Trade in Intermediate Goods, Armington Elasticity and Exchange Rate Pass-through

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What is an exchange rate pass-through (ERPT)?

• Effect of exchange rate changes on import/domestic/export prices
  • If 10% exchange rate change leads to 10% import price change, ERPT is 100% (complete ERPT)

• This topic relates to important macro-economic issues
  • The international transmission of monetary shocks
  • The optimal conduct of domestic monetary policy
  • The adjustment of global imbalances
  • Business cycle co-movements
Three main goals of ERPT studies

1. Measuring the degree of ERPT
2. Finding factors that influence ERPT
3. Analyzing how varying degrees of ERPT influence economic dynamics

• This study explores the contribution of expanding vertical intra-industry trade (intermediate goods trade) to the variations in ERPT to import & domestic prices in the 2000s
Factors that influences ERPT
previous studies explored

• Basic and leading explanation for **incomplete ERPT** is that firms adjust their markups to accommodate the local market environment (‘Pricing to Market’, first pointed out in Krugman (1986))
  • Exchange rate appreciation for importing country ⇒ market share of imports rises ⇒ markup for *exporters* rises ⇒ import price will not fall as much as the extent of exchange rate appreciation (incomplete ERPT )

• Other explanation for incomplete ERPT includes heterogeneous firms with different productivities, currency choice of invoicing, inter- and intra-firm trade, etc.
Vertical intra-industry trade in the 2000s

• During the late 1990s to early 2000s multinational enterprises (MNEs) began to develop global value chains (GVCs) through foreign direct investment (FDI).
  • A GVC is an organization of production known as a ‘fragmentation’ in which different stages of production are divided among different suppliers that are located in different countries.

• Their activities generated vertical intra-industry trade through which firms import intermediate goods to produce finished and/or half-finished goods that are themselves re-exported.
Traditional trade pattern

• ‘Inter-industry’ trade is a traditional trade pattern where imports and exports are in a different sector of the economy
• The source of this trade is comparative advantage
Vertical intra-industry trade in the 2000s:

- **Country A**
- **Country B**
- **Country C**
- **Consumer Country D**

**Fragmentation (Processing and assembling)**

MNEs ↓ Country A ↓ Country B ↓ Country C

Intermediate (half-finished) goods

Finished goods
Vertical intra-industry trade in the 2000s: backward & forward linkages

• The degree of ‘backward linkage’: the share of imported inputs in the overall exports of a country

• The degree of ‘forward linkage’: the share of exported goods and services used as imported inputs to produce other countries’ exports

• Global value chains (GVCs) ‘participation’ index: backward linkages + forward linkages
MNEs (FDI) develop vertical trade linkages (GVCs participation) in the 2000s

OECD, WTO, UNCTAD (2013)
MNEs-induced vertical trade and ERPT

(1) Exchange rate changes ⇒ (2) Marginal cost for each firm changes ⇒ (3) Price changes
  (Cost pass-through; mark-up)

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Own-price elasticity of demand

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The elasticity of substitution between domestic and impoted goods (Armington elasticity)

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MNEs-induced vertical intra-industry trade
 (intermediate goods trade)
MNEs-induced vertical trade and ERPT

- Empirical analysis revealed the causality between MNEs-induced vertical trade and ERPT for 32 countries as follows

1. MNEs prefer to use inputs from their parent country in their offshore production activities (In GVCs, intermediate goods are necessities which are not easily interchangeable with other products for each firm)

2. This ‘bias’ could lower the elasticity of substitution between imported and domestic goods (Armington elasticity) in host countries for MNEs

3. Lower Armington elasticity is a decisive factor in exchange rate pass-through to import and domestic prices through affecting own-price elasticity of demand
The share of imported intermediate goods to total intermediate inputs and Armington elasticity

Changes in the share of imported intermediate goods to total intermediate inputs during the 1990s and 2000s

Changes in Armington elasticities during the 1990s and 2000s
The share of imported intermediate goods to total intermediate inputs and Armington elasticity

• The average ratio of imported intermediate goods to total intermediate inputs among countries in this study rose from 2% during the mid-1990s to 15% during the mid-2000s. (The average ratio of imported intermediate goods to total imports amounts to 65% in the 2000s)

• Empirical results in this paper show that Armington elasticity diminishes as the ratio of imported intermediate manufacturing goods to total intermediate inputs increases during the 1990s and 2000s.

• The changes in macro Armington elasticity positively influenced macro ERPT during the same period (See next slide).
Armington elasticity and ERPT

Changes in Armington elasticities during the 1990s and 2000s
Summary (1)

• This study analyzes the causal relationship between the vertical intra-industry trade and ERPT by using the data of 32 countries. Results show that changes in the Armington elasticity positively influence ERPT. Specifically, Armington elasticity declines in countries where imports of intermediate goods rise relative to domestically produced goods.

• MNEs prefer to use inputs from their parent country in their offshore production activities. This bias could lower Armington elasticity in host countries for MNEs.
Summary (2)

• This is the first study that confirms the causality between expanding vertical intra-industry trade and ERPT to prices of imports and domestic products.

• GVCs and the related vertical intra-industry trade (intermediate goods trade) have had a larger impact on global economy in the 2000s. This study focuses on financial side of the impact (ERPT).

• Previous studies have mainly focused on the impact on real economy (e.g. productivity enhancement).
32 countries in this study

- Australia, Belgium, Brazil, Canada, Colombia, Denmark, Finland, France, Germany, Greece, Hong Kong, Hungary, Ireland, Italy, Japan, Korea, Mexico, the Netherlands, New Zealand, Norway, Pakistan, the Philippines, Poland, Portugal, Singapore, Spain, Sweden, Switzerland, Thailand, Turkey, the United Kingdom and the United States