Innovating in a Global Economy

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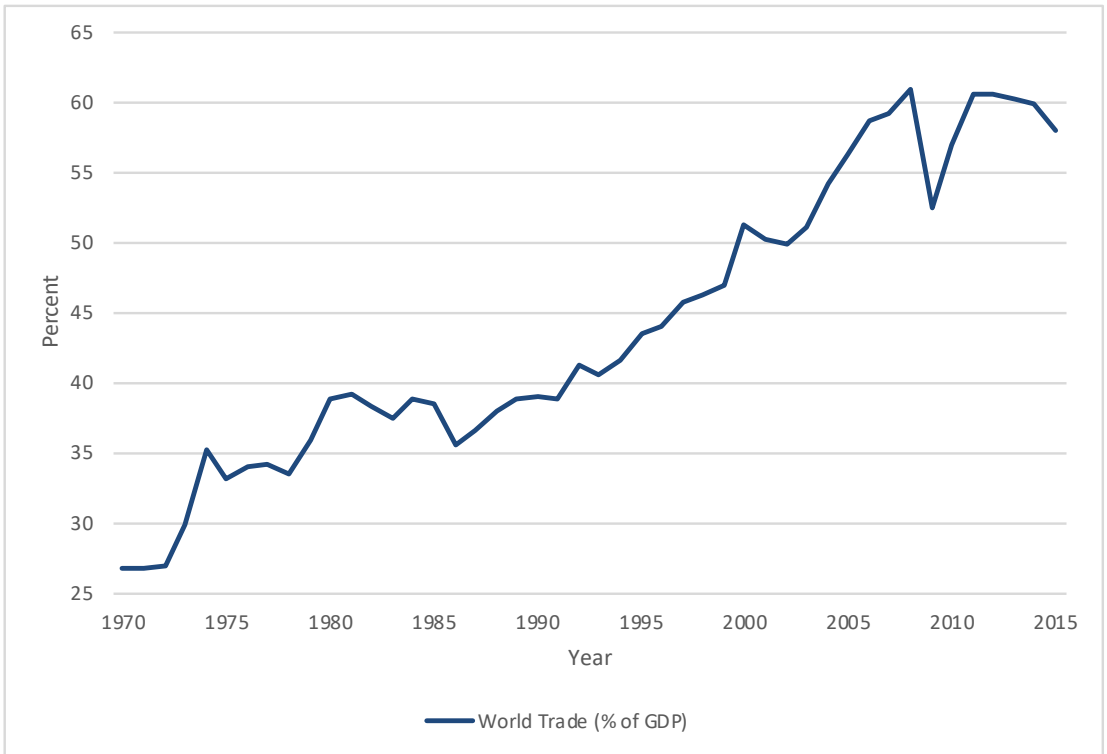
Motivation

How does international trade affect domestic firms' incentives and capabilities to innovate?



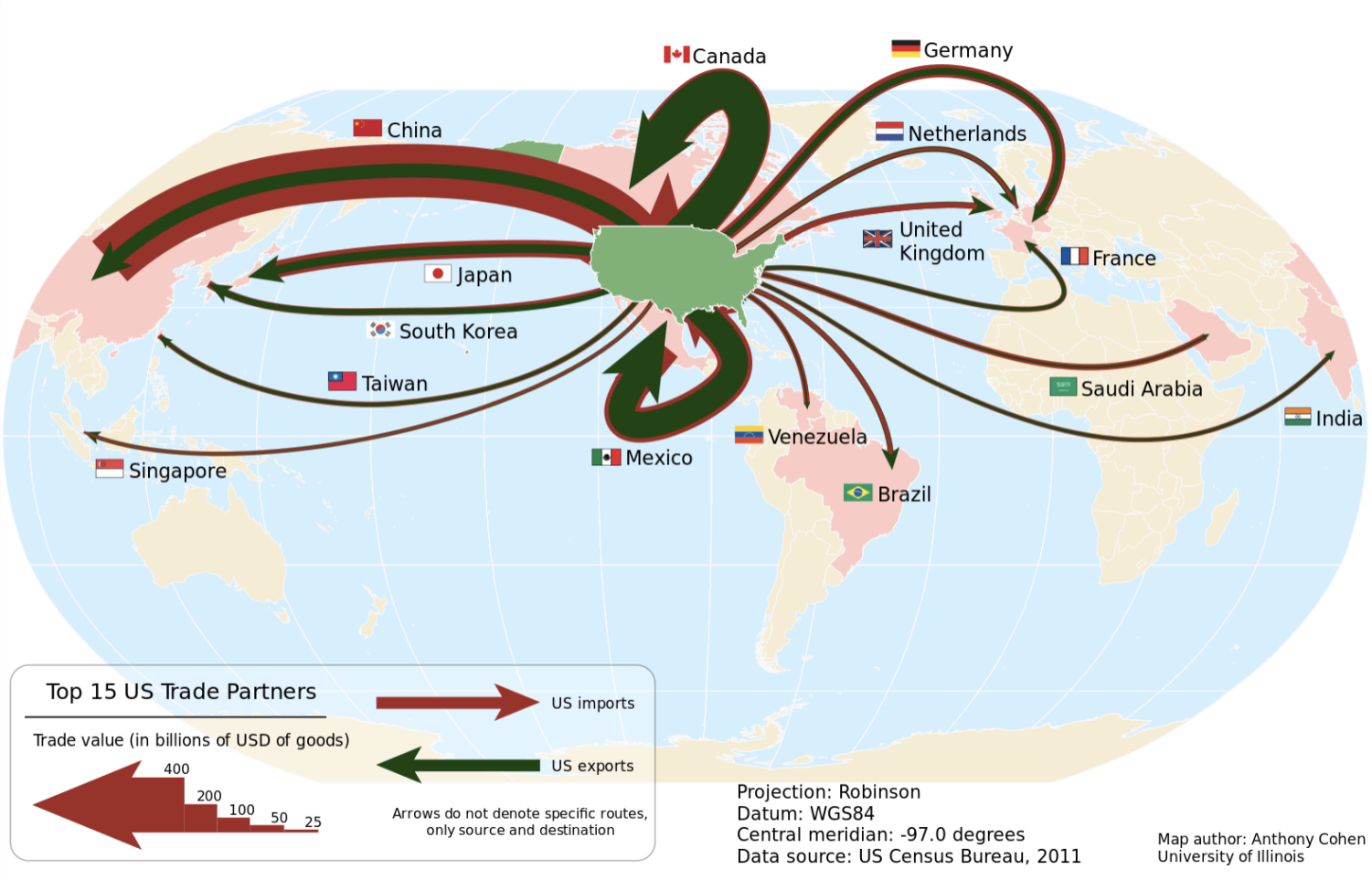
Growth in World Trade (% GDP)

This Paper

We review and summarize the economics literature on the impact of trade on firm productivity and innovation.

1. We define and examine four types of trade shocks:
   - import competition
   - export opportunities
   - access to foreign inputs
   - foreign input competition
2. For each shock, we discuss the potential theoretical channels of the impact and summarize the patterns found by empirical studies.

