

Austrian FDI in Asian economies: Does knowledge capital matter?

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Abstract

Purpose – While Austrian foreign direct investment (FDI) in Asian economies experiences a rising trend, the following question arises: Why does Austria invest more in certain economies over others? This study intends to assess the factors that drive Austrian investment in Asian economies.

Design/methodology/approach – Based on the ownership, location and internalization framework and the knowledge capital approach, this study hypothesizes that knowledge capital significantly attracts FDI from Austria. Meanwhile, this study applies the panel-corrected standard error method to analyze data for 11 Asian economies from 1990 to 2022.

Findings – After considering endogeneity, the results show a positive and significant correlation between expenditure in research and development per gross domestic product (GDP) in the host economies and FDI inflow from Austria. In addition, the study reveals that factors such as market size, trade openness and natural resources in the host economies significantly influence Austria's FDI, which indicates that Austrian investors fall into the three main FDI typologies: market-seeking, resources-seeking and efficiency-seeking.

Originality/value – This study fills the literature gap by becoming the first to analyze the determinants of Austrian FDI in Asian economies, thus enriching our understanding of Austria's global investment pattern.

Keywords Austria, Foreign direct investment, Knowledge capital, Panel data analysis, Asia

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1. Introduction

The Asian region has become the third greatest investment region in the Austrian foreign direct investment (FDI) after Europe and the America. Based on the data from the Austrian National Bank, on average, from 1990 to 2022, Austrian investors have invested in the European region up to 80,625 million EUR, while the value reached more than 8,900 million EUR in America and 5,705 million EUR in Asia. Although Austrian investors are heavily

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invested in neighboring countries in Europe, their investment in Asia indicates a positive trend over the past two decades, from 77 million EUR in 1990 to 25,371 million EUR in 2022 (see [Figure A1\[1\]](#)).

Despite a drop in the investment value between 2019 and 2020, possibly due to COVID-19 restrictions, the Austrian FDI in Asian economies jumped from 2021 to 2022, reaching values beyond those before COVID-19 ([Figure A1\[1\]](#)). This upward trend indicates a growing Austrian presence in the Asian region and highlights the importance of Asian economies as partners for Austrian investors. Unsurprisingly, in October 2023, Advantage Austria–Singapore, a trade promotion organization from the Austrian Government, organized an Austria Connect Southeast Asia conference. The conference aims to serve as a platform to increase awareness among Austrian companies regarding the opportunities in the region and foster connections among Austrian investors in Southeast Asia [\[2\]](#).

However, the allocation of the Austrian FDI among Asian economies appears to vary. Austria invests more in India than Indonesia, even though the two countries are both democratic nations with comparable income levels classified under the World Bank's middle-income group. Additionally, their economies share characteristics such as reliance on labor-intensive industries and dependence on natural resources. Despite these similarities, India has attracted more Austrian FDI than Indonesia. In 2022, India received more than 700 million EUR, while Indonesia received approximately 380 million EUR ([Figure A2\[1\]](#)). This situation also arises between two neighboring economies, South Korea and Japan. Although both are high-income nations, South Korea has received more investment from Austria, with a value of more than 1,000 million EUR. In contrast, Japan has received less than 300 million EUR. This raises the following question that this paper seeks to answer: Why does Austria perform higher investment in particular economies compared to others within the Asian region?

Despite the substantial growth in Austrian outward foreign direct investment (OFDI) in Asian economies, the literature lacks an analysis of the outward investment flows from Austria to these economies. This study aims to bridge this gap and improve our understanding of Austrian investment patterns globally. To the best of the author's knowledge, this study is the first to analyze the drivers of Austrian FDI in Asian economies. Formulating its model based on the ownership, location and internalization (OLI) framework developed by [Dunning and Lundan \(2008b\)](#) and the knowledge capital model proposed by [Markusen \(1998\)](#), this study reveals that Asian economies with higher knowledge capital, as proxied by research and development spending per GDP, tend to attract more FDI from Austria.

