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日本企業の海外展開と国内事業再編

Overseas Expansion and Domestic Business Restructuring in Japanese Firms

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日本企業の海外展開と国内事業再編

文部科学省　科学技術・学術政策研究所　第 1 研究グループ

要旨

本稿は、2001 年、2006 年、2009 年及び 2012 年の事業所レベルのパネルデータを用いて、日本の多国籍企業による国内事業の再編成について分析する。本稿では事業所の「定型業務度（routine-task intensity）」に注目し、企業が多国籍化すると日本国内では、（1）どのような事業所を閉鎖あるいは新しく開設するようになるのか、（2）どのような事業所で雇用が増加あるいは減少するようになるのか、について分析する。海外投資コストが低下した時、定型業務のような取引可能性の高い業務を行う労働力に依存する事業活動はより海外に移転されやすいと考えられる。本研究では、職種レベルの定型業務度と産業別の職種構成の情報を用いて各事業所の定型業務度を推計し、企業の多国籍化と国内事業再編の関係について分析を行った。分析の結果、企業が多国籍化すると、定型業務の多い事業所を閉鎖する可能性が高いことがわかった。また、閉鎖されなかった存続事業所においても、定型業務が少ない事業所ほど、雇用の増加率が高いこともわかった。これらの結果は、企業の海外展開には、国内の事業再編を加速し、国内の事業活動をより定型業務の少ない活動へとシフトさせる効果を持つことを示している。

Overseas Expansion and Domestic Business Restructuring in Japanese Firms

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ABSTRACT

In this paper, we examine domestic business restructuring by Japanese multinational enterprises (MNEs) by using establishment-level panel data constructed for the years 2001, 2006, 2009, and 2012. Focusing on the routine-task intensity of establishments, we examine (1) what type of establishments are closed or newly established and (2) what type of establishments increase or reduce their employment when a firm becomes multinational. When the cost of investment abroad decreases, firms are expected to relocate tradable-task (i.e., routine-task) labor-intensive activities abroad. We measure the skill level of each establishment using the occupation-level routine-task intensity and the occupation compositions for each industry. We find that more routine-task intensive establishments are more likely to exit when the firm becomes multinational. In the case of continuing establishments, we find that less routine-task intensive establishments tend to have a higher employment growth rate when a firm becomes multinational. Our results imply that overseas expansion accelerates domestic business restructuring within a MNE and shifts domestic activities toward less routine-task intensive ones.

概要

1. はじめに

本研究では、日本企業の母集団情報を用いて、企業の海外展開（海外子会社の設立・取得）が国内での事業再編（business restructuring）に与える影響について、業務の海外移転可能性に注目して、分析を行う。具体的には、事業所の「定型業務度（RTI : Routine Task Intensity）」を推計し、企業の海外進出にともなって、国内ではどのような事業所が閉鎖あるいは新設され、どのような事業所で雇用が増加あるいは減少するのか、を明らかにする。

先行研究によれば、多国籍企業による海外生産の拡大は国内の経済活動に対して、様々な影響をもたらしうる。これまでに多くの研究者によって、企業の海外展開が国内の雇用や生産、輸出入、生産性などに与える影響など様々な角度から、事業所、企業、産業といった多様なレベルのデータに基づいた分析がおこなわれてきた。これら多くの先行研究に一致する傾向として、海外展開と国内の生産活動との間には強い負の関係は見られないことがわかっている。また、多国籍企業の国内での事業活動の生産性は比較的高い傾向にあり、海外展開はその企業の生産性の向上をもたらすことが知られている。しかしながら、このような企業の多国籍化による生産性上昇のメカニズムはよくわかっていない。

そこで本研究では、海外展開にともなう国内事業再編や組織再編が多国籍企業の生産性上昇の源泉になっている可能性について検証する。特に、多国籍企業における事業再編にともなう労働者の業務の変化に注目する。英国のデータを用いた先行研究では、低所得国への海外直接投資にともなって、英国企業は英国国内において熟練度の低い産業の事業所を閉鎖する傾向があることが示されている（Simpson 2012）が、本研究の新規性は主に２つある。１つ目は、業務の移転可能性の観点から、労働者の熟練度ではなく、事業所の「定型業務度」の違いによって企業の海外進出の影響が異なる可能性を検証していることである。２つ目は、先行研究で分析が行われている企業の海外展開が国内事業所の閉鎖に与える影響のみならず、企業の海外進出が存続事業所の雇用成長や新たな事業所の設立に与える影響についてもあわせて分析していることである。

2. 分析方法

本研究では、図 1 の分析枠組みを用いて、以下の３点を統計的に検証する

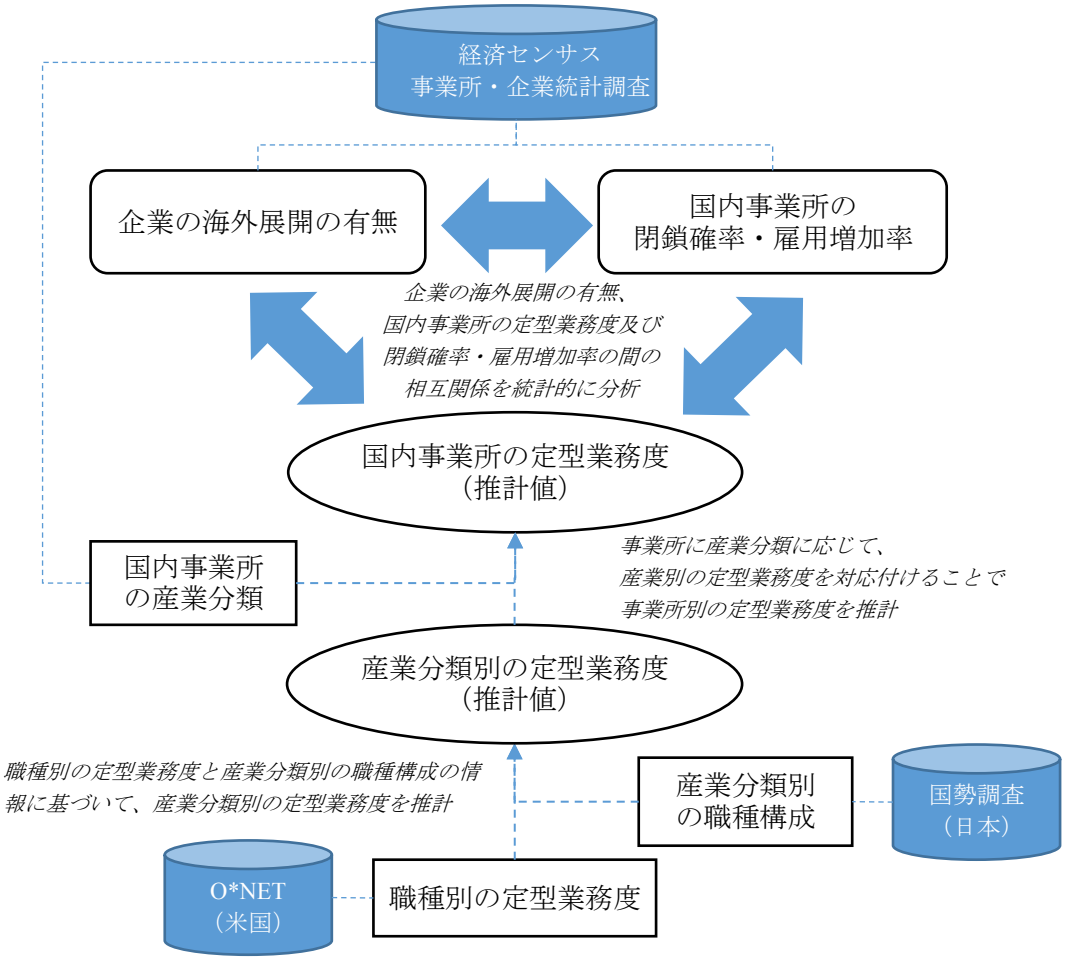
（1）海外展開した企業では、その企業が所有する国内の事業所の中で相対的に定型業務の多い事業所を閉鎖させる傾向が強まるかどうか、

（2）海外展開の前後で、その企業が所有する国内の事業所の中で相対的に定型業務の多い事業所で雇用を減らし、定型業務が相対的に少ない事業所の雇用を増やすようになるかどうか、

（3）海外展開の前後で、企業が相対的に定型業務の多い事業所を国内に新たに設立する傾

向があるかどうか。

図 1：本研究の分析枠組み



本研究で分析に用いる主なデータセットは 2001 年及び 2006 年の「事業所・企業統計調査」（総務省）と 2009 年及び 2012 年の「経済センサス」（総務省）の事業所レベルのパネルデータである。両調査はいずれも総務省の基幹統計調査であり、一部産業の個人事業所を除く、日本全国のほぼ全ての事業所を対象としている。これらの調査では、各事業所が多国籍企業（海外に子会社がある企業）に所属しているかどうかが調査されており、この情報を用いて分析する。なお、パネルデータに含まれる事業所のうち、複数の事業所を所有する企業でかつ、2001 年から 2006 年、2006 年から 2009 年、2009 年から 2012 年のそれぞれの期間において存続している企業の事業所に限定して分析を行った。分析対象の企業数及び事業所数は、2001～2012 年の 4 期間の合計でそれぞれ延べ約 28 万社及び延べ約 230 万事業所である。これは日本の全体の事業所数の約 4 割を占める。

図 1 の分析枠組みにおける各事業所の定型業務度は、米国労働省（雇用訓練局）の「Occupational Information Network (O*NET)」に基づいて推計する。O*NET には職種別に 30

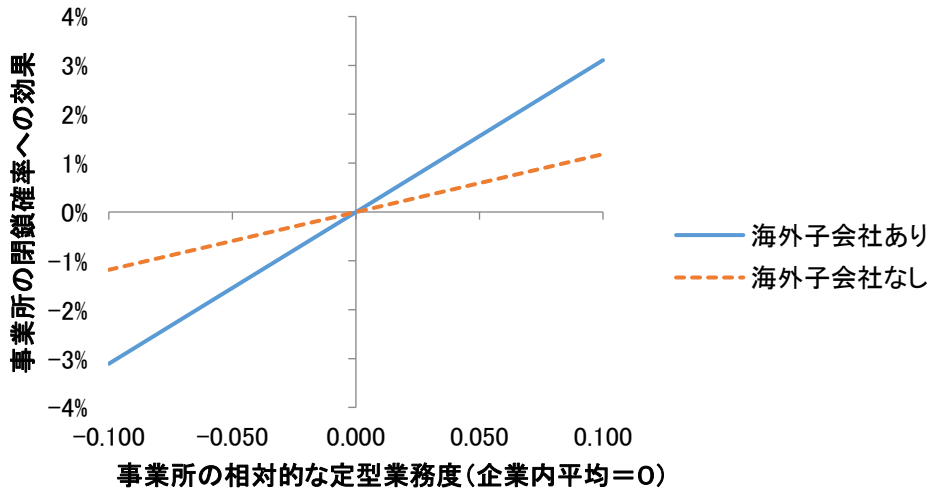
種類以上の詳細な業務（task）ごとにその業務の各職種における重要性が 0～100 点のスコアで表されている。先行研究（Costinot et al. 2011）にしたがい、「意思決定及び問題解決」業務に関する重要性のスコアにより、職種別の定型業務度を求めた。「事業所・企業統計調査」及び「経済センサス」では事業所別の職種の構成は調査されていないため、職種別の定型業務度を日本の「国勢調査」（総務省）の公表結果から得られる産業別の職種構成比の情報を用いて、各産業の定型業務度を推計し、各事業所が所属する産業の定型業務度を事業所別の定型業務度として分析に用いた。

