Kyoto University,
Graduate School of Economics
Discussion Paper Series

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Makoto Hasegawa and Takafumi Suzuki

Discussion Paper No. E-26-001

Graduate School of Economics
Kyoto University
Yoshida-Hommachi, Sakyo-ku
Kyoto City, 606-8501, Japan

August 2026

Real Responses of Intra-Firm Trade to the Large Corporate Tax Cut under the TCJA: Evidence from Japanese Customs Data*

Makoto Hasegawa† Takafumi Suzuki‡

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Abstract

Using Japanese customs data on export transactions from 2014 to 2021, we examine how intra-firm exports to the U.S. responded to the large corporate tax cut enacted under the Tax Cuts and Jobs Act of 2017 (TCJA). We observe exports at the firm-product-consignee-year level and identify whether the consignee is a U.S. subsidiary of the exporter. We find that related-party export prices did not decline relative to unrelated-party export prices following the TCJA, providing no evidence of a profit-shifting response through transfer pricing. In contrast, export quantities and values in related-party transactions increased in the post-TCJA period relative to those in unrelated-party transactions, with particularly strong responses for intermediate goods. These findings suggest that the response of intra-firm exports to the TCJA reflected real adjustment rather than profit-shifting incentives.

Keywords: Intra-firm trade; Transfer pricing; Profit shifting; Multinational firms; International taxation

JEL classification: H25; H26; F23

*This study is an outcome of the research conducted jointly with the Policy Research Institute (PRI) after submitting a request for the use of customs import and export declaration data to the Ministry of Finance (MOF) based on the "Guideline on the utilization of customs' import and export declaration data in joint research with the Policy Research Institute," and receiving approval in February 2023. The views expressed in this paper are those of the authors and do not represent the official views of MOF or PRI. The authors are solely responsible for the content of this paper.

†Corresponding author: Makoto Hasegawa, Graduate School of Economics, Kyoto University, Yoshida-Honmachi, Sakyo-ku, Kyoto 606-8501, Japan. E-mail: mhasegawa@econ.kyoto-u.ac.jp.

‡Aichi Shukutoku University. E-mail: tsuzuki@asu.aasa.ac.jp.

1 Introduction

The Tax Cuts and Jobs Act (TCJA), enacted in December 2017, introduced a major reform of U.S. business taxation. While the TCJA fundamentally transformed the U.S. international tax system by exempting dividends received by U.S. firms from their foreign subsidiaries and introducing several anti-profit-shifting and anti-tax-avoidance measures, its most prominent domestic provision was the reduction in the top federal corporate income tax rate from 35% to 21%. The TCJA naturally affected the domestic activities of U.S. resident corporations and the foreign operations of U.S. multinationals. However, it should also have affected foreign multinational firms with subsidiaries in the U.S.

For foreign multinationals operating in the U.S., the 14-percentage-point tax cut under the TCJA created two distinct incentives. First, for multinational firms headquartered in a high-tax country such as Japan, the TCJA created an incentive to shift profits to the U.S. by booking more profits in their U.S. subsidiaries, thereby reducing tax liabilities at the multinational group level. Second, the large tax cut increased the after-tax return on investment in the U.S. and, as a result, may have encouraged multinationals to expand the operations of their U.S. subsidiaries.

Using Japanese customs data on export transactions from 2014 to 2021, we examine how intra-firm exports to the U.S. responded to the large corporate tax cut enacted under the TCJA. We observe exports at the firm-product-consignee-year level and identify whether the consignee is a U.S. subsidiary of the exporter, that is, whether the transaction is between related parties. To test for a profit-shifting response, we employ event-study and difference-in-differences designs. Specifically, we examine whether Japanese firms lowered transfer prices in related-party transactions with their U.S. subsidiaries relative to arm's-length prices in unrelated-party transactions following the TCJA. We also examine how export quantities and values in related-party transactions responded to the TCJA using the same approach.

We find that related-party export prices did not decline relative to unrelated-party export prices following the TCJA, providing no evidence of a profit-shifting response through transfer pricing. In contrast, export quantities and values in related-party transactions increased in the post-TCJA period relative to those in unrelated-party transactions, with particularly strong responses for intermediate goods. Specifically, export quantities and values in related-party transactions increased by 5.1% and 4.7%, respectively, relative to those in unrelated-party transactions. When the sample is restricted to intermediate goods, the increases in export quantities and values are 7.5% and 6.0%, respectively. Given that intermediate goods are more likely than other goods to be used as inputs in the production of final goods by U.S. subsidiaries, these findings are consistent with Japanese firms increasing

real activity through their U.S. subsidiaries in response to the TCJA.

The contribution of this study is twofold. First, we contribute to the literature on the effects of the TCJA on foreign multinationals. Existing studies primarily examine the effects of the TCJA on the domestic and foreign activities of U.S. firms, including investment, employment, research and development, mergers and acquisitions, and payouts (Amberger and Robinson, 2024; Chodorow-Reich et al., 2024; Crawford and Markarian, 2024; Albertus et al., 2025; Dyrda et al., 2026; Kennedy et al., forthcoming), as well as on profit shifting (Garcia-Bernardo et al., 2026) and domestic and foreign effective tax rates (Dyreng et al., 2023; Dobridge et al., 2025).[1]

However, relatively few studies examine how foreign multinational firms responded to the TCJA. Gaertner et al. (2020) and Overesch and Pflitsch (2021) examine the stock market responses of foreign multinational firms to news about the TCJA. They show that foreign multinationals, particularly those operating in the U.S. and facing a reduction in effective tax rates following the TCJA, experienced positive stock returns in response to events leading to the passage of the TCJA. Neither study examines actual changes in corporate behavior induced by the TCJA. More specifically, to our knowledge, no existing study examines how intra-firm trade responded to the TCJA. We contribute to this literature by providing evidence on the intra-firm trade response of Japanese multinationals to the TCJA.

Second, this study contributes to the literature on tax-motivated profit shifting through transfer pricing. A large body of literature has examined the manipulation of transfer prices by multinational firms using variation in corporate tax rates across destination countries where their foreign subsidiaries are located (e.g., Clausing, 2003; Cristea and Nguyen, 2016; Davies et al., 2018; Liu et al., 2020; Wier, 2020; Hasegawa et al., 2026). These studies estimate the semi-elasticity of related-party prices with respect to the corporate tax rate in the destination country or the tax differential between the home country and the destination country. However, they focus on profit-shifting responses to marginal changes in tax rates. In contrast, we provide new evidence on the profit-shifting response to a large corporate tax cut in a single country by exploiting the TCJA as a natural experiment.

The remainder of the paper is organized as follows. Section 2 describes the institutional background and key provisions of the TCJA and develops the hypotheses tested in the empirical analysis. Section 3 describes the Japanese customs data and other data sources used in the analysis. Section 4 explains the estimation methodology. Section 5 presents the results. Section 6 conducts placebo tests to assess the validity of our results. Section 7 concludes.

[1] Dharmapala (2024) surveys the literature on the effects of the TCJA's international provisions on U.S. multinationals.

2 Institutional Background and Expected Responses

The TCJA introduced a major reform of U.S. business taxation. Its most prominent feature was a reduction in the top federal corporate income tax rate from 35% to 21%, effective January 1, 2018. The reform also introduced full expensing for certain capital investments through 2022 and limited the deductibility of interest expenses to 30 percent of adjusted taxable income. In addition, the TCJA shifted the U.S. international tax system toward territorial taxation by exempting certain dividends received by U.S. corporations from foreign subsidiaries. It also introduced new provisions, including the base erosion and anti-abuse tax (BEAT) and global intangible low-taxed income (GILTI) to reduce profit-shifting incentives, as well as foreign-derived intangible income (FDII) to encourage U.S. corporations to serve foreign markets from the U.S.[2]

The legislative process leading to the TCJA began on September 27, 2017, when a framework for tax reform was released. The House and Senate passed different versions of the bill on November 16 and December 2, respectively. The conference report, released on December 15, 2017, set out the final provisions of the bill. The House approved the conference report on December 19, and both chambers gave final approval to the legislation on December 20 by narrow margins. Accordingly, both the final content of the bill and its passage remained uncertain until mid-to-late December (Gaertner et al., 2020; Overesch and Pflitsch, 2021). The TCJA was signed into law on December 22, 2017.

