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Technology multinational enterprises from emerging markets: Competitive interplay of international entry timing decisions

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ABSTRACT

Given the context that technology is becoming ever more important, research about technology multinational enterprises (MNEs) is also increasing, but from technology in the international business context, especially concerning entry timing, there is scant literature. Therefore, from the perspective of game theory this research examines how different aspects of host countries and players' resources affect the decision on entry timing into foreign countries. The data comprise 979 technology-based Taiwanese firms operating in service and manufacturing industries, mainly collected from the Taiwan Economic Journal and World Bank databases. The empirical findings show that firm resources and experiences, host country uncertainties, and investment payoff all influence the entry timing into foreign countries. This research contributes to the current knowledge about technology-based service and manufacturing firms on what factors they consider when choosing the time to invest into foreign countries, especially for technology MNEs from emerging markets.

Introduction

In the current era of globalization, strategies and decisions are vital to help firms successfully penetrate international markets. In the economics field, game theory – considered as the science of strategy – offers an important lens for the decision of competitive interplay in a strategy setting. A game should be systematic, and every game has certain rules. Every single action an individual player takes is a key issue in game theory, and players come up with a specific decision under the help of decision theory. Decision theory may help players to make the right decision under uncertainty, and a set of actions seems to be at the heart of game theory. In fact, this can be applied to any kind of players - not just for individuals, but also for firms.

Game theory takes a part of decision theory, but goes beyond the classical explanation. In decision theory there are no actions or players, but in game theory, different players and actions are the main factors, and the payoff and information exist as indispensable aspects. In game theory the players formulate a set of actions that are further known as a strategy. A player in the game might have alternative strategies and actions depending on the information received by other players at different times. Based on the received information, players choose their plan of action from equivalent sets. Regardless of the identities or characteristics of the players, the payoff from choosing a particular strategy against an opponent choosing an alternative is the same (Samuelson, 2002). The outputs in the game are expected to represent "fitness", which explain that a process of natural option provides favor upon those players able to earn higher payoffs. The received information, which a payoff heavily depends on, occurs at different levels and times. The strategies and actions played by an individual player also perform differently at various levels of received information.

In the game of going international, the aim of an individual firm is to make the most of the payoff. For maximizing the payoff, a firm chooses alternative actions and a particular strategy to attain as much profit as possible out of various alternative strategies. Following the earlier literature of the 1980s, players should stay away from a weakly dominated strategy. Hence, if any resource of the firm (or player) does not support generating higher project payoffs after making the foreign entry decision, then the manager potentially will choose an alternative entry strategy to avoid investment risk and inefficient operations.

Our study is closer to the circumstance of when firms are choosing their strategies to become an early mover or late entrant. Resources on the firm itself, other competitors, and how well the firm

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understands the foreign market environment are immensely vital. All such information can help a firm to either gain first-mover advantages, choose the right venture, or avoid the risk of uncertainty and become hostage in the host country.

Investments concerning strategic timing and the related streams concentrating on early and late entrant advantages constitute an established body of studies in strategic management literature. A large volume of works has been published in the last couple of decades to study these topics. Markman and Waldron (2014) find that making business decisions is complex, but choosing entry timing is particularly difficult, because it often reflects shifts in strategy, operations, or business model that strongly relate with uncertainty and that stretch well beyond the boundaries of would-be entrants. It is thus necessary for international firms to consider diverse contingencies that differ in resource capability commitment, risk exposure, and the amount of control over entry processes and outcomes.

In accordance with the trend of technology revolution, we conduct this study by using data of technology-related multinational enterprises (MNEs) in Taiwan as it is considered a rapid emerging country in the Asia market. Technology-related MNEs refer to those in the manufacturing and service industries that use technology to support their operations. According to Dahms (2017), Taiwan is an emerging market with a long history and an open economy. As a consequence, the study was conducted by using data of foreign-owned Taiwanese subsidiaries. Kao and Chen (2020) define Taiwan as an ideal environment to analyze R&D activities of technology-related IPO firms in emerging markets. Yang et al. (2021) also see Taiwan as an export-oriented island, and its industrial structure focuses on the development of high-tech industries at present. For those reasons, we choose Taiwanese technology firms as our data sample as there has been a growing amount of technology-based firms operating in many different industries. Technology is a very important tool for firms to optimize their operations. However, research on technology-based firms going abroad seems to be scarce. Thus, we take that as the main motivation to conduct our research.

The remaining parts of this paper are organized as follows. Second 2 provides the literature review, which mainly discusses the relation between entry timing strategy and the advantages and disadvantages of early and late movers. It also illustrates the overall framework and research hypotheses with five aspects of game theory in the internationalization game. Section 3 describes the study's data and analysis method. Section 4 shows the empirical results. Section 5 provides discussions, and the last section summarizes the findings, offers research implications and contributions, points out the study's limitations, and gives future research suggestions.

Literature review and hypotheses' development

The option for internationalization is a hot issue for many firms and organizations worldwide. Consequently, the foreign entry decision is an important strategy that can later have a great influence on a firm's success or survival. Numerous studies have implied that choosing entry timing has critical implications that would affect a firm's performance after penetrating a new market (Isobe et al., 2000; Luo & Peng, 1998; Mascarenhas, 1992; Mascarenhas, 1997; Pan et al., 1999). In an effort to understand how international firms process their internationalization, concerns come under three circumstances: where, when, and how to internationalize. Many researchers have responded to these concerns in a diverse way, but few have concentrated on exploring the relationships among them.

There is a research gap in the literature for offering a view on how a firm's decision over foreign entry would affect other competitors' moves, as well as how the host country's environmental characteristics could influence the entry strategy when considering possible gains and losses. For this reason, the present study offers theoretical and political contributions to fill this gap by examining the factors influencing firms' decisions to enter a foreign market as they relate to game theory.

"When a man takes a decision on any matter whatever, he tacitly or unconsciously takes into account a great range of circumstances which are all relevant, in the sense that if any one of them were materially different his decision might be different", states Shackle (1946). The same thing happens when applying game theory from the economic viewpoint. A firm's decision to internationalize can be influenced by different factors, which include internal and external factors (Dunning, 1980), firm-specific advantages (Chang, 1995; Dunning, 1980), and firms' experience. However, if we see those factors of a firm as resources for a player in game theory, then the other part of the internationalized decision should consider the potential investment risks and benefits, which might consist of uncertainty in the host country, the hostage effect, and pay-off structure. They are all relevant and somehow have causal relationships. Mainly focusing on five aspects of game theory in the internationalization game, we conduct the research framework as below.