なお、本来は海外進出先の違いを考慮して、分析を行うことが望ましいが、残念ながら、「事業所・企業統計調査」及び「経済センサス」では海外子会社の立地（国・地域）についての情報は調査されていない。しかしながら、経済産業省の「企業活動基本調査」の結果によれば、日本の多国籍企業の大部分はアジアの新興国に最初に海外進出し、その後他の国・地域に拡張していくことがわかっている。そのため、本研究では、多国籍企業はアジアを中心とする発展途上国に子会社を有する企業と仮定して分析結果を解釈することとした。

3. 分析結果

分析の結果、分析方法の冒頭で示した 3 点は全て概ね統計的に検証された。第 1 に、事業所の閉鎖確率に関する分析結果は図 2 のとおりである。海外子会社の有無によらず、企業内で相対的に定型業務度の高い事業所ほど閉鎖される確率が高いが、海外子会社を設立して多国籍化した企業では、その傾向が強まることがわかる。すなわち、多国籍企業は国内の事業所の中で相対的に定型業務の多い事業所を閉鎖する傾向が強い。

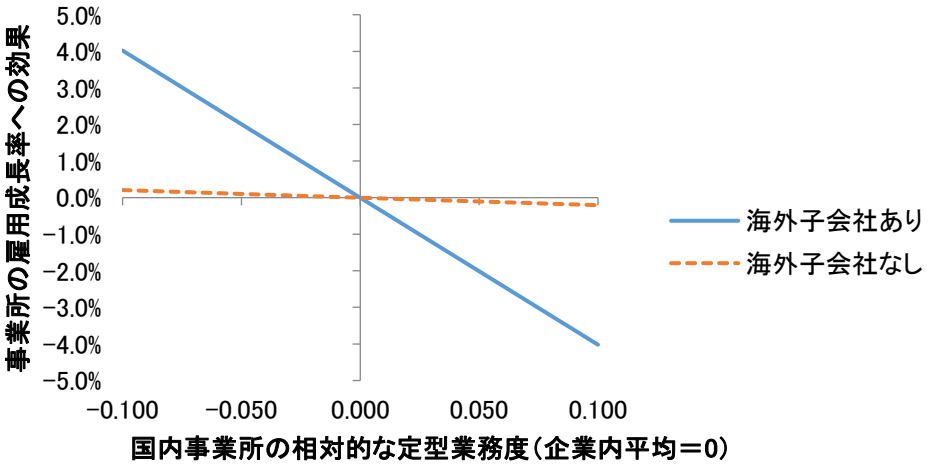
図 2：事業所の定型業務度がその事業所の閉鎖確率に与える効果の推定結果



第 2 に、図 3 は事業所の雇用成長率に関する分析結果を示しており、海外子会社を新たに設立または取得した企業では、相対的に定型業務度の高い（定型業務が多い）事業所で雇

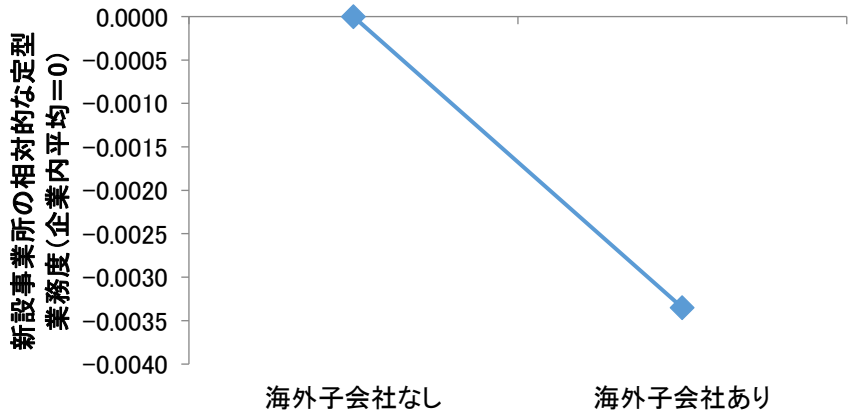
用を減らし、定型業務度の低い（定型業務の少ない）事業所の雇用を増やす傾向が強まることがわかる。

図 3：事業所の定型業務度が雇用の成長率に与える効果の推定結果



第 3 に、図 4 は新設事業所の RTI に関する分析結果を示しており、海外子会社をもつ多国籍企業が新設した事業所は海外子会社のない企業が新設した事業所に比べて相対的な定型業務度が低いことがわかる。すなわち、この結果は、多国籍企業では既に所有している事業所に比べて相対的に定型業務の少ない産業で新しく事業所を設立する傾向が強いことを示している。

図 4：企業の海外子会社の有無が新設事業所の定型業務度に与える効果の推定結果



4. 結論と含意

本研究では、2001 年から 2012 年までの事業所レベルのパネルデータを用いて、日本の多国籍企業による国内事業再編について分析した。定型業務の多い事業所と定型業務の少ない事業所の違いに注目し、企業が海外子会社を持ち、多国籍化することが、日本国内で所有する各事業所の閉鎖確率や雇用の成長率に与える影響と企業の多国籍化が国内に新設する事業所の定型業務度に与える影響を分析した。主な分析結果は以下の３点である。

（1） 企業が海外展開すると、その企業が所有する国内事業所の中で相対的に定型業務の多い事業所ほど閉鎖される傾向が強くなる。

（2） 企業が海外展開すると、その企業が所有する国内事業所の中で相対的に定型業務の多い事業所で雇用が減少し、定型業務の少ない事業所では雇用が増加する傾向が強まる。

（3） 企業が海外展開すると、その企業が所有する既存事業所に比べて定型業務の少ない産業で新しく事業所を設立する傾向が強くなる。

これらの分析結果は、企業が海外展開すると、国内ではより定型業務の多い事業活動を縮小し、定型業務の少ない事業活動を拡大する傾向があることを示している。すなわち今後、企業の海外展開がさらに進んだ場合、定型業務の割合が高い産業や職種に関連した労働者への影響が特に大きく、定型業務から非定型業務への労働者の移動を円滑にするための労働者の再教育などの政策が重要となることが示唆される。これは、企業の海外展開にともなう国内事業再編といった経済のグローバル化の進展に適応するためには、労働政策や産業政策、さらには教育政策等、多様な政策分野の相互補完性を高める必要があり、省庁横断的な政策議論の重要性を意味している。

しかしながら、本研究にはいくつかの残された課題もある。最も重要な点は、利用可能なデータの制約から、分析に用いた事業所の定型業務度は、米国のデータに基づく職種別の定型業務度と産業別の職種構成の情報に基づく推計値に依存している点である。より精緻な分析を行うためには、日本の職種別の定型業務度のデータを用いるとともに、産業別ではなく事業所別あるいは企業別の従業者の職種構成のデータを用いる必要がある。そのためには、日本においても本研究で注目した定型業務度のような職種別の業務特性に関する精緻なデータベースを整備するとともに、労働統計と企業統計を事業所・企業単位で直接リンクして分析可能なデータベースの整備を進めていく必要がある。また、これらのデータベースを整備することは、本研究で注目した企業の国際化が雇用に与える影響のみならず、近年注目が高まっている人工知能やロボット技術の影響といった、企業の競争環境や技術条件の変化が雇用に与える影響についての包括的な調査研究を促進するためにも不可欠であると考えられる。

参考文献

Costinot, Arnaud, Lindsay Oldensky, and James Rauch (2011) “Adaptation and the Boundary of Multinational Firms,” *Review of Economics and Statistics* 93(1): 298−308.

Simpson, Helene (2012) “Investment Abroad and Labour Adjustment at Home: Evidence from UK Multinational Firms,” *Canadian Journal of Economics* 45(2): 698−731.

本文（英語）

1. Introduction

Expansion of overseas production by multinational enterprises (MNEs) is expected to have various impacts on their domestic activities. To date, a number of researchers have investigated the impacts of overseas expansion on domestic employment and production, exports and imports, productivity, and so on, using either firm- or plant-level data or industry-level data.

The majority of such studies have not found a strong negative relationship between overseas expansion and domestic activities such as employment and production within MNEs.[1] Rather, many studies confirm that MNEs tend to be more productive and that overseas expansion by MNEs contributes to their productivity growth. Although the mechanism of MNEs' productivity growth has not yet been understood sufficiently, restructuring or reshuffling their business activities within MNEs is likely to be a source of their productivity growth. On the one hand, the changes in skill compositions within a MNE can produce productivity growth, as confirmed by many papers such as Head and Ries (2002), Hijzen et al. (2005), and Becker et al. (2013), who identify a link between offshoring and labor demand shifts toward high-skilled workers. More recently, a growing number of papers focus on labor demand shifts away from manual low-wage task workers toward nonroutine high-wage task workers. For example, Oldensky (2012) shows that US MNEs are more likely to offshore more routine tasks, whereas less routine tasks are performed in their headquarters.

On the other hand, related to the skill composition changes, domestic activities are likely to be reshuffled within a MNE and some of the domestic establishments would be forced to change their line of business drastically if a MNE shifted a part of their domestic operation to a foreign country. Some of the establishments may even be shut down, while other domestic establishments may be able to improve their productivity either by expanding their operations or by shifting their activities to more technologically

[1] Although the evidence overall is rather mixed, the more recent studies tend to show that overseas operations and home operations are complementary (e.g., Desai et al. 2009). Harrison and McMillan (2011) do not find a strong negative relationship between overseas activities and home employment, although the effect of overseas activities on employment at home differs depending on the tasks performed at home and abroad in the case of US-based multinationals. Similarly, for Japan, Yamashita and Fukao (2010), using a matched dataset of parent firms and their overseas affiliates, find no evidence that the expansion of overseas operations reduces the MNEs' home employment.

advanced ones. Such restructuring within a MNE is likely to contribute to overall productivity improvement at the firm level.

