
Subsidies and MNE investment location choices: Unravelling the effects of firm specificity and immediacy*

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Abstract

Industrialized countries increasingly use targeted subsidies to lessen firms' disadvantages caused by climate change, geopolitical realignment of trade relationships and local COVID-19 pandemic dislocations. The debate over the United States Inflationary Reduction Act and the European Union criticism of it because of its effect on firms' investment location choices exemplify how subsidies affect investment flows. We investigate to what extent different subsidy schemes affect firms' investment location choices and explore the effect on two dimensions: immediacy (direct versus indirect) and firm specificity (firm-specific versus non-firm-specific). Using a sample of United States MNEs and their investments in subsidiaries in the European Union and China, we find that direct subsidies have a greater positive effect on investment than indirect subsidies, and that non-firm-specific subsidies have a greater positive effect than firm-specific subsidies. Our study establishes a more nuanced understanding of subsidy effects, suggesting that policymakers should align their subsidy schemes for attracting foreign direct investment accordingly.

Keywords: foreign direct investment, institutions, investment location choice, policy support, subsidies

JEL classification codes: D04, D78, H29, L52

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1. Introduction

The rapid succession of recent and ongoing international crises, such as the COVID-19 pandemic (WHO, 2023), the Russia–Ukraine war¹ with its resulting shock to food and energy prices² and the growing rivalry between the United States and China (Li et al., 2022), as well as efforts to combat climate change (UNCTAD, 2021), have upended business-as-usual policymaking and led to a paradigm shift toward a more interventionist role of the State.³ The European Union, for example, has tried to entice the production of electric vehicle batteries with a \$7 billion plan that included \$1.5 billion of public subsidies, with the express goal to capture a share of the global production of this strategically important industry (UNCTAD, 2020). The United States Inflationary Reduction Act and the European Union Green Deal, both containing extensive subsidies for specific industries, are emblematic of this fundamental pivot. The heated debate on “how Europe should answer the [United States] Inflation Reduction Act” (Kleimann et al., 2023), as well as specific examples of firms reconsidering their investment plans,⁴ illustrate the impact of subsidies on firms’ investment location choices.

Location choice by multinational enterprises (MNEs) is a longstanding topic in the academic literature (Delios and Henisz, 2003; Georgallis et al., 2021; Maggioni et al., 2019). This stream of research has investigated various factors that influence location choice and has established that subsidies, as part of a country’s formal institutional framework, attract foreign investment (Georgallis et al., 2021). Further studies have demonstrated that subsidies are linked to industry emergence (Georgallis et al., 2019) or industrial change (Bohnsack et al., 2015). However, the UNCTAD *World Investment Report 2023* (UNCTAD, 2023) also shows that subsidies can prevent the renewal of industries by increasing the attractiveness of fossil fuels relative to sustainable alternatives. Most research so far has conceptualized host-country subsidies and their effect on MNEs’ foreign location choices as monolithic. In fact, subsidies have several dimensions, with presumably varied effects on location choice. For example, Georgallis et al. (2021) find a positive relationship between direct feed-in tariffs (per-unit subsidies paid when electricity generated from renewable energies is fed into the grid) and location choice. Yet, Tesla turned down €1.1 billion in European Union aid in 2021, citing the extensive administrative burden before receiving the funds as the reason for withdrawing

¹ *The Economist*, “Why Ukraine must win”, 1 April 2022; “Vladimir Putin’s war is failing. The West should help it fail faster”, 15 September 2022.

² World Bank Group, “Food and energy price shocks from Ukraine War could last for years”, Press release, No. 2022/056/EFI, 26 April 2022.

³ *The Economist*, “Business and the State: The new interventionism”, 15 January 2022.

⁴ Silvia Amaro, “Tesla is not the only company reviewing its Europe investment after Biden’s Inflation Reduction Act”, CNBC News, 3 March 2023.

its funding application.⁵ Thus, depending on their configuration, subsidies do not seem to be universally positive in attracting foreign investment. Given the high costs for governments to create subsidy schemes and the administrative burden for MNEs to access them, it is important to understand which types of subsidies attract foreign investment.

The goal of this study is to examine the effects of different subsidy configurations on MNEs' choices of international investment location. We use institutional theory (North, 1990 and 1991) and specifically the institutions-based view (Peng et al., 2009) to examine this relationship for two dimensions of subsidies: immediacy and firm specificity. These dimensions are not chosen at random or self created. For immediacy, we resort to an established taxonomy of subsidies from the Organisation for Economic Co-operation and Development (OECD) (2021). Subsidies can be either direct – such as an operating grant, which is a cash payment, or indirect – such as a government buffer stock, in which no immediate cash transfer from State to company takes place (OECD, 2021). For firm specificity we adopt a categorization of subsidies by Global Trade Alert, a think tank affiliated with the University of St. Gallen in Switzerland (Evenett and Fritz, 2021). Subsidies can be either firm-specific, meaning that the beneficiary is a known firm or group of firms, or non-firm-specific, meaning that firms are not predefined and many are eligible upon application (Evenett and Fritz, 2021).

As a baseline, we follow prior work (Georgallis et al., 2021) and hypothesize that subsidies have a positive effect on foreign location choice, because firms tend to engage in jurisdiction shopping, a concept describing the inclination of multinational firms to choose those locations that offer the most generous conditions (Findlay, 2014; Georgallis et al., 2021). We extend this research and hypothesize that the effect on foreign location choice is greater for direct subsidies than for indirect ones because direct subsidies immediately and palpably benefit the firm conducting foreign investment, whereas indirect subsidies may benefit the firm later when other conditions are fulfilled after the investment. Furthermore, we hypothesize that the effect of non-firm-specific subsidies is greater than that of firm-specific ones. We assert this because non-firm-specific subsidies may be available to all applicants in a specific target group – industry, sector, topical – whereas firm-specific subsidies are granted only to set beneficiaries. Although firm-specific subsidies may signal the availability of additional future support, they are by no means a guarantee. Thus, non-firm-specific subsidies reduce the risk for investing MNEs to a greater extent than firm-specific subsidies.

⁵ Peter Campbell, Joe Miller and Edward White, "Tesla forced to turn down €1.1bn in EU support for German battery plant: Delays to factory near Berlin meant carmaker unable to meet European State aid conditions", *Financial Times*, 26 November 2021; Nadine Schimroszik and Victoria Waldersee, "Tesla decides against state aid for German battery plant as Musk opposes subsidies", *Reuters*, 26 November 2021.

We find empirical support for our hypotheses in a large sample of public United States MNEs and their investment decisions in countries of the European Union and China between 2009 and 2019. We restrict our sample to this period and these locations because we are relying on a new data set of all subsidies implemented in the European Union and China during this time frame (Evenett and Fritz, 2021). To our knowledge, no comparable cross-industry database of subsidies exists to date.

We contribute to the literature on MNE location choice and subsidies in several ways. First, we provide a starting point for future research on subsidies by offering a detailed framework of subsidy configurations. Extending prior work (Georgallis et al., 2021) that investigated the effect of one specific type of subsidy (direct, non-firm-specific) on foreign location choice, we show that the effects of subsidies depend to a large extent on the configuration of subsidy schemes in terms of immediacy and firm specificity. This framework not only can guide research on location choice but also may help to explain heterogeneity in entry modes, variations in subsidiary performance or differences in behaviour of State-owned and privately owned MNEs. Second, our findings may provide guidance for evidence-based policymaking. Since policymakers face tight budget constraints, plentiful demands for action and high administrative costs, it is crucial that they design appropriate subsidy schemes. Our findings suggest that direct as well as non-firm-specific subsidies are best suited for attracting MNE investment in foreign subsidiaries. Third, our study contributes to the understanding of managers and policymakers. On the one hand, we aim to inform managers about the benefits and costs of different subsidy schemes. On the other hand, we aim to inform policymakers about which subsidy schemes attract foreign investment by MNEs. Both perspectives are important because managers have high search costs in looking for the schemes that support their strategies, and policymakers have high administrative costs in designing and managing these schemes. Taken together, our study adds to the rich body of literature analysing the relationship between formal host-country institutions (North, 1991; Williamson, 2000) and MNEs' international investment decisions (Delios and Henisz, 2003).

