



SCHOOL OF
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AFTA and Regional Strengthening: The Effect of intra-ASEAN Trade on FDI Inflows

by

Jannis Max Perzlmeier; E-mail: ja4453pe-s@student.lu.se

Abstract: *This thesis investigates the effects of intra-ASEAN export flows on global FDI inflows into ASEAN member states. A panel dataset including all ten countries of the ASEAN is created to test these effects from 1992 to 2020. Linear regressions without and with fixed effects predict that intra-ASEAN exports have a positive and significant impact on FDI inflows into ASEAN countries. Furthermore, trade flows between the United States and China are used as an instrument for intra-ASEAN exports in a 2SLS estimation to test for a causal relationship between the correlations. However, the causal interpretation is not conclusive due to the weak explanatory power of the instrument. The thesis also predicts that the AFTA is an effective political instrument to increase FDI inflows into ASEAN member states.*

Keywords: *Exports, trade flows, FDI, ASEAN, AFTA, regional integration*

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List of Abbreviations

AFTA	ASEAN Free Trade Area
ASEAN	Association of Southeast Asian Nations
CEPT	Common Effective Preferential Tariff
DOTS	Direction of Trade Statistics
FDI	Foreign Direct Investment
FTA	Free Trade Agreements
GATT	General Agreement on Tariffs and Trade
GDP	Gross Domestic Product
HPAE	High-performing Asian economies
IMF	International Monetary Fund
PTA	Preferential Trade Arrangement
SSA	Sub-Saharan Africa
USD	United States Dollar
2SLS	2 Stages Least Squares

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1 Introduction

Since the beginning of the 2000s, the number of bilateral and regional free trade agreements (FTAs) has increased globally and in Asia (Okabe et al., 2015). The first FTA in Southeast Asia was the Association of Southeast Asian Nations (ASEAN) Free Trade Area (AFTA) in 1992. Okabe et al. (2015) highlight that the direct effects of the AFTA on intra-ASEAN trade flows in the 1990s were modest and that large effects only appeared since the 2000s. Figure 1.1 supports and visualizes these findings and depicts that aggregated exports within ASEAN member states¹ increased only moderately during the 1990s and that the greatest increase appeared in the 2000s.

Figure 1.1 also shows that the development of aggregated total inflows of foreign direct investment (FDI) into ASEAN countries is similar to that of aggregated exports during the 1990s and in the 2000s. Moreover, the graphical comparison indicates that there is a correlation between intra-ASEAN exports and global FDI inflows into the region. This raises the question if the AFTA is successful in achieving one of its main goals: to increase the attractiveness of foreign investors.

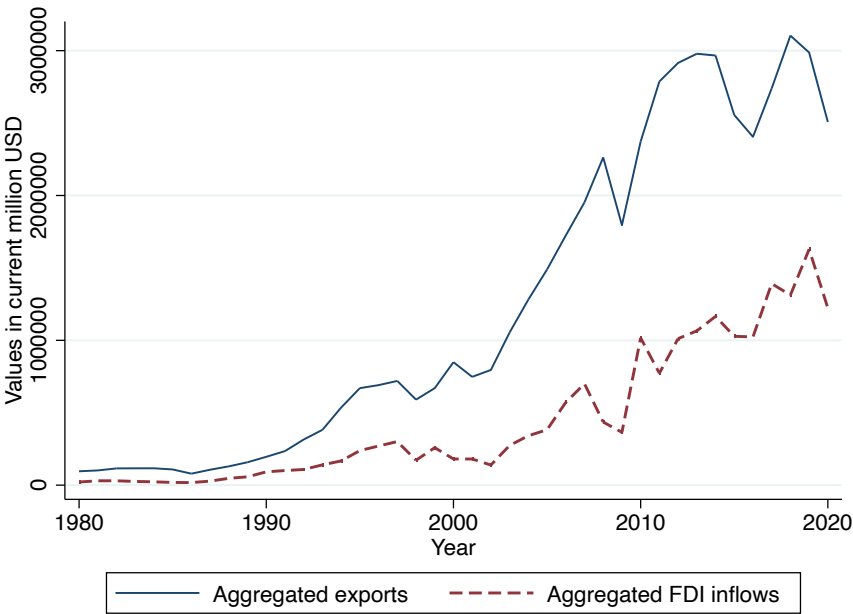


Figure 1.1: Aggregated bilateral trade flows between ASEAN countries and aggregated total FDI inflows from 1980 to 2020; Source: International Monetary Fund (2022) and United Nations (2022)

¹Brunei Darussalam, Cambodia, Indonesia, Lao PDR, Malaysia, Myanmar, the Philippines, Singapore, Thailand, and Vietnam

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Büthe and Milner (2008), Büthe and Milner (2014), and Shah and Khan (2016) find that trade agreements, and especially preferential trade agreements (PTAs), are determinants of FDI inflows. However, they do not observe the effect of regional strengthening through real trade effects between partner countries within the trade agreements. The consensus view in the literature is that trade openness in general determines FDI inflows, but the role of intra-regional trade flows is often neglected (e.g. Asiedu, 2002; Crespo and Fontoura, 2007; Ali et al., 2010; Hoang and Bui, 2015; Jahan and Paul, 2021). Nevertheless, trade openness only captures the total trade flows of countries in relation to the size of domestic markets but does not take into account the importance of regional economic integration and its potential effects on FDI inflows. This means that, for example, in the ASEAN region the effects of the AFTA on FDI inflows are omitted in previous research. Furthermore, generalizing trade effects on FDI inflows neglects the importance of other impacts such as cultural or physical closeness between trading partners. Observing the effects of trade within regional trade agreements is therefore especially interesting, because of missing evidence about the effects of FTAs beyond the pure trade effects. Further, it provides useful insights for policymakers about the effectiveness of regional FTAs to achieve increasing living standards through FDI inflows (e.g. Campos and Kinoshita, 2002; Chowdhury and Mavrotas, 2005; Azman-Saini et al., 2010a). Therefore, this thesis aims to fill this gap in the literature and focuses on linkages between trade between ASEAN member states and FDI inflows in the region in answering the question:

Do intra-ASEAN exports affect FDI inflows into ASEAN member states from all over the world?

To answer this question, a panel dataset covering all ASEAN member states from 1992 to 2020 is created. The time frame of the observations is motivated by the implementation of the AFTA in 1992 and its goal to attract more FDI inflows. Two different empirical methods are used to provide evidence for the correlation between intra-ASEAN exports and FDI inflows. First, a panel data regression without and with fixed effects is applied to showcase correlation. In the fixed effects model controls for time and country invariant characteristics are included. However, the causal link between intra-ASEAN exports and FDI inflows cannot be determined by the panel data regressions. In fact, in the literature, FDI is found to be the main driver in the complementary relationship between trade and FDI

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(e.g. Aizenman and Noy, 2006; Bouras and Raggad, 2015). Therefore, the second estimation approach uses an instrumental variable to exclude endogeneity in the model and provide evidence for a causal interpretation from intra-ASEAN exports on FDI inflows. Thereby, the trade flows between the United States and China are used as an instrument for intra-ASEAN exports and to overcome possible reverse causality between intra-ASEAN exports and FDI inflows. With the fast and export-oriented growth path of the Chinese economy and the dominant role of the United States in global markets during the observation period, the trade flows between these two economies have a great impact on supply and demand everywhere in the world. Raghavan and Devadason (2020) find that in the ASEAN region, economic shocks in the United States or China have an even bigger effect on domestic markets than local shocks. Therefore, the United States-Chinese trade flows are expected to be a relevant and exogenous instrument for intra-ASEAN exports.

The estimates of the panel data regressions without and with fixed effects find that there is a clear positive correlation between intra-ASEAN exports and FDI inflows into the region. Furthermore, with the inclusion of intra-regional exports, general trade openness becomes insignificant in determining FDI inflows. The results of the 2 stages least squares (2SLS) instrumental variable approach indicate that there might be a causal relationship of intra-ASEAN exports on FDI inflows. However, the findings are not robust due to the low explanatory relevance of the instrument.

This thesis aims to clarify the causal chain between intra-ASEAN trade and FDI inflows into ASEAN member states with up-to-date information. This is especially important in recent decades because Southeast Asian countries seem to imitate other Asian countries, which grew earlier and under different conditions than today's much more integrated world economy (Lin, 2013; Wang et al., 2010). Additionally, free trade agreements such as the AFTA or the Regional Comprehensive Economic Partnership (RCEP) show that political decisions are made based on the idea that with increasing trade, other factors such as FDI will increase as well and ultimately lead to economic growth. Therefore, it is important to have sound and fact-based information about the effects between trade and FDI in order to make knowledgeable decisions about the potential costs and benefits of trade agreements. The emphasis of this thesis is to shed light on this discussion and to disentangle the effects between intra-ASEAN trade and FDI, especially in recent years.

The contribution of this thesis is twofold. First, it predicts for the first time that the

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increases in intra-ASEAN exports lead to more FDI inflows into the region. This helps to disentangle the effects of trade on FDI inflows in ASEAN countries and highlights that not general trade openness, but rather regional economic integration leads to more FDI inflows. Second, the findings provide evidence for the effectiveness of AFTA in attracting FDI inflows. This indicates that regional FTAs between emerging markets can generate stable environments, which eventually attract foreign investors. In political discussions about global trade integration and regional strengthening, the results suggest that policymakers in emerging economies should consider regional integration before opening up to the world markets in order to attract more FDI inflows.

The remainder is structured as follows: Chapter 2 gives an overview of the existing literature in the field of trade and FDI and highlights the gap that this thesis aims to fill. Furthermore, it introduces the mechanisms and aims of the AFTA. Chapter 3 explains the data used in the estimations and highlights potential outliers in the sample. Chapter 4 describes the different methodologies and limitations in the analysis. Chapter 5 highlights the empirical results of the estimations. Chapter 6 interprets and discusses the results, depicts limitations in the analysis, and provides alternative estimations. Chapter 7 summarizes and concludes the paper.

2 Literature review

Since the end of the Second World War, some Asian countries achieved rapid economic growth in different waves, commonly known as the *East Asian Growth Miracle* (World Bank, 1993). However, not all Asian economies could follow that trend, and some, especially South East Asian, countries are still lagging behind this unprecedented *Growth Miracle* (e.g. Quibria, 2002; Wang et al., 2010; Lin, 2013; Wade, 2018). Additionally, even if countries are achieving fast economic growth, this does not mean that the general public benefits from this development. If the gains of growth are unevenly distributed, only a small share of the society becomes better off and economic growth is not a desirable outcome for everyone. However, Quibria (2002) shows that economic growth is a desirable goal for countries because it is associated with poverty reduction and general increases in living standards. That is why, in this thesis, higher levels of economic growth, measured in gross domestic product (GDP) per capita, are interpreted as positive and desirable outcomes.