Trade Shocks Differ by Entry Direction

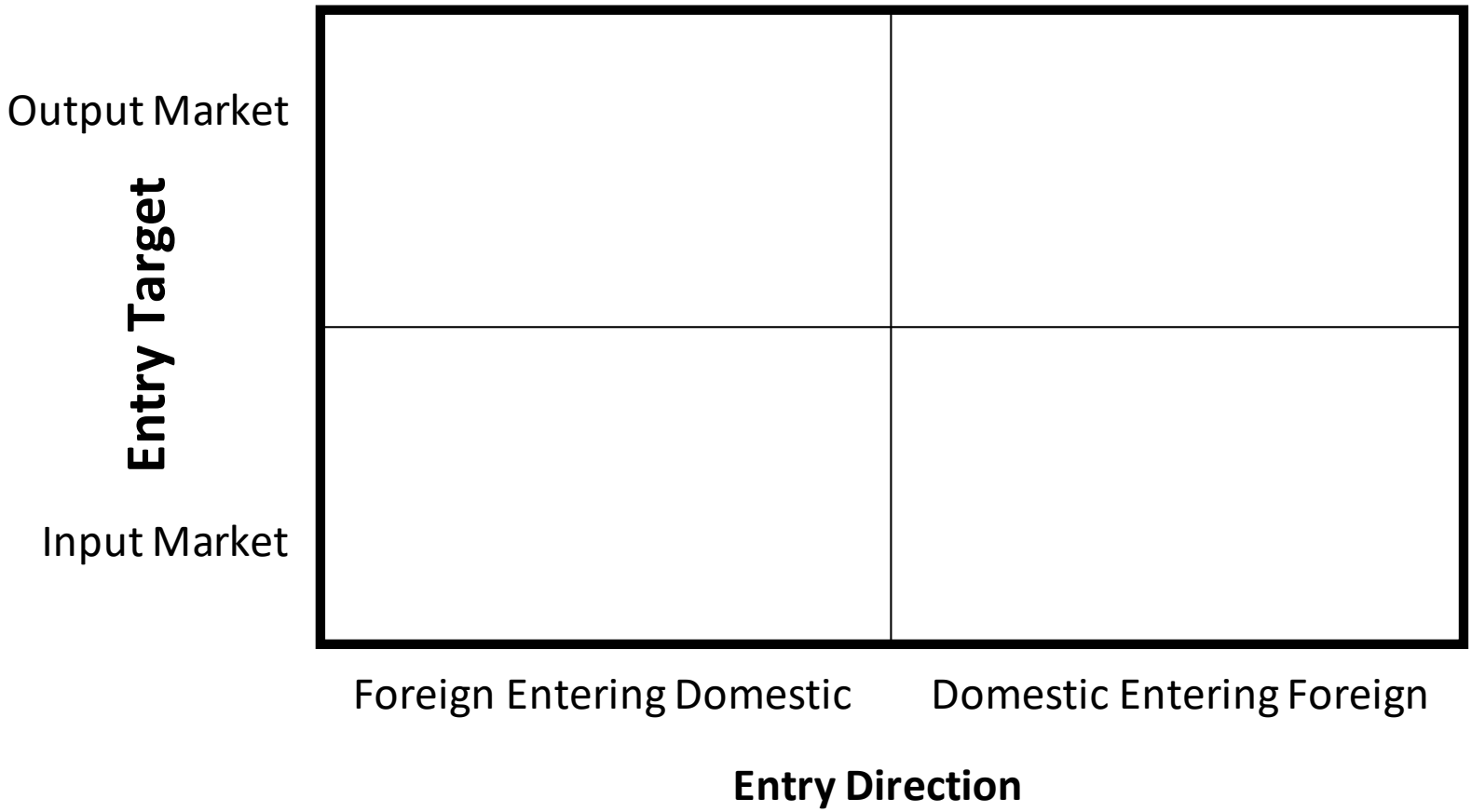


Trade Shocks also Differ by Entry Target

Output Market

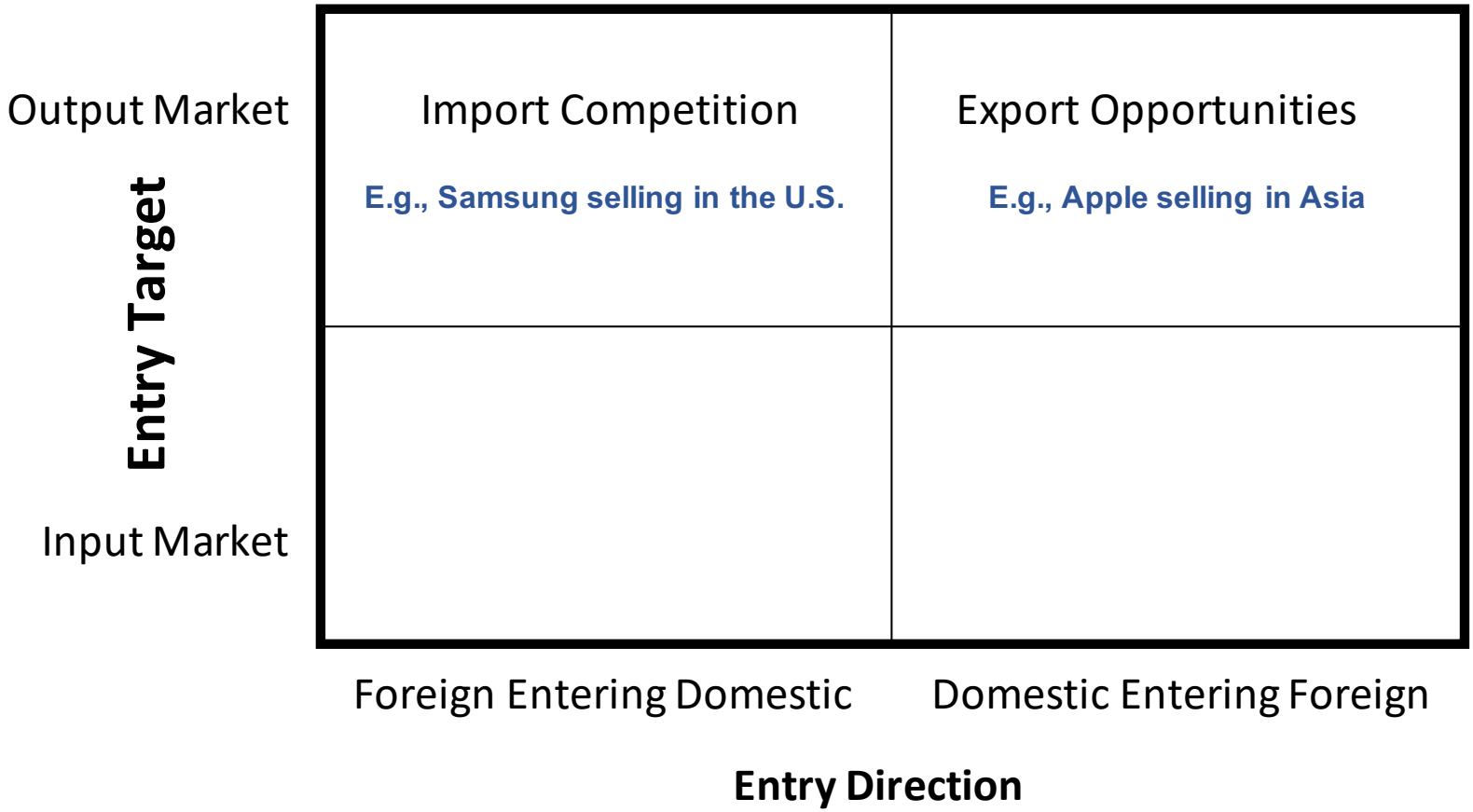
Input Market

Four Types of Trade Shocks



*Our definitions apply to both the flow of goods/services and the flow of capital.

Four Types of Trade Shocks



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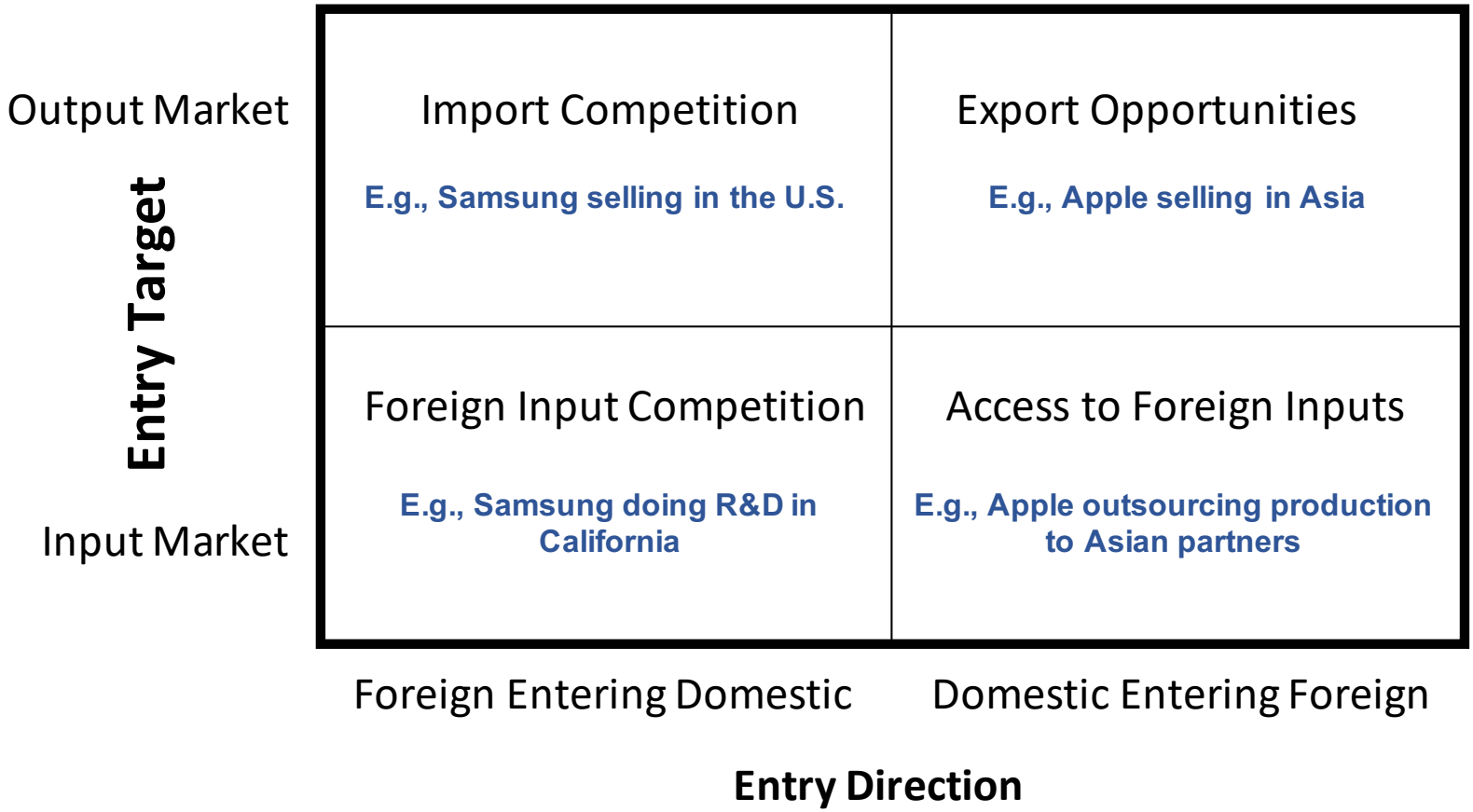

