

# Is Processing Good?: Theory and Evidence from China

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## Overview

- ▶ Well motivated paper
- ▶ High quality of execution, both latest trade theory and empirics
- ▶ Sets out to assess welfare implications of processing trade
- ▶ Processing regime:
  1. Firms exempt from tariffs on intermediate goods used in the production of goods for export
  2. Processing producers prohibited from selling in the domestic market
- ▶ Evidence from China



## Main results

Productivity differences:

- ▶ Potentially large comparative advantage gains from allowing processing to sell domestically
- ▶ Heterogeneity across industries key (inference based on single estimate across industries misleading)
  - ▶ Account for differences in input prices paid by ordinary vs. processing produces (due to treatment of imported intermediate inputs)

Welfare (counterfactual experiments):

- ▶ Small welfare gains from tariff exemptions of processing firms small
- ▶ Large welfare losses (unrealised welfare gains) from restrictions on domestic sales by processing firms
  - ▶ Gains would be biggest for sectors in which processing is most productive relative to ordinary output

## More on the setup

- ▶ Combine the multi-sector, multi-country, multi-factor general equilibrium Ricardian trade model (e.g. Easton and Kortum, 2002; Caliendo and Parro, 2015; Levchenko and Zhang, 2016) with multivariate distribution for independent productivity draws (e.g. Ramondo and Rodriguez-Clare, 2013) and distributional effects across sectors.
- ▶ Modify the framework to introduce the processing sector in China:
  - ▶ “ordinary”  $o$  and “processing”  $p$  sectors additive to  $n = 1, \dots, N$  countries
  - ▶ but subject to (possibly) correlated productivity draws:

$$F^j(z_o, z_p) = \exp \left\{ - \left[ (\lambda_o^j)^{\frac{1}{1-\nu}} z_o^{-\frac{\theta^j}{1-\nu}} + (\lambda_p^j)^{\frac{1}{1-\nu}} z_p^{-\frac{\theta^j}{1-\nu}} \right]^{1-\nu} \right\}$$

$\nu$ : governs correlation between  $z_o$  and  $z_p$ , hence within-industry comparative advantage and presence of any welfare effects

$\lambda_o^j$  and  $\lambda_p^j$ : state of technology of two organisational forms

$\theta$ : shape parameter of Fréchet distribution; theoretically related to the elasticity of bilateral trade to bilateral trade costs

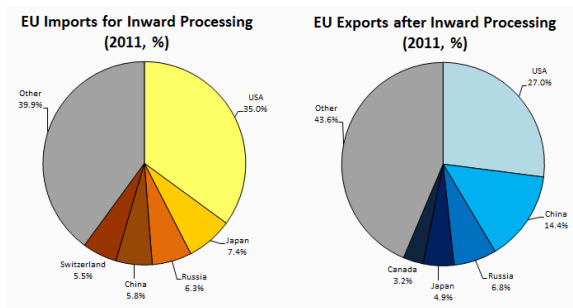
## Comment 1: Estimation of $\nu$

- ▶ Estimates of  $\hat{\nu}$  crucial for accessing the degree of comparative advantage and welfare effects associated processing trade
- ▶ Estimated based on long-linear relation of cross-product expenditure shares with trade costs via productivity distribution parameters ( $\theta^j$  and  $\nu$ ), Eq. 13, p.16.
- ▶ Caliendo and Parro (2015) introduced this method for estimating  $\theta^j$ 's, while the present paper adopts it to estimating  $\nu$
- ▶ But, additional term associated with processing expenditure shares introduces endogeneity:  $\pi_{no}^j$  and  $\pi_{on}^j$  on both sides of the equation
- ▶ Also, Caliendo and Parro (2015) used triplets because NAFTA comprised of 3 countries; is this formulation appropriate here?
- ▶ And, all parameters, including  $\theta^j$ , are actually assumed to be common across industries
- ▶ which leads to ...