Resource of players

Scholars in most previous studies assume that a larger international corporation has a greater intention to make an earlier investment in a foreign market compared with smaller firms. A greater resource base could increase firms' ability to handle the disadvantages and unexpected problems that appear in foreign markets and to act more appropriately under uncertainty. In a study of the eclectic paradigm of international production, Dunning (1988) argues that larger firms have more opportunities to achieve economies of scale and scope and thus have greater tendency to integrate their business domestically or globally.

Lieberman and Montgomery (1998) find that large companies have the capability to act preemptively to create barriers for later entrants when accessing resources such as local customers and suppliers. Large companies are believed to have more resources to properly re-act under uncertainty than smaller rivals in foreign markets. Lee *et al.* (2019) note that firm size positively affects the correlation with internationalization. As bigger size firms have a better chance to lower the barriers of liabilities of foreignness and liabilities of outsider, they prefer to invest earlier to catch the opportunities from being the first mover. As a result, we assume that firms tend to invest earlier in a foreign market if they are bigger in scale. Thus, we propose a hypothesis as follows.

Hypothesis 1: *Players' resources influence a firm's entry timing decision. Larger size firms tend to invest earlier in the foreign market.*

Player experience in a repeating game

Experienced firms typically have more knowledge and hence can operate differently compared to novice firms. Consequently, experienced MNEs have a larger variety of choices compared to inexperienced firms. The former have more experience, more human resources, more knowledge, broader networks of foreign operations, better access to distribution channels, and greater advantages over newcomers. Freeman and Hannan (1989) propose that older firms seem to have the capability to reduce the probability of demise for those firms that survive the "liability of newness" stage. Barnett and Amburgey (1990) and Baum and Mezias (1992) agree after firms survive the initial turbulent period that they achieve long-term benefits and diminish their risk of failure.

Firms with international experience facilitate knowledge accumulation, yet with little understanding about specific local markets, they are still more able to set up new operations on their own. Conversely, firms with experience in specific countries may have benefits for assessing alternative potential partners and support mutually beneficial (mutual-max outcomes) and sustainable joint ventures via

building relationships. Experienced player tends to invest earlier, leading to the next hypothesis.

Hypothesis 2: *Player experience in a repeating game influences a firm's entry timing decision. Firms with more experiences tend to invest earlier in the foreign market.*

Operational experience

The importance of experience has been mentioned in several foreign direct investment (FDI) studies. Weinstein (1977) finds that advertising agencies in the United States develop in size and overseas experience. These firms' investments switch from markets in which they are more accustomed to, such as Canada and Europe, to more unfamiliar markets like Latin America and Far East countries.

Ball and Tschoegl (1982) and Terpstra and Yu (1988) show that general operation experience has a significant impact on the foreign investment activities of banks and advertising agencies. The operational experience of firms gains from operating a business in a particular country. Firms that have more operational experience could boost their confidence in the decision-making process, especially when choosing entry timing in foreign markets. Hence, we propose the next hypothesis.

Hypothesis 2a: *Firms with more operational experience tend to invest earlier in the foreign market.*

International experience

International experience is gained from operating in an international environment without reference to any specific countries (Yu, 1991). Davidson (1980) argues that once international experience starts to increase, firms gain confidence in their capability to gauge customer needs, estimate costs and returns, and assess the true economic growth of foreign markets. Hilmersson (2013) concludes that a firm's international experiences strongly and positively relate to its experience at operating in business networks when opening a new business. Older multinational firms and larger multinational firms are expected to exhibit stronger structural inertia in foreign investment as well, because they have more international experience (Xu et al., 2018). As a consequence, when making the FDI decision, firms with more international experience can take into account the concern of uncertainty in the early stage of international expansion and figure out and maximize the economic opportunity by being the early entrant. Hollender et al. (2017) argue that international experience assists firms using entry strategies in overcoming a lack of foreign market knowledge as well as sensitivity to external problems in foreign markets. As a result of overcoming these limitations, performance increases.

We expect that the factors of both operational and international experiences have a strong relationship to the entry timing strategy of firms. Thus, we propose another hypothesis.

Hypothesis 2b: *Firms with more international experience tend to invest earlier in the foreign market.*

Uncertainty of the host country

Uncertainty is defined to be indecision or doubt in the decision-making process. Uncertainty is inherent when a company wants to make decisions since nobody can be sure about the future or the stability of the economic environment. Xu et al. (2018) find entry mode to be dependent on the changing levels of uncertainty when a making decision over foreign expansion. Uncertainty avoidance refers to people's ability to tolerate risk and uncertainty in their lives. People in societies who have higher uncertainty avoidance create institutions that might decrease risk and ensure financial security. Firms tend to concentrate on stable careers and release regulations to control actions and reduce ambiguity as much as possible.

This study chooses several factors to represent uncertainty in a host country, such as inflation rate, changes in the interest rate, and exchange rate fluctuation, which represent economic uncertainty, and other indicators like the legal rights index (the strength of legal rights index) and corruption perception index (CPI), which show the level of government inefficiency. According to Kouznetsov et al. (2014), smaller manufacturing enterprises seem to be more sensitive to the political environment of the host country. More specifically, it is said that corruption and ineffective law enforcement are the core factors of significant concern to small- to medium-sized manufacturing enterprises when making decisions.

Hypothesis 3: *Uncertainty in the host country influences a firm's entry timing decision.*

Economic uncertainty

Economic uncertainty indicates that an economy's outlook is somehow unpredictable. It is normally believed to show prospects of negative economic events, which are bad signals especially in an unstable economy. A host country's economy exhibiting more uncertainty might cause shocks to both the supply side and demand side and make the financial system become unstable, which has a further direct effect on foreign direct investment firms (e.g., changes in oil prices or commodity prices cause an increase or decrease in production cost). This could lead to cost-push inflation. A supply-side shock can further lead to stagflation – a combination of lower economic growth and higher inflation. This supply shock is difficult to deal with since a central bank does not have the capability to cope with inflation and lower growth by changing interest rates, because interest rates either target higher growth or lower inflation, but not both at the same time (Canh et al., 2020). Nguyen et al. (2017) and Lu et al. (2021) argue that FDI outflows decrease when investing firms find that host countries are institutionally unstable.

A large number of previous researchers has used micro-data to investigate how measures of economic uncertainty relate to business activity. They find that increases in economic uncertainty are associated with prolonged declines in business activity. Thus, foreign firms might wait for an uncertain event to be resolved or diminish until they make investment decisions. There are many indicators of economic uncertainty, such as a higher inflation rate, full-blown recession (negative economic growth), rapid devaluation of the currency, major changes in government borrowings or in the economic structure, etc. In this paper we decide on three indicators to represent a host country's economic uncertainty: inflation rate, exchange rate fluctuation, and a change in the interest rate. Our next hypothesis thus arises.

Hypothesis 3a: *Firms tend to invest later in a host country that has higher economic uncertainty*.

