Who Reshores?

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Abstract

This paper examines the investment types of 1,200 multinational corporations (MNCs) in South Korea from 2008 to 2019, categorizing them into four distinct types: expander, offshorer, reshorer, and idler, based on whether they invest or divest domestically or abroad. We analyze factors associated with investment type choices and find that reshorers tend to be significantly smaller in size, less productive, and less R&D-intensive than expanders. Compared to offshorers, reshorers typically have less experience in foreign production, invest in geographically closer countries, and rely more on labor-intensive operations, suggesting they face lower barriers to bringing activities back home. Among external factors, labor costs critically shape offshoring vs. reshoring choices. While reshorers experience short-term sales and employment growth, they exhibit the lowest productivity gains, risking long-term competitiveness. In contrast, offshorers boost productivity rapidly but cut domestic employment. These findings underscore the economic trade-offs in reshoring.

Keywords: Reshoring, Offshoring, MNCs, Self-selection, Sunk cost
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1 Introduction

Prior to the 2010s, the global economy was progressing toward maximizing the benefits of the international division of labor. Firms were establishing subsidiaries in countries with cheap labor, thereby systematically expanding the intermediate trade network across countries, known as the global supply chain. Participating in this supply chain was seen as mutually beneficial for everybody. However, in developed economies, concerns over domestic industrial hollowing out due to offshoring had been increasingly voiced simultaneously. The global financial crisis (GFC) of 2008-09, which led to economic recessions in these economies, brought such concerns to the forefront. This period marked the beginning of serious policy discussions on reshoring. Since the 2010s, significant events such as the Great East Japan Earthquake, the US-China trade disputes, the COVID-19 pandemic, and the Russia-Ukraine war have only reinforced the necessity for economic security through reshoring.[1]

Despite the significant concerns from policy circles—and in contrast to the extensive literature on offshoring—studies on reshoring remain quite deficient. One potential reason is that, once reshoring is treated as the reversal of offshoring, economic effects of reshoring can be drawn inversely from the existing offshoring literature. However, what factors prompt firms that initially offshored to subsequently reshore? And if the driving factors are not symmetric between offshoring and reshoring, would their economic effects be symmetric? While factors such as rising wages in low-wage countries, geopolitical instability, and home country's industrial policies are assumed to trigger reshoring, it is crucial to identify which one plays key roles and whether the economic effects truly mirror those of offshoring. Moreover, the approach to offshoring and reshoring should not be dictated solely by security imperatives. These are strategic decisions made by firms in pursuit of profit, necessitating a detailed analysis of economic incentives and impacts to determine the best course of action.

This paper seeks to address these questions through a systematic empirical analysis. Using data from the 2010s, we examine the investment decisions of 1,200 multinational corporations (MNCs) headquartered in the South Korean manufacturing sector. Specifically, we categorize MNCs into four mutually exclusive and collectively exhaustive (MECE) groups based on their investment strategies: offshorer, reshorer, expander (firms investing both domestically and abroad), and idler (firms withholding or divesting investments in both locations). This MECE classification enables a unified framework for analyzing MNCs' global investment patterns, encompassing both their static distribution across these categories and their transitions over time. Additionally, we investigate the firm-level characteristics associated with each investment type and the subsequent economic outcomes, thereby providing a comprehensive assessment of MNCs' strategic investment decisions.

[1] In the case of South Korea, the issue was compounded by Japan's semiconductor material export restrictions, elevating reshoring to a matter of national security.

The findings from the analyses can be summarized as a handful of stylized facts. When the sample period from 2008 to 2019 is divided into four periods (Period 0: 2008-10, Period 1: 2011-13, Period 2: 2014-16, Period 3: 2017-19), we find that the four investment types were relatively stable and evenly distributed, with offshorers and reshorers accounting for approximately 20% and 24%, respectively. A major reason for the consistent distribution across periods is the tendency of MNCs to continue their current investment strategies into the next period. For instance, about 40% of MNCs that chose reshoring repeated the same decision in the subsequent period. Additionally, nearly 30% of reshorers transitioned to idler next period, raising concerns about the long-term competitiveness of reshoring.

Further analysis of factors influencing investment type decisions indicates that offshoring and reshoring are strategic and rational decisions made in response to the external and internal environments faced by individual MNCs at the time. Expanders exhibited significantly greater size, productivity, and R&D investment ratios compared to other investment types. Given their high productivity and growth potential, simultaneous expansion in both home and foreign is rational. Offshorers, while smaller than expanders, were larger than the other two types and leveraged their relatively high productivity and extensive experience in foreign markets. Conversely, reshoring was predominantly chosen by firms with less foreign market experience, proximity to South Korea, labor-intensive operations, and lower productivity. These firms found it less burdensome to relocate their foreign operations to home country, making reshoring a rational choice based on their productivity levels. Idlers shared characteristics with reshorers but had even lower productivity, aligning with their chosen investment strategy.

Building on the influence of internal characteristics, external economic conditions also significantly influenced MNC's investment decision. Labor costs in foreign countries, along with the comparative advantages of production in foreign host countries, are significant factors in offshoring vs. reshoring decisions, a finding largely consistent with the literature (See, e.g., Blonigen and Piger, 2014). In particular, the sharp increase in South Korea's minimum wage in 2018 and 2019 also contributed to MNCs' preference for offshoring over other investment types (Ahn et al., 2022).

Examining the average changes within each type after implementing their investments, reshorers initially experienced quantitative growth, such as increased sales and employment, due to expanded domestic investments. However, their productivity turned out to be initially low, and the growth rate of their productivity lagged behind the other three types. Concurrently, the reduction (or cessation) of foreign production activities was not offset by increases in exports, distancing them from international markets.[2] Thus, the initial growth for reshorers is unlikely to be sustainable. In contrast, offshorers showed the highest improvements in pro-

[2]While the reshorers increased imports significantly, their exports did not grow (positive, but statistically not different from zero).

ductivity but experienced negative domestic employment growth due to reduced (or postponed) domestic production activities. Given these economic trade-offs, it is challenging to support either offshoring or reshoring exclusively from a policy perspective.

This paper relates and contributes to the literature on MNCs' investment or sourcing decisions in at least three key ways. The First strand focuses on MNCs' investment decisions, particularly through foreign direct investment (FDI), finding that MNCs evaluate both internal capabilities and external market conditions when determining whether and where to establish foreign affiliates.[3] For example, Helpman et al. (2004) and Yeaple (2009) show that productive firms favor FDI over exports. Brainard (1997) highlights trade costs and proximity driving overseas investment, while Chen and Moore (2010) note productive MNEs target challenging markets. Desai et al. (2005, 2009) reveal that FDI can have complement domestic investment, and consistently, Bernard et al. (2018) emphasize how global firms' strategies are interdependent across multiple dimensions. Building on this foundation of MNC behavior, our analysis expands the perspective by incorporating the invest-versus-divest (including withhold) dimension into the MNCs' location choice problem.

The second strand investigates offshoring, where firms source part of their production abroad through FDI or foreign outsourcing. While most studies focus on its economic effects, research also explores the determinants of offshoring decisions.[4] Antràs and Helpman (2004) extend Melitz (2003) to show that productive firms prefer offshoring, with FDI's higher fixed costs favoring the most productive ones. Antràs et al. (2017) further demonstrate that firms self-select into offshoring based on productivity and country-specific factors, revealing complementarities across source locations that interact via cost functions (See also Bernard et al. 2018). Bernard et al. (2020) find that offshoring leads firms to reorganize their headquarters by reallocating domestic resources toward innovation and higher-quality goods, generating additional productivity gains.

The third body of research tackles reshoring, a potential reversal of offshoring, that has gained increasing academic interest but remains understudied. A few recent works specifically examine how domestic automation and robot adoption influence reshoring decisions. Faber (2020) and Krenz et al. (2021) argue that automation encourages reshoring by reducing domestic labor costs, whereas Artuc et al. (2023) and Stapleton and Webb (2023) suggest that automation instead reinforces offshoring by making global production more efficient. Beyond automation as a driver of reshoring, Antràs (2020) highlights that firms incur additional sunk costs when reshoring, making reversal more costly. Despite these costs, Grossman et al. (2023) argue that firms may still weigh cost efficiency against supply chain risks, emphasizing

[3] A large group of studies examines the determinants of FDI, focusing on the characteristics of both home and host countries. See Blonigen (2005) and Blonigen and Piger (2014).

[4] As main economic effects, some studies examine employment and wage inequality in the labor market (Feenstra, 2010; Hummels et al., 2018), while others focus on technology spillovers and linkage effects in FDI host countries (Saggi, 2002; Harrison and Rodríguez-Clare, 2010).

policy's role in incentivizing reshoring under certain conditions. While the underlying mechanisms vary, these studies generally associate reshoring with the decision of high-productivity headquarter firms. We challenge this view by presenting evidence that supports the opposite case: MNCs self-select into reshoring due to their low productivity.

