# Import Exchange Rate Pass-through by Invoicing Currency

Yushi Yoshida, Takatoshi Ito, Junko Shimizu,
Kiyotaka Sato, Taiyo Yoshimi, and Uraku Yoshimito

November 29, 2025
日本国際経済学会関西支部定例研究会

This study is the result of research conducted jointly with the Policy Research Institute (PRI), Ministry of Finance, which submitted an offer of use to the Ministry of Finance based on the “Guideline on the utilization of Customs’ import and export declaration data in a joint research with Policy Research Institute,” and received approval in February 2022. The views expressed in this research are those of the author and do not represent the official views of the Ministry of Finance or the Policy Research Institute of the Ministry of Finance. The authors thank the staff at the PRI for the great research support they received, especially Fumiharu Ito, Shintaro Negishi, and Kayo Takama, for using transaction-level microdata. Yoshida gratefully acknowledges financial support from the JSPS KAKENHI 20H01518, 22K18527, and 25H00649. Shimizu, Sato, Yoshimi, and Yoshimoto thank 18K01698, 23H00836, 24K04962, & 23K17550, 20H01518 & 20KK0289, 23K20152, and 21K20172, for financial support, respectively.

# Objectives

- We investigate the Japanese import ERPT by utilizing transaction-level data from Japan Customs, MOF.

- The two primary focuses of this study are the following
  1. We estimate import ERPT by distinguishing six major invoicing currencies
     - USD, JPY, EUR, GBP, CNY, THB … 95.1%

  2. We use 'Invoicing Currency Exchange Rate' (JPY/IC) in addition to the dominant currency exchange rates (JPY/USD) and producer currency exchange rates (JPY/PC).
     - See Yoshida et al. (2025) for JPY/IC

# Background: A series of papers by the research team

Junko Shimizu, Takatoshi Ito, Kiyotaka Sato, Yushi Yoshida, Taiyo Yoshimi & Uraku Yoshimoto,

NBER Working Papers:

- Shimizu et al. (2025) " Invoicing of Japanese Exports and Imports: Analysis of Granular Data by Industry and by Country, " May 2025, NBER Working Paper 33826.
- Yoshimoto et al. (2025) "The Myth of U.S. Dollar Dominance in Japanese Exports: New Evidence from Japanese Customs Level Data, " May 2025, NBER Working Paper, 33748.

Export ERPT

- Yoshida et al. (2025) "A Test of Dominant Currency Hypothesis: Evidence From a Non-USD-non-Euro Country," Feb 2025, NBER Working Paper, 33454.

Import ERPT

- Yoshimi et al. (2024) "Invoicing Currency and Exchange Rate Pass-Through in Japanese Imports: A Panel VAR Analysis," Sep 2024, NBER Working Paper, 32910.
- Yoshida et al. (2024) "Invoicing Currency Choice: Strategic Complementarities and Currency Matching," Apr 2024, NBER Working Paper, 32276.
- Yoshimi et al. (2024)"Invoice Currency Choice in Intra-Firm Trade: A Transaction-Level Analysis of Japanese Automobile Exports," Feb 2024, NBER Working Paper, 32142.

# Comparison with

Yoshimi et al. (2024) "Invoicing Currency and Exchange Rate Pass-Through in Japanese Imports: A Panel VAR Analysis," Sep 2024, NBER Working Paper, 32910. (forthcoming in JJIE)

- Yoshimi et al. (2024) investigated the Japanese import ERPT with the same dataset.

- Their study picked up those HS 9-digit products with the invoicing currency share exceeding 95%. (drop others from the sample)
  - PCP (exporter's currency) invoicing products
  - LCP (JPY) invoicing products
  - VCP (USD) invoicing products

  - Transaction-level data
  - We focus on the 6 major invoicing currencies.
  - 2 years longer (with all observations)

- The exchange rate is JPY/(exporter's currency)

  3 different exchange rates (JPY/IC)

- The study applied the panel-VAR approach to estimate the dynamics of ERPT by USD versus JPY invoicing currency.
  - Micro import prices and 3 macro variables
  - 3 lags

  - with micro control variables
  - 12 lags

# Related studies: Yoshida et al. (2024) & Yoshida et al. (2025)

- Yoshida et al. (2024)
  - This study investigated the choice of invoicing currency in Japanese exports.
  - Two-way exporters (i.e., exporters that also import)

- Yoshida et al. (2025)
  - This study estimated the Japanese export ERPT.
  - The invoicing currency exchange rate is defined and used for the first time in the literature.

# General Economic Concepts you need to know in the following presentation

Trade Contract
Exchange rate pass-through (ERPT)
Invoicing Currency
(4 slides)

# Trade Contracts

- Two parties (an exporter and an importer) negotiate on the following:

1. Products (automobile, refrigerator, T-shirt, corns,…)
2. Values (or prices) and Quantities
3. Delivering date
4. Invoicing currency (Euro, USD, JPY, …)
5. Payment method (when to pay,,, cash in advance or open account)

# What price does an exporter set at local markets?

Question? Does Renault really increase the local price in Japan that much?

France

Renault (ARKANA)

Trade contracts: 30,000 euros

Exchange rate pass-through (ERPT) measures how much a change in the exchange rate is reflected in price.

1 euro = 120 JPY

1 euro = 140 JPY

Euro appreciation or JPY depreciation

Japan

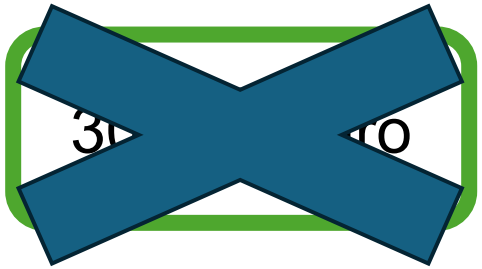
3,600,000 JPY

4,200,000 JPY

# What if Renault contracts in the Japanese yen, not in the Euro?

- In the previous slide, ERPT was 100%
- ERPT (exchange rate pass-through) may be different, depending on the invoicing currency!!!
- In the below, JPY invoicing will end up with 0% ERPT.

1 euro = 120 JPY



1 euro = 140 JPY

Trade contract 3,600,00 JPY

# The dominant use of USD in international trade

- The USD is, of course, preferred for trade with the US.
  - US exports
  - US imports
- However, the USD is also used for trade between non-US countries.
- The use of a third country's currency is called '**vehicle currency**'.
- Now, many researchers emphasize the '**dominant currency paradigm**'.
  - For Turkish exports, 47% (in transactions) is invoiced in USD
  - For Japanese exports, about 51% (in value) is invoiced in USD.

# Empirical Approach

# USD, JPY, EUR, GBP, CNY, and THB Invoicing

- The most commonly invoiced currencies in Japanese imports consist of six currencies: the US dollar, the Japanese yen, the Euro, the British pound, the Chinese yuan, and the Thai baht.
- The2014-2022 monthly dataset comprises 31,781,506 observations, with

  - USD invoicing accounting for 57.6 percent,
  - the Japanese yen for 23.8 percent,
  - the Euro for 11.9 percent,
  - the British pound for 1.2 percent,
  - the Chinese yuan for 2.0 percent, and
  - the Thai baht for 0.6 percent.

