From Dominant to Producer Currency Pricing: Dynamics of Chilean Exports

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Motivation

- International trade transactions in emerging markets are set in USD, this is less so in advanced economies (Boz et al., 2022) USD EMDE AE
- Three pricing paradigms:
  1. Producer currency pricing (Mundell-Fleming). Depreciation makes domestic goods cheaper and foreign ones more expensive; it increases demand for exports and decreases imports. ERPT to import prices is 1.
  2. Local currency pricing. Importers and exporters prices set prices in domestic and destination currencies. Prices do not adjust with exchange rates (zero ERPT), so no impact on imports and exports.
  3. Dominant currency pricing. Prices of exports and imports are set in a dominant currency. Depreciation increases imports' prices, causing them to fall. Depreciation leaves constant prices in dollar of exports: No demand effects.
- Understanding what pricing paradigm better describe the adjustment process of emerging markets is relevant for the design of optimal monetary policy

What do we do?

- We answer three questions
  - What are the implications of the currency of invoicing for ERPT into export prices? Evidence from emerging markets is limited.
  - Does it have allocative implication?
  - To what extent the currency of invoice affects PCP dynamics?

Outline

Outline

Literature

- Event studies: Corsetti, et al. (JIE, 2022). Auer et al., (AER, 2021)
- Panel data: Chung, et al. (JEEA, 2021), Amiti, et al. (QJE, 2022), Boz, et al. (AER, 2020), Goldberg and Tille, (JIE, 2016 and 2008).
- Optimal currency choice: Devereux and Shi (IER, 2013), Burstein and Gopinath (Handbook IE, 2014), Gopinath and Itskhoki (Handbook IE, forthcoming)

Outline

Optimal Price Setting, invoicing in USD and local currency

- Absence of strategic complementarities, and firms facing an isoelastic demand function, the desired flexible price is:

$$\tilde{p}_{f,j,CLP,t}\left(\Omega_t\right) = \mu + mc_{ft},$$

where μ is a markup and mc_f denotes marginal costs.

- If exports are invoiced in USD, the local price at detination j becomes:

$$p_{f,j,t} = \tilde{p}_{f,CLP,t} + e_{CLP,USD,t} + e_{USD,j,t}$$

$e_{CLP,USD,t}$ transforms the price of exports in CLP to USD, the currency of invoicing in which prices are sticky. $e_{USD,j,t}$ is the importer's currency measured in USD to transform the price in USD to local currency.

- If exports are invoiced in destination currency units

$$p_{f,j,t} = \tilde{p}_{f,CLP,t} + e_{CLP,j,t}$$

ERPT under short-run DCP and LCP, long-run PCP

- Over a time span k, $\theta(k)$ firms keeps prices fixed in the invoice currency. $1-\theta(k)$ firms reset their prices to their optimal PCP price.
- Short-run DCP long-run PCP: Prices in the destination currency evolve according to:

$$p_{f,j,t+k} - p_{f,j,t} = \theta(k)(e_{USD,j,t+k} - e_{USD,j,t}) + (1-\theta(k))(e_{CLP,j,t+k} - e_{CLP,j,t})$$

  $\theta(0) = 1$, $\lim_{k\to\infty} \theta(k) = 0$, and $\theta'(k) < 0$: Short run ERPT of the USD is 1. As time passes by, ERPT of the USD is 0, and ERPT of bilateral exchange rate is 1
- Short-run LCP long-run PCP: Prices in the destination currency evolve according to:

$$p_{f,j,t+k} - p_{f,j,t} = (1-\theta(k))(e_{CLP,j,t+k} - e_{CLP,j,t})$$

  ERPT of the USD is 0 at all horizons, and ERPT of bilateral exchange rate is increasing in k

Outline

Data

- We employ Chilean Customs data between 2010-2019
- Variables: FOB value, CIF value, quantity, product code (HS8), exporting firm, destination country, currency of invoicing
- We collapse data to the firm-product-destination-currency-time level (tuple)
- We merge firms to their (1) full-time employees using Unemployment Insurance administrator (AFC), and (2) sector using Electronic Invoices data
- Cleaning:
  - Quantity > 0, FOB > 0 , No. employees ≥ 5
  - Drop firms without economic sector

Outline

Transactions invoiced in USD: Testing for pricing strategies

Standard ERPT Model

- We estimate the following equations:

$$\Delta p_{fgjct} = \lambda_{fgjc} + \sum_{k=0}^{8} \beta_k^{USD} \Delta e_{USD,j,t-k} + \sum_{k=0}^{8} \beta_k^{BER} \Delta e_{CLP,j,t-k} + \theta' X_{jt} + \varepsilon_{fgjct}$$

$$\Delta q_{fgjct} = \lambda_{fgjc} + \sum_{k=0}^{8} \beta_k^{USD} \Delta e_{USD,j,t-k} + \sum_{k=0}^{8} \beta_k^{BER} \Delta e_{CLP,j,t-k} + \theta' X_{jt} + \varepsilon_{fgjct}$$

where,

  - $\Delta p_{fgjct} = \Delta \log (\text{FOB}_{fgjct} \mathcal{E}_{USD,j,t} / Q_{fgjct})$ is the price of product g from Chilean exporter f to destination j invoiced in currency c
  - $e_{i,j} = \log \mathcal{E}_{i,j}$: exchange rate of j currency units for one i ($\uparrow$ depreciation of j)
  - X_{jt} control for demand/supply (Chile PPI and GDP variations at j)

ERPT predictions: Different stickiness and pricing

	Short-run	Long-run
Panel A: Prices sticky in local currency		
PCP	$\beta_0^{P,BER}=0,\ \beta_0^{P,USD}=0$	$\sum_{k=0}^{8}\beta_k^{P,BER}=1,\ \sum_{k=0}^{8}\beta_k^{P,USD}=0$
LCP	$\beta_0^{P,BER}=0,\ \beta_0^{P,USD}=0$	$\sum_{k=0}^{8}\beta_k^{P,BER}=0,\ \sum_{k=0}^{8}\beta_k^{P,USD}=0$
DCP	$\beta_0^{P,BER}=0,\ \beta_0^{P,USD}=0$	$\sum_{k=0}^{8}\beta_k^{P,BER}=0,\ \sum_{k=0}^{8}\beta_k^{P,USD}=1$
Panel B: Prices sticky in dominant currency		
	Short-run	Long-run
PCP	$\beta_0^{P,BER}=0,\ \beta_0^{P,USD}=1$	$\sum_{k=0}^{8}\beta_k^{P,BER}=1,\ \sum_{k=0}^{8}\beta_k^{P,USD}=0$
LCP	$\beta_0^{P,BER}=0,\ \beta_0^{P,USD}=1$	$\sum_{k=0}^{8}\beta_k^{P,BER}=0,\ \sum_{k=0}^{8}\beta_k^{P,USD}=0$
DCP	$\beta_0^{P,BER}=0,\ \beta_0^{P,USD}=1$	$\sum_{k=0}^{8}\beta_k^{P,BER}=0,\ \sum_{k=0}^{8}\beta_k^{P,USD}=1$

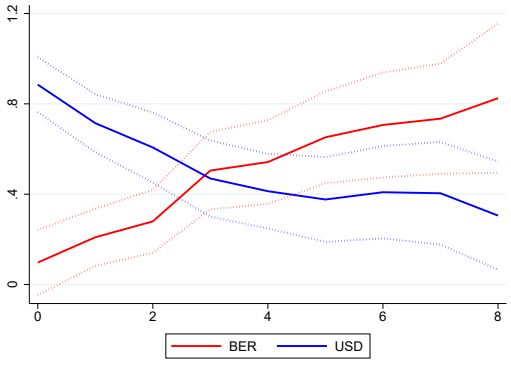
Empirical results

- We restrict observations that have been observed for at least 8 quarters continuously. Results are robust to lifting this criterion.
- To present the results we show the cumulative sum of the parameters: $\sum_{k=0}^{K} \beta_k$ for $K = 0, 1, ..., 8$
- We present results with 95-percent confidence intervals
- We run this for non-USD destination and USD invoices