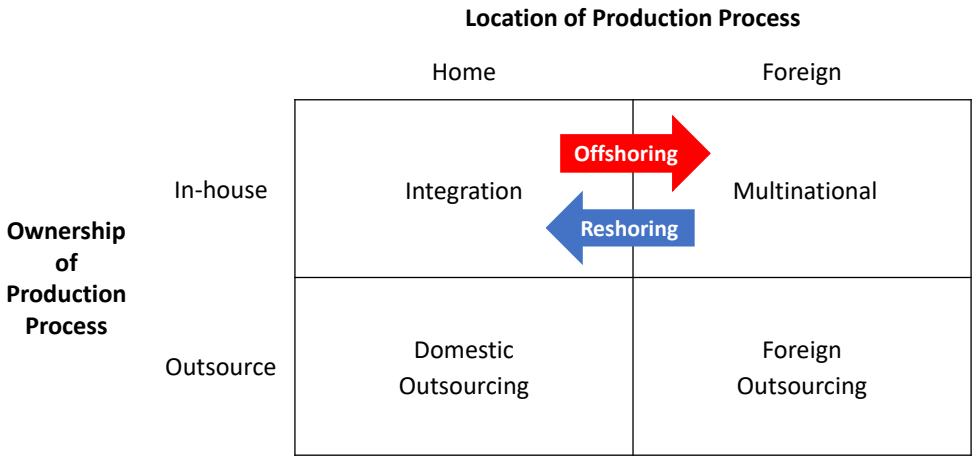
The remainder of the paper is structured as follows. The next section presents the conceptual framework for MNCs' investment decisions and defines offshoring and reshoring as used in this study. Section 3 describes the data and measurement of the four types of MNC investments. Section 4 outlines five stylized facts, with a particular focus on the characteristics of reshorers. Section 5 formulates three testable hypotheses based on these stylized facts and conducts an econometric analysis to validate them. Section 6 concludes with key policy implications.

2 Conceptual Framework

2.1 Definition of Offshoring and Reshoring

While the terms offshoring and reshoring are widely used in practice, their exact meanings tend to diverge depending on the context. This section introduces the working definitions of offshoring and reshoring employed in this study. Consider a firm that may fragment its production process and locate segments in either home or foreign countries. The fragmented processes may be operated in-house (through the firm's own investment) or outsourced. Following Feenstra (2010), the firm's decision problem is described in Figure 1.

Figure 1: The Concept of Offshoring and Reshoring



Notes: Redrawn and modified from Feenstra (2010).

Feenstra (2010) defines offshoring in two ways: The narrow concept of offshoring refers to a scenario where the firm invests in a foreign country to operate the fragmented processes in-house. Consequently, the firm becomes a multinational corporation (MNC or multinational) through foreign direct investment (FDI). The broader concept of offshoring includes not only FDI but also foreign outsourcing, where the firm contracts with other firms to perform the processes abroad. Most of the literature in the economics field adopts the broader concept, which can be empirically measured as the share of imported intermediate input costs in the total input costs.[5]

Reshoring is conceptually the opposite of offshoring, involving the relocation of production processes that were once operated abroad—-either by the firm's affiliates or contractors—-back to the home country. Given the scarcity of studies in the economics literature, however, most discussions about reshoring in policy circles focus on the return of processes by the firm's foreign affiliates. This focus corresponds the narrow concept of reshoring (and offshoring).

Our working definitions of offshoring and reshoring align closely, but not perfectly, with the narrow concepts indicated by the red and blue arrows in Figure 1. Specifically, we define offshoring as the case where a firm halts or retracts its domestic investments (i.e., divest) while simultaneously initiating investments in foreign countries. Conversely, reshoring occurs when a firm suspends or withdraws its FDIs to channel resources into the home country. Firms engaged in offshoring and reshoring will be referred to as offshorers and reshorers, respectively.

Note that these definitions are slightly different from the narrow concepts. While the narrow concepts of offshoring and reshoring must involve some relocation of production processes between home and foreign countries, our definitions do not necessarily require such relocations. For example, if a firm that offshored by establishing a foreign subsidiary in the previous period pauses additional investment there and establishes a new factory at home, we view this firm as a reshorer.[6]

There are at least two reasons for defining reshoring and offshoring in this manner. First, policymakers in major countries, such as the US and Japan, take a view of reshoring similar to ours: They define reshoring to include cases where domestic facilities are newly established or expanded without restructuring foreign operations.[7] Consider the CHIPS (Creating Helpful Incentives to Produce Semiconductors) Act as a reshoring policy of the US. To derive policy implications regarding reshoring, our definitions need to be similar to those used in actual policies.

[5]This measure is not perfect. One potential problem arises when the costs involve nominal prices or exchange rates, which can cause the share to change merely due to price fluctuations. This issue is particularly pronounced in resource-scarce countries like Korea, where the prices of imported raw materials can be significantly volatile.

[6]Even with this definition, one of the stylized facts in the next section shows a strong tendency for offshorers to remain offshorers over time throughout our sample period.

[7]In the example above, if the firm's new factory at home is the result of changing its investment plan from building a new factory abroad due to some policy incentives, policymakers would count the case as reshoring, even though offshoring did not actually occur.

Second, these definitions allow for a unified framework under which we classify offshoring and reshoring, as well as other types of the MNC investment strategies, in a coherent way. If offshoring and reshoring are mutually exclusive investment strategies—-where investments are either concentrated domestically or abroad, excluding the alternate location—-this logically extends to the categorization of firms into expanders, who invest in both home and foreign countries, and idlers (or retractors), who either pause investments altogether or divest existing ones in both locations. Consequently, as summarized in Table 1, we can classify MNCs into four mutually exclusive types based on their investment strategies, thereby facilitating an analysis of offshoring and reshoring within a unified framework.

Table 1: Investment Types of MNCs

Type	**Definition**
Expander	Invests in both home and foreign countries
Offshorer	Invests abroad and divests (or withholds investment) at home
Reshorer	Invests at home and divests (or withholds investment) abroad
Idler	Divests (or withholds investment) in both home and foreign countries

2.2 MNC's Investment Type Choice

Consider now a MNC's investment choice problem among four distinct types. Rather than specifying a fully parameterized model, we outline a dynamic framework designed to flexibly capture the essential characteristics of these investment decisions. The MNC decides how much to invest in two countries—domestic (D) and foreign (F)—over time, considering both current payoffs and future value. Given the inherently dynamic nature of investment decisions, the MNC's optimal choice at time t can be described by the following Bellman equation:

$$\begin{aligned} V_t(k_{t-1}^D, k_{t-1}^F, z_t, \Omega_t) = \\ \max_{(i_t^D, i_t^F)} \{\pi(k_t^D, k_t^F, z_t, \Omega_t) - r_t(i_t^D + i_t^F) - f_t(k_{t-1}^D, k_{t-1}^F) + \beta E\left[V_{t+1} \mid z_t, \Omega_t\right]\} \\ s.t.\ \ k_t^L = (1-\delta)k_{t-1}^L + i_t^L \geq 0, \ \ \forall L \in \{D, F\} \end{aligned} \tag{1}$$

Here, k_t^L denotes the MNC's capital stock in country $L \in \{D, F\}$ at time t with depreciation rate δ, and i_t^L represents the investment amount in that country. The variable z_t indicates the productivity level of the MNC, while Ω_t includes internal and external environmental factors such as relative wages, trade costs, and governmental policies that influence the investment decision. The profit function, $\pi(k_t^D, k_t^F, z_t, \Omega_t)$, reflects returns derived from production activities. The term $r_t(i_t^D + i_t^F)$ captures the cost of investment at a per-unit rate r_t (e.g., a rental

or interest rate), and $f_t(k^D_{t-1}, k^F_{t-1})$ represents fixed sunk costs tied to the previous period's capital stocks, such as entry or continuation costs. The discount factor $\beta \in (0, 1)$ reflects the MNC's intertemporal preferences.

Eq. (1) indicates that at each period t, the MNC chooses the optimal levels of investment in domestic and foreign locations to maximize the expected total value. This value comprises immediate profits, adjusted for investment and sunk costs, plus the discounted expected future value, where the expectation is over stochastic processes for productivity (z_{t+1}) and environment (Ω_{t+1}), conditional on current states.

While the optimal investment levels (i^D_t, i^F_t) span the continuous range $[(\delta-1)k^D_{t-1}, \infty) \times [(\delta-1)k^F_{t-1}, \infty)$, or equivalently, $(I^D_t, I^F_t) \in [-k^D_{t-1}, \infty) \times [-k^F_{t-1}, \infty)$ with $I^L_t \equiv i^L_t + \delta k^L_{t-1}$, we can reformulate this problem as a discrete choice framework to align with four distinct investment types:

$$V_t(k^D_{t-1}, k^F_{t-1}, z_t, \Omega_t) = max\{V_t^{++}, V_t^{-+}, V_t^{+-}, V_t^{--}\} \ \ with \ \begin{cases} V_t^{++} = V_t \mid_{I^D_t>0, I^F_t>0,} \\ V_t^{-+} = V_t \mid_{I^D_t\leq 0, I^F_t>0,} \\ V_t^{+-} = V_t \mid_{I^D_t>0, I^F_t\leq 0,} \\ V_t^{--} = V_t \mid_{I^D_t\leq 0, I^F_t\leq 0.} \end{cases} \tag{2}$$

where each $V_t^{\cdot\cdot}$ corresponds to a strategic option: V_t^{++} reflects Expander, V_t^{-+} and V_t^{+-} indicate Offshorer and Reshorer, respectively, and V_t^{--} represents Idler. Thus, Eq. (2) summarizes how MNCs strategically determine their optimal investment levels among the four types, balancing the received productivity, sunk costs, and economic conditions.

3 Data and Measurement

3.1 Data

To measure offshoring and reshoring at the firm-level, we utilize data from the Survey of Business Activity (SBA) conducted annually by Statistics Korea. This survey targets all firms with 50 or more regular employees and paid-in capital of 300 million KRW or more, and it examines various aspects of business activities such as investment, research and development, and imports and exports. Notably, the survey provides details on the affiliated firms' country of origin, industry (at the 2-digit level), equity share, and investment amount (based on year-end balance). This allows for the simultaneous observation of investment activities within the firm headquarters and their direct investment activities overseas.[8]

[8]Generally, a firm is affiliated if its headquarter can exert "significant influence." In the SBA, an affiliated firm is defined as one in which the headquarter holds more than 20% of the equity capital. Among affiliated firms, those where the headquarters owns more than 50% of the equity capital are referred to as subsidiary.