Government inefficiency

Market efficiency does not mean that there is no uncertainty about the future. It is a simplification of a world that may not always be right. In addition, the market is more or less efficient for investment purposes for most individuals. However, if the target foreign market seems to be inefficient at a certain time, then difficulty arises for managers who are considering whether or not to enter.

A host country with a higher level of government inefficiency can indicate higher market uncertainty, and thus it is obviously not a good choice to invest in for international firms. Different countries possibly have different control levels of government inefficiency. To study how international firms make their decisions on choosing entry timing and why they have such different investment strategies in different countries, we consider two indicators that reflect the efficiency of a government: legal rights index and CPI.

The finding of Bayraktar (2013) supports that with an increase in the legal rights index, FDI inflows in the country also strongly increase. From another study by Fisman and Gatti (2002), their empirical finding suggests that fiscal decentralization in government spending is associated with lower government corruption.

Luu et al. (2019) find that corruption level in a country highly impacts the FDI inflow of that country. A country with a high corruption level will be a huge barrier for investors to enter, and it might severely decrease the economy's quality. Hence, firms will hesitate to invest to that country. Brunetti et al. (1998) provide evidence of the link between economic growth and corruption level. Many empirical studies also agree that the effects of CPI tend to reverberate throughout an economy rather than affect only individual corruption-based transactions. Based on that, a country with a low score for the strength of legal right index and a high level of CPI might be considered to be a bad destination for investment, because of an unsupportive lending policy and unclear government work. International firms might run into trouble or need to spend more under-the-table fees in order to set up and run their new business in those countries. Thus, firms might place greater concern on how efficient the host country's government is when making an entry decision, especially for a first investment.

Hypothesis 3b: *Firms tend to invest later in a host country that has a higher level of government inefficiency.*

Payoff

Any game creates different interesting outputs. After a game is played, the actions can create values, payoffs, and other variables. Such actions and payoffs are helpful to develop microeconomic models. Micro-economists are interested in understanding who is playing what game and for what benefits is the game played. The actions and payoffs are sometimes used on the development of models. Most actions and payoffs are useful for decision theory. Such decisions, actions, and payoffs are graphically presented, whereby geographical actions depict the turns that the players take. They are very useful for prohibiting certain risky behaviors, illegal transactions, market failure, etc.

Game theory could be a new way to adjust whether a firm wants to make an entry decision when considering between the possible gained outcome and the possible risk. This study hence tries to expand the previous literature of firms' entry timing decision by examining the effect of the game theory approach. Lukas and Welling (2014) and Sarkar (2000) show in a numerical example that the impact of uncertainty on the probability to invest in a pre-specified time can cause ambiguity by correcting the usual indications in the extent literature, whereby the risk-adjusted return on a project is invariant to the volatility of an investment's returns. Ambos et al. (2019) argue that the expected return on investment relates to the decision making process when firms want to invest in foreign countries.

Gallego et al. (2009) assume that two factors set up a firm's internationalization process: the evaluated potential profit (or return on a project) from the foreign markets and the degree of commitment that a firm is prepared to make throughout its internationalization campaign. Nonetheless, these decisions can be enclosed by the same specifications about the risk that the firm is prepared to assume. Thus, it is logical that a firm would be prepared to take greater risks when predicting higher potential profits, and that the commitment the firm has to make will also be higher.

Hypothesis 4: *The payoff structure influences the firm's entry timing decision. Firms tend to invest earlier in a host country that offers a higher expected return on a project.*

Hostage effect

Spending money to make money is a basic approach in every business activity. However, in the investment process, many difficulties and unexpected situations are likely to appear and challenge managers. For foreign investments, almost every firm has to face barriers to entry that continuously play an important role in forming the competition space in markets. Aside from earlier entrants, a host country's uncertainty, and local competitors, sunk costs are also considered as barriers to entry in earlier research (Wright & Zhu 2018; Yi & Wang 2012). In the game theory approach, sunk costs are a structural barrier that relates more to fundamental conditions such as production cost or technology production cost. From the perspective of manufacturing firms, besides obtaining advantages, being a first-mover might lead to a higher sunk cost of operating new facilities overseas, which is associated with having a higher hostage risk and spending a larger amount of money to being held up. Hence, more sunk costs mean higher barriers for firms to enter new markets. As a result, manufacturing firms might consider taking the later-entry strategy. As for service firms, due to their particular characteristics of providing intangible products and services, sunk costs seem to be less than manufacturing firms. Therefore, we propose that manufacturing firms are more likely to become late entrants so as to avoid the hostage effect as the next hypothesis states.

Hypothesis 5: *The hostage effect influences the firm's entry timing decision. Firms tend to invest later in a host country that has to invest a higher sunk cost on a project.*

In this research we test the relationship and the impacts of players' resources, host country uncertainties, investment payoff, and hostage effect on the choice of investment entry timing into foreign countries. First, we expect larger size firms to invest earlier in the foreign market. Based on some theoretical background, we hence assume firms that obtained more operational and international experiences tend to have earlier international investment. Moreover, we hypothesize that firms generally invest later in a host country that has higher economic uncertainty, a higher level of government inefficiency, or higher invested sunk cost and invest earlier in a host country that offers a higher expected return on a project. Consequently, we propose our conceptual framework as below (please see Figure 1).

Research methodology

Data and methodology

To test our models, the dataset needs to have a large variation across subsidiary locations and show diversity in terms of firm size and experience. Thus, our study's samples have a wide range of experience, have invested in 31 countries around the world, and are Taiwanese firms operating in technology-based services and manufacturing industries. They are all listed on the Taiwan Stock Exchange (TSE) or the Over-The-Counter (OTC) stock exchange market. Financial data and information, such as firm size, firm type, experience indicators, investment ownership, and time to first investment, are from the Taiwan Economic Journal (TEJ) database. Uncertainty of the host country, which includes changes in interest rate and inflation rate, exchange rate fluctuation, legal rights index, and CPI, are from the World Bank database website. Expected return on a project measured by Gross Domestic Productivity (GDP) annual growth is from the World Bank database website. To check for reliability we triangulate the data with that from the Organization for Economic Co-operation and Development (OECD) and Trading Economics website (tradingeconomics.com).

After removing firms that do not have any foreign investments, firms that do not engage in technology usage, purely manufacturing firms, and purely service firms and excluding all unclear data of the first investment nation or other missing values, the dataset comprises a total of 979 firms that made their first foreign investment from 1988 to 2017. We look to obtain the latest financial data for this study, and based on availability the final dataset collected is for the year 2017. There is a shortage of interest rate information for some countries in 2017, and so we could only collect a full dataset for the change in interest rate between 2015 and 2016.

