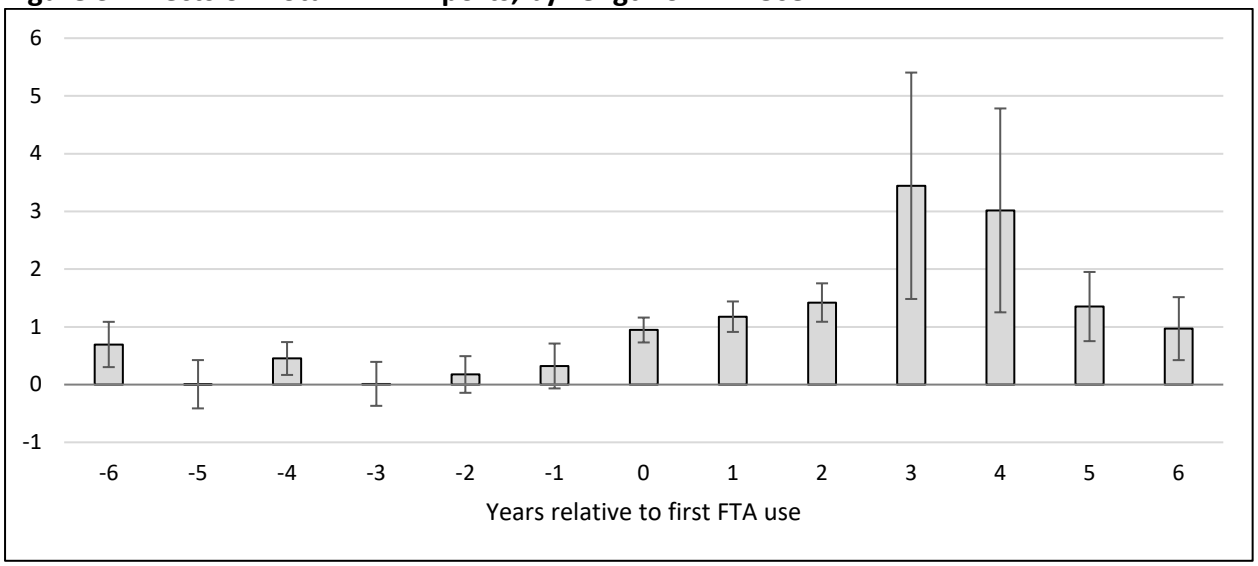
The event-study estimates found in Figure 3 further support the importance of FTAs in facilitating firm imports. Substantial import gains were experienced by firms at the onset of FTA use, as it increased their total import values by an average of 137.6 percent. The statistically significant gains continued to increase in the next three years—by period 3, consistent FTA use led to an increase of 3,030.0 percent. Though the import effects gradually dropped in the following periods—down to 163.6 percent in period 6—the event-study estimates were all statistically significant, which implies that FTAs have consistently facilitated the import activities of Philippine firms. The placebo test results found in panel B of Appendix 2 yielded two significant group-time ATTs, while the event-study estimates show a significant ATT at period -6. Nonetheless, the overall findings do not strongly claim a violation of the parallel trends assumption.

Table 6. Group-time ATTs on Total Firm Imports, Starting FTA Use

Treatment Cohort	2013 (8)	2014 (9)	2015 (10)	2016 (11)	2017 (12)	2018 (13)	2019 (14)
g = 2013	0.806***	1.500***	1.237***	1.146***	1.038***	1.835***	0.969*
	(0.207)	(0.376)	(0.432)	(0.425)	(0.375)	(0.582)	(0.545)
g = 2014		1.575***	1.255***	1.207*	0.893**	0.546	0.247
		(0.582)	(0.402)	(0.636)	(0.402)	(0.450)	(1.279)
g = 2015			2.472**	2.249*	1.928**	13.035	20.945
			(1.209)	(1.301)	(0.858)	(9.334)	(14.33)
g = 2016				0.754**	0.695*	1.502*	0.607
				(0.366)	(0.392)	(0.889)	(0.556)
g = 2017					0.280	0.627	
					(0.336)	(0.454)	
g = 2018						0.352	0.377
						(0.342)	(0.794)
g = 2019							0.172
							(0.228)

Note: This table reports the group-time ATTs on total firm imports, by period of first FTA use. The outcome variable is the natural logarithm of total imports. The control group (i.e. non-users) consisted of never-users and firms that had not yet used in period *t*. Overall, the estimation of group-time ATTs involved 5,329 observations. For all group-time ATTs, the period *g-1* served as the pre-treatment period. Standard errors are in parentheses. Significance at the 90 percent, 95 percent, and 99 percent are indicated by *, **, and ***, respectively.