Neoclassical theory predicts that one main contributor to economic success is the inflow of FDI (Brems, 1970). The inflow of foreign capital increases the capital stock of host countries and thus, generates growth through financing capital formation. Quibria (2002) supports this view and highlights that the most important driver of growth in Asian economies is capital accumulation, which leads to better technology and higher productivity in host countries. However, the direct formation of capital is not the only channel through which FDI inflows can benefit host countries. There is general consent in the literature that multinational enterprises (MNEs) are more productive than domestic firms and invest more in personnel training than local firms. This superior productivity of foreign firms can have positive spillover effects on domestic economies (Crespo and Fontoura, 2007). Crespo and Fontoura (2007) highlight that there are five channels through which FDI inflows can have positive spillover effects on domestic firms and thereby contribute to overall economic growth. First, demonstration or imitation of new technologies and management practices. Second, labor mobility of highly educated employees from MNEs to domestic firms. Third, the ability to learn from or adapt export possibilities of MNEs and to use them to access foreign markets. Fourth, competition in domestic markets can incentivize local firms to become more productive and to use existing resources in more efficient ways. And fifth, the generation of backward and forward linkages between MNEs and domestic firms increases

the market potential for domestic firms.

Despite the theoretically positive impacts of FDI on growth, the effect of FDI inflows on economic growth is ambiguously discussed in the empirical economic literature and finds that the impact of FDI depends on several preconditions in host countries. For example, Alfaro et al. (2004) and Azman-Saini et al. (2010b) find that only countries with sufficient financial systems can benefit from FDI inflows. However, Hermes and Lensink (2003) provide evidence that most Asian economies, including ASEAN countries, provide sufficient financial systems that allow FDI to have a positive impact on economic growth. Other preconditions for positive effects of FDI inflows on economic growth are a certain level of economic freedom, income per capita, and human capital (Campos and Kinoshita, 2002; Herzer, Klasen, et al., 2008; Azman-Saini et al., 2010a).

Nevertheless, there is reason to believe that in ASEAN countries direct and indirect positive effects of FDI on GDP growth exist. A list of fundamental literature, which argues in favor of these effects can be found in Mello Jr. (1997) and World Bank (2002). Furthermore, Chowdhury and Mavrotas (2005) find that in the two ASEAN countries Malaysia and Thailand, FDI has a causal and positive impact on economic growth using the Toda-Yamamoto test for causality. Additionally, FDI inflows have been identified as one main contributor to economic growth at different levels of economic development and in many countries (e.g. Chowdhury and Mavrotas, 2005; Chowdhury and Mavrotas, 2006; Hansen and Rand, 2006; Thangavelu et al., 2009; Edrak et al., 2014; Yucel et al., 2014). Therefore, following the general consent in the literature that FDI inflows have a positive effect on GDP, and GDP growth is a desirable outcome for economies, in this thesis FDI inflows, and mechanisms that foster FDI inflows, are interpreted as desirable outcomes for ASEAN countries.

2.1 Background in the ASEAN region

With the foundation of the ASEAN in 1967 and the signing of the AFTA in 1992, the ASEAN member states¹ formed a regional economic community to strengthen economic and cultural outcomes on a highly dynamic continent and to remain competitive and prosperous in global markets. With the implementation of the AFTA, its member states demonstrated their ambition to strengthen the region and sought two main goals: First, to create a

¹Indonesia, Malaysia, the Philippines, Singapore, and Thailand, and latecomers Brunei Darussalam, Viet Nam, Lao PDR, Myanmar, and Cambodia

competitive market through the reduction of trade barriers, and second, to attract more FDI (Hoang and Bui, 2015; ASEAN, 2022a).

In contrast to other trading unions like the European Union, the AFTA permits individual tariffs on trade outside the ASEAN. However, the Agreement on the Common Effective Preferential Tariff (CEPT) for the AFTA orders that most tariffs on trade within ASEAN member states must be completely erased or reduced to a maximum of 5 percent. This highlights that the focus of AFTA is on strengthening the region and not on the harmonization of international cooperation (ASEAN, 2022b). After the implication of the AFTA, the trend of exports within ASEAN countries increased and the agreement has a positive effect on intra-ASEAN trade. Elliott and Ikemoto (2004) and Okabe and Urata (2014) show that after the implication of the AFTA, the trend of exports within ASEAN countries increased and the agreement has a positive effect on intra-ASEAN trade. Therefore, estimating the effect of intra-ASEAN trade flows on FDI inflows from all over the world is the best way to test if the AFTA and a strong ASEAN region are successful and have positive impacts on FDI inflows.

The nature of the AFTA and the aim of the agreement to generate more FDI inflows through intra-regional trade raises the question of whether intra-ASEAN trade rather than total trade openness has an impact on FDI inflows into ASEAN countries. Therefore, the main explanatory variable in this thesis is not the impact of general trade flows, but intra-ASEAN exports. Exports are identified as a determinant of FDI inflows and further indicate the economic strength of ASEAN member states (H. T. Nguyen, 2011). Moreover, as mentioned above, within the ASEAN, trade flows became more important for the region and highlight that trade openness to the rest of the world might be less relevant in ASEAN countries compared to intra-ASEAN trade in attracting foreign investors.

The AFTA and the newly implemented free trade agreement, the Regional Comprehensive Economic Partnership (RCEP), between six ASEAN member states and four non-ASEAN signatory states² showcase the importance of trade in the region. This emphasizes that the ASEAN governments believe in economic success through trade integration and its potential channels through other growth-enhancing mechanisms such as increasing FDI. However, the relationship between intra-ASEAN trade and FDI has not been explicitly and recently observed. Therefore, there is no empirical evidence that the implementation of the AFTA

²Brunei Darussalam, Cambodia, Lao PDR, Singapore, Thailand, Vietnam, Australia, China, Japan, and New Zealand

is an effective instrument to increase economic growth through FDI inflows in the region.

2.2 Theory and previous empirical findings

In the literature, trade has been identified as a potential main contributor to increases in FDI inflows (e.g. Singh and Jun, 1995; Asiedu, 2002; Ali et al., 2010). The increase in the signing of regional and bilateral free trade agreements (FTAs) since the beginning of the 2000s highlights that also policymakers believe in the positive impact of FTAs (Okabe et al., 2015). However, the causal effect of trade on FDI inflows remains less clear.

Markusen (1997) finds that trade and FDI are complementing each other. His explanation for this effect is that in a relatively skilled-labor scarce country, FDI provides crucial knowledge in order to effectively exploit a country's abundant inputs and therefore, foster exports. He further highlights that since the 1970s trade and FDI are increasing in rich countries and that in this development, FDI is growing faster than trade. This indicates that FDI could be the leading force in the correlation between the two variables and that FDI causes more trade rather than the other way around. In a firm-level empirical analysis, Markusen and Maskus (2001) find that FDI and trade are complements in intermediate goods, but rather substitutes in the trade of final goods. This view is supported by Helpman et al. (2004), who find that horizontal FDI, where firms produce final goods in foreign countries for foreign markets, is rather a substitute than a complement to trade. This channel occurs because if firms invest in foreign countries intending to sell the products in domestic markets, they have to make large investments. Once these fixed costs are spent, products or services are provided in local markets and extra costs for shipping are saved. Therefore, horizontal FDI is rather a substitute to trade than a complement to trade.

More recent empirical research uses co-analytical techniques such as the Granger causality, VECM integration, or augmented gravity models to support the above-mentioned studies in different levels of aggregation and locations. Aizenman and Noy (2006) find that FDI and trade are complements in a sample containing 81 countries in the time from 1982 to 1998. Their findings highlight that the effect of FDI on trade is stronger than that of trade on FDI. Also, Anwar and L. P. Nguyen (2011) find complementary effects between FDI and trade in Vietnam from 1990 to 2007. However, in a more decomposed analysis, Saimul and Darmawan (2020) find that in Indonesia the relationship between trade and FDI only holds

in the short term and only between imports and FDI, but not for exports and FDI in the time from 2004 to 2009. In contrast, Xiong and Sun (2021) find that FDI and exports are complementary when the flows are from rich to poor countries for a sample of 140 countries from 2001 to 2006. In general, the literature agrees on the fact that FDI flows and trade are rather complements than substitutes and that a positive correlation between both measures exists.

Nevertheless, the causal chain between FDI inflows and trade is content to an ongoing discussion. The above-mentioned results of Aizenman and Noy (2006) highlight that the effect of FDI on trade might be bigger than the other way around, but also find that trade has a causal and positive effect on FDI inflows. Bouras and Raggad (2015) find supportive evidence for the effect of trade on FDI in a sample of ten countries³ from 1988 to 2012. Their findings show that an increase of 10 percent in total exports is predicted to increase FDI inflows by 5.97 percent. In contrast to Bouras and Raggad (2015), in most empirical research trade is not included in total values, but rather as trade openness measured in imports plus exports divided by GDP, and is expected to have a positive impact on FDI inflows. Given this assumption, trade openness is in most studies rather included as a covariate in the analysis than as the main explanatory variable. For example, Ali et al. (2010) focus on the effects of institutional quality on FDI inflows and include trade openness as a covariate. The results show that trade openness has a positive and highly statistically significant effect on FDI inflows. Furthermore, Asiedu (2002) observes if trade openness affects FDI inflows into sub-Saharan African (SSA) countries differently than in non-SSA countries. Her findings show that this is not the case and that trade has a positive effect in SSA countries. This highlights that the effect of trade on FDI inflows is not limited to a specific country sample or certain income levels.

In contrast to the above-mentioned studies, Nunnenkamp (2002) and Vijayakumar et al. (2010) find no evidence of positive impacts of trade openness on FDI inflows in a large and diverse set of countries. Nunnenkamp (2002) finds that the change in trade shares in a sample of 28 developing countries only had a positive effect on FDI inflows at the end of the 1980s and the beginning of the 1990s. In the periods from 1993 until 2000, no effects of trade shares on FDI inflows are identified. Only trade restrictions are negatively affecting FDI inflows from 1993 until 2000. However, the explanatory power of Nunnenkamp's results is

³Tunisia, Morocco, Egypt, Finland, Hungary, Poland, Portugal, Czech, Ireland, and Slovenia

limited, because he only observes correlations, and no evidence, based on multiple regression analysis, is presented. Vijayakumar et al. (2010) analyze the determinants of FDI inflows in BRICS countries⁴. Their findings show that trade openness is not an explanatory variable in all BRICS countries from 1975 to 2007. However, the authors also highlight that the BRICS countries are the superior economies in the world and the main recipients of FDI inflows during the last decades. Furthermore, even within BRICS countries, the dynamic of FDI inflows changed from 1975 to 2007. This highlights that BRICS countries are exceptional in receiving FDI inflows and the results of Vijayakumar et al. (2010) cannot be taken as general evidence against the effects of trade openness on FDI inflows. This raises the question, of whether the country sample, the sample period, or the different empirical approaches can explain the diversity of results found in the literature.

Bütthe and Milner (2008) and Bütthe and Milner (2014) observe a different mechanism through which trade can have an effect on FDI inflows. In contrast to the above-discussed studies, they do not test for the effect of trade flows or trade openness on FDI inflows, but whether trade agreements impact the attractiveness of foreign investments. Their findings show that trade agreements, especially if they are in force, have a positive and significant effect on FDI inflows. However, trade agreements are not the only mechanism through which trade affects FDI inflows in their analysis, and also the ratio of trade to GDP plays a key role in determining FDI inflows. Shah and Khan (2016) find supportive evidence for the positive effect of trade agreements on FDI in a sample of 6 emerging countries from 1996 to 2014. Their findings show that especially preferential trade agreements significantly affect the overseas investment decision of multinational enterprises. Nevertheless, because of the initial intention of trade agreements to increase trade flows, the effect of trade agreements and real trade flows can hardly be interpreted as independent from each other. Therefore, the results of Bütthe and Milner (2008), Bütthe and Milner (2014), and Shah and Khan (2016) further highlight the importance of trade for FDI inflows.