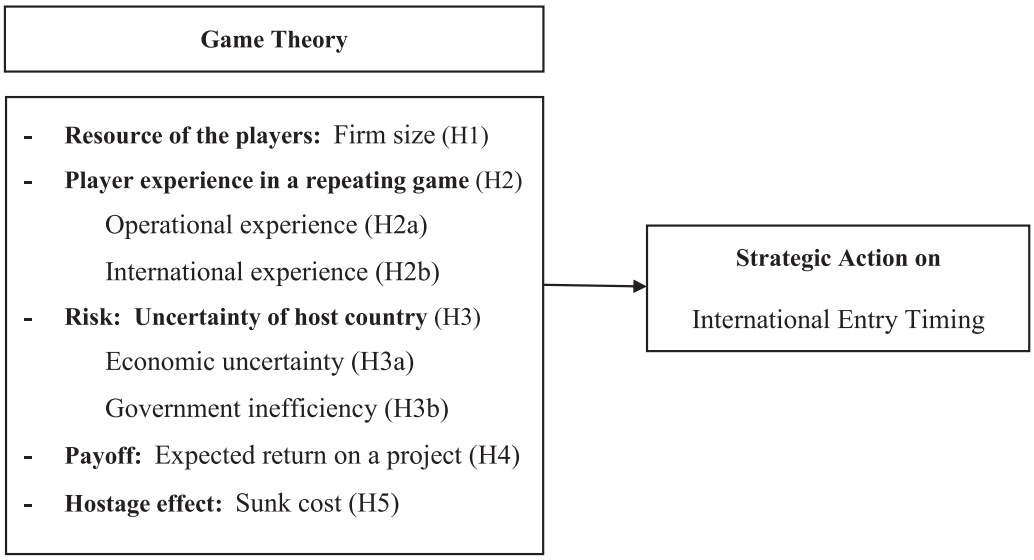

Figure 1. Research framework.

With the purpose of analyzing the effect of a firm's factors and other determinants of game theory to the entry timing decision, we apply linear regression analysis. The reason for doing so is it seems to be a strong method for determining the relationship between predictors and the time-to-event. SPSS software is used to run the analysis.

Measurements

The entry timing in this study focuses on the time that a Taiwanese company made its first investment in a foreign market. As a result, we measure the entry timing by using the difference between the first year of investment and the recent year; for example, if the firm made its first foreign investment in 1993, then we code the entry timing as 24 (2017-1993). A higher value of entry time means the firm invested earlier in a foreign market.

Resources of players

Firm size: Numerous measurements can determine firm size. Kimura (1989) uses domestic market sales, while Cho (1986) takes the value of sales volume, equity, and deposits. Other researchers employ total capital in their research (Aron, 1988; Wakelin, 1998; Fuentelsaz et al., 2002). Yu and Ito (1988) apply the number of employees as a parameter to determine firm size. Based on the availability of the data source, we choose total capital as a measure of firm size. In order to avoid an imbalance between variables when running the regression test, in which an extremely large value variable might lead other small value variables to become non-significant, we transform the value of total capital into a natural logarithm.

Player experience in a repeating game

We separate firm experience into two categories: one is operational experience as measured by firm age, and the other is international experience as measured by the number of long-term foreign investments.

Operational experience: Quite a few previous researchers have used listing age as a superior measure of firm experience (Fama and French, 2001; Pastor and Veronesi, 2003; Shumway, 2001). However, we select established age instead for this study. Firm age is calculated using the difference between study year (2017) and the year a firm was established.

International experience: Measured by the number of long-term foreign investments, this indicator is calculated by the number of investments that a firm made in a foreign market for at least a one-year period. If an investment was continuously invested by the firm through a series of years, then it is still counted as 1. Thus, the value here is the number of different subsidiaries or investment projects of the firm. Based on data availability of the TEJ database, we collect the number of long-term foreign investments during the period 1988-2017.

Risk-uncertainty of the host country

We separate uncertainty of the host country into two categories: the first category is economic uncertainty as measured by the three indicators of inflation rate, exchange rate fluctuation risk, and the change in interest rate; the second category is government inefficiency as presented by the legal rights index and CPI.

Economic uncertainty. Inflation rate of the host country: Inflation is a general increase in the consumer price index. It is measured by a weighted average of prices for different merchandise. There has been a remarkable amount of research interested in how inflation could affect economic performance. The old structuralist Phillips curve takes the view that inflation (at least up to a point in some cases) is good for economic growth, but this has been replaced by the belief that higher inflation hinders economic growth, with empirical support found in some studies like Burdekin et al. (1995) and Fisher (1993). As a consequence, higher inflation decreases the information content of price signals and increases economic uncertainty; foreign managers might thus more seriously consider it when making a decision to enter any market. Annual inflation is the change in consumer pricing index compared to the same month of the previous year. Thus, the inflation rate is counted by a percentage term. We obtain the inflation rates of host countries in 2017 for this study.

Exchange rate fluctuation risk: Ahn et al. (1998) and Campa (1993) note that avoiding exchange rate overvaluation positively affects direct investment inflows. Baek and Kwok (2002) and Marinakis and White (2022) employ foreign exchange rates as a variable in their empirical study. Empirical studies on exchange rates and direct investment flows do not present a consistent theoretical picture. In general, inflation itself negatively affects direct investment inflows. Thus, a higher exchange rate fluctuation risk of the host country might lead to a lower tendency of foreign firms to enter, because it increases economic environment uncertainty and might force them to bear higher investment risk. For exchange rate fluctuation, we take the percentage change between the exchange rate in 2016 and the exchange rate in 2017 of each host country. The variable is

positive if the exchange rate in 2017 is higher and negative if the exchange rate in 2017 is lower.

Change in interest rate: Interest rate typically denotes the cost of borrowing money. As with any good or service in a free market economy, price eventually comes down to appropriately satisfy supply and demand. In the case of weak demand, the interest from borrowing money will be less to part with the lenders' cash; otherwise, they are able to boost the fee on the money borrowed, which is known as the interest rate. Demand for financing, which fluctuates with the business cycle and supply, also changes when economic conditions are unstable. Those changes in demand and supply are the main reason leading up to a change in interest rate, which directly affects domestic businesses and significantly impacts the investment of international firms. Shackle (1946) proves that changes in interest rate powerfully influence the pace of enterprises' investments. The paper concludes that a fall in the interest rate, not counteracted by any other simultaneous change, is expected to increase the pace of gross investment in the system as a whole. Therefore, the change in interest rate is an important factor and will be tested in this model in order to see how it influences the foreign investment decision of an international firm. We measure it by the percentage change between the interest rates in 2015 and 2016.

Government inefficiency. Legal rights index: It is measured by the degree to which the rights of borrowers and lenders are protected by collateral and bankruptcy laws, thus making lending easier. The index is from the World Bank database website. Originally, the index ranges from 0 to 12; a higher score means these laws are better designed to expand access to credit. To make the index more clearly reflect government inefficiency, in this study we recode the index upside down, so that a higher score of the legal rights index indicates a greater inefficiency level of the host country government.