95.1%

# Three kinds of exchange rates

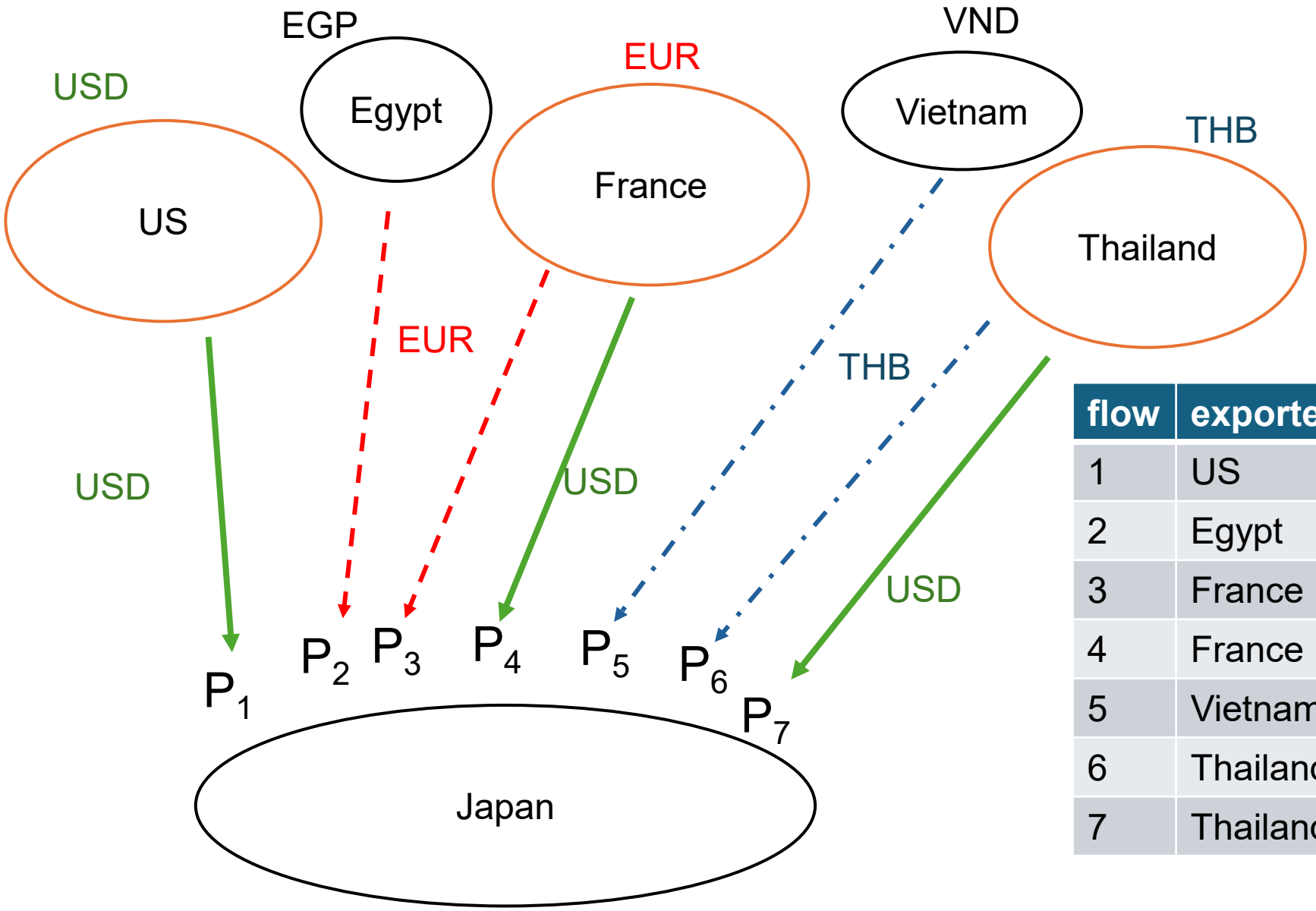
- JPY/USD (LC/USD) (importer / US)
  - The exchange rate of Japanese yen per US dollar, JPY/USD.
  - JPY/USD is not source-varying.

- JPY/PC (LC/PC) (importer/ exporter)
  - The bilateral exchange rates between Japan and the source countries, where an increase implies a depreciation of the Japanese yen.
  - JPY/PC is source-varying.

- JPY/IC (LC/IC) (importer/ invoicing)
  - The corresponding invoicing currency versus the Japanese yen, for each firm-product-source-invoicing unit.
  - JPY/IC is invoicing-currency-varying, but not necessarily source-varying.

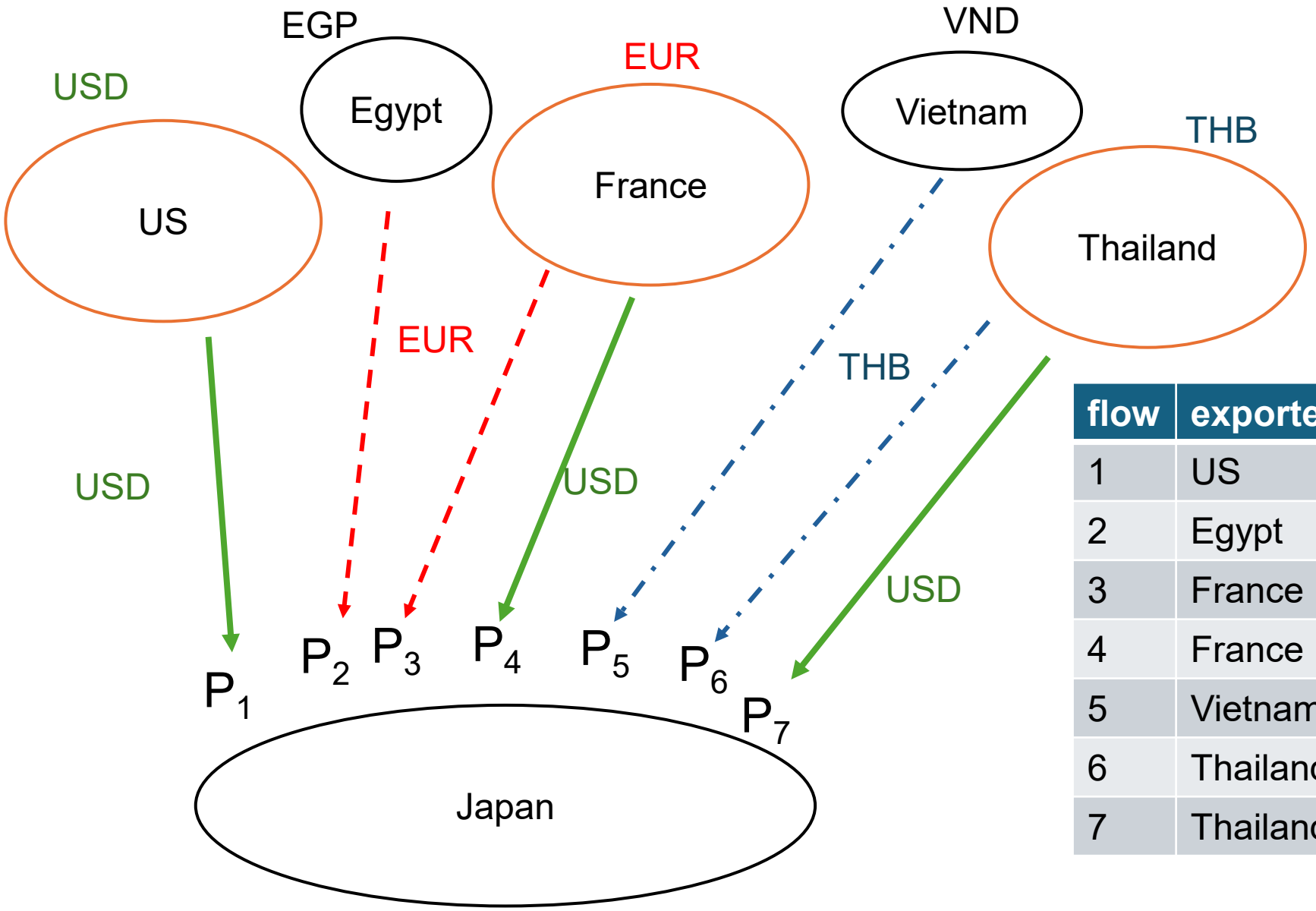
  - See Yoshida et al. (2025) for details about invoicing currency exchange rates.

