Exchange Rate Appreciation and Structural Adjustment: Evidence from the Plaza Accord*

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Abstract

Large exchange rate appreciations pose a fundamental challenge for open economies: they compress export margins, weaken competitiveness, and force firms and regions to adjust their production and employment structures. However, evidence on how such adjustments unfold over the long run remains limited. This paper studies these mechanisms using Japan's sharp yen appreciation following the 1985 Plaza Accord. Combining a firm-level panel data from 1980 to 1999 with industry-level shock exposure, I estimate how appreciation affected firms' employment, sales, and labor productivity. The results show sharp declines in sales and productivity but modest employment losses, reflecting Japan's rigid labor practices. Industries more exposed to export shocks expanded FDI in Asia without inducing additional domestic employment adjustment, but leading to a sharper decline in measured labor productivity. At the regional level, labor reallocation from manufacturing to services occurred in shock-exposed regions, suggesting that the yen appreciation led to gradual structural transformation.

Keywords: Exchange rate, Trade policy, Firm, Plaza Accord, Structural Transformation
JEL Codes: F14, F31, F68

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1 Introduction

Understanding how economies adjust to large exchange rate shocks remains a central question in international economics. While currency depreciation is often expansionary, stimulating exports, investment, and growth, appreciations pose a mirror challenge: they compress export margins, weaken international competitiveness, and force firms and regions to reallocate resources. However, evidence on how such adjustments unfold over the long run, especially within advanced manufacturing economies, remains limited.[1] Episodes of major appreciation offer a rare opportunity to study the mechanisms through which firms adapt, by reorganizing production (Gopinath and Neiman 2014), investing or outsourcing abroad (Antràs *et al.* 2017), changing output markets (Almunia *et al.* 2021), or shifting toward non-tradable activities (Bloom *et al.* 2024), and how these micro responses aggregate into structural transformation at the macro level. This paper examines how Japanese firms and local labor markets adjusted to the sharp yen appreciation that followed the 1985 Plaza Accord.

The Plaza Accord in September 1985 provides an ideal quasi-experimental setting to study long-run adjustment to an adverse exchange rate shock. Between 1985 and 1987, the yen appreciated by more than 50 percent against the U.S. dollar, dramatically reducing the profitability of export-oriented manufacturing while lowering the costs of imported inputs. Unlike typical emerging-country episodes, Japan's appreciation occurred in a mature industrial economy with rigid labor institutions, high human-capital intensity, and globally competitive firms. These features make Japan a natural laboratory for understanding how large, persistent exchange rate movements reshape industrial structure not through crisis-driven collapse, but through gradual reallocation of production, employment, and investment across borders and sectors.

The core analysis examines how Japanese firms responded to the yen appreciation using panel data from the Teikoku Databank covering 1980–1999. I link firms to their industries' pre-Plaza Accord dependence on the U.S. market to construct an export exposure measure that captures dif-

[1] Research on the appreciation effects in the short run is well accumulated using the appreciation of the Swiss franc in 2015 (Auer *et al.* 2019, 2022, Dibiasi and Erhardt 2025, Arni *et al.* 2024).

ferential sensitivity to the yen appreciation. Event study specifications exploit this pre-determined variation to estimate the dynamic effects of appreciation on firms' employment, sales, and labor productivity (sales per worker). To explore heterogeneity in adjustment, I examine how responses vary by initial firm size and by industries' potential for outward FDI. Finally, I complement the firm-level analysis with city-level evidence using a Bartik-type design to assess how the same export shock affected local labor markets following Topalova (2010), Kovak (2013), Autor *et al.* (2013), and among others. This broader perspective helps connect firm-level adjustments to the aggregate patterns of regional structural change.

The results show that the yen appreciation sharply reduced firms' sales and labor productivity, while employment declined only modestly, consistent with Japan's rigid employment institutions. These effects persisted for more than a decade and remain robust even after controlling for import competition, input access, voluntary export restraints, and government policy interventions. After the Plaza Accord, firms in industries one standard deviation more exposed to U.S. export losses experienced 3.8% lower employment, 8.4% lower sales, and 4.5% lower labor productivity. Additionally, by examining heterogeneous effects by initial firm size, I find that larger firms adjusted mainly through the production margin, maintaining employment but experiencing greater output losses, leading to more pronounced labor productivity declines. The result is consistent with Genda and Rebick (2000), which points out that larger firms tend to retain employment in Japan.

Newly digitized industry-level outward FDI data in the 1980s and 90s reveal that industries that were more exposed to the export shock subsequently expanded outward FDI, particularly in Asia, suggesting that firms sought to rebuild export capacity abroad after the decline in domestic competitiveness. To examine this adjustment margin systematically, I construct a measure of FDI potential based on pre-Plaza Accord input–output linkages and import patterns, capturing industries' ex ante ability to relocate production abroad. Employing a reduced-form specification, I find that firms in industries with higher FDI potential adjusted to the appreciation shock primarily through the sales margin rather than through domestic employment, leading to a pronounced decline in labor productivity. This pattern suggests that outward FDI helped stabilize domestic

employment but at the cost of lower productivity, reflecting a gradual redistribution of production activities across borders.

At the regional level, cities more exposed to the export shock experienced a decline in manufacturing employment shares but growth in services, implying that labor reallocation across sectors absorbed part of the adjustment. A 10 percentage point higher pre-Plaza Accord export dependence on the U.S. market led to roughly a 3.1 percentage point lower manufacturing employment share and an 4.8 percentage point higher service employment share after the Plaza Accord. The manufacturing losses are less pronounced in regions with FDI potential, consistent with the firm-level result. Taken together, the evidence points to a persistent process of structural transformation: Japan's long-term shift away from manufacturing continues while outward FDI mitigates the reduction in manufacturing employment.

Related Literature. This study contributes to several strands of the literature. First, it relates to research on how exchange rate shocks shape firm behavior and aggregate adjustment. A large body of work has examined how exchange rate fluctuations affect firms and workers, consistently finding that devaluations benefit exporters by raising sales and wages (Verhoogen 2008, Araújo and Paz 2014, Macis and Schivardi 2016, Alfaro *et al.* 2023, Frías *et al.* 2024).[2] By contrast, empirical evidence on currency appreciation shocks, arguably more relevant for advanced economies, remains limited. The few available episodes reveal more complex adjustment patterns. Revenga (1992) documents contractionary employment effects in U.S. manufacturing during the 1980s, whereas Ekholm *et al.* (2012) find that real appreciations improved exporters' productivity in Norway through increased competition. Recent studies on the 2015 Swiss franc appreciation highlight heterogeneous outcomes. Dibiasi and Erhardt (2025) show reduced investment, particularly among younger firms; Arni *et al.* (2024) report employment losses for workers in exporting firms; and Auer *et al.* (2024) find welfare gains from lower import prices despite contractionary pressures on

[2]Currency devaluation makes imports more expensive. Gopinath and Neiman (2014) show that devaluation exacerbates productivity losses through an import crisis, using data from Argentina. For the macro level, Fukui *et al.* (2025) shows that depreciation is expansionary by comparing outcomes for peggers versus floaters to the U.S. dollar in response to a dollar depreciation.

exporters.[3] Together, these studies suggest that while devaluations typically stimulate exports, appreciations can generate adjustment costs for exporters but potential welfare gains through cheaper imports. Building on this literature, I focus on the sharp yen appreciation following the 1985 Plaza Accord, a rare historical event of a large and persistent appreciation in an advanced industrial economy, to study how firms adjusted to an appreciation shock and how its effects evolved in the long run.

Second, this study contributes to the literature on outward FDI as a firm-level adjustment mechanism. A vast body of research has examined how outward FDI and offshoring affect parent firms' performance, yet the findings remain mixed. The offshoring literature generally agrees that employment effects depend on both the type of activity and its destination (Brainard and Riker 1997, Debaere *et al.* 2010, Harrison and McMillan 2011, Hijzen *et al.* 2011, Kovak *et al.* 2021).[4] Regarding productivity, Monarch *et al.* (2017) find negative effects of offshoring using U.S. Census microdata, whereas other studies report positive impacts across different contexts, including the U.S. (Amiti and Wei 2009), China (Li *et al.* 2017), South Korea (Han and Kim 2023), and Japan (Ito *et al.* 2011). While this literature has focused on the direct effects of outward FDI, less is known about its interaction with external shocks. This paper addresses this gap by examining whether outward FDI mitigated or amplified the adverse effects of the 1985 yen appreciation, thereby clarifying FDI's role as a channel of firm-level adjustment rather than as an independent performance driver.

Third, this paper contributes to the literature studying how trade policy reshape firm performance and the structure of domestic industries. A large body of work shows that trade liberalization raise productivity by intensifying competition and expanding access to new markets, thereby affecting firm-level adjustment (Amiti and Konings 2007, Goldberg *et al.* 2010, Topalova 2010,

[3] Arni *et al.* (2024) additionally examine the effects of the Swiss franc appreciation through import competition in the output market, material input imports, and input imports substituting domestic workers.

[4] For instance, Desai *et al.* (2009) document a positive relationship between domestic labor market outcomes and the offshoring activities of U.S. multinationals. In contrast, Muendler and Becker (2010) and Monarch *et al.* (2017) find negative effects for German and U.S. multinational firms, respectively. Moreover, several studies report null effects of offshoring (or outward FDI) more broadly on domestic labor market outcomes (Slaughter 2000, Amiti and Wei 2005, Yamashita and Fukao 2010).