In fact, several recent studies suggest that MNEs tend to be more active in resource reallocation across establishments within a firm. For example, Kneller et al. (2012), using firm plant-linked data for Japanese manufacturing firms, find that plants belonging to multi-plant MNEs are the most likely to be shut, followed by multi-plant non-MNE firms and then single-plant MNEs. Kodama and Inui (2015) also find that multi-establishment MNEs show a high job-reallocation rate, i.e., the sum of the job creation rate and job destruction rate, suggesting that MNEs have greater flexibility in adjusting to changing market conditions. Furthermore, using British firm plant-linked data, Simpson (2012) finds that firms investing in low-wage economies tend to close down plants in low-skill industries at home.

The findings of these studies suggest that MNEs actively reallocate resources across establishments within the firm, while overall firm-level employment is not necessarily reduced in response to overseas expansion. Rather, they are more likely to improve overall productivity as a result of efficient resource reallocation within the firm.[2]

Numerous previous studies examine why MNEs relocate low-skill labor intensive processes to low-wage developing countries and they are expected to shift their activities at home toward less labor intensive and/or high-skill labor intensive processes. More recently, however, an increasing number of studies add another dimension to this issue: tradability of tasks. Grossman and Rossi-Hansberg (2008) claim that offshoring is costly if the tasks required for processes at an offshore location are not easily moved offshore even though workers can be hired more cheaply abroad. The literature has shown that firms are more likely to offshore routine tasks and keep nonroutine tasks in their headquarters (Oldensky 2014). Routine tasks can be broken down into clear steps and procedures and communicated to someone located overseas. Nonroutine tasks, however, involve decision making and problem solving that often require face-to-face communication within a team, and they are more difficult to communicate to overseas affiliates. Taking the tradability of tasks into account, recent studies such as Ebenstein et

[2] Giroud and Mueller (2015) also find that within-firm resource reallocation increases aggregate firm-wide productivity, although they do not focus on MNEs but rather on US plants that received a positive productivity shock such as the introduction of new airline routes.

al. (2014), Goos et al. (2014), and Keller and Utar (2016) argue that offshoring or import competition from low-wage countries leads to job polarization mainly by pushing workers from initially abundant mid-level routine jobs in manufacturing toward both high-wage nonroutine and low-wage manual jobs.[3] Oldensky (2014), taking both comparative advantages and task tradability into account, also shows that offshoring by US firms has contributed to relative gains for the most high-skilled workers performing nonroutine tasks and relative losses for middle-skilled workers performing routine tasks.[4]

Moreover, as the servitization of manufacturing firms, i.e., the phenomenon where activities of manufacturing firms are shifted toward more nonmanufacturing services activities, has been observed often in developed countries, MNEs' domestic activities may shift toward activities using nontradable service jobs intensively. Therefore, the bottom line of these arguments is that globalization affects not only the relative demand for low-skill and high-skill workers within manufacturing activities, but also the relative demand for workers in tradable task sectors and in nontradable task sectors including both manufacturing and services activities.

Such changes in labor demand are expected to lead to within-firm reallocation of resources, i.e., domestic business restructuring by MNEs, and to industry composition changes within a firm depending on the skill type of each industry. Therefore, in this paper, we examine (1) what type of establishments are closed or newly established and (2) what type of establishments increase or reduce their employment, when an MNE expands its overseas operation. Although our paper is closely related to Simpson (2012), a novelty of our study is to investigate the impact of overseas business expansion on domestic business restructuring within the firm, taking task tradability (or task "offshorability") into account. We assume that routine tasks are more tradable (or offshorable) tasks in the sense that such tasks can be easily displaced by computers and relocated overseas. Therefore, when the cost of investment abroad decreases, firms are expected to relocate routine-task labor-intensive activities abroad and keep nonroutine-

[3] Autor and Dorn (2013) find that rising employment and wages in service occupations account for a substantial share of aggregate polarization of the US employment and earnings distributions.

[4] Keller and Yeaple (2013), focusing on the difficulty of communicating knowledge from one person to another, show that more knowledge intensive production processes are less likely to be moved to distant locations. Their finding also suggests that MNEs tend to keep their nonroutine task processes at home or in regions closer to their home country.

task labor-intensive activities within their home country, if the MNE's home country has a comparative advantage in nonroutine occupations. Moreover, we examine not only establishment closures but also new establishment entries and employment growth in continuing establishments within a MNE, which is an aspect that most previous studies have ignored.

The remainder of this study is organized as follows. Section 2 describes the data and presents some descriptive statistics. Section 3 explains the empirical framework we use in the present study. Section 4 presents the empirical results. Finally, Section 5 concludes and presents future research questions.

2. Data and descriptive statistics

2.1 Firm establishment-matched data

The main dataset used in this study is an establishment-level panel dataset constructed from the Establishment and Enterprise Census (for years 2001 and 2006) and the Economic Census (for years 2009 and 2012) for Japan. The censuses are provided by the Ministry of Internal Affairs and Communications and cover all establishments in all industries (cover only incorporated establishments in the case of agriculture, forestry, and fishery industries) in Japan. Although the censuses, except for 2012, do not contain detailed firm-level financial information, other information for each establishment such as the number of workers, the business activities at the 3-digit JSIC (Japan Standard Industry Classification) industry level (approximately 480 industries), and location is available.[5] Moreover, firm ID code is attached to each establishment and we can identify which establishment belongs to which firm. For each establishment, we can identify whether it is a single-establishment firm, a branch establishment of a firm, or a headquarter establishment of a firm. For each firm, information on whether it owns domestic or foreign subsidiaries is available. We mainly use this information to identify whether a firm is multinational.[6] We should note that in the censuses, branch

[5] For the 2012 Economic Census, more detailed information on business activities such as sales of goods produced and sales of supporting service activities at the establishment level is available.

[6] The number of domestic or foreign subsidiaries for each firm is available only for the 2006 and 2009 censuses. Therefore, we do not use this information and mainly use a binary indicator as to

establishments and subsidiaries are clearly distinguished. Although a substantial number of firms own branch establishments in foreign countries, we define MNEs as firms with at least one foreign subsidiary. Therefore, firms with foreign branches but without foreign subsidiaries are defined as non-MNEs.

Unfortunately, information on the location (country or region) of foreign subsidiaries is not available in the censuses. Although many previous studies suggest that investment or offshoring to low-income countries has a different impact on domestic economies from that to high-income countries, we cannot examine potentially different effects by destination because of data constraints. However, in the case of Japanese MNEs, more than 80 percent of MNEs have subsidiaries in Asian countries, according to the Basic Survey of Japanese Business Structure and Activities conducted by the Ministry of Economy, Trade and Industry. Probably reflecting the geographical proximity to Asian low-wage countries relative to American or European countries, the majority of Japanese MNEs set up their subsidiaries in an Asian country first, and then expand to other regions. Therefore, it would be safe to assume that they are very likely to have a subsidiary in an Asian country.

We construct the establishment-level panel dataset for the years 2001, 2006, 2009, and 2012. Moreover, we link the firm-level information such as firm-level employment size, firm industry, and domestic or foreign subsidiaries with the establishment-level data.

For exits of establishments and/or firms, we identify them if an establishment or a firm existed in the census for a certain year but disappeared in the next census. For entry of establishments and/or firms, we identify them by using the information on the start-up year.

2.2 Data on skill-mix by industry

Using this dataset, we investigate how firms restructure their domestic business activities when they become multinational, whether such behavior of firms with overseas subsidiaries differs from that of firms without overseas subsidiaries, and whether firms with overseas subsidiaries are more likely to concentrate on higher-skill nonroutine

whether a firm owns at least one foreign subsidiary or not.

activities domestically. More specifically, we investigate what types of establishments with respect to skills are closed or newly established when multinational firms restructure their domestic activities.

In order to measure the skill level of each establishment, following previous studies such as Costinot et al. (2011) and Oldenski (2012), we utilize the Occupational Information Network (O*NET).[7] We use the importance of "making decisions and solving problems" as our index of how routine a task is. Similar to Oldenski (2012), who argues for the existence of a strict connection between job autonomy and routine intensity, we consider a routine intensive task as a task with little autonomy for the individual at work. Following Costinot et al. (2011), we measure routineness at the 3-digit sector level, by combing task-level data for each occupation with sector-level data from the Japanese Population Census. Because detailed task-level data equivalent to the O*NET are not available for Japan, we use the task information for each US occupation and match the US occupations with the Japanese occupations.[8] More specifically, we construct our "routine" task intensity measure at the sector level in the following way.

First, we match the information on tasks for each US occupation included in the June 2007 version of O*NET[9] with each Japanese occupation, using the concordance table between the 2010 US Standard Occupational Classification (SOC) codes and Japan's 2005 occupation classification codes constructed by Tomiura et al. (2015).[10] Then, we measure the routineness $\mu(t)$ of an occupation t as:

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[7] This is the US Department of Labor's successor to the Dictionary of Occupational Titles (DOT) (US Department of Labor 1977), which is used to construct task measures from previous studies such as Autor and Dorn (2013). We use the information taken from the O*NET, not the DOT, because the job task information described in the DOT is that of year 1977. Taking into account the fact that tasks have changed substantially even within the same occupation in recent decades, we use newer job-task information taken from the O*NET.

[8] Although the Japan Institute for Labour Policy and Training started a similar service to O*NET, called "Career Matrix (CMX)," in 2006, the CMX website was closed in 2011 and the data are no longer available because this service was abandoned as a result of the Japanese government's budget screening process. If we can obtain the data underlying the CMX in the future, we would like to check the robustness of our results using the Japanese task-occupation matched data.

[9] We use the 0−100 score that O*NET reports to measure the importance of each task in each occupation. These scores are constructed from surveys of individuals in those occupations and are normalized to a 0−100 scale by analysts at the Department of Labor. Lindsay Oldenski kindly provided us with the 0−100 scale index and we utilized her data.

[10] Although the original task importance measures provided by Oldenski were available for over 500 US occupations, the occupation-level task importance measures are aggregated to the 172

$$\mu(t) = 1 - P(t)/100,$$

where $P(t) \in [0, 100]$ measures the importance of making decisions and solving problems of an occupation, *t*, according to O*NET but matched with the Japanese occupation classifications. We define a sector as a three-digit industry in the Japanese Standard Industry Classification (JSIC) revision 11. We use the share of workers in each occupation for each industry, which is calculated from the 2005 Population Census data, and construct the JSIC three-digit level routine-task measure:

$$\mu^s = \sum_{t=1}^{T} b^s(t)\mu(t),$$

where μ^s is our proxy for routineness at sector *s*, and $b^s(t)$ is the share of employment of each occupation, *t*, in sector *s*. Thus, we construct the 3-digit sector-level routine-task measure as a weighted average of occupation-level routine-task measures. Our measure is a sector-specific but time-invariant measure, assuming that the task contents do not change substantially within a sector during the period of our analysis, 2001−2012. Although we may construct a time-variant task measure, we believe that the time-variant task measure is likely to be endogenous to establishment share changes across industries. Therefore, we use the time-invariant task measure in our analysis.