The SBA has been conducted annually since 2006, offering year-by-year panel data at the firm-level. This paper employs data from 2008 to 2019, encompassing a period that includes the 2008-09 GFC, which marked a slowdown in globalization, and the 2010s when discussions on reshoring intensified. Indeed, the VAX ratio—defined as the proportion of value-added exports to gross exports—exhibited a notable rebound in the 2010s, after a drop of over 10 percentage points in the 2000s, suggesting a greater contribution of domestic activities to value creation (see Figure A.1).[9]

The entire sample period was divided into four sub-periods, each spanning three years. Specifically, 2008-2010 was designated as Period 0, 2011-2013 as Period 1, 2014-2016 as Period 2, and 2017-2019 as Period 3, with Period 0 serving as the starting point. The annual data were converted into averages within each period for analysis throughout the paper. The rationale for converting annual data into three-year unit periods stems from the long-term nature and lumpiness of firms' investments. Particularly, offshoring and subsequent reshoring are long-term processes, making three-year intervals more appropriate for analysis than annual data.[10]

The firms in the sample were chosen based on three criteria. First, they must be observed every year from 2008 to 2019. Second, they must be primarily engaged in manufacturing as of 2010. Third, they must have had foreign affiliates as of 2010, i.e., they must be multinational. These criteria have the following implications. By including only firms observed annually, the study aims to analyze the investment strategies of major firms with continuous production activities and significant size. Focusing on manufacturing, which is the most active in global production and closely related to offshoring and reshoring, helps minimize the heterogeneous characteristics that might arise from including other industries. Analyzing only MNCs aligns with the study's primary interest in reshoring. Following these criteria, we obtained a sample of exactly 1,200 Korean MNCs in the manufacturing sector. Summary statistics of the sample are presented in Table 2.

3.2 Measuring MNC's Domestic and Foreign Investment

As defined in Table 1, this study classifies MNCs into four mutually exclusive and collectively exhaustive categories by their investment type. To achieve this, domestic investment is measured by the growth in the total amount (stock) of real tangible assets, with values adjusted to 2010 prices to account for inflation. The SBA offers financial data at the individual firm-level, not consolidated data that includes subsidiaries. Therefore, the tangible assets observed in the data exclude those of overseas affiliates, accurately reflecting investments made within the firm itself. Also, tangible asset information in the SBA corresponds to the total value

[9] Value-added exports refer to domestic value added that is ultimately consumed abroad (Johnson and Noguera, 2012)

[10] Additionally, analyzing annual data could result in too frequent changes in investment types, thereby reducing the stability of the analysis.

Table 2: Summary Statistics of Sample Firms (as of 2010)

Variable (Unit)	Obs.	Mean	S.D.	Min	Max
# of Employees (persons)	1,200	641.5	2,686	14	56,099
Sales (billion KRW)		566.3	2,866	3.4	43,863
Exports (billion KRW)		298.3	1,828	0	23,754
Purchases (billion KRW)		328.7	1,696	0	25,001
Imports (billion KRW)		120.9	1,048	0	25,001
Tangible Assets (billion KRW)		192.2	1,018	0.07	18,548
Intangible Assets (billion KRW)		8.2	86.0	-1.2	1,923
R&D Investment (billion KRW)		9.9	80.7	0	1,842
TFP (log value)		3.54	0.51	-0.50	6.85
# of Foreign Affiliates (units)		2.7	3.38	1	47
FDI Stock (billion KRW)		41.6	275.9	0.01	6,841

Source: Survey of Business Activity by Statistics Korea.

of tangible assets in firms' financial statements, representing the nominal value adjusted for depreciation according to accounting standards. To express values in constant 2010 terms, we applied the Gross Fixed Capital Formation (GFCF) price index from the Bank of Korea.

Next, foreign investment is measured by the growth rate of the real FDI stock of the firms. The FDI stock here refers to the total amount of equity investments (in KRW) in foreign affiliates. Similar to domestic investment, the GFCF price index was applied to convert the nominal values into real terms.[11] By measuring domestic and foreign investments as the stock of assets, an increase in the stock, i.e., a positive growth rate, is considered significant investment. Conversely, if the growth rate is zero or negative, it indicates that investment has been withheld or withdrawn. Accordingly, the four types of MNC investment defined in Table 1 is presented as follows:

1. Expander: $I_O > 0$ and $I_F > 0$
2. Offshorer: $I_O \leq 0$ and $I_F > 0$
3. Reshorer: $I_O > 0$ and $I_F \leq 0$

[11] When evaluating FDI stocks in KRW by country, differences in national price levels may distort the actual size of local firms. For instance, investing 10 billion KRW each in the United States and Vietnam might yield significantly different production capacities due to the countries' disparate price levels. To address this concern, we could convert investment amounts into real terms using capital formation and capital stock price level data from the Penn World Table 10.0 (PWT10). In PWT10, capital formation prices are expressed relative to the 2017 US GDP deflator (set to 1), and capital stock prices are similarly benchmarked to the 2017 US capital stock price. However, applying these PWT10 deflators (up to 2019 due to the data limitation) did not qualitatively alter the results of our study.

4. Idler: $I_O \leq 0$ and $I_F \leq 0$

Here, I_O represents own investment within the firm, and I_F represents foreign investment. The classification aligns with the definitions in Table 1. For example, the third type, reshorer, is accurately identified by two key indicators: a positive growth rate in domestic investment within the firm, coupled with a decreasing or stagnant stock of FDI.

The classification of domestic investment solely based on I_O may not fully capture the firm's total domestic investment activities, as it excludes investments in domestic affiliates. To address this concern, we can alternatively define domestic investment, I_D, which accounts for both own investment and equity investment in domestic affiliates. Specifically, I_D is defined as the weighted average of the growth rate of equity stock in domestic affiliates and the growth rate of own investment, where the weights are given by the lagged stock level of each component. Using I_D instead of I_O lead to any qualitative changes in our findings, so we present the main results using I_O.[12]

4 Stylized Facts

4.1 Relationship among Different Investment Types

This section presents stylized facts on investment types of the 1,200 MNCs over the three periods. The first fact concerns the correlation between domestic and foreign investments. Desai et al. (2005, 2009) report that foreign and domestic investments are complementary within MNCs. In our sample, the Spearman Rank Correlation Coefficient across the three periods is 0.143, which is statistically significant at 1%. This indicates that investments with the same directionality are more common among the four investment types (i.e., becoming either expander or idler). However, the relatively low absolute value of the correlation coefficient implies that a nontrivial number of MNCs also engages in either offshoring or reshoring.

Table 3: Sample Firms by Investment Type

Period	Investment Type				Total
	Expander	Offshorer	Reshorer	Idler	
1	512	227	259	202	1,200
2	399	229	313	259	1,200
3	232	267	298	403	1,200
Total	1,143	723	870	864	3,600

Notes: Period 1=2011∼2013, Period 2=2014∼2016, Period 3=2017∼2019.

[12]The results using I_D are available upon request.

Table 3 illustrates these facts in detail. When MNCs are classified according to the four investment types for each period, expanders or idlers consistently outnumber offshorers or reshorers across all periods. This pattern aligns with our intuition: since investment decisions are heavily influenced by economic cycles, MNCs likely choose expansion during upturns and idling during downturns. However, it is also evident that approximately 40% of MNCs engaged in offshoring or reshoring each period, indicating that there has been a sustained heterogeneity in investment strategies among MNCs that cannot be fully captured by a simple correlation coefficient.[13]

***Fact 1*:** MNCs tend to invest or divest in both home and foreign countries simultaneously. However, there is a significant number of MNCs that defy this tendency.

Table 4 presents the transition matrix illustrating how each investment type evolves into the next period. Taking the first row as an example, of the 911 MNCs that made expansion-type investments in period t, 40.4% (368 firms) continued to be expander in the following period $t+1$, 22.8% (208 firms) switched to offshorer, 20.1% (183 firms) shifted to reshorer, and the remaining 16.7% chose to be idler in the next period.

Table 4: Sample Firms by Investment Type

Type	Investment Type				Total
	Expander	Offshorer	Reshorer	Idler	
Expander	368 (40.4)	208 (22.8)	183 (20.1)	152 (16.7)	911 (100.0)
Offshorer	113 (24.8)	130 (28.5)	92 (20.2)	121 (26.5)	456 (100.0)
Reshorer	97 (17.0)	79 (13.8)	227 (39.7)	169 (29.5)	572 (100.0)
Idler	53 (11.5)	79 (17.1)	109 (23.6)	220 (47.7)	461 (100.0)
Total	631 (26.3)	496 (20.7)	611 (25.5)	662 (27.6)	2,400 (100.0)

Notes: Each cell shows the number of firms, with the transition probability in parentheses.

One important feature highlighted by Table 4 is the strong tendency for MNCs to maintain their current investment type into the next period, regardless of the type. In particular, reshorers in the current period have a 40% likelihood of continuing reshoring in the next period, while the probability of switching to offshoring is significantly lower at 13.8%. Another noteworthy fact is the relatively high transition rates between expander and offshorer, and

[13]See Figure A.2 for the entire distribution of MNCs' investment choices across all periods in the sample.

between reshorer and idler. Specifically, reshorers in the current period are likely to choose idling (29.6%) in the next period, while idlers frequently transition to reshoring (23.6%) in the following period. A similar pattern is observed in the relationship between expander and offshorer, with over 60% of expanders continuing with additional foreign investments in the next period.