Bustos 2011). More recent research shows that large trade shocks can trigger persistent structural transformations, including employment declines in import-competing sectors (Autor *et al.* 2013, Dix-Carneiro and Kovak 2017, Bloom *et al.* 2024). These findings collectively underscore that external policy-driven trade conditions play a central role not only in shaping firm outcomes but also in steering long-run industrial structure. In line with this literature but departing from its focus on expanded export access or import liberalization, this study examines how a policy-induced contraction in export opportunities, triggered by the Plaza Accord, reshaped firm behavior and industrial structure in Japan.

Finally, this study also speaks to the literature on the Japanese economy during the 1980s and 1990s. A central question in this literature is why Japan, after decades of rapid growth up to the 1970s, entered what is often referred to as the "lost decades." Ito and Corbett (2010) argue that policy missteps in responding to the rapid yen appreciation, rather than the Plaza Accord itself, were a key factor behind Japan's prolonged stagnation. Tomiura (2003) emphasizes that the yen appreciation intensified import competition, weakening the competitiveness of domestic industries. The most closely related study, Dekle (1998), documents a negative correlation between real yen appreciation and manufacturing employment in Japan, using two-digit industry-level data from 1975 to 1994. Building on this literature, the present paper focuses on the decline in exports to the United States and revisits the question using a large-scale firm-level dataset and city-level data spanning the 1980s to the 1990s, covering both the pre- and post-Plaza Accord periods.

The remainder of the paper is organized as follows. Section 2 presents the historical background. Section 3 describes the data used in the analysis. Section 4 documents the evolution of trade and outward FDI patterns. Section 5 develops the empirical strategy, and Section 6 presents the main results and discussion. Section 7 examines how the economy adjusted to the yen appreciation by looking at local labor markets. Section 8 concludes.

2 Background

Plaza Accord. In early 1985, the dollar's appreciation and widening balance-of-payments imbalances became the most pressing global issues. The main driver of the strong dollar was high U.S. interest rates. From the late 1970s, Fed Chair Paul Volcker pursued a strict anti-inflation policy with tight monetary control. After the 1982 recession and falling inflation, the Fed shifted to a looser stance, lowering nominal interest rates. Under the Reagan administration, rising fiscal deficits kept U.S. real interest rates high. At the same time, the trade imbalance with Japan, the so-called twin deficits, became a major concern. U.S. fiscal stimulus increased imports and expanded Japanese exports. In 1984, Japan's total exports grew by 16%, while exports to the United States rose by 40%. In response, U.S. protectionism intensified, aiming to push Japan to open its markets and expand domestic demand.

Paul Krugman argued that high U.S. interest rates explained the dollar's appreciation but that it was unsustainable given rising external debt relative to GNP (Krugman 1985). In February 1985, after James Baker became Treasury Secretary, the United States supported coordinated currency market interventions. Japan and other countries also backed the move to stabilize trade relations.[5]

On September 22, 1985, finance ministers and central bank governors from five major economies met at the Plaza Hotel in New York. The United States, the United Kingdom, West Germany, France, and Japan agreed to coordinate interventions to weaken the dollar (The Plaza Accord).[6] Japanese Finance Minister Takeshita was inclined to support yen appreciation, but Fed Chair Paul Volcker was surprised by Japan's swift agreement to the plan.[7]

> What surprised me most during the meeting was Finance Minister Takeshita's voluntary offer to allow a yen appreciation of over 10%. [...] Takeshita's stance certainly surprised other participants as well, significantly influencing the agreement's success.

[5] Amid escalating trade frictions, pressure mounted within Japan's export industries, and leading exporters began openly supporting yen appreciation.

[6] At U.S. insistence, the agreement was framed not as a "devaluation of the dollar" but as an "appreciation of other currencies." The participants broadly accepted a depreciation of more than 10%, but no specific exchange rate target was written into the accord.

[7] More details about the Plaza Accord, see, for example, Frankel (2015).

> The primary concern for European countries was not their exchange rate against the overvalued dollar but rather the dollar exchange rate against the yen. The greater the yen's appreciation, the more reassured European countries felt about their competitive position. (Volcker and Gyohten 1992)

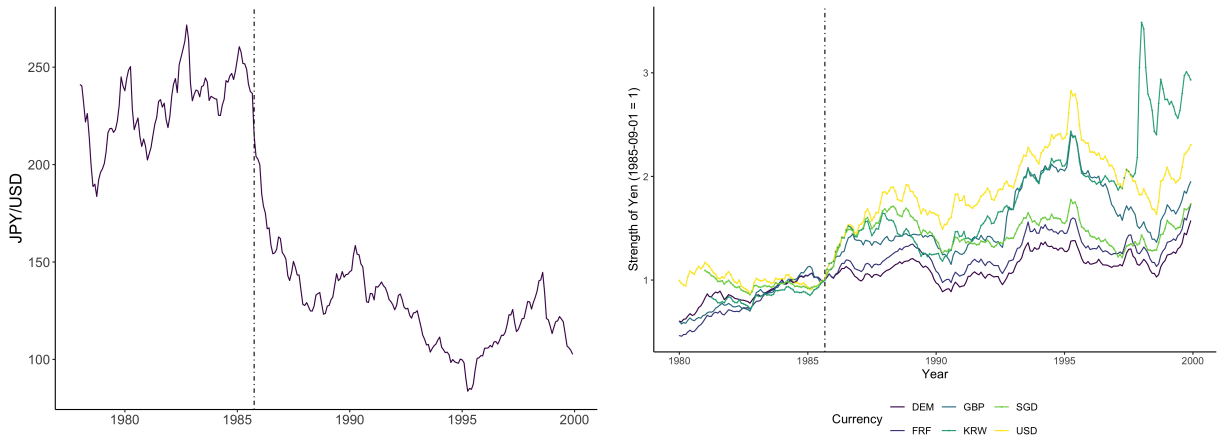
Japan's decision to allow a sharp yen appreciation was unexpected both at home and abroad (The Cabinet Office, 2011).[8] Finance Minister Takeshita even signaled readiness for an exchange rate of 200 yen per dollar (Funabashi 1988). The coordinated interventions were swift and large. By the end of October, the U.S. had intervened with 3.2 billion dollars, Japan with 3 billion, and West Germany, the UK, and France, together with 2 billion. The yen rose quickly, moving from the 240-yen range on September 20 to about 200 yen per dollar by year's end (Figure 1a). During this period, policy interest rates were cut several times to stimulate domestic demand, but the yen continued to appreciate.[9]. The rapid yen appreciation hurt Japan's export industries, at least in the short term. A 1986 survey of small and medium-sized enterprises in export-oriented regions found that in 41 of 50 regions, half of the firms expected to fall into deficit if the yen kept rising. Panel (a) of Figure 1 shows the JPY/USD rate. Panel (b) shows the yen's strength against other major currencies. The yen appreciated most against the U.S. dollar, which was the outcome European countries had hoped for.

3 Data

Firm Level Data. I use an annual firm-level dataset from the Teikoku Databank Center for Advanced Empirical Research on Enterprise and Economy (TDB-CAREE) at Hitotsubashi University. Teikoku Data Bank Ltd. (hereafter, TDB) is a major Japanese credit research company, and the dataset covers listed and unlisted Japanese firms from 1980 onward. It includes basic information such as industry, headquarters location, year of establishment, number of full-time

[8] https://www.esri.cao.go.jp/jp/esri/prj/sbubble/history/history_01/analysis_01_02_02.pdf

[9] In February 1987, the Louvre Accord sought to halt the dollar's rapid depreciation, but it proved ineffective (Funabashi 1988). The movement of the federal funds rate also failed to weaken the yen against the dollar (Figure A2).



(a) JPY/USD Rate

(b) Strength of Yen

Figure 1: The Plaza Accord and Exchange Rate

Notes: Panel (a) depicts the Japanese Yen (JPY) to U.S. Dollar (USD) Spot Exchange Rate. Panel (b) shows the strength of JPY against major currencies, including Deutsche Mark (DEM), Pound Sterling (GBP), Singapore Dollar (SGD), French franc (FRF), South Korean won (KRW), and USD, normalized the values at September 1985 to one. The data is from FRED.

workers, and sales. Here, sales are defined as the sum of unconsolidated domestic and export sales. A limitation is that firm information depends on whether a company reports to TDB in a given year. As a result, missing firm data may reflect either bankruptcy or non-reporting, and the two cannot be distinguished from each other. Therefore, in this analysis, I restrict the sample to 179,842 firms that have information available for all years from 1980 to 1999.

City-Industry Level Employment. I use *Jigyosho Kigyo Tokei Chosa* (Establishment and Enterprise Census) to obtain city- and industry-level employment. The Japanese government digitized editions in 1986, 1991, 1996, and 1999. Unfortunately, so far, the government has digitized data only for after the shock, which cannot be used to study the shock's effects. I therefore digitized three additional years before the shock: 1975, 1978, and 1981. The datasets report the number of employees. They follow the Japan Standard Industrial Classification (JSIC-1976) and cover about 640 cities across 80 industries. The sample accounts for 82 percent of total employment in 1991.

Industry-Destination Level Japanese Outward FDI. Industry-destination-level Japanese outward FDI data come from the "Basic Survey of Overseas Business Activities" (*Kaigai Jigyo*

Katsudo Kihon Chosa in Japanese). I digitized seven editions of reporting books from 1981, 1984, 1987, 1990, 1993, 1996, and 1999. The records are based on a firm-level survey of FDI activities, but only aggregated information is available. The data include counts, values, and reasons for FDI by industry and destination. I converted the industry category to be consistent with JSIC-1976.