Policymakers in Asian economies, particularly those categorized as middle-income nations, can employ the recommendations from the results of this study to build a strategy to attract new investments from Austria. The following sections explain the theoretical framework and the literature review of Austrian FDI, followed by a data and methodology section and a discussion of the empirical results and the conclusion.

2. Theoretical framework

FDI occurs when a company invests outside its country of origin, perhaps allocating some operations to a chosen host country. Companies make these decisions to gain specific advantages such as technology, managerial expertise and marketing know-how, contingent upon a favorable business environment conducive to profitability. According to this definition, FDI differs from trade because it emphasizes the importance of management control over production, which trade does not ([Moon, 2015](#); [Sharma and Bandara, 2010](#)). Theoretically, factors influencing FDI include the OLI framework developed by [Dunning and Lundan \(2008b\)](#) and the knowledge capital model by [Markusen \(1998\)](#). The OLI framework

presents three criteria that firms need to fulfill when investing abroad: (1) ownership advantage (O) indicates that the firm possesses expertise in a product or production that can be an advantage in foreign markets; (2) location advantage (L) signifies that foreign markets offer more favorable conditions for firms to consider relocating their production plants and exploiting their competitive advantages and (3) internalization advantage (I) refers to whether firms want to build and exploit their ownership advantage by themselves or give license to another party as well as sell their products and services in the chosen host countries. Researchers have hypothesized various factors as determinants of location attractiveness for investment, including market size and growth rate, trade openness, corporate income tax rate and natural resources (Sharma and Bandara, 2010; Kumari and Sharma, 2017; Poelhekke and Van Der Ploeg, 2013; Bokpin *et al.*, 2015; Kok and Acikgoz Ersoy, 2009; Bénassy-Quéré *et al.*, 2005; Liargovas and Skandalis, 2012).

These identified determinants clarify the motives of FDI, which are categorized into three groups. The first group refers to the type of firms that serve the domestic market in foreign countries (market-seeking FDI), while the second group focuses on the extraction and processing of natural resources in host countries (resource-seeking FDI). The third is the type of firms that seek more efficiency in global market production (efficiency-seeking FDI) (Dunning and Lundan, 2008b; Moon, 2015). The investment decision-making process for market-seeking FDI is usually based on the potential to expand markets through local production in the host country. Factors such as the market size of the host country and its growth rate influence these investments (Kumari and Sharma, 2017; Hunya, 2008). Conversely, resource-seeking FDI focuses on the presence of natural resources such as gold, oil and gas in foreign countries (Asiedu, 2013). Meanwhile, efficiency-seeking FDI is mainly driven by the purpose of reducing production costs and obtaining higher profits. For example, foreign investors often favor host countries that offer low corporate taxes, as they generate higher earnings (Lesmana and Soetjipto, 2022; Abdioglu *et al.*, 2016; Bénassy-Quéré *et al.*, 2005).

In addition to economic factors, Dunning and Lundan (2008a) explained that the role of institutions in host countries should be considered as a determinant of FDI flows to the host economies, such as the importance of local government stability and commitment to regulations. Previous studies have shown a positive relationship between stability in both economic and political conditions and the inflow of FDI (Busse and Hefeker, 2007; Mengistu and Adhikary, 2011; Staats and Biglaiser, 2012; Sharma and Bandara, 2010). Indeed, foreign investors expect their investments in host countries to be safeguarded under secure conditions and not subject to expropriation by local governments due to sudden changes in regulations.

Markusen (1998) introduced another hypothesis on the importance of knowledge capital to explain the determinant of the choice of foreign investment locations (Markusen, 1998). Within this framework, multinational firms export knowledge-based asset services, such as human capital of employees (e.g. managerial and engineering services), brands and reputations. Firms primarily invest abroad for the opportunity to diversify their product offerings and to maintain their competitiveness. In other words, the disparities in cross-border technology, rooted in differences in knowledge capital, have become the primary motivation for multinational enterprises (MNEs) to invest in different countries (Cantwell, 2017).

