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**Selection into outsourcing versus integration strategies for heterogeneous multinationals**

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## Introduction

- The activity of multinational firms has not been studied in a unified framework: either the boundaries of the firm are confined to FDI, or outsourcing is discussed in the vertical model.
- We need to explain the broad range of strategies utilized by multinational firms.
  - About 70% of multinationals do not fit either into vertical or horizontal.
  - Insourcing by FDI versus outsourcing: the share of outsourcing in manufacturing sector is increasing. Among the selected S&P 500 companies, the share of outsourcing in 2002 was 30%, while it increased to 46% in 2012.
  - Outsourcing firms account for 30% of all U.S. multinational parent firms.
- Our research addresses the following questions:
  - What is the relationship between firm productivity and strategies?
  - Is there a "pecking order" of productivity in firms' strategies?
  - Are the location choices for multinationals substitutes or complements?
- We develop a **complex global sourcing model** in which multinational firms can utilize outsourcing as an additional strategy and connect it to the location choice of multinationals.
- With the benchmark that is the generalized version of existing models of FDI, the effect of outsourcing is analyzed at the margins. When the outsourcing option is added, there is a deviation from the optimal offshoring strategy for firms.
- Our model shows that, depending upon industry characteristics such as fixed costs and outsourcing related parameter ( $\mu$ ), the equilibrium regime of firm type (FDI versus Outsourcing) is determined.

## General structure of trade

- Three countries:**  $N_1$ ,  $N_2$  (together comprise  $N$ ), and  $S$ 
  - $N_1$  and  $N_2$  are fully symmetric.
  - $r \in \{N_1, N_2, S\}$ : the country of origin
- Two sectors:** differentiated ( $X$ ) and homogenous ( $Y$ )
  - Differentiated: monopolistically competitive, two intermediates ( $Q_I$  and  $Q_S$ ) required
  - Homogeneous: perfectly competitive, one intermediate ( $Q_I$ ) required
  - Multinational firms arise in the differentiated goods sector.
- Two endowments:** low-skilled ( $\bar{L}$ ) and skilled ( $\bar{S}$ ) labor
  - They are distributed asymmetrically across regions.
  - $N_1$  and  $N_2$  have both  $\bar{L}$  and  $\bar{S}$ , while  $S$  has  $\bar{L}$  only.
  - $Q_I$ : low-skilled intensive,  $Q_S$ : skilled intensive (with 1:1)
- Fixed costs:** opening a foreign affiliate incurs the fixed costs, which depend either upon the type of intermediates or strategy of the firm.
  - $f^I$ : FDI for intermediate  $Q_I$
  - $f^S$ : FDI for intermediate  $Q_S$
  - $f^O$ : outsourcing of intermediate  $Q_I$
- Productivity:** a firm learns its productivity ( $\psi$ ) and chooses what strategy it follows. This leads to the marginal costs difference across firms.

## Insourcing by FDI (benchmark)

By integrating the production process in the firm's boundaries, the market  $d$  can be served from  $r$  by

- National (Nat) firm:** finishes all of the production processes at home and exports the final goods to the destination countries.
- Vertical (V) firm:** opens a foreign affiliate in  $S$  for intermediate  $Q_I$  and exports the final goods to the destination countries.
- Complex (C) firm:** invests in two different locations to produce intermediates,  $Q_I$  and  $Q_S$ , and exports the final goods to  $S$ .