For the sample of ASEAN member states, few empirical studies examine the determinants of FDI inflows. Two of them, Hoang and Bui (2015) and Jahan and Paul (2021), provide recent evidence for a positive effect of trade openness on FDI inflows. Hoang and Bui (2015) observe a set of independent variables and their impact on FDI inflows in six ASEAN countries from 1991 to 2009. In their estimation, they use a Feasible Generalized Least Squares

⁴Brazil, Russia, India, China, and South Africa

method with random fixed effects and one-year lags in most covariates to overcome possible endogeneity. The results of the effect of trade openness on FDI inflows in ASEAN countries confirm previous findings of Ismail (2009) and Masron and Abdullah (2010), and predict a positive impact of trade openness on FDI inflows in the region. Jahan and Paul (2021) use a fixed effects model to identify the determinants of FDI inflows into 11 states, including the three ASEAN member states Indonesia, the Philippines, and Vietnam from 1995 to 2019. Their findings support that trade openness is a significant contributor to FDI inflows into these countries. Furthermore, the market size, measured in GDP, annual inflation rates, the availability of natural resources, and the infrastructure quality in host countries of FDI inflows are included in the analysis. The results show that all of the covariates, except the one for infrastructure facilities, are significant determinants of FDI inflows. Hoang and Bui (2015) and Jahan and Paul (2021) highlight that in recent observations in ASEAN member states, trade has a positive effect on FDI inflows.

Overall, the findings of previous research highlight that trade is an important determinant of FDI inflows. However, in most studies trade openness is used as the trade variable and the impact of regional trade flows is not observed, and therefore, the real effects of FTAs like the AFTA are neglected in the literature. Thus, empirical evidence for the effects of intra-ASEAN exports on FDI inflows can shed light into the discussion about regional strengthening and its relationship to FDI inflows.

2.3 Endogeneity between FDI and trade

The above-mentioned studies highlight that FDI and trade are connected to each other and rather complement than substitute each other. However, they cannot clarify if FDI or trade is the main driver of this relationship in the ASEAN context. Most of the studies use versions of panel data regressions to estimate the effects of trade on FDI inflows. Even with the inclusion of fixed effects in the analysis, these methods can only be interpreted as correlations between the two variables of interest and no causal linkages from trade to FDI can be explained because of potential reverse causality. Reverse causality exists if intra-ASEAN trade increases due to more FDI inflows in the region. This is a plausible scenario because more FDI inflows are assumed to increase productivity levels, economic activity, and thus exports.

To overcome the reverse causality problems, instrumental variable approaches have been applied in many different contexts in previous research. For example, Autor et al. (2013) and Autor et al. (2016) use the import growth of China with other high-income countries as an instrument for the growth of imports between the United States and China. Nunn (2008) uses the distance of African countries to the locations of high slave demand as an instrument for slave exports in a historical context. Dinkelman (2011) uses the land gradient as an instrument for the implementation of electricity programs in South Africa. These examples highlight that instruments can be used in many areas to overcome reverse causality problems, and are a good approach to solving endogeneity between trade and FDI flows.

Trade disputes between the United States and China have been affecting the global economy since the beginning of the 1990s (Aslam, 2019). Aslam (2019) highlights that variation in trade flows between the two biggest economies in the world can have significant impacts on the trade flows of ASEAN countries. Furthermore, he highlights that this could even lead to a more self-sustained ASEAN economy. Dungey et al. (2018) provide further evidence for the vulnerability of ASEAN countries toward the development of large economies in international markets. Raghavan and Devadason (2020) even highlight that trade shocks between the United States and China in the time after the Asian Financial Crisis have a greater impact on ASEAN markets than shocks within ASEAN countries. Furthermore, they find that trade shocks between the United States and China were the dominant drivers of growth for weaker trade-linked ASEAN countries from 1978 to 2018. Motivated by the impact of trade between the United States and China on intra-ASEAN trade, trade flows between the United States and China are used as an instrument for intra-ASEAN trade flows in this thesis. This allows for the first time to provide causal indicators for the effect of intra-ASEAN trade on FDI inflows.

3 Data

The aim of this thesis is to observe the effects of trade on FDI inflows in ASEAN member states in the time since the introduction of the AFTA in 1992. Therefore, only the time after the implementation of the AFTA is included in the estimations. The data covers intra-ASEAN exports and total FDI inflows into each ASEAN member state from 1992 to 2020. Due to data limitations, only half of the ASEAN countries are covered for the entire sample period and the dataset is unbalanced. Summary statistics of all variables included in the estimations are shown in Table A.1.

In the following, the variables included in the estimations in Chapter 4 are explained and the variation in the data is explored. Chapter 4 first presents correlation and first indicators for the relationship between exports among and total FDI inflows to each member state of the ASEAN. Second, an instrumental variable approach is applied to provide a causal interpretation between ASEAN exports and FDI inflows. The trade volumes between the two largest economies in the world, the United States and China, serves as an instrument for intra-ASEAN exports.

3.1 Variables and composition of the data

The main explanatory variable and the dependent variable are derived from the International Monetary Fund (IMF) Direction of Trade Statistics (DOTS) (International Monetary Fund, 2022) and the United Nations Conference on Trade and Development (UNCTAD) statistics (United Nations, 2022). Information about a set of covariates is based on data from the World Development Indicators (World Bank, 2022).

The dataset covers annual observations from all ten ASEAN member states¹ during the time from 1992 to 2020. For most countries, data is available from the year 2000 onward. However, the information about the full observation period is only available for Indonesia, Malaysia, the Philippines, Singapore, and Thailand. The Lao People's Democratic Republic offers the smallest sample and only covers the years from 2010 to 2016 (see Table A.2).

The indicator for trade between ASEAN countries is measured in total annual exports

¹Indonesia, Malaysia, the Philippines, Singapore and Thailand, and latecomers Brunei Darussalam, Viet Nam, Lao People's Democratic Republic, Myanmar, and Cambodia

3 Data

of each ASEAN member state to all other countries of the Association. Bilateral exports between ASEAN countries are derived from the IMF DOTS and added to the total sum of intra-ASEAN exports per country and year. The original unit of exports is measured in current million USD. For better comparison of the results, current prices are converted to constant million USD in 2011, applying Consumer Price Indices in a standard approach (e.g. Hickel et al., 2021). Total exports per country reflect the strength of intra-ASEAN trade and are, therefore, used as the main explanatory variable for intra-ASEAN trade. If exports within the region increase, also imports and total trade volume increase, because only bilateral trade within the ASEAN is taken into account. Therefore, exports also predict the total trade flows within ASEAN member states and are further highly associated with high FDI inflows. Figure A.2 depicts the total intra-ASEAN exports for all countries in the sample. The blue lines show the actual variation in exports indexed to the year 2010. It highlights that some countries like Malaysia, Thailand, and Vietnam are relatively silent in their export developments and show stable long-term growth in intra-ASEAN exports. The other countries are more volatile in their intra-ASEAN export development. However, the red lines show the trend of exports to other ASEAN member states as fitted values and highlight that for almost all countries exports increased during the observation period. The only country in the sample that has a negative trend in intra-ASEAN exports is Myanmar. Nevertheless, observations for Myanmar are only available from 2010 to 2018. During these nine years, half of the ASEAN member states had negative trends in their export developments and therefore, Myanmar is not an outlier in the sample.

FDI measures are taken from the UNCTAD statistics and originally measured in million USD in current values. As the measure for exports, the unit is converted to constant million USD in 2011 for better compatibility over time, between countries, and to other measures in the analysis. The same method as for exports is applied (see Hickel et al., 2021). FDI can be measured either as stocks or flows in a given time period. In the literature, FDI flows are mostly preferred. According to Nunnenkamp (2002) this has three main advantages. First, FDI flows are expected to be more driven by the determinants over time and less path-dependent than FDI stocks. Second, FDI flows are reacting more towards trade openness as an independent variable. Third, FDI flows allow controlling for the improvement of investment conditions rather than constant impediments.

In contrast to exports, FDI is measured in total net inflows from all countries available

3 Data

in the UNCTAD database, including ASEAN and non-ASEAN countries worldwide. This is because the aim of the analysis is to observe if the regional integration through the ASEAN and AFTA had an impact on attracting more investment from all over the world, not just within the Association. The denotation of net FDI inflows is conventionally used in databases and is defined as the inflows of investments minus the related costs of those investments. This means that net inflows of FDI can be negative due to three reasons. First, if investments are sold to domestic investors and appear in the data as net disinvestments or negative investments. Second, if a foreign parent company borrows money from the affiliate or if the domestic company pays off a loan to the foreign investor. Third, if the affiliate makes negative profits due to non-profitable business or if the dividends paid to the investor are bigger than the income of the affiliate. In the sample, in total seven observations of net FDI inflows are negative in Brunei Darussalam, Indonesia, and Thailand. Figure A.3 depicts the development of net FDI inflows in all ASEAN countries. The blue lines show the actual values indexed to the year 2010 equals 100 and highlight that FDI seems more volatile than exports during the observation period in all countries. The red lines display the fitted values of FDI inflows and show the general trends of FDI over the sample period. For most countries, the trends are similar to the ones observed for exports in Figure A.2. However, in Brunei Darussalam and Thailand the trends for FDI inflows are quite different from developments in export flows between ASEAN countries.

Figure 3.1 presents the actual values of intra-ASEAN exports and total FDI inflows for each country in the data. For better comparison, the two measures are indexed to the value 100 in the year 2010. From a graphical analysis, the correlation between the two variables seems to be positive in most countries. The overall correlation between both measures in all countries is 0.77. However, in Brunei Darussalam and Myanmar, the correlation is rather weak and even negative with -0.20 and -0.13 respectively. One takeaway from the graphical comparison between ASEAN exports and total FDI inflows is that in the last years of the observations in Malaysia, the Philippines, Singapore, and Thailand the variables seem to divert more than in the time before. This is especially interesting because in these countries the variables are stronger correlated in earlier years of the observation. Nevertheless, the

3 Data

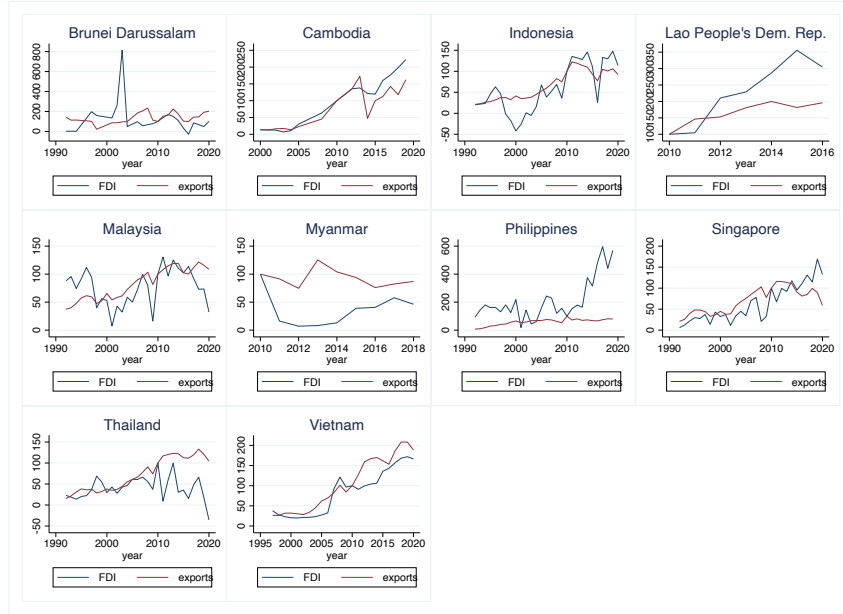


Figure 3.1: Aggregated bilateral export flows within ASEAN countries and net FDI inflows by country; Source: International Monetary Fund (2022) and United Nations (2022)

overall patterns of the correlation between the variables in Figure 3.1 support the hypothesis that intra-ASEAN trade increases the attractiveness of FDI inflows from all over the world.