Figure 3. Effects on Total Firm Imports, by Length of FTA Use



Note: This figure reports the average treatment effects on labor productivity, by number of years since quitting FTA use. The bars represent the coefficients, while the error bars illustrate the standard errors.

4.2 The Case of Stopping Utilization

Since using FTAs is primarily at the discretion of the firm, it would be interesting to also look at the effects of stopping FTA use. In this case, the treated group consists of FTA users that stopped using in period *g* and never used up to 2019, while control observations are consistent FTA users and those that had not yet quitted in the post-treatment period of estimation. Table 7 shows the group-time ATTs for labor productivity. Due to a smaller sample size, group-time

ATTs were not estimated for the 2018 cohort, as well as for some years for the 2015, 2016, and 2017 cohorts.

After quitting use in 2013, the FTA stoppers experienced a significantly negative contemporaneous effect. These firms also incurred greater declines in 2016 and 2017. Meanwhile, the 2017 cohort experienced productivity decreases of 86.2 percent at the onset of non-use, and the 2014 cohort incurred the largest decline in a single year (99.8% in 2018). As in the case of starting FTA use, some group-time ATTs did not exhibit the expected sign—for some importers, stopping FTA use led to significant increases in their productivity levels. This could be observed in the 20.2-percent increase acquired by the 2014 cohort in 2019. Positive ATTs were also observed in other cohorts, although they were non-significant. While this is contrary to the learning-by-doing hypothesis, it could be surmised that these FTA stoppers made the necessary adjustments in their operations after quitting use. These importers might have shifted to other import sources or expanded their domestic operations, which proved to be beneficial from a performance standpoint.

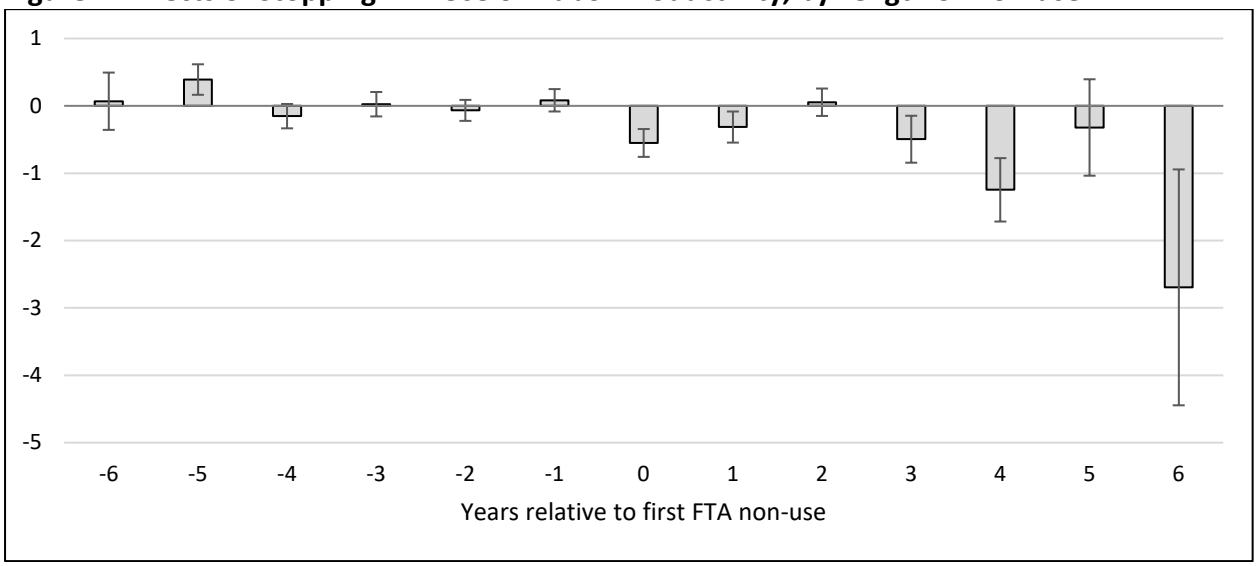
Table 7. Group-time ATTs on Labor Productivity, Stopping FTA Use