While the TCJA introduced multiple international tax provisions, most non-rate changes—such as the dividend exemption and GILTI—primarily apply to U.S.-headquartered multinationals. Consequently, for Japanese multinationals exporting to their U.S. affiliates, the dominant and most direct policy shock is the sharp reduction in the U.S. statutory corporate tax rate.[3] Using survey data on first- and second-tier Japanese-owned U.S. subsidiaries collected by Japan's Ministry of Economy, Trade and Industry (the *Basic Survey on Overseas Business Activities*), we calculate the effective tax rate for each subsidiary-year observation, defined as corporate taxes divided by pretax profits. As shown in Appendix Table A1, the median effective tax rate ranges from 27.5% to 33.3% in the pre-TCJA period (2014–2017), whereas it ranges from 18.4% to 21.1% in the post-TCJA period (2018–2021).[4] The sharp

[2]BEAT is a corporate minimum tax imposed on applicable taxpayers that make deductible payments to foreign related parties. GILTI requires U.S. shareholders of controlled foreign corporations to currently include in gross income foreign earnings in excess of a deemed return on tangible assets. FDII provides a deduction for income earned by domestic corporations from certain foreign sales and services. See Clausing (2020) for a detailed discussion of these provisions.

[3]The FDII rules apply to profits from exports from the U.S. and therefore do not directly affect exports from Japan to the U.S.

[4]Note that this effective tax rate includes both federal and subnational corporate taxes.

decline in 2018 indicates that the TCJA substantially reduced the tax burden on Japanese-owned U.S. subsidiaries.

Japan slightly reduced its national corporate income tax rate during our sample period, from 25.5% to 23.9% in 2015, and further to 23.4% in 2016 and 23.2% in 2018. These cuts were much smaller than the 14-percentage-point cut under the TCJA. As a result, since 2018, the U.S. has become a lower-tax location than Japan for Japanese firms. According to KPMG's Corporate Tax Rates Table, the U.S. statutory corporate income tax rate, including subnational taxes, declined from 40% to 27% in 2018, whereas Japan's remained around 30% from 2016 onward.

The large corporate tax cut under the TCJA could affect the intra-firm trade of Japanese multinationals in at least two ways. First, Japanese firms may have incentives to reduce transfer prices on products exported to their U.S. subsidiaries in order to shift profits to the U.S. By lowering related-party export prices, they can report more profits in the U.S., holding the scale of local business activities constant. A large body of literature documents such profit-shifting responses in related-party prices (i.e., transfer prices) relative to unrelated-party prices (i.e., arm's-length prices), exploiting variation in corporate tax rates across destination countries (Clausing, 2003; Cristea and Nguyen, 2016; Davies et al., 2018; Liu et al., 2020; Wier, 2020; Hasegawa et al., 2026).

In addition to such reporting responses, the corporate tax cut may also induce real responses by Japanese multinationals. Lower corporate tax rates increase the after-tax return on investment, which may encourage Japanese firms to expand investment in the U.S. and scale up the activities of their U.S. subsidiaries. Because intra-firm trade is closely tied to firms' investment and production decisions within multinational networks, exports to related parties may respond more strongly to such tax-induced investment incentives than exports to unrelated parties. To support this expansion, Japanese firms may increase exports of intermediate inputs or final goods to their U.S. subsidiaries. As a result, export quantities in related-party transactions are expected to increase relative to those in unrelated-party transactions following the TCJA.

In summary, we establish the following hypotheses to test in our empirical analysis.

Hypothesis 1: Japanese firms will reduce export prices in related-party transactions relative to unrelated-party transactions following the TCJA.

Hypothesis 2: Japanese firms will increase export quantities in related-party transactions relative to unrelated-party transactions following the TCJA.

Our data include information on the export value for each transaction, which equals price multiplied by quantity. Thus, we expect that export values in related-party transactions may

either increase or decrease depending on whether the decrease in prices in Hypothesis 1 (i.e., the reporting response) dominates the increase in quantities in Hypothesis 2 (i.e., the real response), as summarized below.

Hypothesis 3: Export values in related-party transactions will decrease following the TCJA if the reporting response dominates the real response, and increase otherwise.

3 Data

Our primary data source is transaction-level customs data derived from export declarations submitted to Japan Customs, Ministry of Finance, Japan. These data record all export transactions with a declared value exceeding 200,000 yen, filed on a daily (transaction-by-transaction) basis by Japanese exporters from January 1, 2014 to December 31, 2021. We restrict the sample to transactions conducted by corporate entities, excluding those by individuals. The following data items are used in our analysis: the name and corporate identification number (i.e., Japan's corporate number) of the exporter, the date of export declaration, the names and 9-digit codes of exported products as defined by the Harmonized Commodity Description and Coding System (hereafter HS codes), the value and quantity of each exported product, and the name and address of a consignee (i.e., the declared recipient in the destination country).

No identifier codes are available for consignees in the data. We therefore construct unique consignee identifiers by cleaning and normalizing consignee names and addresses and applying fuzzy matching procedures to link consignees consistently over the study period.[5] This procedure allows us to track the same consignee across transactions and years despite potential variations in reported names and addresses.

To identify whether the consignee is a subsidiary of the exporter (i.e., whether the transaction is between related parties or at arm's length), we use ownership information from the Orbis database provided by Moody's. We collect data on foreign subsidiaries of Japanese firms, including subsidiary names and addresses, as well as the corporate identification numbers of Japanese owners. In Orbis, each subsidiary is associated with an immediate shareholder (ISH) and a global ultimate owner (GUO), each of which directly or indirectly owns at least 50.01% of the subsidiary. We define Japanese owners as the subsidiary's ISH and/or GUO located in Japan.

We merge these subsidiary records with the customs data by matching the corporate identification number of the Japanese owner (i.e., the exporting firm) and by fuzzy matching

[5]Details of the procedures used to assign consignee identifiers are provided in the Appendix.

consignee names and addresses, and determine whether the consignee is a subsidiary of the exporter.[6] Because our analysis focuses on profit shifting and intra-firm trade among multinational firms, we restrict exporters to Japanese multinational firms that own foreign subsidiaries and are recorded as the ISH or GUO of at least one foreign subsidiary in the Orbis data.

We aggregate daily transaction records in the customs data by exporter, 9-digit HS code, consignee, and calendar year to construct a firm-product-consignee panel dataset of export transactions covering 2014–2021.[7] For our main analysis, we restrict the sample to exports destined for the U.S. Using this dataset, we define unit price as export value divided by quantity. We denote the unit price, quantity, and export value of product k exported by Japanese firm i to U.S. consignee c in year t as Unit Price$_{ikct}$, Quantity$_{ikct}$, and Export Value$_{ikct}$, respectively. To capture related-party transactions, we define a dummy variable Related$_{ic}$ that equals one if consignee c is a subsidiary of firm i and zero otherwise.

To construct the final dataset for our analysis, we apply the following sample restrictions. First, to facilitate comparisons of prices and quantities across products between related- and unrelated-party transactions, we restrict the sample to transactions for which quantities are reported in kilograms.[8] Second, we restrict the sample to firm–product–consignee units that are observed at least once both in the pre-TCJA period (2014–2017) and in the post-TCJA period (2018–2021), so that changes in export behavior before and after the TCJA can be examined.

As a result of these sample restrictions, the final sample comprises 321,264 firm-product-consignee-year observations, involving 2,196 firms exporting 2,822 products to 11,895 consignees. Table 1 presents summary statistics for the variables used in the analysis for unrelated-party transactions (Related$_{ic} = 0$), related-party transactions (Related$_{ic} = 1$), and the full sample. To mitigate the influence of outliers, we winsorize unit prices, quantities, and export values at the 1st and 99th percentiles within each year.[9] Related-party transactions account for 49.9% of the observations.

On average, export values and quantities are higher in related-party transactions than in unrelated-party transactions, whereas unit prices are lower. We supplement the customs data with unconsolidated financial information on Japanese exporting firms obtained from the *Basic Survey of Japanese Business Structure and Activities* conducted by Japan's Ministry

[6]Details of the matching procedures are provided in the Appendix. One limitation of our data is that financial information on Japanese-owned subsidiaries in the U.S. is almost entirely missing from Orbis and is therefore unavailable for analysis.

[7]To maintain the panel structure of the data, we exclude a small subset of products whose HS codes were revised during the study period.

[8]In our data, more than 93.4% of transactions are reported in kilograms.

[9]The main results are qualitatively unchanged when we do not apply winsorization.

of Economy, Trade and Industry. As shown in Table 1, the mean and median of total assets are more than twice as large for exporting firms engaged in related-party transactions as for those engaged in unrelated-party transactions, suggesting that the larger quantities and export values observed in related-party transactions may be associated with differences in the size of Japanese exporting firms.

In Figure 1, Panel (a) plots the annual mean of the natural logarithm of unit price for related-party transactions (circles) and unrelated-party transactions (diamonds). Panel (b) presents the same series, normalized to zero in 2017. Unit prices in both related- and unrelated-party transactions increase from 2014 to 2017 and then remain approximately at the 2017 level from 2018 to 2020. Related-party prices do not appear to have declined relative to unrelated-party prices after the TCJA took effect in 2018.