2. Literature review and hypotheses

2.1 Formal institutions as policy support

Management research has focused on host-country determinants as a predictor of foreign direct investment for decades (Dunning, 1980). Prior research has established that different host-country characteristics are crucial in firms' decisions to invest. In particular institutional factors in the host country have been found to be key determinants in foreign firms' location choices (Donnelly and Manolova, 2020).

We follow the perspective of New Institutional Economics, put forward by North (1990 and 1991), which characterizes institutions as “rules of the game” that are crucially important for economic behaviour and economic outcomes. For example, in the context of international business, strong host-country institutions reduce uncertainty and thus transaction costs (North, 1991) for MNE operations (Hotho and Pedersen, 2012). The demarcation of institutions by North (1990 and 1991) into formal institutions, such as explicit rules and laws, and informal institutions, such as behavioural norms, taboos and customs, has helped to identify many relevant antecedents of MNEs’ foreign direct investment. In particular, formal institutions have been used to study MNEs’ decisions to enter foreign countries. Prior work has shown that bilateral investment treaties (Albino-Pimentel et al., 2018), intellectual property rights regimes (Coeurderoy and Murray, 2008) and industry-support policies (Georgallis et al., 2021) attract foreign MNEs. Similarly, studies have demonstrated that countries with stricter employment regulation attract cross-border mergers and acquisitions (Alimov, 2015) and that local labour standards affect firms’ location choices (Maggioni et al., 2019).

The second strand of institutional theory we utilize is the institution-based view (Peng et al., 2009), which posits that institutional environments are crucial antecedents for firms’ strategic choices. In this perspective, firms are conceptualized as autonomous agents that pursue their interests and make strategic choices within the formal and informal constraints in an institutional environment (Peng et al., 2009). The essential element in this view is the tenet that the institutional framework influences firm behaviour.

Relatively recently, the academic conversation about host-country formal institutions put a spotlight on host-country policy support, defined as institutional arrangements that are designed to support specific sectors or firms, and its effects on MNEs’ foreign location choices (Georgallis et al., 2019; Georgallis et al., 2021). This is in contrast to a historically more constraining view of institutions, exemplified by the notion that firms choose foreign locations with the least binding regulation (Ahuja and Yayavaram, 2011). Two examples of this are pollution havens (Copeland and Taylor, 2004), in which legal constraints against pollution are lax (Siegel et al., 2013), and MNEs’ practice of outsourcing socially irresponsible practices to foreign subsidiaries in response to institutional pressure from stakeholders in their home country (Witt and Lewin, 2007).

Research on policy support argues that MNEs are attracted by more stringent and enabling formal institutions. For example, Georgallis et al. (2021) showed that MNEs in the renewable energy sector choose to locate their investments in countries that have a higher level of policy support in the form of more generous feed-in tariffs (Glenk and Reichelstein, 2019). Such policy support can also help

nascent industries to gather momentum, enabling the emergence of local industry (Georgallis et al., 2019). These studies either focused on one particular type of policy support (e.g. Georgallis et al., 2021; Georgallis et al., 2019); looked at policy interventions on a broader level, such as command-and-control, market-based and voluntary policy instruments (Bohnsack et al., 2015); or compared different policy support systems qualitatively (Lewis and Wisser, 2007). However, many market-based policy interventions in the form of subsidy configurations have not been compared empirically. Thus, much of the heterogeneity of subsidies and their effects on MNEs' foreign location choices have not yet been studied.

2.2 Two key dimensions of subsidies: immediacy and firm specificity

International business research has so far conceptualized policy support in the form of subsidies as homogeneous. Yet, policy support is multifaceted, with potentially heterogeneous effects on MNEs' foreign investment location choices, depending on the type of subsidy. Although multiple classifications for subsidies exist, we put forward two salient dimensions that are in line with a taxonomy of the OECD and a classification of Global Trade Alert: immediacy and firm specificity.

2.2.1 Immediacy

Immediacy refers to the degree to which a subsidy affects firms' cash stock. The OECD provides a taxonomy in which subsidies are classified as direct transfer of funds when they refer to a direct payment to a beneficiary under clear, predefined conditions, such as output bounties, deficiency payments, operating grants, input-price subsidies or wage subsidies (OECD, 2021). We classify direct transfers of funds as direct subsidies. The other categories of the taxonomy, which we classify as indirect subsidies, refer to future payments or benefits that may be granted under certain conditions, such as reduced rates of income tax, production tax credits, forgone tax revenues, transfers of risks to government or induced transfers such as monopoly concessions (OECD, 2021).

We subsume the latter classifications as indirect subsidies because they do not provide an immediate and direct transfer of cash to the beneficiary but necessitate that a potential beneficiary first make an investment and start business activities that may later receive a form of rebate. This may be a tax rebate, a payment in case certain risky investments did not realize a predicted return or price regulation (OECD, 2021), such as in the form of feed-in tariffs for renewable energy (Georgallis et al., 2021). This dimension of immediacy (direct or indirect) of subsidies is important because it affects the risk that foreign MNEs bear when entering a market – and thus firm strategy – considerably. For an overview of the direct and indirect categories, see table 1.

Table 1. Demarcation of direct and indirect subsidies

Immediacy		Examples, based on OECD classification
Direct subsidies		<ul style="list-style-type: none"> • Output bounty or deficiency payment • Operating grant • Input-price subsidy • Wage subsidy • Capital grant linked to acquisition of land • Grant tied to the acquisition of assets, including foreign ones • Government research and development • Unit subsidy
Indirect subsidies	Tax revenue forgone	<ul style="list-style-type: none"> • Production tax credit • Reduced rate of income tax • Reduction in excise tax on input • Reduction in social charges (payroll taxes) • Other government revenue forgone • Investment tax credit • Tax credit for private research and development • Value added tax or excise tax concession
	Other government revenue forgone	<ul style="list-style-type: none"> • Waiving of administrative fees or charges • Underpricing of a government good or service • Underpricing of access to government land or natural resources • Debt forgiveness or restructuring • Government transfer of intellectual property rights • Underpricing of access to a natural resource harvested by final consumer
	Transfer of risk to government	<ul style="list-style-type: none"> • Government buffer stock • Third-party liability limit for producers • Assumption of occupational health and accident liabilities • Credit guarantee linked to acquisition of land • Loan guarantee; non-market-based debt-equity swap and equity injection • Price-triggered subsidy
	Induced transfers	<ul style="list-style-type: none"> • Import tariff or export subsidy; local content requirements; discriminatory government procurement • Monopoly concession • Monopsony concession; export restriction; dual pricing; provision of below-cost electricity by a State-owned utility • Wage control, land use control • Credit control; below-market loan by a State-owned bank • Deviations from standard intellectual property right rules • Regulated price; cross subsidy

Source: Authors presentation based on OECD (2021).

Direct subsidies are exemplified in the financial grant (\$62 million) paid to Sikorsky Aircraft by the United States Department of Defense to conduct research in science and engineering.⁶ In contrast, an example of indirect subsidies is the State loan granted to Tesla Motors by the United States Department of Energy in 2010.⁷ Tesla received the loan with favourable terms under the condition to “produce fuel-efficient advanced technology vehicles”. To be eligible for the direct loan programme for advanced technology vehicles, projects must produce products in accordance with predetermined requirements, establish or modernize new facilities, be situated in the United States and have a realistic probability of repayment.⁸ These examples show that direct subsidies affect a firm’s finances immediately, whereas indirect subsidies may improve firms’ finances when certain conditions are met in the future. Thus, firms bear more risk for a longer time with indirect subsidies than with direct subsidies.