Information about a set of covariates is based on data from the World Development Indicators (World Bank, 2022). To capture other explanatory variables and to mitigate the risk of omitted variable bias (OV) problems, covariates of market size, economic stability, trade openness, and natural source availability are included in the analysis following the approaches of Vijayakumar et al. (2010), Hoang and Bui (2015), and Jahan and Paul (2021) and others (see Chapter 4).

As a measure of market size GDP in constant million USD is included in the estimations. It is predicted that bigger markets attract more FDI inflows. For economic stability, annual inflation rates, measured in consumer prices, for each country of the sample are included in the analysis. Economic stability is associated with higher FDI inflows because stable markets are more profitable for long-term investments. Inflation rates are used as a proxy for economic stability. High inflation rates indicate low economic stability and thus, are expected to be negatively correlated with FDI inflows. Trade openness is measured as total exports plus imports divided by GDP. Often, FDI inflows are associated with increases in exports because multinational enterprises produce in low-income countries and export intermediate or final goods. Therefore, trade openness is assumed to be one of the main

drivers of FDI inflows. Moreover, especially in low-income countries, the availability of natural resources seems to attract foreign investors. Fuel exports, measured in percentage of merchandise exports, are used as a proxy for the availability of natural resources and are anticipated to be positively correlated with FDI inflows.

As an additional covariate, the quality of infrastructure facilities is included in the estimations in Chapter 6. Infrastructure development is expected to have a positive impact on FDI inflows. Better infrastructure makes investments more productive, for example, because of lower shipment costs or stable energy supplies. In the estimation, mobile phone usage and fixed telephone subscriptions per 100 persons are used as proxies for the development of infrastructure facilities.

3.2 Instrumental variable approach

As highlighted in Chapter 2, the bilateral trade flows between the United States and China are expected to be correlated with intra-ASEAN exports and are, therefore, used as an instrument in the analysis of this thesis (see Chapter 4). Information about trade flows is taken from the IMF DOTS (International Monetary Fund, 2022). The DOTS contains information about bilateral imports and exports. The instrument is constructed as imports plus exports between the two trading partners and taken from the authorities of the United States. This has the advantage of consistent measurement mechanisms over time and information from the United States contains better data coverage than information from Chinese authorities. As the measures of within ASEAN exports and FDI flows, also bilateral trade flows between the United States and China are converted to constant prices in million USD in 2011 using consumer price indices (see Hickel et al., 2021).

Figure 3.2 shows the development of trade flows between the United States and China and aggregated intra-ASEAN exports from 1992 to 2020. The measures seem to be positively correlated to each other and provide a supportive indication that trade flows between the United States and China are a good instrument for intra-ASEAN trade flows. This graphical analysis is supported by the strong correlation of 0.97 between both measures. It further reveals that they follow generally similar directions even though within ASEAN exports are generally increasing slower than United States-China trade flows. This is most likely explained by the enormous growth of the Chinese economy after the reform package in 1978,

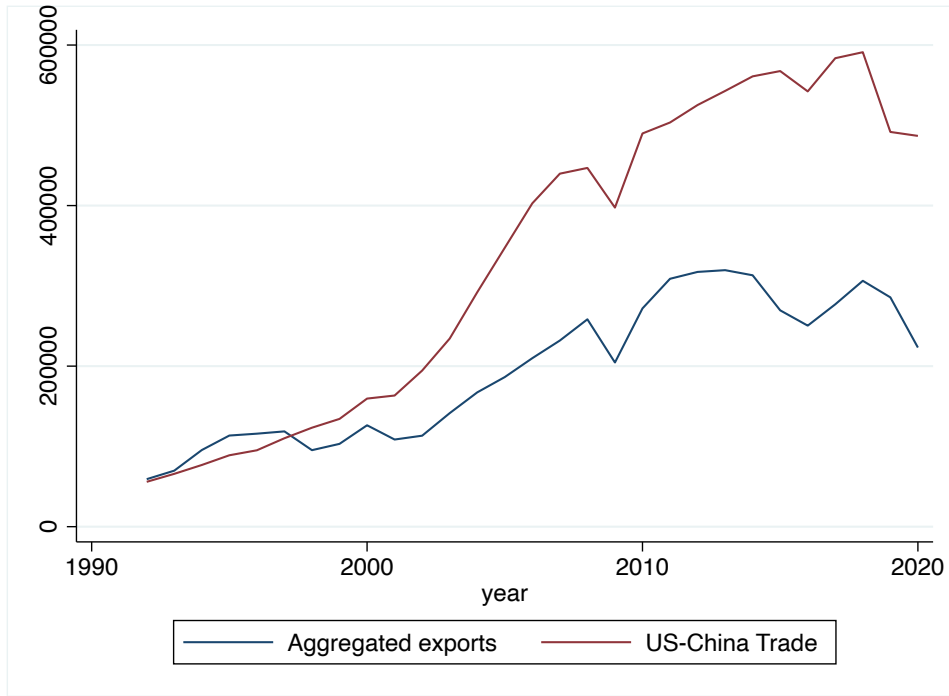


Figure 3.2: Aggregated bilateral exports within ASEAN countries and trade flows between the United States and China in million USD in 2011; Source: International Monetary Fund (2022)

which also increases the trade flows of China (Garnaut et al., 2018).

Figure A.1 provides further support for the importance of the instrument in global markets and its impact on intra-ASEAN trade. The Figure shows the sizes of the economies in the United States, China, and Japan from 1992 to 2020. It shows that throughout the entire sample period, the economy of the United States is the largest in the world. From 1992 to 2004, Japan had the second-largest economy in the world. However, the rapid growth of the Chinese economy from 1978 onwards leads to a catch-up process, and from 2005 to the end of the sample period, China is the second-largest economy in the world, measured in GDP. This supports the relevance of the instrument, measured as trade flows between the United States and China because the trade flows between the two largest economies in the world are expected to have a big impact on exports of other countries including the ASEAN member states.

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To test whether intra-ASEAN exports have an impact on FDI inflows into ASEAN member states, three different estimation strategies are used. First, the relationship between intra-ASEAN exports and FDI inflows is investigated with a linear regression model to observe possible correlation between exports and FDI. Second, year and country fixed effects are included in the regression to control for time and country-specific variation. However, in both approaches, the problem of reverse causality remains and it cannot be excluded that FDI causes increases in exports rather than the other way around. Therefore an instrumental variable approach is finally applied to solve this endogeneity problem. Trade flows between the United States and China are used as an instrument for intra-ASEAN exports.

4.1 Panel data regressions

To estimate the correlation of intra-ASEAN exports and FDI inflows into ASEAN member states, a standard panel data model (e.g. Ali et al., 2010; Jahan and Paul, 2021) is applied following the regression:

$$\begin{aligned} FDI_{ct} = & \alpha + \beta_1 exports_{ct}^A + \beta_2 GDP_{ct} + \beta_3 inflation_{ct} \\ & + \beta_4 trade\ openess_{ct} + \beta_5 natural\ resources_{ct} + \epsilon_{ct} \end{aligned} \quad (4.1)$$

where FDI_{ct} , the dependent variable, refers to the net FDI inflows into each country c at time t from the rest of the world. α is the constant of the regression model. The explanatory variable of interest $exports_{ct}^A$ represents the total intra-ASEAN exports of each country. GDP_{ct} is the total GDP in each country and year. $inflation_{ct}$ is the annual inflation rate. The variable of $trade\ openess_{ct}$ depicts how much a country trades in relation to its market size, and finally, $natural\ resources_{ct}$ is a proxy for the availability of natural resources. ϵ_{ct} is the error term of the model.

The estimations following Equation 4.1 provide the first evidence for possible correlation between FDI inflows, intra-ASEAN exports, and a set of covariates. However, it is reasonable to assume that not all variation between countries is controlled for in the set of covariates and that there are unobserved constant factors in each country that affect FDI inflows and are correlated with intra-ASEAN exports. Furthermore, also time-invariant

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factors can affect FDI inflows and are correlated with ASEAN exports. For example, the Asian Financial Crisis in 1997 is likely to affect the dependent variable and the explanatory variable (Thangavelu et al., 2009). To control for this unobserved variation, two widely used approaches in the literature exist, a random effects and a fixed effects approach (Clark and Linzer, 2015). Given the long observation period of 29 years and sufficient variation in the data (see Table A.2 and Figure A.2 and A.3), country and year fixed effects are a good fit for the model and are included in the model to capture the unobserved variation. Additionally, a Hausman test is applied to test whether the inclusion of fixed effects or random effects in the regression are better fits to capture unobserved country and year variation. The results support the inclusion of fixed effects over random effects in the estimation. Therefore, a fixed effects model specification is applied in Equation 4.2 to control for unobserved country and year variation:

$$FDI_{ct} = \alpha + \beta_1 exports_{ct}^A + \beta_2 X_{ct} + \gamma_c + \theta_t + \epsilon_{ct} \quad (4.2)$$

where all indicators are similar to the ones in Equation 4.1, and X_{ct} represents the vector of covariates as highlighted above. γ_c indicates country fixed effects for each country c and θ_t are year fixed effects for each year t .

Furthermore, the regression must hold a set of assumptions in order to provide valuable estimates. One assumption is that each random error has a probability distribution with variance σ^2 , which is the same for each observation. In other words, the residuals of the explanatory variable must be homoskedastic and fulfill the condition:

$$var(y_i) = var(e_i) = \sigma^2 \quad (4.3)$$

If this assumption does not hold, the standard errors of the estimation decrease, and the results for the level of significance are not trustworthy. Therefore, a series of tests for heteroskedasticity of the explanatory variable are performed. First, the graphical analysis in Figure A.4 shows the linear distribution of the residuals of intra-ASEAN exports. Furthermore, Figure A.5 depicts the squared values of the linear distribution of the residuals of intra-ASEAN exports. Both Figures highlight that for larger values of intra-ASEAN exports, the residuals become larger and indicate heteroskedasticity and thus, a violation of the homoskedasticity assumption. In addition to the graphical analysis, two tests for ho-

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moscedasticity are applied. First, a Breusch-Pagan test supports the graphical findings of heteroskedasticity for a linear model. Second, a White test is applied, which also captures non-linear and interactive effects on the error variance. Like the Breusch-Pagan test, also the White test indicates heteroscedastic in the variance. In order to overcome heteroskedasticity in the variance and additionally control for correlated standard errors at the country level, the model is estimated with clustered standard errors. This is a standard procedure in the literature and relaxes the assumption of homoskedasticity. With robust standard errors, the error variance can differ between years but is constant at the country level.