Panels (c)–(f) plot the annual mean of the natural logarithm of quantity and export value in the same manner. In these panels, quantities and export values for related-party transactions trend similarly to those for unrelated-party transactions in the pre-TCJA period but appear to increase modestly relative to unrelated-party transactions from 2018 onward.

4 Estimation Methodology

To test Hypotheses 1–3 presented in Section 2, we follow the empirical strategy used in the literature on profit shifting through transfer pricing, which compares related-party transactions with unrelated-party transactions (e.g., Cristea and Nguyen, 2016; Davies et al., 2018; Liu et al., 2020; Wier, 2020; Laudage Teles et al., 2024). We begin by estimating the following event-study specification:

$$\log y_{ikct} = \sum_{s \neq 2017} \beta_s \left(\text{Related}_{ic} \times 1\{t = s\} \right) + \eta_{ikc} + \lambda_{kt} + \mu_{it} + \epsilon_{ikct}, \tag{1}$$

where $\log y_{ikct}$ denotes the natural logarithm of the unit price, quantity, or export value of product k exported by Japanese firm i to U.S. consignee c in year t. As described in the previous section, Related_{ic} is the dummy variable that equals one if consignee c is a subsidiary of firm i, indicating a related-party transaction. The term $1\{t = s\}$ denotes a year dummy equal to one if $t = s$ and zero otherwise, for $2014 \leq s \leq 2021$ and $s \neq 2017$.

To control for confounding factors that may affect export outcomes, we include a rich set of fixed effects. η_{ikc} denotes firm-product-consignee fixed effects that capture time-invariant characteristics at the firm-product-consignee level. λ_{kt} and μ_{it} denote product-year and firm-year fixed effects, respectively. These fixed effects control for product- and firm-specific shocks to export outcomes and help absorb COVID-19-related shocks at both the product

and firm levels.

The parameter of interest is β_s, which captures the change in outcomes for related-party transactions relative to unrelated-party transactions in year s, with 2017 as the omitted base year.[10] Hypotheses 1 and 2 imply that the expected sign of β_s for $s \geq 2018$ is negative when the dependent variable is unit price and positive when it is quantity. Hypothesis 3 implies that, when the dependent variable is export value, the sign of β_s is expected to be negative if the reporting response dominates the real response and positive if the real response dominates the reporting response. For $s \leq 2016$, β_s captures differential trends in outcomes between related- and unrelated-party transactions in the pre-TCJA period.

To measure the average change in outcomes for related-party transactions relative to unrelated-party transactions between the pre- and post-TCJA periods, we next estimate the following difference-in-differences specification:

$$\log y_{ikct} = \beta \, \text{Post}_t \times \text{Related}_{ic} + \eta_{ikc} + \lambda_{kt} + \mu_{it} + \epsilon_{ikct}, \tag{2}$$

where Post_t is a dummy variable equal to one for $t \geq 2018$ and zero otherwise. The notation for the other variables is the same as in equation (1).

The parameter of interest is β, the coefficient on the interaction term $\text{Post}_t \times \text{Related}_{ic}$, which captures the average change in outcomes for related-party transactions relative to unrelated-party transactions in the post-TCJA period.[11] Its expected sign is negative when the dependent variable is unit price and positive when it is quantity. When the dependent variable is export value, β is expected to be negative if the reporting response dominates the real response and positive if the real response dominates the reporting response.

5 Results

5.1 Main Results

We begin by presenting the results for the full sample. We first estimate the event-study specification in equation (1) to examine the yearly responses of related-party transactions to the TCJA relative to unrelated-party transactions. Panels (a), (c), and (e) of Figure 2 plot the estimated coefficients, β_s, for $2014 \leq s \leq 2021$ and $s \neq 2017$, together with 90% confidence intervals. In these panels, the dependent variables are the logarithms of unit price, quantity, and export value, respectively. The coefficient for 2017 is omitted and normalized

[10] The main effects of Related_{ic} and the year dummies are absorbed by the fixed effects included in equation (1). Therefore, these variables do not appear as separate regressors.

[11] The main effects of Post_t and Related_{ic} are absorbed by the fixed effects included in equation (2).

to zero. The confidence intervals are constructed using standard errors clustered at the firm level. All estimated coefficients and their standard errors are reported in Appendix Table A2.

In Panel (a), the estimated coefficients for unit price are close to zero and statistically insignificant in all years except 2014, for which the estimate is negative and marginally significant at the 10% level. Although all the post-TCJA estimates are negative, they are small in magnitude and statistically insignificant. Thus, we find no evidence of a statistically significant reduction in related-party export prices relative to unrelated-party export prices following the TCJA, providing no support for Hypothesis 1.

Panel (c) shows that the estimated coefficients for quantity are positive but statistically insignificant from 2014 to 2016, indicating no evidence of differential pre-trends between related- and unrelated-party transactions. The estimates are larger from 2018 onward and are statistically significant at the 5% level in 2018 and at the 10% level in 2019 and 2021. The estimated magnitudes imply that quantities in related-party transactions increased by 7.3%–8.2% relative to those in unrelated-party transactions, compared with the 2017 baseline, without corresponding significant changes in unit prices.[12]

A similar pattern emerges for export value in Panel (e). The coefficients for 2014–2016 are positive but small and statistically insignificant. By contrast, the coefficients for 2018, 2019, and 2021 are larger and statistically significant at the 5% level in 2018 and 2021 and at the 10% level in 2019. These estimates imply that export values in related-party transactions increased by 6.1%–7.4% relative to those in unrelated-party transactions, compared with the 2017 baseline.

Panel (a) of Table 2 reports the difference-in-differences estimates from equation (2) for the full sample. The dependent variable is the logarithm of unit price in columns (1)–(3), the logarithm of quantity in columns (4)–(6), and the logarithm of export value in columns (7)–(9). Columns (3), (6), and (9) present our preferred specifications, which include the full set of fixed effects specified in the equation. To examine how the results vary with the choice of fixed effects, columns (1), (4), and (7) include only firm-product-consignee and year fixed effects, whereas columns (2), (5), and (8) include only firm-product-consignee and product-year fixed effects. Standard errors are clustered at the firm level.

When the dependent variable is the logarithm of unit price, the coefficient on $\text{Post}_t \times \text{Related}_{ic}$ is negative but close to zero and statistically insignificant across all specifications in columns (1)–(3). This result suggests that Japanese firms did not reduce export prices in related-party transactions relative to unrelated-party transactions following the TCJA, providing no support for Hypothesis 1.

[12] In this section, percentage changes in outcomes are calculated as $100 \times (\exp(\beta_s) - 1)$.

When the dependent variable is the logarithm of quantity, the coefficient on $\text{Post}_t \times \text{Related}_{ic}$ is positive in all specifications in columns (4)–(6) and statistically significant at the 10% level in columns (5) and (6). The estimate of 0.050 in column (6) suggests that, following the TCJA, Japanese firms increased export quantities in related-party transactions by 5.1% relative to those in unrelated-party transactions, consistent with Hypothesis 2.

The increase in quantities, together with the absence of a decline in unit prices, implies higher export values. This interpretation is supported by the results in columns (7)–(9), where the dependent variable is the logarithm of export value. In column (9), the estimate of 0.046 is statistically significant at the 10% level and suggests that export values in related-party transactions increased by 4.7% relative to those in unrelated-party transactions following the TCJA.

Overall, related-party export prices did not decline relative to unrelated-party export prices following the TCJA, providing no evidence of a profit-shifting response through transfer pricing. In contrast, the quantity and value of exports to related parties increased by approximately 5% relative to those of exports to unrelated parties. Taken together, these findings suggest that Japanese firms exhibited a real response rather than a reporting response to the 14-percentage-point reduction in the U.S. federal corporate tax rate under the TCJA.

Although the absence of a profit-shifting response contrasts with our hypothesis, it is consistent with previous studies showing that Japanese multinational firms exhibit relatively modest sensitivity of reported profits and related-party prices to foreign corporate income tax rates (Hasegawa, 2023; Hasegawa et al., 2026). Gaertner et al. (2020) and Overesch and Pflitsch (2021) show that foreign multinationals, particularly those operating in the U.S. and facing a reduction in effective tax rates following the TCJA, experienced positive stock returns in response to events leading to the passage of the TCJA. Gaertner et al. (2020) also report in their Table 4 that Japanese firms experienced positive stock returns. Our finding that intra-firm exports to the U.S. increased is broadly consistent with these findings and suggests greater activity by Japanese-owned U.S. subsidiaries.

5.2 Response of Intermediate-Goods Exports

If Japanese firms increased exports to U.S. subsidiaries in response to the TCJA in order to expand the activities of those subsidiaries, we would expect a stronger response for exports of intermediate goods in related-party transactions. This is because intermediate goods are more likely than other goods to be used as inputs in the production of final goods by U.S. subsidiaries.