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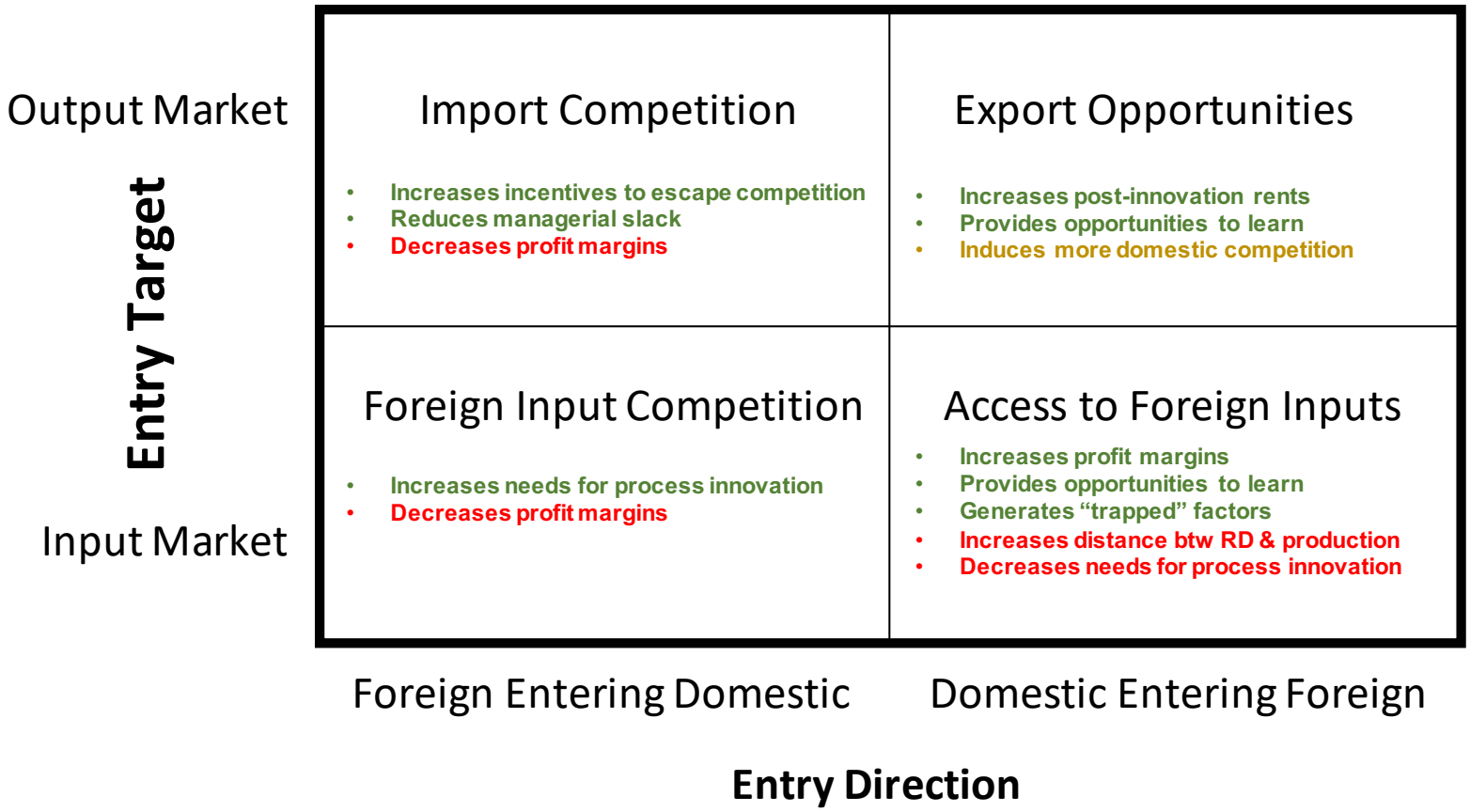
Summary: Theory

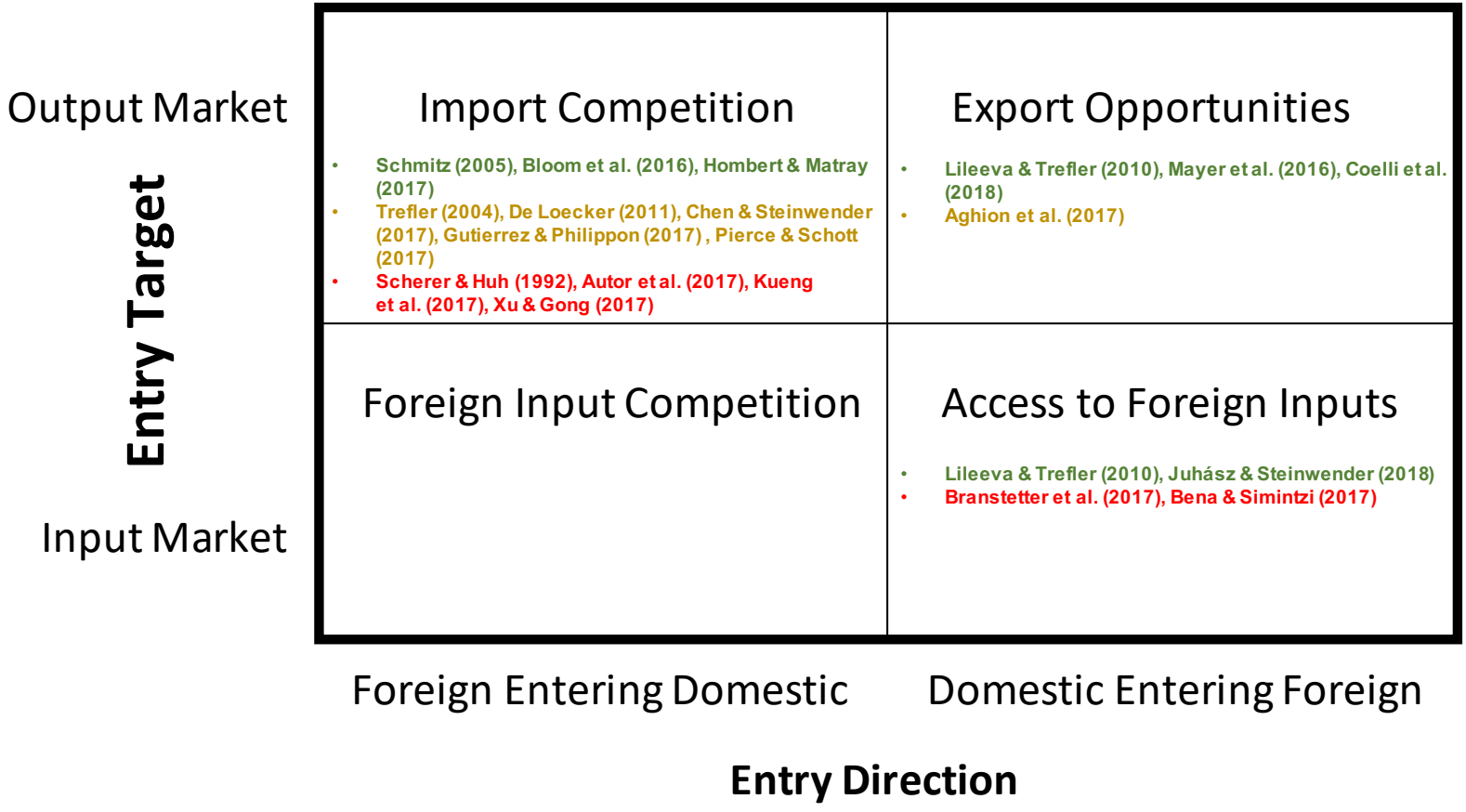


• Positive Channels • Negative Channels • Mixed Channels

Summary: Empirical Evidence

- Most studies use trade liberalization episodes as sources of variations ("reduced-form" as opposed to "structural")
- Key outcomes: productivity, input and output of innovation (e.g. R&D expenses and patenting)