Strategy research has shown that cash stock is an essential asset (Kim and Bettis, 2014) for dealing with uncertain economic decisions because those unutilized resources can be easily allocated to unforeseen activities in foreign markets (Asseraf and Gnizy, 2022). In the case of investment decisions in host countries, firms operate in an unfamiliar environment and thus face uncertain economic conditions in the form of liability of foreignness (Hymer, 1976; Sethi and Guisinger, 2002; Zaheer, 1995) and added costs of doing business abroad (Hymer, 1976). Thus, cash stock is a crucial asset for business endeavours in foreign host countries. The effect of subsidies on cash stock is not homogeneous though, which is apparent in the OECD classification of government support.

Furthermore, indirect subsidies are harder to quantify than direct subsidies, both *ex ante* and *ex post*. Whereas direct subsidies can be detected and measured rather precisely, indirect transfers are more difficult to quantify both for the OECD and for firms specifically (OECD, 2019). The amounts granted through direct subsidies as, for example, operating grants or input-price subsidies are easy to quantify (OECD, 2021) and can thus be easily priced into corporate calculations of return on investment. In contrast, the effects of indirect subsidy mechanisms such as an import tariff or a monopoly concession are more difficult to assess. For investment location decisions, it is crucial for firms to have a very thorough understanding of the benefits of each location, since decision makers are confronted with

⁶ Global Trade Alert, “United States of America: The Department of Defense provides a financial grant to Sikorsky Aircraft Corporation”, www.globaltradealert.org/intervention/97649 (accessed 21 September 2022); United States Government, “Grant summary – Sikorsky Aircraft Corporation”, www.usaspending.gov/award/ASST_NON_W911W61320003_2100 (accessed 21 September 2022).

⁷ Global Trade Alert, “United States of America: \$465 million loan to Tesla Motors from the Department of Energy”, www.globaltradealert.org/intervention/72259 (accessed 21 September 2022).

⁸ United States, Department of Energy, Loan Program Office, “Advanced Technology Vehicles Manufacturing Loan Program”, www.energy.gov (accessed 14 November 2022).

complex environments in which gathering information and conducting analysis is crucial (Maitland and Sammartino, 2015). The importance of subsidies in the investment calculations of firms can also be seen in their reaction to the withdrawal of previously granted subsidies. For example, in the case of *Micula v. Romania (I)*, Swedish investors legally fought the post-investment withdrawal of previously granted investment subsidies (UNCTAD, 2022b).

Following prior work (Georgallis et al., 2021) and our own assertions, we hypothesize that subsidies in general, whether direct or indirect, should attract foreign MNEs to invest in host countries. We additionally hypothesize that the effect of subsidies on MNEs' location choices should be stronger for direct than for indirect subsidies. This is so because MNE finances are immediately positively affected by direct subsidies but not by indirect ones, which reduces the MNEs' risk of foreign investment.

Baseline hypothesis 1: *Host-country subsidies are positively related to the likelihood of MNEs investing in that foreign country.*

Hypothesis 2: *The positive effect of direct subsidies on the likelihood of foreign MNE investment is stronger than the effect of indirect subsidies.*

2.2.2 Firm specificity

Firm specificity refers to the degree to which a subsidy scheme is directed only to specific preselected firms (firm-specific) or is open for applications of firms that are not predefined (non-firm-specific). Many subsidies are targeted only at specific firms and are inaccessible to firms that do not belong to the predefined group (Evenett and Fritz, 2021). The examples of Sikorsky Aircraft and Tesla Motors are both firm-specific because those firms specifically had access to a specific subsidy. In contrast, European Union feed-in tariffs for renewable energy firms are non-firm-specific and open to any firm that would feed electricity from renewable sources to the grid (Georgallis et al., 2021). Other examples of non-firm-specific policy support are a production subsidy for United States farmers (\$143 million) approved by the United States Department of Agriculture in May 2018,⁹ and the 2009 dairy export incentive programme that was available for bidding by private exporters.¹⁰

⁹ Global Trade Alert, "United States of America: The Department of Agriculture provides a production subsidy to multiple farmers worth USD 143 million.", www.globaltradealert.org/intervention/94668 (accessed 21 September 2022); United States, Department of Agriculture, "Farm Bill", www.usda.gov/farmbill (accessed 21 September 2022).

¹⁰ Global Trade Alert, "United States of America: Dairy Export Incentive Program", www.globaltradealert.org/intervention/15301 (accessed 21 September 2022).

The importance of firm specificity in research on host-country institutions was first put forward by Blake and Moschieri (2017), who find that MNEs face a firm-specific institutional environment in host countries. They show that legal disputes between foreign MNEs and host countries lead to divestments of MNEs as they perceive a deterioration of the host-country investment environment for them specifically. In general, it can be expected that subsidies are more attractive to a wider audience of firms when they have not been granted only to a single firm or group of firms. While firm-specific subsidies can also indicate to non-eligible firms that the institutional environment of a country is generally positive within a sector, such subsidies are less attractive than subsidy schemes that are not open only to a predetermined set of firms, i.e. non-firm-specific subsidies. As a result, we hypothesize that the effect of subsidies on MNEs' location choices should be stronger for non-firm-specific subsidies than for firm-specific subsidies.

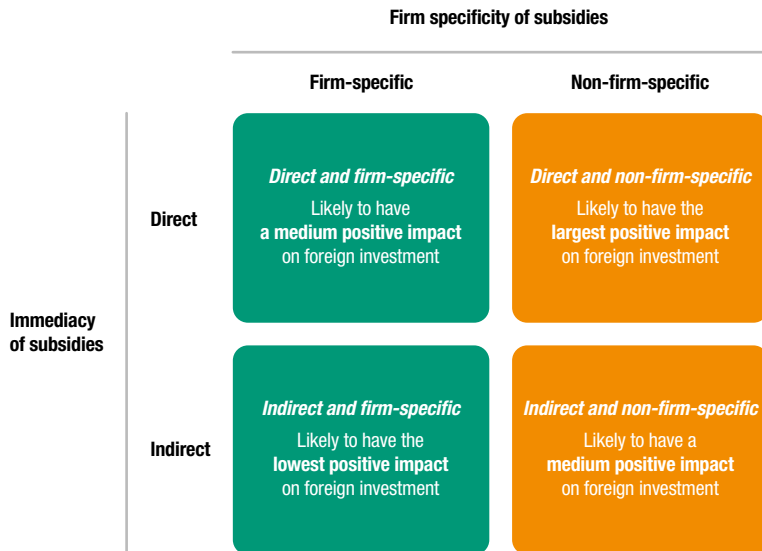
Hypothesis 3: *The positive effect of non-firm-specific subsidies on the likelihood of foreign MNE investment is stronger than the effect of firm-specific subsidies.*

Given these considerations, it may follow that these effects are additive in nature. To explore the additivity of immediacy and firm specificity, we hypothesize that direct and non-firm-specific subsidies exhibit the strongest positive effect on investment location choice, whereas indirect and firm-specific subsidies exhibit the weakest effect. For an overview of the immediacy–firm-specificity framework of subsidies, see figure 1.

Hypothesis 4a: *Direct and non-firm-specific subsidies have the largest effect on the likelihood of foreign MNE investment when compared with all other combinations of immediacy and firm specificity.*

Hypothesis 4b: *Indirect and firm-specific subsidies have the smallest effect on the likelihood of foreign MNE investment when compared with all other combinations of immediacy and firm specificity.*

Figure 1. The immediacy–firm specificity framework



Source: Authors' conceptualization and visualization.