CPI: An index published every year by Transparency International since 1995 in which countries are ranked "by their perceived levels of public sector corruption, as determined by expert assessments and opinion surveys'". We also obtain CPI from the World Bank database website. CPI scores denote how corrupt countries' governments are believed to be. The index originally ranges from 0 to 100; a higher score means the government is cleaner and has less corruption. We recode the index, and as a result a higher CPI score reflects a greater inefficiency level of the host country government.

Payoff

Payoff is represented by the expected return of an investment, calculated by the rate of return for a given investment. It considers the situation of a firm's investment abroad by game theory. This study takes the annual growth rate of the host country's GDP to determine how healthy the target market is.

Sunk cost

We assume that a manufacturing firm normally needs to spend a larger fixed cost to set up new facilities overseas compared to a service firm. The sunk costs of this for a manufacturing firm are higher than for service subsidiaries. Based on that, we separate the main data into two parts, using the code of 1 if it is a manufacturing firm and 0 if it is a service firm. Hence, a higher value represents the firm is bearing a higher sunk cost.

Control variables

With the aim of studying the impact of a firm's internal factors and external factors on entry timing, we use a control variable by firm ownership of its foreign subsidiary, because prior research has suggested that the ownership of a venture may relate to its internationalization. We further recode the subsidiary's ownership to 0 if a firm holds less than 95% (joint venture - JV) and recode it to 1 if a firm holds more than 95% (wholly owned - WO).

Table 1
Sample characteristics.

Total sample: 979		Samples	%
Industry type Entry timing	Manufacturing	844	86.21
	Service	135	13.79
	1988-1997	213	21.76
	1998-2007	570	58.22
	2008-2017	196	20.02
Age (years)	1-20	307	31.36
	21-40	544	55.57
	> 40	128	13.07

Empirical results

We have 979 firms with full information on their first investment. Table 1 below presents the sample characteristics. Within the sample of 979 firms taken for analysis, 844 are in the manufacturing industry, accounting for 86.21% of the total sample size; the other 135 firms are in the service industry. Older firms that have operated businesses over 40 years account for 13.07% of the total sample size, while young and new start-up firms less than 20 years old take up 31.36%. The highest weight is for firms in the range from 21 to 40 years old, covering 55.57%.

Also from Table 1, we see that the entry timing of a firm is similar to a firm's age characteristic. While most firms have their first entry timing in the middle range from 1998 to 2007, the smallest percentage is taken by the group of new entrant firms – those firms that just started their first foreign investment from 2008 to 2017.

Table 2 shows the means, standard deviations (Std. D.) and correlation matrix for the analyzed variables. The dependent variable of first entry timing significantly correlates at R-square = 0.552 ($p < 0.01$). We include it in the separate regression model.

Table 3 shows the regression analysis results. The most important result can be seen in model 8, which represents the result of the whole testing model. In model 8, the players' resources gives a significantly positive result ($\beta = 1.076$, $p < 0.001$), which clearly supports Hypothesis 1 in that larger size firms tend to invest earlier in the foreign market. Player experience in a repeating game also has the same direction as the prediction, with significantly positive results for both the operational experience factor ($\beta = .283$, $p < 0.001$) and international experience factor ($\beta = .117$, $p < 0.001$), showing that firms with more experiences tend to invest earlier in the foreign market. This supports Hypothesis 2.

Uncertainty of host country indicators shows a better result compared with models 4 and 5, in which exchange rate fluctuation and change in interest rate both have a negative relationship at the higher respective significance levels of $p < 0.01$ and $p < 0.005$, but inflation rate has a significantly positive correlation. Therefore, Hypothesis 3a is partially supported. The results are also supported by negatively and highly significant ($p < 0.001$) correlations in both indicators of government inefficiency indices, hence supporting Hypothesis 3b.

The payoff structure is on the right path when the expected return of a project is found to be positive and significant in this model ($\beta = .543$, $p < 0.001$), thus supporting Hypothesis 4. Hostage effects change the direction with the results in Model 7 from positive relationship to negative relationship. Even though the results in the full model show that hostage effects have the same direction with our prediction that manufacturing firms with higher sunk costs tend to invest in the later stage ($\beta = -0.003$), it seems to not have a relationship with entry timing due to no significant result, and so Hypothesis 5 is not supported. The overall model is strong as it has the value R-squared = 0.552, and most parts of model 8 give supportive results as expected.

We also conduct robustness tests by checking the regression result for each hypothesis. The results can be seen from model 2 to

Table 2
Matrix of means, standard deviations, and correlations.

	Mean	Std. D.	1	2	3	4	5	6	7	8	9	10	11	12
1. International entry timing	14.970	6.083	1											
2. Ownership (WO/JV)	0.851	3.043	-.093**	1										
3. Firm size	20.874	1.043	.439**	-0.022	1									
4. Operational experience	27.433	11.433	.642**	-.075*	.252**	1								
5.International experience	7.427	9.106	.421**	-0.034	.475**	.239**	1							
6. Inflation rate	1.961	0.765	.079*	-0.047	0.012	0.057	-0.014	1						
7. Exchange rate fluctuation	-0.388	2.337	0.032	0.043	.088**	0.026	0.041	.157**	1					
8. Interest rate change	30.700	68.603	-0.039	-.079*	-.105**	0.009	-.128**	-0.054	-.187**	1				
9. Legal rights index	4.050	2.111	-0.062	0.051	-0.050	0.051	-0.047	0.028	.077*	-.269**	1			
10. CPI	31.796	16.432	-.192**	-0.012	-.184**	-0.035	-.114**	0.019	-.179**	-.103**	0.029	1		
11. Expected return on a project	2.727	1.197	0.027	-0.050	-.070*	.157**	-0.039	0.007	.100**	.105**	.339**	.485**	1	
12. Sunk cost	0.861	0.346	0.037	0.017	.074*	0.039	0.036	.065*	-0.060	-0.057	-0.034	.078*	-0.034	1

Significance levels: *p < 0.01, **p < 0.005, and ***p < 0.001. (2-tailed). N = 979.

model 7 in Table 3, except for model 1, which is for testing the control variable of firm ownership. Model 2 tests the correlation between the players' resources, represented by the natural logarithm of total capital, and entry timing. Model 3 tests the importance of firm experience when making the entry timing decision. Model 4 tests the effect of uncertainty of the host country on entry timing strategy. We add firm experience together with uncertainty of the host country to test Model 5, and the result in this model is better compared to model 4. Models 6 and 7 respectively test for payoff structure and hostage effect.

