

Export Pass-Through, Imported Inputs and Domestic Supply Networks

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- Well-identified micro-level evidence from Turkey: product-level customs data, domestic firm-to-firm sales, balance sheets for the universe of Turkish exporters.
- Period: 2006-2016. Final Sample: $\sim 72\text{K}$ exporting firms, $\sim 800\text{K}$ suppliers.

Contribution

Literature on export price pass-through and use of imports:

- Amiti, Itskhoki, Konings (2014, AER): Exporters with higher reliance on imports raise their export prices more following an ER depreciation, i.e., higher price pass-through (Belgium)
 - ... Heterogeneity in pass-through: Goldberg and Hellerstein (2008); Market structure: Auer and Schoenle (2016), Productivity: Berman, Martin, Mayer (2012); Quality of exports: Chen and Juvenal (2016); Incomplete information: Garetto (2016).

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Contribution #1

Incorporating exporters' supply network (in particular, exporters' suppliers' reliance on imports) into the picture.

Contribution (cnt'd)

Literature on supply networks:

- idiosyncratic shocks \Rightarrow aggregate outcomes:
 - ... Acemoglu et al., 2016; Carvalho and Tahbaz-Salehi, 2018.
- firm-to-firm spillovers through domestic supply network:
 - ... natural disasters (Barrot and Sauvagnat, 2016); trade shocks (Tintelnot et al., 2017); infrastructure (Bernard et al., 2017); financial shocks (Demir-Pakel et al. 2018).

Contribution #2

The role of supply network for pricing; and export dynamics.

Definitions and terms

Exchange rate pass-through to export prices:

- Sensitivity of exports to exchange rate movements
 - ... Local currency pricing (e.g., USD, Euro)
 - ... **Producer currency pricing (TL)**

Example:

- $1\text{TL} = \$1$ at $t \rightarrow 1.1\text{TL} = \1 at $t + 1$ (a 10% depreciation in TL)...
- 100% pass-through in **producer currency** if the unit price of the good goes from 10 TL at t to 11 TL at $t + 1$.

What we find?

Suppliers' import intensity is a key part of the picture!

- 1 64% of exporters import directly vs. 99% use imported inputs once we include suppliers.
- 2 Exporters' import intensity: 22% (own) \Rightarrow 45% (own+suppliers)

Suppliers' import intensity matters for the export pass-through!

- 3 Exporters that rely more on imports, directly or through their suppliers, increase their export prices significantly more and their export volumes significantly less following an exchange rate depreciation.

Market power at domestic supply markets matters!

- 4 Exporters that work with only a few suppliers have higher price pass-through.

Greater domestic supply chain disruptions!

- 5 Exporters that rely more on import-intensive suppliers have fewer suppliers, fewer new suppliers and lose a greater number of suppliers following an ER depreciation.

Data

Data

- **Exports:** Firm-product(CN8)-destination(country) level export value and amount.
- **Imports:** Firm-product(CN8)-destination(country) level import value and amount.
- **Network:** Domestic firm-to-firm sales.
- **Balance Sheets:** Firm-level balance sheets.

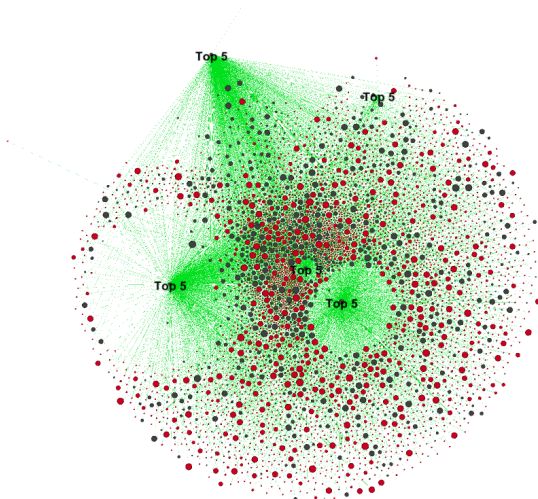
Our final sample consists of 72,610 exporters and their “nearly” complete supply network (up to 3rd degree: all of their suppliers and their suppliers’ suppliers, a total of 813,261 supplier firms).