***Fact 2*:** There exists a strong persistence in investment type. Also, transition rates are relatively high between expander and offshorer, and between reshorer and idler.

The fact that 70% of reshorers in the current period either continued reshoring or opted for idling in the next period suggests that these firms might face a potential decline in their long-term competitiveness. Indeed, consistent findings will be presented in the subsection 4.3.

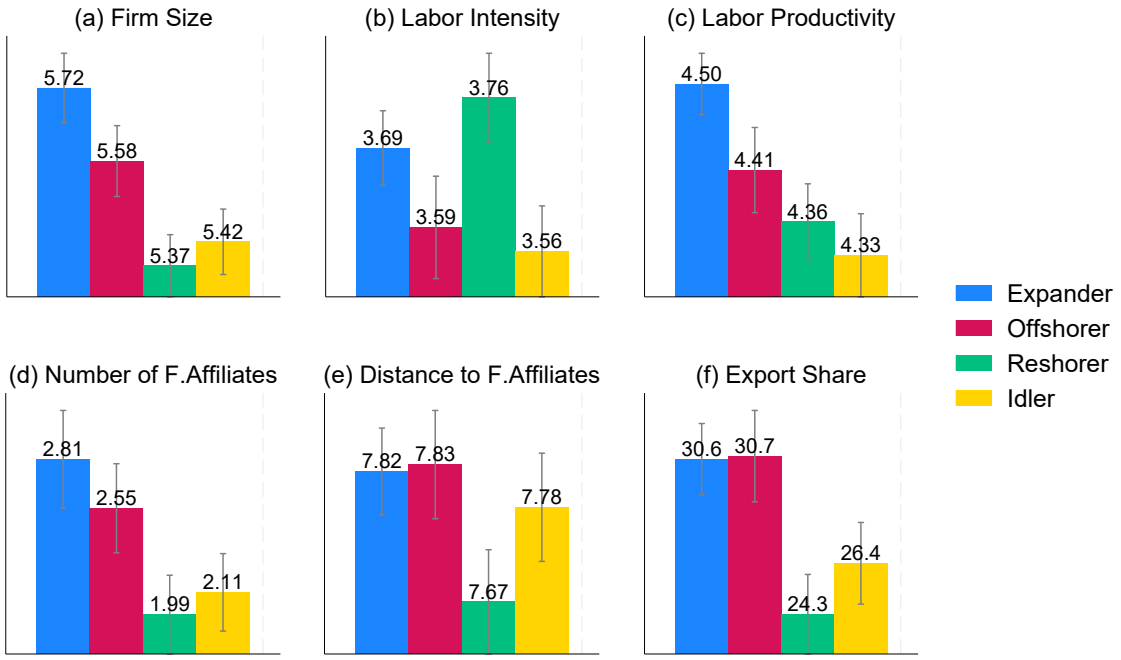
4.2 Firm Characteristics by Investment Type

This subsection examines the potential internal factors of MNCs that may influence each type of investment strategy. Variables from the previous period $(t-1)$ are used to account for their impact on investment decisions. That is, the (simple) average values of all observations during sample periods 0, 1, and 2 were derived for each investment type. Figure 2 presents the results. The first potential factor considered is firm size. Panel (a) shows the relationship between firm size, measured by (log of) the number of regular employees, and investment type. Expanders are the largest, followed by offshorers, idlers, and reshorers. Although there is no statistically significant difference between reshorers and idlers, it is somewhat surprising that reshoring firms are the smallest among the four MNC groups.

Next, panel (b) shows the relationship between labor intensity and investment types. Labor intensity is defined as the total wage bill relative to the real stock of tangible assets; a higher ratio indicates a more labor-intensive firm. The hierarchy presented in panel (b) differs from panel (a), with reshorers having the highest labor intensity, and the difference between reshorers and other types being statistically significant. The high labor intensity of reshorers may be associated with relatively low initial sunk costs of foreign operation, since labor-intensive tasks require less capital investment upfront. This high labor intensity also indicates that reshorers' productivity levels are likely lower than MNCs of other types.

Panel (c) supports our conjecture by showing the relationship between labor productivity and investment type. Labor productivity here is measured by real value-added per worker. In the literature, a firm's productivity is known to be a key determinant of its decision to invest abroad (Helpman et al., 2004). It is also a fundamental prerequisite for a firm's sustained growth. Therefore, one can hypothesize that firms with higher productivity are more likely to make expansion-type investments, followed in descending order by offshoring, reshoring, and idling, in a kind of pecking order. The result in panel (c) aligns perfectly with this hypothesis. The difference in productivity between offshorers and reshorers is not statistically

Figure 2: Firm Characteristics by Investment Type



Notes: Each panel presents the average levels of the corresponding variables by investment type in the previous period (i.e., characteristics in t-1 for investment type in t) across the three periods (t=0, 1, 2), along with the 95% confidence interval. Definition of the variables are as follows: (a)=(log of) the number of regular employees, (b)=(log of) total wage bill relative to the stock of tangible assets, (c)=(log of) value-added per regular employee, (d)=the number of foreign affiliates, (e)=(log of) weighted distance to foreign affiliates from the home country in kilometer (with the weight being the equity value), (f)=export share in sales revenue (%). All monetary values are converted to 2010 constant KRW (million).

significant. However, the relationship of "Expander > Offshorer ≥ Reshorer ≥ Idler" is clearly established in terms of productivity.[14] Given that productivity is largely reflected in firm size, the pecking order also applies to firm size, just as confirmed in panel (a).

***Fact 3*:** There is a pecking order among investment types in terms of size and productivity: Expander > Offshorer ≥ Reshorer ≥ Idler.

Panels (d) and (e) present the characteristics related to existing foreign affiliates for each investment type, both of which can be interpreted as the level of foreign production activities, or more broadly, the MNC's business competitiveness in international markets.[15] Panel (d) first shows the number of foreign affiliates. The order of bar heights closely resembles that

[14]This pecking order is robust to different measures of productivity, including sales per worker and TFP. Refer to Figure A.3 for the distribution of TFP by each type.

[15]Antràs et al. (2017) argue that as the geographical distance between a MNC and its foreign subsidiaries in-

in panel (a), which is intuitive given the strong positive correlation between firm size and the number of foreign affiliates. Specifically, expanders own about 2.8 foreign affiliates, and offshorers about 2.6, before deciding on new foreign investments. In contrast, reshoring firms owned about 2 foreign affiliates, and idlers owned about 2.1, showing a significant difference compared to the first two types (expanders and offshorers).

Panel (e) measures (log of) the distance to these foreign affiliates from the home country in kilometer. The distance data between countries is sourced from the CEPII Gravity Database (Conte et al., 2022). If a MNC had affiliates in more than one country, the weighted average distance was calculated, with the weight being the headquarter's equity stock value for each affiliate. The results in panel (d) indicate no significant difference in the distance to foreign affiliates between expanders and offshorers. Interestingly, as already revealed in panel (a) and (d), reshorers' foreign affiliates are primarily located in countries closest to the home country. These affiliates are even closer than those of idlers, and the difference in distance with the other three types is statistically significant.

Finally, panel (f) reports the average share of sales revenue (in percentage terms) derived from exports, by investment type. A larger export share can be seen as another suggestive evidence of higher international competitiveness for an MNC (Melitz, 2003). Again, the pattern of bar heights in panel (f) is consistent with that of panel (e).

***Fact 4*:** Compared to other types of MNCs, reshorers exhibited lower levels of experience and competitiveness in international business operations from the outset.

Summing up, firm characteristics like size, labor intensity, productivity, and international business experience are strongly associated with its investment type. Larger, more productive MNCs with extensive foreign affiliates tend to keep expanding into new markets or offshore production. In contrast, smaller, labor-intensive, less productive MNCs, which also have fewer and geographically closer foreign affiliates, are more prone to reshoring production back home or idling without new investments. A clear productivity hierarchy emerges, with expanders being the most productive, followed by offshorers, reshorers, and idlers, highlighting productivity's pivotal role in driving investment type decisions.[16]