Trade Data. I use the UN Comtrade data to obtain bilateral trade flows at the product level. I use annual trade values for 1978-1999 across products categorized in SITC Rev. 2, 4-digit classifications from UN Comtrade. I convert these SITC Rev. 2, 4-digit product categories into HS 1996/2002 6-digit codes using the crosswalk provided by the United Nations, and then into JSIC-1976 2-digit industry codes, following Kikuchi (2024).

Other Variables. First, the industry-level automation measure is from Adachi *et al.* (2024). They digitized the appendix tables from the Survey Report on Company Conditions of Manipulators and Robots, conducted by the Japan Robot Association (JARA) as part of its annual survey. Based on their dataset, I calculate the robot expenditure per worker at the JSIC-1976 level in 1982. Second, I construct the indicator variables for the history of voluntary export restraints (VERs). From the 1950s to the early 1990s, Japan introduced a series of VERs under U.S. trade pressure. These covered major goods: textiles (1957–early 1970s), steel (late 1960s–mid-1970s), color televisions (1977–1980), passenger cars (1981–1994), and semiconductors (1986–1991). Third, I construct the industry-level oil dependency index using the input-output table in the pre-Plaza Accord period.

4 Patterns of Exports and Outward FDI

Export. How did the Plaza Accord change Japan's export pattern? The yen appreciation shock affects industries differently. To capture this, I use the U.S. share of Japanese exports in the pre-Plaza Accord period as "shock exposure." With this measure, I run the following event study

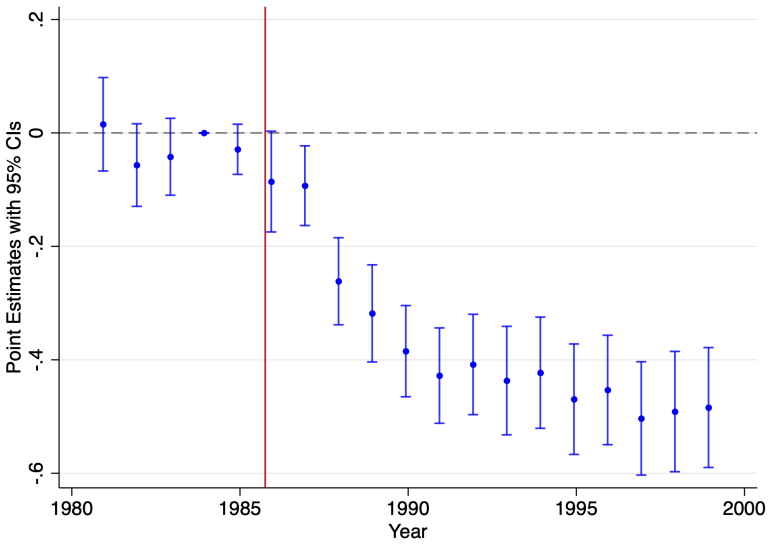


Figure 2: Export Pattern after the Shock

Notes: This figure shows the event study plots for β_τ in equation (1). Each point in (a) depicts how "US Export Share", defined as the extent to which the industry's exports relied on the US market in the 1970s, is associated with the U.S. share in Japanese exports in each year. Standard errors are clustered at the SITC-4-digit product level.

regression at the product level:

$$(\text{US Export Share})_{pt} = \sum_{\tau \neq 1984} \beta_\tau (\text{US Export Share})_{pt_0} + \sum_{\tau \neq 1984} \eta_\tau Z_{pt_0} + \alpha_t + \alpha_p + \varepsilon_{pt} \qquad (1)$$

where $(\text{US Export Share})_{pt}$ is the U.S. share of Japanese export values for product p at year t. $(\text{US Export Share})_{pt_0}$ is the U.S. share of Japanese exports in the 1970s. As the exchange rate shock also affects imports, I construct $(\text{US Import Exposure})_{pt_0}$ and include it in Z_{pt_0}. Macro trends and product characteristics are absorbed by year and product fixed effects. ε_{pt} is the error term. I clustered standard errors at the product-level. As the Plaza Accord occurred in September 1985, 1984 is the appropriate reference year. Figure 2 shows the event study plots of β_τ. The figure clearly shows that Japan's export dependence on U.S. markets decreased after the Plaza Accord.[10]

[10]The export reaction to the exchange rate change depends on invoicing currencies. Ito *et al.* (2010, 2016) show that the share of yen invoicing exports was low: 29% in 1980, 42% in 1983, and 33% in 1987. This means that Japanese exporters' invoicing choices were endogenously determined. Even with this pattern, the decline in exports to the U.S. was evident.

Foreign Direct Investments. The yen appreciation made exports more difficult for Japanese firms but reduced the cost of shifting production abroad. As a result, outward FDI flow surged after 1985. Figure 3 shows this rise, with large variation across manufacturing sectors. Sectors that had relied heavily on the U.S. market in the 1970s, indicated by smaller numbers in labels, expanded FDI the most after losing export opportunities to the U.S. I will examine whether outward FDI helps some firms overcome the adverse shocks of the yen appreciation.

5 Empirical Strategy

This section outlines the identification strategy to examine how firms' performance responded to the extent of their industries' exposure to the U.S. market prior to the Plaza Accord. Specifically, I construct an industry-level measure of exposure, termed "US Export Exposure," which aggregates the product-level export dependence on the U.S. market defined earlier.

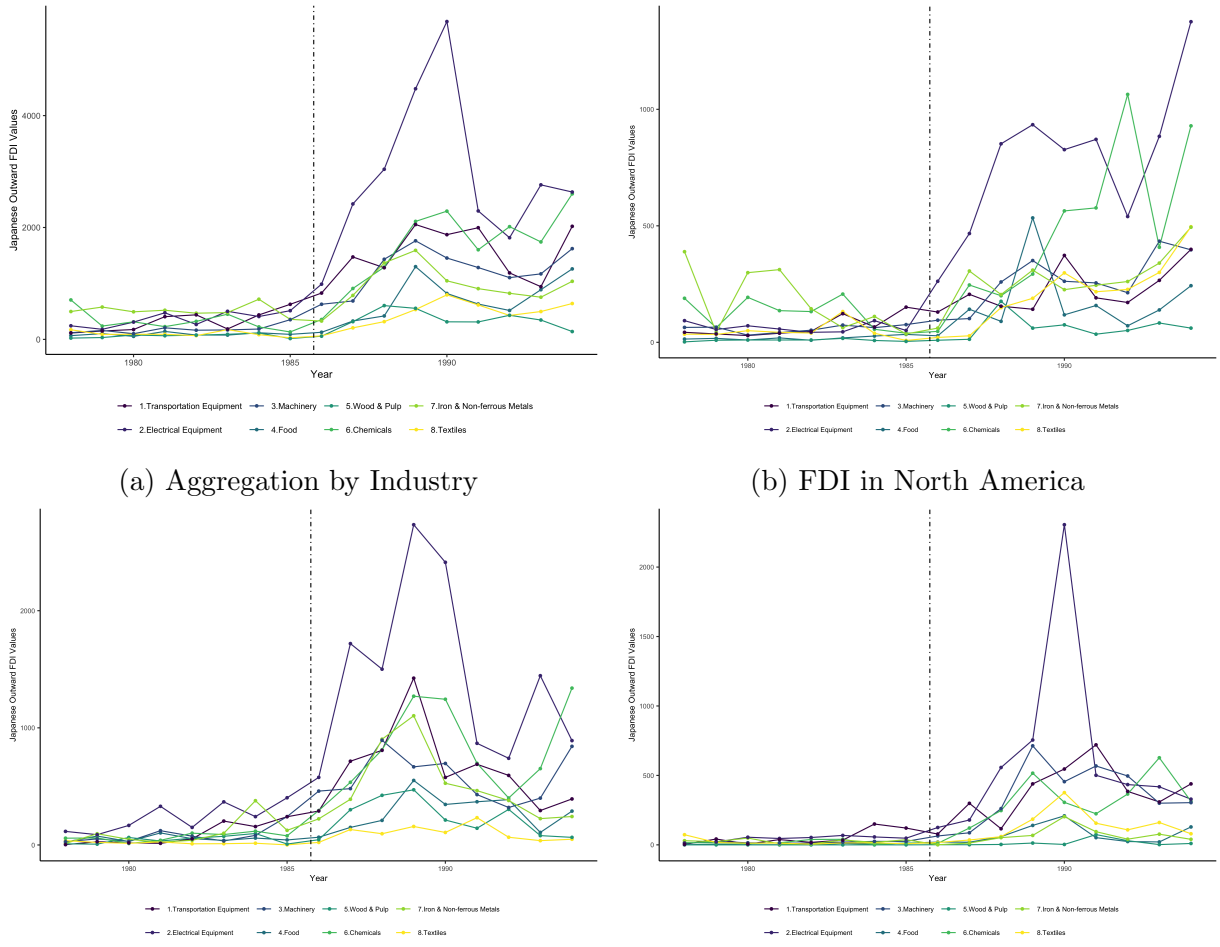
I estimate the following event-study specification:

$$\ln(Outcomes)_{ijt} = \sum_{\tau \neq 1984} \eta_\tau (\text{US Export Exposure})_{jt_0} + \sum_{\tau \neq 1984} \phi_\tau X_{jt_0} + \alpha_i + \alpha_{ct} + \varepsilon_{ijt}, \quad (2)$$

where $Outcomes_{ijt}$ denotes firm i's employment, sales, or labor productivity (sales per worker) in industry j and year t. The main regressor, $(\text{US Export Exposure})_{jt_0}$, measures the extent to which industry j relied on the U.S. market in the 1970s, capturing the magnitude of the appreciation shock.