What is product *i* ?

| | | | | |
|------|--------|-----------------|---|---|
| 6403 | | | Footwear with outer soles of rubber, plastics, leather or composition leather and uppers of leather: | Dış tabanı kauçuktan, plastik maddeden, tabii veya terkip yoluyla elde edilen köseleden ve yüzü deriden olan ayakkabılar: |
| | | | - Sports footwear: | - Spor ayakkabıları: |
| | | 64031200 | -- Ski-boots, cross-country ski footwear and snowboard boots | -- Kayak ayakkabıları , kuzey disiplini kayak ayakkabıları ve kar sörfü için ayakkabılar |
| | | 64031900 | -- Other | -- Diğerleri |
| | | 64032000 | - Footwear with outer soles of leather, and uppers which consist of leather straps across the instep and around the big toe | - Dış tabanı tabii köseleden ve yüzü ayağın üstünden geçip baş parmağa dolanan deri bir şeritten olan ayakkabılar |
| | | 64034000 | - Other footwear, incorporating a protective metal toecap | - Diğer ayakkabılar (metalden koruyucu burun olanlar) |
| | | | - Other footwear with outer soles of leather: | - Diğer ayakkabılar (dış tabanı tabii köseleden olanlar): |
| | 640351 | | -- Covering the ankle: | -- Bileği örtenler: |
| | | 64035105 | --- Made on a base or platform of wood, not having an inner sole | --- İç tabanı olmayan, ahşap mesnet veya platform üzerine yapılmış olanlar |
| | | | --- Other: | --- Diğerleri : |
| | | | ---- Covering the ankle but no part of the calf, with insoles of a length: | ---- Bileği örten fakat baldırını örtmeyenler, iç taban uzunluğu: |
| | | 64035111 | ----- Of less than 24 cm | ----- 24 cm. den az olanlar |
| | | | ----- Of 24 cm or more: | ----- İç tabanının uzunluğu 24 cm. veya daha fazla olanlar: |
| | | 64035115 | ----- For men | ----- Erkekler için |
| | | 64035119 | ----- For women | ----- Kadınlar için |
| | | | ---- Other, with insoles of a length: | ---- Diğerleri, iç taban uzunluğu: |
| | | 64035191 | ----- Of less than 24 cm | ----- 24 cm. den az olanlar |
| | | | ----- Of 24 cm or more: | ----- İç tabanının uzunluğu 24 cm. veya daha fazla olanlar: |

Domestic supply network of exporters

Exporters have many import-intensive suppliers.

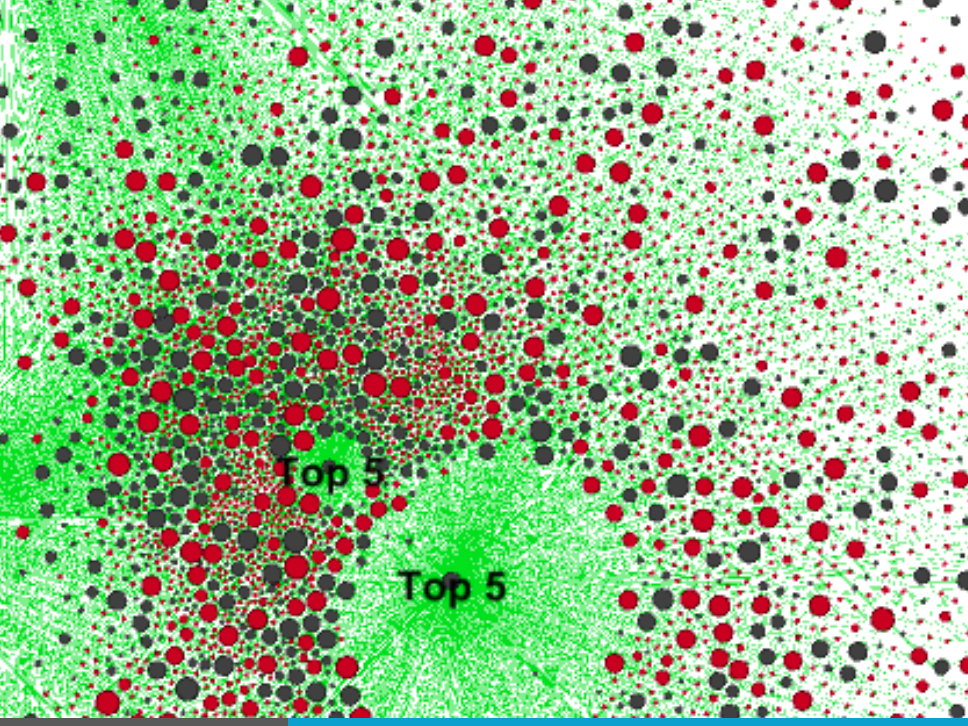


Source: GBS, Ministry of Treasury and Finance.