4.3 Changes in Production Activities by Investment Type

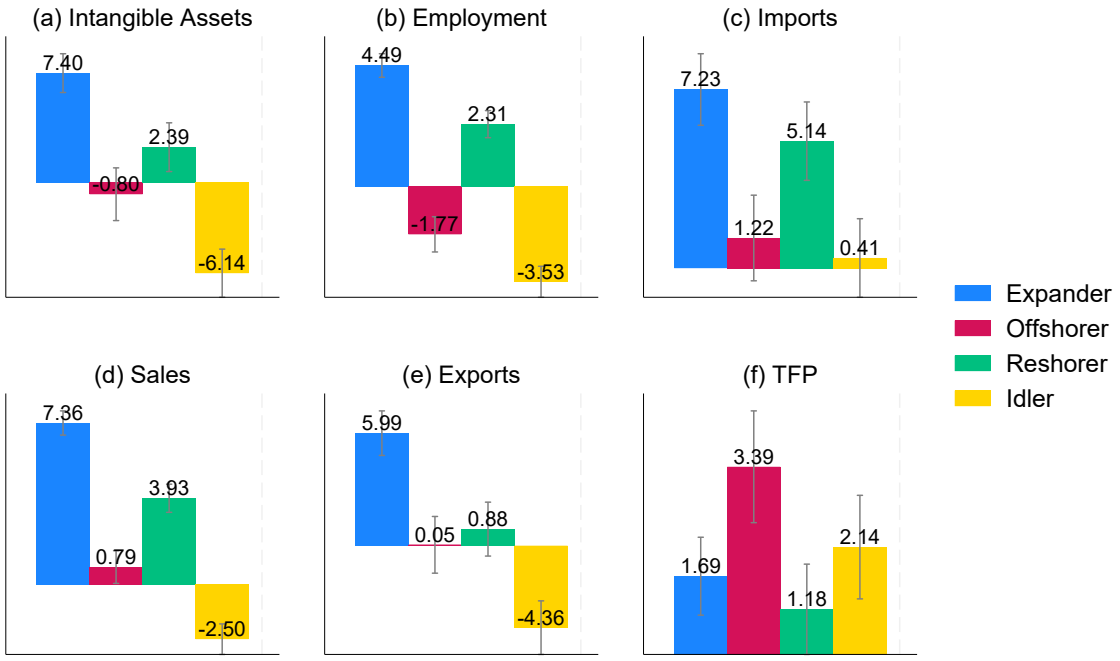
We now show the changes in production activities resulting from MNCs' investment decisions for each type. Figure 3 displays the annualized average growth rates in production-related activities for each investment type across all periods. Panels from (a) to (c) in Figure 3

creases, the fixed costs associated with sourcing from those subsidiaries also tend to rise, with an elasticity of 0.19. Thus, greater distance implies a need for higher scale of production to offset the higher fixed costs.

[16] While Figure 2 presents the average values over the three periods (t=0, 1, 2), the breakdown by period reveals no changes in the hierarchy or qualitative patterns.

present input changes. First, take a look at the growth rate of intangible assets (based on real stock value). Intangible assets have typically a complementary relationship with tangible assets, as they are both types of capital. However, Bernard et al. (2020) suggest that firms that engage in offshoring tend to reallocate domestic production factors to areas that can generate higher value-added, along with an increase in related R&D activities. Therefore, the growth of intangible assets such as intellectual property might complement the increase in FDI.

Figure 3: Changes in Production Activities by Investment Type



Notes: Each panel presents the annualized average growth rates of the corresponding production activity by investment type across the three periods (t=1, 2, 3), along with the 95% confidence interval. In panel (f), the (log of) TFP is estimated following the method of Ackerberg et al. (2015). All monetary values are converted to 2010 constant KRW (million).

It is evident from panel (a) that intangible assets increased only in the expander and reshorer, indicating a complementary relationship between tangible and intangible asset investments within the firm. The growth of intangible assets among offshorers decreased by approximately 0.8%, the 95% confidence interval shows that this decrease is not statistically different from zero.

Panel (b) presents growth in employment, a variable of significant interest in both academia and policy circles. Intuitively, employment is likely to have a positive correlation with investments in tangible and intangible assets, as long as capital and labor are complements to each other. However, some media have recently reported that reshoring firms, even when building

factories in their home country, often seek to automate their processes to a considerable extent.[17]. If such cases are common, the employment effects of reshoring might be significantly mitigated. However, panel (b) shows that employment of reshorers increased by approximately 2.3% per annum, indicating that domestic investment and employment are aligned, at least within the sample. In contrast, offshorers, which reduce domestic investment and increase overseas production, show a statistically significant decrease in employment by about 1.8% per annum, highlighting a contrast with reshorers.

Panel (c) shows the growth of imports, which are intermediate inputs sourced from foreign countries. Since reshorers have shifted their production process from foreign to the home country, imports would increase unless they change their intermediate suppliers to domestic firms. As expected, their imports increased by a substantial level of 5.1%, following expanders (7.23%), while offshorers' import growth is not statistically different from zero.

The fourth and fifth indicators of firms' production activities are sales and exports, respectively, both related to outputs. Panel (d) shows significant sales growth for both expanders and reshorers. Moreover, the order of sales growth by investment type is consistent with input growths in panels (a) to (c), being highest for expanders, followed by reshorers, offshorers, and idlers. This simply confirms that output is proportional to input. The growth of exports, a component of sales revenue, presented in panel (e) also indicates a consistent pattern. However, the export growth of reshorers is not statistically different from zero, suggesting that reshorers' main market tends to shift from foreign countries to the home country.

Finally, panel (f) explores the relationship between investment types and total factor productivity (TFP), which is most commonly used in assessing the efficiency of firm production. To estimate TFP, we followed the methodology of Ackerberg et al. (2015) and used intermediate input costs as a proxy variable. Additionally, we estimated the production function parameters separately for each 2-digit industry according to the Korean Standard Industrial Classification (KSIC). Applying the estimated values, the productivity growth of offshorers is most pronounced, followed by idlers, expanders, and reshorers. This result is intuitive considering that productivity is the output relative to the input of production factors. For example, offshoring firms reduced their domestic tangible assets and employment, while maintaining previous levels of sales revenue, leading to increased productivity due to a reduced denominator. In the case of idlers, both inputs and sales decreased, but the reduction in input was greater. Conversely, expanders increased both inputs and sales with their output growth being greater than input growth. Reshorers had the smallest increase in output relative to the increase in inputs.[18]

[17] For an example, refer to the interview in Dong-A Business Review (2020)

[18] While the breakdown by period reveals no changes in the hierarchy or qualitative patterns as in Figure 2, the overall growth rates for employment (b) and sales (d) declined progressively from period 1 to period 3. This downward trend can be interpreted as reflecting the macroeconomic environment's influence on firms' production scales during those time periods.

Summarizing the performance of MNCs by investment type shown in Figure 3, the group with the highest growth rates in production scale is expander. Growing firms naturally increase investments and production activities both domestically and internationally, resulting in concurrent increases in employment, revenue, and exports. Conversely, firms that reduce or withhold investments both domestically and internationally exhibit the opposite characteristics, which is also expected. Offshorers and reshorers exhibit contrasting patterns. Offshoring firms increased production activities abroad through reducing some inputs at home. However, their sales and exports did not decline and they achieved the highest productivity growth. In contrast, reshorers experienced increases in domestic investments and employment, which translated into increased sales revenue. However, their participation in foreign markets through export decreased, and they recorded the lowest productivity growth.

***Fact 5*:** Reshorers employ more workers and record higher sales after reshoring. However, their productivity growth is the lowest among the different types of MNCs.

These results can be interpreted in terms of a trade-off between short-term and long-term outcomes. For example, reshoring may contribute to the domestic economy by boosting employment and revenue in the short term, but without accompanying productivity improvements, this contribution is unlikely to be sustainable in the long run. Additionally, trade literature consistently shows a strong positive correlation between export participation and firm productivity. This suggests that the short-term effects of reshoring are less likely to extend into the long term.

5 Econometric Analysis

While the characteristics of firms by type of investment shown in the previous section are insightful in themselves, a formal econometric analysis is desirable to identify which factors play decisive roles in choosing the type of investment. Furthermore, MNC's investments are affected not only by internal firm characteristics but also by external factors, including the macroeconomic cycles, economic conditions in host countries, and government policies, collectively represented in Ω in Eq. (1). Therefore, it is also necessary to examine which external variables significantly affect the investment decisions of Korean MNCs. Drawing from the conceptual framework in Section 2.2 and the stylized facts in Section 4, this section formulates statistical hypotheses and tests them through model estimation to provide a more comprehensive analysis.

5.1 Testable Hypotheses and Model Specification

As previously discussed, two key factors distinguish MNCs by investment type: (i) productivity levels and (ii) the history of production activities in each country. First, Productivity,

particularly when persistent, is a crucial determinant of expected returns and thus plays a fundamental role in shaping firms' investment decisions, as established in the literature (e.g., Antràs and Helpman, 2004; Helpman et al., 2004). Building on Eq. 1, where productivity (z_t) drives the current profit (π) and future value (V_{t+1}), and consistent with Fact 3, which reveals a productivity hierarchy (Figure 2(c)), we posit that highly productive MNCs are more likely to pursue expansionary investments both domestically and abroad. Conversely, MNCs with lower productivity, facing reduced profitability, tend to idle, minimizing investments in both locations. MNCs with intermediate productivity strategically concentrate investments, opting for either offshoring or reshoring based on additional internal and external factors. This forms the basis for the first Hypothesis:

***Hypothesis 1*:** Highly productive MNCs tend to become expanders, while those with low productivity are more likely to be idlers. MNCs with moderate productivity levels tend to concentrate their investments strategically, either being offshorers or reshorers.

Second, the extent and scale of an MNC's past production activities in domestic and foreign markets can play a crucial role in determining its investment type. As Antràs et al. (2017) argue, MNCs with extensive foreign affiliate networks typically develop enhanced sourcing capabilities that progressively reduce variable costs and increase profits. This creates a self-reinforcing cycle that makes continued offshoring more attractive than reshoring, as established supplier networks and accumulated cost advantages create path dependency.[19] Conversely, MNCs with limited foreign presence—fewer affiliates or smaller overseas investments—face fewer constraints from past sunk investments and have less to gain from existing international sourcing networks. Fact 4 indeed confirms that reshorers have fewer foreign affiliates (approximately 2.0, Figure 2(d)) and shorter distances to those affiliates (Figure 2(e)). Additionally, reshorers' higher labor intensity (Figure 2(b)) suggests lower capital-intensive foreign operations, making them footloose in relocating production. Thus, the second hypothesis is as follows:

***Hypothesis 2*:** The lower investments already sunk in foreign affiliates and the smaller the foreign production network, the easier MNCs can opt for reshoring.