Bilateral and USD ERPT and quantities

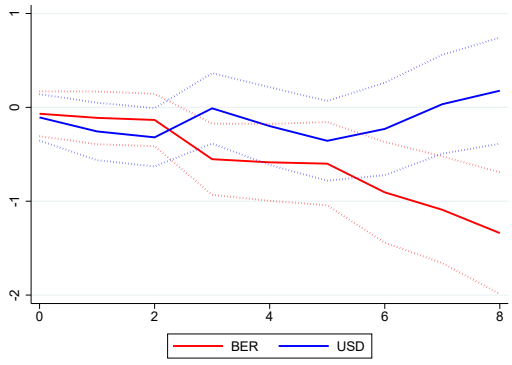
Table Results

(a) Price



Notes: We report $\sum_{k=0}^{S} \beta_k^{BER}$ and $\sum_{k=0}^{S} \beta_k^{USD}$ coming from estimation this equation, $\Delta p_{fgjct} = \lambda_{fgjc} + \sum_{k=0}^{8} \beta_k^{USD} \Delta e_{USD,j,t-k} + \sum_{k=0}^{8} \beta_k^{BER} \Delta e_{CLP,j,t-k} + \theta' X_{jt} + \varepsilon_{fgjct}$

(b) Quantity



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Results

- For prices: In the short-run, DCP is strongly supported and PCP rejected
- At longer horizons, DCP is less relevant than PCP
  - The bilateral exchange rate contributes to the external adjustment process
- LCP is not supported at any time horizon
- For quantities: Over shorter periods of time, the USD has allocative implications; Over longer ones, the BER appears to be more important

Outline

DCP vs LCP

- Alternatively, we focus on tuples that invoice in USD or local currency
- We estimate the following regression:

$$\Delta p_{fgjct} = \sum_{k=0}^{8} \left(\beta_k^{USD} + \gamma_k^{USD} D_{fgjct}^{LC}\right) \Delta e_{USD,j,t-k} + \sum_{k=0}^{8} \left(\beta_k^{BER} + \gamma_k^{BER} D_{fgjct}^{LC}\right) \Delta e_{CLP,j,t-k}$$
$$+ \sum_{k=0}^{8} \alpha_k D_{fgjct}^{LC} + \theta' X_{jt} + \lambda_{fgjc} + \varepsilon_{fgjct} \quad (1)$$

where D_{fgjct}^{LC} is 1 if invoiced in local currency and 0 if in USD

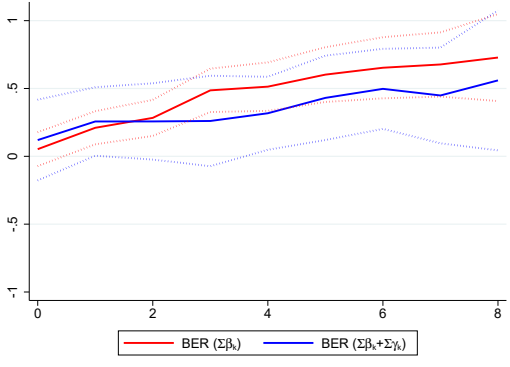
- We report $\sum_{k=0}^{K} \beta_k$ and $\sum_{k=0}^{K} \gamma_k$ for $K = 0, 1, ..., 8$, and both currency pass-through

How to interpret these coefficients

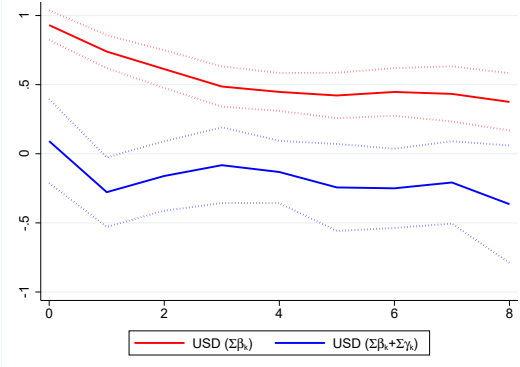
- β_k^{USD} and β_k^{BER} have the usual interpretation
- γ_k^{USD} informs whether the USD pass-through changes when exports are invoiced in local currency:
  - $\gamma_k^{USD} < 0$: import prices at destination rise by less if invoiced in local currency when the destination currency depreciates against the USD
- γ_k^{BER} informs whether the BER pass-through changes when exports are invoiced in local currency:
  - $\gamma_k^{BER} > 0$: import prices at destination rise by more if invoiced in local currency when the destination currency depreciates against the CLP

Local currency vs USD invoicing

(a) Price, BER



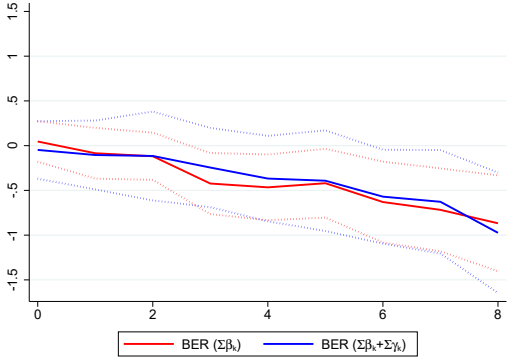
(b) Price, USD



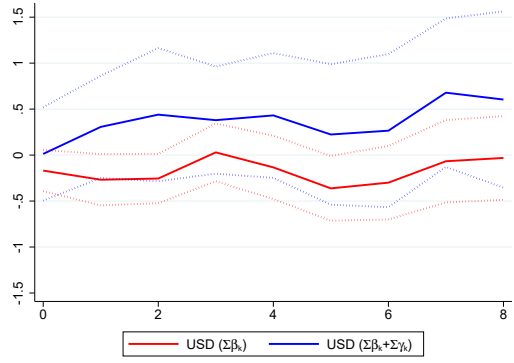
Notes: We report $\sum_{k=0}^{S} \beta_k^{BER}$, $\sum_{k=0}^{S} \left(\beta_k^{BER} + \gamma_k^{BER}\right)$, $\sum_{k=0}^{S} \beta_k^{USD}$ and $\sum_{k=0}^{S} \left(\beta_k^{USD} + \gamma_k^{USD}\right)$ coming from estimation this equation, $\Delta p_{fgjct} = \sum_{k=0}^{8} \left(\beta_k^{USD} + \gamma_k^{USD} D_{fgjct}^{LC}\right) \Delta e_{USD,j,t-k} + \sum_{k=0}^{8} \left(\beta_k^{BER} + \gamma_k^{BER} D_{fgjct}^{LC}\right) \Delta e_{CLP,j,t-k} + \sum_{k=0}^{8} \alpha_k D_{fgjct}^{LC} + \theta' X_{jt} + \lambda_{fg} + \varepsilon_{fgjct}$

Local currency vs dominant currency invoicing

(a) Quantity, BER



(b) Quantity, USD



Notes: We report $\sum_{k=0}^{S} \beta_k^{BER}$, $\sum_{k=0}^{S} \left(\beta_k^{BER} + \gamma_k^{BER}\right)$, $\sum_{k=0}^{S} \beta_k^{USD}$ and $\sum_{k=0}^{S} \left(\beta_k^{USD} + \gamma_k^{USD}\right)$ coming from estimation this equation, $\Delta q_{fgjct} = \sum_{k=0}^{8} \left(\beta_k^{USD} + \gamma_k^{USD} D_{fgjct}^{LC}\right) \Delta e_{USD,j,t-k} + \sum_{k=0}^{8} \left(\beta_k^{BER} + \gamma_k^{BER} D_{fgjct}^{LC}\right) \Delta e_{CLP,j,t-k} + \sum_{k=0}^{8} \alpha_k D_{fgjct}^{LC} + \theta' X_{jt} + \lambda_{fg} + \varepsilon_{fgjct}$

Takeaways

- Prices:
  - The dynamics of the bilateral exchange rate are independent of the invoice currency
  - The USD only affects transactions invoiced in USD. In the short run prices are fixed in the invoicing currency.
  - In the medium term prices move consistently with PCP.