Summary: Empirical Evidence from Developed Countries



• Positive Evidence • Negative Evidence • Mixed/Insignificant Evidence

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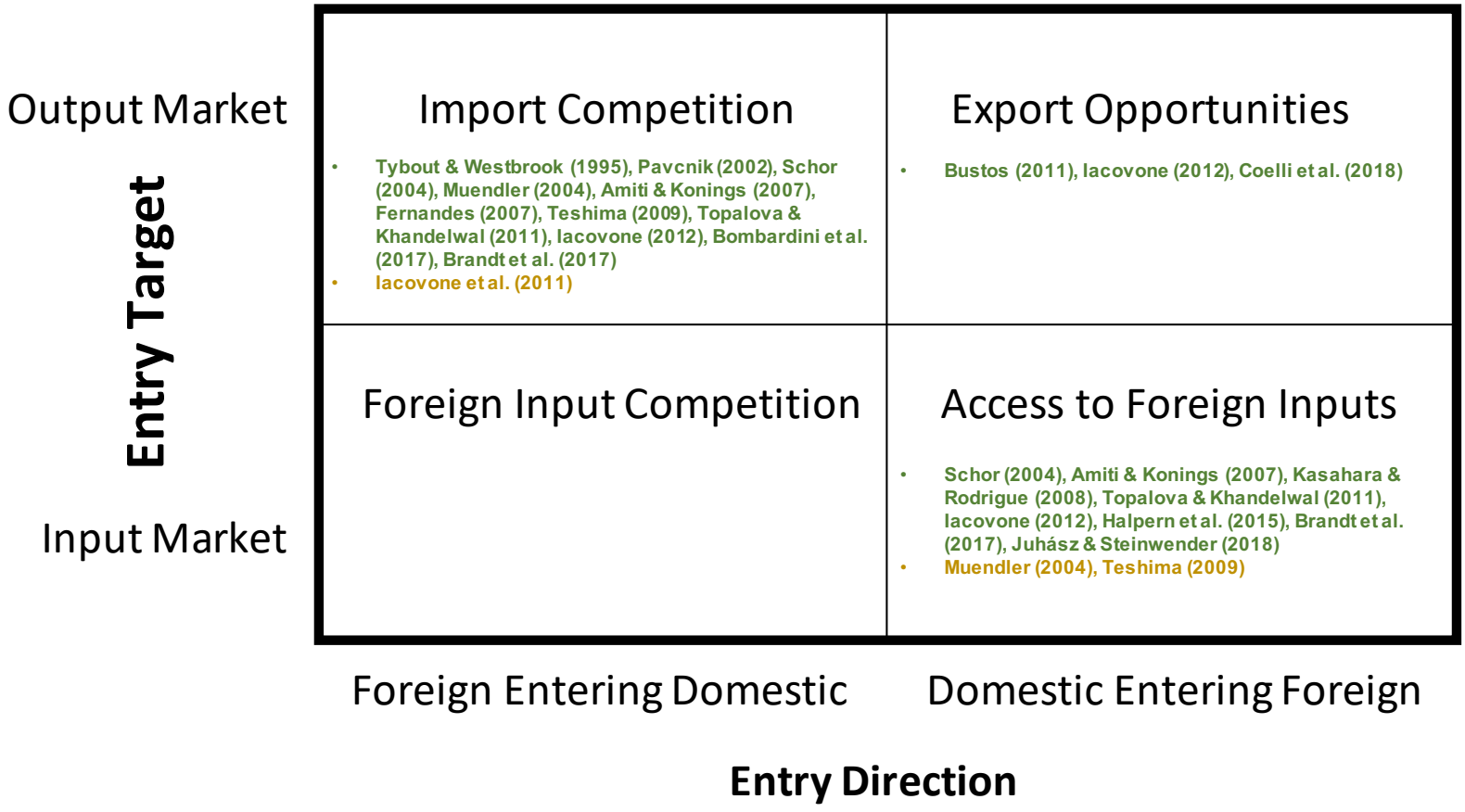
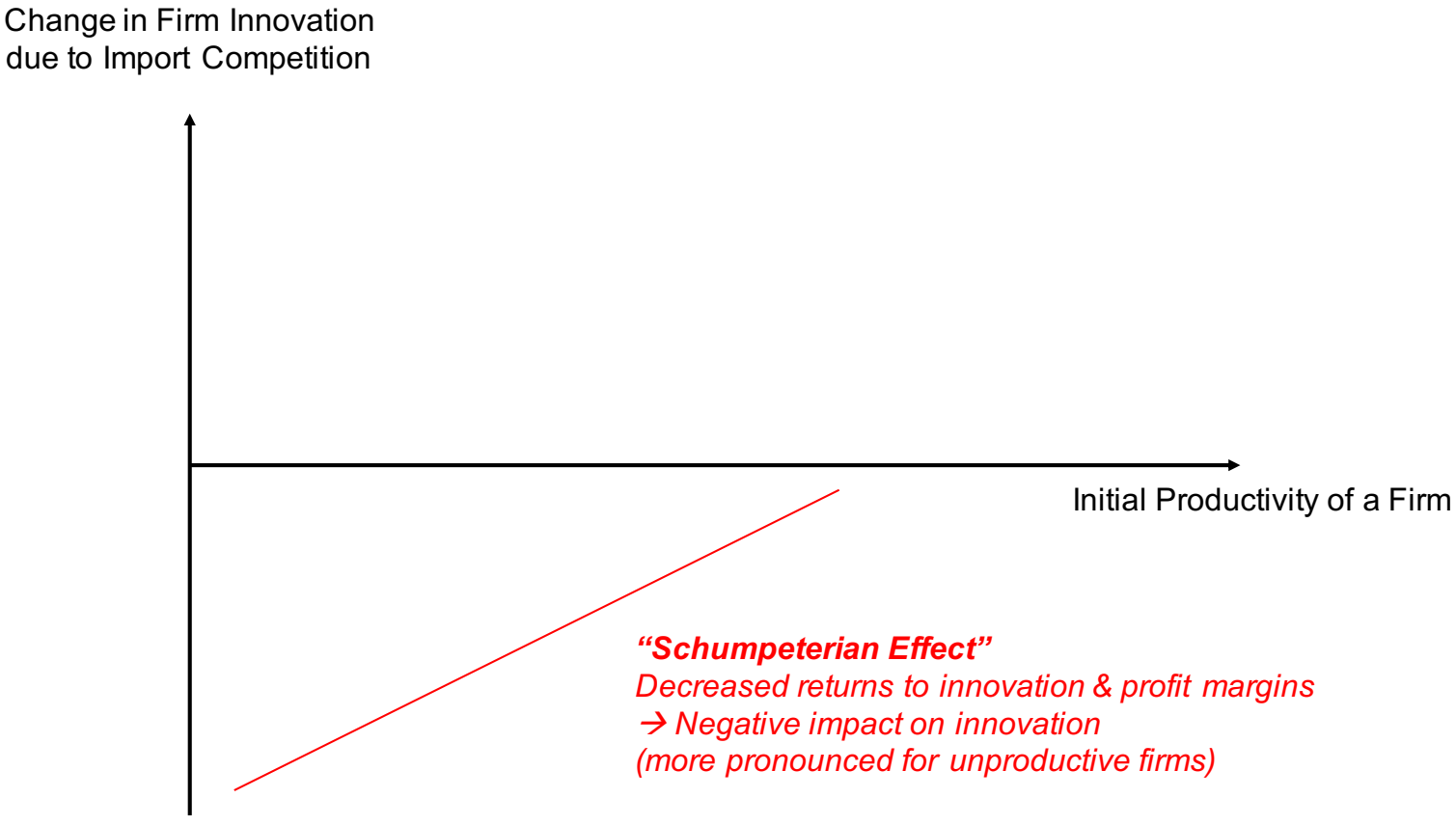


• Positive Evidence • Negative Evidence • Mixed/Insignificant Evidence

Agenda

1. Import Competition
2. Export Opportunities
3. Access to Foreign Inputs
4. Foreign Input Competition
5. Discussion and Conclusion

Import Competition: Theory



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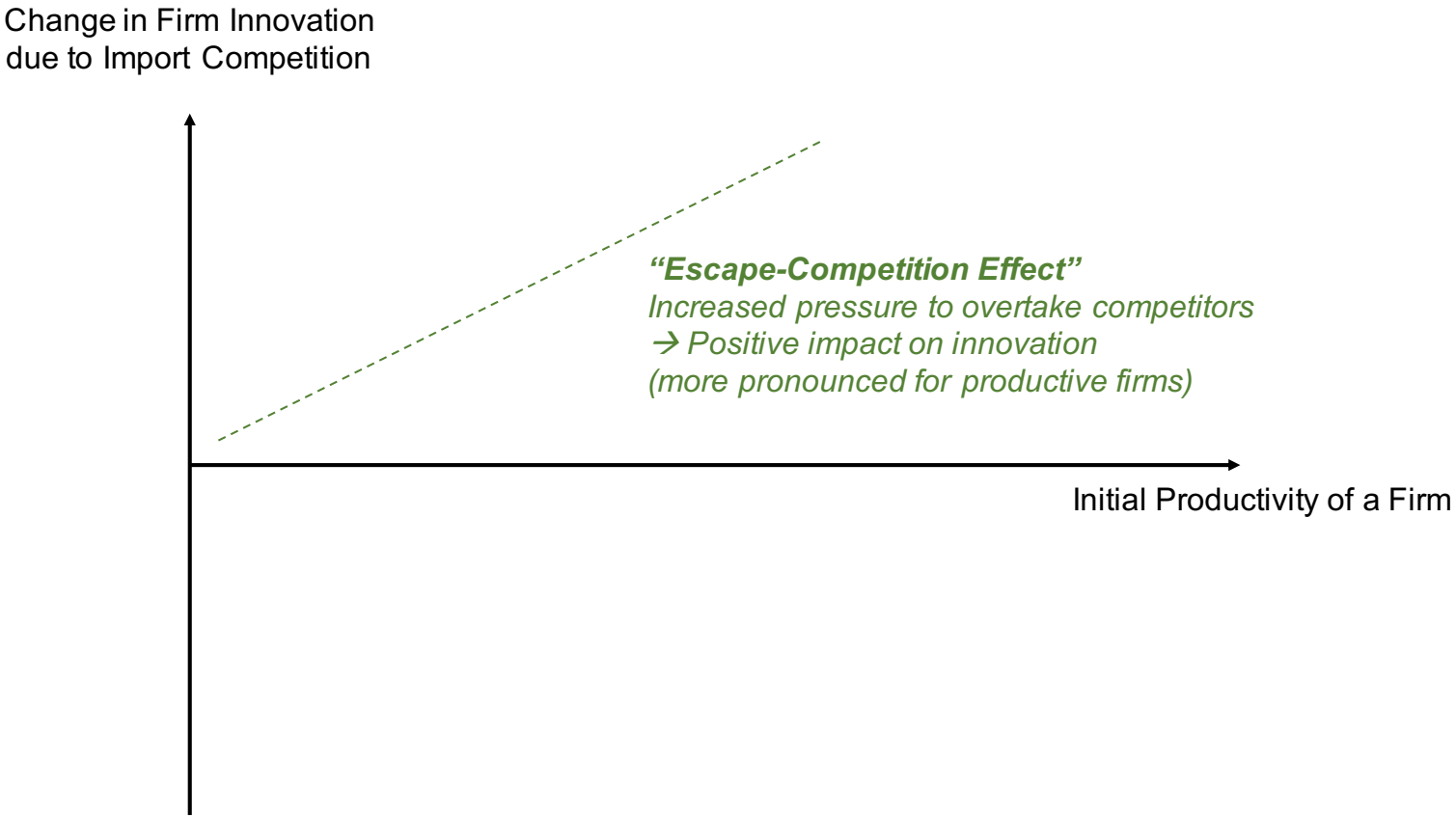