To examine this possibility, we re-estimate equations (1) and (2) using a sample restricted to intermediate goods. We classify products as intermediate goods using the United Nations Statistics Division's Broad Economic Categories (BEC, Revision 4) and its correspondence to the System of National Accounts (SNA) basic classes of goods. We exclude BEC categories whose end use is potentially mixed between intermediate and final demand.[13] After restricting the original sample of U.S.-bound exports to intermediate goods, we apply the same sample restrictions and winsorization procedures as described in Section 3. Summary statistics for the intermediate-goods sample are presented in Appendix Table A3.

Panels (b), (d), and (f) of Figure 2 plot the estimated coefficients from equation (1) for unit price, quantity, and export value, respectively. All estimated coefficients and their standard errors are reported in Appendix Table A4. Compared with the full-sample results presented in Panels (a), (c), and (e), the results for unit price in Panel (b) are similar to those in Panel (a), confirming the absence of a profit-shifting response in the intermediate-goods sample. By contrast, Panels (d) and (f) show a more pronounced post-TCJA increase in the estimated coefficients for quantity and export value than in Panels (c) and (e), indicating a stronger response for intermediate goods.[14]

Panel (b) of Table 2 presents the results from estimating equation (2) using the intermediate-goods sample. Compared with the full-sample results in Panel (a), Panel (b) shows larger and more statistically significant coefficients on the interaction term $\text{Post}_t \times \text{Related}_{ic}$ for quantity and export value. In our preferred specification with the full set of fixed effects, the estimate of 0.072 in column (6) suggests that, following the TCJA, Japanese firms increased export quantities of intermediate goods in related-party transactions by 7.5% relative to those in unrelated-party transactions. This increase is larger than that in the full sample reported in column (6) of Panel (a), which is 5.1%. Similarly, the increase in export value is larger in the intermediate-goods sample, at 6.0% in column (9) of Panel (b), than in the full sample, at 4.7% in column (9) of Panel (a).

These results suggest that exports of intermediate goods in related-party transactions were particularly responsive to the large tax cut under the TCJA. This pattern is consistent with Japanese firms increasing exports of intermediate goods to their U.S. subsidiaries to expand the activities of those subsidiaries.

[13] Under BEC Rev. 4, we define intermediate goods as BEC categories 111, 121, 21, 22, 31, 322, 42, and 53. We exclude BEC categories 321 (motor spirit), 51 (passenger motor cars), and 7 (goods n.e.s.), which are not uniquely assignable to intermediate versus final use in the BEC-SNA correspondence.

[14] In Panel (d), the coefficient for quantity is positive and statistically significant at the 1% level in 2018, the 10% level in 2019, and the 5% level in 2021. In Panel (f), the coefficient for export value is positive and statistically significant at the 5% level in 2018 and at the 10% level in 2019 and 2021.

6 Placebo Tests

One concern is that the responses of intra-firm exports to the U.S. documented in the previous section may not be driven by the TCJA, but instead may reflect changes in intra-firm trade patterns arising from other factors affecting Japanese firms. To address this concern, we conduct placebo tests by examining changes in intra-firm exports to other destinations, namely Germany and the U.K. We choose Germany and the U.K. as placebo destinations because they satisfy several criteria that make them suitable comparison countries for the analysis of U.S.-bound exports. First, they are economically important destinations for Japanese exports. Second, they are high-income advanced economies and therefore more comparable to the U.S. in terms of market and institutional environments than many other destinations. Third, unlike nearby Asian markets, they are less likely to be closely integrated into Japanese firms' regional production networks in Asia. Most importantly, neither country experienced a large corporate tax-rate change comparable to that enacted in the U.S. under the TCJA during our study period. In particular, according to KPMG's Corporate Tax Rates Table, Germany's combined statutory corporate tax rate, including subnational taxes, was 29.7%–29.9% over the period, whereas the U.K. implemented a small rate cut from 20% to 19% in 2017 and maintained that rate thereafter.

To conduct the placebo test for Germany, we restrict the original customs sample to exports to Germany and apply the same sample restrictions and winsorization procedures as described in Section 3. We then estimate equation (1) using firm-product-consignee-level panel data on exports to Germany. Panels (a), (c), and (e) of Figure 3 plot the estimated coefficients with 90% confidence intervals for unit price, quantity, and export value, respectively.

The coefficient for unit price in Panel (a) is close to zero and statistically insignificant throughout the study period, indicating no change in related-party prices relative to unrelated-party prices. As in the case of the U.S. in Panel (c) of Figure 2, the coefficient for quantity is positive but statistically insignificant prior to 2017. However, it declines from 2018 onward, with only the 2019 coefficient remaining close to its pre-2017 level. The coefficient for export value in Panel (e) follows a similar pattern. Overall, these results indicate no increase in related-party export quantities or values to Germany in the post-TCJA period.

We repeat the same exercise using panel data on exports to the U.K. and present the results in Panels (b), (d), and (f) of Figure 3. The estimates show no statistically significant change in related-party unit prices, quantities, or export values in 2018–2020 relative to 2017, although 2021 is the only year in which the coefficients for quantity and export value are higher than in the other years. We also estimate equation (2) using the German and U.K.

samples and find that the coefficient on $\text{Post}_t \times \text{Related}_{ic}$ is not statistically significant for any outcome variable in either sample, as reported in Appendix Table A5. Taken together, the increase in related-party export quantities and values to the U.S. following the TCJA does not appear to reflect common trends in Japanese intra-firm exports to other countries.

7 Conclusion

This study examines how intra-firm trade responded to the large corporate tax cut under the TCJA using transaction-level Japanese customs data. Although the 14-percentage-point tax cut could have created incentives for Japanese firms to shift profits to the U.S. through transfer pricing, we find no evidence that Japanese firms reduced prices in related-party exports to the U.S. relative to those in unrelated-party exports following the TCJA.

In contrast, export quantities and values in related-party transactions increased relative to those in unrelated-party transactions following the TCJA. This response is more pronounced for intermediate-goods transactions. These results suggest that Japanese firms increased exports to their U.S. subsidiaries in order to expand the activities of those subsidiaries.

It remains an open question how the increase in intra-firm exports to the U.S. affects the performance of Japanese-owned U.S. subsidiaries, including investment, employment, sales, and profits.[15] However, it is still worth noting that Japanese firms exhibited a real response to the large corporate tax cut by increasing export quantities and values in related-party transactions relative to those in unrelated-party transactions.

Acknowledgement

We gratefully acknowledge financial support from the Japan Society for the Promotion of Science (JSPS KAKENHI Grant Numbers JP22H00840, JP22H00855, JP24K04910, and JP25K16676). We also appreciate the continued support of Takahiro Chiba, Masayuki Fujihira, Masaki Fukui, Tetsushi Horie, Fumiharu Ito, Motoki Katano, Shintaro Negishi, Tasuku Sato, Kayo Takama, and Uraku Yoshimoto at the Policy Research Institute of the Ministry of Finance, Japan.

[15] Kennedy et al. (forthcoming) find that U.S. firms (i.e., C corporations) increased investment, employment, sales, and profits relative to S corporations in response to the corporate tax cut under the TCJA.

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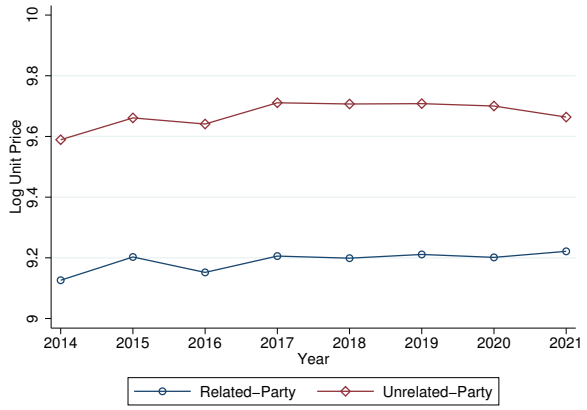
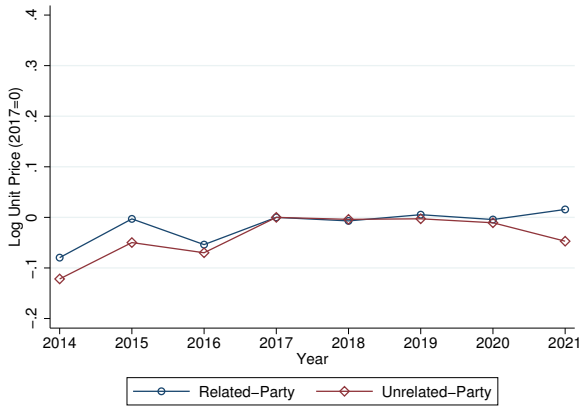
Figure 1: **Mean Log Unit Price, Quantity, Export Value by Related-Party Status**