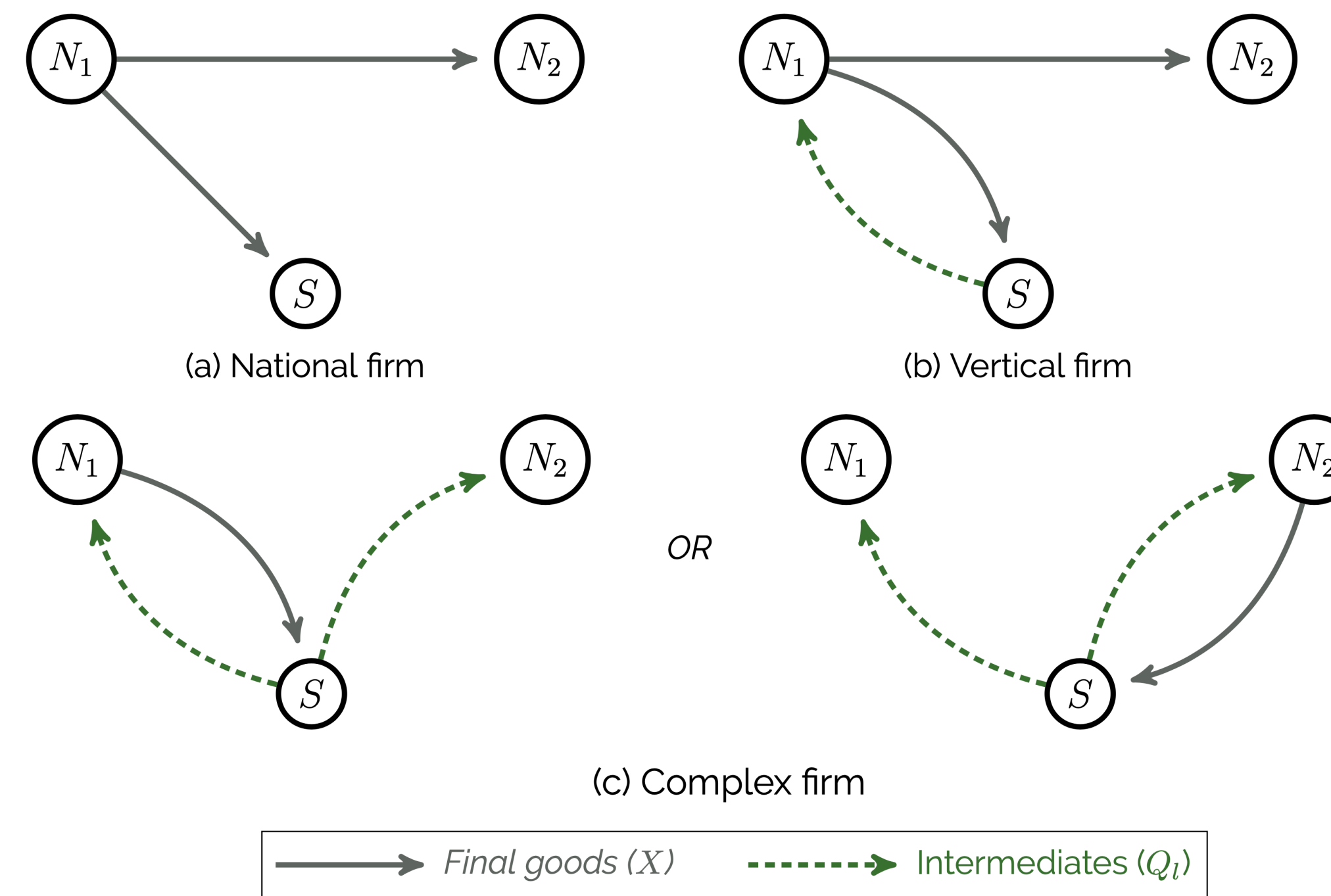


Figure 1. Structure of trade by firm type

Along with the envelope of operating profits, the firm type is determined. Higher productivity induces self-selection into the firm engaging in a more complicated strategy.