In addition to internal characteristics of MNCs, changes in the external environment can significantly affect their choice of investment type. Representative factors include the comparative advantage of production factors between countries, such as the wage differential

[19] Past production experience in each country also affects the fixed costs for market access and continuation. Eq. 1 incorporates this sunk entry costs ($f_t(k^D_{t-1}, k^F_{t-1})$), which depend on previous capital stocks and, in turn, shape future investment decisions. Given that prior active production in country L—represented by $k^L_{t-1} > 0$—reduces entry costs at t in that country, as widely assumed in exporter dynamics literature (e.g., Alessandria et al., 2021), this mechanism creates investment hysteresis. As a result, offshorers and expanders are likely to persist in their investment type even if their current economic conditions deteriorate compared to their initial entry conditions.

between countries. For instance, rising foreign labor costs could favor reshoring, while lower foreign costs or domestic wage hikes (e.g., South Korea's 2018–2019 minimum wage increase) encourage offshoring. Also, recent policies aimed at attracting foreign investment and promoting reshoring can be viewed as changes in the production environment that reduce costs for MNCs. As such, the third hypothesis is formulated as follows:

***Hypothesis 3*:** The decision-making process of MNCs regarding the investment type is significantly influenced by external factors related to domestic and foreign production costs.

To test the above three hypotheses, a multinomial logistic regression model with four investment types as outcome variables is employed as follows:

$$\log\left[\frac{p(Y_{fit}=k \mid X)}{p(Y_{fit}=2 \mid X)}\right] = \alpha_k + X_{fit}\beta_k, \quad k=1,3,4. \tag{3}$$

In Equation (3), k represents MNC's type by its investment: 1 for expander, 2 for offshorer, 3 for reshorer, and 4 for idler. These numbers are assigned purely for classification purposes and do not imply any order or intensity, hence the use of a multinomial model instead of an ordered logit model. The left-hand side of the equation represents the log odds of choosing investment type k(=1, 3, or 4) compared to offshoring for firm f in industry i at time t. In the literature, the term is often called the log of relative risk.[20]

On the right-hand side of Equation (3), α_k is a constant for each investment type, controlling for all time-invariant characteristics affecting the investment. X_{fit} is a vector of time-varying explanatory variables for firm f in industry i, and β_k represents the coefficients of each variable. Estimating the values of β_k and interpreting their meaning is the main goal in this section. The mathematical expression of β_k is the following:

$$\beta_k = log\left[\frac{p(Y=k \mid X+1)}{p(Y=2 \mid X+1)}\right] - log\left[\frac{p(Y=k \mid X)}{p(Y=2 \mid X)}\right], \quad k=1,3,4. \tag{4}$$

In words, this equation implies that when the variable X increases by one unit, while all other variables remain constant, the log-odds of choosing investment type k relative to offshoring (the first term on the right-hand side) increase by β_k times compared to the log-odds before the increase in X (the second term on the right-hand side).

The key explanatory variables X_{fit} are classified into internal factors of the multinational and external factors. Internal factors pertaining to Hypothesis 1 include TFP and R&D intensity (i.e., R&D expenditure per employee), both representing productivity measures. Firm size,

[20]Relative risk is a concept akin to odds used in binary logistic models, but its exact mathematical definition differs slightly. In binary logistic models, the dependent variable is dichotomous (0 or 1), and odds are defined as $p(Y=0)/p(Y=1)$, with the sum $p(Y=0)+p(Y=1)=1$. However, in multinomial logistic models, the dependent variable can take on three or more values (e.g., 0, 1, 2), so the sum $p(Y=0)+p(Y=1)$ is less than one. Therefore, $p(Y=0)/p(Y=1)$ can be distinctly called relative risk rather than odds. Throughout this paper, however, we use both terms interchangeably.

also associated with productivity, is included as well. Internal factors related to Hypothesis 2 encompass labor intensity, the number of foreign affiliates, and the distance to those foreign affiliates from the home country. Firms with high labor intensity are less likely to incur high upfront capital costs for foreign investments. Additionally, having more foreign affiliates and greater distances to those affiliates likely correspond to higher sourcing capabilities.

Turning to the external factors related to Hypothesis 3, we first include proxies for labor costs in the home country and foreign host countries, respectively. An increase in labor costs in a given country is expected to deter investment in that country. Second, corporate income tax rates are included for an external factor associated with production costs, as lower corporate tax rates generally stimulate investment (Devereux et al., 2002; Blonigen, 2005). Third, foreign host countries' competitiveness in intermediate input supply is considered an important factor in MNCs' investment decisions, given the opportunities of local sourcing. Lastly, market accessibility to foreign countries along with its adjacent countries is considered in the estimation. Investment incentives are likely higher in countries with large markets and easier access to nearby countries.

5.2 Variable Construction of External Factors

While internal factors are measured at the firm-level by definition, external factors are mostly observed at the country level and yet have heterogeneous impacts on each MNC's investment decision. For example, the same external economic shocks in China would affect MNCs differently, largely depending on whether a firm has affiliates in China and, if so, how many affiliates it has there. A conventional approach to construct firm-specific external factors in this case would be to calculate weighted averages of the country-level characteristics, where the weights are the MNC's existing production allocation across countries.

However, this study posits that even if a firm f has not yet invested in a particular country, the investments made by other firms in the same industry i in that country could significantly influence f's future investment decisions regarding that country. For example, if an industry has invested 50% of its total FDI in China and 50% in Vietnam, firm A within that industry, despite having all its subsidiaries in China, is likely to closely monitor Vietnam's economic conditions. To reflect this possibility, we apply a unique weighting formula that utilizes both the firm's investment stocks and its industry's investment stocks across over 120 foreign countries. Specifically, the weight is calculated as follows:

$$w_{fict} = \frac{\max\{Vshare_{fict}, Vshare_{.ict}\}}{\sum_{c \in C} \max\{Vshare_{fict}, Vshare_{.ict}\}}$$
$$\text{where} \quad Vshare_{fict} = \frac{V_{fict}}{\sum_{c \in C} V_{fict}}, \quad Vshare_{.ict} = \frac{\sum_{f \in i} V_{fict}}{\sum_{c \in C} \left(\sum_{f \in i} V_{fict}\right)}. \tag{5}$$

In Equation (5), V_{fict} represents the investment stock of firm f in country c, and $Vshare_{fict}$ is the share of total investment stock of firm f in country c. Similarly, $Vshare_{\cdot ict}$ is the share of total investment stock of industry i in country c. The weight for each MNC and industry is calculated based on the higher value between the firm's investment share and the industry's investment share in each country. Applying this weighting formula to the previous example, firm A would be assigned weights of $100/(100+50) = 2/3$ for China and $50/(100+50) = 1/3$ for Vietnam. These firm-specific weights are applied to all country-level characteristics to create a unique foreign economy for each MNC. In this example, if labor costs in China and Vietnam are \$6 and \$3 respectively, the labor cost in firm A's foreign economy would be $\$5 (= 6\times 2/3 + 3\times 1/3)$.[21]

For labor costs, data from the International Labor Organization (ILO) is used, specifically the average monthly earnings for all industries (2017 US\$ PPP). Again, the labor costs are then averaged across countries by applying the weights specific to each MNC, thus measuring the average monthly earnings of its unique foreign economy. For South Korea, instead of the ILO data, the rate of increase in the minimum wage is used, as it significantly accounts for the rapid increase in Korea's outward FDI since 2017 (Ahn et al., 2022). Corporate tax rates are sourced from the OECD's statutory corporate income tax rate database, which includes the combined rates of central and local governments.

To measure foreign host countries' competitiveness in intermediate input supply, we first calculate the revealed comparative advantage (RCA) index at the 2-digit manufacturing industry level for each country. Export data is taken from World Integrated Trade Solution (WITS) Global Value Chain Database.[22] An RCA value greater than 1 indicates country's comparative advantage in that industry. These industry-level RCA values are weighted by corresponding input share obtained from the Korean input-ouput table (as of 2010) and summed across industries as follows:

$$Upstream.CA_{ict} = \sum_{j \in I} a_{ji} RCA_{jct} \quad \text{where} \quad RCA_{jct} = \frac{Export_{jct} / \sum_c Export_{jct}}{\sum_j Export_{jct} / \sum_j \sum_c Export_{jct}} \tag{7}$$

where a_{ji} refers to industry j's intermediate input share in industry i to which an MNC belongs, which is assumed to be time-invariant. Thus, Equation (7) measures country c's

[21] An alternative weighting that accounts for the potential influence of industry-level investments on firms is:

$$\tilde{w}_{fict}(\lambda) = \frac{\lambda Vshare_{fict} + (1-\lambda) Vshare_{\cdot ict}}{\sum_{c \in C} (\lambda Vshare_{fict} + (1-\lambda) Vshare_{\cdot ict})} \tag{6}$$

where $\lambda \in [0, 1]$ is a parameter that adjusts the influence of the firm-specific and industry-specific shares. However, this alternative weight requires an arbitrary value for λ without a formal basis. Employing $\tilde{w}_{fict}(0.5)$ yields qualitatively similar estimation results to those obtained with w_{fict}.

[22] https://wits.worldbank.org/gvc/global-value-chains.html

(weighted) average level of comparative advantage in the upstream industries of industry i. Higher value of this measure means the country has greater comparative advantage in supplying intermediate inputs used by MNCs in industry i. This could benefit those MNCs in terms of input costs or quality if sourcing from that country.