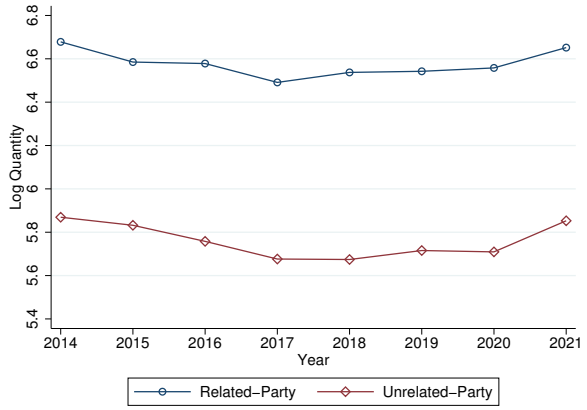
(a) Unit Price



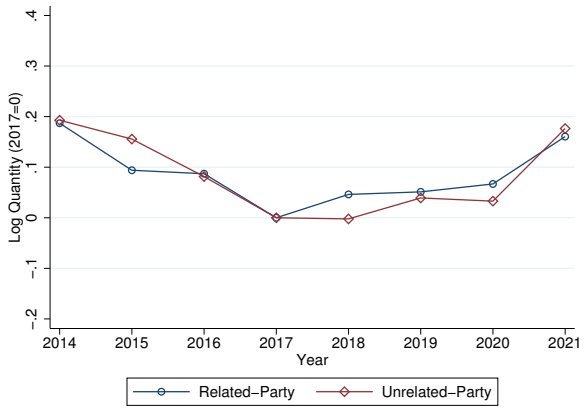
(b) Unit Price (2017=0)



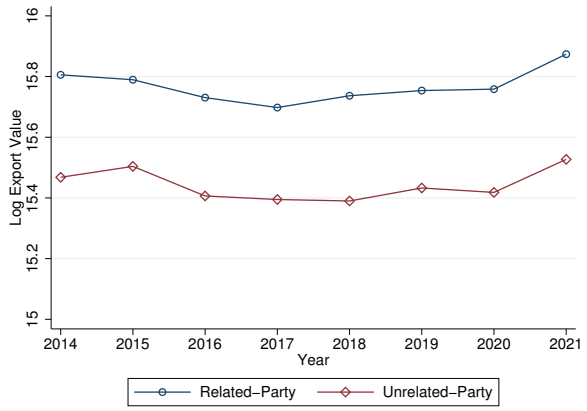
(c) Quantity



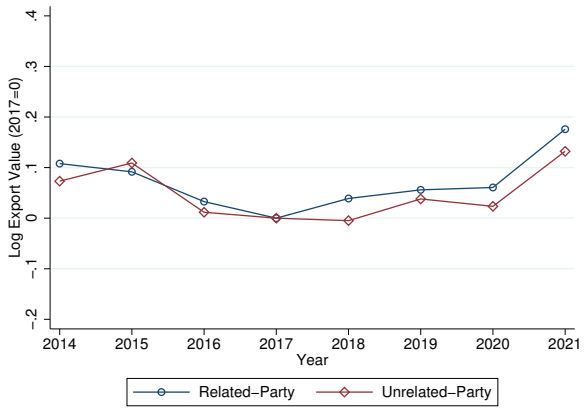
(d) Quantity (2017=0)



(e) Export Value



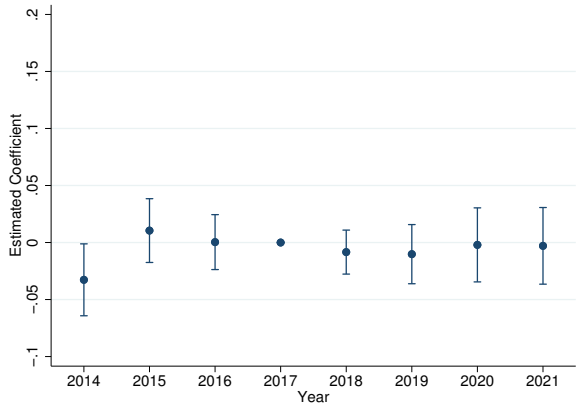
(f) Export Value (2017=0)



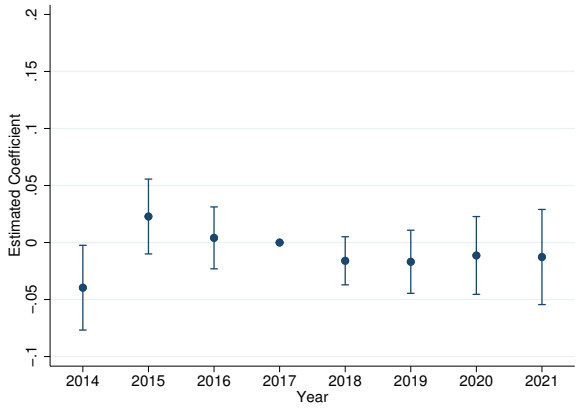
Notes: Panel (a) plots the annual mean of the natural logarithm of unit price for related-party transactions (circles) and unrelated-party transactions (diamonds). Panel (b) presents the same series, normalized to zero in 2017. Panels (c)–(f) plot the annual mean of the natural logarithm of quantity and export value in the same manner.

Figure 2: **Dynamic Responses of U.S.-Bound Intra-Firm Exports to the TCJA**

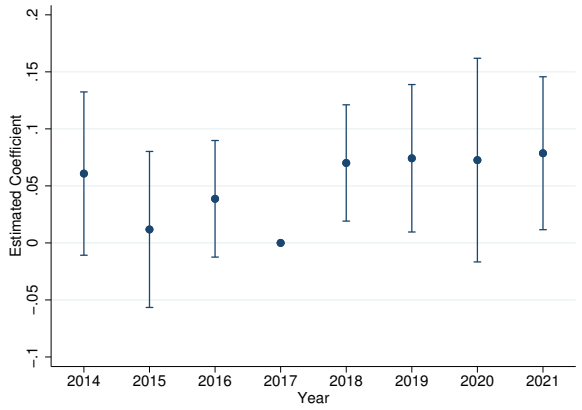
(a) Unit Price



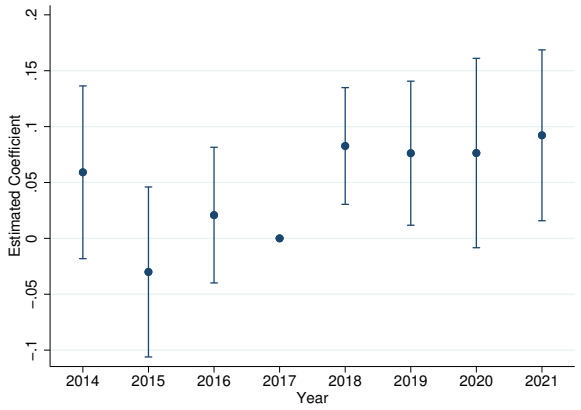
(b) Unit Price (Intermediate Goods)



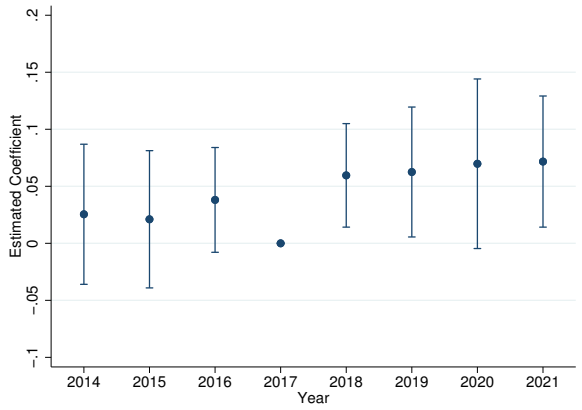
(c) Quantity



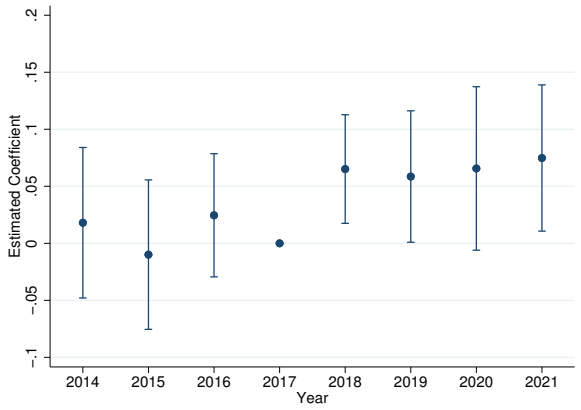
(d) Quantity (Intermediate Goods)