# Definitions of exchange rates



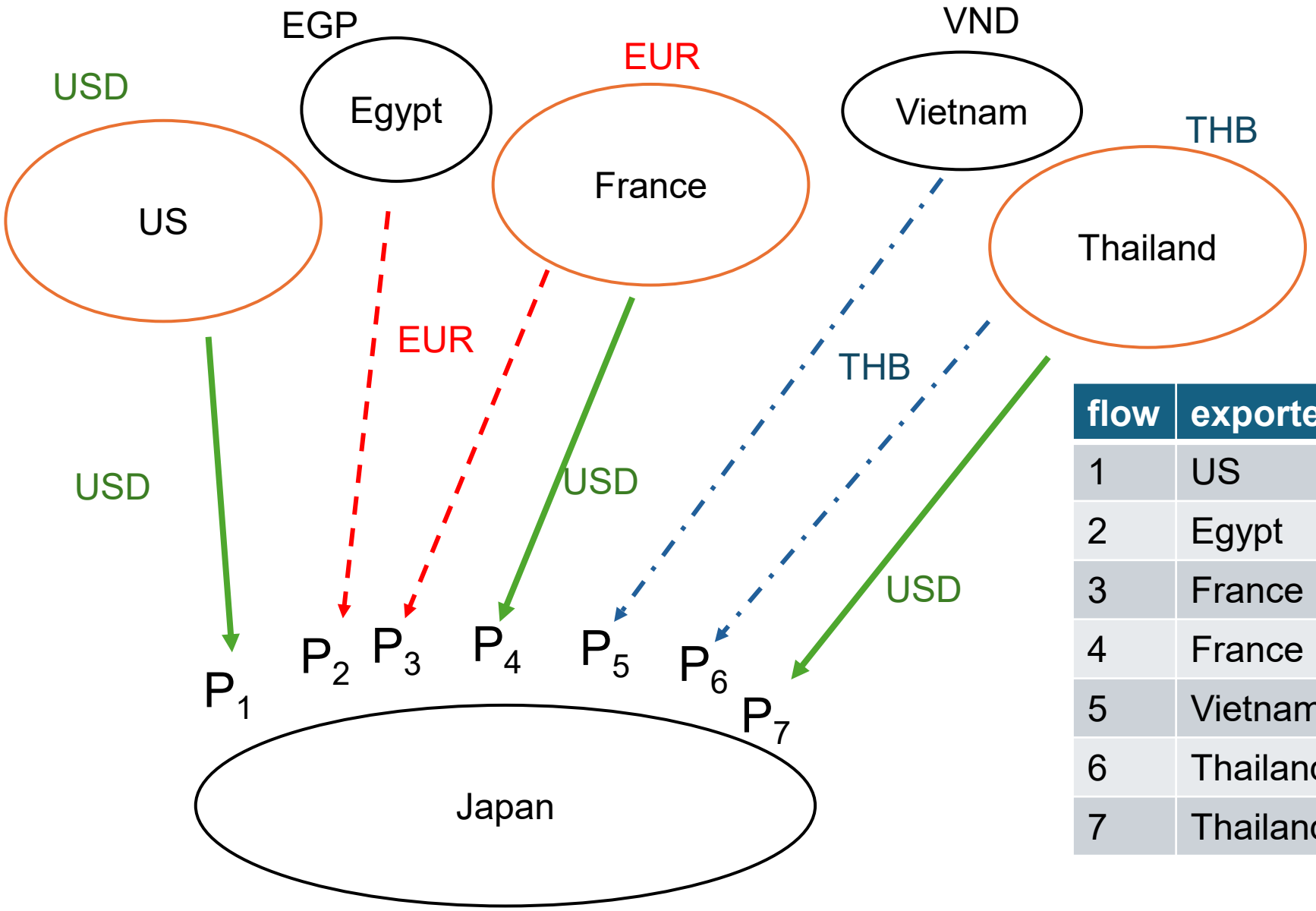

| flow | exporter | JPY/USD | JPY/PC | JPY/IC |
|---|---|---|---|---|
| 1 | US | JPY/USD | | |
| 2 | Egypt | JPY/USD | | |
| 3 | France | JPY/USD | | |
| 4 | France | JPY/USD | | |
| 5 | Vietnam | JPY/USD | | |
| 6 | Thailand | JPY/USD | | |
| 7 | Thailand | JPY/USD | | |

# Definitions of exchange rates




| flow | exporter | JPY/USD | JPY/PC | JPY/IC |
|---|---|---|---|---|
| 1 | US | JPY/USD | JPY/USD | |
| 2 | Egypt | JPY/USD | JPY/EGP | |
| 3 | France | JPY/USD | JPY/EUR | |
| 4 | France | JPY/USD | JPY/EUR | |
| 5 | Vietnam | JPY/USD | JPY/VND | |
| 6 | Thailand | JPY/USD | JPY/THB | |
| 7 | Thailand | JPY/USD | JPY/THB | |

# Definitions of exchange rates




| flow | exporter | JPY/USD | JPY/PC | JPY/IC |
|---|---|---|---|---|
| 1 | US | JPY/USD | JPY/USD | JPY/USD |
| 2 | Egypt | JPY/USD | JPY/EGP | JPY/EUR |
| 3 | France | JPY/USD | JPY/EUR | JPY/EUR |
| 4 | France | JPY/USD | JPY/EUR | JPY/USD |
| 5 | Vietnam | JPY/USD | JPY/VND | JPY/THB |
| 6 | Thailand | JPY/USD | JPY/THB | JPY/THB |
| 7 | Thailand | JPY/USD | JPY/THB | JPY/USD |

# Determinants of Short-run Exchange Rate Pass-through

- Short-run Base Model

The panel fixed model specification of the ERPT equation as the base model is estimated for a given invoicing currency,$c$, as follows.

$$lnP^{c}_{i,j,k,t} = \alpha + \beta lnER_{c,k,t} + \lambda_{i,j,k,c} + \epsilon_{c,i,j,k,t}, \quad (1)$$

where $lnP^{c}_{i,j,k,t}$ is the natural log of the unit value in Japanese yen of product $j$ invoiced in currency $c$ for importing firm $i$ from source country $k$ in year-month $t$. For $lnER_{c,k,t}$, alternatively, we use three distinctive exchange rates: JPY/USD, JPY/PC, and JPY/IC. $\lambda_{i,j,k,c}$ is the firm-product-source-invoice fixed effect.