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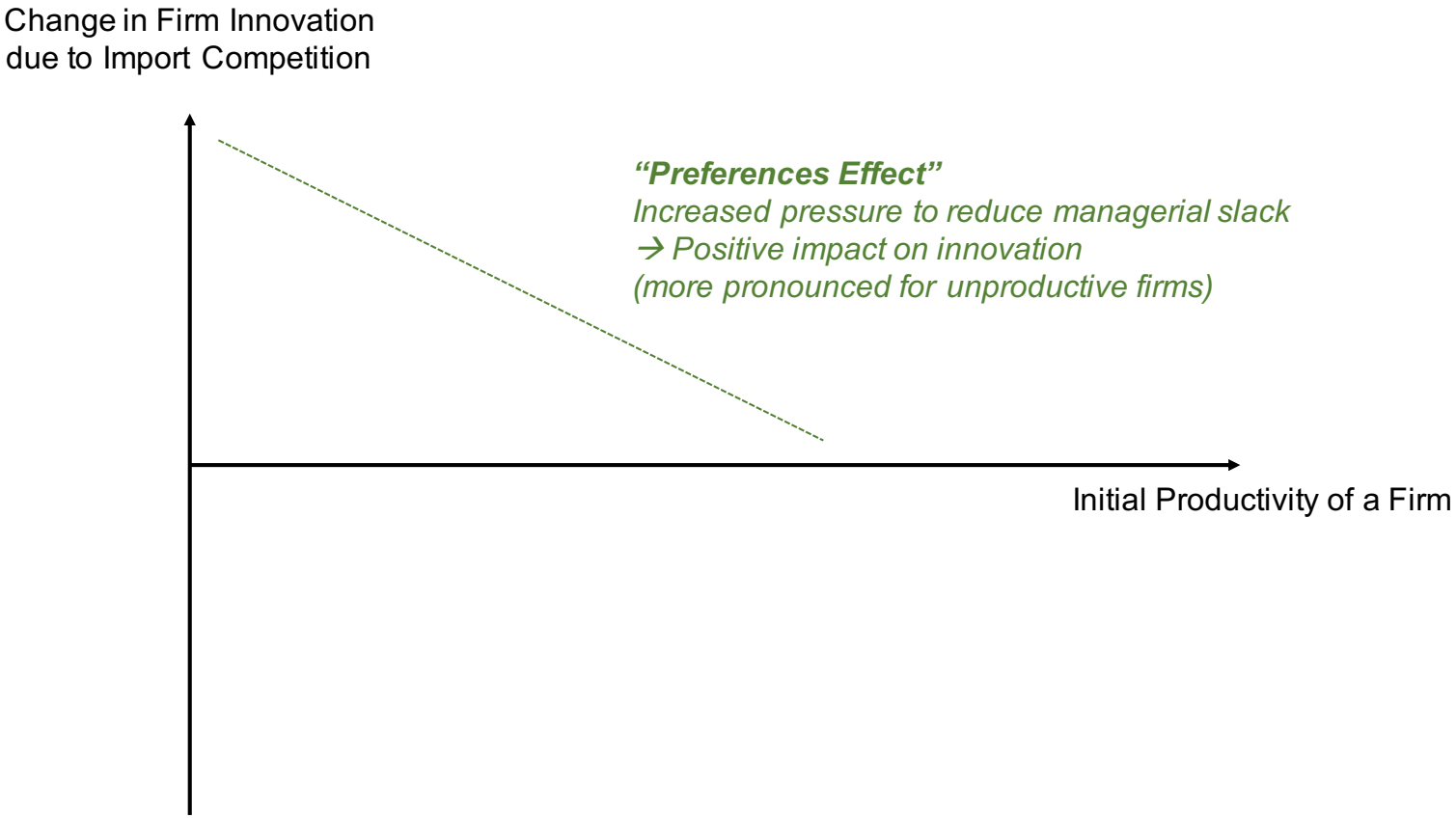

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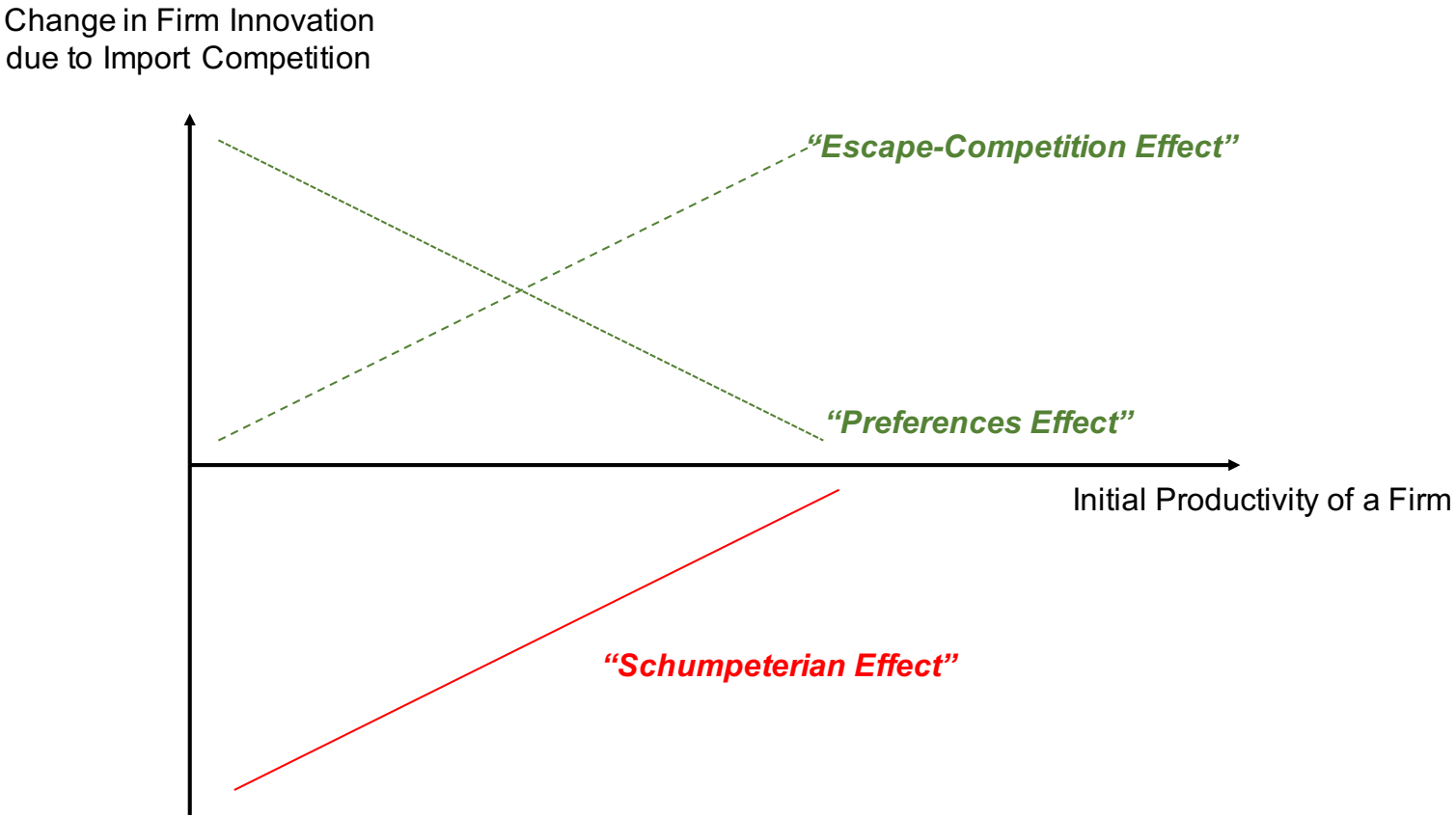
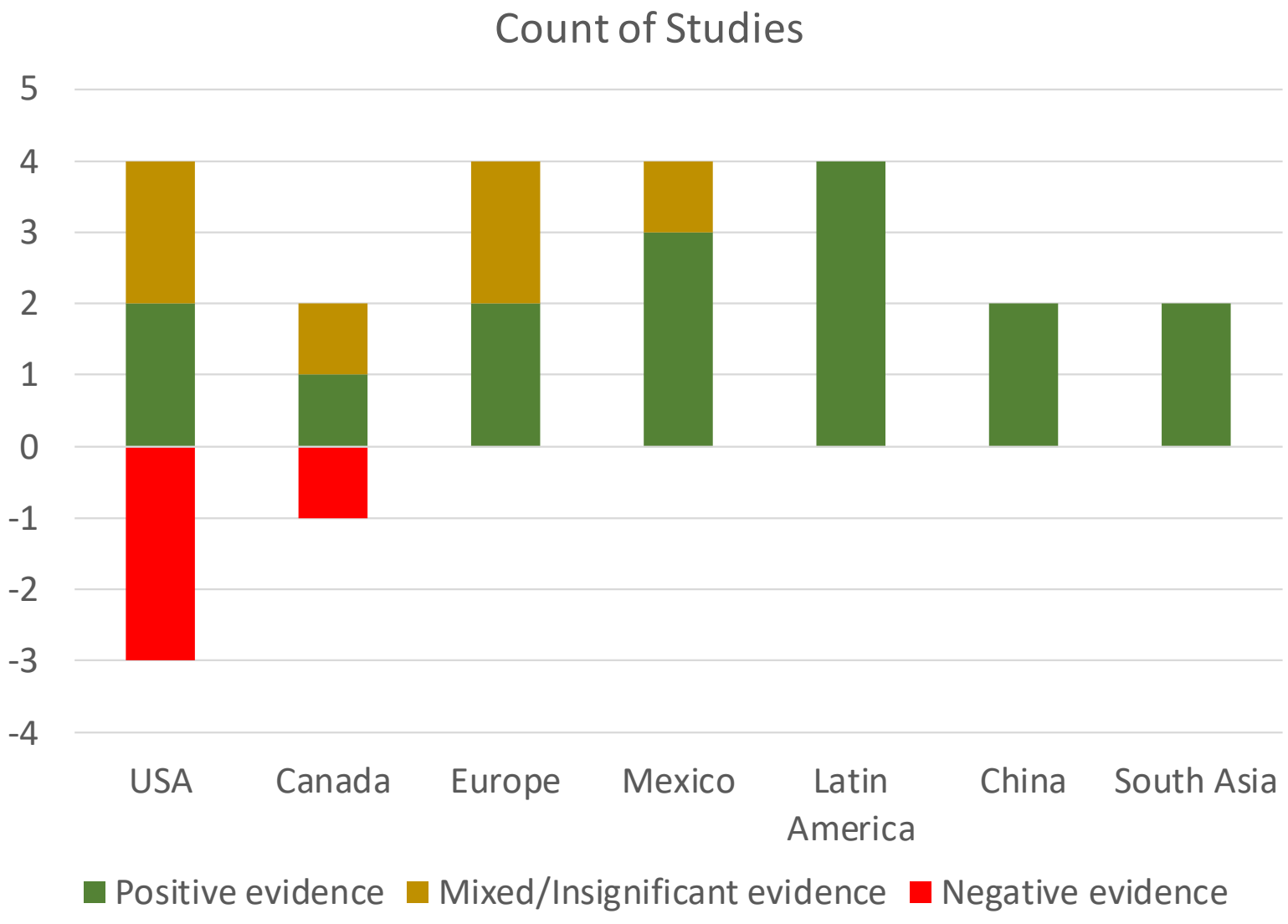