LEGEND: ● Non-Exporter

● Exporter

● Bigger circle: Higher reliance on imports

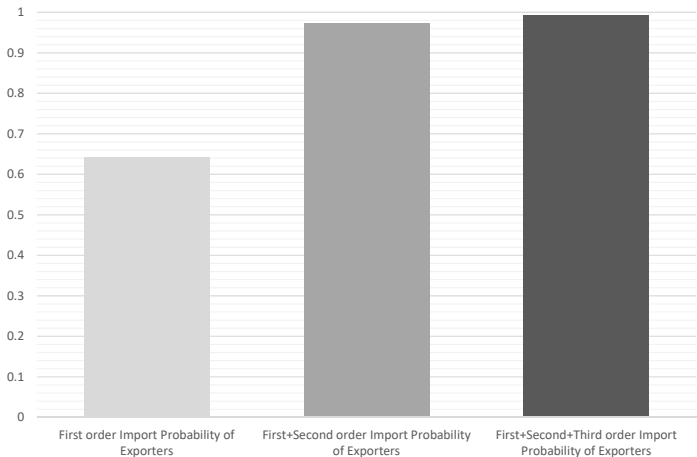


Top 5

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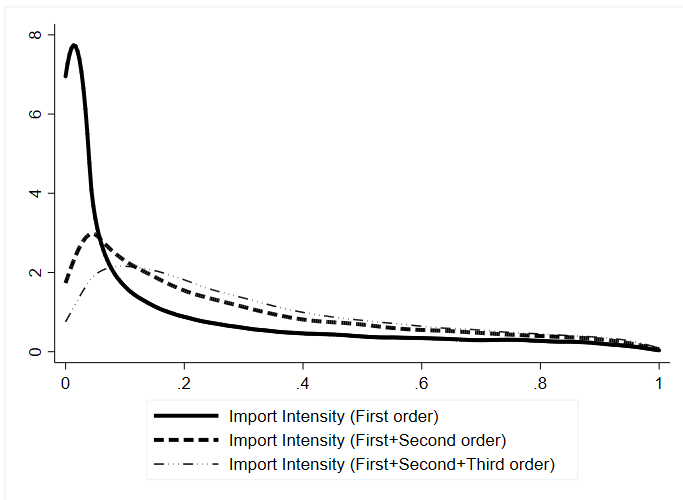
Finding 1: Almost all exporters import

An exporter's probability of using imported goods



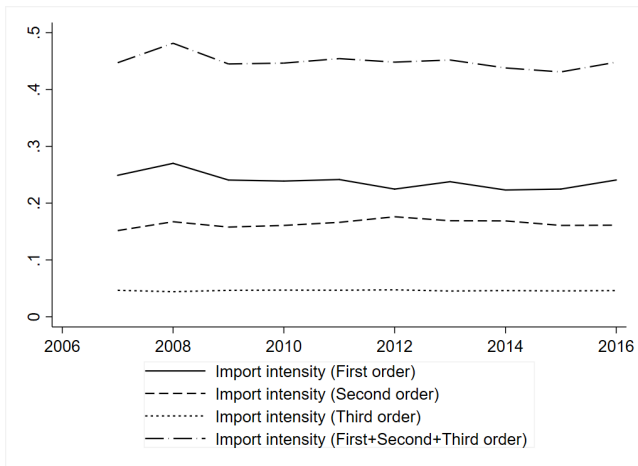
Finding 2: Exporters are in fact much more import-intensive once their suppliers are taken into account.

Kernel density estimates of exporters' import intensity



Finding 2 (cont'd): Exporters are in fact much more import intensive once their suppliers are taken into account (22% vs. 45%)

Evolution of exporters' import intensity



Exporters vs. their suppliers vs. non-exporters

- Few exporters.
- Exporters are larger and more productive than their suppliers.
- Exporters' suppliers are larger and more productive than non-exporters.

| | Exporters | Suppliers | Non-Exporters |
|----------------------------------|-----------|-----------|---------------|
| Prob. of being an importer | 0.64 | 0.16 | 0.06 |
| Prob. of being an importer (agg) | 0.99 | -- | -- |
| Employment | 38.68 | 11.41 | 5.18 |
| Net sales (log) | 14.73 | 13.43 | 12.57 |
| Sales per employment (000s, TL) | 1117.44 | 683.09 | 577.18 |
| Cost of sales (log) | 14.52 | 13.15 | 12.27 |
| N | 72,610 | 813,261 | 1,603,575 |

Empirical Strategy and Identification

Empirical Strategy

The effect of import intensity of exporter f on its export price of product i to country k following an ER depreciation ?

Main Specification

$$\Delta p_{f,i,k,t} = (\beta_1 \varphi_{f,t-1}^1 + \beta_2 \varphi_{f,t-1}^2 + \beta_3 \varphi_{f,t-1}^3 + \alpha S_{f,s,k,t-1}) \Delta e_{kt} + \dots \\ \dots + \delta_{s,k,t} + u_{f,i,k,t}$$

given the demand for sector (CN-4) s of destination country k at year t .