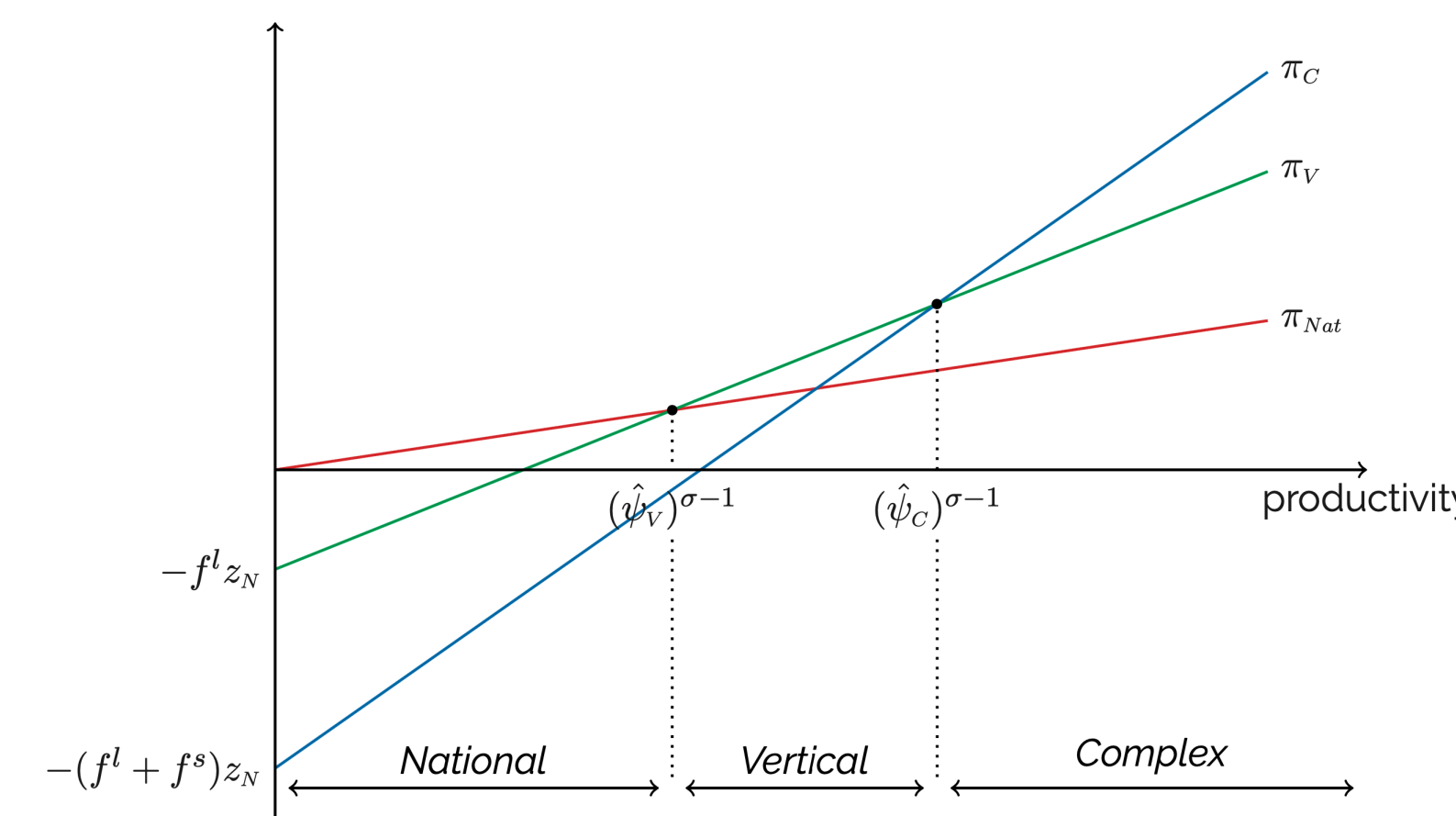


Figure 2. Productivity Spread

## The equilibrium regime - FDI versus outsourcing

- Firms have the option to outsource intermediate  $Q_I$  to foreign suppliers in  $S$ , but this indicates a trade-off.
- By outsourcing, the firm can save on governance costs reflected in a marginal costs decrease:  $\tilde{\psi}(\omega) = \lambda\psi(\omega)$  where  $\lambda > 1$ . Outsourcing might, however, cause contractual friction that leads to a loss of efficiency in production.  $\mu \equiv \lambda^{\sigma-1}\Gamma \in [0, \infty)$  represents the trade-off between two forces of outsourcing, reduction in the marginal costs and contractual friction.
- Vertical and complex firms can now switch their strategy from insourcing to outsourcing. We define them as **Outsourcing (O)** and **Complex-Outsourcing (CO)** types.
- Depending upon the value of parameters, the types of firms existing in equilibrium are settled. For example, the regime of  $Nat - O - CO$  represents that national, outsourcing, and complex-outsourcing firms are active and arranged by productivity in equilibrium.