Treatment Cohort	2013 (15)	2014 (16)	2015 (17)	2016 (18)	2017 (19)	2018 (20)	2019 (21)
g = 2013	-0.358*	-0.415	0.135	-0.772*	-0.657***	-0.634	-2.695
	(0.206)	(0.285)	(0.238)	(0.424)	(0.220)	(0.471)	(1.751)
g = 2014		-0.574	0.184*	0.012		-5.792***	1.713
		(0.482)	(0.110)	(0.575)		(0.827)	(4.122)
g = 2015			-0.695	0.082	-0.281	0.333	-0.531
			(0.758)	(0.435)	(0.435)	(0.409)	(1.268)
g = 2016				-0.272			
				(0.500)			
g = 2017					-1.982***	-1.746	
					(0.600)	(1.157)	
g = 2019							0.460
							(0.841)

Note: This table reports the group-time ATTs on labor productivity, by first period of stopping FTA use. The outcome variable is the natural logarithm of labor productivity. The control group (i.e. consistent FTA users) consisted of never-stoppers and firms that had not yet stopped in period *t*. Overall, the estimation of group-time ATTs involved 3,297 observations. For all group-time ATTs, the period *g-1* served as the pre-treatment period. Standard errors are in parentheses. Significance at the 90 percent, 95 percent, and 99 percent are indicated by *, **, and ***, respectively.

The event-study estimates found in Figure 4 show that, on the average, FTA stoppers incurred productivity decreases since quitting use. Stopping use generated a contemporaneous effect of -42.3 percent, significant at the 99-percent level. The estimate might have been influenced by the group-time ATTs of the 2013 and 2017 cohorts, which were both negative and significant. A significant decline was once again observed after four years of non-use (71.3%). The greatest average decline, around 93.2%, was observed in period 6; however, it was not statistically significant. Meanwhile, in the placebo test, two group-time ATTs in the pre-treatment periods were statistically significant. At the event-study setting, significant differences in productivity were observed five years before importers stopped using FTAs. Nonetheless, the significant ATTs were not frequent and consistent, making the conditional parallel trends less likely to be violated.

Figure 4. Effects of Stopping FTA Use on Labor Productivity, by Length of Non-use



Note: This figure reports the average treatment effects on labor productivity, by number of years since quitting FTA use. The bars represent the coefficients, while the error bars illustrate the standard errors.

Stopping FTA use also had generally adverse effects on the import activities of Philippine firms. As shown in Table 8, most of the group-time ATTs with statistical significance were negative. Importers that stopped using FTAs in 2014 consistently incurred substantial reductions in total imports. Moreover, opting to use general tariffs decreased the total imports of the 2014 cohort by almost 100 percent in 2016 and 2019—the largest significant group-time ATTs across all cohorts and post-treatment periods. Meanwhile, it is interesting to note that quitting FTA use yielded substantial import gains for certain firms and periods. Importers that have quit FTA use since 2013 were able to increase their total imports by 245.5 percent in 2018, significant at 99 percent.

Table 8. Group-time ATTs on Total Firm Imports, Stopping FTA Use

Treatment Cohort	2013 (1)	2014 (2)	2015 (3)	2016 (4)	2017 (5)	2018 (6)	2019 (7)
g = 2013	-1.809***	-1.492**	-0.393	-1.629*	0.407	1.240***	0.070
	(0.616)	(0.703)	(0.465)	(0.959)	(0.388)	(0.432)	(2.708)
g = 2014		-1.698**	-1.714**	-4.065**		-4.816	-4.848***
		(0.782)	(0.812)	(1.956)		(4.168)	(1.499)
g = 2015			-2.733*	-3.582**	-0.843	-1.809	-0.992***
			(1.595)	(1.822)	(0.567)	(1.152)	(0.352)
g = 2016				-8.321**			
				(3.917)			
g = 2017					-4.420	-2.534**	
					(4.916)	(1.143)	
g = 2019							0.089
							(0.731)