- Product level is at HS 9-digit category.

# Empirical Results (1)

Short-run base model

Table 1: Base JPY/USD ERPT by Invoicing Currency

| | USD | JPY | EUR | GBP | CNY | THB |
|---|---|---|---|---|---|---|
| ln JPY/USD | 1.186*** | 0.554*** | 0.742*** | 1.017*** | 0.997*** | 0.747*** |
| | (0.002) | (0.004) | (0.006) | (0.019) | (0.014) | (0.027) |
| constant | 2.491*** | 5.79*** | 5.762*** | 4.867*** | 2.868*** | 4.465*** |
| | (0.011) | (0.019) | (0.027) | (0.087) | (0.064) | (0.127) |
| NOB | 18,321,561 | 7,567,248 | 3,785,134 | 376,508 | 631,742 | 201,193 |
| overall $R^2$ | 0.0031 | 0.0011 | 0.0012 | 0.0017 | 0.0039 | 0.0023 |

Note: The coefficients of fixed effects estimates are shown along with standard deviations in parentheses below. ***,**,* denote the statistical significance at the one, five, and ten percent levels, respectively.

- The trade prices are claimed to be the most sensitive to the USD exchange rate in the literature.
- Complete ERPT
  - USD
  - GBP
  - CNY
- Incomplete ERPT
  - EUR
  - THB
- Only a half ERPT for JPY

Table 2: Base JPY/PC ERPT by Invoicing Currency

| | USD | JPY | EUR | GBP | CNY | THB |
|---|---|---|---|---|---|---|
| ln JPY/PC | 0.758*** | 0.305*** | 0.523*** | 0.649*** | 1.020*** | 1.129*** |
| | (0.006) | (0.006) | (0.013) | (0.021) | (0.014) | (0.036) |
| constant | 6.406*** | 7.832*** | 7.021*** | 6.710*** | 4.693*** | 6.582*** |
| | (0.013) | (0.011) | (0.055) | (0.097) | (0.040) | (0.045) |
| NOB | 18,264,552 | 7,556,141 | 3,783,232 | 376,377 | 631,575 | 201,032 |
| overall $R^2$ | 0.0319 | 0.0436 | 0.0004 | 0.0171 | 0.0022 | 0.0024 |

Note: The coefficients of fixed effects estimates are shown along with standard deviations in parentheses below. ***,**,* denote the statistical significance at the one, five, and ten percent levels, respectively.

- The trade prices are claimed to be the most sensitive to the USD exchange rate in the literature.
- Less responses to the bilateral exchange rate
- True for
  - USD
  - JPY
  - ERU
  - GBP
- But not for
  - CNY
  - THB

Table 3: Base JPY/IC ERPT by Invoicing Currency

| | USD | JPY | EUR | GBP | CNY | THB |
|---|---|---|---|---|---|---|
| ln JPY/IC | 1.186*** | | 1.061*** | 0.717*** | 1.021*** | 1.167*** |
| | (0.002) | | (0.008) | (0.017) | (0.014) | (0.037) |
| constant | 2.491*** | | 4.109*** | 6.057*** | 4.687*** | 6.561*** |
| | (0.011) | | (0.037) | (0.088) | (0.04) | (0.045) |
| NOB | 18,321,561 | | 3,785,134 | 376,508 | 631,742 | 201,193 |
| overall $R^2$ | 0.0031 | | 0.0014 | 0.0003 | 0.0056 | 0.0032 |

Note: The coefficients of fixed effects estimates are shown along standard deviations in parenthesis below. ***,**,* denote the statistical significance at the one, five, and ten percent levels, respectively.

- The trade prices are claimed to be the most sensitive to the USD exchange rate in the literature.
- More responsive to JPY/IC exchange rates
  - EUR
  - CNY
  - THB
- Caveat: not testable for
  - USD
  - JPY

# Empirical Results (2)

Short-run extended model

# Determinants of Short-run Exchange Rate Pass-through

- The short-run extended estimation models

$$lnP^{c}_{i,j,k,t} = \alpha + (\beta_0 + \beta_1 TwoWay_{i,t} + \beta_2 lnFirmSize_{i,t} + \beta_3 lnFreq_{i,t} + \beta_4 lnExpSize_{k,t}) \times lnER_{c,k,t} + \lambda_{i,j,k,c} + \epsilon_{c,i,j,k,t}, \quad (2)$$

(1) ***TwoWay***

- We add the two-way trader status as a dummy variable, which takes the value of one if an importer also exports in the same year.

(Two variables are introduced as proxies for the **market share**. )

(2) ***ln FirmSize***

- The size of an importing firm is measured as the annual total import value

(3) ***ln Freq***

- We also measure the intensity of importing activities by the natural log of the number of import transactions in the year

(4) ***ln ExpSize***

- In addition, the size of a source country is measured by the aggregate Japanese import value

Table 4: Short-Run JPY/USD ERPT by Invoicing Currency

| | USD | JPY | EUR | GBP | CNY | THB |
|---|---|---|---|---|---|---|
| ln JPY/USD ($\beta_0$) | -0.443*** | -0.621*** | -0.150*** | 1.629*** | -2.368*** | -1.873*** |
| | (0.016) | (0.023) | (0.021) | (0.091) | (0.121) | (0.219) |
| # TwoWay ($\beta_1$) | -0.000** | -0.002*** | -0.001*** | -0.001 | -0.000 | -0.001 |
| | (0.000) | (0.000) | (0.000) | (0.001) | (0.001) | (0.003) |
| # ln FirmSize ($\beta_2$) | 0.01*** | 0.01*** | 0.005*** | 0.007*** | 0.008*** | 0.007*** |
| | (0.000) | (0.000) | (0.000) | (0.001) | (0.001) | (0.002) |
| # ln Freq ($\beta_3$) | -0.01*** | -0.009*** | -0.005*** | -0.007*** | -0.009*** | -0.013*** |
| | (0.000) | (0.000) | (0.000) | (0.001) | (0.002) | (0.002) |
| # ln ExpSize ($\beta_4$) | 0.042*** | 0.029*** | 0.026*** | -0.025*** | 0.092*** | 0.076*** |
| | (0.000) | (0.001) | (0.001) | (0.003) | (0.004) | (0.007) |
| constant | 3.644*** | 6.575*** | 6.257*** | 4.713*** | 5.028*** | 6.127*** |
| | (0.015) | (0.022) | (0.028) | (0.094) | (0.08) | (0.171) |
| NOB | 18,321,561 | 7,567,248 | 3,785,134 | 376,508 | 631,742 | 201,193 |
| overall $R^2$ | 0.0072 | 0.0293 | 0.0010 | 0.0002 | 0.0001 | 0.0007 |

The coefficients of fixed effects estimates are shown along with standard deviations in parentheses below. # denotes the interaction term with ln JPY/USD. ***,**,* denote the statistical significance at the one, five, and ten percent levels, respectively.