- Quantities:
  - They react over time to the bilateral exchange rate
  - The USD does not have any effect on transactions invoiced in the destination currency

Additional material and robustness

- Supply and demand effects Supply and Demand
- Optimal currency choice: Descriptive statistics Opt curr choice
- Dollar as LCP Model & Results
- We provide several robustness checks for this analysis:
  1. Using Manufacturing PPI instead of General PPI
  2. Annual frequency
  3. Only Manufacturing firms
  4. Changing minimum spells Statistics Results
  5. Results hold at the sectoral level Statistics Results
  6. Controlling by Imports Results
  7. Controlling by product type Results

Outline

Closing remarks

- Time series correlation of export prices in the destination currency with its bilateral exchange rate and the USD are informative of DCP, LCP or PCP
- Shorter horizons:
  - Strong evidence of price stickiness in the currency of invoicing
- Longer horizons:
  - Exporters reset their prices according to PCP models
  - Quantities respond to bilateral exchange rate movements
- Bilateral ERPT does not depend on the currency of invoicing
- USD ERPT into prices and quantities depend on the currency of invoicing
  - Exports invoiced in local currency: ERPT into prices is zero at all horizons.
  - Exports invoiced in USD, ERPT is complete in the short-run and incomplete in the long-run

Descriptive Statistics

Return

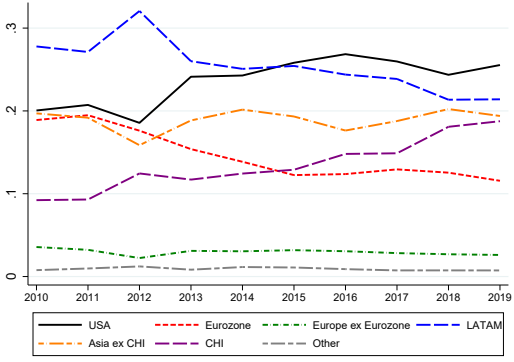
Export Value and Transaction per Destination

Destination	Exports (%)	Transactions (%)
USA	23.63	35.43
China	13.45	6.25
Japan	10.80	5.68
Brazil	8.73	7.20
Peru	5.53	11.85
Netherlands	5.31	3.60
Mexico	4.97	4.26
South Korea	4.17	2.37
Colombia	3.33	5.17
United Kingdom	2.52	3.97
Italy	2.19	0.84
Russia	2.18	1.96
Spain	2.14	1.87
Belgium	1.87	0.57
Germany	1.81	1.24
Canada	1.80	2.99
France	1.37	0.84
Costa Rica	1.10	1.47
Australia	0.92	0.98
India	0.76	0.36
Thailand	0.72	0.43
Sweden	0.33	0.42
Turkey	0.29	0.14
Switzerland	0.11	0.12

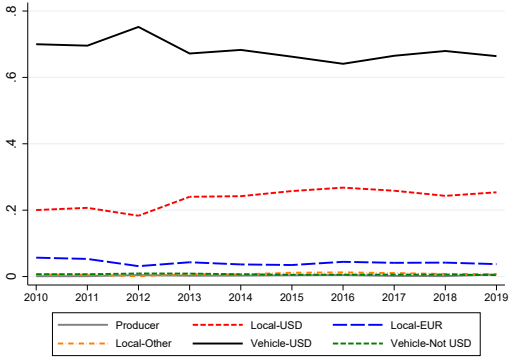
Notes: Sample of considerate destinations are the top 30 trading partners excluding those without macro data, ending with 24 countries. This represents on average 81% and 73% of the value and transactions respectively of the universe of non-mining exports.

Descriptive Statistics: Exports Share (1/2)

(a) By destination



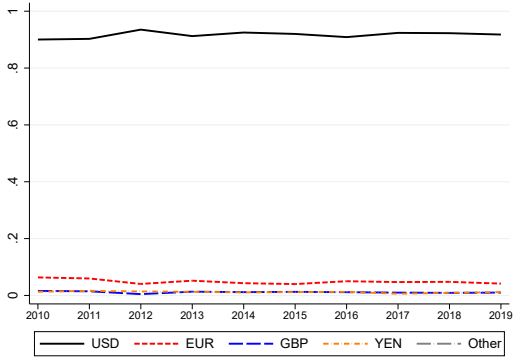
(b) By currency type



Descriptive Statistics: Exports Share (2/2)

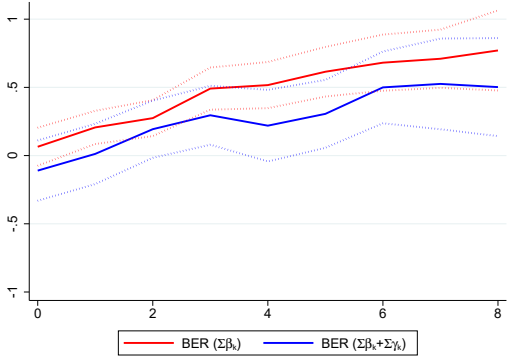
Return

(c) By currency

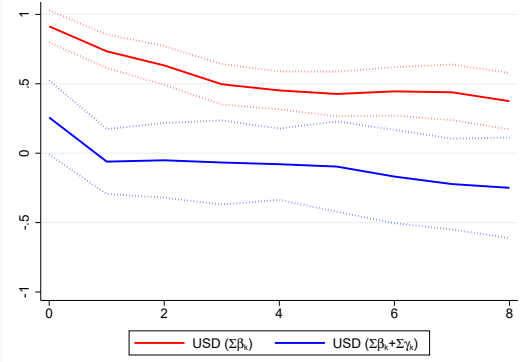


Non-US sample: Local currency vs USD invoicing

(a) Price, BER



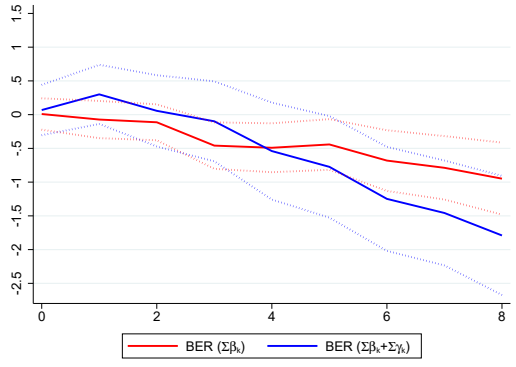
(b) Price, USD



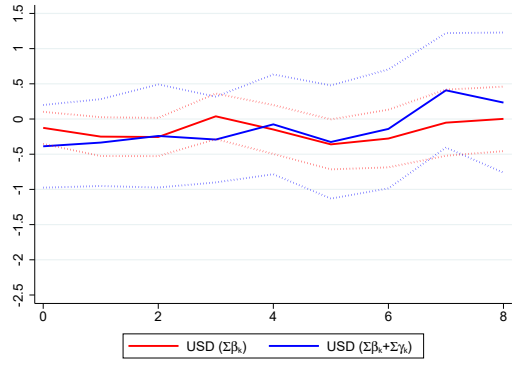
Notes: We report $\sum_{k=0}^{S} \beta_k^{BER}$, $\sum_{k=0}^{S} \left(\beta_k^{BER} + \gamma_k^{BER}\right)$, $\sum_{k=0}^{S} \beta_k^{USD}$ and $\sum_{k=0}^{S} \left(\beta_k^{USD} + \gamma_k^{USD}\right)$ coming from estimation this equation, $\Delta p_{fgjct} = \sum_{k=0}^{8} \left(\beta_k^{USD} + \gamma_k^{USD} D_{fgjct}^{LC}\right) \Delta e_{USD,j,t-k} + \sum_{k=0}^{8} \left(\beta_k^{BER} + \gamma_k^{BER} D_{fgjct}^{LC}\right) \Delta e_{CLP,j,t-k} + \sum_{k=0}^{8} \alpha_k D_{fgjct}^{LC} + \theta' X_{jt} + \lambda_{fg} + \varepsilon_{fgjct}$