Finally, foreign host country's market accessibility is defined as

$$Mkt.Access_{ct} = \sum_{l \in C} \frac{1}{distance_{cl}} GDP_{lt} \tag{8}$$

where $distance_{cl}$ is the distance between host country c and country l (including c), and GDP_{lt} is the real GDP of country l in period t. This variable captures both the market size of country c and the aggregated market sizes of all other countries, inversely weighted by their distance to the country c. This approach is based on the fact that MNCs consider not only the host country but also the accessibility to neighboring countries when making FDI decisions. Data on distance and GDP are sourced from the CEPII Gravity Database and the Penn World Table (PWT) 10.0, respectively.

5.3 Estimation Results

Using the multinomial logistic regression model, offshorer (k=2) is set as the base category, and the model is estimated for the other three investment types (k=1, 3, 4). Therefore, we estimate three distinct coefficients corresponding to the three alternative investment types. Each column in Table 5 represents the estimated coefficients for the three investment types. The model includes six variables internal to MNC and six external factor variables. All explanatory variables, except for the domestic minimum wage growth rate, are lagged across all periods. Using lagged variables is to minimize the simultaneity bias, where explanatory and outcome variables might be determined concurrently.

Despite these precautions, interpreting the estimates as causal effects needs caution. Even with the lagged values, explanatory variables could be endogenously adjusted in anticipation of the next period's investment decisions, particularly regarding internal firm factors.[23] The most accurate interpretation of these estimates is that they represent partial correlations, reflecting the relationship between each explanatory variable and investment type, controlling for the various factors commonly cited in the literature.

Furthermore, as indicated in Equation (4), each estimated coefficient in Table 5 signifies the change in log-odds of selecting investment type k over offshoring due to a one-unit increase in the explanatory variable. Although this provides directional insight——where a positive estimate suggests an increased odd of selecting type k relative to offshoring, and a negative estimate suggests a decreased odd——the precise interpretation of the coefficient magnitudes

[23] While external factors may appear exogenous from the perspective of individual firms, they cannot be unequivocally interpreted as causal.

Table 5: Factors Influencing Investment Type: Coefficient Estimates

Variables	**Investment Type**		
	Expander (k=1)	**Reshorer** (k=3)	**Idler** (k=4)
Internal Factors			
TFP	0.392***	-0.069	-0.338**
	(0.131)	(0.147)	(0.145)
R&D Intensity	0.118***	0.043	-0.068
	(0.044)	(0.043)	(0.042)
Firm Size	0.147**	-0.083	-0.130*
	(0.058)	(0.072)	(0.071)
Labor Intensity	0.276***	0.284***	-0.103
	(0.081)	(0.085)	(0.088)
Number of Foreign Affiliates	-0.059	-0.186**	-0.051
	(0.071)	(0.078)	(0.077)
Distance to Foreign Affiliates	-0.126*	-0.328***	-0.135
	(0.076)	(0.088)	(0.088)
External Factors			
Foreign Labor Costs	-0.186	0.877**	1.030**
	(0.350)	(0.422)	(0.417)
Minimum Wage Growth in Korea	-0.193***	-0.084***	0.058*
	(0.032)	(0.032)	(0.033)
Foreign Corporate Tax Rate	0.035	-0.011	-0.030
	(0.024)	(0.026)	(0.031)
Domestic Corporate Tax Rate	0.093	-0.253	-0.064
	(0.143)	(0.158)	(0.168)
Upstream Comparative Advantage	-0.679***	-0.468**	-0.100
	(0.210)	(0.237)	(0.230)
Market Accessibility	0.548	-0.692	-0.626
	(0.495)	(0.582)	(0.591)
Observations	2,982	2,982	2,982
Number of Clustered Firms	1,068	1,068	1,068

Notes: The baseline category is offshorer (k=2). Values in parentheses are clustered robust standard errors at the firm level. *, **, *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

may not be intuitively clear. Therefore, the coefficients are transformed into relative risk ratios (RRR) for easier interpretation:

$$RRR = exp(\beta_k) = \frac{p(Y = k|X + 1)/p(Y = 2|X + 1)}{p(Y = k|X)/p(Y = 2|X)}, \quad k = 1, 3, 4. \tag{9}$$

Equation (9) is derived by exponentiating both sides of Equation (4), expressing the change in odds ratio of choosing investment type k over offshoring due to a one-unit increase in the explanatory variable. An RRR greater than one indicates an increased odds ratio, while an RRR less than one indicates a decreased odds ratio. Additionally, the RRR allows us to directly interpret how many times the odds ratio increases or decreases.

Table 6: Factors Influencing Investment Type: Relative Risk Ratios

Variables	**Expander**	**Reshorer**	**Idler**
Internal Factors			
TFP	1.480***	0.933	0.713**
R&D Intensity	1.125***	1.044	0.934
Firm Size	1.159**	0.921	0.878*
Labor Intensity	1.318***	1.328***	0.902
Number of Foreign Affiliates	0.943	0.830**	0.951
Distance to Foreign Affiliates	0.882*	0.720***	0.873
External Factors			
Foreign Labor Costs	0.830	2.403**	2.801**
Minimum Wage Growth in Korea	0.825***	0.920***	1.060*
Foreign Corporate Tax Rate	1.035	0.989	0.970
Domestic Corporate Tax Rate	1.098	0.777	0.938
Upstream Comparative Advantage	0.507***	0.627**	0.905
Market Accessibility	1.730	0.501	0.535

Notes: The baseline category is offshorer (k=2). Estimate in each cell is the relative risk ratio (RRR) compared to the baseline, derived from the exponentiation of the coefficients in Table 5. *, **, *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

Table 6 presents the estimated coefficients from Table 5 converted to RRRs. The statistical significance of these estimates is the same as in Table 5, so it is omitted here, but statistically significant estimates are marked with an asterisk (*). The first row of the table shows that, holding other variables constant, a 1% increase of TFP in the previous period $(t - 1)$ would increase the odds of a firm being expander over offshorer by 1.48 times, while decreasing the odds of being idler over offshorer by 0.713 times. These results are statistically significant. Although the odds of reshoring over offshoring slightly decreases, it is not statistically significant.

Similarly, the R&D intensity in the second row, another indicator related to firm productivity, shows comparable results in terms of the magnitude and statistical significance. Specifically, a 1% increase in R&D investment per employee raises the odds of becoming expander over offshorer by 1.125 times. Increases in R&D intensity do not significantly raise the odds of becoming reshorer or idler. The third row's firm size estimates also align with the results in the first and second rows in terms of statistical significance and ordinal magnitude.

Variables in the fourth to sixth rows——labor intensity, the number of foreign affiliates, and distance to them—are related to the barriers to bringing activities back home. The estimates indicate that these factors are crucial in distinguishing between offshoring and reshoring. Assuming that labor intensity is inversely proportional to the costs of foreign investment, an increase in labor intensity (i.e., a decrease in capital costs) raises the odds of reshoring over offshoring by about 1.328 times. Conversely, a one-unit increase in the number of foreign affiliates and distance to them decreases the odds of becoming reshorer over offshorer by 0.83 and 0.72 times, respectively.

Next, examining the external factors influencing investment type selection, an increase in labor costs in the foreign economy significantly affects investment type selection. Specifically, a 1% increase in foreign labor costs raises the odds of being reshorer and idler over offshorer by 2.4 and 2.8 times, respectively. This aligns with the intuition that higher production costs abroad negatively impact FDI decisions. The opposite is also true. MNCs respond oppositely to increases in domestic labor costs, represented by the rise in the domestic minimum wage. Specifically, a 1% point increase in the domestic minimum wage reduces the odds of being expander and reshorer over offshorer by 0.825 and 0.92 times, respectively.

Corporate tax rates (both home and foreign) do not significantly impact the investment choice. However, in terms of magnitude, an increase in domestic corporate tax reduces the odds of reshoring over offshoring by 0.777 times, which is intuitive.

The estimates for the upstream comparative advantage of the foreign economy are also consistent with intuition and the rich literature. If the foreign economy has a comparative advantage over the domestic economy in upstream industries, MNCs have more incentive to invest there to benefit from the local sourcing opportunities. In fact, the results in Table 6 demonstrate that a 1% increase in the level of upstream comparative advantage of the foreign economy would incentivize MNCs to become offshorers over other types of investment. For example, the odds of an MNC choosing reshoring rather than offshoring decreases by a factor of 0.627.

Finally, in the market accessibility of the foreign economy, although there was no statistical significance, the direction of the estimate was consistent with intuition. When foreign markets expand, firms are more likely to increase investment in the markets through expansionary investment or offshoring, while reshoring and idling are likely to decrease.

In sum, the estimates from the first to the third rows indicate that explanatory variables re-

lated to a firm's productivity, such as TFP, R&D intensity, and firm size, are strongly associated with the choice of investment type. These estimates are particularly consistent with Hypothesis 1. The variables from the fourth to the sixth rows are related to the sunk investments in a firm's existing foreign affiliates, and the lower these investments, the higher the likelihood of choosing reshoring, which supports Hypothesis 2. Moreover, synthesizing the estimates of external factors affecting MNCs' investment decision, we confirm that investments tend to concentrate in areas with lower production costs, which supports Hypothesis 3.

5.4 Robustness Checks

TBD

6 Conclusion

This study offers a novel measurement approach and comprehensive analytical framework for identifying key characteristics of reshoring multinational corporations. By classifying MNCs into four distinct investment types—expander, offshorer, reshorer, and idler—we analyze their investment behaviors and the underlying factors influencing their strategic choices. Our analysis reveals that reshorers typically demonstrate lower productivity, smaller size, and higher labor intensity compared to expanders and offshorers. These firms generally maintain fewer foreign affiliates, which are located in closer geographic proximity to their home country, and exhibit limited international market presence. While reshoring initially correlates with increases in domestic employment and sales, these firms experience the weakest productivity growth among all four types, raising questions about their long-term sustainability. These findings collectively provide clues answering to the title question: Who reshores? It is merely the one with lower productivity responding to adverse internal or external shocks.