3. Methods

3.1 Sample

We analyse the heterogeneous effects of different types of subsidies on investment location choice using a large sample of investments in foreign subsidiaries made by publicly traded United States firms between 2009 and 2019 in several host countries that provide subsidies. In our analysis, data availability on subsidies determine the set of host countries: member States of the European Union and China.

To construct the sample, we collected corporate and financial data from Standard & Poor's Compustat Fundamentals Annual database. Information on firms' subsidiary locations we obtained from the LexisNexis Corporate Affiliations database. Data on host-country subsidies was sourced from Global Trade Alert, which monitors policies affecting world commerce and released an inventory of corporate subsidies issued by China, the United States, and the individual member states of the European Union (Evenett and Fritz, 2021). As a supranational institution, the European Union has special rules for State aid of its member States in order to prohibit distortion of the European Union's single market. Article 107 of the Treaty on the Functioning of the European Union specifically addresses the European Union's competition policy.

Under this legislation, State aid is generally prohibited “unless exceptionally justified”.¹¹ The body that oversees this regulation is the directorate-general for Competition of the European Commission, the executive branch of the European Union. According to Article 107, State aid is deemed compatible with the internal market under certain circumstances. This is the case, for example, when the State aid has a social character, when it relieves “damage caused by natural disasters” or when it “promote[s] economic development of areas where the standard of living is abnormally low”.¹² However, even with those rules, European Union member States are making use of discriminatory State aid, with larger States intervening more often (Evenett, 2019).

Additional country-level data were acquired from a variety of publicly available sources. From the World Bank, we use macroeconomic data from the World Development Indicators database (World Bank, 2022a) and data from the World Governance Indicators database for indices measuring governance quality (World Bank, 2022b). Furthermore, trade data were obtained from the United Nations Conference on Trade and Development (UNCTAD, 2022a) to capture bilateral trade relationships between home and host countries.

Our final sample is an unbalanced longitudinal data set that allows us to analyse the determinants of MNEs’ investment location choices. The sample contains more than 4,000 United States firms and their subsidiaries in 29 countries in the time period between 2009 and 2019. The time variable of the panel data set is years, and the unit of analysis is the firm-country dyad. Our final sample contains 42,584 observations at the firm-country-year level.

3.2 Variables

The main dependent variable in our data set, *Subsidiaries*, is the number of subsidiaries per firm-country-year and thus an integer. With this approach concerning our dependent variable, we follow prior research that examined MNEs’ foreign investment levels (Oh and Oetzel, 2011).

Since we are concerned with the impact of subsidies on firms’ investment location decisions, our focal independent variables are subsidies in their various manifestations. We constructed the subsidy variables on the basis of the “inventory of corporate subsidies” released by Global Trade Alert (Evenett and Fritz, 2021).

¹¹ “Consolidated version of the Treaty on the Functioning of the European Union - Part Three: Union Policies and Internal Actions - Title VII: Common Rules on Competition, Taxation and Approximation of Laws - Chapter 1: Rules on competition - Section 2: Aids granted by States - Article 107 (ex Article 87 TEC)”, Official Journal 115, 9 May 2008, <https://eur-lex.europa.eu/legal-content/EN/TXT/HTML/?uri=CELEX:12008E107&from=EN>.

¹² Ibid.

In this inventory, each subsidy is assigned a unique ID. Moreover, the database contains crucial information on each recorded subsidy scheme, such as the implementing country, the date of implementation, the date of removal and whether the subsidy was firm-specific or non-firm-specific. The inventory also adopts the taxonomy of the OECD such that each subsidy is categorized as either “Direct transfer of funds”, “Induced transfer”, “Tax revenue foregone” or “Transfer of risk to government”. Importantly, the database includes information on the industry sectors that benefit from the respective subsidy, using the United Nations Central Product Classification System, version 2.1 (CPC 2.1).

We calculated the relevant subsidy variables in several steps. First, we converted the CPC 2.1 to the North American Industry Classification System (NAICS) at the two-digit level. Then, we calculated the number of active subsidies per year, country and industry, conditional on subsidy characteristics.¹³ For example, in 2009, Germany had 78 active subsidy schemes for the NAICS sector with the number 33, which refers to “metal manufacturing”. Of those 78 subsidy schemes, 75 were granted to specific firms, whereas 3 were implemented as non-firm-specific. With respect to the OECD taxonomy, of the 78 subsidy schemes for this specific sector, 2 were granted as a “Direct transfer of funds”, while the other 76 were granted as indirect subsidies. Then, we matched this information uniquely to the unit of analysis of our longitudinal data set, firm-country dyads, by considering the firm’s industry and the year.

Finally, for each firm-country dyad and year in our longitudinal data set we obtain several variables containing information on the active subsidies for the respective country and sector: *Subsidies* captures the total number of active subsidies per year (*t*), country (*ct*) and industry sector at the NAICS two-digit level. *Direct subsidies* captures the number of subsidy programmes classified as “Direct transfer of funds”, whereas the variable *Indirect subsidies* captures the number of subsidies not classified as “Direct transfer of funds”. *Non-firm-specific subsidies* counts the number of subsidies that are classified as non-firm-specific and thus available in principle to many firms. In contrast, *Firm-specific subsidies* measures the number of subsidies for which only specific companies are eligible. The variable *Indirect-NFS subsidies* counts the number of subsidies that are non-firm-specific and indirect, *Direct-NFS subsidies* tracks the number of subsidies that are non-firm-specific and direct, *Direct-FS subsidies* measures the number of firm-specific and direct subsidies, and *Indirect-FS subsidies* captures the number of firm-specific and indirect subsidies.

¹³ For those subsidy schemes in the database that lacked a removal date, we assumed that the schemes were still active at the end of the time period covered.

We control for several factors on the firm, host-country and country-dyad levels. At the firm level we included *Cash stock* because research has shown that in environments characterized by uncertainty, cash serves as a buffer (Kim and Bettis, 2014). We included both the return on assets (*ROA*) and the return on investment (*ROI*), since firms performing high on those metrics may have a higher propensity to conduct foreign investment (Henderson et al., 2012). We transformed both variables with the inverse hyperbolic sine because of their highly skewed nature in our sample (Sabel and Sasson, 2023). Similarly, we included *Leverage* and *Tobin's Q* as firm-level controls (Kim and Bettis, 2014) as well as *Firm size*. We included the variable *Colocation*, which captures localized knowledge spillovers in the home country (Lamin and Livanis, 2013) and the tendency of firms to invest in countries in which national peers are present (Zhu et al., 2022). In addition to the firm level, we included several variables for host-country characteristics. We included *GDP* (Blake and Moschieri, 2017), *GDP growth* (Blake and Moschieri, 2017), *Inflation rate* (Cuervo-Cazurra, 2008), endowment of *Natural resources* (Zilja et al., 2022), *Population* (Li and Vashchilko, 2010), and the *Worldwide Governance Indicators*, constructed by Daniel Kaufmann and Aart Kraay.¹⁴ Following prior research, we also included the country-dyadic variable *Trade dependence* (Holburn and Zelner, 2010). For a complete overview of all variables and their operationalizations, see table 2.

Table 2. Overview of all variables and their operationalizations

Variable	Description	Measurement	Source
Subsidiaries	Number of subsidiaries per firm-country dyad	Discrete integers	LexisNexis Corporate Affiliations (acquired in November 2021)
Subsidies	Number of active subsidy schemes per firm-country dyad, broken down by industry at the two-digit NAICS level	Discrete integers	Global Trade Alert, Corporate Subsidy Inventory 2.1, www.globaltradealert.org/data_extraction
Cash stock	Cash and short-term investments divided by total assets	Continuous (ratio)	S&P Global Market Intelligence, Compustat Fundamentals, annual (last accessed 18 July 2022)
ROA	Net income divided by total assets; transformed with inverse hyperbolic sine	Continuous	S&P Global Market Intelligence, Compustat Fundamentals, annual (last accessed 18 July 2022)
ROI	Net income divided by invested capital; transformed with inverse hyperbolic sine	Continuous	S&P Global Market Intelligence, Compustat Fundamentals, annual (last accessed 18 July 2022)
Leverage	Sum of short- and long-term debt, divided by total assets. Transformed with the natural logarithm	Continuous	S&P Global Market Intelligence, Compustat Fundamentals, annual (last accessed 18 July 2022)

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¹⁴ See <http://info.worldbank.org/governance/wgi> (accessed 29 September 2022).