(e) Export Value



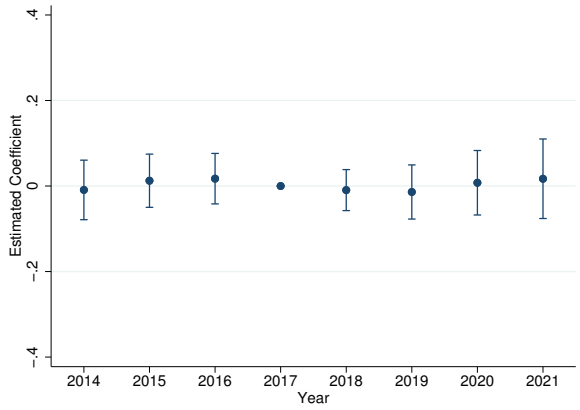
(f) Export Value (Intermediate Goods)



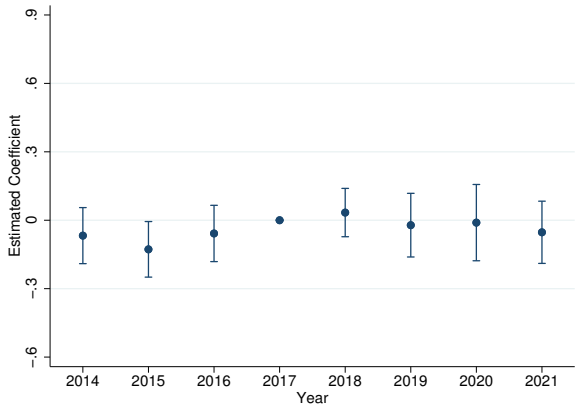
Notes: This figure plots the estimated coefficients β_s for $2014 \leq s \leq 2021$ and $s \neq 2017$, together with 90% confidence intervals, estimated from equation (1). Panels (a), (c), and (e) use the full sample, whereas Panels (b), (d), and (f) use the intermediate-goods sample. The coefficient for 2017 is omitted and normalized to zero. The confidence intervals are constructed using standard errors clustered at the firm level.

Figure 3: **Placebo Tests: Dynamics of German- and U.K.-Bound Intra-Firm Exports**

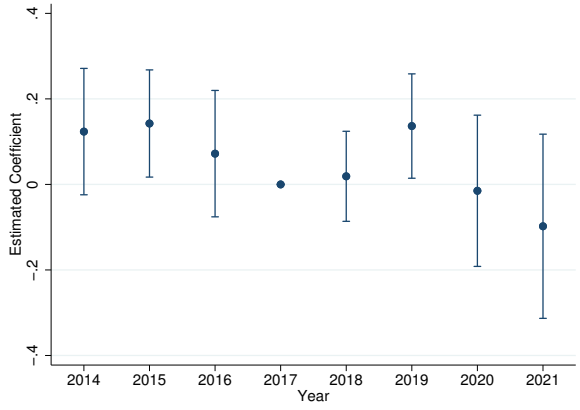
(a) Unit Price (Germany)



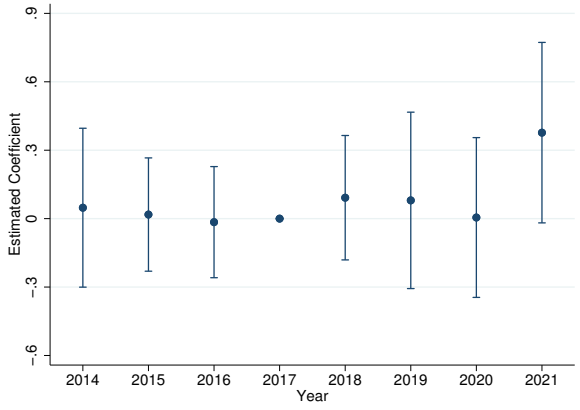
(b) Unit Price (U.K.)



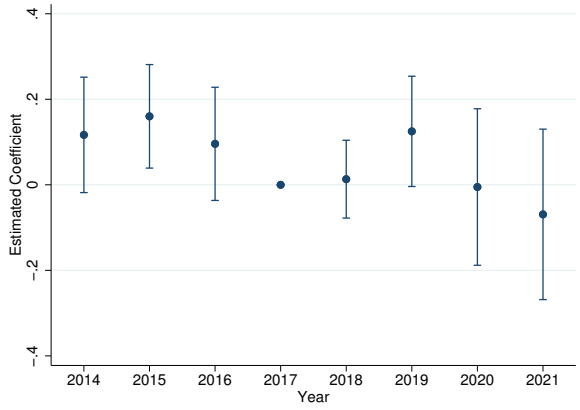
(c) Quantity (Germany)



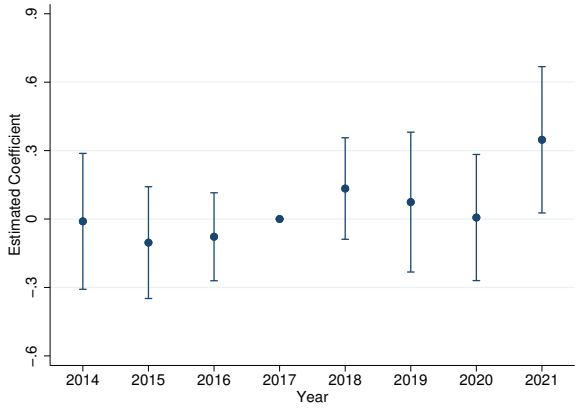
(d) Quantity (U.K.)



(e) Export Value (Germany)



(f) Export Value (U.K.)



Notes: Using panel data on exports to Germany, Panels (a), (c), and (e) plot the coefficients estimated from equation (1) with 90% confidence intervals for unit price, quantity, and export value, respectively. Panels (b), (d), and (f) plot the corresponding coefficients using panel data on exports to the U.K.

Table 1: **Summary Statistics**

	Mean	Std. Dev.	Median	Count
Unrelated-Party Transactions				
Related_{ic}	0	0	0	161,163
Unit Price_{ikct} (yen/kg)	107,415	272,442	14,813	161,163
Quantity_{ikct} (kg)	26,962	142,661	222	161,163
Export Value_{ikct} (yen)	61,281,195	242,446,396	3,774,727	161,163
Total Assets_{it} (million yen)	515,050	1,387,564	110,998	138,352
Post_t	.506	.5	1	161,163
Related-Party Transactions				
Related_{ic}	1	0	1	160,101
Unit Price_{ikct} (yen/kg)	44,805	134,974	9,316	160,101
Quantity_{ikct} (kg)	50,118	206,662	536	160,101
Export Value_{ikct} (yen)	106,182,274	349,566,489	5,129,000	160,101
Total Assets_{it} (million yen)	1,141,162	2,562,017	270,121	148,433
Post_t	.504	.5	1	160,101
All Transactions				
Related_{ic}	.498	.5	0	321,264
Unit Price_{ikct} (yen/kg)	76,214	217,471	11,400	321,264
Quantity_{ikct} (kg)	38,502	177,842	343	321,264
Export Value_{ikct} (yen)	83,657,520	301,475,398	4,370,000	321,264
Total Assets_{it} (million yen)	839,111	2,103,337	183,310	286,785
Post_t	.505	.5	1	321,264

Notes: The subscripts i, k, c, and t denote firm, product, U.S. consignee, and year, respectively. Related_{ic} is a dummy variable equal to one if consignee c is a subsidiary of firm i and zero otherwise. Unit Price_{ikct}, Quantity_{ikct}, and Export Value_{ikct} denote the unit price, quantity, and export value of product k exported by firm i to U.S. consignee c in year t. The unit price equals export value divided by quantity (Unit Price_{ikct} = Export Value_{ikct}/Quantity_{ikct}). Unit prices, quantities, and export values are winsorized at the 1st and 99th percentiles within each year. Total Assets_{it} denotes firm i's total assets in year t. Post_t is a dummy variable equal to one for $t \geq 2018$ and zero otherwise. Median values are reported as conventional medians when they are based on at least 10 firms. When the median is based on fewer than 10 firms, the reported value is replaced by the average for 10 firms around the median, owing to confidentiality restrictions.