Moreover, as mentioned above, we measure the routine-task measure for each establishment using the 3-digit industry-level information because of data constraints. That is, we assume that the routine-task measure is the same for all the establishments belonging to the same 3-digit industry. Appendix Table 1 shows the list of the 50 industries with the highest routine-task measure and the 50 industries with the lowest routine-task measure. In addition, we should note that we use the task information for each US occupation, assuming that the task contents for each occupation are the same in the United States as in Japan. Looking at the routine-task index constructed from the OECD's Programme for the International Assessment of Adult Competencies (PIAAC) database[11], the correlation coefficient between the Japanese and US routine-task index by occupation is over 0.6 and the Spearman rank correlation between them is also over

Japanese occupations. When more than one US occupation matches with one Japanese occupation, we took an average value of the importance score for the US occupations.

[11] See, for example, Marcolin et al. (2016).

0.6.[12] Although the task contents for each occupation may not be exactly the same in the both countries, the correlation is high and we use the US task measure as a proxy for the Japanese task measure.

We also checked the correlation between our routine-task intensity measure and the share of unskilled workers based on the education attainment for workers in each industry. That is, we calculate the share of workers who graduated from junior college or had higher education for each industry, using the data taken from the 2000 Population Census for Japan. Then, we measure the share of unskilled workers in each industry as the residual from one: 1 − (share of workers who graduated from junior college or had higher education). The correlation coefficient for our routine-task measure and the unskilled worker share is 0.23 (statistically significant at the one percent level). The Spearman rank correlation is 0.21 and also statistically significant. The positive correlation between the two measures indicates that nonroutine-task intensity positively correlates with unskilled worker share in terms of education attainment. However, the magnitude of the correlation coefficient also indicates that these two measures are not very highly correlated and that they reflect somewhat different skill characteristics. Although closer investigation of the differences across various skill intensity measures is required in our future research, we use the Costinot et al.-type routine-task intensity for this study.[13]

2.3 Descriptive statistics

Table 1 summarizes the number of establishments by firm ownership type and by firm-level industry. We focus on establishments belonging to private firms. More specifically, our dataset includes establishments for which the legal organization is 1) a joint-stock company, 2) a limited or unlimited partnership, 3) a limited liability company, or 4) a mutual insurance company. We exclude branch establishments whose headquarters are located in foreign countries, because firm-level information is not available in the

[12] Luca Marcolin kindly provided us with the routine-task index at the 3-digit occupation level for Japan and the United States.

[13] Simpson (2012) mainly uses the share of workers with qualifications (basically measured by education level). We could also have used the wage rank of occupation data compiled by Goos et al. (2009) in order to construct a measure of skill intensity for each industry.

Japanese Census for these establishments. We also exclude establishments for which employment is zero or missing. As a result, in 2006, approximately 2.6 million privately owned establishments in Japan remained in our dataset. Furthermore, we exclude establishments of firms that disappeared in the next Census, i.e., the 2009 Economic Census. These firms are likely to have exited and were shut down sometime between 2006 and 2009. That is, we focus on establishments of firms that continued operating until the next census year, and we are left with approximately 1.9 million such privately owned establishments for 2006 as summarized in Table 1. As mentioned above, we define Japanese MNEs as firms that have at least one foreign subsidiary while we define foreign MNEs as firms with a parent company in a foreign country. As shown in Table 1, reflecting the fact that MNEs tend to be large firms, most of the establishments of Japanese MNEs are part of a firm with more than one establishment (multi-establishment firm). Although the number of establishments of Japanese MNEs is only four percent of the total number of establishments (= 78,896/(1,817,023 + 6,652)), the corresponding share becomes nearly 10 percent (= 78,896 * 0.978/(1,817,023 * 0.40 + 78,896 * 0.978 + 6,652 * 0.831)) when we focus on multi-establishment firms.

As shown in Table 1, nearly 98 percent of Japanese MNEs' establishments are part of a multi-establishment firm. Given this fact and because we focus on within-firm business restructuring, we restrict our sample for the following analyses to the establishments belonging to multi-establishment firms.

INSERT Table 1

Table 2 shows the descriptive statistics for the establishments used in our analysis: establishments belonging to multi-establishment firms. The figures in the table, except the number of observations, are averaged over the years 2001, 2006, and 2009. In fact, the 2012 Census does not have information on whether a firm has at least one foreign affiliate, and we cannot identify multinationals as of 2012. Therefore, we show the average value of the statistics for the three years. To calculate exit and entry rates during

the period from 2009 to 2012, however, we also use the data taken from the 2012 Census, where we classified a firm's multinational status using the data for year 2009.[14]

In Table 2, we show the statistics for the establishments belonging to manufacturing firms and for establishments belonging to nonmanufacturing firms, separately. Various characteristics are shown for establishments owned by three different types of firms: domestic only, Japanese-owned multinationals, and foreign-owned multinationals. First, the proportion of establishments that exit or enter in the period between two censuses is much higher for Japanese-MNE and foreign-MNE establishments than for establishments owned by domestic firms. We should note that we exclude single-establishment firms and focus on establishments belonging to multi-establishment firms that continued operating for the period between the two censuses. Even focusing on multi-establishment firms, domestic firms show lower exit and/or entry rates than Japanese and foreign MNEs, implying that MNEs are more likely to be active in shutting down and/or opening establishments. In addition, establishments owned by domestic firms are on average much smaller in terms of employment size than those owned by multinationals.

We construct three indicators of multi-establishment firms: *Multi_same 3-digit industry*, *Multi_manufacturing*, and *Multi_nonmanufacturing*. *Multi_same 3-digit industry* is a dummy variable that equals one for establishments that are a part of a firm with other establishments (a multi-establishment firm) and for which the 3-digit industry is the same as the firm-level industry. *Multi_manufacturing* is a dummy variable that equals one for establishments that are part of a multi-establishment firm and for which the 3-digit industry is not the same as the firm-level industry but is a manufacturing industry. *Multi_nonmanufacturing* is a dummy variable that equals one for establishments that are part of a multi-establishment firm and for which the 3-digit industry is not the same as the firm-level industry but is a nonmanufacturing industry. In the case of manufacturing firms, the share of *Multi_nonmanufacturing* is much higher for Japanese and foreign MNEs than for domestic firms, suggesting that manufacturing

[14] More specifically, to calculate the entry and exit rates, we count the number of exited establishments and new establishments for the three periods: 2001−2006, 2006−2009, and 2009−2012. A firm's multinational status is identified using the information of the initial year of each period, 2001, 2006, and 2009.

MNEs have many nonmanufacturing establishments within the firm although their main business activity is manufacturing. The figures show that more than half (over 60 percent) of the establishments of manufacturing MNEs conduct nonmanufacturing business activities, which is consistent with the growing importance of the servitization of manufacturing firms in developed countries (e.g., Crozet and Milet 2014 and Bernard et al. 2016). On the other hand, in the case of nonmanufacturing firms, the majority of establishments within a firm belong to the same industry as the firm-level industry, suggesting that business activities are less diversified within a nonmanufacturing firm.

As for average task measures, establishments owned by MNEs tend to have a slightly higher routine-task index on average than those owned by domestic multi-establishment firms in the case of manufacturing firms. However, in the case of nonmanufacturing firms, establishments owned by Japanese MNEs tend to have a slightly lower routine-task index than those owned by domestic multi-establishment firms. By only looking at the average routine-task index, the differences in task intensities between domestic firms' establishments and MNEs' establishments are less clear. We will examine the relationship between routine-task intensity and establishments' dynamics in more detail by estimating empirical models in the following sections.

INSERT Table 2

In Table 3, we examine the share of foreign-owned establishments by firm industry and its evolution over time. Columns (1)−(3) show the share of Japanese MNEs at the firm level: the number of Japanese multinational firms divided by the total number of firms, while columns (4)−(6) show the corresponding share at the establishment level: the number of establishments owned by Japanese multinational firms divided by the total number of establishments. Looking at the firm-level shares, industries such as manufacturing, telecommunication, and finance and insurance tend to show a higher share of multinationals. Moreover, the shares tend to decrease from 2006 to 2009 while they tend to increase from 2001 to 2006 in many industries, which might reflect the trend in the growth of the world economy.

The establishment-level shares in columns (4)–(6) show a more or less similar trend, but the magnitude of the shares are much larger than the firm-level shares, reflecting the fact that multinationals tend to be larger and have more establishments within a firm than nonmultinational firms. Moreover, the establishment-level MNE shares did not decrease substantially from 2006 to 2009 in many industries, although the firm-level corresponding shares decreased in many industries during the period. This finding may imply that MNEs increased their presence in the overall Japanese economy in recent years not by extensive margin changes but by intensive margin changes. That is, although the number of new MNEs may be stagnant, existing MNEs may have increased the number of establishments within their firm. However, the decrease in the share of MNEs for the period 2006−2009 could be a short-run impact of the drastic economic downturn after the 2008 Lehman shock.

INSERT Table 3

3. Estimation approach

3.1 Baseline specifications

Following the research frameworks in Kneller et al. (2012) and Simpson (2012), the starting point of our empirical analysis is to examine the determinants of the exit of establishments, taking routine-task intensity of establishments into account. Then, we will also examine the routine-task intensity of the new establishments.

Simpson (2012) assumes that foreign countries are more abundant in low-skill labor with lower wages than the home country and that the wages of high-skill workers at home are no higher than the wages of high-skill workers in foreign countries. Then, she shows that a reduction in the fixed cost of investment in a relatively low-skill-abundant country results in the substitution of domestic for overseas production in low-skill-intensive but not in high-skill-intensive industries. Therefore, the likelihood of plant closure resulting from outward foreign direct investment (FDI) will decrease with the high-skill intensity of the industry. On the other hand, for firms that switch production overseas, expand output, and increase profits, their remaining activities at home will increase output and the likelihood of survival.