## Comment 2: Dispersion and heterogeneity important or unimportant?

- ▶ Theory and results emphasize the importance of distributional characteristics of technology across industries ( $\lambda_i^j$ 's)
- ▶ At the same time  $\theta = 4$  set common across all industries & countries (Simonovska and Waugh, 2014) vs Caliendo and Parro (2015), who estimate unique  $\theta$ 's across countries, goods, and sectors
- ▶ Is it reasonable to assume that productivity draws are equally dispersed irrespective of country and that all countries' bilateral trade intensities have same sensitivities trade costs?
- ▶ Countries  $n = 1, \dots, N$  assumed not to engage in processing trade
- ▶ While simplifying assumptions are needed, suggest some explanation and a discussion of the magnitude and direction for any associated bias for the main results

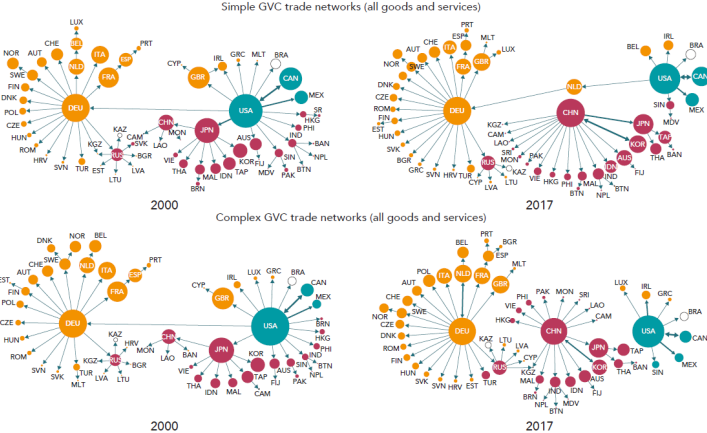
### Comment 3: Processing trade by China's trading partners



Source: Cernat L. and M. Pajot, 2012, Assembled in Europe - the role of processing trade in EU export performance. Directorate General for Trade, European Commission

- ▶ In 2011, around euro 148 billion (10%) of EU exports were conducted under the inward-processing regime

# Comment 4: Network structure and changes since 2000



Source: X Li, B Meng and Z Wang, 2019 Recent patterns of global production and GVC participation, in D Dollar (ed), Global Value Chain Development Report, WTO

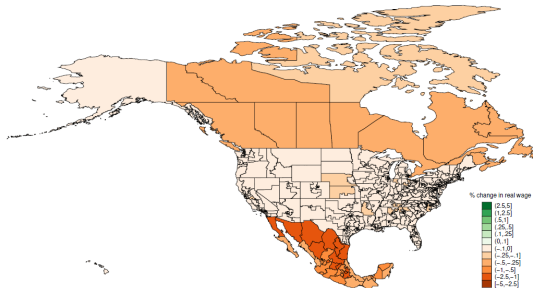


## To conclude

- ▶ Very well executed study based on state-of-the-art in the literature, both theoretically and empirically
- ▶ Addresses important question in international trade, with a focus on China
- ▶ Big takeaway: prohibiting processing producers to sell domestically leads to costly distortions
- ▶ One set of comments: introduction of processing sector and additional parameters in sectoral productivity estimations appears to come with trade-offs of additional simplifying assumptions, which are best explained..
- ▶ Another set of comments: robustness of welfare analysis to i) heterogeneity across China's trading partners (eg trade elasticities, share of processing trade in total trade) and ii) network structure of traditional and GVC trade

# A little marketing: analysis using same baseline toolkit

Figure 5: Real wage changes in NAFTA countries in tariff counterfactual



Notes: This figure depicts the average wage changes by geographic region in North America for the first counterfactual modelling a hypothetical rise in tariffs from the current NAFTA-negotiated ones to the MFN level, while NTBs remain at current levels.

Source: Auer R, A Levchenko and P Saure, 2018 The economics of revoking NAFTA, BIS Working Paper no 739

- ▶ U.S. districts suffering most from import competition see larger wage reductions, because same districts overwhelmingly export to NAFTA and rely on NAFTA intermediaries