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- $\Delta p_{f,i,k,t} \equiv \Delta \log \left(\frac{\text{Export value}_{f,i,k,t}}{\text{Export quantity}_{f,i,k,t}} \right)$; price \approx unit value at CN 8-digit
- $\varphi_{f,t}^1$: First-order Import Intensity
- $\varphi_{f,t}^2$: Second-order Import Intensity: Import intensity of exporter f due to its suppliers
- $\varphi_{f,t}^3$: Third-order Import Intensity: ... due to its suppliers' suppliers
- $S_{f,s,k,t}$: Market share of exporter f at the destination-sector(CN-4)-year
- $\delta_{s,k,t}$: Destination-sector-year F.E.s: demand-side effects or common shocks to marginal costs across these exporters.

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Identification is based on

- the cross-sectional variation in the import intensity of firms that export the same 4-digit good to the same destination country at the same year.

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Identification is based on

- the cross-sectional variation in the import intensity of firms that export the same 4-digit good to the same destination country at the same year.
- $\varphi \Rightarrow \Delta e_{kt}$? Do exporters change their import intensities due to changes in ER? No! R^2 of 91% for the regression: import intensities on firm fixed effects.

Definitions: Import Intensities and Export Market Share

$$\varphi_{f,t}^1 \equiv \frac{\sum_{c \in C_{f,t}} \sum_{i \in I_{f,t}} \text{Import Value}_{f,i,c,t}}{\text{Cost of Sales}_{f,t}} = \frac{\text{Import Value}_{f,t}}{\text{Cost of Sales}_{f,t}}$$

$$\varphi_{f,t}^2 \equiv \frac{\text{Supplier Purchases}_{f,t}}{\text{Cost of Sales}_{f,t}} \sum_{n=1}^{N_{f,t}} w_{f,n,t} \frac{\text{Import Value}_{n,f,t}}{\text{Cost of Sales}_{n,f,t}}$$

$$\varphi_{f,t}^3 \equiv \frac{\text{Supplier Purchases}_{f,t}}{\text{Cost of Sales}_{f,t}} \sum_{n=1}^{N_{f,t}} w_{f,n,t} \left[\frac{\text{Supplier Purchases}_{n,t}}{\text{Cost of Sales}_{n,t}} \left(\sum_{m=1}^{M_{n,t}} w_{n,m,t} \frac{\text{Import Value}_{n,m,t}}{\text{Cost of Sales}_{n,m,t}} \right) \right]$$

$$\varphi_{f,t}^{agg} \equiv \varphi_{f,t}^1 + \varphi_{f,t}^2 + \varphi_{f,t}^3 \leq 1$$

$$S_{f,s,k,t} \equiv \frac{\text{Export Value}_{f,s,k,t}}{\sum_{f' \in F_{s,k,t}} \text{Export Value}_{f',s,k,t}}$$

Empirical Results

Empirical Results: Baseline

- 10% depreciation $\Rightarrow \approx 2.2\%$ increase in export prices (TL).
- High market share \Rightarrow higher pass-through \checkmark
- **First-order import-intensity (p90-p10): the price pass-through is higher (by 27%)**

| Dependent variable: Log-change in export price ($\Delta P_{i,t,k,t}$) | (1) | (2) | (3) | (4) | (5) |
|--|------------------------------|------------------------------|------------------------------|------------------------------|------------------------------|
| $\Delta ER_{k,t}$ * First-order Import Intensity | 0.0463** (0.0233) | 0.1026*** (0.0220) | 0.1206*** (0.0232) | 0.1311*** (0.0240) | |
| $\Delta ER_{k,t}$ * Export Market Share | 0.1025*** (0.0207) | 0.0825*** (0.0254) | 0.0761*** (0.0252) | 0.0761*** (0.0252) | 0.0758*** (0.0252) |
| $\Delta ER_{k,t}$ * Second-order Import Intensity | | | 0.1385*** (0.0330) | 0.1327*** (0.0324) | |
| $\Delta ER_{k,t}$ * Third-order Import Intensity | | | | 0.3034** (0.1316) | |
| $\Delta ER_{k,t}$ * Aggregate Import Intensity | | | | | 0.1303*** (0.0224) |
| $\Delta ER_{k,t}$ | 0.2187*** (0.0185) | | | | |
| Destination x Sector <i>and</i> Year FE | Yes | -- | -- | -- | -- |
| Destination x Sector x Year FE | No | Yes | Yes | Yes | Yes |
| Observations | 3,237,893 | 3,237,893 | 3,237,893 | 3,237,893 | 3,237,893 |
| R-squared | 0.030 | 0.106 | 0.106 | 0.106 | 0.106 |

Notes: Standard errors are clustered at the destination x year level, and given in parantheses. *** significant at 1%, ** significant at 5%, and * significant at 10%.

Empirical Results: Baseline

- If you rely more on import-intensive suppliers: **an additional 16% higher price pass-through.**
- If you rely more on suppliers who rely more on import-intensive suppliers: **an additional 10% higher price pass-through.**
- Including suppliers' import intensities (second and third-order import intensities combined) adds up to **30% higher price pass-through** compared to the first-order.