Table 2. Overview of all variables and their operationalizations (Concluded)

Variable	Description	Measurement	Source
Tobin's Q	Firm value in relation to the replacement value of all assets	Continuous	S&P Global Market Intelligence, Compustat Fundamentals, annual (last accessed 18 July 2022)
Firm size	Natural log of number of employees	Continuous	S&P Global Market Intelligence, Compustat Fundamentals, annual (last accessed 18 July 2022)
Colocation	Number of United States firms with a headquarters in the same State as the headquarters of the focal firm that have at least one subsidiary in the host country	Discrete integers	LexisNexis Corporate Affiliations (acquired in November 2021)
Worldwide Governance Indicators	Estimate of governance quality; range: [-2.5 to 2.5]	Continuous	World Bank (2022b)
Population	Natural log of country's population	Continuous	World Bank (2022a)
GDP	GDP of host country in constant 2015 United States dollars; transformed with the natural logarithm	Continuous	World Bank (2022a)
GDP growth	GDP growth rate of host country in the respective year	Percentage points	World Bank (2022a)
Inflation rate	Inflation rate of host country in the respective year	Percentage points	World Bank (2022a)
Trade dependence	Host country's share of merchandise trade volume with the United States in relation to the country's total trade volume; transformed with the natural logarithm	Continuous	UNCTAD (2022a)
Natural resources	Natural log of total natural resources rents (per cent of GDP); transformed with the natural logarithm	Continuous	World Bank (2022a)

Source: Authors' compilation.

3.3 Empirical strategy

Since we are studying multiple units over several years and investigating changes within firm-country dyads, we apply a fixed-effects ordinary least squares model to explore the effects of subsidies on foreign investment decisions. Inherent in fixed-effects models is consideration of time-invariant fixed effects at the unit level. In our case, those are factors that do not change within firm-country dyads over time. As our dependent variable counts the number of subsidiaries per firm-country dyad, our primary independent variable is *Subsidies*, and we incorporate controls at the firm, country, and dyad levels. Our regression model can be presented as follows:

$$\begin{aligned}
 \text{Subsidiaries}_{ij,t} = & \beta_0 + \beta_1 \times \text{subsidies}_{j,t-1} + \beta_2 \times \text{firm controls}_{i,t-1} + \\
 & \beta_3 \times \text{country controls}_{j,t-1} + \beta_4 \times \text{dyad controls}_{ij,t-1} + \text{Year}_t + \varepsilon_{ij,t}
 \end{aligned}$$

In this specification, *Subsidiaries*_{ij,t} is the number of subsidiaries per firm-country dyad *ij* in year *t*; β is the vector of coefficients with β_0 representing the intercept and β_1 to β_4 depicting the coefficients for the various sets of independent variables; *subsidies*_{j,t-1} is the number of subsidy schemes per country in year *t-1*; *firm controls*_{ij,t-1} is a vector of control variables on the firm level in year *t-1*; *country controls*_{j,t-1} is a vector of control variables on the country level in year *t-1*; *dyad controls*_{ij,t-1} represents our dyad controls. *Year*_t represents a vector of yearly fixed effects, and $\varepsilon_{ij,t}$ is the error term.

Since international business research usually assumes that firms are heterogeneous and that their competitive advantage arises from specific firm characteristics which are often unobservable, endogeneity, and, consequently, biased estimates in empirical analyses are a considerable reason for concern in this field of research (Wolfolds and Siegel, 2019). This also applies to our study, where endogeneity might be an issue. Specifically, endogeneity arising from sample selection bias might be present in our analysis because firms are likely to have hidden preferences to invest in certain countries or latent preferences to explicitly avoid investing in particular countries. For example, strategizing managers might base their judgement and decision on their personal experience from their career (Crossland et al., 2014), which is often hidden to the researcher. In order to address this potential sample selection bias (Certo et al., 2016), we apply a two-stage Heckman model (Heckman, 1979), following established practice in previous research (Chen, 2015; Rubera and Tellis, 2014).

In the first stage, we estimate the probability of a firm investing in a country with a probit regression. We follow established practice in empirical research and inflated the data set by counterfactual information, as potential but unrealized investment in host countries needs to be considered (Albino-Pimentel et al., 2021; Georgallis et al., 2021). Thus, for each firm and year, there are 29 observations in our data set, resulting in more than 600,000 firm-year-country observations. Then, we calculate the inverse Mills ratio using the probit estimation results by dividing the probability density function by the normal cumulative distribution. This resulting parameter, often denoted as lambda (Wolfolds and Siegel, 2019), is then used as a control in the second-stage regression. Afterwards, in the second stage, we restrict our sample to observations in which firms have a commitment in the form of at least one subsidiary per year and country (i.e. the sample is restricted to observations that have a positive value in the dependent variable).

Using this empirical approach, we estimated four different model specifications. In the first specification, we used the aggregated number of subsidies per year and country as the main independent variable. In the second specification, we distinguished between direct and indirect subsidies as independent variables to test for their differential effect. In the third specification, we included both non-firm-specific and firm-specific subsidies as independent variables to test for their distinct effect.

Finally, in the fourth model, we break down the subsidy variables further to their four types. Thus, we distinguished between direct and firm-specific, direct and non-firm-specific, indirect and firm-specific, and indirect and non-firm-specific subsidies.

4. Results

Table 3 presents the descriptive statistics of the main sample, which is used in the second-stage regressions. The correlation matrix is presented in table 4. In the first-stage sample, 627,564 observations were artificially created through zero inflation, whereas this number drops to 42,584 observations in the restricted sample that considers only existing observations. The mean number of subsidiaries in the restricted sample is 2.23. The mean number of policy support schemes is 24 in the sample of the second stage.

Our regression results from the analysis of the effect of subsidies on investment location choice are presented in table 5.¹⁵ Model 1 contains the estimates of the first-stage regression of our first model with the aggregated number of subsidies per year and country as the main independent variable. Since the first-stage results of the other models are very similar because only the main independent variables vary, we decided to restrict presentation of the first stage to the first model. The remaining columns contain the estimation results of the second-stage regressions. Although the main independent variables vary in each model, we used the same controls to ensure comparability. The inverse Mills ratio is highly significant throughout all models ($p < 0.001$), indicating that a selection effect is present and has been accounted for.

In Model 2, we tested for the aggregate effect of subsidies on investment location choice (H1) with the main independent variable *Subsidies*. The coefficient of *Subsidies* is positive and significant ($\beta = 0.021$, $p < 0.001$), indicating that an increase in policy support by one unit leads to an increase in the number of subsidies per year and country by 0.021, on average. This provides support for hypothesis 1. In Model 3, we test for the difference of subsidies with respect to immediacy and distinguish between direct and indirect subsidies (H2). The coefficient of *Direct subsidies* is positive and significant ($\beta = 0.027$, $p < 0.001$) and larger than the coefficient of indirect policy support, *Indirect subsidies* ($\beta = 0.017$, $p < 0.001$).

¹⁵ The F-statistics of the main models (> 30) show that each model individually includes coefficients that are jointly different from 0. This model fit does not decrease strongly when we split the subsidy variables in granular categories, indicating that each category has its distinct effect on the dependent variable. However, the R-squared of the model overall stays stable across models (~ 0.14), which means that splitting the subsidy variables does not help to explain more of the variation in subsidiary investment.