Table 2: **Responses of U.S.-Bound Intra-Firm Exports to the TCJA**

(a) Full Sample

	log Unit Price$_{ikct}$			log Quantity$_{ikct}$			log Export Value$_{ikct}$		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Post$_t$ × Related$_{ic}$	-0.0044	-0.0043	-0.0030	0.0324	0.0447*	0.0499*	0.0280	0.0400*	0.0459*
	(0.0098)	(0.0105)	(0.0118)	(0.0248)	(0.0263)	(0.0303)	(0.0204)	(0.0212)	(0.0253)
Firm-Product-Consignee Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year Fixed Effects	Yes	No	No	Yes	No	No	Yes	No	No
Product-Year Fixed Effects	No	Yes	Yes	No	Yes	Yes	No	Yes	Yes
Firm-Year Fixed Effects	No	No	Yes	No	No	Yes	No	No	Yes
Observations	321,264	316,336	313,595	321,264	316,336	313,595	321,264	316,336	313,595
R-Squared	0.9248	0.9263	0.9305	0.8861	0.8905	0.8984	0.8363	0.8443	0.8563

(b) Intermediate Goods

	log Unit Price$_{ikct}$			log Quantity$_{ikct}$			log Export Value$_{ikct}$		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Post$_t$ × Related$_{ic}$	-0.0103	-0.0124	-0.0135	0.0479*	0.0622**	0.0720**	0.0381*	0.0498**	0.0580**
	(0.0103)	(0.0109)	(0.0127)	(0.0255)	(0.0264)	(0.0308)	(0.0213)	(0.0217)	(0.0263)
Firm-Product-Consignee Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year Fixed Effects	Yes	No	No	Yes	No	No	Yes	No	No
Product-Year Fixed Effects	No	Yes	Yes	No	Yes	Yes	No	Yes	Yes
Firm-Year Fixed Effects	No	No	Yes	No	No	Yes	No	No	Yes
Observations	236,957	234,052	231,316	236,957	234,052	231,316	236,957	234,052	231,316
R-Squared	0.9280	0.9290	0.9338	0.8907	0.8944	0.9031	0.8374	0.8448	0.8582

Notes: This table reports the results from estimating equation (2). Panel (a) uses the full sample, whereas panel (b) uses the sample restricted to intermediate goods based on the Broad Economic Categories classification. The subscripts i, k, c, and t denote firm, product, U.S. consignee, and year, respectively. The dependent variable is the logarithm of unit price in columns (1)–(3), the logarithm of quantity in columns (4)–(6), and the logarithm of export value in columns (7)–(9). Post$_t$ is a dummy variable equal to one for $t \geq 2018$ and zero otherwise. Related$_{ic}$ is a dummy variable equal to one if consignee c is a subsidiary of firm i, indicating a related-party transaction. Standard errors clustered by firm are in parentheses. ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively.

A Appendix Tables

Table A1: **Summary Statistics for Effective Tax Rates of Japanese-Owned U.S. Subsidiaries**

	Mean	Std. Dev.	Median	Count
2014	0.2843	0.3009	0.3328	1,772
2015	0.2823	0.3069	0.3284	1,726
2016	0.2809	0.3040	0.3229	1,650
2017	0.3056	0.4040	0.2752	1,696
2018	0.2076	0.2415	0.2097	1,711
2019	0.2489	0.5110	0.2107	1,537
2020	0.2152	0.3603	0.1955	1,476
2021	0.1751	0.1939	0.1843	1,636
Total	0.2510	0.3405	0.2285	13,204

Notes: This table reports summary statistics for the effective corporate income tax rates faced by Japanese-owned subsidiaries located in the U.S. for each year from 2014 to 2021. Count reports the number of subsidiaries. The effective tax rate is calculated for each subsidiary with positive pretax profits as corporate taxes divided by pretax profits. The effective tax rates are winsorized at the 1st and 99th percentiles within each year. Median values are reported as conventional medians when they are based on at least 10 Japanese parent firms. When the median is based on fewer than 10 Japanese parent firms, the reported value is replaced by the average for 10 Japanese parent firms around the median, owing to confidentiality restrictions. The subsidiary data are taken from the *Basic Survey on Overseas Business Activities*, conducted by Japan's Ministry of Economy, Trade and Industry.

Table A2: **Event-Study Estimates of U.S.-Bound Intra-Firm Export Responses to the TCJA**

	Unit Price	Quantity	Export Value
	(1)	(2)	(3)
$\text{Related}_{ic} \times 1\{t = 2014\}$	-0.0327*	0.0608	0.0255
	(0.0192)	(0.0435)	(0.0373)
$\text{Related}_{ic} \times 1\{t = 2015\}$	0.0105	0.0118	0.0211
	(0.0170)	(0.0416)	(0.0366)
$\text{Related}_{ic} \times 1\{t = 2016\}$	0.0004	0.0387	0.0381
	(0.0146)	(0.0311)	(0.0279)
$\text{Related}_{ic} \times 1\{t = 2018\}$	-0.0084	0.0701**	0.0596**
	(0.0117)	(0.0310)	(0.0276)
$\text{Related}_{ic} \times 1\{t = 2019\}$	-0.0102	0.0742*	0.0625*
	(0.0158)	(0.0393)	(0.0346)
$\text{Related}_{ic} \times 1\{t = 2020\}$	-0.0021	0.0726	0.0698
	(0.0197)	(0.0543)	(0.0452)
$\text{Related}_{ic} \times 1\{t = 2021\}$	-0.0029	0.0786*	0.0717**
	(0.0204)	(0.0407)	(0.0349)
Firm-Product-Consignee Fixed Effects	Yes	Yes	Yes
Product-Year Fixed Effects	Yes	Yes	Yes
Firm-Year Fixed Effects	Yes	Yes	Yes
Observations	313,595	313,595	313,595
R-Squared	0.9305	0.8984	0.8563

Notes: This table reports estimates from equation (1). The dependent variable is the logarithm of unit price in column (1), the logarithm of quantity in column (2), and the logarithm of export value in column (3). Related_{ic} is a dummy variable equal to one if consignee c is a subsidiary of firm i, indicating a related-party transaction. $1\{t = s\}$ denotes a year dummy equal to one if $t = s$ and zero otherwise, where $2014 \leq s \leq 2021$ and $s \neq 2017$. Standard errors clustered by firm are in parentheses. ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively.

Table A3: **Summary Statistics for the Intermediate-Goods Sample**

	Mean	Std. Dev.	Median	Count
Unrelated-Party Transactions				
Related_{ic}	0	0	0	120,489
Unit Price_{ikct} (yen/kg)	118,722	303,237	14,916	120,489
Quantity_{ikct} (kg)	31,453	168,548	213	120,489
$\text{Export Value}_{ikct}$ (yen)	59,337,596	233,221,020	3,720,000	120,489
Total Assets_{it} (million yen)	525,635	1,389,412	116,658	103,793
Post_t	.506	.5	1	120,489
Related-Party Transactions				
Related_{ic}	1	0	1	116,468
Unit Price_{ikct} (yen/kg)	44,048	138,034	8,346	116,468
Quantity_{ikct} (kg)	62,171	252,565	614	116,468
$\text{Export Value}_{ikct}$ (yen)	106,769,081	345,778,502	5,340,909	116,468
Total Assets_{it} (million yen)	1,164,024	2,571,020	283,546	108,901
Post_t	.505	.5	1	116,468
All Transactions				
Related_{ic}	.492	.5	0	236,957
Unit Price_{ikct} (yen/kg)	82,019	239,823	10,858	236,957
Quantity_{ikct} (kg)	46,551	214,556	357	236,957
$\text{Export Value}_{ikct}$ (yen)	82,650,898	294,934,509	4,401,000	236,957
Total Assets_{it} (million yen)	852,495	2,104,354	188,661	212,694
Post_t	.505	.5	1	236,957

Notes: This table reports summary statistics for the sample restricted to intermediate goods. After restricting the original sample of U.S.-bound exports to intermediate goods, we apply the same sample restrictions and winsorization procedures described in Section 3. The subscripts i, k, c, and t denote firm, product, U.S. consignee, and year, respectively. Related_{ic} is a dummy variable equal to one if consignee c is a subsidiary of firm i and zero otherwise. Unit Price_{ikct}, Quantity_{ikct}, and $\text{Export Value}_{ikct}$ denote the unit price, quantity, and export value of product k exported by firm i to U.S. consignee c in year t. The unit price equals export value divided by quantity ($\text{Unit Price}_{ikct} = \text{Export Value}_{ikct}/\text{Quantity}_{ikct}$). Unit prices, quantities, and export values are winsorized at the 1st and 99th percentiles within each year. Total Assets_{it} denotes firm i's total assets in year t. Post_t is a dummy variable equal to one for $t \geq 2018$ and zero otherwise. Median values are reported as conventional medians when they are based on at least 10 firms. When the median is based on fewer than 10 firms, the reported value is replaced by the average for 10 firms around the median, owing to confidentiality restrictions.