Table 5: Short-Run JPY/PC ERPT by Invoicing Currency

| | USD | JPY | EUR | GBP | CNY | THB |
|---|---|---|---|---|---|---|
| ln JPY/PC ($\beta_0$) | -0.978*** | -0.645*** | -0.721*** | -0.35*** | -2.991*** | -3.456*** |
| | (0.026) | (0.027) | (0.026) | (0.094) | (0.236) | (0.553) |
| # TwoWay ($\beta_1$) | -0.001*** | -0.002*** | -0.001* | -0.002 | -0.001 | -0.001 |
| | (0.000) | (0.001) | (0.000) | (0.001) | (0.002) | (0.009) |
| # ln FirmSize ($\beta_2$) | 0.011*** | 0.011*** | 0.005*** | 0.007*** | 0.012*** | 0.030*** |
| | (0.000) | (0.001) | (0.000) | (0.001) | (0.002) | (0.008) |
| # ln Freq ($\beta_3$) | -0.011*** | -0.006*** | -0.007*** | -0.011*** | -0.015*** | -0.040*** |
| | (0.000) | (0.001) | (0.000) | (0.001) | (0.003) | (0.008) |
| # ln ExpSize ($\beta_4$) | 0.051*** | 0.025*** | 0.043*** | 0.033*** | 0.114*** | 0.137*** |
| | (0.001) | (0.001) | (0.001) | (0.003) | (0.007) | (0.019) |
| constant | 6.494*** | 7.874*** | 6.963*** | 6.597*** | 5.679*** | 6.907*** |
| | (0.009) | (0.01) | (0.042) | (0.09) | (0.066) | (0.046) |
| NOB | 18,264,552 | 7,556,141 | 3,783,232 | 376,377 | 631,575 | 201,032 |
| $R^2$ | 0.0277 | 0.0338 | 0.001 | 0.0158 | 0.0009 | 0.0019 |

Note: The coefficients of fixed effects estimates are shown along with standard deviations in parentheses below. # denotes the interaction term with ln JPY/PC. ***,**,* denote the statistical significance at the one, five, and ten percent levels, respectively.

Table 6: Short-Run JPY/IC ERPT by Invoicing Currency

| | USD | JPY | EUR | GBP | CNY | THB |
|---|---|---|---|---|---|---|
| ln JPY/IC ($\beta_0$) | -0.443*** | | 0.067*** | -0.135*** | -2.973*** | -5.023*** |
| | (0.016) | | (0.021) | (0.077) | (0.238) | (0.72) |
| # TwoWay ($\beta_1$) | -0.000** | | -0.001** | -0.002 | -0.001 | -0.002 |
| | (0.000) | | (0.000) | (0.001) | (0.002) | (0.01) |
| # ln FirmSize ($\beta_2$) | 0.01*** | | 0.004*** | 0.007*** | 0.013*** | 0.034*** |
| | (0.000) | | (0.000) | (0.001) | (0.002) | (0.008) |
| # ln Freq ($\beta_3$) | -0.01*** | | -0.006*** | -0.011*** | -0.016*** | -0.05*** |
| | (0.000) | | (0.000) | (0.001) | (0.003) | (0.008) |
| # ln ExpSize ($\beta_4$) | 0.042*** | | 0.031*** | 0.028*** | 0.114*** | 0.188*** |
| | (0.000) | | (0.001) | (0.003) | (0.007) | (0.025) |
| constant | 3.644*** | | 4.490*** | 6.004*** | 5.672*** | 7.000*** |
| | (0.015) | | (0.038) | (0.085) | (0.066) | (0.051) |
| NOB | 18,321,561 | | 3,785,134 | 376,508 | 631,742 | 201,193 |
| overall $R^2$ | 0.0072 | | 0.0017 | 0.0007 | 0.0005 | 0.0002 |

Note: The coefficients of fixed effects estimates are shown along with standard deviations in parentheses below. # denotes the interaction term with ln JPY/IC. ***,**,* denote the statistical significance at the one, five, and ten percent levels, respectively.

# Empirical Results (3)
# Long-run exchange rate pass-through results

# Empirical approach for the long-run ERPT (1)

- For a simple dynamic ERPT model, we extend the short-run model by adding the lagged ER variables.
- A priori, we do not know the true number of lagged variables, so we estimate all patterns up to one year (12 months) lags.

  - For a given invoicing currency, c, and the maximum lag, M = {0, 1,…,12}, we estimated 13 regressions as follows:

$$lnP^{c}_{i,j,k,t} = \alpha + \sum_{m=0}^{M} \beta^{m}\, lnER_{c,k,t-m} + \varepsilon_{c,i,j,k,t}$$

  - The long-run ERPT is defined as: $\sum_{m=0}^{M} \beta^{m}$

# Empirical approach for the long-run ERPT (2)

- How about an alternative model with autoregressive terms?
  - Usually, including an own lag variable leads to a parsimonious model with fewer parameters.

$$lnP^{c}_{i,j,k,t} = \alpha + \rho\, lnP^{c}_{i,j,k,t-1} + \sum_{m=0}^{M} \beta^{m}\, lnER_{c,k,t-m} + \varepsilon_{c,i,j,k,t}$$

- The import price is at the (importing Japanese) firm-product-(exporting) country level, i.e., triplets (i, j, k).
  - A Japanese importer does not necessarily import the same product every month.
  - We lose many observations if P(t-1) is included.