Given these findings, a policy approach that prioritizes reshoring as a blanket strategy may not may not effectively enhance domestic economic performance, which is one of the main goal of such policy. If the typical reshorer resembles a "prodigal son" returning home after underperforming abroad rather than a highly productive industry leader, then reshoring should not be treated as a goal in itself. Instead, policy efforts should focus on incentivizing more productive firms to expand their domestic investments and evolve into expanders. For reshorers, domestic production should not replicate the same foreign production methods but should incorporate productivity-enhancing technologies, an area where policy can provide meaningful support. Ultimately, policies that improve the domestic business environment—such as reducing investment barriers, fostering innovation, and enhancing labor market flexibility—could be more effective in attracting investment from high-productivity firms.

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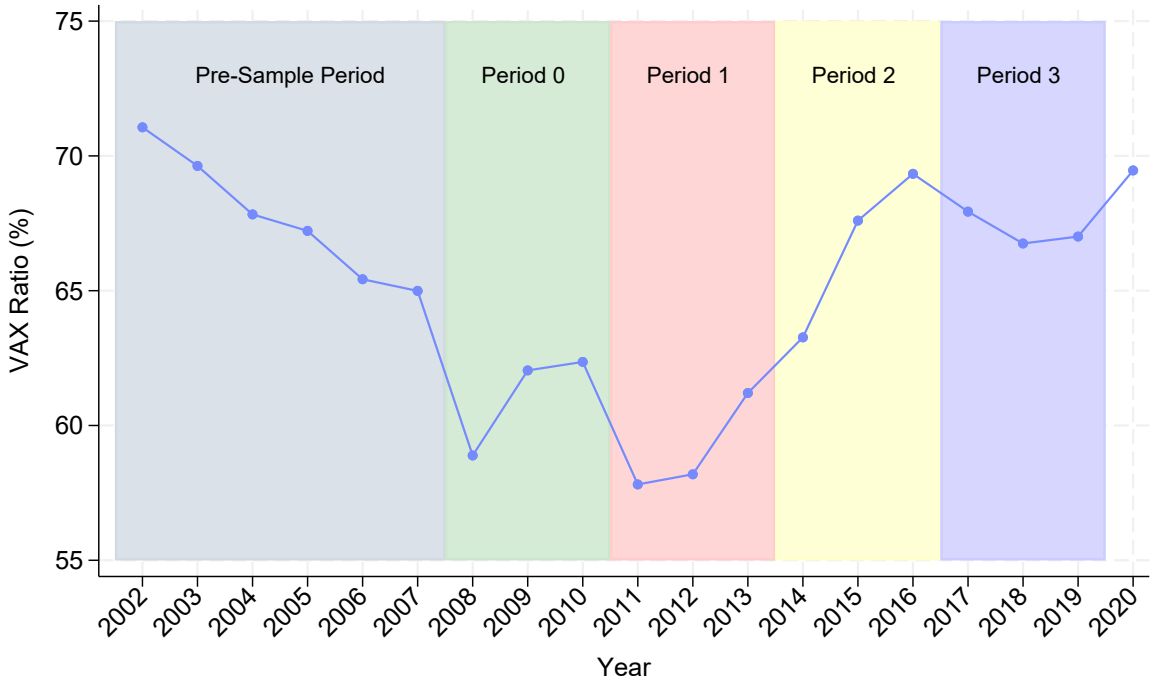
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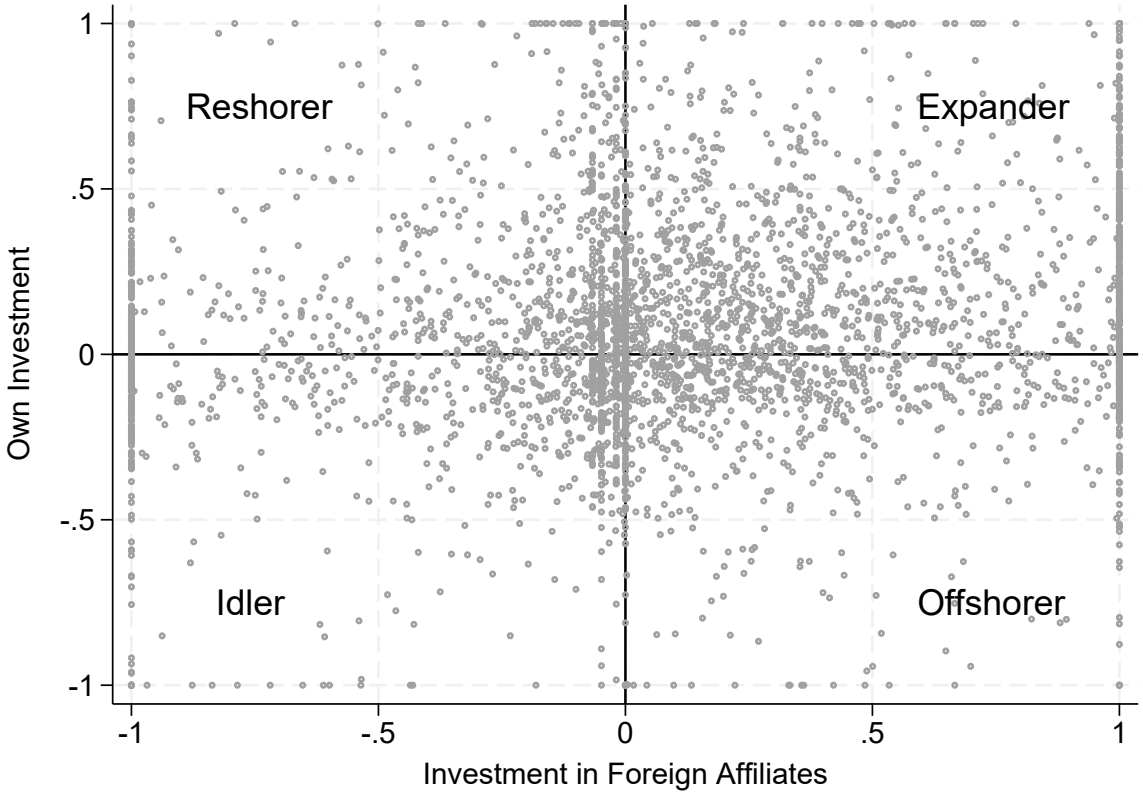
Appendix

Figure A.1: Trend in the VAX Ratio in South Korea



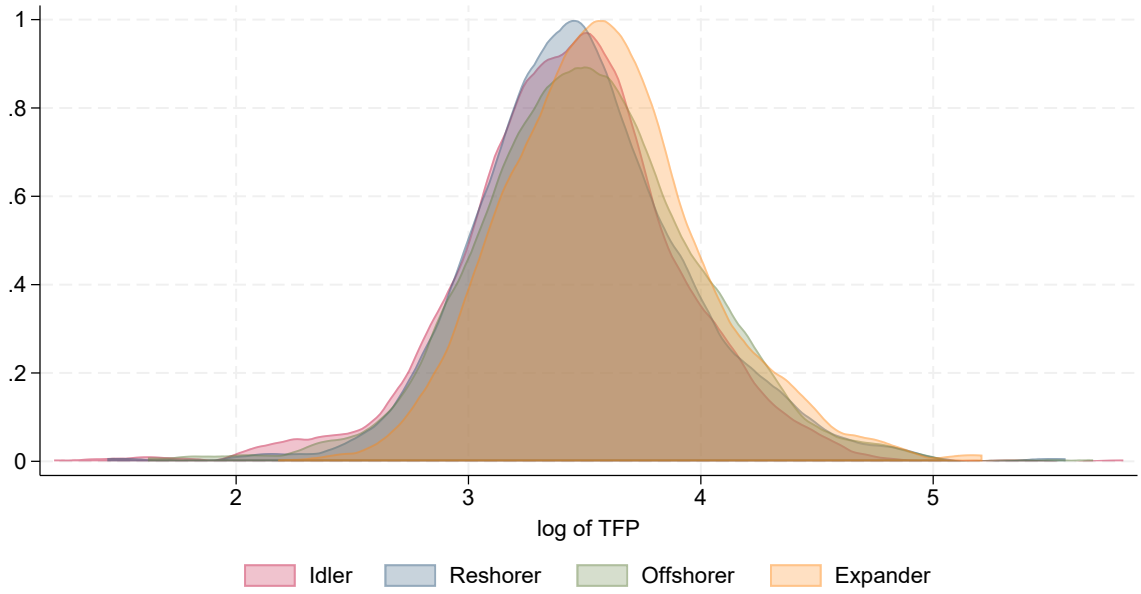
Notes: The VAX ratio, defined as the share of value-added exports to gross exports (Johnson and Noguera, 2012), is calculated using data from the OECD Trade in Value Added (TiVA) Indicators, 2023 edition.

Figure A.2: The Distribution of MNCs' Investment Choices across All Periods



Notes: Investment growths are measured using log differences, with values exceeding one or falling below minus one censored at one and minus one, respectively.

Figure A.3: Distribution of (log of) TFP by Investment Type



Notes: The (log of) TFP is estimated following the method of Ackerberg et al. (2015). The values for each type exhibit a one-period lag.