Next, the assumption of no perfect multicollinearity within the independent variables in the model must hold. If variables show perfect multicollinearity to each other, the results of each single covariate cannot be interpreted independently and the model cannot be estimated in a linear regression. A variance of inflation factor test is applied to test for possible multicollinearity in the model. The results depict that there are no concerning levels of multicollinearity within the sample of independent variables.

In Equations 4.1 and 4.2 only linear terms of covariates are included. Therefore, the error terms are assumed to be normally distributed in order to estimate exact confidence intervals and thus, interpret statistical significance. In Figure A.6 a graphical analysis at the country level is applied to observe the distribution of the residuals. It shows that intra-ASEAN exports are not normally distributed over the total sample period in some ASEAN countries. This could be caused by external shocks, which influence the density of exports within ASEAN countries at a specific time. In the case of Indonesia, Tambunan et al. (2012) show that three external shocks had an impact on trade flows. First, the Asian Financial crisis in 1997, second the Global Financial Crisis in 2008, and third the debt crisis of the Eurozone in 2011. Further, Dungey et al. (2018) highlight that ASEAN member states have become more independent from economic shocks from outside of Asia after the Financial Crisis. Following these shocks and general trends of intra-ASEAN export flows, three different periods for the normal distribution of the residuals are observed. First, a comparison of the time before and after the Asian Financial Crisis, second, the time before and after the Global Financial Crisis, and third, the periods before and after the shock of the debt crisis of the Eurozone in 2011. Especially the time after the debt crisis of the Eurozone shows more normally distributed residuals than the observations over the total sample period (Figure A.7). Also, the distribution of residuals before 2011 seems to be more

normally distributed than during the complete sample (Figure A.8). Therefore, the year dummy $Year_{2011}$ is created which equals zero for the time before 2011 and one otherwise. The dummy is included in a model specification with country fixed effects to control for within-country changes of the results due to non-normally distributed residuals following Equation 4.4. The results are not meaningfully different from the estimates without the year dummy and therefore, the effect of non-normally distributed residuals in the estimation does not threaten the credibility of the overall results (see Table A.3).

$$FDI_{ct} = \alpha + \beta_1 exports_{ct}^A + \beta_2 X_{ct} + \beta_3 Year_{2011} + \gamma_c + \epsilon_{ct} \quad (4.4)$$

4.2 Instrumental variable estimation

The above-explained panel data estimations without and with fixed effects can explain a correlation between the explanatory variable of intra-ASEAN exports and the dependent variable of FDI inflows into ASEAN countries. However, the findings of these estimations cannot be interpreted as causal relationships from exports to FDI inflows. There is reason to believe that reverse causality could occur and that FDI inflows are the main driver of the relationship between FDI and trade. This would also indicate that trade agreements, like the AFTA, might not be efficient mechanisms to increase FDI inflows, and therefore, external variation is needed to explain the causal chain from intra-ASEAN exports to FDI inflows.

One frequently used mechanism to overcome endogeneity problems is the use of exogenous instruments (e.g. Nunn, 2008; Dinkelman, 2011). In an instrumental variable approach, an exogenous variable is used as a substitute for the main endogenous variable in the analysis. The substitute (instrument) must thereby be correlated with the endogenous variable but uncorrelated with the dependent variable. In order to generate credible results, an instrument must fulfill two conditions: First, the instrument must be relevant. This means that the instrument has a statistically significant effect on the main independent variable of interest and that this effect can explain enough variation. Second, the instrument cannot have a direct effect on the dependent variable, the effect of the instrument on the dependent variable must only appear through the independent variable of interest (exclusion restriction) (Angrist and Pischke, 2008, p.117).

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The relevance condition of instruments can be estimated in the first stage of a 2 stages least squares (2SLS) estimation procedure. In the first stage of the 2SLS analysis, the effect of the instrument on the original explanatory variable is estimated. As mentioned above, the first stage results of good instruments must show a statistically significant effect on the main explanatory variable and also explain enough variation in the original explanatory variable. As a rule of thumb, the F-statistic of a strong instrument in the first stage estimation in a 2SLS approach should be around 10 or higher (Andrews et al., 2019). In the second stage estimation, the instrument substitutes the endogenous variable in the main estimation to provide exogenous results.

In globally integrated markets, the ASEAN member states react to developments in the United States and China. Raghavan and Devadason (2020) highlight that trade flows between the two largest economies in the world also affect the direct trade flows between ASEAN countries and the United States and China. However, due to the interdependency of regional markets on demands from China or the United States, also intra-ASEAN trade is affected by trade flows between China and the United States. Therefore, in this analysis intra-ASEAN exports are instrumented by the trade flows between the United States and China, as motivated by the correlation between both variables shown in Chapter 3. The first stages estimation in the instrumental variable approach follows the regression:

$$exports_{ct}^A = \alpha + \beta_1 tradeUSChina_t + \beta_2 X_{ct} + \gamma_c + \epsilon_{ct} \quad (4.5)$$

where $exports_{ct}^A$ and X_{ct} describe intra-ASEAN exports and the same set of covariates as in Equation 4.1. $tradeUSChina_t$ refers to the exports from the United States to China plus the imports from China into the United States for each year t in the sample. γ_c are country fixed effects and ϵ_{ct} is the error term.

In this model trade flows between the United States and China are instrumenting all bilateral export flows between ASEAN countries for each year. This means that the instrument has only one value per year and the variation is only determined by time. Therefore, the inclusion of year fixed effects in the estimation would omit the effect of the instrument in the analysis. The instrument and the year dummies would exactly explain each other and cause perfect multicollinearity. Therefore, only country fixed effects are included in the 2SLS estimations and no year fixed effects.

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In contrast to the relevance condition, the exclusion restriction cannot be proven by statistical analysis. The condition requires that the error terms of the first stage estimation are not correlated with the dependent variable of the second stage analysis. In other words, the instrument should affect the dependent variable only through the explanatory variable. In the case of this study, this means that trade flows between the United States and China have no direct effect on FDI inflows into ASEAN countries and the only effect is through intra-ASEAN exports. Due to Raghavan and Devadason (2020) the ASEAN region is more affected by global shocks than by shocks within the region, especially in the time after the Global Financial Crisis in 2008. This means that trade within the ASEAN member states reacts especially volatile toward trade between the two biggest economies in the world, the United States and China. If the trade flows between those two countries increase, global demand also increases and the production within ASEAN countries goes up in order to supply these demands. Majuca, Pagaduan, et al. (2015) show that the share of intra-ASEAN exports to total ASEAN exports is increasing from 1990 to 2012, which indicates that within ASEAN exports become more relevant for the region. This highlights that exports of ASEAN countries to the rest of the world become less important in relation to intra-ASEAN exports, which supports the exclusion restriction of the instrument.

One could argue that increasing trade flows between the United States and China lead to greater demands on global markets and that these demands increase FDI inflows into all countries, including ASEAN member states. However, this mechanism would only occur through an indirect effect through exports of ASEAN countries to the rest of the world to supply increasing global demands. As mentioned above, this does not seem to be the driving force of FDI inflows into ASEAN countries, because exports of ASEAN member states to countries outside of the ASEAN become less important in the region (Majuca, Pagaduan, et al., 2015). Napoli (2014) describes that the importance of Chinese exports in global markets become more relevant and are taking over the role of ASEAN exports to supply demands in the United States and other parts of the world. At the same time, FDI inflows into ASEAN countries increase (Napoli, 2014). This means that the driving force of FDI inflows into ASEAN member states must be due to the strengthening of the region and intra-ASEAN trade. Therefore, the instrument of trade flows between the United States and China are expected to be exogenous on FDI inflows to ASEAN countries, and the main driving force of the relationship between the United States and Chinese trade flows with

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ASEAN FDI inflows through increased exports between ASEAN countries.

The regression in Equation 4.6 estimates the second stage of the instrumental variable approach. In contrast to the regressions in Equations 4.1 and 4.2, intra-ASEAN exports are substituted by $trade\ USChina_t$, the annual trade flows between the United States and China.

$$FDI_{ct} = \alpha + \beta_1 trade\ USChina_t + \beta_2 X_{ct} + \gamma_c + \epsilon_{ct} \quad (4.6)$$

5 Empirical results

This Chapter presents the empirical findings of the models explained in Chapter 4. The estimations are based on the data described in Chapter 3. In Section 5.1 the findings of the panel data estimations without and with fixed effects regressions are shown. The results show a correlation between intra-ASEAN exports and net FDI inflows into ASEAN countries from all over the world. Section 5.2 describes the results of the instrumental variable estimations. It shows that the instrument is relevant for the baseline model specification. However, the causal relation from intra-ASEAN exports to net FDI inflows in the model specification with all covariates included cannot be confirmed in the instrumental variable approach.

5.1 Panel data regressions

The results displayed in Table 5.1 present the findings of Equation 4.1 in Chapter 4. The dependent variable in the panel data regression is measured as FDI inflows from all over the world into ASEAN member states. The different model specifications in Columns (1) to (6) depict different sets of covariates.

Column (1) shows the baseline model where only intra-ASEAN exports are included in a linear panel data regression model to explain FDI inflows. It shows that in this model specification, intra-ASEAN exports have a positive and highly statistically significant impact on the dependent variable. If exports increase by one million USD, FDI inflows are predicted to increase by 0.4 million USD. In Column (2) GDP as a measure of market size is included in the estimation. The results highlight that GDP has a positive and significant effect on FDI inflows, but the magnitude and economic relevance of GDP seems much smaller than that of intra-ASEAN exports. If GDP increases by one million USD, FDI inflows are predicted to increase by 0.01 million USD. However, the predicted effect of intra-ASEAN exports on FDI inflows is not affected in its significance and is only slightly reduced in its magnitude with the inclusion of GDP in the estimation. In Columns (3), (4), and (5), inflation, trade openness, and the availability of natural resources are included as additional covariates next to intra-ASEAN exports. The main takeaway from these Columns is that the effect of intra-ASEAN exports on FDI inflows is quite stable and highly statistically significant in all specifications. None of the covariates in Columns (3) to (5) have a statistically significant effect on FDI

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Table 5.1: Panel data regressions without fixed effects

Dep. var. FDI	(1)	(2)	(3)	(4)	(5)	(6)
Exports	0.398*** (0.109)	0.357*** (0.110)	0.396*** (0.109)	0.415*** (0.150)	0.399*** (0.111)	0.373* (0.191)
GDP		0.009*** (0.003)				0.007 (0.007)
Inflation			-85.39 (95.25)			-39.01 (108.8)
Trade openness				-14.98 (34.98)		-4.153 (45.15)
Availability of natural resources					-34.75 (38.70)	-18.20 (46.30)
Constant	-735.3 (1235.2)	-1385.5 (1554.9)	-322.7 (892.4)	836.2 (2952.4)	-39.11 (1088.1)	-266.4 (5534.0)
N	227	227	227	227	227	227
Within R^2	0.347	0.363	0.349	0.357	0.350	0.364

The dependent variable is the total inflow of FDI. Standard errors in parentheses.