Although we follow the empirical model of Simpson (2012), our theoretical motivation follows Acemoglu and Autor (2010) and Oldensky (2014). In the model of Acemoglu and Autor (2010), workers are classified as low-, medium-, or high-skilled, and each skill level has a comparative advantage in the performance of a subset of production tasks. Tasks are indexed such that high-skilled workers have a comparative advantage in the higher numbered tasks. They assume that although workers of any skill level can perform any task, only one skill level in which workers have a comparative advantage will actually be used in the production of that task in equilibrium. If a set of tasks that had previously been performed by middle-skilled workers were offshored, the range of tasks performed by these workers would be reduced. However, the ranges of tasks performed by high-skilled workers (nonroutine tasks) and by low-skilled workers (manual tasks) are less likely to be affected.

Therefore, taking task "offshorability" into account, we expect that firms that expand overseas activities are more likely to shut down establishments in medium-skill-intensive industries than establishments in high-skill- or low-skill-intensive industries. We use the routine-task intensity measure explained above to characterize both skill levels and task tradability for each industry. Following Simpson (2012), we estimate a linear probability model of establishment death:

$$Exit_{it} = \alpha + X_{it}\beta + \gamma MNE_{ft} + \delta MNE_{ft} * Relative\ \ RTI_{it} + \mu Relative\ \ RTI_{it} + \varphi SIZE_{ft} + Ind_j + T_t + R_r + F_f + \varepsilon_{it}, \quad (1)$$

where i indicates establishment, f firm, j establishment's industry, t year, and r establishment's prefecture. $Exit_{it}$ is a dummy variable that equals one if establishment i exits during the period from t and $t+s$. s denotes the number of years until the next census. X_{it} is a vector of establishment characteristics and includes age and establishment size (measured as log employment). We also include a dummy variable, *Same 3-digit industry*, that equals one for establishments for which the 3-digit industry is the same as the firm-level industry. MNE_{ft} is a firm-level variable that equals one if firm f, which owns establishment i, has one or more subsidiaries in foreign countries. *Relative* RTI_i is the

routine-task index for establishment *i* relative to the average routine-task index for firm *f*. The routine-task index is defined at the 3-digit industry level as explained in the previous section, but we take the deviation from the simple average of the routine-task index for all the establishments belonging to a firm. As described above, the routine-task index is the same for all the establishments belonging to the same 3-digit industry and is not a time variant index. However, by taking the deviation from the firm-level average, our relative RTI measure becomes establishment-specific and time variant. The higher the relative RTI value is, the more routine-task intensive the establishment within the firm is. Assuming that routine tasks are relatively low or medium skill tasks and are more easily moved offshore than nonroutine tasks, we expect that MNEs are more likely to shut down establishments in more routine-task intensive industries at home when they expand overseas activities. Therefore, we expect a positive value for δ. $SIZE_{ft}$ is the log of employment at the firm level, which is included to control for the firm size. Ind_j are establishment *i*'s industry dummies that control for industry-level offshoring or import competition and industry-specific technological changes, and so on. T_t, R_r, and F_f are year dummies, establishment *i*'s region (defined as one of the 47 prefectures in Japan) dummies, and firm *f*'s dummies, which control for year-, region-, and firm-specific shocks or characteristics, respectively. In the estimations, the standard errors are clustered at the firm level. As mentioned above, we restrict our sample to establishments of firms that continue operating until the next census year in order to avoid possible biases arising from firm exits. Moreover, we restrict our sample to establishments that are part of a multi-establishment firm, because the decision for firm exits and for closure of one of the establishments owned by a firm should be considered separately.

In addition to the exit analysis, we also examine whether new establishments of MNEs have different characteristics from those of domestic firms. More specifically, our main interest is whether MNEs are more likely to shift their business activities toward less routine-task intensive activities. In order to examine whether new establishments of MNEs are less routine-task intensive than those of other domestic firms, we estimate the following model:

$$Relative\ \ RTI_{it+s} = \alpha + X_{ft}\beta + \gamma MNE_{ft} + Ind_k + T_t + R_r + F_f + \varepsilon_{it,} \qquad (2)$$

where *Relative* RTI_{it+s} is the routine-task index for establishment *i* which was newly established between years *t* and *t+s*, and it is relative to the average routine-task index for firm *f* as of year *t+s*. X_{ft} is a vector of firm characteristics and includes firm age, size (measured as log employment), and the number of domestic establishments firm *f* owns. MNE_{ft} is a firm-level variable that equals one if firm *f*, which owns establishment *i*, has one or more subsidiaries in foreign countries. Ind_k are firm *f*'s industry dummies that control for firm industry-specific effects. T_t, R_r, and F_f are year, new establishment *i*'s region (prefecture), and firm dummies, respectively. We estimate equation (2) using OLS, clustering standard errors at the firm level. We restrict our sample to establishments of firms that continued operating during the period between two censuses in order to avoid possible biases arising from firm entries. We also restrict our sample to establishments that are part of a multi-establishment firm, because the decision for a new firm's entry and for adding of new establishments by an incumbent firm should be considered separately.

Furthermore, we examine the determinants of employment growth for the continuing establishments. We estimate the following model and see whether the establishments of MNEs in routine-task intensive industries increase their employment more than establishments of other types.

$$\Delta lnEMP_{it+s} = \alpha + X_{it}\beta + \gamma MNE_{ft} + \delta MNE_{ft} * Relative\ \ RTI_{it} + \mu Relative\ \ RTI_{it} + \varphi SIZE_{ft} + Ind_j + T_t + R_r + F_f + \varepsilon_{it}, \quad (3)$$

where $\Delta lnEMP_{it+s}$ is the growth rate of employment for establishment *i* from year *t* to *t+s*. The other variables are defined in the same way as those in equation (1) above. However, in order to control for within-firm resource reallocation effects, we include a dummy variable that equals one if firm *f*, which owns the continuing establishment, shut down at least one other establishment *i* during the period from year *t* to *t+s*. We restrict our sample to establishments that continue operating during the period between the two censuses and to establishments that are part of a multi-establishment firm. We estimate equation (3) using OLS, clustering standard errors at the firm level.

3.2 Empirical issues

The decision to invest in a foreign country is potentially endogenous, because the decisions to invest abroad and to shut down establishments at home (or restructure domestic business activities) are possibly made simultaneously. Moreover, a firm may invest abroad in order to survive in the domestic market. Therefore, we control for the time-invariant firm-specific effects in the above specifications in order to take into account the possibility that unobserved firm-characteristics are related to both the decisions to invest abroad and restructure domestic activities.

In order to address the potential endogeneity issue more rigorously, however, we estimate the probability of a firm owning a subsidiary abroad as an instrument. This type of approach is used in Simpson (2012) and Bandick (2016), etc., and this approach generates estimates comparable to Heckman's (1978) well-known endogeneity bias-corrected OLS estimator. In order to generate a firm's predicted probability to invest abroad, we estimate the following model using the linear probability model approach:

$$\Pr\left(MNE_{ft} = 1\right) = \Phi\left(X_{ft}, Ind_j, T_t, R_r, F_f, USDIA_{jt-2}\right), \quad (4)$$

where X_{ft} is a vector of relevant firm-specific characteristics in year *t*, which may affect the firm's probability to invest in foreign countries in year *t*. Ind_k, T_t, R_r, and F_f control for time-invariant fixed industry, year, prefecture, and firm effects, respectively. The estimation is conducted using the firm-level data, not the establishment-level data, and we control for firm-level industry fixed effects and prefecture fixed effects of the location of the headquarters of an establishment of a firm. Given firm-level data availability and assuming that a firm's decision to invest abroad is influenced by the firm's productivity and the degree of the firm's exposure to foreign markets, we include the following firm-level variables in the vector X_{ft}. We include log employment, number of domestic branch establishments owned by a firm and number of foreign branch establishments owned by a firm, which are proxies for firm size and productivity. The number of 3-digit industries that a firm is engaged in is also included as another proxy for the firm's productivity, assuming that the more diversified firms should have higher productivity by exercising

economies of scope. As proxies for the degree of a firm's exposure to foreign markets, we include ownership share of foreign shareholders and the ratio of employment at foreign branch establishments to total employment of the firm. We also control for firm age and the routine-task index for a firm.[15]

As for the exogenous explanatory variable included in the FDI decision equation, we include the two-year lagged ratio of workers employed by overseas affiliates of US MNEs to the total employment in the US at the industry level. The ratio is calculated using the number of employed workers taken from the US *Current Employment Statistics* compiled by Bureau of Labor Statistics and the number of employees at foreign affiliates of US Multinational firms taken from the *US Direct Investment Abroad, Activities of US Multinational Enterprises (MNEs),* compiled by the US Bureau of Economic Analysis. Because it is not straightforward to find a strictly exogenous variable at the firm level, we use the industry-level foreign worker share for the US MNEs as an exogenous variable that explains Japanese firms' propensity to become multinational.

We estimate equation (4) using the linear probability model and calculate the probability to invest abroad for each firm.[16] Then, using the estimated probability as an instrument for the MNE dummy variable, we estimate IV regressions for equations (1), (2), and (3).

For further robustness checks, we split our sample into establishments owned by manufacturing firms and those owned by nonmanufacturing firms and conduct separate estimations, taking into account the possibility that the domestic business restructuring of manufacturing firms is different from that of nonmanufacturing firms because of the structural, technological, and demographic changes of developed economies. We define manufacturing firms as firms whose firm-level industry is classified as one of the manufacturing industries.

4. Estimation results

[15] The routine task index for a firm is the routine task index for the firm's headquarter industry.

[16] The OLS estimation results for the determinants of investing abroad are shown in Appendix Table 2.

4.1 Exit of establishments

Table 4 shows the estimation results for equation (1). Larger establishments are less likely to exit, which is consistent with most previous studies on firm exits. Although older establishments are less likely to exit, they are more likely to exit in the case of establishments owned by manufacturing firms (columns 2 and 5). Establishments in the same industry as the firm's industry are less likely to exit. The coefficient of the MNE variable is positive and significant in the case of the IV regressions (columns 4−6), suggesting that the probability of establishment exits increases when a firm becomes multinational. However, the coefficient of the MNE variable is not significant for the OLS regressions (columns 1−3). Relative RTI tends to have a positive coefficient and the estimated coefficient is statistically significant for all the cases except the cases of manufacturing firms (columns 2 and 5). As for the coefficient of the interaction term of MNE and relative RTI, it is positive and significant in the case of the IV regression for nonmanufacturing firms (column 6), while the OLS estimations show somewhat different results. According to these results, more routine-task intensive establishments are more likely to exit and the likelihood of exit is even higher when the firm becomes multinational. This is the case particularly for nonmanufacturing firms. This result is consistent with our prediction that routine-task intensive establishments are more likely to be shut down when a firm becomes multinational.