Various studies have tested the knowledge capital approach. For example, Abbas *et al.* (2022) explored the importance of adequate human capital in developing countries to attract foreign investment. Using three different indicators of human capital (e.g. primary, secondary and tertiary education), their study finds that tertiary education serves as a robust variable that attracts FDI. The authors emphasize the role of tertiary education in providing skills and knowledge to the population in the host countries, which foreign

investors need. This is consistent with the needs of foreign investors to exploit their knowledge-capital ownership, especially those from advanced countries. To fulfill that purpose, they seek skilled labor in the foreign market with which they can work well, for example, to apply modern technology or research activities and to have a similar capacity to speak in foreign languages to ensure the transfer of knowledge process (Kim *et al.*, 2015; Kox, 2023; Abbas *et al.*, 2022).

However, Teixeira and Heyuan (2012) argued that human capital alone cannot attract foreign investment. Research and development (R&D) plays a necessary role in making human capital attractive to foreign investors. This study highlights the importance of well-established R&D spending and infrastructure (e.g. cooperation with universities and research incentives).

Real-world scenarios involving Austria confirm these findings. For example, in 2021, Austria Technologie & Systemtechnik AG (AT&S), a global manufacturer specializing in high-end printed circuit boards and integrated circuit (IC) substrates, opened its first production and R&D facilities in Southeast Asia. The company chose the plant location of Kulim Hi-Tech Park in Malaysia to introduce its latest high-end technologies in its new location and foster the development of innovative products [3]. AT&S decided to invest in Malaysia due to the adequate technology infrastructure and the availability of highly-skilled talent. Another example comes from RHI Magnesita, an Austrian mining company headquartered in Vienna. In 2018, the company established its regional R&D center in India after previously opening similar facilities in China. This strategic move has made India an important hub for R&D and manufacturing within the regions of India, Africa and the Middle East [4].

3. Literature review

3.1 FDI inflow to Asian economies

Asia has recently attracted increased foreign investment. In 1990, Asia's total FDI was \$21,933 million, putting it in third place after Europe (\$102,697 million) and North America (\$56,004 million). However, in 2022, Asia took the first place with \$661,807 million, while North America (\$337,690 million) and Latin America and the Caribbean (\$208,454 million) occupied the second and third places [5].

Various studies have argued that several factors influence the investment inflow to Asian countries. For example, Kumari and Sharma (2017), focusing on developing countries in the Asian region, argued that market size (GDP) and human capital are important factors in attracting FDI. In addition, researchers also find lower interest rates to be a significant determinant of FDI inflow to these countries.

Institutional aspects have also been considered a determinant of FDI inflow to Asian economies. Using the governance and economic freedom index as key independent variables, Ullah and Khan (2017) argued that institutional qualities help determine investment inflows. They find different results for each region, such as the positive and significant relationship between improved economic freedom and FDI inflow for countries in the Southeast Asian region [Association of Southeast Asian Nations (ASEAN)] and those in the South Asian region [Association for Regional Cooperation (SAARC)]. In contrast, economic freedom generates a negative relationship in countries in the Central Asian region. Meanwhile, improvement in the governance index yields a positive and significant relationship with ASEAN member countries and Central Asian countries, whereas it generates a negative correlation with countries in SAARC.

After including the economic crisis within the countries, Sasana and Fathoni (2019) argued that economic and institutional factors in the host countries play a significant role in attracting new investment. Regarding economic factors, they found that foreign investors

prefer trade openness, market size (GDP) and low exchange rates. However, only the latter two factors prove to be significant. Meanwhile, government integrity has a positive and significant relationship with FDI inflow. In other words, low corruption levels in these countries attract foreign investors.