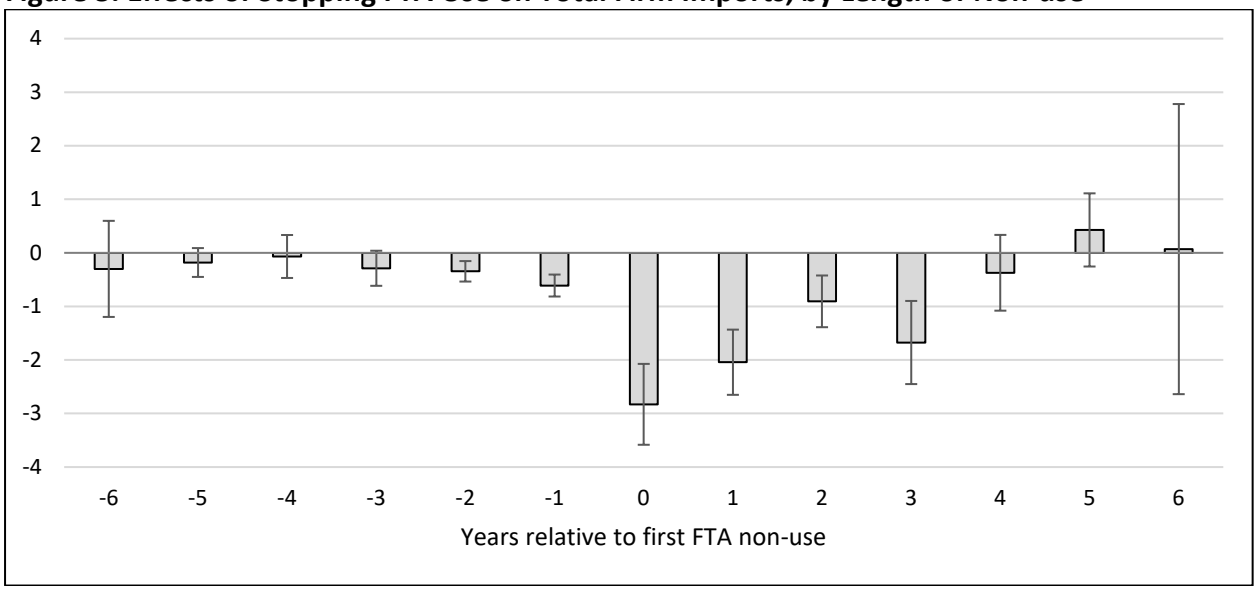
Note: This table reports the group-time ATTs on total firm imports, by first period of stopping FTA use. The outcome variable is the natural logarithm of total imports. The control group (i.e. consistent FTA users) consisted of never-stoppers and firms that had not yet stopped in period *t*. Overall, the estimation of group-time ATTs involved 3,297 observations. For all group-time ATTs, the period *g-1* served as the pre-treatment period. Standard errors are in parentheses. Significance at the 90 percent, 95 percent, and 99 percent are indicated by *, **, and ***, respectively.

It is important to note that the positive group-time ATTs of the 2013 cohort were obtained at the latter part of the time period, which influenced the event-study estimates found in Figure 5. While the FTA stoppers incurred a 94.1-percent decrease in total import at the onset of non-use, the negative effect gradually diminished in the succeeding periods, down to 81.3 percent in period 3. By the next period, the negative ATT was already non-significant. The estimation even generated a positive effect in periods 5 and 6, albeit non-significant. This trend established by the event-study estimates suggests that, while some importers have become less active after stopping FTA use, others might have adjusted their respective importations, such as acquiring goods from non-FTA partners.

The results of the placebo test, however, show that many treatment cohorts exhibited significant group-time ATTs in pre-treatment periods, even after controlling for observed firm characteristics. This adds uncertainty to the plausibility of the conditional parallel trends assumption. While these significant estimates still comprise only a handful of the pre-treatment group-time ATTs, it must be noted that the differing trends mostly occurred around one to two years before importers stop using FTAs. This observation was further reflected in the event-study estimates—the would-be FTA stoppers already started to have significant decreases in imports two years before quitting use.