Non-US sample: Local currency vs USD invoicing

(a) Quantity, BER



(b) Quantity, USD



Notes: We report $\sum_{k=0}^{S}\beta_k^{BER}$, $\sum_{k=0}^{S}\left(\beta_k^{BER}+\gamma_k^{BER}\right)$, $\sum_{k=0}^{S}\beta_k^{USD}$ and $\sum_{k=0}^{S}\left(\beta_k^{USD}+\gamma_k^{USD}\right)$ coming from estimation this equation, $\Delta q_{fgjct} = \sum_{k=0}^{8}\left(\beta_k^{USD}+\gamma_k^{USD}D_{fgjct}^{LC}\right)\Delta e_{USD,j,t-k} + \sum_{k=0}^{8}\left(\beta_k^{BER}+\gamma_k^{BER}D_{fgjct}^{LC}\right)\Delta e_{CLP,j,t-k} + \sum_{k=0}^{8}\alpha_k D_{fgjct}^{LC} + \theta' X_{jt} + \lambda_{fg} + \varepsilon_{fgjct}$

Dominant and local currency invoicing

Dependent Variables:	DCP vs LCP		Non-USD: DCP vs LCP		USD as DCP and LCP	
	price	quantity	price	quantity	price	quantity
	(1)	(2)	(3)	(4)	(5)	(6)
β_0^{BER}	0.0528	0.0465	0.0647	0.0094	0.0668	0.015
	(0.0637)	(0.1152)	(0.0711)	(0.1186)	(0.0657)	(0.1158)
$\sum_{k=0}^{4} \beta_k^{BER}$	0.5137***	-0.4659***	0.5168***	-0.4907***	0.5261***	-0.4861***
	(0.0911)	(0.1874)	(0.0863)	(0.1849)	(0.0932)	(0.1898)
$\sum_{k=0}^{8} \beta_k^{BER}$	0.7281***	-0.8674***	0.7707***	-0.9486***	0.7618***	-0.9684***
	(0.1636)	(0.2731)	(0.1497)	(0.2723)	(0.1654)	(0.2757)
γ_0^{BER}	0.0671	-0.0941	-0.1748	0.0589	0.2255	-0.1659
	(0.1289)	(0.1747)	(0.1105)	(0.2119)	(0.1921)	(0.2399)
$\sum_{k=0}^{4} \gamma_k^{BER}$	-0.1961	0.0981	-0.2974**	-0.0489	-0.1608	0.1973
	(0.1231)	(0.2518)	(0.1378)	(0.3917)	(0.1664)	(0.2936)
$\sum_{k=0}^{8} \gamma_k^{BER}$	-0.1683	-0.1063	-0.2685	-0.8416*	-0.1107	0.264
	(0.1983)	(0.3136)	(0.1863)	(0.4567)	(0.29)	(0.394)
β_0^{USD}	0.9305***	-0.1685	0.9136***	-0.1255	0.9249***	-0.1604
	(0.0543)	(0.1143)	(0.0586)	(0.1162)	(0.057)	(0.1171)
$\sum_{k=0}^{4} \beta_k^{USD}$	0.4475***	-0.1337	0.4522***	-0.1489	0.4568***	-0.1914
	(0.07)	(0.1757)	(0.0697)	(0.1769)	(0.0723)	(0.179)
$\sum_{k=0}^{8} \beta_k^{USD}$	0.3753***	-0.031	0.3748***	0.0021	0.3638***	-0.0318
	(0.1056)	(0.2325)	(0.1035)	(0.2338)	(0.1101)	(0.2346)
γ_0^{USD}	-0.8393***	0.1812	-0.6565***	-0.2622		
	(0.148)	(0.2722)	(0.1366)	(0.3129)		
$\sum_{k=0}^{4} \gamma_k^{USD}$	-0.5793***	0.5652	-0.5315***	0.0731		
	(0.1149)	(0.3442)	(0.1323)	(0.3582)		
$\sum_{k=0}^{8} \gamma_k^{USD}$	-0.7399***	0.635	-0.6245***	0.2312		
	(0.2)	(0.4516)	(0.1788)	(0.4757)		
Fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Observations	101,564	101,564	84,587	84,587	88,656	88,656
R^2	0.0838	0.0609	0.0887	0.0627	0.0881	0.0657

Notes: Clustered (firm) standard-errors in parentheses. Signif. Codes: ***: 0.01, **: 0.05, *: 0.1.

Export Value and Transaction per Sector

Return

Sector	Macrosector	Exports (%)	Transactions (%)
Pulp, paper and printing prod. prod.	Manufacturing industry	24.14	4.53
Chemical industries	Manufacturing industry	18.03	7.15
Fishing industry	Manufacturing industry	15.57	16.73
Wood and furniture manufacture	Manufacturing industry	12.21	15.31
Rest of the food industry	Manufacturing industry	9.07	9.41
Wine elaboration	Manufacturing industry	5.72	18.85
Basic metal industry	Manufacturing industry	4.28	0.91
Metal prod., machinery and equip. manuf.	Manufacturing industry	3.88	9.20
Rubber and plastic production	Manufacturing industry	3.42	12.47
Other beverages and tobacco prod. elab.	Manufacturing industry	1.50	1.51
Fruit growing	Agricultural and Fishing	0.57	0.92
Textile industry	Manufacturing industry	0.49	1.55
Fishing	Agricultural and Fishing	0.42	0.15
Fuels elaboration	Manufacturing industry	0.20	0.07
Agriculture	Agricultural and Fishing	0.18	0.30
Non-metallic minerals manufacture	Manufacturing industry	0.15	0.57
Elect. gas and water supply	Elect. gas and water supply	0.12	0.17
Silviculture	Agricultural and Fishing	0.06	0.07
Ranching	Agricultural and Fishing	0.05	0.03
Other manufacturing industries	Manufacturing industry	0.01	0.12
Information services	Transport, info. and comm.	0.00	0.01

Notes: Sectors according to economy activity code-42 from Harmonized System Codes (HSC). Relevant sectors are those with Exports value (%) > 0.01, sectors with Exports value (%) < 0.01 are added in other industries category. Sectors in descending order by Exports value.