While intra-Asian economies such as China, Japan and Singapore are the primary sources of FDI in Asian economies, non-Asian economies also provide a significant contribution. The United States of America and various European economies, for instance, have emerged as major investors in the region [6]. Various studies reveal the drivers of these investments. [Al Nasser \(2007\)](#) found that market potential, measured by GDP growth, has a positive and significant relationship with FDI from the United States of America. In addition, infrastructure availability (e.g. telephone lines) generates a similar effect. Meanwhile, [Antonakakis and Tondl \(2012\)](#) studied the determinants of FDI from the Organization for Economic Cooperation and Development (OECD) countries for various countries. They argue that European investors care more about market size and educated labor than about bilateral trade agreements, whereas investors from the United States of America count more on the importance of free trade agreements and natural resources.

3.2 Austrian FDI

Most studies on Austrian FDI analyze the determinants of FDI flows to Austria. For example, using firm-level data from 2008 to 2018, a study by [Ghods and Jovanovic \(2022\)](#) revealed that reducing trade costs leads to increased investments in foreign-owned subsidiaries in Austria. FDI is concentrated in regions with larger GDPs and a higher proportion of the population with educational backgrounds of upper-secondary and post-secondary non-tertiary education. The study also identifies the positive spillover effects of FDI on the domestic economy, especially in fostering innovation among Austrian firms, particularly in key environmental technology sectors.

[Agiomirgianakis et al. \(2004\)](#) showed that factors such as market size, a skilled workforce, trade openness and robust infrastructure attract foreign investors to invest in Austria and other OECD countries. Meanwhile, [Falk \(2012\)](#) analyzed the factors influencing bilateral Greenfield FDI projects and flows in knowledge-intensive business services from OECD/Brazil, Russia, India, China and South Africa (BRIC nations) to European Union (EU) countries, including Austria from 2003 to 2010. The study reveals that local wages, tertiary education, corporate taxes, geographical proximity (common border) and linguistic similarity are important determinants.

However, the research landscape demonstrates a gap regarding Austrian FDI, particularly within Asian economies. One possible reason is that Austrian FDI is often concentrated in Central and emerging European countries ([Antonakakis and Tondl, 2012](#)). Indeed, [Hunya \(2008\)](#) identified Austrian investors as critical players in Central and Southeast European nations. Using survey data from the National Bank of Austria, the study finds that Austrian investors belong to a group of market-seekers. The reason is that their main intention to invest abroad is to sell their products in the local market in the chosen host countries. Still in Europe, a spatial study conducted by [Fischer et al. \(2016\)](#) explored the FDI from Austria to the European countries. Applying spatial Durbin panel data from 2009 to 2013, the research finds that the horizontal FDI becomes the main driver of Austrian investors to allocate their investment abroad.

Beyond the European context, [Korez-Vide et al. \(2014\)](#) analyzed the determinants of Austrian FDI in Brazil and argue that physical infrastructure, such as the presence of a seaport and international airport, prompts Austrian investors to invest in Brazil. Semi-structured interviews also reveal that the companies choose based on the availability of a qualified labor force, especially in big cities in Brazil.

Despite various studies on Austrian FDI and its positive investment trend in Asian economies, the research still lacks a focus on the determinants of Austrian FDI in these economies. Therefore, this study aims to fill this gap and expand our understanding of Austrian global investment patterns. The results from this study may not only aid policymakers but also provide another literature stream on FDI policy formulation and management studies, especially in the context of attracting new investment from Austria and other developed nations. Indeed, establishing policies that provide more incentives that spur R&D activities is essential to influence the location decisions of FDI (Loewendahl, 2001; Guimón, 2009).

4. Hypothesis development

Based on previous research that investigates the determinants of Austrian FDI, the literature mostly focuses on market size, labor cost and physical infrastructure as significant factors in the decisions of Austrian investors (Hunya, 2008; Korez-Vide *et al.*, 2014). However, an understanding of the role of knowledge capital in guiding Austrian investors in selecting their investment destinations is still lacking. This research offers an alternative explanation by arguing that the different levels of FDI inflow from Austria among Asian economies are determined by the level of host countries' knowledge capital.