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 - ... Wholesale traders (< 10 employees) ✓

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 - ... Wholesale traders (< 10 employees) ✓
 - ... Stronger results ✓
- 4 Firms produce many products, and for each, the production technology (and import use) may differ?
 - ... Focusing on main export products (at CN 2-digit) ✓
 - ... Smaller effects ↔ exporters are less competitive outside their main products. ✓

Robustness and Further Discussions

- 5 High-quality exports (above median price at destination-good (CN-8) level) ✓
- 6 Bilateral exchange rate (for all ER vis-a-vis destination- k currency) ✓
- 7 A coarse definition for goods CN 4-digit ✓
- 8 Exports to the Euro-area ✓

Further Insights:

- 1 Imported intermediate goods (CN \leftrightarrow BEC classification) ✓
- 2 Export volume (amount) ✓, export value (price \times volume) ✓

Results are strongly robust.

| Specification: | Baseline | Weighted LS | Time-varying Import Intensity ($\delta_t \equiv \delta_{t,t}$) | Wholesale Traders (Emp < 10) | Main Export Products | High Quality Products | Bilateral Exchange Rate | CN 4-digit | Euro-area Countries |
|--|------------------------------|------------------------------|--|------------------------------|------------------------------|------------------------------|------------------------------|------------------------------|------------------------------|
| Dependent variable: Log-change in export price ($\Delta P_{i,j,k,t}$) | (0) | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) |
| $\Delta ER_{k,t}$ * First-order Import Intensity | 0.1311*** (0.0240) | 0.1290*** (0.0227) | 0.1108*** (0.0207) | 0.1574*** (0.0571) | 0.0933*** (0.0259) | 0.1457*** (0.0323) | 0.1514*** (0.0237) | 0.0786*** (0.0257) | 0.0184 (0.0462) |
| $\Delta ER_{k,t}$ * Export Market Share | 0.0761*** (0.0252) | 0.0643*** (0.0246) | 0.0799*** (0.0252) | 0.2034*** (0.0666) | 0.0700*** (0.0269) | 0.1534*** (0.0376) | 0.1309*** (0.0256) | 0.0852*** (0.0287) | 0.3059*** (0.0576) |
| $\Delta ER_{k,t}$ * Second-order Import Intensity | 0.1327*** (0.0324) | 0.1165*** (0.0319) | 0.0828*** (0.0281) | 0.1690*** (0.0611) | 0.0978*** (0.0374) | 0.1190** (0.0467) | 0.1570*** (0.0334) | 0.0983*** (0.0367) | 0.1451*** (0.0671) |
| $\Delta ER_{k,t}$ * Third-order Import Intensity | 0.3034** (0.1316) | 0.3041** (0.1275) | 0.2523** (0.1021) | 0.1162 (0.2127) | 0.0776 (0.1592) | 0.1242 (0.1565) | 0.3537** (0.1382) | 0.1369 (0.1587) | 0.1899 (0.3044) |
| Destination x Sector x Year FE | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Observations | 3,237,893 | 3,237,893 | 3,237,893 | 937,670 | 2,386,320 | 1,549,541 | 3,237,893 | 1,655,343 | 785,801 |
| R-squared | 0.106 | 0.110 | 0.106 | 0.148 | 0.120 | 0.142 | 0.106 | 0.175 | 0.097 |

Notes: Standard errors are clustered at the destination x year level, and given in parantheses. *** significant at 1%, ** significant at 5%, and * significant at 10%.

Robust to using Intermediate Import Goods

| Specification: | Baseline | Weighted LS | Time-varying Import Intensity ($\delta_t \equiv \delta_{it}$) | Wholesale Traders (Emp < 10) | Main Export Products | High Quality Products | Bilateral Exchange Rate | CN 4-digit | Euro-area countries |
|--|------------------------------|------------------------------|--|------------------------------------|------------------------------|------------------------------|------------------------------|------------------------------|------------------------------|
| Dependent variable: Log-change in export price ($\Delta P_{i,j,t}$) | (0) | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) |
| $\Delta ER_{i,t}$ * First-order Import Intensity | 0.1184*** (0.0231) | 0.1208*** (0.0220) | 0.0998*** (0.0201) | 0.1242** (0.0584) | 0.0669** (0.0262) | 0.154*** (0.0344) | 0.1337*** (0.0232) | 0.0679** (0.0273) | -0.0102 (0.0438) |
| $\Delta ER_{i,t}$ * Export Market Share | 0.0778*** (0.0252) | 0.0657*** (0.0246) | 0.0813*** (0.0253) | 0.2123*** (0.0665) | 0.0736*** (0.0265) | 0.1376*** (0.0389) | 0.1318*** (0.0255) | 0.0833*** (0.0288) | 0.3128*** (0.0576) |
| $\Delta ER_{i,t}$ * Second-order Import Intensity | 0.1244*** (0.0320) | 0.1095*** (0.0315) | 0.0757*** (0.0280) | 0.1579*** (0.0612) | 0.0716* (0.0371) | 0.1272** (0.0508) | 0.1456*** (0.0329) | 0.0920** (0.0363) | 0.1421** (0.0675) |
| $\Delta ER_{i,t}$ * Third-order Import Intensity | 0.3087** (0.1305) | 0.3125** (0.1261) | 0.2501** (0.1014) | 0.0400 (0.2125) | 0.0698 (0.1601) | 0.0765 (0.1701) | 0.3515*** (0.1362) | 0.1421 (0.1559) | 0.1566 (0.3225) |
| Destination x Sector x Year FE | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Observations | 3,263,355 | 3,263,355 | 3,263,355 | 941,752 | 2,430,636 | 1,432,961 | 3,263,355 | 1,667,680 | 795,039 |
| R-squared | 0.105 | 0.110 | 0.106 | 0.148 | 0.118 | 0.148 | 0.105 | 0.174 | 0.097 |