Bilateral and USD ERPT by sector

Model:	Price					
Variable:	β_0^{BER}	$\sum_{k=0}^{4}\beta_k^{BER}$	$\sum_{k=0}^{8}\beta_k^{BER}$	β_0^{USD}	$\sum_{k=0}^{4}\beta_k^{USD}$	$\sum_{k=0}^{8}\beta_k^{USD}$
Pulp, paper and printing prod.	0.322	0.7061***	0.6148*	0.803***	0.4156	0.5528*
	(0.3201)	(0.3008)	(0.3582)	(0.1572)	(0.3447)	(0.2842)
Chemical industries	0.0148	0.5947**	1.0795***	0.7731***	0.4718***	0.1561
	(0.1125)	(0.2664)	(0.4252)	(0.1361)	(0.1852)	(0.2003)
Fishing industry	0.5699***	0.6255***	0.6543***	0.2236***	0.3154***	0.3793**
	(0.0757)	(0.1254)	(0.1787)	(0.0931)	(0.1264)	(0.1823)
Wood and furniture manufacture	-0.0398	0.3426***	0.2789	0.8646***	0.1149	0.0865
	(0.1398)	(0.0986)	(0.1987)	(0.1123)	(0.1852)	(0.245)
Rest of the food industry	0.0593	0.3971*	0.7431*	0.8809***	0.4693***	0.3264**
	(0.0988)	(0.2372)	(0.392)	(0.0667)	(0.1057)	(0.1536)
Wine elaboration	-0.0292	0.2715***	0.4449***	0.8655***	0.3852***	0.3021*
	(0.0639)	(0.1106)	(0.1814)	(0.0732)	(0.1258)	(0.1785)
Basic metal industry	0.122	0.2237	0.1209	0.3886*	0.2143	0.3178
	(0.2322)	(0.3318)	(0.4903)	(0.2103)	(0.3592)	(0.3644)
Metal prod., machinery and equip.	0.2334	0.9968***	1.7343***	0.8903***	0.2993	-0.1339
	(0.2971)	(0.3611)	(0.5604)	(0.2565)	(0.3523)	(0.4765)
Rubber and plastic production	-0.2222	0.0284	0.4441	1.3327***	0.8392***	0.6196**
	(0.2528)	(0.2784)	(0.4722)	(0.1781)	(0.2895)	(0.2842)
Other industries	0.1566	0.469	0.3624	0.908***	0.2299	0.3696
	(0.2781)	(0.3138)	(0.6195)	(0.2235)	(0.3608)	(0.4402)
Other beverages and tobacco prod.	0.3198**	0.4509***	-0.2476	1.2407***	0.5044	1.3477
	(0.1541)	(0.1902)	(0.4466)	(0.2917)	(0.4819)	(0.8275)
Median	0.1220	0.4509	0.4449	0.8655	0.3852	0.3264
Mean	0.1370	0.4642	0.5663	0.8337	0.3872	0.3931
Transaction-weighted median	0.0148	0.3971	0.4449	0.8655	0.3852	0.3021
Transaction-weighted mean	0.1108	0.4427	0.6375	0.8135	0.3905	0.3033
Value-weighted median	0.1220	0.5947	0.6148	0.8030	0.4156	0.3264
Value-weighted mean	0.1829	0.5346	0.6636	0.7381	0.3752	0.3359

Notes: Clustered (firm) standard-errors in parentheses. Signif. Codes: ***: 0.01, **: 0.05, *: 0.1.

Bilateral and USD quantites by sector

Return

Model:	Quantity					
Variable:	β_0^{BER}	$\sum_{k=0}^{4}\beta_k^{BER}$	$\sum_{k=0}^{8}\beta_k^{BER}$	β_0^{USD}	$\sum_{k=0}^{4}\beta_k^{USD}$	$\sum_{k=0}^{8}\beta_k^{USD}$
Pulp, paper and printing prod.	-0.5557	0.0362	0.1266	0.2933	-0.2365	-0.0625
	(0.5485)	(0.3918)	(0.6943)	(0.4409)	(0.4285)	(0.6218)
Chemical industries	0.0536	-0.4985	-1.2272**	-0.0658	-0.1061	0.3003
	(0.2653)	(0.4236)	(0.6012)	(0.2896)	(0.2824)	(0.3682)
Fishing industry	-0.1911	-0.5043	-0.8385	0.2328	0.2731	0.7885
	(0.3112)	(0.3897)	(0.5473)	(0.3162)	(0.4131)	(0.5788)
Wood and furniture manufacture	0.0791	-0.4425	-1.0389	0.1301	-0.7209**	-0.0863
	(0.2917)	(0.4224)	(0.6583)	(0.2795)	(0.3317)	(0.4697)
Rest of the food industry	-0.105	-0.4418	-1.4904***	-0.3495*	-0.4451	-0.0988
	(0.1576)	(0.3031)	(0.4513)	(0.1866)	(0.3018)	(0.3525)
Wine elaboration	-0.0289	-0.758***	-1.7171***	-0.0965	0.3682	0.8939**
	(0.1386)	(0.2706)	(0.4325)	(0.1744)	(0.2954)	(0.4224)
Basic metal industry	-0.7803	-0.5362	-1.0413	0.3412	-0.8941	-1.3899
	(0.4851)	(0.7198)	(1.1069)	(0.6107)	(0.6596)	(1.05)
Metal prod., machinery and equip.	-0.0227	-0.9855	-1.6291**	-0.0589	0.4507	0.743
	(0.3823)	(0.6001)	(0.8301)	(0.3536)	(0.5182)	(0.6043)
Rubber and plastic production	0.4532	-0.2888	-0.8612	-0.7134**	-0.55	-0.4682
	(0.3857)	(0.5064)	(0.8445)	(0.3405)	(0.4214)	(0.6137)
Other industries	0.3271	-0.5852	-0.5019	-0.7045*	0.4006	0.6238
	(0.3723)	(0.5444)	(0.8506)	(0.3923)	(0.6318)	(0.7839)
Other beverages and tobacco prod.	-0.712	0.4628	2.1904*	0.6513	1.4036	1.3176
	(0.6155)	(0.9893)	(1.3102)	(1.0022)	(1.3426)	(1.3166)
Median	-0.0289	-0.4985	-1.0389	-0.0589	-0.1061	0.3003
Mean	-0.1348	-0.4129	-0.7299	-0.0309	-0.0051	0.2329
Transaction-weighted median	-0.0289	-0.4985	-1.0389	-0.0658	0.2731	0.6238
Transaction-weighted mean	-0.0071	-0.5181	-1.0987	-0.0928	-0.0538	0.3383
Value-weighted median	-0.1050	-0.4425	-1.0389	0.1301	-0.2365	-0.0625
Value-weighted mean	-0.1781	-0.3739	-0.7968	0.0563	-0.1509	0.1801

Notes: Clustered (firm) standard-errors in parentheses. Signif. Codes: ***: 0.01, **: 0.05, *: 0.1.

Different Minimum Spells Statistics

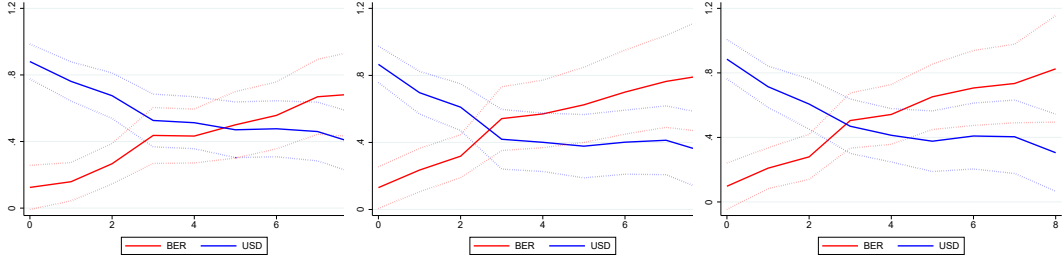
Return

Panel A: 0y continuity						
	All		USD		Non USD	
	Mean	Median	Mean	Median	Mean	Median
# employees	308.5	75.1	291.0	69.7	489.5	181.8
# destinations	2.5	1.1	2.4	1.0	3.2	2.9
# products	3.5	2.0	3.4	2.0	4.5	3.5
# total exports[2]	6.22	0.34	6.14	0.29	7.16	1.26
# firms	1,937		1,768		169	
Panel B: 1y continuity						
	All		USD		Non USD	
	Mean	Median	Mean	Median	Mean	Median
# employees	411.7	115.1	396.2	108.0	582.6	286.8
# destinations	2.1	1.0	2.1	1.0	2.6	2.3
# products	2.9	1.9	2.8	1.7	3.9	3.4
# total exports[3]	10.58	0.76	10.62	0.67	10.51	2.03
# firms	972		886		86	
Panel C: 2y continuity						
	All		USD		Non USD	
	Mean	Median	Mean	Median	Mean	Median
# employees	482.3	144.3	464.1	134.2	705.5	392.1
# destinations	2.0	1.0	2.0	1	2.4	2.1
# products	2.7	1.6	2.6	1	3.3	2.9
# total exports[3]	13,19	1,06	13,38	0.95	11,69	2,66
# firms	680		622		58	