While they pose potential issues on the plausibility of parallel trends, the placebo test results alternatively suggest that FTA stoppers manifest treatment anticipation behavior. Most of the FTA stoppers decided to be non-users mainly due to reduced importation, rather than shifting to other import sources. During the year prior to switching status, FTA stoppers could have had reduced importations compared to the consistent users. Possessing the knowledge and experience in using FTAs, these importers might have anticipated that the import reduction would continue in the next few years and deemed that it was more cost-effective to instead utilize general tariffs. Nonetheless, the much larger contemporaneous effect implies that, despite the presence of anticipation effects, stopping FTA use significantly reduced total firm imports, at least in the short run.

Figure 5. Effects of Stopping FTA Use on Total Firm Imports, by Length of Non-use



Note: This figure reports the average treatment effects on total firm imports, by number of years since quitting FTA use. The bars represent the coefficients, while the error bars illustrate the standard errors.

In summary, the multi-period DID estimation on the effects of FTA import utilization shows that the effects of using FTAs could vary across different periods and treatment timings. The dynamic effects generated from the event-study estimates imply that the learning-by-doing hypothesis does not precisely hold in the context of FTA use, as FTA starters mostly did not exhibit significant productivity gains after using FTAs. However, productivity losses from stopping FTA use were relatively more evident in the findings. Thus, while using FTAs did not directly improve firm productivity, one might still deduce that consistent FTA users acquired productivity gains through other channels in the long run. For instance, consistently utilizing preferential rates might have eventually resulted in significantly lower production costs and, subsequently, improved the firms' competitiveness. Meanwhile, the generally significant effects of FTA use on firm imports signify that learning by doing is more evident in facilitating trade activities. This is consistent with existing macro-level studies, wherein FTAs have generally positive effects on bilateral trade flows (see, for example, Baier et al. 2019). The preferential duty savings acquired by importers might have incentivized them to further expand the scale of their importation. This suggests the effectiveness of the country's existing FTAs, as these agreements are primarily established to promote trade among FTA partners.

5. Conclusion and Recommendations

As the Philippines continues to advance a trade policy that revolves around FTAs, it is crucial to thoroughly assess how its existing FTAs have contributed to the growth of its businesses and industries. During the previous decade, Philippine importers have taken advantage of the preferential tariffs, resulting in the increasing utilization of FTA schemes in imports. Building on the budding empirical literature on firm-level effects of FTA use, this study attempted to establish the causal effects of FTA import use on the performance of Philippine manufacturing firms.

Exploiting a rich micro dataset of Philippine firms, the study utilized the recently developed DID strategy of Callaway and Sant'Anna (2021), which addresses estimation issues in a multi-period setting where treatment could take place in different periods. The results show that, overall, FTA use did not consistently result in significant productivity gains. However, it might still be possible that consistent utilization would eventually result in capability building and performance improvement, evidenced by the adverse productivity effects of quitting FTA use, at least in the short run.

One of the potential channels through which FTA import use could induce productivity gains is the expansion of import activities. The DID estimates indicate that starting FTA use significantly enhanced total firm imports, and these import gains might have been consistent over time. The importance of FTAs in facilitating trade was further reinforced by the short-term import declines sustained by importers that stopped FTA use. Nonetheless, the findings also suggest that non-users could eventually raise their importations outside FTAs. For some firms, it might be more beneficial to import from non-FTA partners if, for example, they produce certain types of goods with higher quality compared to FTA partners.

The import-enhancing effects of FTAs could result in an influx of imported goods, which has been a cause of concern regarding the Philippines' recent trade agreements, most notably the RCEP (Crismundo 2023). Nonetheless, empirical studies have found that import competition arising from greater import activities could induce firms to engage in capacity building and innovation to improve their production efficiency, as well as the quality of their products (see,

for example, Pavcnik 2002, Amiti and Khandelwal 2013). Fernandes and Paunov (2009) observed that import competition had a strongly positive effect on the product quality of non-exporting firms. However, substantial import surges could also threaten firm survival (Colantone et al. 2015). Thus, it is important to ensure that the increase in imports due to lower tariffs would not severely affect the competitiveness of local industries. To avoid unwarranted surges in imports, the Department of Trade and Industry (DTI) launched the Import Surge Monitoring System that would allow local stakeholders to monitor the importation of certain goods, as well as generate statistical data and trends (Talavera 2023).