All specifications with clustered standard errors.

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$ indicate significance at the 1%, 5%, and 10% levels.

inflows. Taking into account previous studies, the insignificant results of inflation and the availability of natural resources are rather surprising. Nevertheless, this even supports the importance of intra-ASEAN trade on FDI inflows and shows that neglecting intra-ASEAN trade in previous studies could have led to omitted variable bias problems. Also, the insignificant effect of trade openness contrasts with the findings of previous studies. The result additionally supports the exclusion restriction for the instrument in the instrumental variable approach and highlights that ASEAN FDI inflows are not directly affected by the global market, but rather by intra-ASEAN exports. In Column (6) of the Table, all covariates are included in the estimation. The results highlight that the general trends of Columns (1) to (5) hold. However, the level of significance for intra-ASEAN exports decreases from the 99 percent confidence interval to the 90 percent confidence interval. The model predicts that if intra-ASEAN exports increase by one million USD, FDI inflows increase by 0.37 million USD. Additionally, GDP becomes insignificant in Column (6). In the last row of the Table, the within R^2 values are depicted. The difference in the explained within-country variation of the model does not increase much when the covariates are added

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to the model. This indicates, that intra-ASEAN exports explain most variation in the model. Overall, Table 5.1 highlights that intra-ASEAN exports are statistically significant determinants of FDI inflows into ASEAN member states.

Table 5.2: Panel data regressions with fixed effects

Dep. var. FDI	(1)	(2)	(3)	(4)	(5)	(6)
Exports	0.378*** (0.114)	0.363** (0.132)	0.378*** (0.113)	0.406** (0.159)	0.384*** (0.096)	0.456* (0.216)
GDP		0.009 (0.007)				0.00582 (0.012)
Inflation			19.07 (198.4)			138.0 (208.2)
Trade openness				-60.69 (102.9)		-99.15 (134.9)
Availability of natural resources					-49.84 (229.9)	-380.9 (318.2)
Constant	144.9 (3913.5)	-326.5 (3706.2)	41.62 (4569.5)	7251.9 (8757.8)	1222.6 (8638.5)	18922.0 (18059.7)
N	227	227	227	227	227	227
Within R^2	0.406	0.411	0.406	0.422	0.406	0.438

The dependent variable is the total inflow of FDI. Standard errors in parentheses.

All specifications with clustered standard errors.

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$ indicate significance at the 1%, 5%, and 10% levels.

Table 5.2 presents the findings of Equation 4.2 in Chapter 4. In contrast to the findings in Table 5.1, country and year fixed effects are included in the regression. The results of Table 5.2 are similar to the ones in the estimation without fixed effects. Column (1) shows the baseline model and predicts that if intra-ASEAN exports increase by one million USD, FDI inflows from all over the world increase by 0.38 million USD. Interestingly and in contrast to the results in Table 5.1, in Column (2) GDP is no significant determinant of FDI inflows when unobserved country and year variation is controlled for. The coefficient for intra-ASEAN exports is even slightly larger than in the regression without fixed effects and significant to the 95 percent confidence interval. The other covariates in the model in Columns (3), (4), and (5) remain insignificant in the fixed effects estimation. Surprisingly, the coefficient for inflation in Column (3) turns positive, which is in contrast to evidence found in the literature. However, given that the result is insignificant, no relationship

between inflation rates and FDI inflows is identified. In Column (4), trade openness is added as a covariate to the baseline model. This reduces the significance level for the main explanatory variable from 99 percent to 95 percent. Furthermore, the inclusion of trade openness increases the magnitude of the effect of intra-ASEAN exports on FDI inflows from 0.38 million USD to 0.41 million USD for each additional million of intra-ASEAN exports. Column (6) shows the model where all covariates are included. In the full sample specification, intra-ASEAN exports have a positive and statistically significant effect on FDI inflows to the 90 percent confidence interval. If exports increase by one million USD, FDI inflows are predicted to increase by 0.46 million USD. The within R^2 values vary in all specifications between 0.41 and in the baseline model and 0.44 in the full specification. This indicates that the inclusion of the covariates cannot explain much additional variation of FDI inflows to ASEAN countries. The main takeaway from Table 5.2 is that even with controlled unobserved country and year variation, intra-ASEAN exports seem to be a robust determinant of FDI inflows.

5.2 Instrumental variable approach results

The results of Tables 5.1 and 5.2 predict a correlation between intra-ASEAN exports and global FDI inflows into ASEAN member states. However, as explained in Chapter 4, this correlation cannot be interpreted as a causal relationship from exports to FDI inflows.

Table 5.3 shows the results of the instrumental variable approach with trade flows between the United States and China as an instrument for intra-ASEAN exports. At the bottom of the Table, the first stage results are presented. In all specifications, the instrument has a positive and statistically significant effect on intra-ASEAN exports. In Column (1), the baseline model is estimated with intra-ASEAN exports as the only independent variable without fixed effects. The first stage result is significant to the 99 percent confidence interval and relevant with an F-statistic of 9.96. In Column (2), the full set of covariates is included in the estimation. Also with all covariates in the estimation, the first stage result is positive and statistically significant. However, with an F-statistic of 3.89, the relevance of the instrument is weak. In Column (3), country fixed effects are included in the baseline model. In the first stage of the regression, the impact of the trade volume between the United States and China on intra-ASEAN exports is positive, statistically significant, and with an F-statistic

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Table 5.3: Instrumental variable regressions

Dep. var. FDI	(1)	(2)	(3)	(4)
Exports	0.439*** (0.168)	0.395 (0.264)	0.434*** (0.165)	0.413 (0.358)
GDP		0.006 (0.012)		0.007 (0.019)
Inflation		-35.14 (115.3)		67.49 (55.56)
Trade openness		-17.55 (66.43)		-94.60 (149.2)
Availability of natural resources		-40.73 (82.14)		-400.1 (491.7)
Constant	-1567.1 (2400.7)	1636.3 (8582.9)	-1945.1 (4120.4)	18040.8 (24896.4)
First stage Dependent variable: intra-ASEAN exports				
Trade volume USA and China	0.06*** (0.02)	0.034** (0.017)	0.06** (0.019)	0.037** (0.016)
F-Statistic	9.96	3.89	9.97	5.21
Country fixed effects	No	No	Yes	Yes
<i>N</i>	227	227	227	227

Standard errors in parentheses. All specifications with clustered standard errors.

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$ indicate significance at the 1%, 5%, and 10% levels

of 9.97 also relevant. Column (4) shows the results for a model with all covariates and country fixed effects. The first stage results are positive and statistically significant to the 95 percent confidence interval. However, with an F-statistic of 5.21, the instrument cannot fulfill the rule of thumb for a strong instrument, which requires an F-statistic of around 10 or higher (Andrews et al., 2019).

The first stage results of the instrumental variable approach show that the trade flows between the United States and China are positive significant determinants of intra-ASEAN exports, however, the instrument is only relevant in the baseline model specifications with and without country fixed effects. In the model specifications with all covariates, the instrument appears to be weak and the second stage results should be interpreted carefully.

The second stage results of the instrumental variable approach are displayed in the top panel of Table 5.3. The baseline models in Column (1) and Column (3) without and with country fixed effects show positive and highly significant effects of intra-ASEAN exports on FDI inflows. The findings support the findings in the first Columns of Table 5.1 and 5.2 and are even larger in magnitude. In Column (1), FDI inflows are predicted to increase by 0.44

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million USD if intra-ASEAN exports increase by one million USD. The effect is therefore not only significant but also economically relevant. With the exclusion of endogeneity between intra-ASEAN exports and FDI inflows, the instrumental variable approach further allows for a causal interpretation of the effects of exports on FDI inflows. The similarity in the coefficients in Column (1) of Table 5.1 (0.4) and the second stage results of Column (1) in Table 5.3 (0.44) further support the relevance of the instrument. The results of Column (3) in the second stage estimation depict the baseline model with country fixed effects. The model predicts that if intra-ASEAN exports increase by one million USD, FDI inflows increase by 0.43 million USD. As in Column (1), the results are slightly larger in magnitude than the estimations of the fixed effects model in Table 5.2 (0.38).

In Columns (2) and (4), the full model specifications including all covariates without and with country fixed effects are estimated. The second stage results show that the intra-ASEAN exports have no significant effect on FDI inflows. However, the coefficients are similar in magnitude to the findings of the full model estimates in Table 5.1 (0.37) and 5.2 (0.46). This suggests that the direction and magnitude of the findings might indicate the correct direction, but that the low relevance of the instrument does not allow for statistically significant interpretations of the results.

Overall, the findings in Table 5.3 highlight that trade flows between the United States and China are positive and highly significantly correlated to intra-ASEAN exports. However, the explained variation of the explanatory variable by the instrument is only high in the baseline model specifications and not relevant enough for a causal interpretation of results in the second stage estimation including all covariates. Therefore, the baseline model estimations indicate that there is a causal relationship of intra-ASEAN exports on FDI inflows into ASEAN member states from all over the world, but this relationship cannot be confirmed in the full sample regressions.

6 Discussion, limitations, and additional checks

6.1 Discussion

The relationship between trade and FDI has been discussed in length in the literature. Previous literature mainly focuses on trade openness as a determinant of FDI inflows into ASEAN countries (see Chapter 2). However, this does not cover the intention of the ASEAN, and especially the AFTA, which is to strengthen the region and increase its attractiveness to foreign investors. Therefore, the focus of this thesis is on the effect of intra-ASEAN exports on FDI inflows, where trade openness is included as a control variable in the analysis.

The results in Chapter 5 show, that intra-ASEAN exports are predicted to have a positive impact on FDI inflows into the region. Therefore, the findings support the hypothesis that regional strengthening increases the attractiveness to foreign investors. This finding is also in line with the intention of the AFTA to increase FDI inflows through intra-regional economic strengthening. Previous studies have focused on the effects of general trade openness of ASEAN countries on FDI inflows, but neglected the mechanisms behind the AFTA, which fosters intra-ASEAN trade, but not international trade. The fact that with intra-ASEAN exports and general trade openness in the estimations only intra-ASEAN exports have a significant effect on FDI inflows leads to the conclusion that in ASEAN countries regional integration is more important than integration into global markets in order to attract FDI inflows. Furthermore, the results of the panel estimations and the baseline instrumental variable approaches support the implementation of the AFTA as a catalyzer to generate FDI inflows into the ASEAN region. This can also incentivize policymakers in other emerging regions of the world to implement regional FTAs to strengthen their markets and attract more FDI inflows. However, the transferability of the results should be interpreted cautiously, because they might be due to ASEAN specific conditions and are not confirmed by similar research in other regions of the world.

In contrast to previous literature, it especially stands out that the covariates in the analysis of Chapter 4 are no significant determinants of FDI inflows when intra-ASEAN exports are included in the estimations. This indicates that in other research, omitted variable bias problems might occur due to the exclusion of intra-ASEAN exports in the estimations. Insignificant results for all covariates in the models, except for Column (2) in Table 5.1,

raise the question of whether the differences in economic and political conditions between ASEAN countries are responsible for the overall insignificant results. The estimations with country fixed effects control for country-specific variation, but cannot erase the possibility that covariates might have different effects within the ASEAN countries. Another possible explanation for the insignificant results of the covariates in the analysis is that during the observed sample period, ASEAN countries react differently to variation in the covariates than in the time periods analyzed in previous studies. One reason to assume that in recent years regional economic integration became more important in the ASEAN member states is the trade war between the United States and China. With less reliable global trading partners, the strengthening of the region and potentially other factors became more important to attract foreign investors to ASEAN countries (Raghavan and Devadason, 2020).