Notes: Standard errors are clustered at the destination x year level, and given in parantheses. *** significant at 1%, ** significant at 5%, and * significant at 10%.

Volume: Higher import intensity \Rightarrow lower exports

- 10% depreciation: Highly import intensive exporters raise their exports significantly less (numerically, by 0.7pp (1st-order), 1.5pp (2nd-order), 2.4pp (3rd-order), respectively).
- Positive impact of an ER depreciation on exports \Leftarrow only if import intensity of an exporter is sufficiently small.

| Dependent variable: Log-change in export volume ($\Delta V_{i,j,k,t}$) | (1) | (2) | (3) | (4) | (5) |
|---|------------------------------|-------------------------------|-------------------------------|-------------------------------|-------------------------------|
| $\Delta ER_{k,t}$ * First-order Import Intensity | -0.0794 (0.0940) | -0.0548 (0.0942) | -0.1582 (0.0982) | -0.2843*** (0.1031) | -0.2161** (0.0990) |
| $\Delta ER_{k,t}$ * Export Market Share | -0.3409** (0.1495) | -0.6384*** (0.1801) | -0.6003*** (0.1799) | -0.5993*** (0.1799) | -0.2931* (0.1509) |
| $\Delta ER_{k,t}$ * Second-order Import Intensity | | | -0.8094*** (0.1639) | -0.7258*** (0.1582) | -0.7058*** (0.1512) |
| $\Delta ER_{k,t}$ * Third-order Import Intensity | | | | -3.6736*** (0.7412) | -4.3251*** (0.7224) |
| ΔER_{kt} | -0.1484 (0.0974) | | | | 0.1828* (0.0980) |
| Destination x Sector and Year FE | Yes | -- | -- | -- | Yes |
| Destination x Sector x Year FE | No | Yes | Yes | Yes | No |
| Observations | 3,237,893 | 3,237,893 | 3,237,893 | 3,237,893 | 3,237,893 |
| R-squared | 0.061 | 0.138 | 0.138 | 0.139 | 0.062 |

Volume: Robustness

- Strongly robust in all dimensions.
- except for exports to the Euro-area countries (price pass-through \checkmark , volume pass-through \otimes).

| Specification: | Baseline | Weighted LS | Time-varying Import Intensity ($\hat{\theta}_t \equiv \hat{\theta}_{t,1}$) | Wholesale Traders (Emp < 10) | Main Export Products | High Quality Products | Bilateral Exchange Rate | CN 4-digit | Euro-area countries |
|---|-------------------------------|-------------------------------|--|-------------------------------|-------------------------------|-------------------------------|-------------------------------|-------------------------------|-------------------------------|
| Dependent variable: Log-change in export volume ($\Delta V_{t,j,k,t}$) | (0) | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) |
| $\Delta ER_{k,t}$ * First-order Import Intensity | -0.2843*** (0.1031) | -0.3236*** (0.1027) | -0.0376 (0.0914) | -0.6317** (0.2463) | -0.2262** (0.1052) | -0.3391** (0.1380) | -0.1746 (0.1117) | -0.1664 (0.1485) | 0.1501 (0.2472) |
| $\Delta ER_{k,t}$ * Export Market Share | -0.5993*** (0.1799) | -0.4808*** (0.1677) | -0.6227*** (0.1811) | -0.8999** (0.4151) | -0.3902** (0.1797) | -0.7803*** (0.2540) | -0.3173* (0.1780) | -0.5873*** (0.2274) | -0.8881*** (0.2623) |
| $\Delta ER_{k,t}$ * Second-order Import Intensity | -0.7258*** (0.1582) | -0.6874*** (0.1558) | -0.3925*** (0.1372) | -0.8587*** (0.2709) | -0.6604*** (0.1754) | -0.675*** (0.2021) | -0.3130* (0.1740) | -0.5248** (0.2233) | 0.1403 (0.2855) |
| $\Delta ER_{k,t}$ * Third-order Import Intensity | -3.6736*** (0.7412) | -4.0968*** (0.7378) | -0.3874 (0.5029) | -5.0012*** (0.9909) | -3.909*** (0.8199) | -3.0497*** (0.8976) | -2.6204*** (0.9348) | -0.8207 (0.8259) | 0.0888 (1.5244) |
| Destination x Sector x Year FE | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Observations | 3,237,893 | 3,237,893 | 3,237,893 | 937,670 | 2,386,320 | 1,549,541 | 3,237,893 | 1,973,063 | 785,801 |
| R-squared | 0.139 | 0.142 | 0.138 | 0.178 | 0.148 | 0.166 | 0.139 | 0.134 | 0.048 |