Table 3. Descriptive statistics

Variable	Number of observations	Mean	Standard deviation	Minimum	Maximum
Subsidiaries	42 584	2.227	3.044	1	65
Subsidiés	42 584	24.642	68.777	0	336
Direct subsidiaries	42 584	11.091	43.204	0	302
Indirect subsidiaries	42 584	13.551	51.589	0	330
Non-firm-specific subsidiaries	42 584	3.706	5.859	0	38
Firm-specific subsidiaries	42 584	20.936	65.764	0	330
Direct-NFS subsidiaries	42 584	1.981	4.303	0	33
Indirect-NFS subsidiaries	42 584	1.725	3.613	0	25
Direct-FS subsidiaries	42 584	9.110	42.949	0	298
Indirect-FS subsidiaries	42 584	11.826	51.382	0	328
Cash stock	42 584	0.149	0.136	0	0.968
ROA	42 584	0.044	0.103	-4.513	2.638
ROI	42 584	0.072	0.223	-5.009	5.224
Leverage	42 584	-1.641	1.173	-13.088	1.672
Tobin's Q	42 584	1.665	1.213	0.004	22.719
Firm size	42 584	2.466	1.661	0.693	14.648
Colocation	42 584	24.222	27.652	0	155
WGI Governance and Accountability	42 584	1.051	0.767	-1.701	1.690
WGI Political Stability	42 584	0.573	0.456	-0.657	1.461
WGI Government Effectiveness	42 584	1.286	0.541	-0.360	2.241
WGI Regulatory Quality	42 584	1.279	0.582	-0.289	2.051
WGI Rule of Law	42 584	1.287	0.681	-0.543	2.130
WGI Control of Corruption	42 584	1.268	0.795	-0.562	2.446
Population	42 584	17.311	1.474	13.118	21.062
GDP	42 584	27.658	1.318	23.665	30.233
GDP growth	42 584	1.989	3.172	-14.839	25.176
Inflation rate	42 584	1.449	1.204	-4.478	6.091
Trade dependence	42 584	-2.820	0.587	-4.809	-1.404
Natural resources	42 584	-1.446	1.377	-6.711	2.038

Source: Author's estimations.

Table 4. Correlation matrix

Number	Variable	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	
(1)	Subsidiaries	1.00																					
(2)	Subsidies	0.10	1.00																				
(3)	Cash stock	-0.09	0.01	1.00																			
(4)	ROA	0.03	-0.02	-0.01	1.00																		
(5)	ROI	0.03	-0.02	-0.02	0.61	1.00																	
(6)	Leverage	0.07	-0.02	-0.27	-0.03	0.00	1.00																
(7)	Tobin's Q	-0.05	0.00	0.32	0.25	0.16	0.03	1.00															
(8)	Firm size	0.17	-0.08	-0.17	0.31	0.23	0.18	-0.03	1.00														
(9)	Colocation	0.12	0.10	0.20	-0.08	-0.07	-0.10	0.08	-0.18	1.00													
(10)	WGI Governance and Accountability	0.02	-0.44	0.02	0.00	0.00	0.01	0.02	-0.01	0.06	1.00												
(11)	WGI Political Stability	-0.07	-0.30	0.01	0.03	0.02	0.01	0.00	0.07	-0.16	0.72	1.00											
(12)	WGI Government Effectiveness	0.08	-0.17	0.03	-0.02	-0.02	-0.03	0.01	-0.08	0.18	0.74	0.60	1.00										
(13)	WGI Regulatory Quality	0.08	-0.28	0.02	-0.03	-0.02	-0.01	0.02	-0.07	0.20	0.87	0.67	0.89	1.00									
(14)	WGI Rule of Law	0.07	-0.27	0.03	-0.02	-0.02	-0.02	0.01	-0.07	0.17	0.85	0.66	0.95	0.95	1.00								
(15)	WGI Control of Corruption	0.09	-0.18	0.03	-0.03	-0.02	-0.03	0.01	-0.09	0.20	0.78	0.60	0.96	0.93	0.96	1.00							
(16)	Population	0.13	0.49	0.01	-0.04	-0.04	-0.06	-0.01	-0.15	0.29	-0.67	-0.77	-0.40	-0.50	-0.41	1.00							
(17)	GDP	0.18	0.44	0.02	-0.06	-0.05	-0.08	0.01	-0.20	0.41	-0.39	-0.61	-0.07	-0.18	-0.17	-0.08	0.92	1.00					
(18)	GDP growth	-0.01	0.21	-0.01	-0.01	-0.01	0.03	0.02	0.00	-0.04	-0.50	-0.23	-0.25	-0.29	-0.31	-0.26	0.24	0.12	1.00				
(19)	Inflation rate	0.00	0.08	-0.01	0.01	0.01	-0.07	-0.07	-0.03	0.06	-0.22	-0.14	-0.11	-0.10	-0.11	-0.09	0.20	0.15	-0.02	1.00			
(20)	Trade dependence	0.16	0.26	0.03	-0.06	-0.06	-0.05	0.01	-0.18	0.37	-0.18	-0.32	0.22	0.12	0.13	0.22	0.50	0.68	0.30	0.05	1.00		
(21)	Natural resources	0.00	0.11	0.01	0.00	0.00	-0.05	-0.05	-0.03	0.07	-0.41	-0.14	-0.19	-0.15	-0.22	-0.16	0.28	0.13	0.23	0.38	0.04	1.00	

Source: Authors' estimations.

Table 5. Main regression

Dependent variable	Model				
	(1)	(2)	(3)	(4)	(5)
	Probit	OLS	OLS	OLS	OLS
	Investment (1/0)		Subsidiaries		
Subsidiaries	0.002*** (0.000)	0.021*** (0.003)			
Direct subsidiaries			0.027*** (0.003)		
Indirect subsidiaries			0.017*** (0.002)		
Non-firm-specific subsidiaries				0.108*** (0.012)	
Firm-specific subsidiaries				0.017*** (0.002)	
Direct-NFS subsidiaries					0.081*** (0.010)
Indirect-NFS subsidiaries					0.216*** (0.027)
Direct-FS subsidiaries					0.012*** (0.002)
Indirect-FS subsidiaries					0.016*** (0.002)
Cash stock	0.423*** (0.046)	3.981*** (0.451)	3.891*** (0.423)	3.743*** (0.413)	3.717*** (0.404)
ROA	0.252** (0.095)	2.108*** (0.267)	2.075*** (0.255)	2.118*** (0.262)	2.087*** (0.257)
ROI	-0.032 (0.038)	-0.303*** (0.052)	-0.298*** (0.052)	-0.301*** (0.052)	-0.296*** (0.052)
Leverage	0.017** (0.006)	0.141*** (0.023)	0.137*** (0.022)	0.138*** (0.022)	0.137*** (0.022)
Tobin's Q	-0.003 (0.003)	-0.001 (0.014)	0.000 (0.014)	-0.000 (0.014)	0.001 (0.014)
Firm size	0.272*** (0.004)	2.760*** (0.280)	2.720*** (0.267)	2.726*** (0.270)	2.706*** (0.266)
Colocation	0.003*** (0.000)	0.050*** (0.006)	0.049*** (0.006)	0.049*** (0.006)	0.049*** (0.006)
WGI Governance and Accountability	0.464*** (0.044)	4.609*** (0.479)	4.906*** (0.498)	4.481*** (0.456)	4.809*** (0.491)
WGI Political Stability	-0.074* (0.030)	-0.549*** (0.119)	-0.589*** (0.120)	-0.587*** (0.121)	-0.659*** (0.125)
WGI Government Effectiveness	0.063 (0.051)	0.457*** (0.118)	0.337** (0.111)	0.244* (0.108)	0.151 (0.105)
WGI Regulatory Quality	0.113* (0.054)	1.442*** (0.178)	1.606*** (0.178)	1.656*** (0.189)	1.649*** (0.181)
WGI Rule of Law	-0.029 (0.060)	-0.782*** (0.125)	-0.842*** (0.125)	-0.800*** (0.123)	-0.919*** (0.130)