The results in model 2 and model 3 are specifically similar to those in model 8. The results in model 4, model 5, and model 6 are more significant that in the overall model of model 8. Thus Hypothesis 1, Hypothesis 2, Hypothesis 3, and Hypothesis 4 are all strongly supported. Hypothesis 5 is not supported, as the hostage effect has no significant results in both models 7 and 8. Overall, most of the testing models have the same result direction with model 8, showing that our final result is robust.

Discussions

This research examines the determinant of the entry timing of Taiwanese listed firms into new markets from the perspective of game theory. The original idea proposes that entry-timing decisions are affected by five factors from the view of game theory: resources of the players, player experience in a repeating game, uncertainty level of the host country, payoff effect, and hostage effect. All the results from the analysis part show a highly significant level, and most of them give the same direction as with our prediction.

We have predicted that bigger size firms in terms of total capital are likely to make their first investment earlier into foreign markets. The supporting results strengthen previous findings of other scholars

Table 3
Regression results of independent factors and entry timing.

Variable Dependent variable	Model 1 First entry timing	Model 2 First entry timing	Model 3 First entry timing	Model 4 First entry timing	Model 5 First entry timing	Model 6 First entry timing	Model 7 First entry timing	Model 8 First entry timing
Constant	15.129*** (.201)	-38.098*** (3.493)	5.298*** (.369)	17.405*** (.762)	7.455*** (.636)	14.814*** (.488)	14.540*** (.522)	-14.739*** (3.088)
Control variable								
Ownership (WO/JV)	-.186** (.064)	-.168** (.057)	-.081+ (.046)	-.188** (.062)	-.078+ (.045)	-.184** (.064)	-.188** (.064)	-.069 (.044)
Resources of the players								
Firm size [a]		2.549*** (.167)						1.076*** (.148)
Player experience in a repeating game								
Operation experience			.304*** (.013)		.306*** (.012)			.283*** (.012)
International experience			.189*** (.016)		.170*** (.016)			.117*** (.017)
Uncertainty of host country								
Economic uncertainty:								
Inflation rate				.634+ (.251)	.441+ (.180)			.472* (.175)
Exchange rate fluctuation				-.063 (.085)	-.084 (.061)			-.164* (.062)
Change in interest rate				-.008* (.003)	-.005+ (.002)			-.007** (.002)
Government inefficiency:								
Legal rights				-.216+ (.093)	-.250*** (.067)			-.339*** (.073)
CPI				-.076*** (.012)	-.057*** (.009)			-.070*** (.010)
Payoff								
Expected return on a project						.115 (.162)		.543*** (.152)
Hostage effect								
Sunk cost (M/S)							.686 (.560)	-.003 (.384)
Model indices								
F-value	8.573	121.719	311.485	10.717	131.696	4.534	5.038	108.218
R-square	.009	.200	.489	.062	.521	.009	.010	.552
Adjust R-square	.008	.198	.488	.056	.517	.007	.008	.547
Sig.	.003	.000	.000	.000	.000	.011	.007	.000

Significance levels: +p < 0.1, *p < 0.01, **p < 0.005, and ***p < 0.001. (2-tailed). a Natural logarithm.

Table 4
Foreign investment strategy by considering five aspects of game theory.

		Bigger sized player	More		Higher uncertainty		Higher payoff	Higher hostage effect
			Operation experience	International experience	Higher Economic uncertainty	Higher Government inefficiency		
Smaller sized player		Bigger sized player tends to invest in foreign country earlier	Smaller sized and more experienced player tends to invest in foreign country earlier		Smaller sized player that tends to invest later in the foreign country has a higher level of uncertainty		Smaller sized player that tends to invest earlier in the foreign country a higher payoff	Smaller sized player tends to invest later if it faces higher hostage of the investment
Lack of	**Operation experience International experience**	Bigger sized and lack of experience player tends to invest in foreign country later	More experienced player tends to invest in foreign country earlier		Lack of experience player that tends to invest later in the foreign country has a higher level of uncertainty		Lack of experience player tends to invest either earlier or later in the foreign country has a higher payoff	Lack of experience player tends to invest later if it faces higher hostage of the investment
Lower uncertainty	**Lower Economic uncertainty Lower Government inefficiency**	Bigger sized player that invests either earlier or later in the foreign country has a lower level of uncertainty	More experienced player that tends to invest earlier in the foreign country has a lower level of uncertainty		MNEs that tend to invest later in the foreign country have higher uncertainty		MNEs that tend to invest earlier in the foreign country have lower level of uncertainty and higher payoff	MNEs that tend to invest either earlier or later in the foreign country have lower level of uncertainty and face higher hostage effect
Lower payoff		Bigger sized player that tends to invest later in the foreign country has a lower payoff	More experienced player that tends to invest either earlier or later in the foreign country has a lower payoff		MNEs that tend to invest later in the foreign country have higher uncertainty and lower payoff		MNEs that tend to invest earlier in the foreign country have higher payoff	MNEs that tend to invest later in the foreign country have lower payoff and face higher hostage effect
Lower hostage effect		Bigger sized player tends to invest later if it faces lower hostage of the investment	More experienced player tends to invest earlier if it faces lower hostage of the investment		MNEs that tend to invest either earlier or later in the foreign country have higher uncertainty and face lower hostage of the investment		MNEs that tend to invest earlier in the foreign country have higher payoff and face lower hostage effect	MNEs tend to invest later in the foreign country if they face higher hostage effect

that bigger size firms have higher resource ability to set up a foreign business at an earlier stage and have a tendency to choose to expand their brand as well as market by opening new foreign subsidiaries.

The main result of the second criterion shows that firms with more operational experience and international experience are likely to invest in foreign markets earlier. This is understandable, because, first, firms with more experience at running a business and at investing will have more knowledge and ability to handle unexpected events that new entrants usually encounter. Second, a lack of experienced players means a higher chance of being cheated in the game by foreign competitors or even business partners. With no experience in new markets, firms might suffer a loss and even divest. The situation changes for experienced players; after a long time staying and getting familiar in the game, experienced firms have higher preservation to competitors' frauds, and their partners also realize that they can get more profit by cooperating and keeping business promises to each other, but not by cheating. Hence, experienced players will take a chance at earlier entry to maximize the first-mover advantages and create barriers for late entrants. This result confirms our prediction that firm size and factors concerning experience are very important in foreign investment strategies.

Uncertainty represents the risk level of the host country, as economic uncertainty and government inefficiency level both show significant results and confirm that they have a strong relationship with entry timing decisions. The results also reveal no matter in an emerging or a developed country, or with or without tax incentive support by the host country government that firms still have a higher tendency to invest later in a host country that has a higher uncertainty level. This finding is consistent with earlier researchers who note that firms tend to take a chance at facilitating a new foreign subsidiary earlier in a host country that has a more stable economy and cleaner government. The same situation happens from the perspective of game theory; players will likely not join a game that they find to have plenty of risk and would be not fair. In the round of collecting data, we find among the 31 countries in this study that most developed countries have lower economic uncertainty and a lower level of government inefficiency.