Import Competition: Empirical Evidence



Impact of Chinese Import Competition on US Firms

- Strong evidence of the **"Schumpeterian Effect"**
  - Large US firms downscale both production and innovation in response to the import competition from China; results more negative for initially weaker firms (Autor Dorn Hanson Pisano Shu 2017)
  - Negative impact on firm's financial outcomes, investment, and R&D expenses (Hombert & Matray 2017; Gutierrez & Philippon 2017; Xu & Gong 2017)
- Some evidence of the **"Escape-Competition Effect"**
  - Positive impact on product differentiation for firms with high R&D-stock (which reduces the negative impact on financial outcomes) (Hombert & Matray 2017)
  - Positive impact on investment for firms that are highly productive (Gutierrez & Philippon 2017, Pierce & Schott 2017)
- Reallocation of R&D resources from less productive firms to more productive firms (Xu & Gong 2017)

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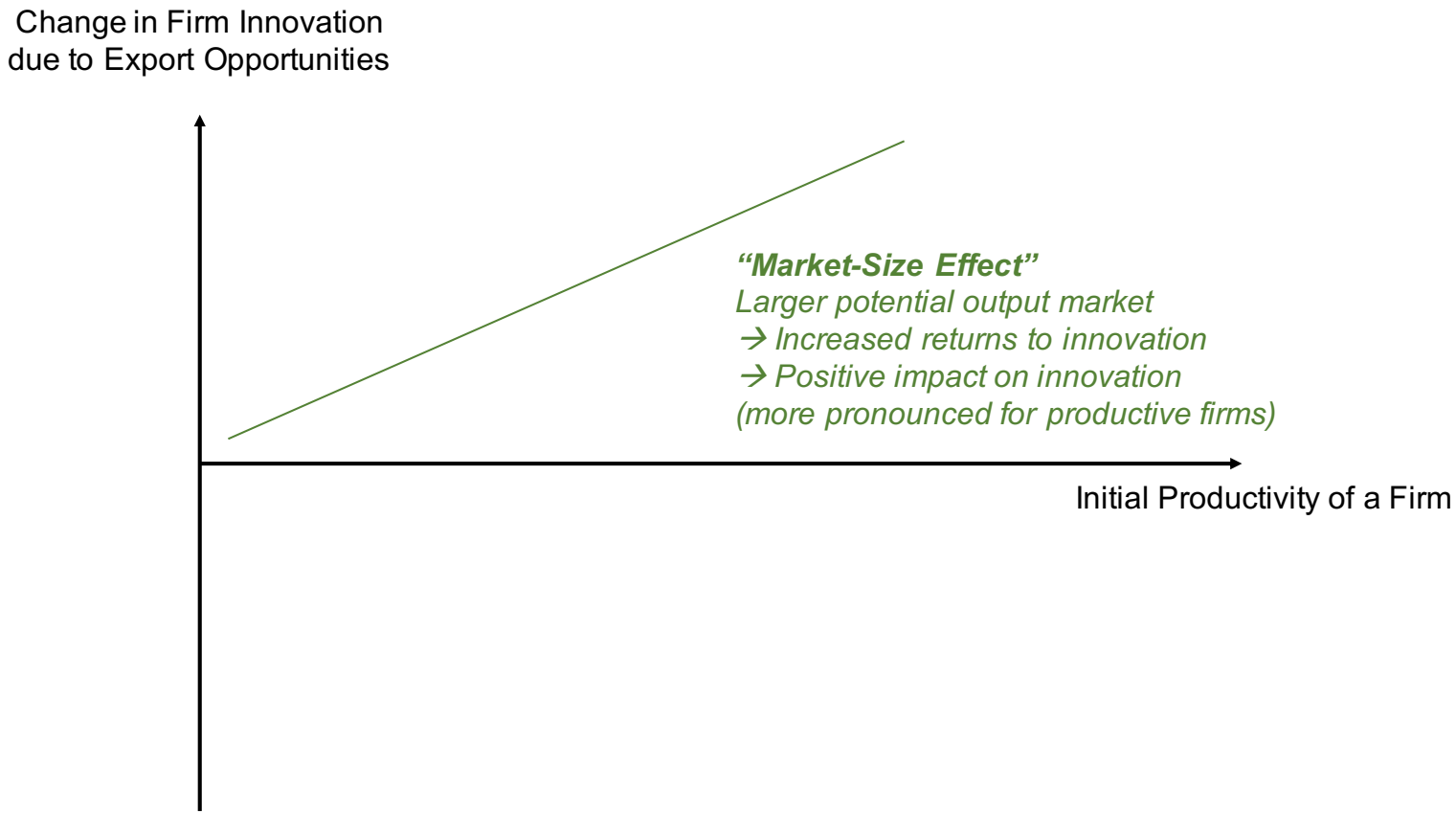
Export Opportunities: Theory



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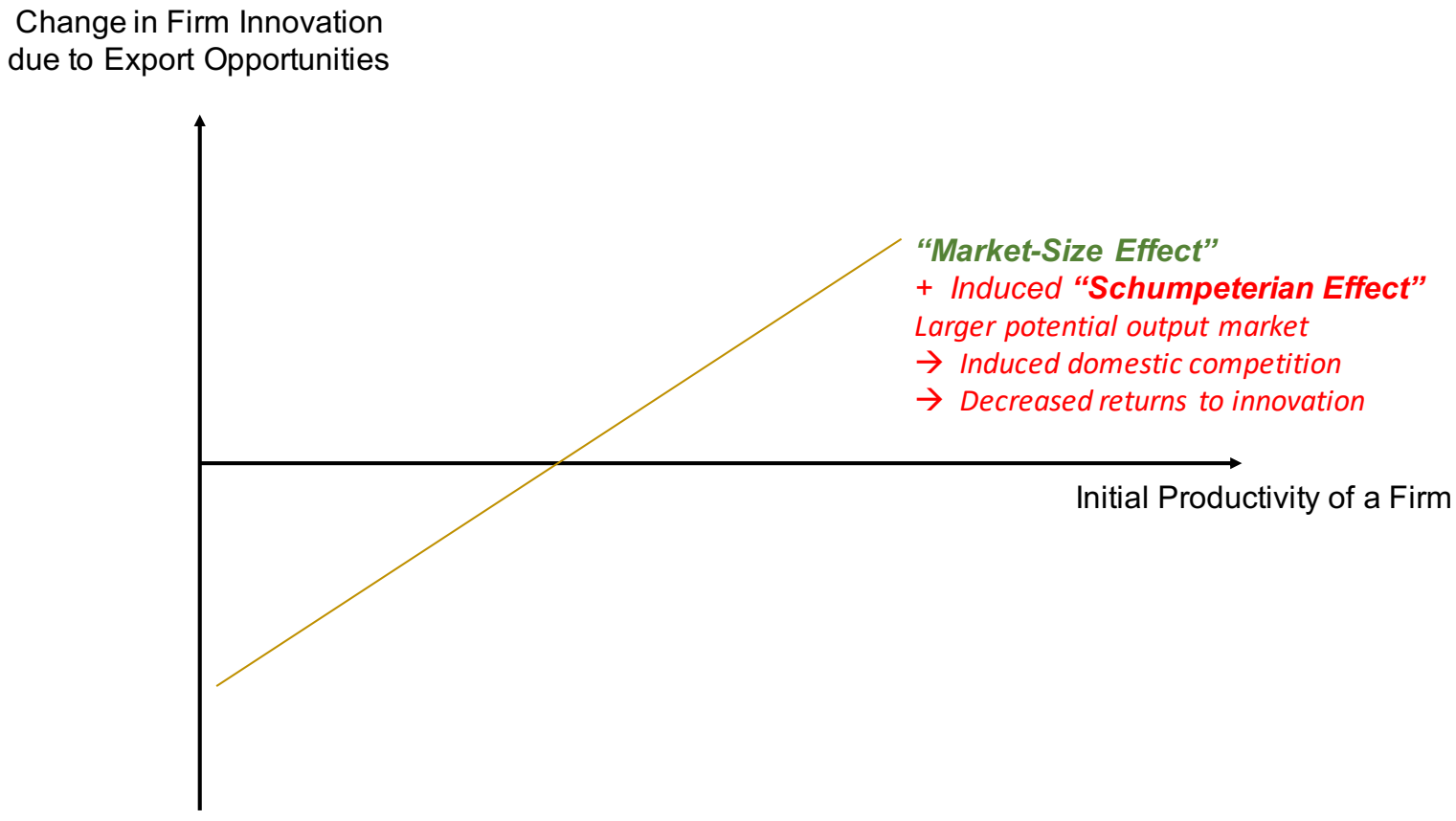