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Table 5. Main regression (Concluded)

Dependent variable	Model				
	(1) Probit	(2) OLS	(3) OLS	(4) OLS	(5) OLS
	Investment (1/0)		Subsidiaries		
WGI Control of Corruption	-0.108** (0.041)	-0.384* (0.180)	-0.363* (0.177)	-0.292 (0.175)	-0.337 (0.175)
Population	0.107** (0.040)	4.496*** (1.063)	4.664*** (1.070)	4.332*** (1.061)	4.044*** (1.022)
GDP	0.188*** (0.040)	0.851** (0.322)	1.054** (0.324)	0.890** (0.323)	1.135*** (0.338)
GDP growth	0.016*** (0.003)	0.120*** (0.016)	0.120*** (0.016)	0.123*** (0.016)	0.130*** (0.017)
Inflation rate	0.023** (0.009)	0.226*** (0.025)	0.236*** (0.025)	0.247*** (0.027)	0.257*** (0.027)
Trade dependence	0.168*** (0.025)	1.265*** (0.189)	1.193*** (0.173)	1.187*** (0.177)	1.157*** (0.170)
Natural resources	0.038*** (0.009)	0.245*** (0.053)	0.180*** (0.046)	0.236*** (0.051)	0.195*** (0.047)
Inverse Mills ratio		9.114*** (1.063)	8.960*** (1.008)	8.987*** (1.023)	8.914*** (1.004)
Constant	-12.648*** (0.487)	-158.647*** (21.525)	-166.850*** (21.812)	-156.298*** (21.414)	-157.709*** (20.717)
Observations	627 564	42 584	42 584	42 584	42 584
Firm-country dyads	110 544	7 729	7 729	7 729	7 729
Chi-squared	8 144	n/a	n/a	n/a	n/a
Loglikelihood	-30 137	n/a	n/a	n/a	n/a
Year dummies	No	Yes	Yes	Yes	Yes
Firm-country fixed effects	No	Yes	Yes	Yes	Yes
F-statistic	n/a	32.716	31.860	31.692	30.376
R-squared	n/a	0.141	0.142	0.141	0.142

Source: Authors' estimations.

Note: *** $p < 0.001$, ** $p < 0.01$, * $p < 0.05$. n/a = the fit statistics are not applicable to this particular model.

We tested for statistically significant difference using a standard Wald test and found that this is indeed the case at the 1per cent level. This provides support for hypothesis 2.

In Model 4, we dissected subsidies according to their firm specificity (H3) and compared non-firm-specific with firm-specific subsidies. The coefficient of *Non-firm-specific subsidies* ($\beta = 0.108$, $p < 0.001$), is significantly larger than the coefficient of *Firm-specific subsidies* ($\beta = 0.017$, $p < 0.001$), as confirmed by the Wald test ($p < 0.001$).

Finally, in Model 5, we tested for the differential effect of the four types of policy, combining the dimensions of immediacy and firm specificity. Thus, we used Wald tests to pairwise compare the coefficients of *Direct-NFS subsidies* ($\beta = 0.081$,

$p < 0.001$), *Indirect-NFS subsidies* ($\beta = 0.216$, $p < 0.001$), *Direct-FS subsidies* ($\beta = 0.012$, $p < 0.001$) and *Indirect-NFS subsidies* ($\beta = 0.016$, $p < 0.001$). While the difference between *Direct-FS subsidies* and *Indirect-NFS subsidies* is only marginally significant ($p = 0.0744$), all other pairwise comparisons yield significant differences at the 1 per cent level ($p < 0.001$). Contrary to our hypothesizing, *Indirect-NFS subsidies* shows the largest effect and *Direct-FS subsidies* yields the lowest effect on investment location choice. Hence, we do not find empirical support for our hypotheses 4a and 4b. This alludes to the fact that these effects are not additive but may cancel each other out to some extent. Similar to prior studies on foreign subsidiary investments specifically (Zilja et al., 2022) and on foreign entry choices in general (Boustanifar et al., 2022), we are able to explain only a small part of firm-level investment, with an R-squared of approximately 0.14. This reflects the fact that market entry decisions are based on complex evaluations of firm-specific risks and opportunities (Blake and Moschieri, 2017), of which subsidies are just one aspect.

To increase confidence in our findings, we conduct several robustness tests with focus on the dependent variable, the estimation technique and the sample (table 6). First, we transformed our dependent variable with the natural logarithm to reduce the impact of outliers. Results for the direct effects and for the Wald tests for differences in coefficients remain significant (Models 1–4). Second, we exchanged our main estimation technique (fixed-effects ordinary least squares) with fixed-effects Poisson regressions, as distributional effects of the dependent variable may distort our results. The results remain consistent with this change (Models 5–8).

Third, we test our results within subsets of our sample, to check whether our effects cluster within specific countries. We observe that our results hold.¹⁶ Excluding Germany (Models 9–12), the coefficients of indirect and direct subsidies are not statistically different. This observation may imply that the pronounced impact of direct subsidies can be attributed largely to Germany. Furthermore, we partitioned our sample into two time frames, 2009–2014 and 2015–2019. Our results remain significant when we confine the sample to the years 2009–2014 (Model 13). Conversely, in the subsequent period of 2015–2019, while all coefficients retain their positive direction, the statistical significance between the coefficients of direct and indirect subsidies diminishes (Model 14). This may suggest that the stronger effect of direct subsidies might be more relevant at the beginning of the decade. However, because we are studying the variation within firm-country dyads over time, splitting the sample this way may also obfuscate firms' past decisions in the more recent subsample and distort the coefficients downwards.

¹⁶ We observe that our results hold when we exclude China, as the sole non-European Union country in the sample, or the United Kingdom and France as two of the three largest European Union economies during the sample time frame.

Table 6. Robustness tests

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
Corresponding main model	Model 2	Model 3	Model 4	Model 5	Model 2	Model 3	Model 4	Model 2	Model 3	Model 4	Model 5	Model 5	Model 5	Model 5
Robustness test	In(DV)	In(DV)	In(DV)	In(DV)	FE Pois	FE Pois	FE Pois	FE Pois	Germany	Germany	Germany	Germany	Germany	Germany
Model	OLS	OLS	OLS	OLS	Poisson	Poisson	Poisson	Poisson	OLS	OLS	OLS	OLS	OLS	OLS
Subsidies	0.004*** (0.000)				0.003*** (0.000)				0.018*** (0.002)					
Direct subsidies	0.006*** (0.001)				0.004*** (0.001)				0.023*** (0.003)					
Indirect subsidies	0.003*** (0.000)				0.002*** (0.000)				0.038*** (0.010)					
Non-firm-specific subsidies		0.022*** (0.002)				0.015*** (0.003)					0.099*** (0.013)			
Firm-specific subsidies		0.003*** (0.000)				0.003*** (0.000)					0.014*** (0.002)			
Direct-NFS subsidies			0.017*** (0.002)				0.012*** (0.002)					0.075*** (0.010)	0.081*** (0.023)	0.024* (0.010)
Indirect-NFS subsidies			0.036*** (0.005)				0.024*** (0.006)					0.202*** (0.028)	0.294*** (0.044)	0.042 (0.026)
Direct-FS subsidies			0.003*** (0.000)				0.003*** (0.001)					0.011*** (0.002)	0.013*** (0.003)	0.006* (0.003)
Indirect-FS subsidies			0.003*** (0.000)				0.002*** (0.000)					0.037*** (0.011)	0.014*** (0.003)	0.008* (0.003)
Observations	42 584	42 584	42 584	42 584	41 676	41 676	41 676	41 676	38 109	38 109	38 109	38 109	17 958	24 626
Firm-country dyads	7 729	7 729	7 729	7 729	6 821	6 821	6 821	6 821	6 911	6 911	6 911	6 911	5 454	6 620
Year dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Firm-country fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
F-statistic	63.001	61.067	61.024	57.376	n/a	n/a	n/a	n/a	28.613	28.279	27.756	26.780	25.208	13.052
R-squared	0.218	0.218	0.218	0.218	n/a	n/a	n/a	n/a	0.132	0.134	0.133	0.134	0.130	0.052
Chi-squared	n/a	n/a	n/a	n/a	1 837	1 848	1 836	1 844	n/a	n/a	n/a	n/a	n/a	n/a
Loglikelihood	n/a	n/a	n/a	n/a	-40 576	-40 576	-40 576	-40 576	n/a	n/a	n/a	n/a	n/a	n/a