Several policy implications could be derived from the analysis of the findings. To encourage firms to utilize FTAs, the Philippine government must work on easing of FTA procedures and lowering of administrative and compliance costs. The complex process of availing the preferential rates, due to the "noodle bowl effect" of overlapping FTAs, could be reason enough for firms to disregard the benefits of using FTAs (Wignaraja et al. 2011). The Philippines' ratification of the RCEP could be a welcome development in this regard, as the megaregional agreement aims to streamline rules of origin and customs procedures, among others (Malindog-Uy 2022). This could be complemented by intensifying efforts that would raise firm awareness (e.g. Doing Business in Free Trade Areas[11]), regularly monitor firm FTA utilization, and assist distressed traders, especially MSMEs. Forging inter-agency partnerships, as well as collaborations with the private sector, could be highly beneficial for the government in initiating these efforts. In September 2023, the DTI signed an MOU with the Philippine Chamber of Commerce and Industry (PCCI), to formalize their partnership in promoting trade agreements and facilitating their utilization in the country. Under the MOU, the DTI and PCCI will capacitate local business communities, through establishing international trade assistance centers or help desks in the regions, conducting capacity-building and mentorship programs, organizing trade-related dialogues and consultations, and providing networking and linkage opportunities for firms seeking to participate in global value chains (GVCs) (Desiderio 2023). The consultation sessions could be especially crucial in further investigating the main factors on why firms quit FTA use and formulate the necessary interventions to address this issue.

The Import Surge Monitoring System could be utilized to conduct sector-specific assessments on Philippine imports. While increased importation might not be favorable to some sectors (e.g. agriculture), it could be exploited by those that rely on imported raw and intermediate inputs. For instance, electronic firms, which mostly engage in assembly and testing activities, extensively import most of their inputs, such as integrated circuits and wafers and passive components (Frederick and Gereffi 2016). Thus, aside from preventing unwarranted import surges, the system could also help in strengthening the country's participation in GVCs, by identifying specific sectors and value-chain segments that substantially import intermediate inputs. Given its import-facilitating effects, FTAs must be leveraged to make these inputs more accessible to Philippine firms. It would also be crucial to take advantage of other FTA provisions that would complement the greater market access resulting from lower tariffs. Attracting foreign investments and facilitating cooperation in other areas, such as MSME development and S&T, could provide industries various opportunities to penetrate higher-value GVC segments.

Meanwhile, the limitations of the study present various opportunities for further research on the impacts of FTAs. First, since the FTA user status was denoted by a binary variable, researchers could delve deeper into the intensity of FTA use among importers. Products that

[11] An outreach program of the Philippine Department of Trade and Industry that conducts information drives to increase firm knowledge and awareness on FTAs, the ASEAN Economic Community, and other preferential schemes (BusinessMirror 2017).

were imported from FTA partners, both under preferential and most favored nation tariffs, also present a low-hanging fruit for researchers and policymakers in terms of further evaluating the FTA import utilization in the country, and formulating the appropriate interventions to boost FTA utilization rates. Second, the study was constrained by various data limitations. The set of covariates was limited to the indicators from the surveys and censuses; thus, important FTA use determinants, such as firm awareness, were not incorporated. A considerable number of observations were also excluded from the merged data, since the matching of establishment and trader codes is still a work in progress. In addition, potential accuracy issues with the exports data limited the analysis to import utilization. The Philippines could address the latter by initiating efforts with its FTA partners in aligning their respective trade transactions databases, to come up with consistent export data. This would be crucial in evaluating the impact of FTAs among Philippine exporters and identify key policy areas for improving the competitiveness of the export sector.

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Appendix

Appendix 1. Definition of Variables

Variable	Definition
Labor Productivity	natural logarithm of labor productivity (value added divided by total number of permanent workers)
Total Imports	natural logarithm of total imports (total freight on board (FOB) value of goods imported)
FTA User Status	FTA user dummy—1 if the imported at least one product under any FTA scheme; 0 otherwise
Age	age of firm (number of years)
Capital Intensity	natural logarithm of capital intensity (total book value of tangible and intangible assets as of December 31, divided by total number of permanent workers)
MSME	MSME status dummy—1 if firm has less than 200 employees; 0 otherwise
Foreign Ownership	foreign ownership status dummy—1 if firm has at least 10% foreign capital participation; 0 otherwise
Average Wage	natural logarithm of average wage (total expenses on salaries, wage, and benefits, divided by total number of employees)
R&D Employment	total number of research and development (R&D) personnel
R&D Spender	R&D spender status dummy—1 if total R&D expenditure is not 0; 0 otherwise
Export Intensity	percentage of export sales in total revenue
Industry	industry categorical variable, by 2-digit Philippine Standard Industrial Classification (PSIC) code

Source: Authors' elaboration based on the ASPBI and CPBI.