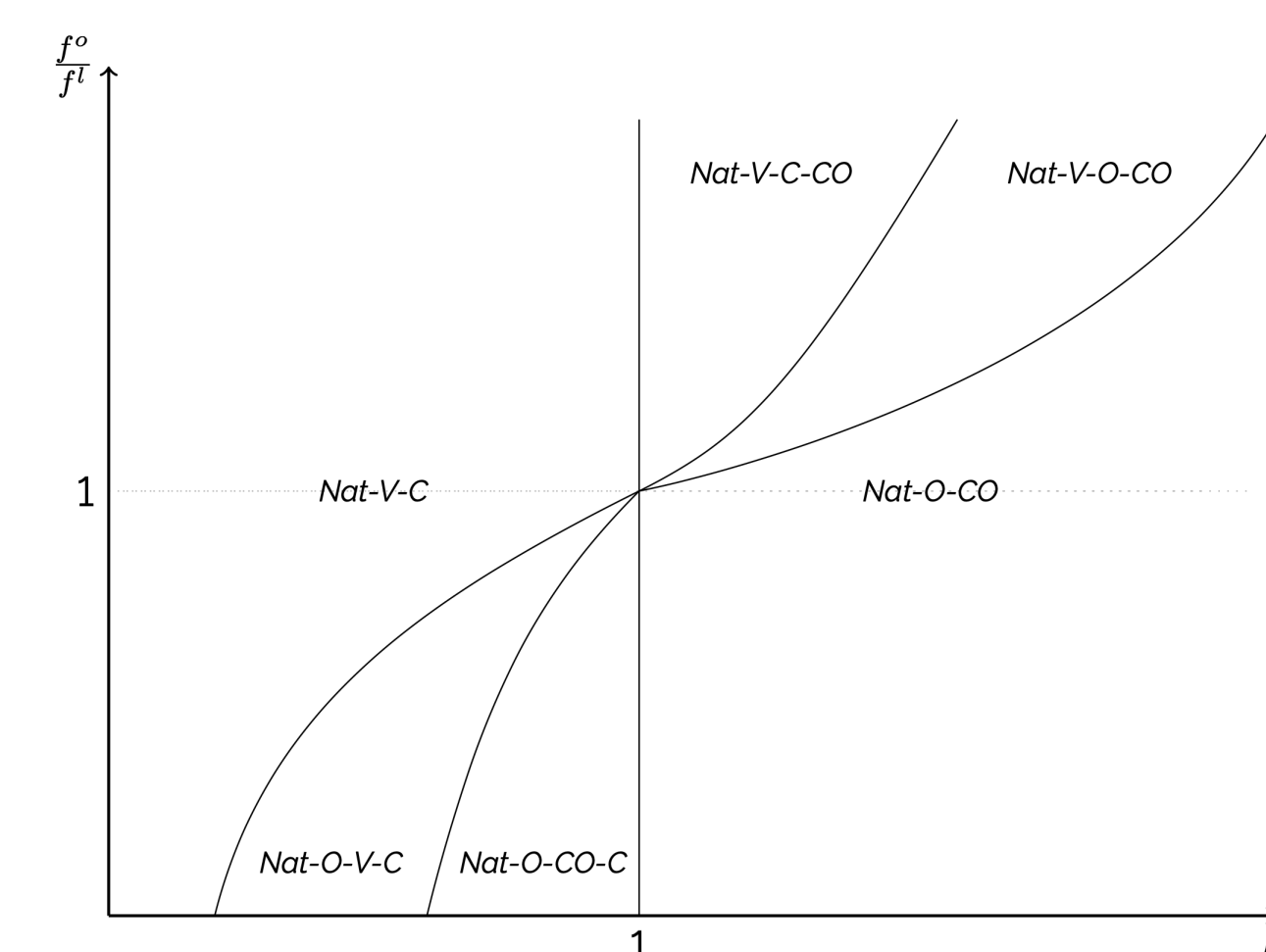


Figure 3. The equilibrium regime

## Case 1. Fewer fixed costs with contractual friction

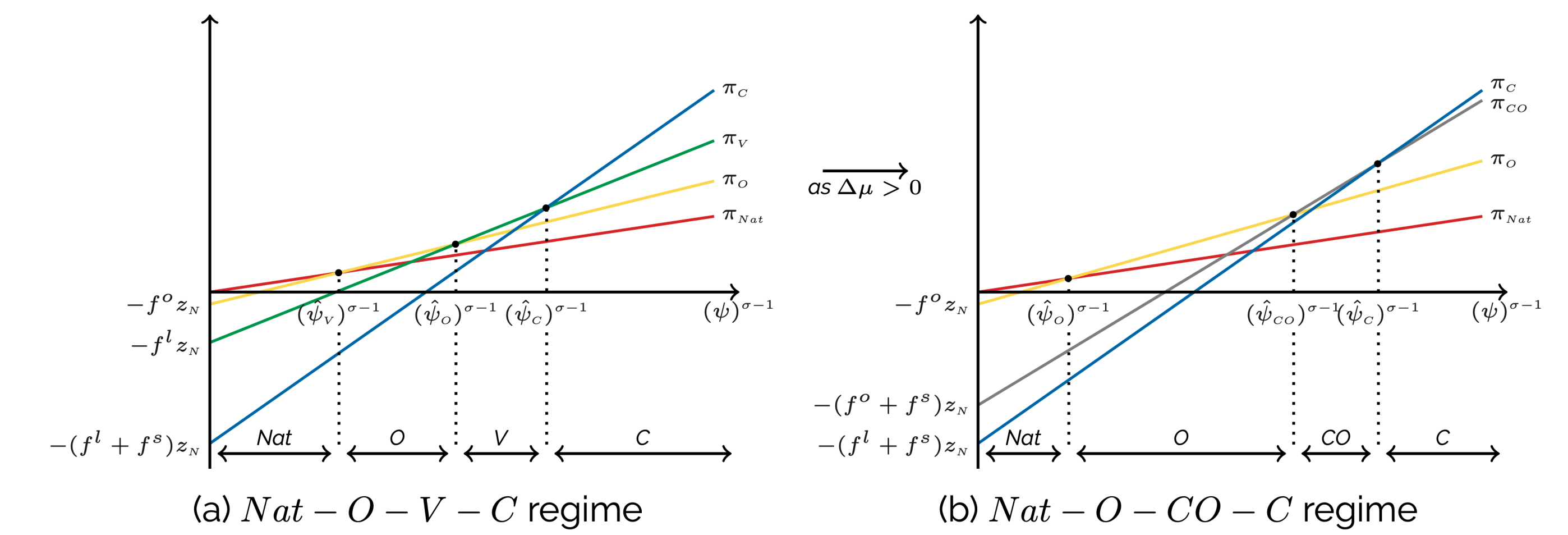


Figure 4. Regime shifting with a decrease in contractual friction

- The most productive firm engages in the complex strategy, however, mid-productive firms change their strategy from integration to outsourcing.
- As contractual friction decreases ( $\Delta\mu > 0$ ), firms have growing incentives to utilize the outsourcing option more aggressively, which lead to an  $Nat - O - CO - C$  regime.