In spite of decreasing the value of money, keeping a high inflation rate and interest rate might help push domestic purchasing power and support exporting domestic products. Thus, emerging countries also need to balance these factors in order to attract foreign direct investment (FDI). The results are clearer when we test with factors relating to experience. They strengthen the assumption that experienced players are obviously smarter investors, have a more straightforward investment strategy, and are strong in the decision-making process compared to players that lack experience.

In any game, the payoff structure is very important. A payoff structure reflects how great or little is the possibility that the player can earn a profit from the game. In fact, firms do not want to play a game if they cannot earn anything or only can earn a little bit after spending a huge amount of investment resources. It is hence reasonable when the results show that firms tend to invest earlier in a host country with a higher payoff structure.

From the results of regression analysis, Table 4 below shows the complexity of an internationalization strategy under a mix of different aspects. Different players' actions are examined for different games. While the entry timing strategy is clear for most cases, firms might become more hesitant with their decision when investing in a host country with a higher payoff if they have less experience. The situation stays the same when international firms find the uncertainty level of a host country is appropriately low, but they might suffer a higher hostage effect for new investment. In most cases, experienced players are likely to take the chance to become the market pioneer to maximize first-mover advantages, except for the situation when firms find a low payoff in the target investment market.

Conclusions

Originality and value

This paper has presented the results of an empirical analysis by studying the impact of five aspects in terms of game theory on the foreign direct investment decisions of Taiwan's listed technology companies over the period 1988-2017. By using linear regression analysis with dynamic game theory perspectives, several important strategies appear. We show that all the proposed factors have significant impacts on firms' internationalization strategies. The challenge of this research is that there are not many materials and references for us to refer to when conducting this study. For the concept of putting the ideas of game theory into this research, the simplest method regression was chosen following many difficulties from testing the model, but our findings do confirm the expected results. As predicted, the evidence proves that every move of firms on choosing entry timing is based on the consequences of gaining information, considering the investment gain and loss, and balancing between uncertainty and payoff of the host country. The evidence supports that firms prefer to choose a game with which they are more familiar; e.g., invest in the foreign country that has more similarities with those countries that they have invested into before, or similar investing environment and regulations to the country of origin. Moreover, the results imply that firms have a higher ability to participate in games in which they are able to prevent unfair situations by reducing the amount of risk due to the likelihood of the hostage effect.

From the view of service managers, choosing to be the first mover could give their firms a better chance to strengthen customer relationships and increase the switching cost of the customers. A service firm with broader economies of scope is more confident of having the right product and greater chances of success when entering a market earlier.

Manufacturing firms are more likely, on the other hand, to invest later by hesitating about the sunk costs of operating new facilities overseas. The results of Hypothesis 5 do run in the opposite direction with our prediction. This could be explained in that when making investment decisions, firms might place more attention on the fixed costs of new operations and not sunk costs. We note that while all sunk costs are considered fixed costs, it is important to realize that not all fixed costs are considered sunk costs. Thus, to examine the difference in foreign investment strategy between manufacturing and service firms, it is more appropriate to look at fixed costs as a percentage of investment holdings.

This paper offers better knowledge and understanding about FDI entry timing under the consideration of new factors compared to past studies. When making any investments in a foreign country, it is immensely important for managers to consider when the appropriate time to enter the market is. The decision is affected by many different factors. This research contributes to the literature by helping firms decide more quickly and effectively as to whether to be an early entrant or a late entrant in a new "playground". The factors concerning the decision-making process – from game theory perspectives like player information and economic elements – help explain the influences and the results on a firm's choice for effective entry timing. Firms in different industries can take this as a reference for their business expansion in a foreign country. This paper gives a wider and more objective reference for firms to make their entry timing of foreign investment.

The novelty of this research is that we use quite a large sample size, which improves the representativeness of this paper. Moreover, we consider political and financial aspects like host country economic uncertainties and government inefficiency, which are not commonly used as variables in international business research. Furthermore, many previous studies about FDI mainly employ entry modes as dependent variables. In this research we take entry timing under the perspective of game theory, which is novel and interesting from the international business perspective.

Research limitations and implications

This study uses the sample of technology MNEs from the emerging market of Taiwan. In order to generalize the findings and obtain more practical applications, future studies might consider a broader sample size by examining a sample of cross-border countries to test the relationships among these five aspects of game theory and entry timing decisions. Other country risk indicators such as unemployment rate, total government public debt per GDP, etc. can also be used to test the model.

The strategy of choosing entry timing has been used for analyzing a firm's performance in many previous studies (e.g., Lo & Kletsova, 2018). This paper, however, investigates the effects of five aspects of game theory on the entry timing decision. Future research can be extended by concentrating on a firm's performance in relation to its strategy of entry timing. It would also be helpful to examine how different the performances are between manufacturing and service firms after taking dissimilar strategies of entry timing into account.

Appendix

Table A1

Table A1
Table of acronyms and abbreviations.

MNEs	Multinational Enterprises
R&D	Research and Development
IPO	Initial Public Offering
FDI	Foreign Direct Investment
Legal rights index	The strength of the legal rights index
CPI	Corruption Perception Index
TSE	Taiwan Stock Exchange
OTC	Over The Counter
TEJ	Taiwan Economic Journal
GDP	Gross Domestic Productivity
OECD	Organization for Economic Co-operation and Development
JV	Joint Venture
WO	Wholly Owned
WO/JV	Joint Venture / Wholly Owned
M/S	Manufacturing / Service (firm)

References

Ahn, Y. S., Adji, S. S., & Willett, T. D. (1998). The effects of inflation and exchange rate policies on direct investment to developing countries. *International Economic Journal*, *12*(1), 95–104.

Ambos, T. C., Cesinger, B., Eggers, F., & Kraus, S. (2019). How does de-globalization affect location decisions? A study of managerial perceptions of risk and return. *Global Strategy Journal*, *10*(1), 210–236.

Aron, D. J. (1988). Ability, moral hazard, firm size, and diversification. *The RAND Journal of Economics*, *19*(1), 72–87.

Baek, H. Y., & Kwok, C. C. (2002). Foreign exchange rates and the corporate choice of foreign entry mode. *International Review of Economics & Finance*, *11*(2), 207–227.

Bayraktar, N. (2013). Foreign direct investment and investment climate. *Procedia Economics and Finance*, *5*, 83–92.

Brunetti, A., Kisunko, G., & Weder, B. (1998). Credibility of rules and economic growth: Evidence from a worldwide survey of the private sector. *The World Bank Economic Review*, *12*(3), 353–384.