Markusen (1998) defined the knowledge capital approach as firms engaging in international investments to enhance their ownership-specific advantages, especially regarding knowledge and technology. This theoretical framework demonstrates why certain countries emerge as more attractive for foreign investment, emphasizing the importance of a supportive environment for exploiting knowledge capital, such as robust R&D infrastructure and the availability of high-skill labor, as essential determinants for investment locations.

Austria's status as a developed nation reflects its advanced technology and knowledge capital. As a result, Austrian investors are naturally inclined to explore foreign markets that offer comparable technological capacity and infrastructure, particularly in R&D. Austrian FDI tends to flow toward countries with greater knowledge capital, measured by a greater commitment to R&D. To illustrate, recent data show that Austria directs more investment toward India than Indonesia despite their similarities. This may be because India has a threefold higher level of R&D expenditure than Indonesia, constituting up to 0.6% of GDP in 2020. Additionally, compared to India and Indonesia, China, as another emerging economy with a high population, allocates an even higher level of R&D expenditure. China's R&D expenditure per GDP surpassed 2% in 2021, possibly explaining why China is the primary recipient of FDI inflow from Austria [7].

Thus, this study proposes its main hypothesis:

- H1.* In comparing economies, those with higher levels of R&D expenditure have higher FDI inflow from Austria than those with lower R&D expenditures.

5. Model and data

Based on the theoretical framework from Dunning and Lundan (2008b) and Markusen (1998), this study proposes a basic model:

$$Y_{it} = \alpha_i + \beta_1 R\&D_{it} + \theta_j Z_{it} + \epsilon_{it}$$

where Y is the dependent variable, followed by R&D as the key independent variable. Meanwhile, Z is a vector of control variables and the ϵ is the error term.

5.1 Dependent variable

The dependent variable was OFDI from Austria to the eleven host economies located in the Asian region from 1990 to 2022 (in million EUR). This study uses the OFDI position provided by the National Bank of Austria (Oesterreichische Nationalbank). Data availability mainly guides the selection of economies. The 11 Asian economies included in this study are China, India, Indonesia, Japan, Kazakhstan, Malaysia, the Philippines, Singapore, South Korea, Thailand and Hong Kong SAR, China. To ensure data stability and address the zero or negative values of Austrian FDI in the host economies, the author created a logarithmic format for the data.

5.2 Key independent variable

Markusen (1998) introduced the concept of knowledge capital, consisting of the availability of human capital, provisions related to patents, blueprints, working culture and procedures, marketing knowledge and trademarks. As no single variable captures all dimensions, this study follows the approach of Sharma and Bandara (2010), who applied expenditure on R&D per GDP in the host countries to represent the presence of knowledge capital. The author source the data for the key independent variable from the World Development Indicator.

5.3 Control variables

Departing from previous similar research and the OLI framework from Dunning and Lundan (2008b), this study divides the control variable based on the typology of FDI. First, this study controls the effect of market size represented by host countries' GDP. The author expect the variable to positively influence FDI outflow from Austria, suggesting that the investor belongs to the market-seeker group (Hunya, 2008; Sharma and Bandara, 2010).

Meanwhile, this study also controls for natural resources belonging to the host countries. Foreign investors often cite the role of raw materials in the foreign market as a reason to invest, especially with appropriate technology to extract the resources (Asiedu, 2013). The author expect the variable to have a positive relationship with the Austrian FDI, suggesting the resource-seeker group. For this variable, the author use data on total natural resource rent (% of GDP).

Under another control variable, efficiency-seeking, corporate taxation and trade openness play a role in investment decision-making. Indeed, the higher the taxation in the host countries, the less likely the Austrian investor will invest there (Bénassy-Quéré *et al.*, 2005). Conversely, the more open the host countries are in their trade activities, the more likely they will invest (Liargovas and Skandalis, 2012; Sharma and Bandara, 2010). The World Development Indicators provide most of the data from the previous explanation.

Following Dunning and Lundan (2008a), this study includes institutional dimensions, specifically political risk (*law and order*) in the host countries. This study uses the law-and-order risk index data from The International Country Risk Guide by The PRS Group. This index ranges from 1 to 6, with values closer to 6, indicating a robust legal system. This translates to lower risk for host country governments to alter their legal systems to the detriment of foreign investors (Busse and Hefeker, 2007). This study also employs GDP per capita to control for the economic development level (Sabir *et al.*, 2019; Büthe and Milner, 2008).