Appendix 2. Placebo Test, Starting FTA Use

Treatment Cohort	2012-2013 (1)	2013-2014 (2)	2014-2015 (3)	2015-2016 (4)	2016-2017 (5)	2017-2018 (6)
a. Labor Productivity						
g = 2014	0.288					
	(0.258)					
g = 2015	-0.613**	-0.974				
	(0.296)	(1.607)				
g = 2016	-0.047	-0.027	-0.543**			
	(0.712)	(0.457)	(0.218)			
g = 2017	-1.732**	-0.313	0.119	0.634		
	(0.731)	(0.213)	(0.180)	(0.421)		
g = 2018	0.209	0.092	0.321*	-0.041	0.025	
	(0.254)	(0.174)	(0.193)	(0.216)	(0.270)	
g = 2019	0.146	-0.215	0.048	0.096	-0.145	-0.035
	(0.378)	(0.152)	(0.154)	(0.139)	(0.129)	(0.196)
b. Total Imports						
g = 2014	1.026***					
	(0.365)					
g = 2015	1.407	-2.702				
	(1.748)	(2.743)				
g = 2016	0.741	0.207	0.813			
	(1.120)	(0.754)	(0.663)			
g = 2017	0.929	0.012	-0.304	1.599		
	(0.811)	(0.837)	(1.828)	(0.981)		
g = 2018	-1.221	0.334	0.025	-0.537	0.338	
	(1.033)	(0.302)	(0.582)	(0.359)	(0.483)	
g = 2019	0.695*	0.439	0.475	-0.118	0.206	0.210
	(0.392)	(0.380)	(0.400)	(0.554)	(0.153)	(0.196)

Note: This table reports the placebo test results, by period of first FTA use. Standard errors are in parentheses. Significance at the 90 percent, 95 percent, and 99 percent are indicated by *, **, and ***, respectively.

Appendix 3. Placebo Test, Stopping FTA Use

Treatment Cohort	2012-2013 (1)	2013-2014 (2)	2014-2015 (3)	2015-2016 (4)	2016-2017 (5)	2017-2018 (6)
a. Labor Productivity						
g = 2014	0.850					
	(0.657)					
g = 2015	0.383	-0.338				
	(0.242)	(0.217)				
g = 2016	0.165	-0.690*	0.279			
	(0.282)	(0.380)	(0.287)			
g = 2017	-0.199	-0.053	0.276	0.177		
	(0.348)	(0.323)	(0.393)	(0.377)		
g = 2018	0.394	-0.185	0.022	-0.027	-0.072	
	(0.302)	(0.285)	(0.491)	(0.253)	(0.355)	
g = 2019	0.069	0.384	-0.010	-0.059	-0.982***	-0.042
	(0.232)	(0.361)	(0.185)	(0.155)	(0.243)	(0.357)
b. Total Imports						
g = 2014	0.120					
	(0.341)					
g = 2015	-0.555*	-0.957***				
	(0.286)	(0.320)				
g = 2016	-0.096	-0.424	-0.702			
	(0.260)	(0.400)	(0.483)			
g = 2017	-0.228	-0.114	0.442	-1.128*		
	(1.060)	(0.963)	(0.850)	(0.606)		
g = 2018	0.127	0.153	-0.670**	-0.737***	0.101	
	(0.217)	(0.168)	(0.267)	(0.209)	(0.720)	
g = 2019	-0.299	-0.732	-0.228	-0.374	0.098	-0.756*
	(0.897)	(0.551)	(0.173)	(0.484)	(0.246)	(0.444)

Note: This table reports the placebo test results, by period of first FTA non-use. Standard errors are in parentheses. Significance at the 90 percent, 95 percent, and 99 percent are indicated by *, **, and ***, respectively.