Burdekin, R. C., Salamun, S., & Willett, T. D. (1995). The high costs of monetary instability. *Establishing monetary stability in emerging market economies* (pp. 13–32).

Campa, J. M. (1993). Entry by foreign firms in the United States under exchange rate uncertainty. *The Review of Economics and Statistics*, *75*(4), 614–622.

Canh, N. P., Binh, N. T., Thanh, S. D., & Schinckus, C. (2020). Determinants of foreign direct investment inflows: The role of economic policy uncertainty. *International Economics*, *161*, 159–172.

Chang, S. J. (1995). International expansion strategy of Japanese firms: Capability building through sequential entry. *Academy of Management Journal*, *38*(2), 383–407.

Dahms, S. (2017). Determinants of foreign-owned subsidiary performance in emerging economies: Evidence from Taiwan. *Management Research Review*, *40*(6), 626–647.

De Groot, H., McMahon, W. W., & Volkwein, J. F. (1991). The cost structure of American research universities. *The Review of Economics and Statistics*, *73*(3), 424–431.

Dunning, J. H. (1980). Toward an eclectic theory of international production: Some empirical tests. *Journal of International Business Studies*, *11*(1), 9–31.

Dunning, J. H. (1988). The eclectic paradigm of international production: A restatement and some possible extensions. *Journal of International Business Studies*, *19*(1), 1–31.

Fischer, S. (1993). The role of macroeconomic factors in growth. *Journal of Monetary Economics*, *32*(3), 485–512.

Fisman, R., & Gatti, R. (2002). Decentralization and corruption: Evidence across countries. *Journal of Public Economics*, *83*(3), 325–345.

Fuentelsaz, L., Gomez, J., & Polo, Y. (2002). Followers' entry timing: Evidence from the Spanish banking sector after deregulation. *Strategic Management Journal*, *23*(3), 245–264.

Gallego, M. A., Hidalgo, E. R., Acedo, F. J., Casillas, J. C., & Moreno, A. M. (2009). The relationship between timing of entry into a foreign market, entry mode decision and market selection. *Time & Society*, *18*(2-3), 306–331.

Hilmersson, M. (2013). The effect of international experience on the degree of SME insidership in newly opened business networks. *Baltic Journal of Management*, *8*(4), 397–415.

Hollender, L., Zapkau, F. B., & Schwens, C. (2017). SME foreign market entry mode choice and foreign venture performance: The moderating effect of international experience and product adaptation. *International Business Review*, *26*(2), 250–263.

Isobe, T., Makino, S., & Montgomery, D. B. (2000). Resource commitment, entry timing, and market performance of foreign direct investments in emerging economies: The case of Japanese international joint ventures in China. *Academy of Management Journal*, *43*(3), 468–484.

Kao, L., & Chen, A. (2020). CEO characteristics and R&D expenditure of IPOs in emerging markets: Evidence from Taiwan. *Asia Pacific Management Review*, *25*(4), 189–197.

Kouznetsov, A., Dass, M., & Schmidt, P. (2014). Entry mode decisions. *Baltic Journal of Management*, *9*(3), 277–293.

Lee, S., Park, S. W., & Namgung, D. (2019). Internationalization and performance of SMEs in masan free trade zone (Korea): The direct and moderating effects of firm size. *Journal of Korea Trade*, *23*(4), 30–57.

Lieberman, M. B., & Montgomery, D. B. (1998). First-mover (dis) advantages: Retrospective and link with the resource-based view. *Strategic Management Journal*, *19*(12), 1111–1125.

Lo, F. Y., & Kletsova, A. (2018). Entry timing into international markets: Evidence from the Taiwanese service industry. *Economic Research- Ekonomska istraživanja*, *31*(1), 1059–1077.

Lu, Y., Wu, L., & Zeng, K. (2021). Economic policy uncertainty, bilateral investment treaties, and Chinese outward foreign direct investment. *Pacific Affairs*, *94*(3), 519–557.

Lukas, E., & Welling, A. (2014). On the investment–uncertainty relationship: A game theoretic real option approach. *Finance Research Letters*, *11*(1), 25–35.

Luo, Y., & Peng, M. W. (1998). First mover advantages in investing in transitional economies. *Thunderbird International Business Review*, *40*(2), 141–163.

Luu, H. N., Nguyen, N. M., Ho, H. H., & Nam, V. H. (2019). The effect of corruption on FDI and its modes of entry. *Journal of Financial Economic Policy*, *11*(2), 232–250.

Marinakis, Y. D., & White, R. (2022). Hyperinflation potential in commodity-currency trading systems: Implications for sustainable development. *Sustainable Technology and Entrepreneurship*, *1*,(1) 100003.

Markman, G. D., & Waldron, T. L. (2014). *Small entrants and large incumbents: A framework of micro entry: 28* (pp. 179–197). Academy of Management Perspectives.

Mascarenhas, B. (1992). Research notes and communications first-mover effects in multiple dynamic markets. *Strategic Management Journal*, *13*(3), 237–243.

Mascarenhas, B. (1997). The order and size of entry into international markets. *Journal of Business Venturing*, *12*(4), 287–299.

Nguyen, Q., Kim, T., & Papanastassiou, M. (2017). Policy uncertainty, derivatives use, and firm-level FDI. *Journal of International Business Studies*, *49*(1), 96–126.

Pan, Y., Li, S., & David, K. T. (1999). The impact of order and mode of market entry on profitability and market share. *Journal of International Business Studies*, *30*(1), 81–103.

Samuelson, L. (2002). Evolution and game theory. *Journal of Economic Perspectives*, *16*(2), 47–66.

Shackle, G. L. S. (1946). Interest-rates and the Pace of Investment. *The Economic Journal*, *56*(221), 1–17.

Wakelin, K. (1998). Innovation and export behaviour at the firm level. *Research Policy*, *26*, 829–841 7-8.

Weinstein, A. K. (1977). Foreign investments by service firms: the case of multinational advertising agencies. *Journal of International Business Studies*, *8*(1), 83–91.

Wright, J., & Zhu, B. (2018). Monopoly rents and foreign direct investment in fixed assets. *International Studies Quarterly*, *62*(2), 341–356.

Xu, G., Guo, B., Li, W., & Wang, X. (2018). Foreign sequential entry mode choice. *Baltic Journal of Management*, *13*(4), 544–563.

Yang, S. Y., Chen, S. C., Lee, L., & Liu, Y. S. (2021). Employee stress, job satisfaction, and job performance: A comparison between high-technology and traditional industry in Taiwan. *The Journal of Asian Finance, Economics and Business*, *8*(3), 605–618.

Yi, J., & Wang, C. (2012). The decision to export: Firm heterogeneity, sunk costs, and spatial concentration. *International Business Review*, *21*(5), 766–781.