[2]Exports expressed in USD million

Bilateral an USD ERPT

(a) 0y Continuity (b) 1y Continuity (c) 2y Continuity

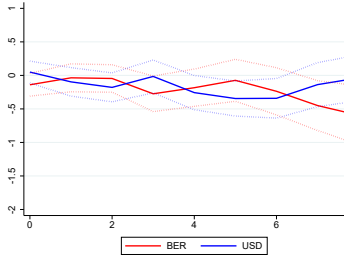


Notes: We report $\sum_{k=0}^{S} \beta_k^{BER}$ and $\sum_{k=0}^{S} \beta_k^{USD}$ coming from estimation this equation, $\Delta p_{fgjct} = \lambda_{fgjc} + \sum_{k=0}^{8} \beta_k^{USD} \Delta e_{USD,j,t-k} + \sum_{k=0}^{8} \beta_k^{BER} \Delta e_{CLP,j,t-k} + \theta' X_{jt} + \varepsilon_{fgjct}$

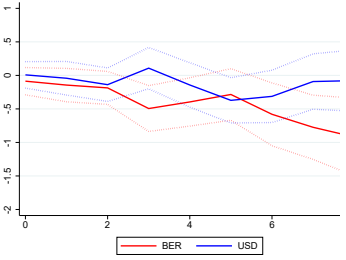
Bilateral an USD quantities

Return

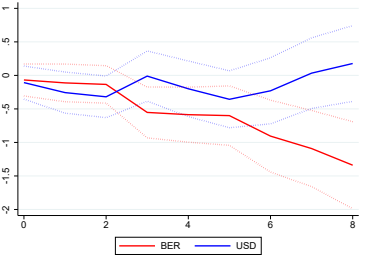
(a) 0y Continuity



(b) 1y Continuity



(c) 2y Continuity



Notes: We report $\sum_{k=0}^{S} \beta_k^{BER}$ and $\sum_{k=0}^{S} \beta_k^{USD}$ coming from estimation this equation, $\Delta q_{fgjct} = \lambda_{fgjc} + \sum_{k=0}^{8} \beta_k^{USD} \Delta e_{USD,j,t-k} + \sum_{k=0}^{8} \beta_k^{BER} \Delta e_{CLP,j,t-k} + \theta' X_{jt} + \varepsilon_{fgjct}$

Exports Heterogeneity

Return

Dependent Variables:	price		quantity		price		quantity	
Model:	(1)		(2)		(3)		(4)	
Commodities	Yes	No	Yes	No	Yes	No	Yes	No
β_0^{BER}	0.7301***	0.6168***	-0.6951	-0.0726	0.1887	0.0952	-0.4103	-0.0584
	(0.1458)	(0.0432)	(0.5014)	(0.0741)	(0.1338)	(0.0735)	(0.5491)	(0.1238)
$\sum_{k=0}^{4} \beta_k^{BER}$	1.0373***	0.6268***	-1.2891*	-0.5411***	1.3054***	0.5324***	-1.1701	-0.5781***
	(0.2592)	(0.0727)	(0.7052)	(0.1504)	(0.3446)	(0.094)	(0.7456)	(0.2115)
$\sum_{k=0}^{8} \beta_k^{BER}$	1.2695***	0.7863***	-2.1561*	-0.8859***	1.3102***	0.8206***	-2.7186**	-1.3198***
	(0.4949)	(0.1267)	(1.2412)	(0.2388)	(0.5119)	(0.168)	(1.2751)	(0.333)
β_0^{USD}					0.8068***	0.8866***	-0.5165	-0.1058
					(0.1672)	(0.0632)	(0.6529)	(0.1272)
$\sum_{k=0}^{4} \beta_k^{USD}$					-0.6368	0.4258***	-0.6085	-0.1937
					(0.394)	(0.0851)	(0.9823)	(0.2106)
$\sum_{k=0}^{8} \beta_k^{USD}$					-0.8328*	0.3171***	0.7745	0.171
					(0.4357)	(0.123)	(1.3392)	(0.2873)
Fixed effects	Yes		Yes		Yes		Yes	
Observations	71,679		71,679		71,679		71,679	
R^2	0.1166		0.1038		0.1213		0.1045	

Clustered (firm) standard-errors in parentheses
*Signif. Codes: ***: 0.01, **: 0.05, *: 0.1*

Controlling by Imports

Return

Dependent Variables:	price	quantity	price	quantity
Model:	(1)	(2)	(3)	(4)
$\beta_0^{M,P,cif}$	0.3849***	-0.2662*	0.2573***	-0.2546*
	(0.0916)	(0.153)	(0.0945)	(0.1545)
$\sum_{k=0}^{4} \beta_k^{M,P,cif}$	0.2897***	-0.1889	0.1672	-0.1569
	(0.1133)	(0.2106)	(0.1132)	(0.2098)
$\sum_{k=0}^{8} \beta_k^{M,P,cif}$	0.221*	0.003	0.0822	0.0186
	(0.1218)	(0.2259)	(0.1214)	(0.2263)
β_0^{BER}	0.6383***	-0.0981	0.1213*	-0.089
	(0.0406)	(0.0754)	(0.0704)	(0.1232)
$\sum_{k=0}^{4} \beta_k^{BER}$	0.6587***	-0.5953***	0.5459***	-0.6031***
	(0.0741)	(0.1564)	(0.0966)	(0.2175)
$\sum_{k=0}^{8} \beta_k^{BER}$	0.8018***	-0.9541***	0.8027***	-1.363***
	(0.1276)	(0.2444)	(0.1677)	(0.3363)
β_0^{USD}			0.8665***	-0.0889
			(0.0604)	(0.1271)
$\sum_{k=0}^{4} \beta_k^{USD}$			0.431***	-0.2248
			(0.0863)	(0.2157)
$\sum_{k=0}^{8} \beta_k^{USD}$			0.3375***	0.1458
			(0.1222)	(0.2935)
Fixed effects	Yes	Yes	Yes	Yes
Observations	70,250	70,250	70,250	70,250
R^2	0.1251	0.1071	0.1296	0.1079

Clustered (firm) standard-errors in parentheses
*Signif. Codes: ***: 0.01, **: 0.05, *: 0.1*

Dollar as LCP

- We focus on exports invoiced in USD to both the US and rest of the world
- Test for USD as LCP
- We estimate the following regression:

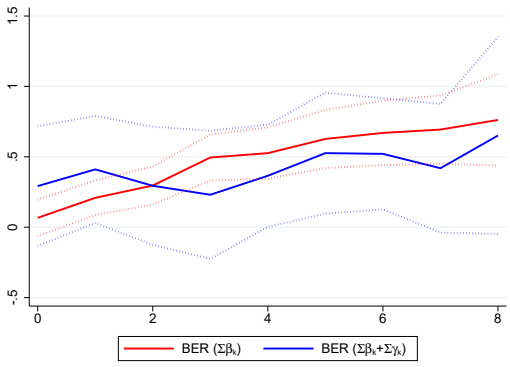
$$\Delta p_{fgjt} = \lambda_{fg} + \sum_{k=0}^{8} \left(\beta_k^{BER} + \gamma_k^{BER} D_{fgjt}^{USA}\right) \Delta e_{CLP,j,t-k} + \sum_{k=0}^{8} \beta_k^{USD} \Delta e_{USD,j,t-k} + \alpha D_{fgjt}^{USA} + \theta' X_{jt} + \varepsilon_{fgjt} \quad (2)$$

where D_{fgjt}^{USA} is 1 if destination is the USA and 0 otherwise

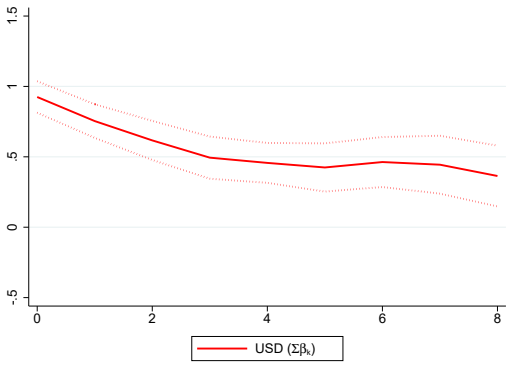
- We report $\sum_{k=0}^{K} \beta_k$ and $\sum_{k=0}^{K} \gamma_k$ for $K = 0, 1, ..., 8$, and both currency pass-through
- We can run for quantities and exclusively for firms that export in USD and LC at the same time

Exports invoiced in USD

(a) Price, BER



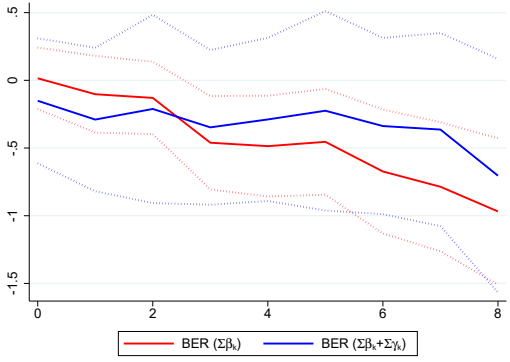
(b) Price, USD



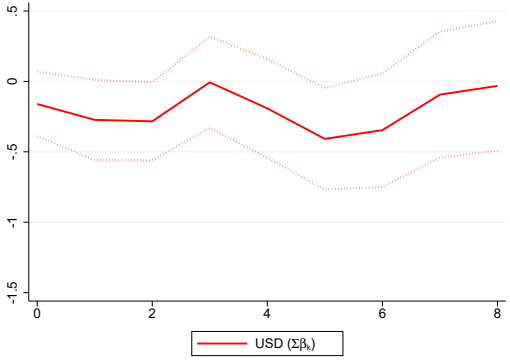
Notes: We report $\sum_{k=0}^{8}\beta_k^{BER}$, $\sum_{k=0}^{8}\left(\beta_k^{BER}+\gamma_k^{BER}\right)$ and $\sum_{k=0}^{8}\beta_k^{USD}$ coming from estimation this equation, $\Delta p_{fgjt}=\lambda_{fg}+\sum_{k=0}^{8}\left(\beta_k^{BER}+\gamma_k^{BER}D_{fgjt}^{USA}\right)\Delta e_{CLP,j,t-k}+\sum_{k=0}^{8}\beta_k^{USD}\Delta e_{USD,j,t-k}+\alpha D_{fgjt}^{USA}+\theta' X_{jt}+\varepsilon_{fgjt}$

Exports invoiced in USD

(a) Quantity, BER



(b) Quantity, USD



Notes: We report $\sum_{k=0}^{8}\beta_k^{BER}$, $\sum_{k=0}^{8}\left(\beta_k^{BER}+\gamma_k^{BER}\right)$ and $\sum_{k=0}^{8}\beta_k^{USD}$ coming from estimation this equation, $\Delta q_{fgjt}=\lambda_{fg}+\sum_{k=0}^{8}\left(\beta_k^{BER}+\gamma_k^{BER}D_{fgjt}^{USA}\right)\Delta e_{CLP,j,t-k}+\sum_{k=0}^{8}\beta_k^{USD}\Delta e_{USD,j,t-k}+\alpha D_{fgjt}^{USA}+\theta' X_{jt}+\varepsilon_{fgjt}$

Interpretation and results

Return

- β_k^{USD} and β_k^{BER} have the usual interpretation
- γ_k^{BER} informs whether the USD when used as local currency has a different effect
- Results:
  1. Controlling for destination does not change the general conclusions
  2. When the USD is the local currency, the pass-through is not different to other currencies; yet the estimates are too imprecise to derive definitive conlcusions

ERPT

- We estimate the following equations:

$$\Delta p_{fgjct} = \lambda_{fgjc} + \sum_{k=0}^{8} \beta_k \Delta e_{CLP,j,t-k} + \theta' X_{jt} + \varepsilon_{fgjct} \quad (3)$$

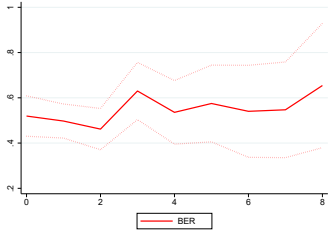
$$\Delta q_{fgjct} = \lambda_{fgjc} + \sum_{k=0}^{8} \beta_k \Delta e_{CLP,j,t-k} + \theta' X_{jt} + \varepsilon_{fgjct} \quad (4)$$

where,

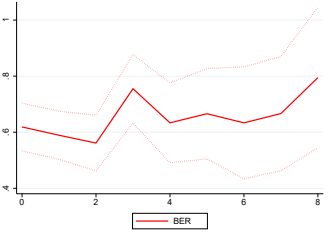
- $\Delta p_{fgjct} = \Delta \log (\text{FOB}_{fgjct} \mathcal{E}_{USD,j,t} / Q_{fgjct})$ is the price of product g from Chilean exporter f to destination j invoiced in currency c
- $e_{i,j} = \log \mathcal{E}_{i,j}$: exchange rate of j currency units for one i ($\uparrow$ depreciation of j)
- X_{jt} control for demand/supply (Chile PPI and GDP variations at j)

Results for (3)

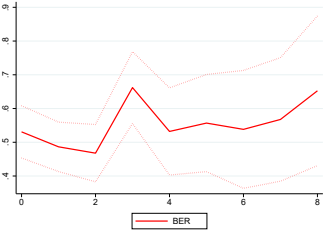
(a) All currencies, all destinations



(b) USD, non-dollarized destinations



(c) All currencies, non-dollarized destinations

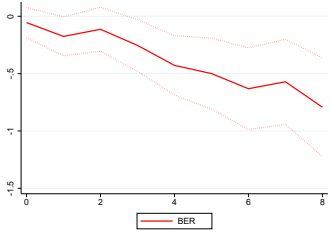


Notes: We report $\sum_{k=0}^{S} \beta_k$ coming from estimation this equation, $\Delta p_{fgjct} = \lambda_{fgjc} + \sum_{k=0}^{8} \beta_k \Delta e_{CLP,j,t-k} + \theta' X_{jt} + \varepsilon_{fgjct}$

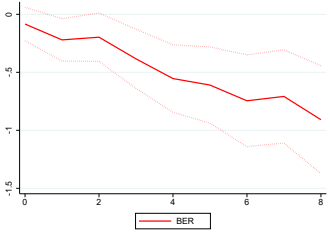
Results for (4)

Return

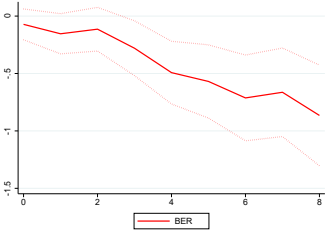
(a) All currencies, all destinations



(b) USD, non-dollarized destinations



(c) All currencies, non-dollarized destinations



Notes: We report $\sum_{k=0}^{S} \beta_k$ coming from estimation this equation, $\Delta q_{fgjct} = \lambda_{fgjc} + \sum_{k=0}^{8} \beta_k \Delta e_{CLP,j,t-k} + \theta' X_{jt} + \varepsilon_{fgjct}$