To account for the import-side benefits of the yen appreciation, I include two variables in X_{jt_0}. The first, $(\text{US Import Exposure})jt_0$, is defined analogously for imports and captures each industry's exposure to import competition from the United States.[11] The second variable measures industries' access to imported inputs from the U.S. Appreciation reduced the cost of imported inputs, which generally benefits firms through productivity gains (Amiti and Konings 2007, Goldberg *et al.* 2010,

[11] Tomiura (2003) shows that import competition reduces employment in Japanese manufacturing, especially during episodes of yen appreciations.



(a) Aggregation by Industry

(b) FDI in North America

(c) FDI in Asia

(d) FDI in Europe

Figure 3: Japanese Outward FDI Trends

Notes: These figures show the Japanese outward FDI flow by industry and destination regions. Panel (a) shows the aggregated FDI values, while panels (b)-(d) show them by region. The colors represent the extent to which that industry's exports relied on the US market in the 1970s. Industries with a smaller number show high dependence on the U.S. market in the pre-shock period. The data is from "Basic Survey of Overseas Business Activities."

Halpern *et al.* 2015, De Loecker *et al.* 2016, Aghion *et al.* 2024).[12] I construct the industry-level measure of U.S. input access using the 1975 Japanese input-output table as

$$(\text{US Input Intensity})_{jt_0} = \sum_k \left(\frac{Expenditure_{j \to k}}{Expenditure_j} \right) \times (\text{US Import Exposure})_{kt_0},$$

which quantifies the share of U.S. inputs consumed by industry j in the pre-Plaza Accord period.

In addition, the appreciation likely lowered Japan's import costs for oil, as most oil-producing countries pegged their currencies to the U.S. dollar.[13] I therefore construct an industry-level oil dependency index using the pre-Plaza Accord input-output table and include it in X_{jt_0}. Further controls in X_{jt_0} include a dummy for industries subject to voluntary export restraints (VERs), reflecting bilateral negotiations with the U.S. and potentially shaping the industrial structure, and an industry-level automation measure in 1982 to capture heterogeneity in adaptation to technological change. Firm fixed effects (α_i) control for time-invariant firm characteristics, and city-year fixed effects (α_{ct}) absorb local macroeconomic shocks. Standard errors are clustered at the industry and city-year levels.

6 Results

Figure 4 presents the event-study estimates of η_τ from equation (2). Each panel reports two specifications, with and without the control variables X_{jt_0}.[14] Employment shows a mild negative trend in coefficients, yet no specification exhibits statistically significant pre-trends.[15] Sales and labor productivity decline sharply beginning in 1987. Because the yen appreciation following the

[12] Barattieri and Cacciatore (2023) and Handley *et al.* (2025) show that increases in input trade costs worsen exporters' performance in the context of the U.S.-China trade war. While most studies find positive effects of input access, some highlight potential adverse effects through stronger import competition in upstream sectors (Acemoglu *et al.* 2016).

[13] Ilzetzki *et al.* (2019) provide data on anchor currencies and exchange rate regimes for 194 countries from 1946-2016.

[14] Table A1 reports the results from a difference-in-differences specification.

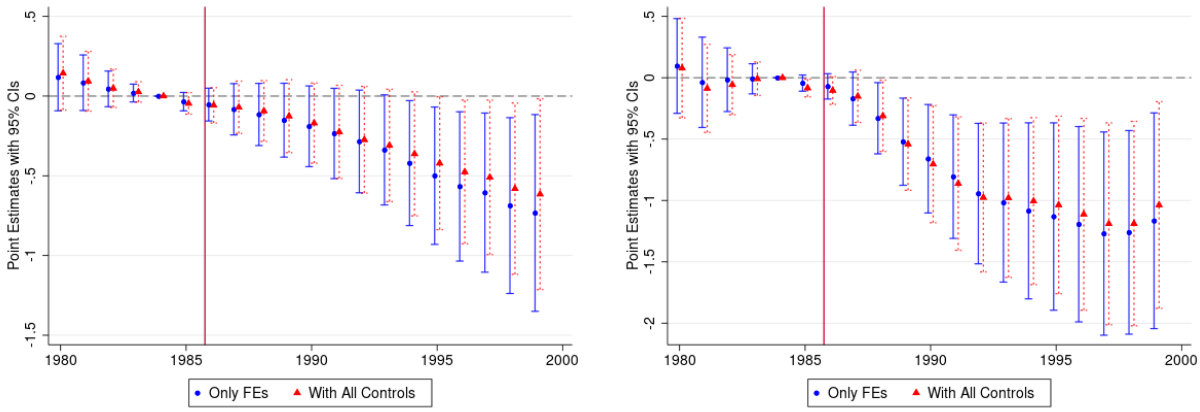
[15] The TDB firm-level data may not be fully representative. To address this, Appendix A.1 replicates the analysis using census data aggregated at the industry-city level. The results are consistent with those obtained from the TDB sample.

Plaza Accord took roughly two years to materialize fully, and firms required time to adjust, this lagged response is consistent with expectations. Notably, the negative effects persist for more than a decade after the shock, indicating a gradual but enduring adjustment process among firms. Quantitatively, a one–standard deviation increase in pre-Plaza Accord export exposure (0.11) leads to a 3.8% decline in employment, a 8.4% decline in sales, and a 4.5% decline in labor productivity after the shock.

The results remain robust after controlling for a range of confounding factors, including (i) import-side benefits from cheaper U.S. inputs and foreign oil resources, (ii) industries' experience with voluntary export restraints (VERs), and (iii) differences in automation intensity. A potential concern is that the analysis may not fully account for government interventions following the Plaza Accord. In 1986, the Japanese government introduced subsidies for small and medium-sized enterprises as part of its relief package against the yen appreciation. In Appendix A.2, I exploit the firm size threshold for subsidy eligibility and estimate the policy's effect using a regression discontinuity design (RDD). Although the data do not indicate which firms actually received the subsidies, I estimate the intent-to-treat (ITT) effect and find no evidence that eligibility improved employment, sales, or labor productivity. Hence, the government's relief program appears to have had only limited effects and is unlikely to bias the main results.

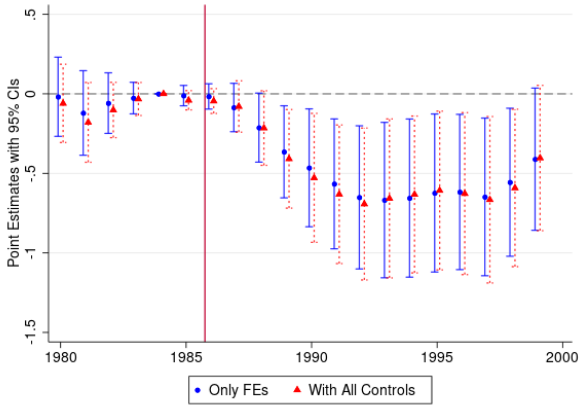
Overall, the yen appreciation sharply reduced firms' sales, and the sluggish adjustment of employment translated into a persistent decline in labor productivity.

Initial Firm Size Heterogeneity I next examine whether the adjustment to the yen appreciation differs by firms' initial sizes. Japan is characterized by strong employment protection, and labor adjustments are typically achieved through changes in working hours or internal reallocation rather than layoffs, in contrast to countries such as the United States (Abraham and Houseman 1989, Kambayashi and Kato 2017). Using data from 1985 to 1999, Genda and Rebick (2000) show that the tendency to retain employment is particularly strong among large firms. This pattern likely reflects employees' greater bargaining power in larger firms and the presence of more devel-



(a) Employment

(b) Sales



(c) Labor Productivity

Figure 4: US Export Exposure on Firms' Outcomes

Notes: These figures show the event study plots for η_τ in equation (2). Each point depicts how "US Export Exposure", defined as the extent to which the industry's exports relied on the U.S. market in the 1970s, is associated with firms' performance. The blue line shows the results of the regression only with fixed effects. The red one additionally controls for X_{jt_0}. Standard errors are clustered at the industry and city-year level.

oped internal labor markets. Moreover, because firm-specific training remains the dominant mode of skill formation, dismissals would entail substantial losses of such investments. These institutional features suggest that employment reductions were less pronounced among larger firms.

To test this prediction, I examine heterogeneity by initial firm size, measured by the number of employees in 1980. Figure 5 presents the event-study estimates by firm-size quartile. Smaller firms exhibit pronounced declines in employment, whereas the effects are much weaker among larger firms. Because the dataset includes only full-time employees, this pattern is consistent with smaller firms adjusting primarily by converting full-time positions into part-time or temporary ones. By contrast, sales declined across all firm-size categories, implying that larger firms, which maintained employment levels, experienced sharper reductions in labor productivity.