Table A.1: Estimation Results with the concurrent and the lagged exchange rates, JPY/USD, USD invoicing

| Invoicing currency=USD | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Long-run | 1.186 | 1.214 | 1.206 | 1.192 | 1.172 | 1.158 | 1.137 | 1.114 | 1.097 | 1.075 | 1.059 | 1.03 | 1.014 |
| 2months | | 1.214 | 1.44 | 1.384 | 1.368 | 1.342 | 1.385 | 1.355 | 1.347 | 1.327 | 1.347 | 1.296 | 1.374 |
| ln JPY/USD | 1.186 | 0.991 | 0.926 | 0.911 | 0.904 | 0.934 | 0.903 | 0.898 | 0.893 | 0.923 | 0.918 | 1.004 | 0.992 |
| | (0.002) | (0.008) | (0.008) | (0.009) | (0.009) | (0.009) | (0.01) | (0.01) | (0.011) | (0.011) | (0.011) | (0.012) | (0.012) |
| Lag 1 | | 0.223 | 0.514 | 0.473 | 0.464 | 0.408 | 0.482 | 0.457 | 0.454 | 0.404 | 0.429 | 0.292 | 0.382 |
| | | (0.007) | (0.011) | (0.012) | (0.012) | (0.012) | (0.01) | (0.013) | (0.014) | (0.015) | (0.015) | (0.016) | (0.017) |
| Lag 2 | | | -0.234 | 0.042 | -0.005 | -0.014 | -0.075 | -0.019 | -0.05 | -0.033 | -0.075 | 0.054 | -0.055 |
| | | | (0.008) | (0.012) | (0.012) | (0.013) | (0.01) | (0.013) | (0.014) | (0.014) | (0.015) | (0.015) | (0.016) |
| Lag 3 | | | | -0.234 | 0.089 | 0.088 | 0.074 | 0.037 | 0.105 | 0.067 | 0.095 | -0.026 | 0.057 |
| | | | | (0.009) | (0.012) | (0.013) | (0.01) | (0.013) | (0.014) | (0.014) | (0.014) | (0.015) | (0.016) |
| Lag 4 | | | | | -0.28 | -0.002 | -0.024 | -0.045 | -0.078 | -0.01 | -0.046 | 0.013 | -0.077 |
| | | | | | (0.009) | (0.013) | (0.01) | (0.014) | (0.014) | (0.015) | (0.015) | (0.015) | (0.016) |
| Lag 5 | | | | | | -0.256 | 0.003 | -0.009 | -0.036 | -0.075 | -0.026 | -0.095 | -0.04 |
| | | | | | | (0.01) | (0.014) | (0.014) | (0.015) | (0.015) | (0.015) | (0.016) | (0.016) |
| Lag 6 | | | | | | | -0.226 | -0.015 | -0.016 | -0.033 | -0.059 | 0.004 | -0.041 |
| | | | | | | | (0.011) | (0.014) | (0.014) | (0.015) | (0.015) | (0.015) | (0.016) |
| Lag 7 | | | | | | | | -0.19 | -0.006 | -0.03 | -0.039 | -0.072 | -0.049 |
| | | | | | | | | (0.011) | (0.015) | (0.015) | (0.015) | (0.015) | (0.016) |
| Lag 8 | | | | | | | | | -0.169 | 0.05 | 0.02 | 0.056 | 0.038 |
| | | | | | | | | | (0.011) | (0.015) | (0.016) | (0.016) | (0.016) |
| Lag 9 | | | | | | | | | | -0.188 | 0 | -0.105 | -0.068 |
| | | | | | | | | | | (0.012) | (0.016) | (0.016) | (0.017) |
| Lag 10 | | | | | | | | | | | -0.158 | 0.082 | 0.018 |
| | | | | | | | | | | | (0.012) | (0.016) | (0.016) |
| Lag 11 | | | | | | | | | | | | -0.177 | -0.091 |
| | | | | | | | | | | | | (0.012) | (0.016) |
| Lag 12 | | | | | | | | | | | | | -0.052 |
| | | | | | | | | | | | | | (0.012) |
| constant | 2.491 | 2.127 | 2.091 | 2.123 | 2.196 | 2.25 | 2.336 | 2.433 | 2.507 | 2.607 | 2.68 | 2.821 | 2.891 |
| | (0.011) | (0.015) | (0.017) | (0.019) | (0.022) | (0.024) | (0.01) | (0.031) | (0.035) | (0.038) | (0.042) | (0.045) | (0.049) |
| NOB | 18,321,561 | 9,393,593 | 6,970,720 | 5,733,769 | 4,946,218 | 4,388,758 | 3,968,955 | 3,635,663 | 3,362,581 | 3,133,303 | 2,936,957 | 2,768,822 | 2,623,348 |
| overall $R^2$ | 0.0031 | 0.0032 | 0.0032 | 0.0033 | 0.0033 | 0.0032 | 0.0031 | 0.0029 | 0.0028 | 0.0027 | 0.0027 | 0.0026 | 0.0025 |

## Table A.1

- USD invoicing products
- JPY/USD exchange rate

Table 7: Long-run ERPT by JPY/USD exchange rates

| | USD | JPY | EUR | GBP | CNY | THB |
|---|---|---|---|---|---|---|
| Lag 1 | 1.214 | 0.556 | 0.736 | 1.03 | 1.021 | 0.73 |
| Lag 1&2 | 1.206 | 0.566 | 0.726 | 1.032 | 1.025 | 0.705 |
| Lag 1-3 | 1.192 | 0.564 | 0.714 | 1.004 | 0.999 | 0.665 |
| Lag 1-4 | 1.172 | 0.562 | 0.699 | 1.02 | 0.975 | 0.634 |
| Lag 1-5 | 1.158 | 0.563 | 0.717 | 1.055 | 0.963 | 0.628 |
| Lag 1-6 | 1.137 | 0.559 | 0.726 | 1.064 | 0.942 | 0.573 |
| Lag 1-7 | 1.114 | 0.553 | 0.717 | 1.054 | 0.924 | 0.518 |
| Lag 1-8 | 1.097 | 0.559 | 0.715 | 1.028 | 0.892 | 0.461 |
| Lag 1-9 | 1.075 | 0.544 | 0.695 | 0.985 | 0.825 | 0.388 |
| Lag 1-10 | 1.059 | 0.532 | 0.675 | 0.96 | 0.753 | 0.343 |
| Lag 1-11 | 1.03 | 0.514 | 0.614 | 0.897 | 0.685 | 0.306 |
| Lag 1-12 | 1.014 | 0.5 | 0.538 | 0.802 | 0.609 | 0.239 |
| shrinkage | 83.5 | 89.9 | 73.1 | 77.9 | 59.6 | 32.7 |

Note: Long-run ERPT is defined as the sum of the coefficients of the concurrent and lagged exchange rate variables up to twelve months. Shrinkage is 100 times the ratio of the long-run ERPT on the first row to that on the last row.

- With estimation results in Table A.1 through A.6, Table 7 summarizes the long-run JPY/USD ERPT for six currencies.
- The results are shown in Figure 1 in the next slide.