Bilateral and USD ERPT and quantities

Graphical results

Dependent Variables:	price	quantity	price	quantity
Model:	(1)	(2)	(3)	(4)
β_0^{BER}	0.6189***	-0.0838	0.0975	-0.0683
	(0.0433)	(0.0736)	(0.0735)	(0.1216)
$\sum_{k=0}^{4} \beta_k^{BER}$	0.6335***	-0.5537***	0.5425***	-0.5858***
	(0.0726)	(0.1486)	(0.0945)	(0.2093)
$\sum_{k=0}^{8} \beta_k^{BER}$	0.7949***	-0.9084***	0.8251***	-1.3394***
	(0.1278)	(0.2375)	(0.1684)	(0.3309)
β_0^{USD}			0.885***	-0.1073
			(0.0622)	(0.126)
$\sum_{k=0}^{4} \beta_k^{USD}$			0.4133***	-0.1995
			(0.0844)	(0.2115)
$\sum_{k=0}^{8} \beta_k^{USD}$			0.3052***	0.1773
			(0.122)	(0.2883)
Fixed effects	Yes	Yes	Yes	Yes
Observations	71,679	71,679	71,679	71,679
R^2	0.1165	0.1037	0.1212	0.1043

Notes: Clustered (firm) standard-errors in parentheses. Signif. Codes: ***: 0.01, **: 0.05, *: 0.1.

Descriptive Statistics

	All		USD		Non USD	
	Mean	Median	Mean	Median	Mean	Median
# employees	482.3	144.3	464.1	134.2	705.5	392.1
# destinations	2.0	1.0	2.0	1	2.4	2.1
# products	2.7	1.6	2.6	1	3.3	2.9
# total exports[3]	13,19	1,06	13,38	0.95	11,69	2,66
# firms	680		622		58	

[3]Exports expressed in USD million

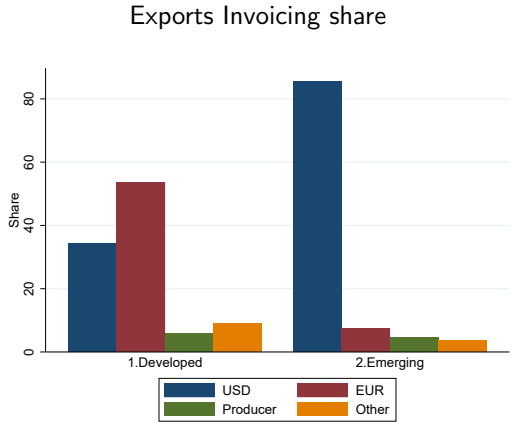
Descriptive Statistics

Exports by Country Exports Share Return

Destination	Currency	Value (%)	Transaction (%)
Asia ex China	USD	93.47	92.57
	YEN	6.32	7.11
	EUR	0.21	0.31
China	USD	99.84	99.65
	EUR	0.10	0.21
	RMB	0.06	0.13
	YEN	0.00	0.01
Europe no Eurozone	GBP	58.56	72.6
	USD	31.19	20.38
	EUR	7.85	4.13
	Other	2.41	2.89
Eurozone	USD	79.33	47.02
	EUR	20.55	52.84
	CLP	0.12	0.13
	GBP	0.00	0.01
LATAM	USD	95.89	90.72
	Other	2.98	6.80
	CLP	0.76	0.51
	EUR	0.36	1.96
USA	USD	99.91	99.99
	CLP	0.09	0.01
Other	USD	99.53	99.66
	EUR	0.47	0.34

International trade transactions in emerging markets are set in USD, this is less so in advanced economies

Return



Notes: Differences in exports invoicing share for developed and emerging countries. Author´s own calculations based on Boz et al. (2022) data.

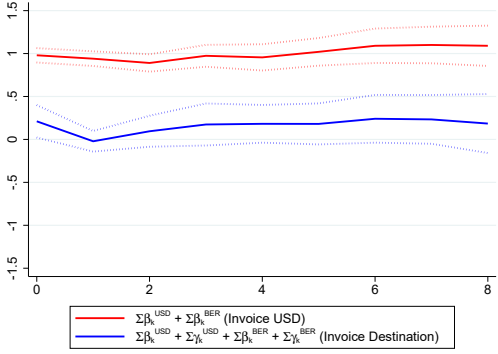
Identifications of supply and demand components

- Transactions invoiced in USD:
  - Demand: Currency j depreciates against the CLP and USD, prices increase in the destination but not in the origin country: $\beta^{\cdot,USD} + \beta^{\cdot,BER}$
  - Supply: Depreciation of the CLP against currency j, holding the parity USD-j constant, increases prices in pesos faced by Chilean exporters, but not in the destination currency: $-\beta^{\cdot,BER}$

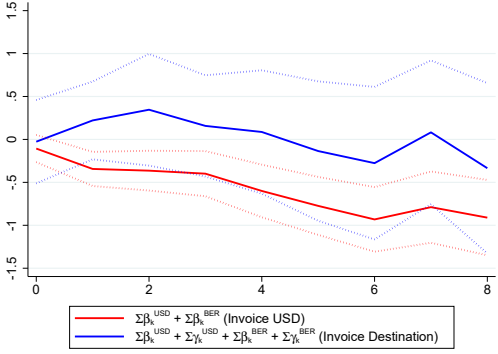
- Transactions invoiced in destination currency:
  - Currency j depreciates against the CLP and USD should have no effect on prices and quantities: $\beta^{\cdot,USD} + \gamma^{\cdot,USD}\beta^{\cdot,BER} + \gamma^{\cdot,BER}$
  - Negative supply shock: Depreciation of the CLP against currency j, holding the parity USD-j constant, decreases prices in pesos faced by Chilean exporters, but not in the destination currency: $-\beta^{\cdot,BER} - \gamma^{\cdot,BER}$

Demand effects

(a) Multilateral depreciation of curr j. Price



(b) Multilateral depreciation of curr j. Quantity

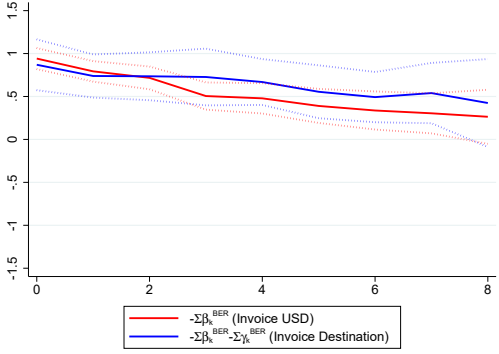


Notes: In all panels, red line is the total effect for exports invoiced in USD and blue line is for exports invoiced in the destination currency.

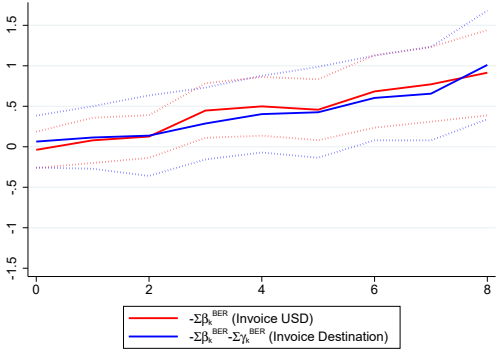
Supply effects

Additional

(a) Multilateral depreciation of CLP. Price



(b) Multilateral depreciation of CLP. Quantity



Notes: In all panels, red line is the total effect for exports invoiced in USD and blue line is for exports invoiced in the destination currency.