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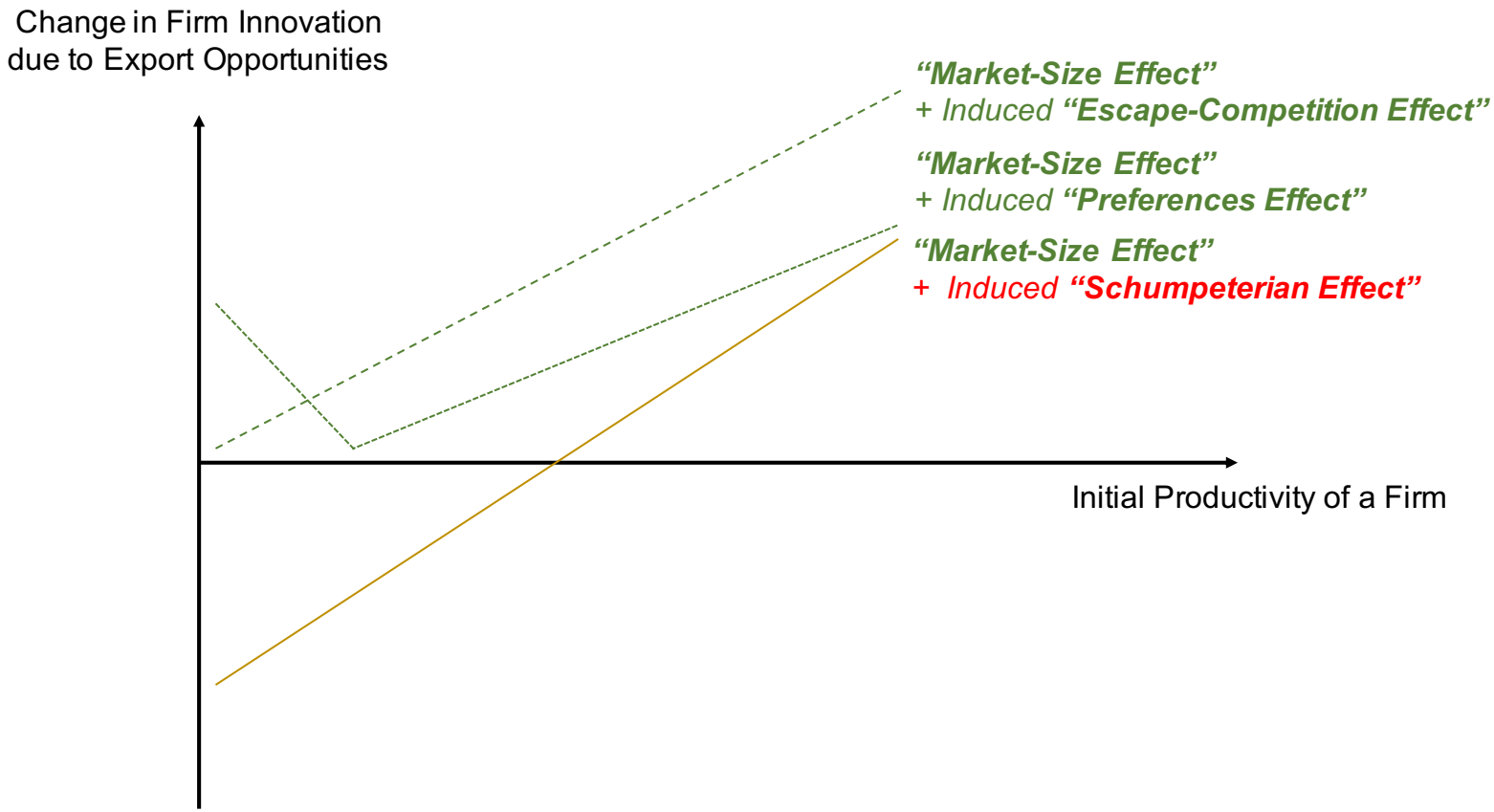
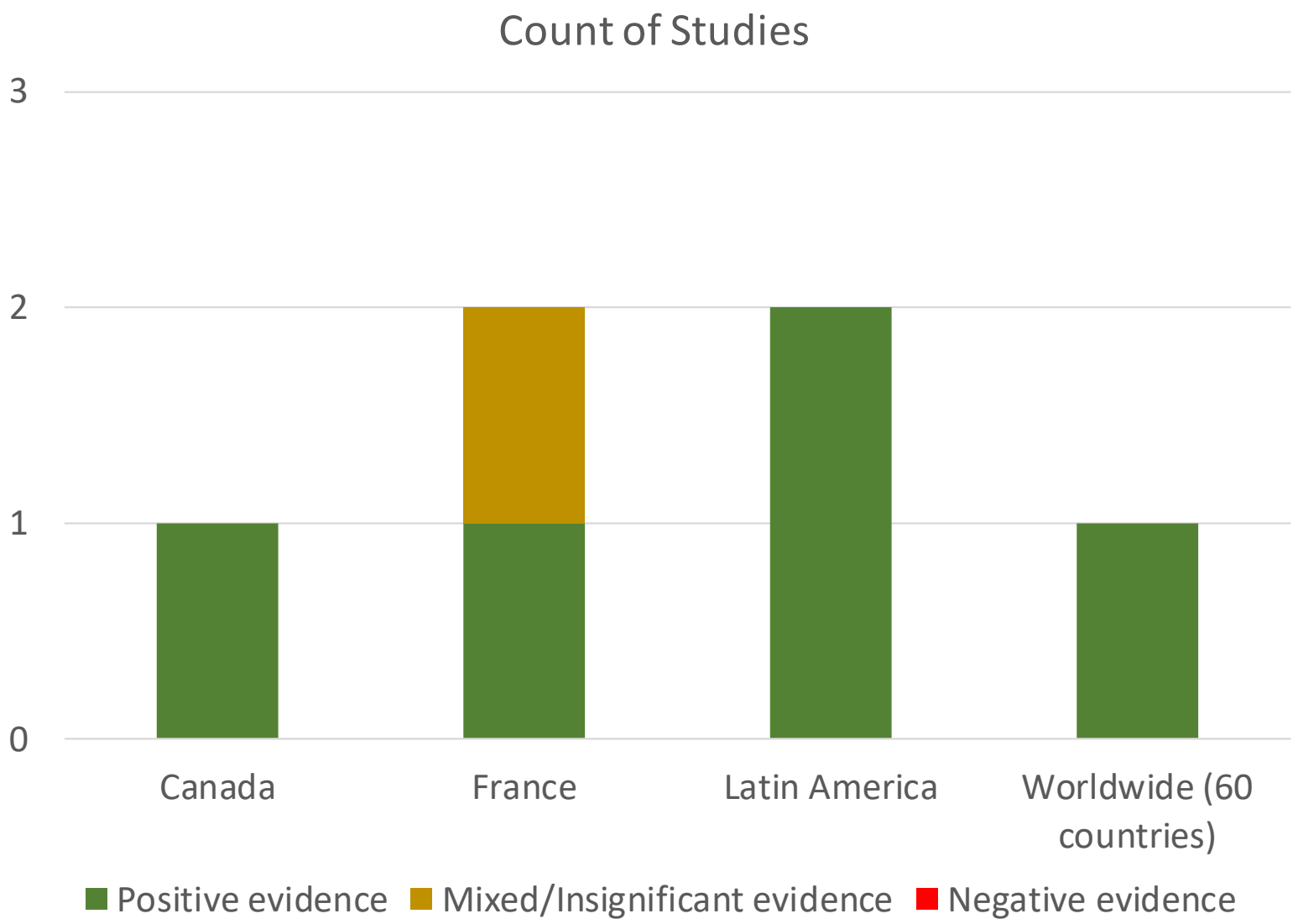


Export Opportunities: Empirical Evidence



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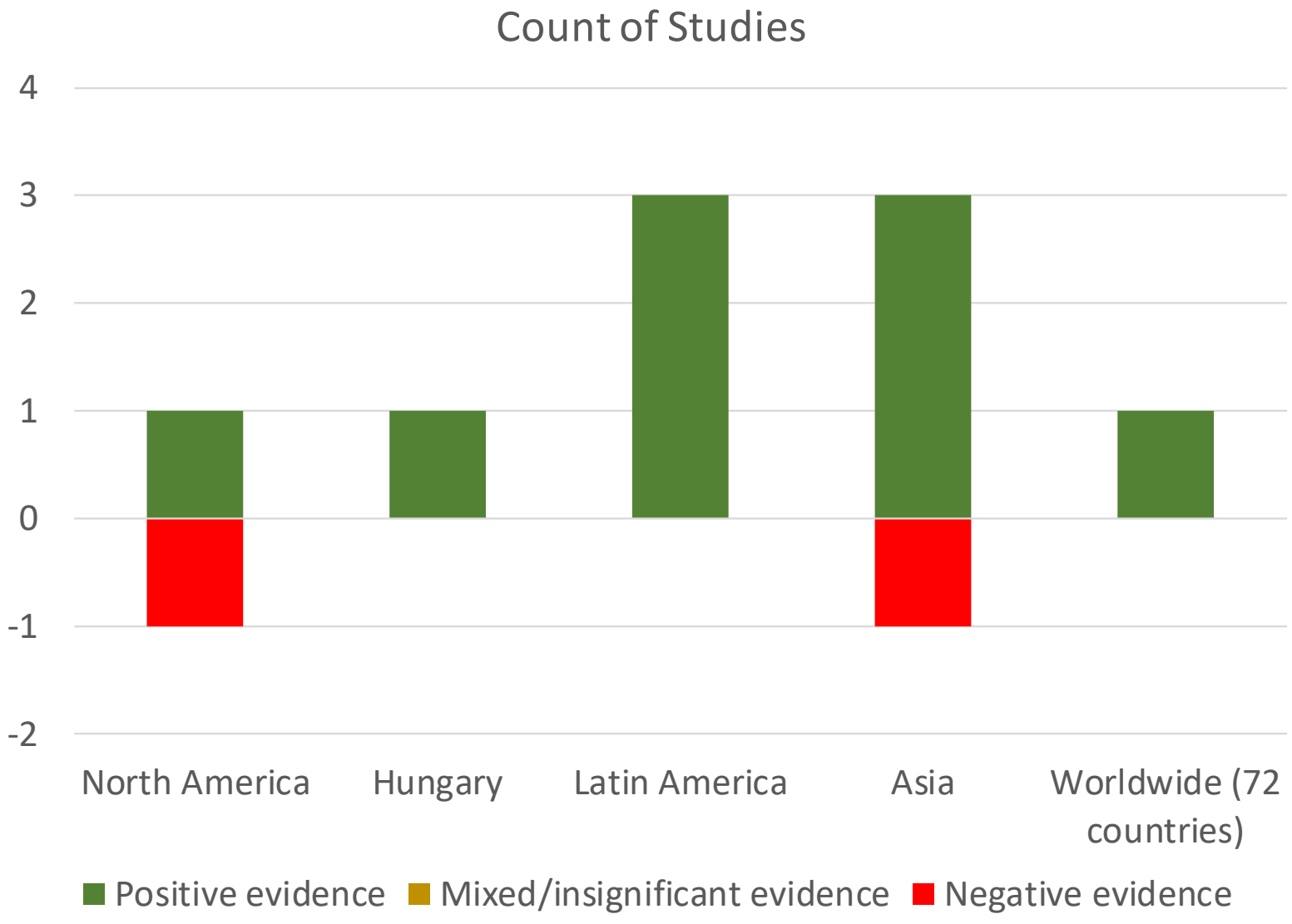
Access to Foreign Inputs: Theory