Table A4: **Event-Study Estimates of U.S.-Bound Intra-Firm Export Responses to the TCJA: Intermediate-Goods Sample**

	Unit Price	Quantity	Export Value
	(1)	(2)	(3)
$\text{Related}_{ic} \times 1\{t = 2014\}$	-0.0396*	0.0591	0.0180
	(0.0226)	(0.0470)	(0.0401)
$\text{Related}_{ic} \times 1\{t = 2015\}$	0.0228	-0.0301	-0.0099
	(0.0199)	(0.0462)	(0.0398)
$\text{Related}_{ic} \times 1\{t = 2016\}$	0.0041	0.0208	0.0246
	(0.0165)	(0.0369)	(0.0328)
$\text{Related}_{ic} \times 1\{t = 2018\}$	-0.0160	0.0826***	0.0651**
	(0.0128)	(0.0317)	(0.0289)
$\text{Related}_{ic} \times 1\{t = 2019\}$	-0.0169	0.0762*	0.0586*
	(0.0168)	(0.0392)	(0.0350)
$\text{Related}_{ic} \times 1\{t = 2020\}$	-0.0114	0.0763	0.0656
	(0.0207)	(0.0515)	(0.0436)
$\text{Related}_{ic} \times 1\{t = 2021\}$	-0.0127	0.0922**	0.0748*
	(0.0253)	(0.0464)	(0.0390)
Firm-Product-Consignee Fixed Effects	Yes	Yes	Yes
Product-Year Fixed Effects	Yes	Yes	Yes
Firm-Year Fixed Effects	Yes	Yes	Yes
Observations	231,316	231,316	231,316
R-Squared	0.9338	0.9031	0.8582

Notes: This table reports estimates from equation (1) using the sample restricted to intermediate goods. The dependent variable is the logarithm of unit price in column (1), the logarithm of quantity in column (2), and the logarithm of export value in column (3). Related_{ic} is a dummy variable equal to one if consignee c is a subsidiary of firm i, indicating a related-party transaction. $1\{t = s\}$ denotes a year dummy equal to one if $t = s$ and zero otherwise, where $2014 \leq s \leq 2021$ and $s \neq 2017$. Standard errors clustered by firm are in parentheses. ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively.

Table A5: **Placebo Tests Using Exports to Germany and the U.K.**

	Exports to Germany			Exports to the U.K.		
	Unit Price	Quantity	Export Value	Unit Price	Quantity	Export Value
	(1)	(2)	(3)	(4)	(5)	(6)
$\text{Post}_t \times \text{Related}_{ic}$	-0.0077	-0.0470	-0.0533	0.0486	0.1093	0.1695
	(0.0278)	(0.0728)	(0.0669)	(0.0568)	(0.1734)	(0.1442)
Firm-Product-Consignee Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Product-Year Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Firm-Year Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Observations	65,012	65,012	65,012	37,766	37,766	37,766
R-Squared	0.9480	0.9213	0.8860	0.9473	0.9180	0.8825

Notes: This table reports estimates from equation (2), using firm–product–consignee-level panel data on exports to Germany in columns (1)–(3) and exports to the U.K. in columns (4)–(6). The dependent variable is the logarithm of unit price in columns (1) and (4), the logarithm of quantity in columns (2) and (5), and the logarithm of export value in columns (3) and (6). Post_t is a dummy variable equal to one for $t \geq 2018$ and zero otherwise. Related_{ic} is a dummy variable equal to one if consignee c is a subsidiary of firm i, indicating a related-party transaction. Standard errors clustered by firm are in parentheses. ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively.

B Construction of the Firm–Product–Consignee–Year Dataset

This appendix describes the procedure used to construct the firm–product–consignee–year panel dataset from Japanese customs records.

B.1 Base Data

We use Japanese customs export declaration records for 2014–2021. The data are observed at the declaration–product level, where each observation corresponds to one product line in an export declaration. We merge these records with a manually verified file of consignee-country codes and replace the original codes when corrections are available. We drop observations that still lack consignee-country information after this reconciliation.

B.2 Consignee Name and Address Standardization and Cleaning

Consignee names and addresses in the customs records are entered as free-form text. As a result, a single foreign entity often appears under multiple string variants because of typographical errors, abbreviations, and inconsistent transcription. Before any matching step, we standardize and clean both fields. For consignee names, we remove legal-form suffixes (e.g., *Ltd.*, *Co.*, *GmbH*, and *S.A.*, as well as analogous forms used in other legal systems) using the `cleanco` Python library together with hand-coded regular expressions, normalize punctuation and whitespace, and convert all strings to uppercase. We apply the same normalization steps to addresses wherever they are relevant.

B.3 Consignee Entity Identification via Fuzzy Matching

Because the customs data contain no consignee identifier, we infer consignee entities using fuzzy matching based on Jaro–Winkler string similarity, implemented separately by consignee country. In hand-checked pilot subsamples, Jaro–Winkler performed better in our setting than alternative string-matching measures we considered, including Levenshtein distance. The thresholds used below were chosen on the basis of iterative inspection of matched and unmatched pairs in these subsamples.[16]

Because fuzzy matching requires pairwise comparisons among candidate records, applying an exhaustive one-pass procedure to all U.S.-bound records would exceed the memory

[16]For related applications of fuzzy string matching in economics, see Kline et al. (2019) and Sugita et al. (2023).

available in our computing environment. We therefore use a two-stage fuzzy-matching procedure for the United States, which reduces peak memory requirements by restricting the set of record pairs compared at each step. In the first stage, we block observations by cleaned consignee name and compute pairwise Jaro–Winkler similarity for addresses within each name block. Pairs with similarity above 0.90 are linked using a Union–Find algorithm, so that if record A matches record B and record B matches record C, all three records are assigned to the same intermediate cluster. In the second stage, we retain one representative record for each (name, cluster) pair and compare these representatives pairwise using name similarity alone. Representative pairs with name similarity above 0.95 are then merged to form the final consignee identifier. Relative to exhaustive pairwise comparison over all observations, this procedure greatly reduces computation by confining address comparisons in the first stage to observations with identical cleaned names and by limiting the second stage to representative records.

For all other consignee countries, we adopt a simpler single-stage procedure based on names alone. We first deduplicate observations at the (name, address, country) level and then compute pairwise Jaro–Winkler name similarity within each consignee country. Pairs with similarity above 0.95 are linked using the Union–Find algorithm. Restricting comparisons to pairs within the same consignee country avoids conflating distinct entities that share similar or identical names across jurisdictions.

In both cases, the resulting clusters define the consignee entities used in the analysis.

B.4 Linking Consignee Entities to Orbis Subsidiary Records and Assigning BvD Identifiers

We next link these consignee entities to subsidiary records in Orbis to determine whether a consignee is a subsidiary of the exporting Japanese firm. Orbis reports subsidiary links under two ownership concepts: the immediate shareholder (ISH) and the global ultimate owner (GUO). For each concept, we retrieve the name, address, and BvD identifier of all foreign subsidiaries associated with each Japanese parent firm.

We restrict candidate matches to the parent-firm–consignee-country level, so that each consignee entity is compared only with subsidiaries of the relevant Japanese parent located in the same consignee country. This restriction reduces the scope for false positives. For each consignee–subsidiary pair, whenever the Orbis subsidiary record contains an address, we compute two similarity measures: the average of the name and address Jaro–Winkler similarities, and the name-only Jaro–Winkler similarity. When the subsidiary record lacks address information, only the name similarity is available. We construct these measures

separately for the ISH and GUO subsidiary lists and impose no threshold at this stage.

We then assign a BvD identifier to each consignee observation using a priority rule. First, if the average of the name and address similarity scores is at least 0.90 under either ISH or GUO, we assign the BvD identifier associated with the higher average score. Second, if this condition is not met but the name similarity from matches to address-bearing subsidiary records is at least 0.95, we assign the BvD identifier associated with the higher name score. Third, if neither condition is satisfied, we consider matches based on subsidiary records without address information and assign the BvD identifier if the name similarity is at least 0.95. Observations that satisfy none of these conditions remain unmatched.

After this assignment, we reconcile inconsistencies within each consignee entity. Because address quality varies across declarations, the matching procedure can occasionally assign different BvD identifiers to observations belonging to the same consignee cluster. When this occurs, we replace all assignments within the cluster with the modal BvD identifier. This reconciliation ensures that each consignee entity maps to at most one Orbis entity.

B.5 Final Dataset

The resulting dataset records, for each export declaration line, the associated consignee entity and, where available, the corresponding BvD identifier from Orbis. We then collapse the data to the firm–product–consignee–year level to construct the analysis panel.

References

[1] Kline, Patrick, Neviana Petkova, Heidi Williams, and Owen Zidar. 2019. "Who Profits from Patents? Rent-Sharing at Innovative Firms." *The Quarterly Journal of Economics* 134(3): 1343–1404.

[2] Sugita, Yoichi, Kensuke Teshima, and Enrique Seira. 2023. "Assortative Matching of Exporters and Importers." *The Review of Economics and Statistics* 105(6): 1544–1561.