INSERT Table 4

4.2 Type of new establishments

Table 5 shows the estimation results for equation (2). The MNE variable tends to have a negative coefficient in all the cases, and the estimated coefficient is statistically significant in the case of the IV regression for nonmanufacturing firms (column 6). The negative coefficient suggests that newly added establishments tend to be less routine-task intensive compared with other establishments belonging to the same firm when a firm becomes multinational as expected. However, such results are not statistically significant in most cases.

As for the other explanatory variables, the number of establishments owned by a firm tends to have a positive coefficient and the estimated coefficient is statistically significant in columns 4 and 5. This suggests that firms that already have many establishments tend to open less routine-task intensive establishments.

INSERT Table 5

4.3 Employment growth rate of continuing establishments

Table 6 shows the estimation results for equation (3). The coefficient of the MNE variable is positive and statistically significant in all the cases, suggesting that establishments owned by MNEs tend to have a higher employment growth rate than those owned by non-MNEs. Moreover, the coefficient of the interaction term of MNE and relative RTI is negative and significant in columns 1, 4, and 5, implying that less routine-task intensive establishments relative to other establishments within an MNE increase their employment more than other establishments. The coefficient of relative RTI is negative and statistically significant in the cases of all firms and manufacturing firms (columns 1, 2, and 5) while it is positive and statistically significant in the case of nonmanufacturing firms (column 6). These results suggest that more routine-task intensive establishments tend to have a lower employment growth rate in the case of manufacturing firms while they tend to have a higher employment growth rate in the case of nonmanufacturing firms.

The coefficient of exiting establishment dummy is positive and significant in all cases. In fact, plant workers are often relocated to other plants within the same firm when one of the plants is shut down. We include a dummy variable that equals one if a firm has shut down at least one other establishment, in order to take account of worker relocations because of exits of other establishments owned by a firm. The result may imply that a firm is likely to relocate their workers to other continuing establishments within the firm when it shuts down one or more establishments.

We also estimate the same equation using the employment growth rate for only regular workers as the dependent variable, instead of the total employment growth rate including nonregular workers. The estimation results are shown in Table 7. The results

in Table 7 are very similar to those in Table 6. However, the coefficient of relative RTI is now insignificant in column 6. Therefore, when nonregular workers are excluded, the employment growth rate of routine-task intensive establishments owned by nonmanufacturing firms is not significantly higher than other establishments, suggesting that the employment growth for routine-task intensive establishments owned by nonmanufacturing firms can be explained largely by the increase in nonregular workers. The coefficient of the interaction term of MNE and relative RTI remains negative in most cases and significant in columns 4 and 5, while it is insignificant in columns 1 and 6. The coefficient of the stand-alone MNE term remains positive and significant, suggesting that the employment growth rate is higher for continuing establishments when the firm becomes an MNE even though nonregular workers are excluded. Moreover, when the firm becomes an MNE, less routine-task intensive establishments tend to increase their employment more than more routine-task intensive establishments.

INSERT Tables 6 and 7

5. Conclusions

In this paper, we examined the effects of the expansion of overseas activities on the restructuring of domestic activities within MNEs by utilizing the large-scale firm-establishment-linked data constructed from the Establishment and Enterprise Census (for years 2001 and 2006) and the Economic Census (for years 2009 and 2012) for Japan. More specifically, focusing on the routine-task intensity of establishments, we examined (1) what types of establishments are closed or newly established and (2) what types of establishments increase or reduce their employment when an MNE expands its overseas operations.

When the cost of investment abroad decreases, firms are expected to relocate labor-intensive, particularly tradable-task labor-intensive, activities abroad. We measured the skill level of each establishment by mainly using the routine-task intensity measure constructed in the same manner as Costinot et al. (2011) and the occupation compositions for each industry taken from the Japanese Population Census for 2005.

We found that more routine-task intensive establishments were more likely to exit when a firm becomes multinational, which is consistent with our expectation. This was the case particularly for nonmanufacturing firms. In the case of continuing establishments, we found that less routine-task intensive establishments were more likely to increase or less likely to reduce employment, when a firm becomes multinational. Moreover, newly entered establishments tend to be less routine-task intensive compared with other establishments within an MNE, although the results are somewhat weak.

Our results show that firms investing abroad accelerate establishment closures in routine-task intensive industries and that the employment growth rate is higher for MNEs' continuing establishments in routine-task intensive industries than for non-MNEs' continuing establishments. Therefore, overseas expansion accelerates domestic business restructuring within an MNE and shifts domestic activities toward less routine-task intensive ones. Such changes within an MNE may lead to economy-wide industrial composition changes in employment.

Our results suggest that routine-task workers are more likely to lose their workplaces and to be forced to change their place of work or their job than other types of workers. From a policy perspective, it is important to ensure a nondisruptive and smooth job transfer particularly for routine-task workers.

Finally, we did not take geographical dimensions into account in this study. However, a natural extension would be to examine how different are the impacts of MNEs' overseas expansion on domestic establishments located in urban areas compared with those located in rural areas. If endowments of labor with certain skill levels are associated with various regional characteristics such as per capita income and social infrastructure including schools and transportation networks, domestic business restructuring by MNEs may have asymmetric effects across regions. We believe that further research on this issue will provide important empirical evidence with which to develop appropriate policy schemes for the human capital development and social infrastructure upgrading in response to changes in industrial structure driven by internationalization of business activities.

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References

Acemoglu, Daron, and David H. Autor (2010) "Skills, Tasks and Technologies: Implications for Employment and Earnings," in Orley Ashenfelter and David E. Card (Eds.), *Handbook of Labor Economics* 4b: 1043−1171.

Autor, David H., and David Dorn (2013) "The Growth of Low-Skill Service Jobs and the Polarization on the US Labor Market," *American Economic Review* 103(5): 1553−1597.

Bandick, Roger (2016) "Offshoring, Plant Survival, and Employment Growth," *World Economy*, 39(5): 597−620.

Becker, Sascha O., Karolina Ekholm, and Marc-Andreas Muendler (2013) "Offshoring and the Onshore Composition of Tasks and Skills," *Journal of International Economics* 90: 91−106.

Bernard, Andrew B., Valerie Smeets, and Frederic Warzynski (2016) "Rethinking Deindustrialization," NBER Working Paper 22114, March, National Bureau of Economic Research.

Costinot, Arnaud, Lindsay Oldensky, and James Rauch (2011) "Adaptation and the Boundary of Multinational Firms," *Review of Economics and Statistics* 93(1): 298−308.

Crozet, M. and E. Milet (2014) "The Servitization of French Manufacturing Firms," CEPII Working Paper No. 2014-10-May, Centre d'Etudes Prospectives et d'Informations Internationales.

Desai, M., F. Foley, and J. Hines (2009) "Domestic Effects of the Foreign Activities of US Multinationals," *American Economic Journal: Economic Policy* 1(1): 181−203.

Ebenstein, A., A. Harrison, M. McMillan, and S. Phillips (2014) "Estimating the Impact of Trade and Offshoring on American Workers using the Current Population Surveys," *Review of Economics and Statistics* 96(4): 581−595.

Giroud, Xavier, and Holger Mueller (2015) "Capital and Labor Reallocation within Firms," *Journal of Finance* 70(4):1767–1804.

Goos Maarten, Alan Manning, and Anna Salomons (2009) "Job Polarization in Europe," *American Economic Review Papers and Proceedings*, 99 (2): 58−63.

Goos, Maarten, Alan Manning, and Anna Salomons (2014) "Explaining Job Polarization: Routine-Biased Technological Change and Offshoring," *American Economic Review* 104(8): 2509−26.

Grossman, Gene M., and E. Rossi-Hansberg (2008) "Trading Tasks: A Simple Theory of Offshoring," *American Economic Review* 98: 1978−1997.

Harrison, Ann, and Margaret McMillan (2011) "Offshoring Jobs? Multinationals and U.S. Manufacturing Employment," *Review of Economics and Statistics* 93 (3): 857−875.

Head, Keith, and John Ries (2002) "Offshore Production and Skill Upgrading by Japanese Manufacturing Firms," *Journal of International Economics* 58: 81−105.

Heckman, James J. (1978) "Endogenous Variables in a Simultaneous Equation System," *Econometrica* 46(4): 931−959.

Hijzen, Alexander, Holger Görg, and Robert C. Hine (2005) "International Outsourcing and the Skill Structure of Labor Demand in the United Kingdom," *Economic Journal* 115: 860−878.

Keller, Wolfgang, and H. Utar (2016) "International Trade and Job Polarization: Evidence at the Worker Level," NBER Working Paper 22315, National Bureau of Economic Research.

Keller, Wolfgang, and Stephen Yeaple (2013) "The Gravity of Knowledge," *American Economic Review* 103(4): 1414−1444.

Kneller, Richard, D. McGowan, Tomohiko Inui, and Toshiyuki Matsuura (2012) "Closure within Multi-Plant Firms: Evidence from Japan," *Review of World Economics* 148 (4): 647−668.

Kodama, Naomi, and Tomohiko Inui (2015) "The Impact of Globalization on Establishment-Level Employment Dynamics in Japan," *Asian Economic Papers* 1(2): 41-65.

Marcolin, Luca, Sébastien Miroudot, and Mariagrazia Squicciarini (2016) "Routine Jobs, Employment and Technological Innovation in Global Value Chains," OECD Science, Technology and Industry Working Papers 2016/1, OECD Publishing, Paris. http://dx.doi.org/10.1787/5jm5dcz2d26j-en.

Oldenski, Lindsay (2012) "Export Versus FDI and the Communication of Complex Information," *Journal of International Economics* 87 (2): 312−322.

Oldenski, Lindsay (2014) "Offshoring and the Polarization of the U.S. Labor Market," *ILR Review* 67 (Supplement): 734−761.

Simpson, Helene (2012) "Investment Abroad and Labour Adjustment at Home: Evidence from UK Multinational Firms," *Canadian Journal of Economics* 45(2): 698−731.

Tomiura, E., R. Wakasugi, and L. Zhu (2015) "A Concordance between US and Japanese Classifications of Occupations for Empirical Analyses of Tasks in Japan," KIER Discussion Paper No. 923, May, Kyoto Institute of Economic Research, Kyoto University.

US Department of Labor (1977) Dictionary of Occupational Titles, 4th ed. Washington, DC: US Government Printing Office.

Yamashita, Nobu, and Kyoji Fukao (2010) "Expansion Abroad and Jobs at Home: Evidence from Japanese Multinational Enterprises," *Japan and the World Economy* 22(2): 88−97.