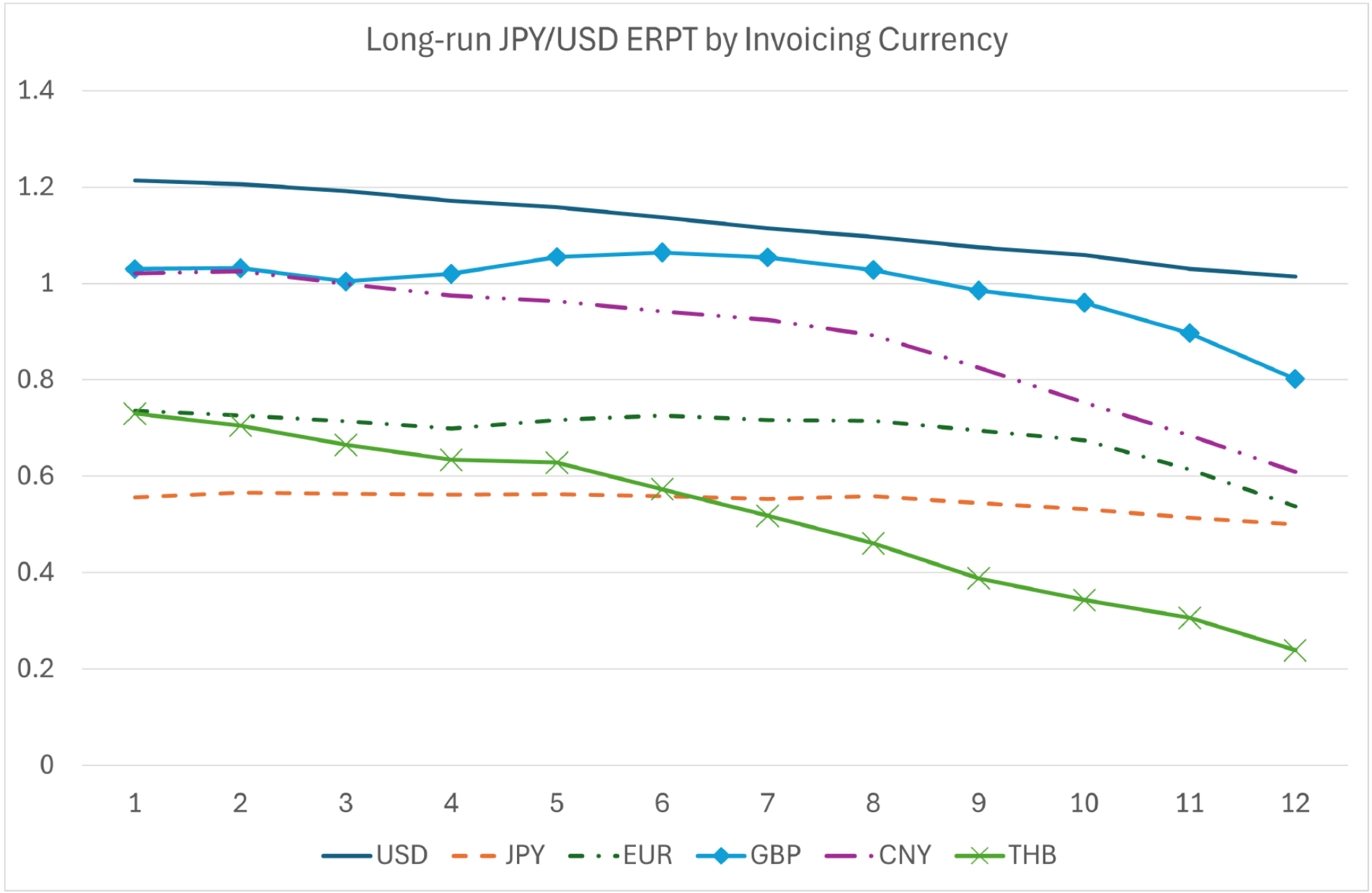



Figure 1: The long-Run Dominant-Currency ERPT by Invoicing Currency

# Figure 1 (JPY/USD)

1. The short-medium ERPT (descending order)
   1. USD
   2. GBP, CNY
   3. EUR, THB
   4. JPY
2. Declining trend
3. THB crossing JPY after 6 lags

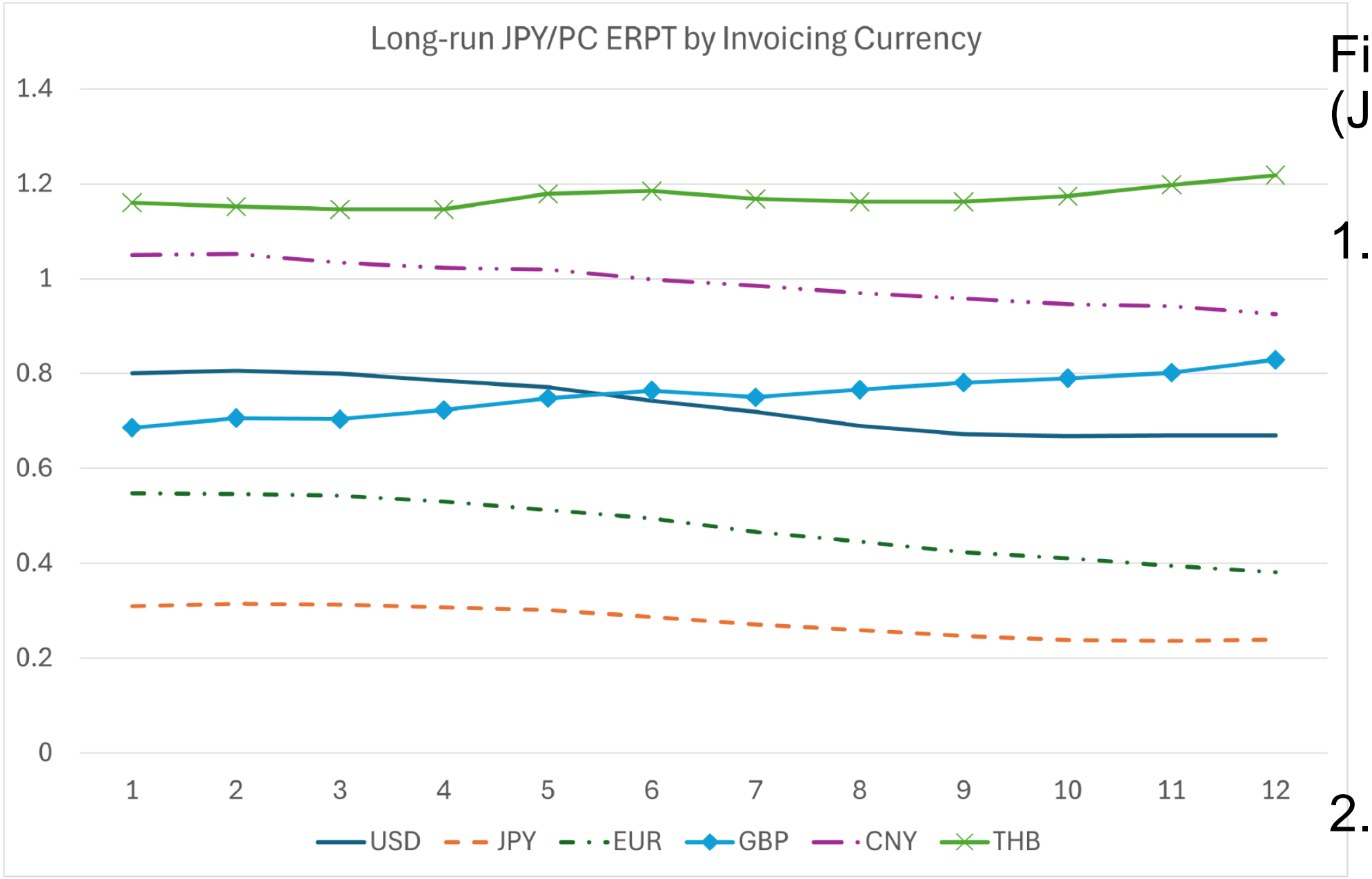



Figure 2: The long-Run Producer-Currency ERPT by Invoicing Currency

Figure 2 (JPY/PC)