## Case 2. More fixed costs with reduction in the marginal costs

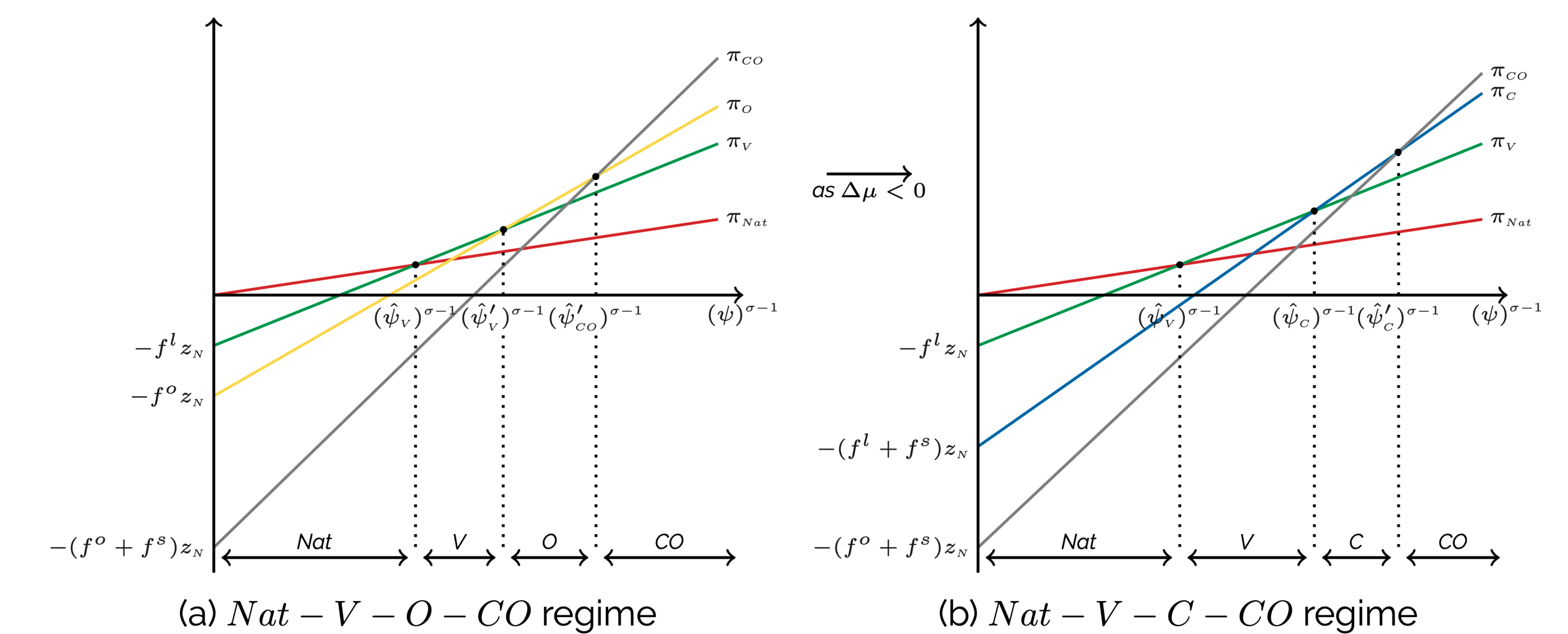


Figure 5. Regime shifting with a increase in contractual friction

- The benefit from reduction in the marginal costs is substantial in a  $Nat - V - O - CO$  regime due to less contractual friction.
- As contractual friction increases ( $\Delta\mu < 0$ ), a new regime ( $Nat - V - C - CO$ ) arises.
- While enjoying the advantages of outsourcing, fixed costs become a burden to firms using the outsourcing strategy. The most productive firms keep engaging in complex-outsourcing, but less productive firms using the outsourcing strategy shift into a complex FDI strategy.

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