Table 1. Number of establishments by firm industry and by ownership type 2006

Headquarter's industry		Domestic			Japanese-MNE			Foreign-MNE		
		Total number of establishments	Single-establishment (%)	Multi-establishments (%)	Total number of establishments	Single-establishment (%)	Multi-establishments (%)	Total number of establishments	Single-establishment (%)	Multi-establishments (%)
Primary (A, B, C, D)		12,714	79.3	20.7	113	11.5	88.5	12	25.0	75.0
Construction	E	276,329	80.5	19.5	5,009	0.7	99.3	21	28.6	71.4
Manufacturing	F	281,880	67.3	32.7	23,403	3.4	96.6	1,291	8.7	91.3
Utility	G	1,524	19.4	80.6	1,007	0.2	99.8	X	X	X
Telecommunication	H	33,444	56.4	43.6	1,852	6.6	93.4	331	44.1	55.9
Transportation services	I	65,415	47.5	52.5	4,072	2.9	97.1	212	18.4	81.6
Wholesale & retail trade	J	610,081	49.5	50.5	20,385	2.1	97.9	3,029	17.9	82.1
Finance & Insurance	K	31,663	39.6	60.4	9,813	0.4	99.6	854	6.6	93.4
Real estate	L	99,355	79.9	20.1	867	7.6	92.4	22	59.1	40.9
Restaurants & accomodation	M	110,822	52.8	47.2	4,972	0.2	99.8	196	10.2	89.8
Medical services & social welfare	N	17,519	61.4	38.6	67	9.0	91.0	7	28.6	71.4
Education	O	21,017	35.4	64.6	1,152	0.4	99.6	12	41.7	58.3
Miscellaneous services	P, Q	255,260	57.7	42.3	6,184	2.1	97.9	664	26.5	73.5
Total		1,817,023	60.0	40.0	78,896	2.2	97.8	6,652	16.9	83.1

Table 2. Establishment characteristics by ownership type, 2001−2012

	Manufacturing firms			Non-manufacturing firms (excluding primary and public services)		
	Domestic	Japanese-MNE	Foreign-MNE	Domestic	Japanese-MNE	Foreign-MNE
Number of observations	318,528	73,704	5,027	2,160,655	191,080	18,582
% exit	15.7	19.5	21.9	18.5	22.9	25.3
% entry	16.8	20.1	24.2	21.7	27.2	26.9
Employment per establishment	30.8	110.8	71.9	19.5	38.4	43.0
Multi_same 3-digit industry (%)	49.4	24.9	23.8	73.3	74.7	77.7
Multi_manufacturing (%)	11.3	10.3	4.0	1.6	1.8	1.5
Multi_non-manufacturing (%)	37.2	62.7	70.4	24.0	22.2	19.9
Average routin-task index	0.36	0.38	0.39	0.35	0.34	0.36

Table 3. Share of MNEs by firm industry: Multi-establishment firms only

Headquarter's industry	Industry code	Firm-level share (%)			Establishment-level share (%)		
		Share of MNEs in total number of multi-establishment firms			Share of MNEs in total number of establishments of multi-establishment firms		
		2001	2006	2009	2001	2006	2009
		(1)	(2)	(3)	(4)	(5)	(6)
Primary (A, B, C, D)		1.4	1.9	1.0	3.2	3.4	3.4
Construction	E	0.7	0.8	0.6	7.3	8.4	8.8
Manufacturing	F	6.4	9.1	7.3	16.3	20.4	20.6
Utility	G	1.6	6.0	5.0	9.5	39.0	44.7
Telecommunication	H	3.1	5.1	4.7	9.0	14.0	10.1
Transportation services	I	1.5	2.0	1.6	15.2	10.9	8.2
Wholesale & retail trade	J	1.5	2.1	1.7	4.5	6.8	7.9
Finance & Insurance	K	5.9	5.1	4.0	40.8	35.2	46.9
Real estate	L	1.5	1.0	0.6	5.2	3.2	4.8
Restaurants & accomodation	M	0.4	0.5	0.4	5.7	10.1	11.7
Medical services & social welfare	N	0.4	0.5	0.2	0.3	0.9	1.2
Education	O	0.7	0.9	0.6	5.0	8.6	7.1
Miscellaneous services	P, Q	0.9	1.2	0.9	3.8	5.7	5.5
Total		2.2	3.1	2.4	8.6	10.2	10.9

Table 4. Exit of establishments and overseas expansion of MNEs: Multi-establishment firms only

Dependent variable: Exit (dummy variable)

	[1]	[2]	[3]	[4]	[5]	[6]
	All firms	Mfg. firms	Non-mfg. firms	All firms	Mfg. firms	Non-mfg. firms
	OLS	OLS	OLS	IV	IV	IV
Establishment age (est. level)	-0.00029***	0.00024***	-0.00035***	-0.00028***	0.00025***	-0.00034***
	[0.00004]	[0.00008]	[0.00005]	[0.00003]	[0.00007]	[0.00003]
Establishment size (log)	-0.07180***	-0.07431***	-0.07198***	-0.07232***	-0.07427***	-0.07261***
	[0.00078]	[0.00103]	[0.00091]	[0.00033]	[0.00087]	[0.00037]
Multi_same 3-digit industry	-0.04069***	-0.03388***	-0.04686***	-0.04033***	-0.03408***	-0.04705***
	[0.00197]	[0.00279]	[0.00246]	[0.00080]	[0.00270]	[0.00093]
Relative RTI	0.08595***	0.01683	0.11674***	0.09270***	0.04311	0.11835***
	[0.01648]	[0.03856]	[0.01989]	[0.01327]	[0.03734]	[0.01541]
MNE	-0.00335	-0.01028	0.00242	0.09269***	0.16608***	0.13993***
	[0.01106]	[0.00858]	[0.01506]	[0.00966]	[0.03623]	[0.01240]
MNE * Relative RTI	-0.08078*	-0.10564***	0.02372	-0.01718	-0.10264	0.19230***
	[0.04552]	[0.04073]	[0.07461]	[0.05116]	[0.08536]	[0.07350]
Firm size (log)	0.04016***	0.04935***	0.04001***	0.03683***	0.03577***	0.03703***
	[0.00139]	[0.00258]	[0.00165]	[0.00065]	[0.00338]	[0.00070]
Constant	0.23631***	0.18111***	0.23365***			
	[0.01742]	[0.03998]	[0.02797]			
Industry effect (3 digit)	Yes	Yes	Yes	Yes	Yes	Yes
Firm effect	Yes	Yes	Yes	Yes	Yes	Yes
Region effect (prefecture)	Yes	Yes	Yes	Yes	Yes	Yes
Year effect	Yes	Yes	Yes	Yes	Yes	Yes
N (of establishments)	2,297,666	302,460	1,987,861	2,176,251	289,586	1,872,594
R squared	0.048	0.071	0.045	0.047	0.064	0.042
N of firms	283,845	56,874	245,109	226,993	44,097	194,263
Underidentification test				13752.8	1508.8	8478.6
(p-value)				0.000	0.000	0.000
Weak identification test				7485.9	701.5	4716.6

Standard errors in brackets.

Standard errors are clustered at the firm level.

* p<0.1, ** p<0.05, *** p<0.01

Table 5. Routine-task index for new establishments: Multi-establishment firms only

Dependent variable: New establishment's relative RTI						
	[1]	[2]	[3]	[4]	[5]	[6]
	All firms	Mfg. firms	Non-mfg. firms	All firms	Mfg. firms	Non-mfg. firms
	OLS	OLS	OLS	IV	IV	IV
Firm age	-0.00001	-0.00008	-0.00002	-0.00001	-0.00008*	-0.00002
	[0.00003]	[0.00006]	[0.00003]	[0.00001]	[0.00004]	[0.00001]
Firm size (log)	-0.00017	0.00008	-0.00040	-0.00016	0.00009	-0.00033**
	[0.00045]	[0.00091]	[0.00051]	[0.00013]	[0.00119]	[0.00013]
N. of establishments	0.00035	0.00028	0.00050	0.00044***	0.00026	0.00063***
	[0.00030]	[0.00136]	[0.00032]	[0.00010]	[0.00062]	[0.00010]
MNE	-0.00159	-0.00050	-0.00278	-0.00335	-0.00037	-0.00791***
	[0.00181]	[0.00183]	[0.00229]	[0.00239]	[0.01351]	[0.00280]
Constant	-0.02257**	-0.01100	-0.00723			
	[0.01055]	[0.00695]	[0.01085]			
Industry effect (3 digit)	Yes	Yes	Yes	Yes	Yes	Yes
Firm effect	Yes	Yes	Yes	Yes	Yes	Yes
Region effect (prefecture)	Yes	Yes	Yes	Yes	Yes	Yes
Year effect	Yes	Yes	Yes	Yes	Yes	Yes
N (of establishments)	605,209	67,840	535,685	519,583	52,726	460,909
R squared	0.018	0.028	0.014	0.016	0.028	0.012
N of firms	138,638	25,005	118,035	64,045	9,930	54,238
Underidentification test				11615.4	416.5	9083.4
(p-value)				0.000	0.000	0.000
Weak identification test				11906.9	418.7	9283.8

Standard errors in brackets.
Standard errors are clustered at the firm level.
* p<0.1, ** p<0.05, *** p<0.01

Table 6. Employment growth rate for continuing establishments: Multi-establishment firms only

Dependent variable: employment growth rate (continuing establishments)						
	[1]	[2]	[3]	[4]	[5]	[6]
	All firms	Mfg. firms	Non-mfg. firms	All firms	Mfg. firms	Non-mfg. firms
	OLS	OLS	OLS	IV	IV	IV
Establishment age (est. level)	0.00090***	0.00026**	0.00100***	0.00092***	0.00028**	0.00103***
	[0.00007]	[0.00012]	[0.00008]	[0.00005]	[0.00012]	[0.00005]
Establishment size (log)	-0.20421***	-0.13419***	-0.22037***	-0.20628***	-0.13422***	-0.22364***
	[0.00337]	[0.00219]	[0.00406]	[0.00082]	[0.00192]	[0.00092]
Multi_same 3-digit industry	0.07419***	0.04976***	0.07152***	0.07735***	0.04985***	0.07468***
	[0.00292]	[0.00509]	[0.00340]	[0.00144]	[0.00509]	[0.00167]
Relative RTI	-0.06543*	-0.25326***	0.00945	-0.02068	-0.19995***	0.04831*
	[0.03354]	[0.06577]	[0.04309]	[0.02453]	[0.06666]	[0.02871]
MNE	0.08090***	0.05899***	0.06926**	0.22411***	0.25618***	0.15227***
	[0.02133]	[0.00930]	[0.02820]	[0.01588]	[0.06403]	[0.01924]
MNE * Relative RTI	-0.14105**	-0.08673	-0.02876	-0.38144***	-0.20476	-0.28561*
	[0.06460]	[0.07121]	[0.10137]	[0.10314]	[0.16783]	[0.14836]
Firm size (log)	-0.10618***	-0.13081***	-0.13047***	-0.10804***	-0.14627***	-0.12831***
	[0.00411]	[0.00599]	[0.00519]	[0.00135]	[0.00676]	[0.00151]
Exiting establishment dummy	0.06660***	0.06128***	0.07085***	0.06627***	0.06165***	0.07019***
	[0.00296]	[0.00517]	[0.00346]	[0.00166]	[0.00429]	[0.00185]
Constant	0.85702***	0.80896***	0.93254***			
	[0.04002]	[0.08890]	[0.05917]			
Industry effect (3 digit)	Yes	Yes	Yes	Yes	Yes	Yes
Firm effect	Yes	Yes	Yes	Yes	Yes	Yes
Region effect (prefecture)	Yes	Yes	Yes	Yes	Yes	Yes
Year effect	Yes	Yes	Yes	Yes	Yes	Yes
N (of establishments)	1,838,572	246,071	1,586,214	1,705,593	229,773	1,461,160
R squared	0.112	0.078	0.125	0.111	0.074	0.125
N of firms	272,808	54,448	235,307	197,705	38,226	168,011
Underidentification test				10651.7	1180.6	6714.9
(p-value)				0.000	0.000	0.000
Weak identification test				5954.1	557.6	3883.2