Notes: Standard errors are clustered at the destination x year level, and given in parantheses. *** significant at 1%, ** significant at 5%, and * significant at 10%.

Supply chain disruptions?

- Recall: 10% depreciation: Highly import intensive exporters raise their exports significantly less (numerically, by 0.7pp (1st-order), 1.5pp (2nd-order), 2.4pp (3rd-order), respectively).

Supply chain disruptions?

- Recall: 10% depreciation: Highly import intensive exporters raise their exports significantly less (numerically, by 0.7pp (1st-order), 1.5pp (2nd-order), 2.4pp (3rd-order), respectively).
- Following an ER depreciation, lower demand by high import-intensity exporters for inputs?, or potentially abrupt increase in marginal costs for more import-intensive suppliers?

Supply chain disruptions?

- Import-intensive exporters have fewer suppliers (1.4%↓), fewer new suppliers (3.3%↓), greater number of lost suppliers (3.1%↑), following a 10% currency depreciation.

| Dependent variable: | $\Delta \text{Log}(\text{Number of Suppliers})$ | $\text{Log}(\text{Number of New Suppliers})$ | $\text{Log}(\text{Number of Lost Suppliers})$ |
|---|---|--|---|
| | (1) | (2) | (3) |
| ΔER_t * First-order Import Intensity | -0.3025*** (0.0690) | -0.7336*** (0.1095) | 0.6679*** (0.0867) |
| ΔER_t * Second-order Import Intensity | -0.4212*** (0.1102) | -0.9874*** (0.1801) | 0.2965** (0.1408) |
| Year FE | Yes | Yes | Yes |
| Observations | 171,006 | 171,006 | 171,006 |
| R-squared | 0.092 | 0.095 | 0.164 |

Notes: Standard errors are clustered at the firm level, and given in parentheses. All columns include the levels of first- and second-order import intensities. *** significant at 1%, ** significant at 5%, and * significant at 10%.

Supply chain disruptions?

- Import-intensive exporters have fewer suppliers (1.4%↓), fewer new suppliers (3.3%↓), greater number of lost suppliers (3.1%↑), following a 10% currency depreciation.
- Exporters with import-intensive suppliers: (1.1%↓), (2.6%↓), (0.8%↑).

| Dependent variable: | $\Delta \text{Log}(\text{Number of Suppliers})$ | $\text{Log}(\text{Number of New Suppliers})$ | $\text{Log}(\text{Number of Lost Suppliers})$ |
|---|---|--|---|
| | (1) | (2) | (3) |
| ΔER_t * First-order Import Intensity | -0.3025*** (0.0690) | -0.7336*** (0.1095) | 0.6679*** (0.0867) |
| ΔER_t * Second-order Import Intensity | -0.4212*** (0.1102) | -0.9874*** (0.1801) | 0.2965** (0.1408) |
| Year FE | Yes | Yes | Yes |
| Observations | 171,006 | 171,006 | 171,006 |
| R-squared | 0.092 | 0.095 | 0.164 |

Notes: Standard errors are clustered at the firm level, and given in parentheses. All columns include the levels of first- and second-order import intensities. *** significant at 1%, ** significant at 5%, and * significant at 10%.

Market Power within the Domestic Supply Network

Further Discussions: Market Power within Domestic Supply Network

- ① Higher reliance on a single supplier \longleftrightarrow weaker bargaining power of exporter f on the supplier L (L : the largest supplier)

$$C_{f,t} = \frac{\text{Purchased Value}_{L,f,t}}{\text{Supplier Purchases}_{f,t}}$$

- ② Lower monopsony power \longleftrightarrow weaker bargaining power of exporter f on the supplier L

$$M_{f,t} = \frac{\text{Firm-to-firm Sales}_{L,f,t}}{\sum_{f' \in F} \text{Firm-to-firm Sales}_{L,f',t}}$$

We expect

- Higher reliance on a single supplier \implies higher pass-through
- Lower monopsony power \implies higher pass-through

Further Discussions: Market Power within Domestic Supply Network

- Import-intensive exporters work with many suppliers, and have a lower monopsony power.