Source: Authors' estimations.
Note: DV = dependent variable, FE = ordinary least squares. *** p < 0.001, ** p < 0.01, * p < 0.05. n/a = the fit statistics are not applicable to this particular model.

5. Discussion

Our research is based on the idea that the effect of subsidies on MNEs' investment location choices is based on the configuration of the subsidy scheme. Our empirical results indicate that firms respond to various types of subsidies in different ways, depending on their specific type. First, the results of our analysis demonstrate that host-country subsidies have a general positive effect on firms' investment location choices. Second, our results suggest that subsidies in the form of direct transfers have a larger effect on MNEs' likelihood to invest than host-country subsidies in the form of indirect transfers. Third, the empirical results demonstrate that the effect on MNEs' likelihood to invest is larger for non-firm-specific host-country subsidies than for firm-specific ones.

However, the last regression set comparing the four types of subsidies is somewhat puzzling. Our results suggest that non-firm-specific subsidies have a greater effect than firm-specific subsidies on investment in foreign subsidiaries. This is in line with our theorizing concerning the firm specificity of subsidies. However, in more nuanced models that address immediacy and firm specificity simultaneously, we find that indirect subsidies have a larger effect on foreign investment than direct subsidies. This contradicts our explorative hypotheses on the intricate effects of subsidies. Further investigation into this phenomenon is needed to resolve this puzzle. It might be that specific combinations of immediacy and firm specificity imply disparate effects on location choices that are distinct from the effects of those dimensions considered in the aggregate.

Our research makes multiple contributions. First, as our evidence is consistent with previous research on the effect of subsidies on firms' investment location choices (Georgallis et al., 2021), we confirm preceding theoretical advances. However, whereas Georgallis et al. (2021) analysed the effect of subsidies in one specific sector, we empirically show that this effect is also prevalent when considering a variety of sectors. Second, we demonstrate that the effects of subsidies depend substantially on the specific configuration of subsidy schemes along the dimensions of immediacy and firm specificity. Third, by offering this finer-grained picture of subsidy configurations, we provide a starting point for future research on policy support. This is not confined to research about investment location choice but includes other research streams in international business and global strategy. For instance, configurations of subsidies may explain variations in subsidiary performance, heterogeneity in entry modes and disparities in behaviour in State-owned and privately owned MNEs. Fourth, we provide insights and guidance for both managers and policymakers. On the one hand, we believe that managers benefit from our study as they have a better awareness of the landscape of subsidies and the various impacts that the different facets of subsidies have on their companies' costs and benefits. On the other hand, we supply policymakers with knowledge of variations

in subsidy programmes that draw in foreign investment. Both viewpoints are crucial since both politicians and managers face substantial costs associated with subsidies – administrative costs associated with establishing and running subsidy schemes in the case of policymakers and search costs associated with finding and evaluating subsidy schemes that underpin their strategy in the case of managers.

6. Limitations

Our study has limitations. We studied the effect of different types of subsidies on firms' investment location choices by using data from United States firms. Thus, it may be that firms from other home countries with different institutional settings, historical background and experience show a different behavioural pattern in response to subsidies. Also, the host countries we studied in our data set all have (arguably) trustworthy bureaucratic systems. Thus, it might be possible that the effect of subsidies on investment location choice differs substantially in countries that lack sound civil administrations. Also, further investigation into firm-level boundary conditions is needed. We know so far that firms hold more subsidiaries in countries where subsidies are more generous. We do not know whether this effect is due to more entry decisions, additional investments in countries where the focal MNE is already present or fewer divestments.

Finally, we rely on count data of subsidies for our empirical analysis, owing to data availability. Specifically, we calculated the number of subsidy programmes per year, country and industry. This specific operationalization of subsidies as a count variable does not take the generosity of subsidy schemes into account. Thus, the effects of specific subsidy programmes on location choice might very well differ with respect to their financial generosity. However, we believe that the scope of the study, in which we consider multiple industries, numerous countries and various subsidy schemes, provides valuable insights into the heterogeneous relationship between variations of subsidies and investment location choice. This is a starting point for further research. This includes discovering other dimensions by which to categorize subsidies to get a clear picture of the constructs and to explain further the heterogeneity in firm behaviour.

7. Conclusion and policy implications

Ultimately, given the increasingly interventionist role adopted by the State in the face of global challenges,¹⁷ such as fighting the COVID-19 pandemic,¹⁸ managing the energy transition to combat climate change (Ghauri et al., 2021), gaining

¹⁷ *The Economist*, "Business and the State: The new interventionism", 15 January 2022.

¹⁸ *The Economist*, "Rich countries try radical economic policies to counter Covid-19", 26 March 2020.

strategic national independence from other regimes (Evenett, 2020), and dealing with populism and economic nationalism (Ghauri et al., 2021), our study is highly relevant. The role of the State in tackling those global challenges is also evident in the UNCTAD *World Investment Report*. The yearly report highlights, for instance, that investment policies specifically are key to address adverse consequences of the pandemic (UNCTAD, 2020) and to facilitate the transition towards clean energy (UNCTAD, 2023).

Cautious extrapolation of our results in light of current events, recent crises and challenges for policymakers suggests that subsidies should be designed in specific ways if governments are to attract foreign investment flows for specific purposes. Most importantly, our findings suggest that policymakers are well advised to design their subsidy schemes in a non-firm-specific way, i.e. governments should not “pick winners”. Second, because firms face liability of foreignness in foreign host countries and cash can be quickly allocated to relieve various barriers, subsidies should be designed to be direct. Yet, policymakers need to clearly outline the industry boundaries of subsidy schemes, to make them efficient in achieving their goals. In the case of the energy transition, for example, policymakers need to clearly delineate which type of industry is eligible for support, e.g. solar power versus wind power. In the process of defining the boundaries of eligible firms, policymakers should pay particular attention to integrating the Sustainable Development Goals. By doing so, they can make sure that government spending is encouraging investment inflows to ensure access to affordable and sustainable energy for all (SDG 7), for example. Finally, collaboration between developing and especially low-income countries and regional and international development banks should be encouraged to help those countries develop non-discriminatory, reliable and sound subsidy programmes.

Our study highlights the different effects that the various instruments of the policy toolkit have on the strategic management of companies. By adopting an institutional lens, we contribute to a more nuanced understanding of strategic firm behaviour at the interplay of the complex cross-country context with “the multiplicity of entities, multiplexity of interactions, and dynamism of the global economic system” that is characteristic of international business research (Eden and Nielsen, 2020). Our study contributes to the rich body of research investigating the interaction of host-country institutional settings (North, 1990; Williamson, 2000) and investment location decisions of MNEs (Delios and Henisz, 2003).

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