Standard errors in brackets.
Standard errors are clustered at the firm level.
* p<0.1, ** p<0.05, *** p<0.01

Table 7. Regular-worker employment growth rate for continuing establishments: Multi-establishment firms only

Dependent variable: regular worker employment growth rate (continuing establishments)						
	[1]	[2]	[3]	[4]	[5]	[6]
	All firms	Mfg. firms	Non-mfg. firms	All firms	Mfg. firms	Non-mfg. firms
	OLS	OLS	OLS	IV	IV	IV
Establishment age (est. level)	-0.00045***	-0.00082***	-0.00036***	-0.00044***	-0.00082***	-0.00034***
	[0.00008]	[0.00012]	[0.00009]	[0.00005]	[0.00012]	[0.00006]
Establishment size (log)	-0.11436***	-0.09135***	-0.12073***	-0.11610***	-0.09154***	-0.12311***
	[0.00333]	[0.00210]	[0.00404]	[0.00078]	[0.00188]	[0.00087]
Multi_same 3-digit industry	0.03766***	0.02476***	0.03465***	0.03966***	0.02538***	0.03702***
	[0.00227]	[0.00516]	[0.00269]	[0.00149]	[0.00521]	[0.00173]
Relative RTI	-0.01352	-0.17974***	0.00836	0.02743	-0.12297*	0.04184
	[0.02871]	[0.06661]	[0.03566]	[0.02627]	[0.07064]	[0.03069]
MNE	0.05110***	0.05546***	0.04624**	0.08749***	0.13343**	0.04972***
	[0.01601]	[0.00908]	[0.02220]	[0.01547]	[0.06115]	[0.01892]
MNE * Relative RTI	-0.06293	-0.10684	0.06449	-0.33588***	-0.32210*	-0.22793
	[0.05135]	[0.06538]	[0.07858]	[0.10350]	[0.16778]	[0.14947]
Firm size (log)	-0.05584***	-0.09576***	-0.06542***	-0.05572***	-0.10191***	-0.06369***
	[0.00230]	[0.00555]	[0.00292]	[0.00133]	[0.00679]	[0.00146]
Exiting establishment dummy	0.03633***	0.04049***	0.03883***	0.03587***	0.04057***	0.03818***
	[0.00252]	[0.00511]	[0.00294]	[0.00173]	[0.00444]	[0.00196]
Constant	0.44577***	0.57054***	0.44833***			
	[0.03639]	[0.09473]	[0.05036]			
Industry effect (3 digit)	Yes	Yes	Yes	Yes	Yes	Yes
Firm effect	Yes	Yes	Yes	Yes	Yes	Yes
Region effect (prefecture)	Yes	Yes	Yes	Yes	Yes	Yes
Year effect	Yes	Yes	Yes	Yes	Yes	Yes
N (of establishments)	1,566,132	222,561	1,338,176	1,435,737	206,179	1,215,996
R squared	0.042	0.040	0.045	0.042	0.039	0.045
N of firms	244,921	50,644	209,366	170,054	34,329	142,606
Underidentification test				9686.9	1133.4	5965.9
(p-value)				0.000	0.000	0.000
Weak identification test				5839.5	531.9	3865.6

Standard errors in brackets.
Standard errors are clustered at the firm level.
* p<0.1, ** p<0.05, *** p<0.01

Appendix Table 1. Task measures by industry (top 50 industries for each task measure)

	High routine-task intensity		Low routine-task intensity	
Rank	Index	Industry code and name	Index	Industry code and name
1	0.73	213 Cut stock and findings for boots and shoes	0.01	822 Barbershops
2	0.73	214 Leather footwear	0.01	823 Hair-dressing and beauty salon
3	0.62	832 Domestic services	0.02	999 Industries unable to classify
4	0.59	201 Tires and inner tubes	0.07	693 Automobile parking
5	0.59	202 Rubber and plastic footwear and its findings	0.07	75G Offender rehabilitation services
6	0.55	116 Dyed and finished textiles	0.07	75H Home care help services
7	0.54	371 Transmission of correspondence	0.07	75J Miscellaneous social insurance, social welfare and care services
8	0.54	781 Postal services	0.08	84H "Mah-jong" clubs
9	0.54	782 Contracted postal services	0.08	84J "Pachinko" parlors
10	0.54	221 Glass and its products	0.08	84K Game centers
11	0.51	833 Garment sewing services and repairs	0.08	84L Miscellaneous amusement and recreation facilities
12	0.51	873 Paper hangers	0.09	773 Supplementary tutorial schools
13	0.51	879 Miscellaneous repair services	0.09	761 Elementary schools
14	0.49	225 Clay refractories	0.09	762 Lower secondary schools
15	0.49	226 Carbon and graphite products	0.09	763 Upper secondary schools, secondary schools
16	0.49	227 Abrasive products	0.09	764 Institution of higher education
17	0.49	228 Aggregate and stone products	0.09	765 Special education schools
18	0.49	229 Miscellaneous ceramic, stone and clay products	0.09	766 Kindergartens
19	0.47	143 Sliding doors and screens	0.09	75C Special nursing home for the elderly
20	0.46	203 Rubber belts and hoses and mechanical rubber goods products	0.09	75D Care and health services facilities for the aged
21	0.46	209 Miscellaneous rubber products	0.09	75E Fee charging home for the aged
22	0.46	011 Crop farming	0.09	75F Miscellaneous welfare services for the aged and care services
23	0.46	012 Livestock farming	0.10	75A Day nursery
24	0.45	121 Textile outer garments and shirts, including bonded fabrics and lace, except Japanese style	0.10	75B Miscellaneous child welfare services
25	0.45	122 Knitted garments and shirts	0.10	829 Miscellaneous laundry, beauty and bath services

	High routine-task intensity		Low routine-task intensity	
Rank	Index	Industry code and name	Index	Industry code and name
26	0.45	123 Underwear	0.13	921 Shintoism
27	0.45	124 Japanese style apparel and "tabi"-sock	0.13	922 Buddhism
28	0.45	125 Other textile apparel and accessories	0.13	923 Christianity
29	0.45	129 Miscellaneous fabricated textile products	0.13	929 Miscellaneous religions
30	0.45	861 Automobile maintenance services	0.13	582 Retail trade (bicycles)
31	0.45	522 Chemicals and related products	0.13	77F Music instructions
32	0.45	098 Animal and vegetable oils and fats	0.13	77G Calligraphy instructions
33	0.45	533 Electrical machinery, equipment and supplies	0.13	77H Flower, tea ceremony instructions
34	0.44	106 Prepared animal foods and organic fertilizers	0.13	77J Abacus instructions
35	0.44	222 Cement and its products	0.13	77K Foreign language instructions
36	0.44	49A Wholesale trade, general merchandise (with 100 or more employees)	0.13	77L Sports and health instructions, except fitness centers
37	0.44	49B Miscellaneous wholesale trade, general merchandise	0.13	77M Fitness centers
38	0.44	104 Manufactured ice	0.13	77N Miscellaneous instruction services for arts, culture and technical skills
39	0.44	322 Musical instruments	0.13	216 Baggage
40	0.44	324 Pens, lead pencils, painting materials and stationery	0.13	217 Handbags and small leather cases
41	0.44	325 Costume jewelry, costume accessories, buttons and related products, except precious metals and jewelry	0.14	092 Seafood products
42	0.44	326 Lacquer ware	0.14	191 Plastic plates, bars and rods, pipes and tubes, pipe fittings and profile extrusions
43	0.44	327 Sundry goods of straw, "tatami" mats, umbrellas and other daily commodities	0.14	192 Plastic films, sheets, floor coverings and synthetic leather
44	0.44	328 Manufacture of ordnance and accessories	0.14	193 Industrial plastic products
45	0.44	32C Information recording materials, except newspapers, books, other printed products, etc.	0.14	194 Foamed and reinforced plastic products
46	0.44	32D Miscellaneous manufacturing industries, n.e.c	0.14	195 Compounding plastic materials, including reclaimed plastics
47	0.44	581 Retail trade (motor vehicles)	0.14	199 Miscellaneous plastic products
48	0.44	532 Wholesale trade (motor vehicles)	0.15	151 Pulp
49	0.44	531 Wholesale trade (general machinery and equipment)	0.15	152 Paper
50	0.44	539 Wholesale trade (miscellaneous machinery and equipment)	0.15	153 Coated and glazed paper

Appendix Table 2. Determinants of MNEs

Dependent variable: MNE dummy	
	[1]
US FDI	0.01498***
	[0.00267]
RTI	-0.02057*
	[0.01134]
Firm age	-0.00006**
	[0.00003]
Firm size (log)	0.01830***
	[0.00060]
Foreign ownership share	-0.00002
	[0.00012]
N. of domestic establishments	0.00571***
	[0.00106]
N. of overseas branch establishments	0.20246***
	[0.00658]
Share of workers employed in overshes branches	0.00275***
	[0.00030]
N. of active industries (3digit)	0.00481***
	[0.00058]
Constant	-0.06551***
	[0.02510]
Industry effect (3 digit)	Yes
Firm effect	Yes
Region effect (prefecture)	Yes
Year effect	Yes
N of observations	589,357
R squared	0.122
N of firms	270,496

Standard errors in brackets
Standard errors are clustered at the firm level
* p<0.1, ** p<0.05, *** p<0.01

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