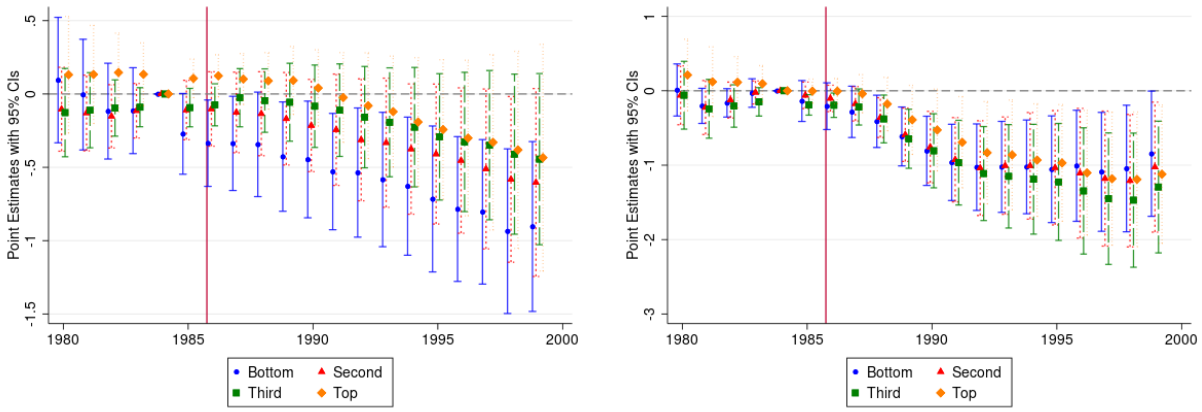
Effects in FDI-Capable Industries Following the evidence that the Plaza Accord sharply reduced firms' sales, I next examine whether outward FDI served as an adjustment channel for affected industries. As shown in Figure 3, Japanese outward FDI expanded rapidly after 1985, with considerable variation across industries. To test whether industries more exposed to the U.S. export shock increased their outward FDI, I estimate the following event-study specification:

$$IHS(\text{FDI Value})^{r}_{jt} = \sum_{\tau \neq 1984} \lambda_{\tau} (\text{US Export Exposure})_{jt_0} + \sum_{\tau \neq 1984} \phi_{\tau} X_{jt_0} + \alpha_j + \alpha_t + \varepsilon_{jt}, \quad (3)$$

where the outcome is the inverse hyperbolic sine of Japanese outward FDI flow for industry j to destination region r in year t. The sample covers 1980-1994, constrained by data availability. The set of controls X_{jt_0} is identical to that used in the firm-level analysis, while α_j and α_t capture industry-specific characteristics and macroeconomic trends, respectively. The FDI data are available only at the industry-destination level, but this level of aggregation remains suitable for identifying systematic post-Plaza Accord changes in FDI behavior across sectors.[16]

Figure 6 reports the estimated event-study coefficients (λ_{τ}) from three separate regressions by

[16]The industry categories in the FDI data are converted to JSIC–1976. The destination regions include North America, Asia, Europe, Central and Eastern countries, Africa, Oceania, and Latin America.



(a) Employment

(b) Sales

(c) Labor Productivity

Figure 5: Initial Firm-size Heterogeneity in US Export Exposure on Firms' Outcomes

Notes: These figures show the event study plots for η_τ in equation (2) by firm-size quartile. Each point depicts how "US Export Exposure", defined as the extent to which the industry's exports relied on the U.S. market in the 1970s, is associated with firms' performance. Smaller firms are labeled "Bottom" and larger firms are labeled "Top". All specifications control for X_{jt_0}. Standard errors are clustered at the industry and city-year level.

destination region. Panel (a) shows an increase in outward FDI to Asia following the Plaza Accord export shock, whereas the pattern is much weaker for North America and Europe. Historical accounts indicate that Japanese firms expanded investment in both the United States and Asia after the Plaza Accord (Cabinet Office, 2012).[17] Against this background, it is noteworthy that only Asian destinations exhibit a systematic industry-level response to the export shock. Given that the data do not distinguish between vertical and horizontal FDI, this increase should be interpreted broadly, reflecting a range of adjustment behaviors, including supply chain reorganization and market diversification, rather than purely production relocation. The result suggests that outward FDI was part of a gradual restructuring process that helped firms adapt to the stronger yen.

Motivated by the preceding evidence that outward FDI to Asia increased after the Plaza Accord, I next examine whether such FDI helped firms mitigate the adverse effects of the yen appreciation. The direction of this relationship is a priori ambiguous. On the one hand, FDI may have supported recovery by expanding global sales and sustaining, or even increasing, employment at the headquarters. On the other hand, FDI could have served as offshoring, potentially amplifying the contractionary impact of appreciation on domestic operations. I therefore test which of these mechanisms dominated: whether FDI acted as a buffer or an amplifier of the appreciation shock.

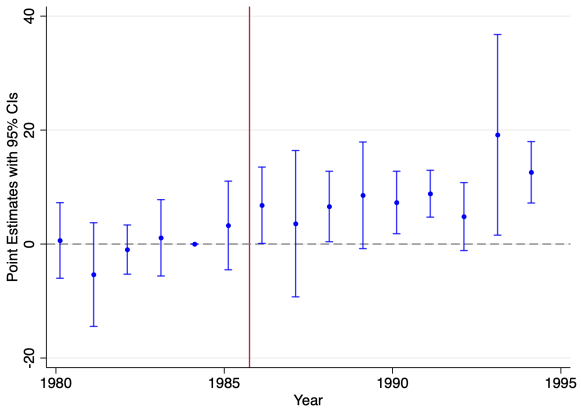
Because prior studies show that FDI is strongly correlated with firm size and productivity (Helpman *et al.* 2004, Tomiura 2007, Antràs and Yeaple 2014), FDI flows are likely endogenous to firm performance.[18] To address this concern, I construct an industry-level measure of FDI potential, particularly for Asia, based on the 1975 input-output table and import values from Asian countries, following Amiti and Wei (2009) and Hummels *et al.* (2014):[19]

$$(\text{FDI Potential})_{jt_0} = \frac{1}{L_{jt_0}} \sum_k \left(\frac{Expenditure_{j \to k}}{Expenditure_j} \right) \times (\text{Imports from Asian Countries})_{kt_0},$$

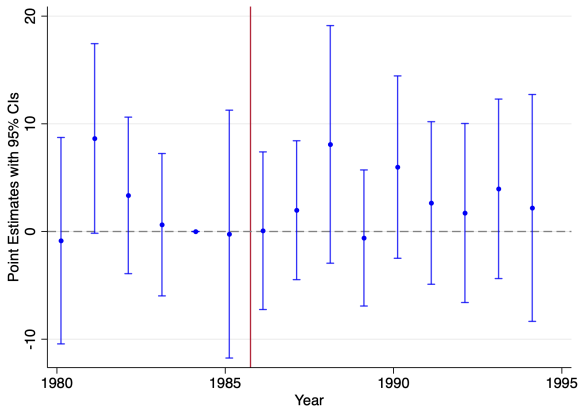
[17] https://www5.cao.go.jp/keizai3/2012/1222nk/n12_3_1.html

[18] The FDI premium arises because only highly productive firms can afford the large sunk costs of establishing foreign affiliates.

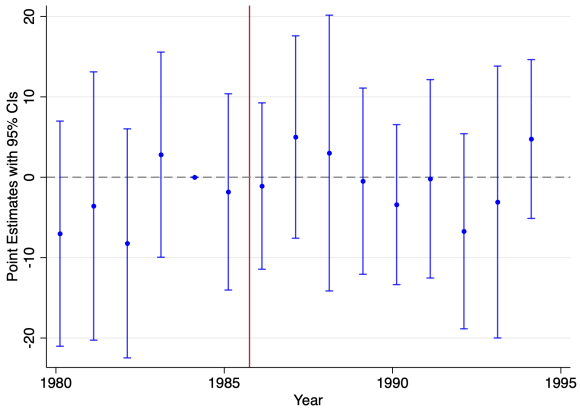
[19] Although this measure is often interpreted as capturing the ease of vertical fragmentation, it also reflects an industry's preexisting capability to coordinate cross-border production networks. Industries that sourced a larger share of intermediates from abroad before the Plaza Accord were more likely to have established international supplier linkages and therefore had greater potential to relocate production or engage in horizontal or platform-type FDI in response to an appreciation shock.



(a) FDI in Asia



(b) FDI in North America



(c) FDI in Europe

Figure 6: US Export Exposure on FDI by Destination Regions

Notes: These figures show the event study plots for λ_τ in equation (3). Each point depicts how "US Export Exposure", defined as the extent to which the industry's exports relied on the US market in the 1970s, is associated with Japanese outward FDI flow. The outcome is the inverse hyperbolic sine of FDI values in each region. All specification controls for all covariates. I employed robust standard errors.

where L_{jt_0} is workers in industry j in the pre-Plaza Accord period.

Using these pre-determined measures, I estimate the following reduced-form event study specification to examine whether industries with higher FDI potential were better able to cope with exchange rate appreciation through outward FDI to Asia:

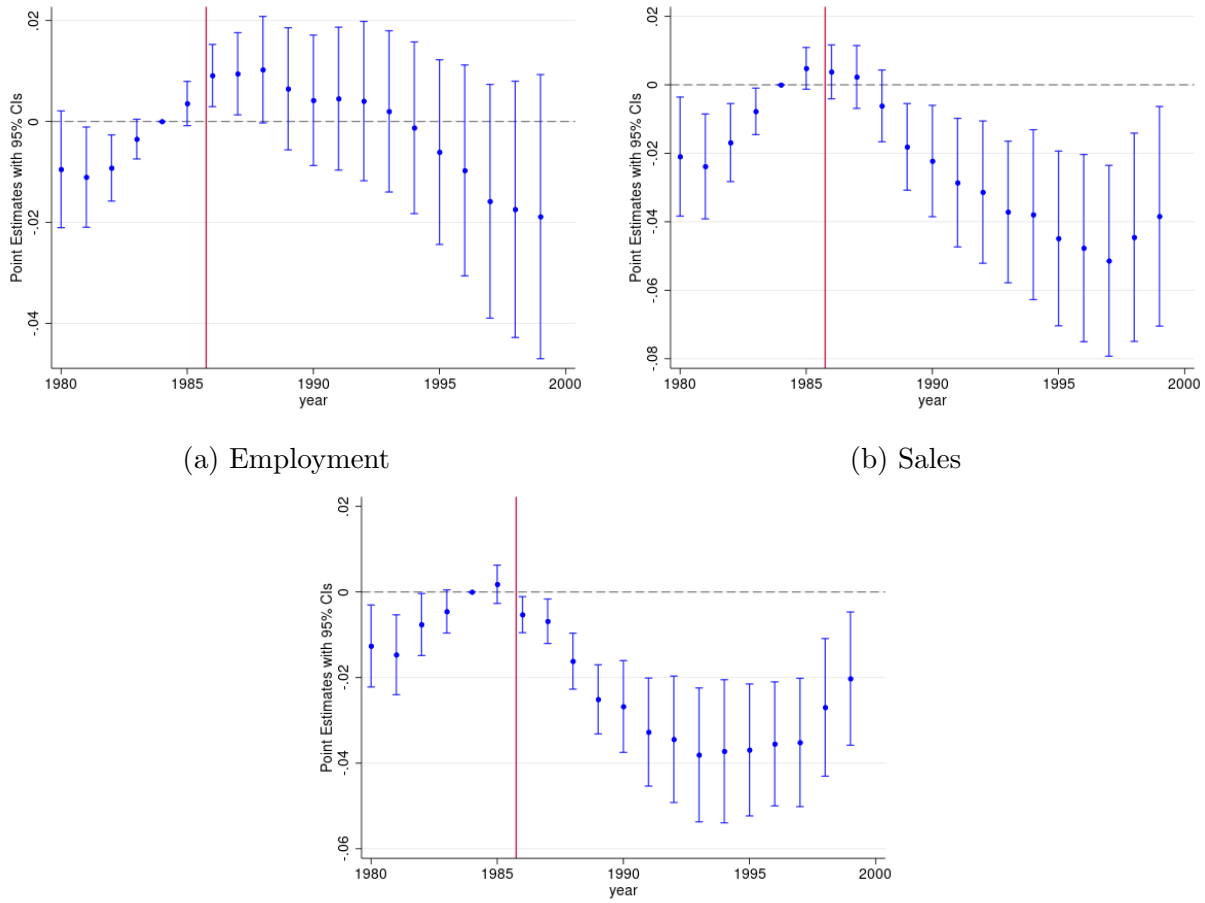
$$\begin{aligned}\ln(Outcomes)_{ijt} = &\sum_{\tau \neq 1984} \psi_\tau (\text{US Export Exposure})_{jt_0} \times (\text{FDI Potential})_{jt_0} \\ &+ \sum_{\tau \neq 1984} \eta_\tau (\text{US Export Exposure})_{jt_0} + \sum_{\tau \neq 1984} \theta_\tau (\text{FDI Potential})_{jt_0} \\ &+ \sum_{\tau \neq 1984} \phi_\tau X_{jt_0} + \alpha_i + \alpha_{ct} + \varepsilon_{ijt},\end{aligned} \tag{4}$$

The main parameters of interest are the coefficients on the interaction between FDI potential and US Export Exposure. The specification additionally controls for year fixed effects interacted with FDI potential and US Export Exposure, along with the same set of controls used in the previous analyses.

Figure 7 presents the estimated interaction effects between FDI Potential and US Export Exposure.[20] Firms in industries with higher FDI potential experienced a larger decline in total sales, but no corresponding reduction in employment.[21] This pattern indicates that FDI-oriented firms shifted part of their production or market focus abroad while maintaining headquarters employment to support overseas operations. In other words, firms in industries with higher FDI potential adjusted to the appreciation shock primarily through the production and sales margin, rather than through domestic employment. While sales contracted more sharply, employment did not respond differentially, indicating that outward FDI was not associated with additional job losses at home. Consequently, labor productivity declined more sharply among firms with higher FDI potential than among those less exposed to FDI. Taken together, these results suggest that outward FDI served as a mechanism of gradual structural adjustment rather than an immediate escape from the appreciation shock, helping firms preserve employment at home while reorganizing

[20] Table A2 reports the results from a difference-in-differences specification.

[21] Ito and Matsuura (2025) find that offshoring plays a critical role in mitigating negative import competition effects on employment using Japanese data.



(a) Employment

(b) Sales

(c) Labor Productivity

Figure 7: Reduced Form Event Study on Firms' Outcomes

Notes: These figures show the event study plots for ψ_τ in equation (4). Each point depicts how the interaction term of "US Export Exposure" and "FDI potential" is associated with firms' outcomes. The specification controls for all covariates. Standard errors are clustered at the industry and city-year level.

production abroad.

7 Manufacturing Hollowing-Out

In Section 6, I showed that firms more exposed to the export shock modestly reduced their employment. This section complements the firm-level analysis with city-level evidence using a Bartik-type design to assess how the same export shock affected local labor markets. As the export shock primarily affects manufacturing sectors, I examine how it relates to the hollowing out of Japanese

manufacturing. Between the late 1970s and the 1990s, the share of manufacturing employment in total employment declined sharply, from 28.3 percent in 1978 to 18.6 percent in 1999, marking a profound structural shift in Japan's economy. The analysis assesses whether cities more exposed to export shocks experienced stronger contractions in manufacturing employment relative to less exposed cities. In addition, I examine whether city-level FDI potential mitigates employment contraction, as suggested by the firm-level analysis.

To examine the regional consequences of the yen appreciation, I construct a measure of local labor market (LLM) exposure to the negative export shock at the city level.[22] Specifically, I employ a Bartik-type shift–share design that aggregates industry-level export shocks into local exposure using pre-determined employment shares.[23] The identifying assumption is that either the industry-specific export shocks are exogenous to local conditions (exogenous shift) or that pre-shock industry employment shares are uncorrelated with contemporaneous local shocks (exogenous share). In constructing the exposure measure, the shift component is defined as the interaction between industry-level exchange rate sensitivity, captured by US Export Exposure measured before the shock, and the exogenous yen appreciation following the Plaza Accord. This design helps isolate plausibly exogenous variation stemming from the exchange rate shock, rather than from endogenous movements in realized export prices or exchange rates. For the share component, I use each city's pre-determined industry composition, which helps satisfy the share exogeneity condition by anchoring local weights to the pre-shock industrial structure.

At the city level, I construct the following measure of exposure to the export shock:

$$\begin{aligned} \text{Shock Exposure}_{mt} =& (\text{US Export Exposure})_{mt_0} \times (\text{Post 1986 Dummy})_t \\ \text{where} \quad (\text{US Export Exposure})_{mt_0} =& \sum_j \frac{L_{mj,1975}}{L_{m,1975}} \times (\text{US Export Exposure})_{jt_0}. \end{aligned} \tag{5}$$

$L_{mj,1975}$ is the employment level of industry j in the city m at year 1975. $L_{m,1975}$ is the total

[22] This approach follows Topalova (2010), Autor *et al.* (2013), Kovak (2013), and Acemoglu *et al.* (2016), who use industrial labor–weighted shocks to study regional adjustment.

[23] For recent methodological discussions of shift–share identification, see Adão *et al.* (2019), Goldsmith-Pinkham *et al.* (2020), and Borusyak *et al.* (2022).

Table 1: Local Labor Market Reactions to the Yen Appreciation

	(1)	(2)	(3)	(4)	(5)
Dep.Var	Manufacturing Share		Service Share		log(Employment)
Shock Exposure	-0.292***	-0.312***	0.760***	0.782***	0.704**
	(0.083)	(0.084)	(0.137)	(0.141)	(0.328)
Shock Exposure × FDI potential		0.052***		-0.067***	
		(0.015)		(0.025)	
Controls	Yes	Yes	Yes	Yes	Yes
Incomplete Share	Yes	Yes	Yes	Yes	Yes
Pre-Outcomes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes
City FE	Yes	Yes	Yes	Yes	Yes
Obs.	3804	3804	3804	3804	3804

Notes: This table shows the results of equation (6). The number of observations is 3,804 (= 634 cities × 6 years). The specifications control for all covariates, including shift-share aggregates of trade exposure variables. The sum of exposure shares is also included in all specifications to address the "incomplete shares" problem discussed by Borusyak *et al.* (2025). In columns (1) and (2), the outcome is the share of manufacturing employees, while columns (3)-(4) set the share of service employees as an outcome. Standard errors are clustered at the city level. $^{**}p < 0.05$, $^{***}p < 0.01$.

employment in the city m in the same year. The regression equation is the following:

$$Outcome_{mt} = \chi(\text{Shock Exposure})_{mt} + \gamma Outcome_{mt-1} + \alpha_m + \alpha_t + \zeta X_{mt} + \varepsilon_{mt}. \tag{6}$$

The control vector X_{mt} includes city-level exposure to import competition and input imports to isolate the export-side effects.[24] Like Autor *et al.* (2013), a key feature of this setting is that the exposure shares do not sum to one. Some industries, such as service sectors with zero export values, are not exposed to the shock.[25] In this setting, manufacturing sectors are more exposed to the shock. Cities with a larger manufacturing share may therefore exhibit systematically different outcome trends. To address this, I control for the sum of exposure shares in each city. I also cluster standard errors at the city level to handle heteroskedasticity and serial autocorrelation.

Table 1 reports the estimates from equation (6). The results indicate that the Plaza Accord

[24] All industry-level confounders are constructed as shift–share aggregates using the same exposure shares as the main regressor (Borusyak *et al.* 2025).