- **Positive channels**
  - Increases profit margins through reducing input cost
  - Encourages learning
  - Generates "trapped" factors to be re-allocated to innovation
- **Negative channels**
  - Reduces needs for process innovation
  - Increases distance between production and R&D

Access to Foreign Inputs: Empirical Evidence



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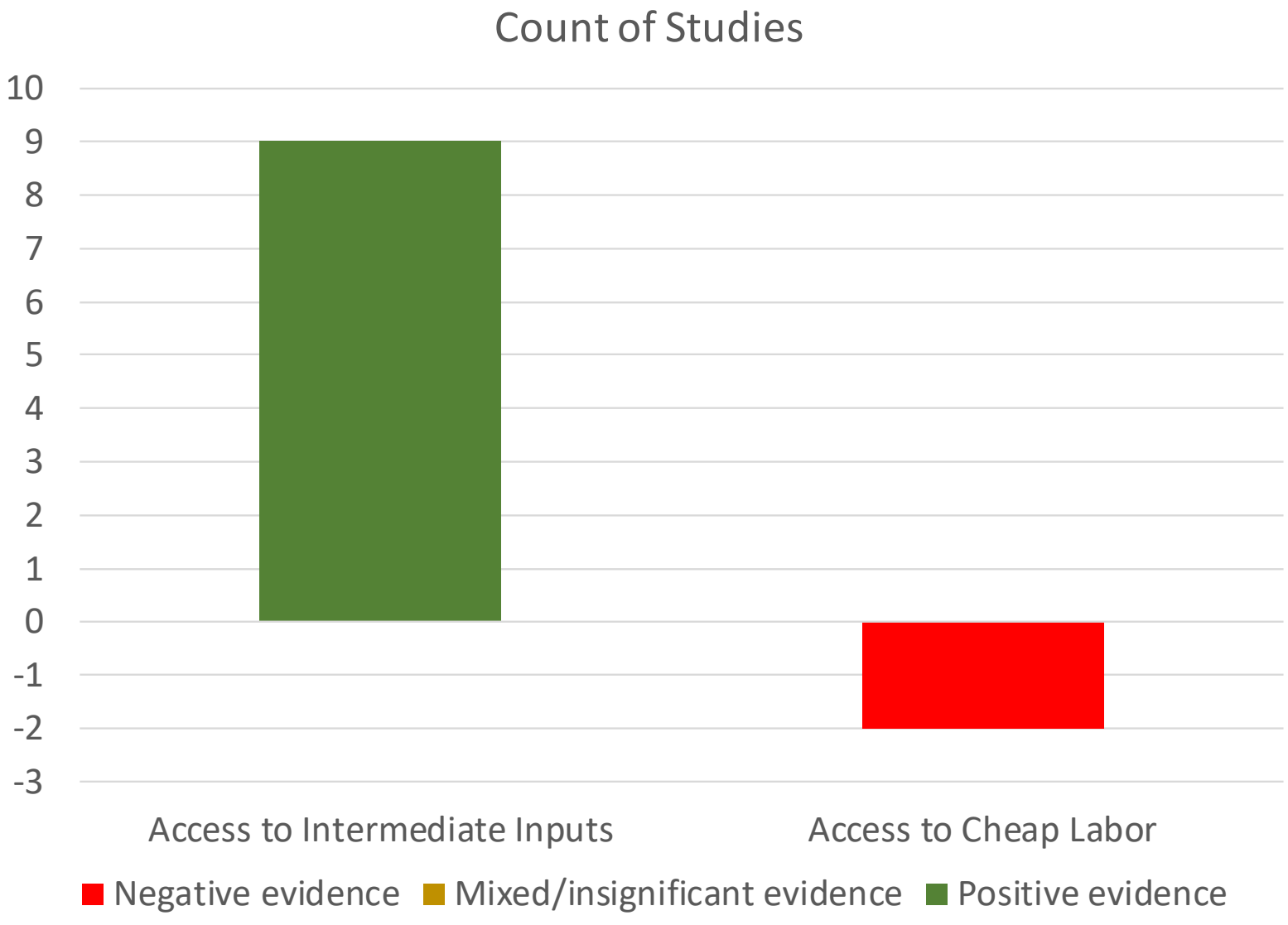

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Foreign Input Competition

- Input cost may rise in the short-run and fall in the long-run
- Positive channels
  - Increases needs for process innovation (if input cost rises)
  - Increases profit margins (if input cost falls)
- Negative channels
  - Reduces profit margins (if input cost rises)
  - Reduces needs for process innovation (if input cost falls)

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Discussion: Trade Policy Implications

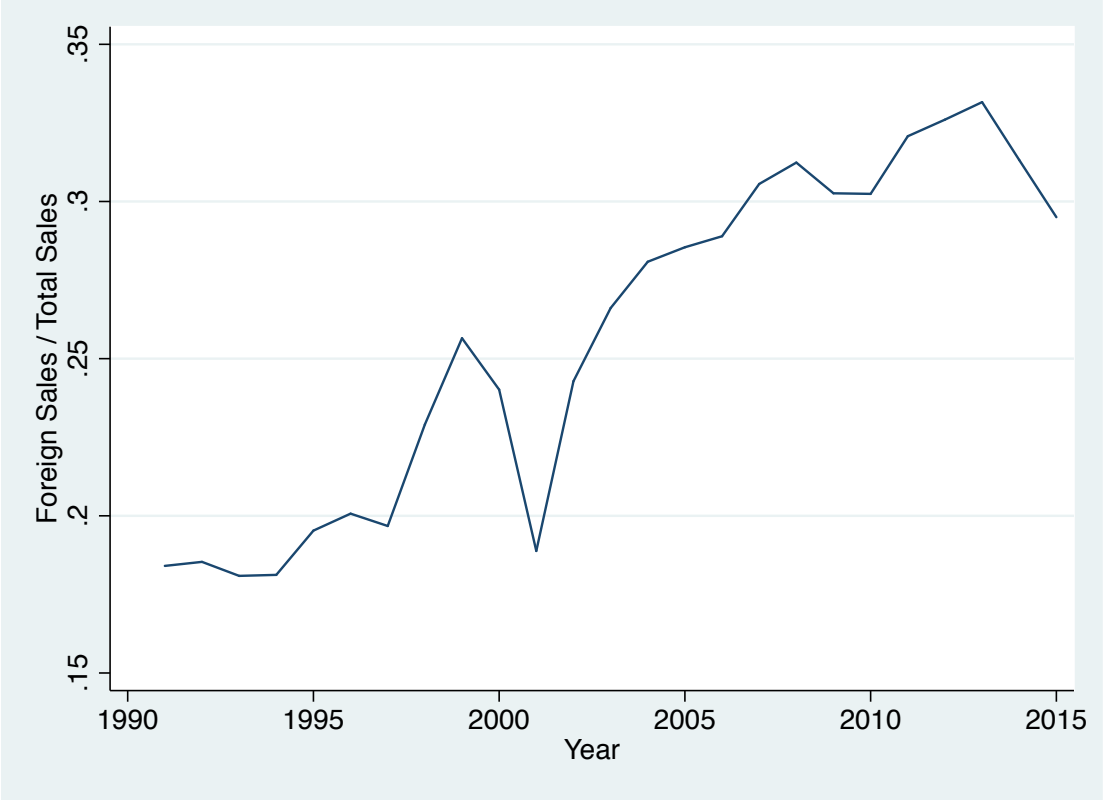
Trade liberalization (opening up)	Protectionism (closing down)
• **Increases returns to innovation due to increased export opportunities**	• **Increases returns to innovation and profit margins due to decreased import competition**
• **Increases opportunities to learn due to increased access to intermediate inputs**	• Increases needs for process innovation due to decreased access to cheap labor
• Increases pressure to escape competition and/or reduce managerial slack due to increased import competition	• Decreases pressure to escape competition and/or reduce managerial slack due to decreased import competition
• **Reduces returns to innovation and profit margins due to increased import competition**	• **Decreases opportunities to learn due to decreased access to intermediate inputs**
• Reduces needs for process innovation due to increased access to cheap labor	• **In case of retaliation: Decreases returns to innovation due to decreased export opportunities**

Discussion: Important Sources of Heterogeneity

1. Heterogeneity by Country :
   - Evidence more positive for firms in developing countries than those in developed countries
   - Potential explanations: distance to production frontier, initial competitiveness of the market
2. Heterogeneity by Industry:
   - Different industries experience different trade shocks
3. Heterogeneity by Firm:
   - Positive effects of trade liberalization tend to concentrate on initially productive firms
   - Negative effects of trade liberalization tend to concentrate on initially unproductive firms

Discussion: Limitations and Opportunities

We need more evidence on the impact of export opportunities on US firms (through both exporting goods and FDI)



Sample: Compustat Firms with Headquarters in the US

Discussion: Limitations and Opportunities

- What is the overall impact aggregating across different trade shocks? How do they interact with each other?
- Are productivity gains from trade generated from a reallocation of resources or original innovation?
- How would the impact differ by FDI versus trading goods?
- What are the effects of foreign input competition?
- How does trade influence the nature and direction of innovation?