6.2 Limitations

FDI inflows can depend on many different factors. The analysis in Chapter 5 observes a selected group of covariates following the approaches of Hoang and Bui (2015) and Jahan and Paul (2021) for ASEAN member states. However, as mentioned above, previous studies have identified a variety of factors that can influence FDI inflows (see Chapter 2). One of the most prominent determinants of FDI inflows is the quality of infrastructure development. Despite the findings in the literature, in the main analysis of this thesis, the quality of infrastructure development is not included as an independent variable. The quality of infrastructure is often measured as the length of paved roads, the fixed telephone, and mobile phone subscriptions per 100 people (Gopalan et al., 2019). Thereafter, the most important factor of infrastructure development in ASEAN countries is the length of paved roads, and fixed telephone and mobile phone subscriptions play a minor role. Unfortunately, due to data limitations in this thesis, only fixed telephone and mobile phone subscriptions are available, and are no significant determinants of FDI inflows in the sample (results on request). Moreover, the inclusion of fixed telephone and mobile phone subscriptions in the estimation has a neglectable effect on the explanatory power of the model and does not influence the impacts of the other independent variables in the models. At the beginning of the observation period, phone usage in the ASEAN member states was low and increased rapidly in each country due to industrialization. Therefore, the nature of phone usage in ASEAN countries

does not provide much evidence about the real level of infrastructure development in the region. However, this does not rule out that the omission of an appropriate infrastructure development indicator in the analysis might cause an OVB problem.

Furthermore, due to the best of my knowledge, no instrumental variable approach has been applied to test the effects of intra-ASEAN trade flows on FDI inflows. Therefore, this thesis provides the first attempt to instrument intra-ASEAN exports with trade flows between the United States and China and to overcome the reverse causality problem between exports and FDI inflows. Even though the baseline estimations reveal good results, the weak instrument in the full sample of the estimations in Table 5.3 cannot provide a conclusive causal interpretation of the findings. The instrument fulfills the exclusion restriction, but not enough variation in intra-ASEAN exports can be explained by trade flows between the United States and China. Two possible explanations might be responsible for the low level of explained variance of the explanatory variable by the instrument. First, at the beginning of the sample period from 1992 onwards, the Chinese economy was simply not large enough to have an impact on intra-ASEAN exports. Second, the different economic and political structures within ASEAN countries lead to diverse effects of intra-ASEAN exports on FDI inflows and therefore, the instrument cannot explain enough variance in outlier countries. In the following section, four different samples are tested to increase the relevance of the instrument.

6.3 Alternative approaches

Table 6.1 depicts the findings of the 2SLS regressions from Table 5.3 Column (4) in Column (1) and four different samples to test whether the exclusion of countries from the sample or a reduced time increases the relevance of the instrument.

In Column (2) Brunei Darussalam and Singapore are excluded from the sample. Brunei Darussalam is taken out of the analysis because it is a small country depending on its oil reserves and shares little similarities in its economic structure to the other ASEAN member states. Singapore accounts for almost half of all FDI inflows into ASEAN countries and is therefore clearly more effective in attracting FDI and less dependent on the influence of intra-ASEAN trade. The linkage between the United States-China trade flows can therefore be expected to have a different effect on Singapore's intra-regional exports than in other

Table 6.1: Instrumental variable regression with different data samples

Dep. var. FDI	(1)	(2)	(3)	(4)	(5)
Exports	0.413 (0.358)	-0.057 (0.078)	0.421 (0.373)	0.4* (0.234)	0.34** (0.148)
GDP	0.007 (0.019)	0.027*** (0.005)	0.006 (0.020)	0.007 (0.012)	0.005 (0.008)
Inflation	67.49 (55.56)	55.81 (39.89)	55.43 (60.30)	206.5* (118.8)	152.7 (122.3)
Trade openness	-94.60 (149.2)	42.70 (26.17)	-101.1 (158.9)	-164.7 (163.9)	-198.9 (155.7)
Availability of natural resources	-400.1 (491.7)	15.39 (147.3)	-459.5 (572)	-498.4 (443.4)	-495.6 (371.4)
Constant	18040.8 (24896.4)	-4515.6 (3088.1)	20574 (28367.2)	29570.3 (27460.7)	36474.8 (27683.3)
First stage Dependent variable: intra-ASEAN exports					
Trade volume USA and China	0.037** (0.016)	0.033* (0.017)	0.036* (0.016)	0.041* (0.021)	0.051* (0.024)
F-Statistic	5.21	4.12	5.16	3.93	4.53
Country fixed effects	Yes	Yes	Yes	Yes	Yes
<i>N</i>	227	174	210	172	140

Standard errors in parentheses. All specifications with clustered standard errors.

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$ indicate significance at the 1%, 5%, and 10% levels

Column (1) full sample; Column (2) without Brunei Darussalam and Singapore;

Column (3) without Myanmar and Lao People's Dem. Rep.;

Column (4) without years before 2001; Column (5) without years before 2005

less globally integrated countries in the ASEAN. Furthermore, both countries are by far the richest in the region in per capita terms and are therefore expected to have different demands on global markets. However, the results in Column (2) show that the F-statistic even decreases compared to the full sample in Column (1) and that taking Brunei Darussalam and Singapore out of the sample does not increase the relevance of the instrument.

In Column (3) Myanmar and the Lao People's Democratic Republic are excluded from the sample. This is because of low data availability of only ten years for Myanmar and seven years for the Lao People's Democratic Republic from 2010 onwards (see Table A.2). Figure A.2 highlights that the developments in these two countries, in the much shorter sample period than in the other countries, do not reflect the general trends of exports in the data. Nevertheless, the results of the first stage regression cannot explain more variation in intra-ASEAN exports than in the full sample.

In Columns (4) and (5) the instrumental variable approach is estimated with reduced sample periods. The relevance of the instrument is based on the idea that the two biggest economies in the world, the United States and China, have an impact on intra-ASEAN exports. However, at the beginning of the sample in 1992, China's impact on the world economy was rather small. Therefore, in Column (4) the analysis takes only into account the years from 2001 onwards when China joined the World Trade Organization and signed the General Agreement on Tariffs and Trade (GATT). In Column (5), only the years from 2005 onwards are included in the estimation, the year in which China became the second-largest economy in the world (see Figure A.1). Neither Column (4) nor Column (5) show higher F-statistics than in Column (1) and therefore, the low explained variation of intra-ASEAN exports by trade flows between the United States and China cannot be explained by the time before China became one of the most important economies in the world.

The results of Table 6.1 show that the weakness of the instrument is not explained by outlier countries in the sample or the time before China had a large influence on global markets. It further highlights that the results can only indicate a relationship of intra-ASEAN exports on FDI inflows exists, but cannot provide conclusive evidence for a causal linkage.

7 Conclusion

This thesis aims to answer whether intra-ASEAN trade flows have an impact on FDI inflows from all over the world into ASEAN countries. The results based on the panel data regressions without and with fixed effects show that intra-ASEAN exports are positively correlated to FDI inflows. Furthermore, an instrumental variable approach with a newly developed instrument for intra-ASEAN exports confirms these findings and even indicates that there might be a causal relationship from intra-ASEAN exports to FDI inflows. However, the results should be interpreted cautiously, because in the full sample instrumental variable estimation the instrument has low explanatory power of intra-ASEAN exports and does not provide evidence for a relationship between intra-ASEAN exports and FDI inflows.

With the introduction of the AFTA in 1992, the ASEAN member states aimed to increase FDI inflows into the region. Policymakers and the academic literature hypothesize that stronger economic integration leads to more inflows of foreign investment. The results in this thesis confirm this hypothesis and find a clear relationship between intra-ASEAN trade and FDI inflows. However, the general validity of these results should be interpreted cautiously because they might be caused by time and region-specific conditions.

The main takeaway is that in today's globally integrated economies, regional strengthening can be a good instrument to attract more investments and achieve higher growth rates. In contrast to previous studies, this thesis emphasizes that for emerging economies, regional integration might be more effective in attracting FDI inflows than general trade openness. A strong regional integrated market does not only directly help domestic firms to supply their products for lower costs, but also provides foreign investors with more confidence to invest in domestic markets. Based on these findings, policymakers in emerging economies should consider building strong regional relationships before opening up to global markets in order to attract more FDI inflows.

The contribution of this thesis is twofold. First, regional strengthening and its effects on FDI inflows are observed in ASEAN member states. Second, in an instrumental variable approach, the first indication for a causal relationship from intra-ASEAN exports to FDI inflows is provided. However, due to the weakness of the instrument, no conclusive evidence for a causal relationship can be provided. Further research with stronger instruments or a different methodological approach is needed to find clear evidence for causality between

7 Conclusion

intra-ASEAN exports and FDI inflows. Moreover, research in other emerging regions of the world needs to be conducted in order to confirm the general validity of the effects of intra-regional trade on FDI inflows.

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Appendix

Table A.1: Summary Statistics of Dependent and Independent Variables

Variable	Number of Observations	Mean	Standard Deviation	Min.	Max.
FDI inflows	227	8922.06	15032.01	-5944	100449.6
intra-ASEAN exports	227	25015.45	28702.9	92.59	127704.6
GDP	227	196331.9	199404.1	4773.14	984674.2
inflation	227	4.01	5.24	-2.32	58.45
trade openness	227	137.69	94.17	11.86	437.37
Availability of natural resources	227	19.97	27.33	3.21e-07	99.71
mobile phone usage	224	72.23	57.24	0.02	186.16
fixed phone usage	225	13.15	12.57	0.244	48.3
Trade volume USA and China	227	366278	186300.2	55918.88	591097.8

Appendix

Table A.2: Year coverage by country

	Number of years	min	max
Brunei Darussalam	24	1992	2020
Cambodia	17	2000	2020
Indonesia	29	1992	2020
Lao People's Democratic Republic	7	2010	2016
Malaysia	29	1992	2020
Myanmar	10	2010	2019
Philippines	29	1992	2020
Singapore	29	1992	2020
Thailand	29	1992	2020
Vietnam	24	1997	2020

Appendix

Table A.3: Panel data regressions including the time dummy for 2011

Dep. var. FDI	(1)	(2)	(3)
Exports	0.373*	0.456*	0.455*
	(0.191)	(0.216)	(0.223)
GDP	0.007	0.00582	0.004
	(0.007)	(0.012)	(0.011)
Inflation	-39.01	138.0	56.90
	(108.8)	(208.2)	(54.74)
Trade openness	-4.153	-99.15	-105.2
	(45.15)	(134.9)	(119.3)
Availability of natural resources	-18.20	-380.9	-456.1
	(46.30)	(318.2)	(356.9)
Year dummy 2011			-321.1
			(1798.7)
Constant	-266.4	18922.0	20243.3
	(5534.0)	(18059.7)	(19201.2)
Country FEs	No	Yes	Yes
Time FEs	No	Yes	No
N	227	227	227
Within R^2	0.364	0.438	0.411

Standard errors in parentheses. All specifications with clustered standard errors.