6. Estimation strategy

Considering the data conditions, which indicate a smaller number of samples than time variables ($T > n$), this study employs the panel-corrected standard error (PCSE) technique, as recommended by Beck and Katz (1995) and Beck *et al.* (1993). The PCSE generates estimates that address issues related to unobserved autocorrelation and heteroscedasticity, ensuring

the production of robust standard errors (Reed and Webb, 2010; Bailey and Katz, 2011; Beck and Katz, 1995). Moreover, considering the presence of random missing values in the data, the estimation employs the pairwise option [8]. This study takes endogeneity issues into account by adding the lagged form of the dependent variable and the key independent variable (one-year lag) to address potential reverse causality issues (Beck and Katz, 1995; Ahlquist and Prakash, 2008; Wang and Youn, 2018).

7. Empirical result

7.1 Descriptive statistics

This subsection focuses on the main dependent and independent variables (e.g. OFDI and R&D) [9].

According to the descriptive statistics, the average investment from Austria in 11 Asian countries from 1990 to 2022 reached 380.717 million EUR (Table A1[1]). China received the highest investment in 2022 of 3,484 million EUR. Other countries such as Singapore and South Korea have also become the primary locations of Austrian FDI (Figure A2[1]).

Meanwhile, the key independent variable in this study, R&D expenditure per GDP, shows a mean value of up to 1.379. In other words, these countries allocate up to 1.379% of their GDP. The highest expenditure on R&D was recorded by South Korea in 2021, with 4.93% of the GDP, whereas Indonesia held the minimum value at 0.048% in 2001. As the main recipient of the investment from Austria, China demonstrated an average R&D expenditure of more than 1.5%, above the average values of R&D expenditures of all countries within the samples. This trend also applies to other primary locations for Austrian FDI, such as Singapore (1.9%) and South Korea (3.2%). As the mean value of R&D is higher than its standard deviation, the distribution of data for the variable of R&D is relatively even, without any significant outliers or extreme values that would skew the distribution.

Meanwhile, the correlation matrix indicates that R&D expenditure in the host countries is positively associated with FDI from Austria, and most variables are free from multicollinearity problems (Table A2[1]).

7.2 Main regression result

Overall, the results suggest that the knowledge capital model proposed by Markusen (1998) holds. Model 1 shows us the basic model with the key independent variable (R&D) and other traditional economic variables as the controls. The result indicates a positive correlation with the Austrian FDI (Table 1). Next, in Model 2, I add more control variables (e.g. institutional quality, trade openness and level of economic development) and lag dependent variable, which results in the improvement of the relationship of the key independent variable (R&D) with the FDI inflow from Austria, suggesting a positive and significant correlation. The coefficient also improved from 0.124 in Model 1 to 0.241 in Model 2, while the R-squared improved significantly from 0.21 to 0.83.

These results resonate with other studies, such as Kumari and Sharma (2017) and Abbas *et al.* (2022), which argue the importance of human capital as another dimension of knowledge capital. Similarly, the results support other studies on OECD countries, including Antonakakis and Tondl (2012), which find that European investors care about the knowledge capital in the host countries, as proxied by the presence of educated labor.