[25] Sufficient variation in shifts is required for the shift exogeneity condition (Borusyak *et al.* 2025). In my setting, the "effective number of shifts," defined as the inverse Herfindahl index of shock importance weights, $1/\sum_j s_j^2$, is 55.54.

significantly reduced the manufacturing employment share across cities, as shown in column (1). In contrast, column (3) shows that the service sector share expanded markedly in more shock-exposed cities. Quantitatively, a 0.1 increase in pre-Plaza Accord export share in the U.S. market is associated with a 3.1 percentage point decline in the manufacturing employment share and a 7.8 percentage point increase in the service employment share after the Plaza Accord. Bloom *et al.* (2024) document similar reallocation patterns in the United States in response to Chinese import competition, while Gagliardi *et al.* (2023) find that some deindustrializing cities grew faster by shifting toward human-capital–intensive services. Figure 8 presents event-study estimates using the city-level exposure measure $(\text{US Export Exposure})_{mt_0}$ defined in equation (5). The divergence between manufacturing and service employment becomes increasingly pronounced after the Plaza Accord: manufacturing employment declines, while service employment expands. At first glance, the mild employment response at the firm level may appear at odds with the pronounced decline in manufacturing employment shares observed at the city level. This discrepancy is reconciled by the fact that the firm-level analysis relies on a balanced panel of surviving firms, thereby capturing adjustments along the intensive margin only. In contrast, the city-level analysis incorporates firm entry, exit, and sectoral reallocation. The evidence that more exposed cities experienced rising total employment suggests that structural change operated primarily through the extensive margin, with labor reallocated from exiting manufacturing activities toward expanding service sectors.

Next, I assess how FDI potential mitigates the adverse effects on manufacturing sectors by interacting "Shock Exposure" with the city-level FDI potential measure. I construct the city-level FDI potential as shift–share aggregates, using the same exposure shares as in the export shock. The even-numbered columns of Table 1 report the results. Consistent with the firm-level analysis, the negative effects on manufacturing employment are significantly attenuated in cities with higher FDI potential, indicating that access to outward FDI served as an adjustment margin that helped stabilize local manufacturing jobs. At the same time, the positive effects on service-sector employment are weaker in more FDI-capable cities. These patterns suggest that outward FDI reduced the labor displacement pressure generated by the export shock, thereby limiting the

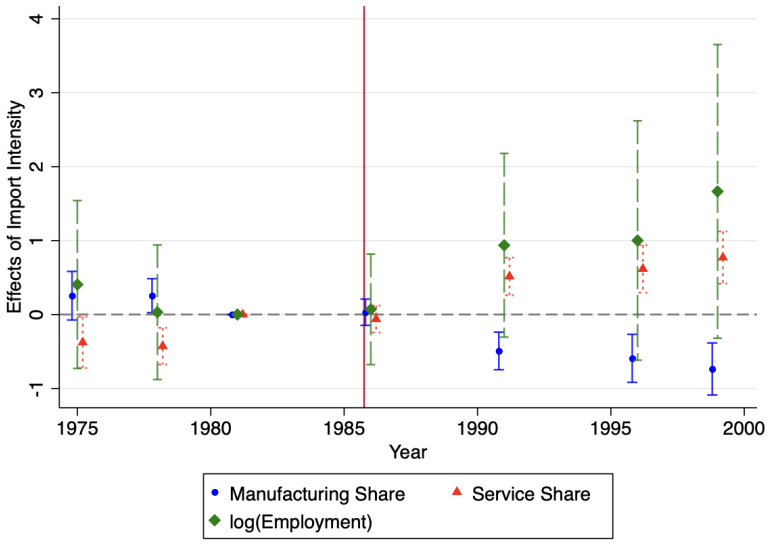


Figure 8: Reduced Form Event Study on LLM Outcome

Notes: This figure shows the event study plots for the local labor market analysis. Each point depicts how (US Export Exposure)$_{mt_0}$, defined as the extent to which cities relied on the US as an export market in the 1970s, is associated with the manufacturing/service employment share. Standard errors are clustered at the city level.

extent to which workers shifted from manufacturing into services in highly exposed regions. This result is qualitatively robust to weighted least squares with employment in 1975 as a weight (Table A4).

Overall, the Plaza Accord appreciation triggered a shift of labor from manufacturing to services, partially offset by outward FDI, marking the onset of Japan's long-run move toward a service-oriented economy.

8 Conclusion

This paper examines how firms adjusted to one of the largest exchange rate shocks in modern history, the sharp appreciation of the Japanese yen following the 1985 Plaza Accord. The episode offers a unique quasi-experiment to study long-run adjustment mechanisms in an advanced export-oriented economy suddenly confronted with a negative export shock.

Using microdata from the TDB covering 1980–1999, I link firms' performance to their industries'

pre-Plaza dependence on the U.S. market, constructing an exposure measure that captures differential sensitivity to the yen appreciation. Event-study specifications exploit this pre-determined heterogeneity to estimate the dynamic effects of appreciation on employment, sales, and labor productivity.

The results show that the yen appreciation sharply reduced firms' sales and labor productivity, while employment declined only modestly, reflecting Japan's rigid employment practices. Larger firms adjusted mainly along the productivity margin, maintaining employment but suffering output losses. Outward FDI in Asia rose substantially in industries more exposed to U.S. export losses. However, rather than offsetting the domestic contraction, FDI amplified the decline in domestic firms' sales without triggering additional employment adjustment at the firm level. These results indicate that FDI functioned as a gradual reallocation mechanism that redistributed activity across borders rather than as an immediate escape from the appreciation shock.

At the regional level, cities more exposed to export shocks experienced a pronounced decline in manufacturing employment shares but a rise in service employment shares, suggesting a reallocation of labor from manufacturing to services within Japan's domestic economy. Also, the negative effects on manufacturing are less pronounced in more FDI-capable cities.

Taken together, the evidence shows that the Plaza Accord triggered a slow but persistent structural transformation of Japan's economy; a long-term shift away from manufacturing continues, while outward FDI somehow mitigates the declines.

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A Appendix

A.1 TDB Firm-level Data's Representativeness

The TDB firm-level data may not necessarily be representative. To address this concern, this section presents an analysis based on census data at the industry–city level, demonstrating that the results are consistent with those obtained by aggregating the TDB firm data to the industry–city level for the specification (2). I calculate the total employment in the industry-city level by summing up the firms' employment $L_{cjt} = \sum_{i \in I_{cj}} L_{it}$, where I_{cj} is the set of firms in city c and industry j.

$$lnL_{cjt} = \sum_{\tau \neq 1984} \eta_\tau (\text{US Export Exposure}_{jt_0}) + \sum_{\tau \neq 1984} \phi_\tau X_{jt_0} + \alpha_j + \alpha_{ct} + \varepsilon_{cjt}, \tag{7}$$

Figure A1 compares the census results in panel (a) with the firm-level aggregation in panel (b). The data in panel (a) are sparse because the census is available only at seven points in time. I therefore set 1981 as the reference year, the closest pre-shock year. The results are both qualitatively and quantitatively similar, confirming the representativeness of the TDB data.

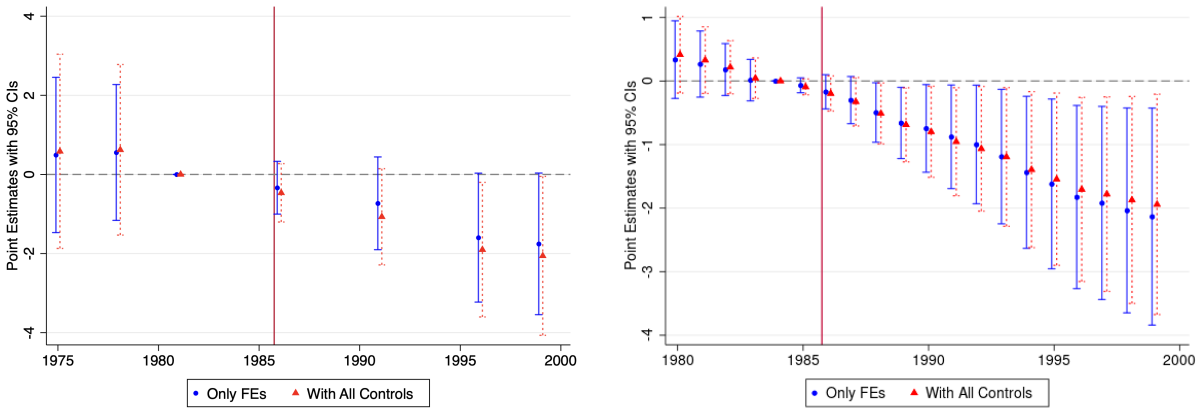
A.2 Effects of Subsidies for SMEs amid the Yen Appreciation

The government introduced a subsidy program for small and medium-sized enterprises (SMEs) in response to the sharp appreciation of the yen following the Plaza Accord. This section examines the policy effects on firm performance, exploiting the eligibility threshold for receiving the subsidy in the regression discontinuity design (RDD) specification. The Special Measures Law on Business Conversion of Designated Small and Medium Enterprises was enacted in February 1986.[26] The program offered four types of support: (i) preferential financing and credit guarantees for investment and working capital, (ii) tax incentives such as accelerated depreciation and deferred capital gains taxation, (iii) employment measures including retraining, reallocation, and job stabilization subsidies, and (iv) managerial guidance and technical assistance from government agencies and business associations.

Eligibility for subsidies was defined by firm size. In manufacturing, mining, and transport, firms qualified if they had capital below 100 million yen or fewer than 300 employees. In retail and services, the thresholds were 10 million yen or 50 employees. For analytical tractability, I focus on the employment criterion and implement an RDD using the number of employees in 1985 as the running variable. The outcome is the log change in average firm performance between the pre- and post-Plaza Accord periods. This design estimates the causal effect of program eligibility by comparing firms just above and just below the threshold.