Cross Correlations

| | Import Intensity | Export Market Share | Supplier Concentration | Monopsony |
|------------------------|------------------|---------------------|------------------------|-----------|
| Import Intensity | 1 | | | |
| Export Market Share | 0.1038*** | 1 | | |
| Supplier Concentration | -0.3163*** | -0.0010* | 1 | |
| Monopsony | -0.0527*** | 0.0225*** | 0.3082*** | 1 |

Further Discussions: Market Power within Domestic Supply Network (Export Price)

- Higher reliance on a single supplier \implies higher pass-through
- Higher monopsony power \rightarrow lower pass-through

| Dependent variable: Log-change in export price ($\Delta P_{i,j,k,t}$) | (1) | (2) | (3) | (4) |
|--|------------------------------|------------------------------|------------------------------|------------------------------|
| $\Delta ER_{k,t}$ * Supplier Concentration _t | 0.1155*** (0.0135) | 0.1152*** (0.0136) | 0.1220*** (0.0147) | 0.1215*** (0.0147) |
| $\Delta ER_{k,t}$ * Monopsony _t | | | -0.0207 (0.0143) | -0.0199 (0.0143) |
| $\Delta ER_{k,t}$ * First-order Import Intensity | 0.1777*** (0.0252) | 0.1885*** (0.0264) | 0.1796*** (0.0252) | 0.1900*** (0.0264) |
| $\Delta ER_{k,t}$ * Export Market Share | 0.0732*** (0.0251) | 0.0732*** (0.0251) | 0.0749*** (0.0249) | 0.0748*** (0.0249) |
| $\Delta ER_{k,t}$ * Second-order Import Intensity | 0.1041*** (0.0323) | 0.0980*** (0.0318) | 0.1001*** (0.0324) | 0.0944*** (0.0318) |
| $\Delta ER_{k,t}$ * Third-order Import Intensity | | 0.3170** (0.1363) | | 0.3106** (0.1361) |
| Destination x Sector x Year FE | Yes | Yes | Yes | Yes |
| Observations | 3,234,860 | 3,234,860 | 3,234,860 | 3,234,860 |
| R-squared | 0.106 | 0.106 | 0.106 | 0.106 |

Further Discussions: Market Power within Domestic Supply Network (Export Volume)

- No significant effect of domestic market power on the export volume.
- Our key results remain intact.

| Dependent variable: Log-change in export volume ($\Delta V_{i,j,k,t}$) | (1) | (2) | (3) | (4) |
|---|-------------------------------|-------------------------------|-------------------------------|-------------------------------|
| $\Delta ER_{k,t}$ * Supplier Concentration | 0.0855 (0.0608) | 0.0847 (0.0606) | 0.0811 (0.0711) | 0.0834 (0.0707) |
| $\Delta ER_{k,t}$ * Monopsony | | | 0.0014 (0.0858) | -0.0079 (0.0852) |
| $\Delta ER_{k,t}$ * First-order Import Intensity | -0.0934 (0.1089) | -0.2075* (0.1143) | -0.1007 (0.1091) | -0.2141* (0.1147) |
| $\Delta ER_{k,t}$ * Export Market Share | -0.5973*** (0.1798) | -0.5966*** (0.1799) | -0.5965*** (0.1783) | -0.5951*** (0.1785) |
| $\Delta ER_{k,t}$ * Second-order Import Intensity | -0.7972*** (0.1601) | -0.7255*** (0.1545) | -0.7939*** (0.1600) | -0.7236*** (0.1551) |
| $\Delta ER_{k,t}$ * Third-order Import Intensity | | -3.2967*** (0.7425) | | -3.3072*** (0.7358) |
| Destination x Sector x Year FE | Yes | Yes | Yes | Yes |
| Observations | 3,234,860 | 3,234,860 | 3,234,860 | 3,234,860 |
| R-squared | 0.139 | 0.139 | 0.139 | 0.139 |

Notes: Standard errors are clustered at the destination x year level, and given in parantheses. *** significant at 1%, ** significant at 5%, and * significant at 10%.

Conclusion

A domestic currency depreciation \Rightarrow lower export prices, higher exports ? Not strongly so.

- Almost all exporters import.
- Their import intensity doubles, once we take into account their domestic supply network.

Following an ER depreciation, exporters ...

- cannot offer competitive prices,
- cannot raise their exports,
- experience greater supply chain disruptions.

to the extent they, or their suppliers, rely on imports.

Policy should keep an eye on exporters' direct and indirect reliance on imports as a hurdle to overcome for harnessing the benefit of an ER depreciation on exports.

Export Pass-Through, Imported Inputs and Domestic Supply Networks

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