1. The short-medium ERPT (descending order)
   1. THB, CNY
   2. USD, GBP
   3. EUR,
   4. JPY
2. (no?) trend

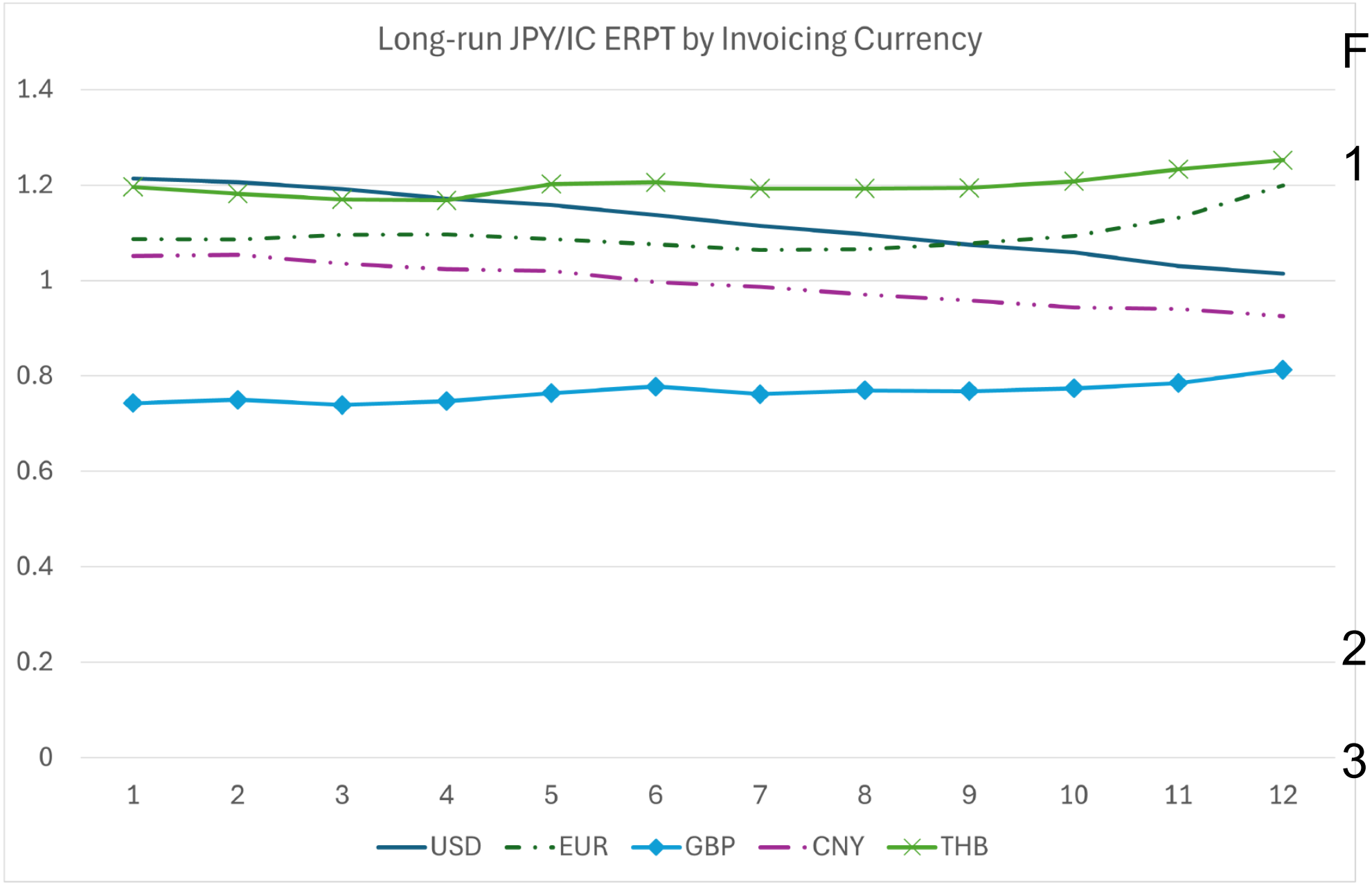



Figure 3: The long-Run Invoicing-Currency ERPT by Invoicing Currency

# Figure 3 (JPY/IC)

1. The short-medium ERPT (descending order)
   1. USD, THB
   2. EUR, CNY
   3. GBP

   (No JPY)
2. (no?) trend
3. ERPT are 100 percent.

   (except for GBP)

# Summary of the results

- Comparing three figures (Fig. 1 through Fig. 3)
  1. ERPT for JPY (local currency pricing) stands out
     low ERPT….50% by JPY/USD and 20-30% by JPY/PC

  2. JPY/IC ("Invoicing currency" exchange rate) analysis (Fig.3) reveals that…

     Four invoicing currencies correspond 100 percent to the JPY/IC exchange rate.

     In Fig. 1 and Fig. 2, there are relatively large discrepancies in ERPT among invoicing currencies.

- What matters is the "Invoicing currency" exchange rate.
  - "Dominant currency" and "Producer currency" capture the "Invoicing currency" effect from different angles.

# Concluding remarks

# Conclusion (1)

- We find that invoicing currency matters for the degree of exchange rate pass-through. More specifically, in this paper, we compared three definitions of exchange rate: dominant-currency exchange rate, producer-currency exchange rate, and invoicing-currency exchange rate.

- For a complementary analysis to this study, Yoshida et al. (2025) investigated the export exchange rate pass-through at the destination country and found that a choice of invoicing currency matters substantially. The ERPT is almost complete, i.e., 100 percent, for exports invoiced in the Japanese yen; however, the ERPT is only 30-40 percent for exports invoiced in local currency. This is consistent with the theoretical results in the literature of invoicing currency choice that exporters choose PCP if the desired ERPT is large and LCP, if the desired ERPT is small as in Amiti et al. (2022).

- In this paper, on the import side, we also find similar results. ERPT is the lowest when the invoicing currency is the destination currency, i.e., in this case, the Japanese yen.

# Conclusion (2)

- The findings in this study on the prices of internationally traded products revealed the weak power of the importer's characteristics for the import ERPT. The importer's characteristics, such as the size and frequency of transactions, appear statistically significant. However, the fitness of regression only marginally improved. On the other hand, Yoshida et al. (2025) found that the exporter's characteristics showed substantial explanatory power for the export ERPT.

- These two studies use the same source but in different directions of trade flows. Combining the results of these studies, we may claim that theoretical models, which exclusively focus on exporters' decisions, may reasonably approximate the bargaining between an exporter and an importer.

Thank you, and we welcome your comments.