As Austria is known as a developed country with advanced technological capabilities, investors from Austria are likely to seek foreign markets that offer comparable capacity and infrastructure, such as developed countries such as South Korea, Singapore and Hong Kong. This potentially explains the significance of knowledge capital. Meanwhile, emerging economies such as China, India and Malaysia are possible alternatives. Within the press

	Model 1	Model 2	Model 3
R&D _{it-1}	0.127 (0.154)	0.241* (0.104)	0.368** (0.0981)
Log.GDP	0.863*** (0.132)	0.284*** (0.0728)	2.249* (0.808)
Natural Resources	0.0467 (0.0359)	0.0404* (0.0200)	0.118* (0.0493)
Corporate Taxes	-0.191*** (0.0258)	-0.0391* (0.0189)	-0.0235 (0.0315)
Log.AUT FDI _{it-1}		0.718*** (0.0621)	0.594*** (0.0586)
Log. law		-0.175 (0.237)	0.733 (0.393)
Trade openness		0.00321** (0.00123)	0.00218**** (0.00105)
Log.GDPc		-0.216* (0.0888)	-1.603*** (0.803)
Constant	-13.89*** (3.370)	-3.805* (1.539)	-46.12* (15.47)
Observations	202	195	195
R-squared	0.210	0.839	0.839
Prob > χ^2	0.000	0.000	0.000
Hausmann test			21.53**

Note(s): Standard errors are in parentheses

In all regressions, the dependent variable is FDI outflow from Austria

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$, **** $p < 0.1$

Source(s): Compiled by the author

Table 1.
Regression results

release, Austrian companies (e.g. AT&S and RHI Magnesita) express that the main reason to invest in countries like India, Malaysia and China is the availability of technology infrastructure [10].

This study's results contrast with [Sharma and Bandara \(2010\)](#), which analyzed other OECD countries and find that knowledge capital (R&D expenditure per GDP) has a negative and significant relationship with FDI from Australia. This study revealed the challenge in explaining this relationship, as most of the investments from Australia go to countries with robust knowledge capital. They argued that Australian investors care more about market size, trade openness and culture and language similarity (e.g. English-speaking countries).

Furthermore, the empirical result also categorizes FDI from Austria as market-seeking. Indeed, the result from the control variables shows a positive correlation with the GDP variable (Log.GDP) with the dependent variable. The outcome resonates with [Hunya \(2008\)](#), who suggested that Austrian investors aim to invest in foreign markets to sell their products locally. Meanwhile, in line with [Asiedu \(2013\)](#), this study finds that natural resources play a positive and significant role in Austrian investors' decisions. This suggests that Austrian investors belong to the resource-seeker group.

The results also reveal a positive association between trade openness and FDI from Austria. This indicates that Austrian investors are also efficiency seekers. The degree of trade openness mirrors the proportion of trade in the host countries' economies, and a higher share suggests a reduction in trade barriers, such as tariffs, upon implementing a free trade agreement. These barriers are commonly perceived as costs for investors, potentially leading to inefficient production ([Sharma and Bandara, 2010](#); [Liargovas and Skandalis, 2012](#); [Banday et al., 2021](#)). In addition, GDP per capita (Log.GDPc) shows a negative and significant relationship with the

Austrian FDI in the sample countries, perhaps because the higher the countries' economic development, the greater the cost of labor becomes (Walsh and Yu, 2010; Asiedu, 2013; Narayanan and Bin Mohd Thas Thaker, 2015).

For the robustness check, this study determines whether the other model estimator generates results similar to the previous PCSE model. The primary model (PCSE) can improve the validity of statistical inference by tackling serial correlation and heteroscedasticity problems. However, it does not control for the unobserved effects of time-invariant factors. This is important because, if we fail to remove those effects, the coefficients are more likely to be overestimated (Green *et al.*, 2001).

Thus, this study applies the fixed-effects model (FEM) for the estimation to ensure a standard procedure by applying the Hausman test at the diagnostic stage. As expected, the result from the Hausman test suggests an FEM over the random-effects model. In addition, I used the white Heteroscedasticity procedure to correct for heteroscedasticity (Table A3[1]). Model 3 shows a positive and significant relationship between R&D spending and FDI outflow from Austria (Table 1). In other words, the central hypothesis holds.

8. Conclusion

Although Austrian FDI has exhibited a positive trend toward Asian countries for the past 20 years, no study has examined the driver of this investment pattern. This study fills the gap by explaining the Austrian global investment pattern, particularly in Asian countries. The findings reveal that the knowledge capital approach, represented by the expenditure on R&D per GDP in the host countries, plays a significant and positive role.