Figure A3 and A4 show the regression discontinuity plots for manufacturing and service sectors, respectively. There are no significant effects in either case, implying that the government policy does not drive or influence the main result. The point estimates are shown in Table A3.

[26] https://www.shugiin.go.jp/internet/itdb_housei.nsf/html/houritsu/10419860225004.htm



(a) Census

(b) TDB Aggregation

Figure A1: Effects on City-Industry Level Employment

Notes: These figures compared the results of the event study. Panel (a) uses the city-industry level employment as an outcome from Census data. Panel (b) aggregates firm-level employment into the city-industry level to check the TDB data representativeness. Each point depicts how "US Export Exposure", defined as the extent to which the industry's exports relied on the US market in the 1970s, is associated with outcomes. The blue line shows the results of the regression only with fixed effects. The red one additionally controls for X_{jt_0}. Standard errors are clustered at the industry and city-year level.

A.3 Figures and Tables

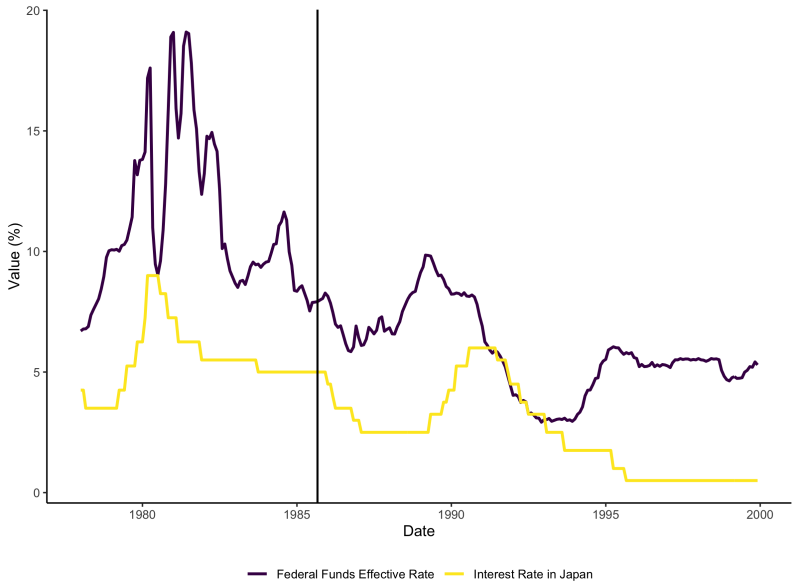
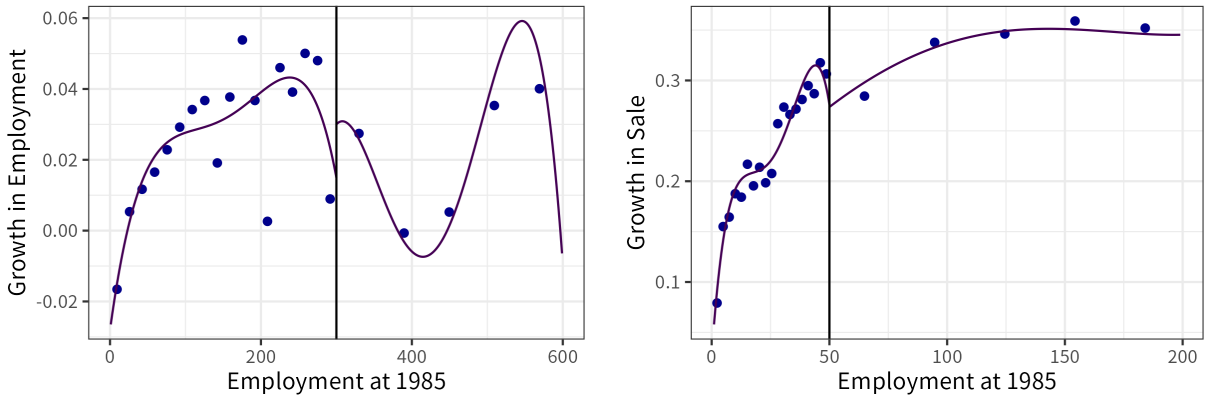


Figure A2: Policy Interest Rate in Japan and the U.S.

Notes: This figure shows the policy interest rate in the US (Federal Funds Effective Rate) and Japan (Official discount rate). The data is from FRED.



(a) Employment

(b) Sales

(c) Labor Productivity

Figure A3: Subsidy Effects on Manufacturing Firms' Performance

Notes: These figures show the regression discontinuity plots for the effects of the subsidy for SMEs in manufacturing, mining, and transport sectors. The cutoff number of employees to be eligible for the subsidy is 300. The x-axis is the employment level in 1985. The outcome is the growth of performance measure defined as $Gr(Y)_i = log(\overline{Y}_{1985-90}) - log(\overline{Y}_{1980-85})$, where $\overline{Y}$ is its average value for subscript period. I select the bin number based on the integrated MSE-optimal evenly spaced method proposed by Calonico *et al.* (2014).

(a) Employment

(b) Sales

(c) Labor Productivity

Figure A4: Subsidy Effects on Service Firms' Performance

Notes: These figures show the regression discontinuity plots for the effects of the subsidy for SMEs in retail and service sectors. The cutoff number of employees to be eligible for the subsidy is 50. The x-axis is the employment level in 1985. The outcome is the growth of performance measure defined as $Gr(Y)_i = log(\overline{Y}_{1985-90}) - log(\overline{Y}_{1980-85})$, where $\overline{Y}$ is its average value for subscript period. I select the bin number based on the integrated MSE-optimal evenly spaced method proposed by Calonico *et al.* (2014).

Table A1: DiD Results: US Export Exposure on Firms' Outcomes

	(1)	(2)	(3)	(4)	(5)	(6)
Dep.Var	Employment		Sales		Labor Productivity	
US Export Exposure x Post 1986	-0.387*	-0.346	-0.820**	-0.766**	-0.424**	-0.412**
	(0.207)	(0.210)	(0.344)	(0.337)	(0.208)	(0.203)
Controls x Post 1986	No	Yes	No	Yes	No	Yes
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes
City-Year FE	Yes	Yes	Yes	Yes	Yes	Yes

Notes: This table shows the results from a difference-in-differences specification for Figure 4. The number of observations is approximately 3.5 million. All specifications control for all covariates interacted with the post dummy. All dependent variables are in logarithms. Standard errors are clustered at the industry and city-year levels. $^{**}p < 0.05$, $^{*}p < 0.10$.

Table A2: DiD Results: Reduced Form Event Study on Firms' Outcomes

	(1)	(2)	(3)
Dep.Var	Employment	Sales	Labor Productivity
US Export Exposure x FDI Potential x Post 1986	0.005	-0.016	-0.020***
	(0.009)	(0.012)	(0.007)
Controls x Post 1986	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes
City-Year FE	Yes	Yes	Yes

Notes: This table shows the results from a difference-in-differences specification for Figure 7. All specifications control for all covariates interacted with the post dummy. All dependent variables are in logarithms. Standard errors are clustered at the industry and city-year levels. $^{***}p < 0.01$.

Table A3: Effect of Receiving the Subsidies

	Subsidy	S.E.	N (Left)	N (Right)
Employment growth				
Manufacturing	0.015	(0.039)	932	582
Service	0.015	(0.036)	1865	1272
Sales growth				
Manufacturing	0.012	(0.043)	937	584
Service	-0.045	(0.046)	1642	1215
LP growth				
Manufacturing	0.004	(0.033)	1535	752
Service	-0.031	(0.041)	1338	1078

Notes: This table shows the estimation results based on the RDD using the cut-off points of eligibility criteria for the subsidies. The cutoff number of employees to be eligible for the subsidy is 300 for manufacturing firms and 50 for service firms. The running variable is the employment level in 1985. The outcome is the growth of performance measure defined as $Gr(Y)_i = log(\overline{Y}_{1985-90}) - log(\overline{Y}_{1980-85})$, where $\overline{Y}$ is its average value for subscript period. Standard errors are in parentheses. We employ a mean square error optimal bandwidth and a local-linear regression. The bias is corrected and the standard errors are robust according to Calonico *et al.* (2014).

Table A4: Local Labor Market Reactions to the Yen Appreciation (WLS)

	(1)	(2)	(3)	(4)	(5)
Dep.Var	Manufacturing Share		Service Share		log(Employment)
Shock Exposure	-0.377**	-0.379**	0.629***	0.628***	0.587*
	(0.151)	(0.151)	(0.214)	(0.215)	(0.301)
Shock Exposure × FDI potential		0.070***		-0.100***	
		(0.019)		(0.027)	
Controls	Yes	Yes	Yes	Yes	Yes
Incomplete Share	Yes	Yes	Yes	Yes	Yes
Pre-Outcomes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes
City FE	Yes	Yes	Yes	Yes	Yes
Obs.	3804	3804	3804	3804	3804

Notes: This table shows the results of equation (6) with total employment in 1975 as a weight. The number of observations is 3,804 (= 634 cities × 6 years). The specifications control for all covariates, including shift-share aggregates of trade exposure variables. The sum of exposure shares is also included in all specifications to address the "incomplete shares" problem discussed by Borusyak *et al.* (2025). In columns (1) and (2), the outcome is the share of manufacturing employees, while columns (3)-(4) set the share of service employees as an outcome. Standard errors are clustered at the city level $^{***}p < 0.01$, $^{**}p < 0.05$.