The expected result may be attributed to Austria being a developed nation that depends on technological advancement for its national competitiveness. As a result, Austrian investors will seek similar technological capabilities in the foreign market. In addition, the result also indicates that Austrian FDI falls into the market-seeking, resource-seeking and efficiency-seeking categories based on the positive correlation between the variables of GDP, natural resources and trade openness with the FDI inflow from Austria.

These findings have significant policy relevance, especially for emerging Asian economies such as Indonesia, India, Thailand, Malaysia and the Philippines. Indeed, the result suggests that Austria's advanced technological capabilities inspire its investors to seek foreign markets with comparable capacity, thus sending a call for the host countries to improve their knowledge capital provision, particularly R&D infrastructures. This improvement can take various forms, such as increasing the research budget, providing adequate incentives to local scientists and attracting international scientists. For example, state subsidies give companies more room to conduct their R&D activities or hire more local and international scientists. Alternatively, the government may provide special economic zones (SEZ) specializing in particular R&D activities. SEZs bring tax credits and technological subsidies, help spur innovation and increase the host country's attractiveness to foreign investors (Wu *et al.*, 2021).

Proper understanding requires identification of which channels are applied in the R&D process and the application of the results to improve stakeholders' productivity. One can do so by establishing cooperation with universities and local firms. Improving human capital offers another essential complementary process to increase the knowledge capital in the host countries. As Teixeira and Heyuan (2012) suggest, human capital must combine with R&D activities by improving various aspects of tertiary education. Such education equips individuals with the minimum skills and knowledge required by foreign investors, such as using modern technology and speaking foreign languages. Indeed, these skills can often be acquired at the post-secondary level, such as at universities and colleges (Abbas *et al.*, 2022; Kim *et al.*, 2015) [11].

By improving human capital and R&D infrastructure, these countries can attract higher-quality FDI. These two components enhance the absorptive capacity of those emerging

economies, ensuring the knowledge spillover of FDI to the local economy and attracting high-quality FDI (Görg and Greenaway, 2004; Moran *et al.*, 2016).

Future studies can address some limitations in this work by using alternative indicators to represent the presence of knowledge capital in the host countries. Researchers could consider human capital capabilities such as the number of populations that have tertiary education (Noorbakhsh *et al.*, 2001; Abbas *et al.*, 2022). Moreover, this study analyzes only at the aggregate level, so future studies could operate at the sector-specific level to determine whether the findings still hold within all main sectors or only particular sectors in the host economies. Finally, due to the limitation of the countries included in this study as a sample, future studies might consider increasing the number of the host countries as a sample.

Notes

1. Please see it on the Online Appendix.
2. [Austria Connect Southeast Asia 2023 \(advantageaustria.org\)](https://advantageaustria.org)
3. [AT&S chooses Malaysia for its first production site in Southeast Asia \(advantageaustria.org\)](https://advantageaustria.org)
4. [RHI Magnesita to make India R&D and Manufacturing hub for India, Middle East, Africa region | RHI Magnesita](https://www.rhimagnesita.com)
5. [Global foreign direct investment flows over the last 30 years | UNCTAD](https://unctad.org)
6. [Investment flows to developing countries in Asia remained flat in 2022 | UNCTAD](https://unctad.org)
7. Based on data from the statistical office of National Bank of Austria (OeNB) and World Development Indicator.
8. The study specifies the option of *corr (ARI)* in STATA command as it considers the AR1 structure in its panel data. Please refer to: [txtxpcse.pdf \(stata.com\)](https://www.stata.com).
9. The descriptive statistics and correlation matrix tables were made using the “*asdoc*” command provided by Shah (2021).
10. [AT&S chooses Malaysia for its first production site in Southeast Asia \(advantageaustria.org\)](https://advantageaustria.org)
11. Based on the definition provided by the World Bank (2017) on Higher Education. [Education: Development news, research, data | World Bank](https://www.worldbank.org)

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Appendix

The appendix for this article can be found online.

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