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$ indicate significance at the 1%, 5%, and 10% levels

Appendix

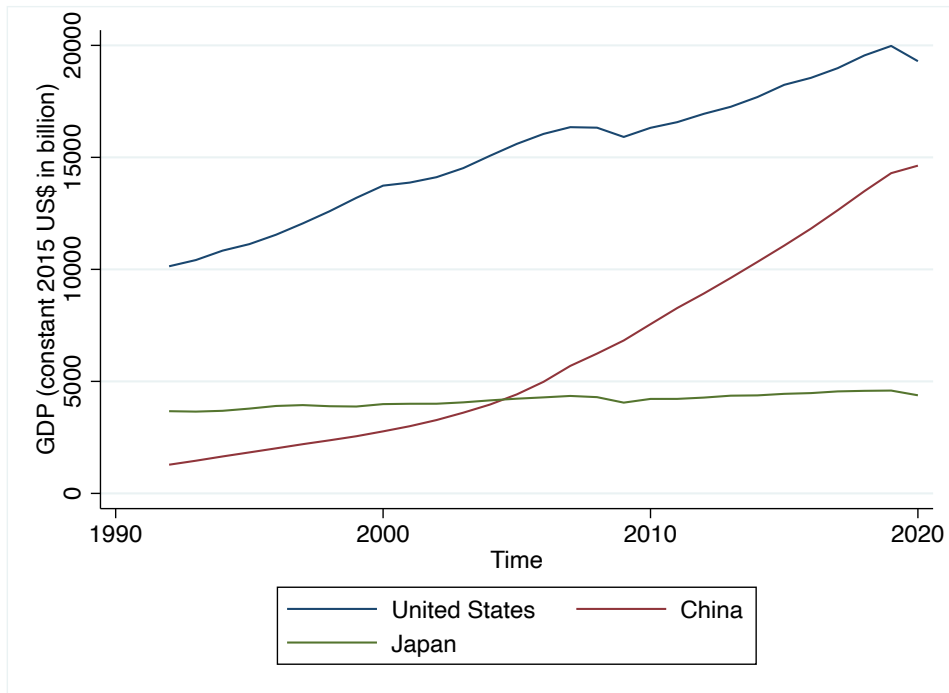


Figure A.1: GDP in the United States and China; Source: World Bank (2022)

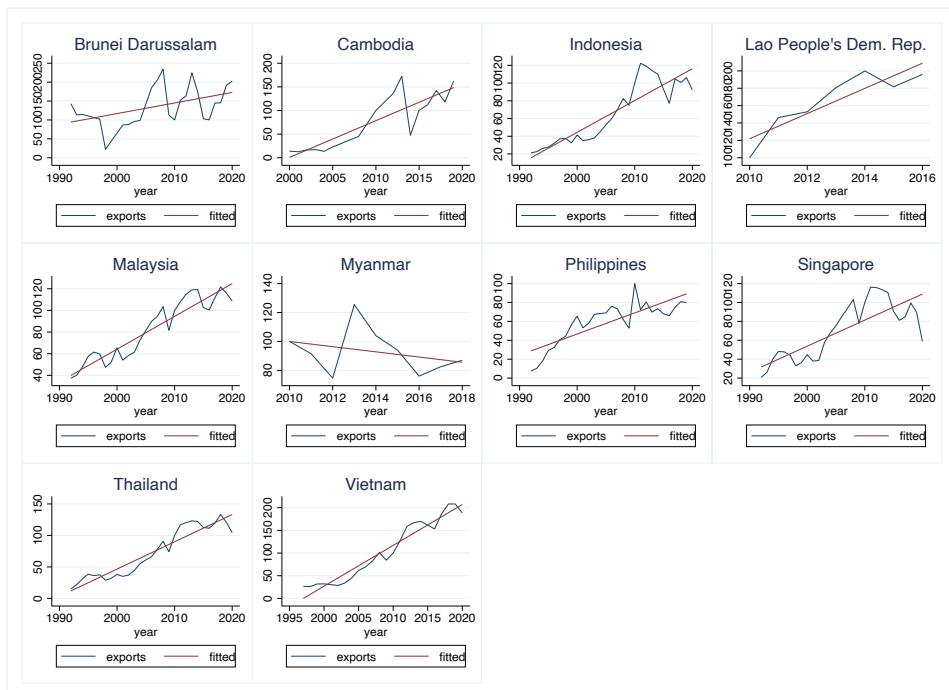


Figure A.2: Aggregated bilateral trade flows within ASEAN countries by country; Source: International Monetary Fund (2022)

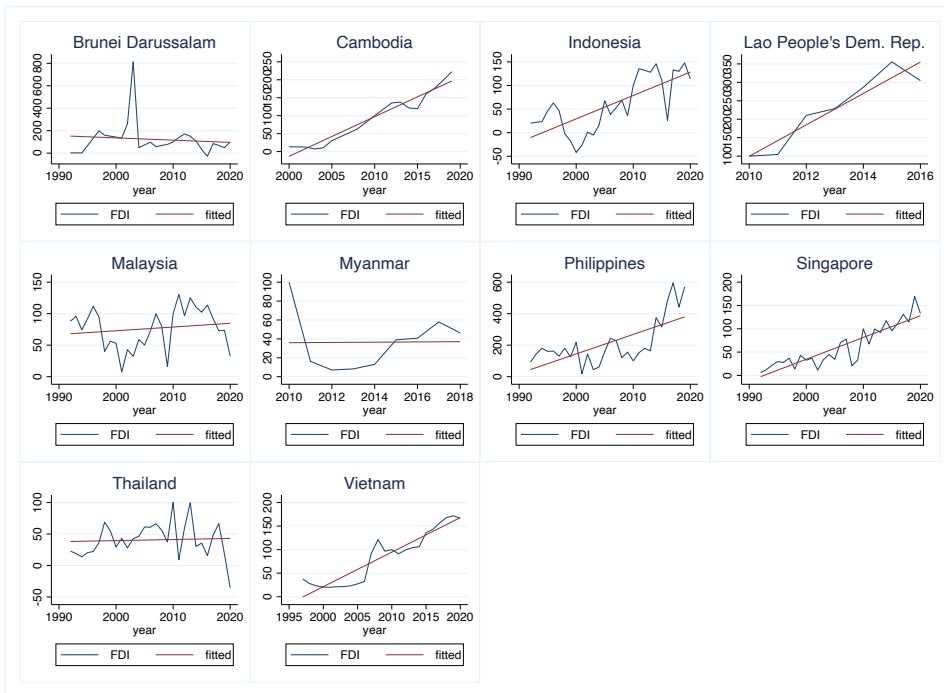


Figure A.3: Total net FDI inflows by country; Source: United Nations (2022)

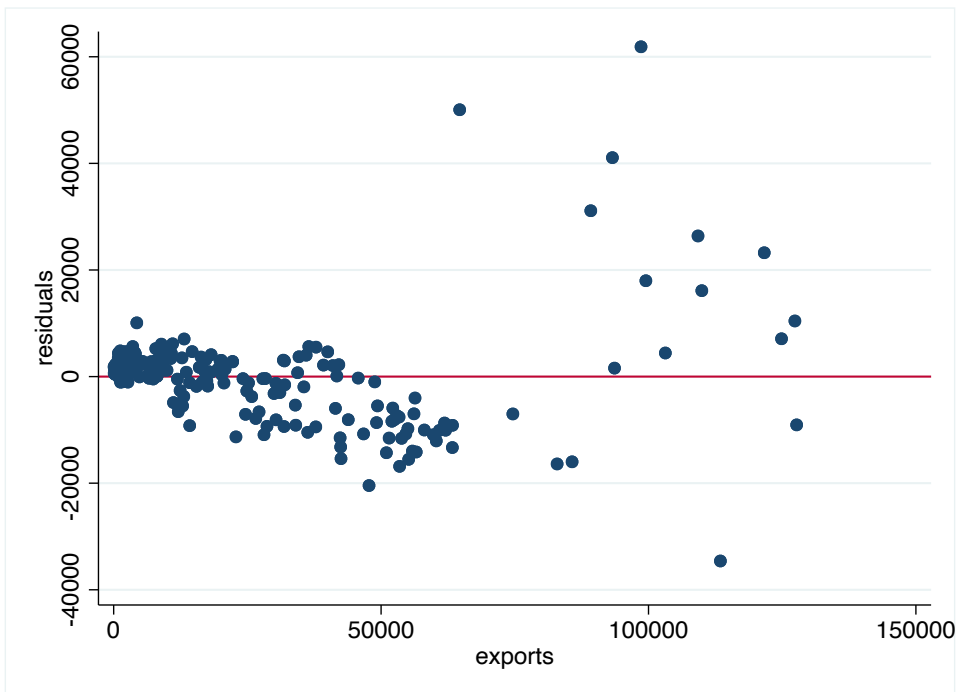


Figure A.4: Residuals of intra-ASEAN exports; Source: International Monetary Fund (2022)

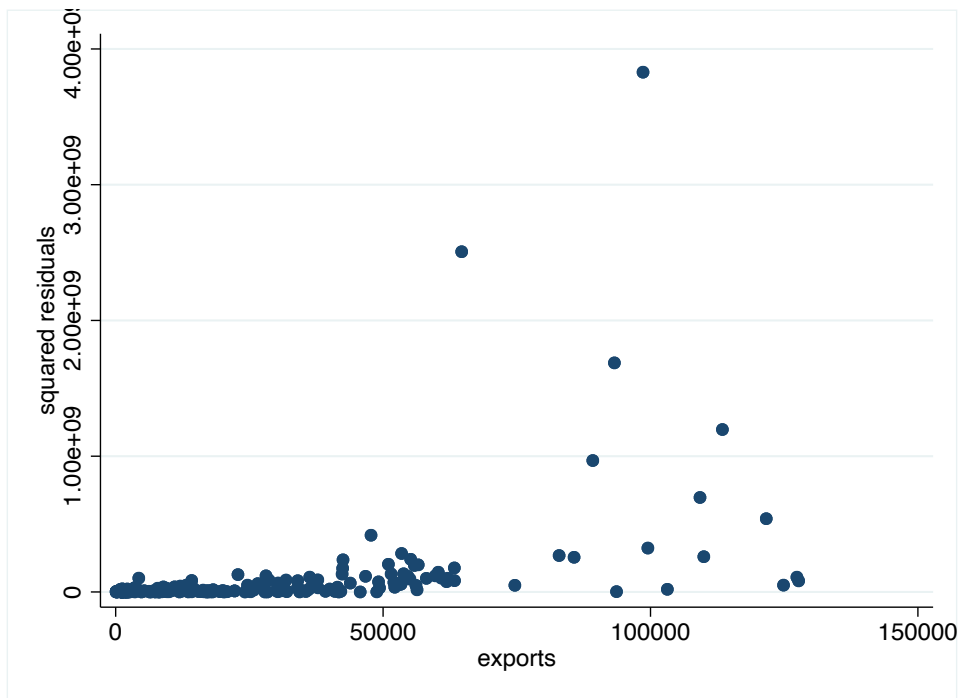


Figure A.5: Squared residuals of intra-ASEAN exports; Source: International Monetary Fund (2022)

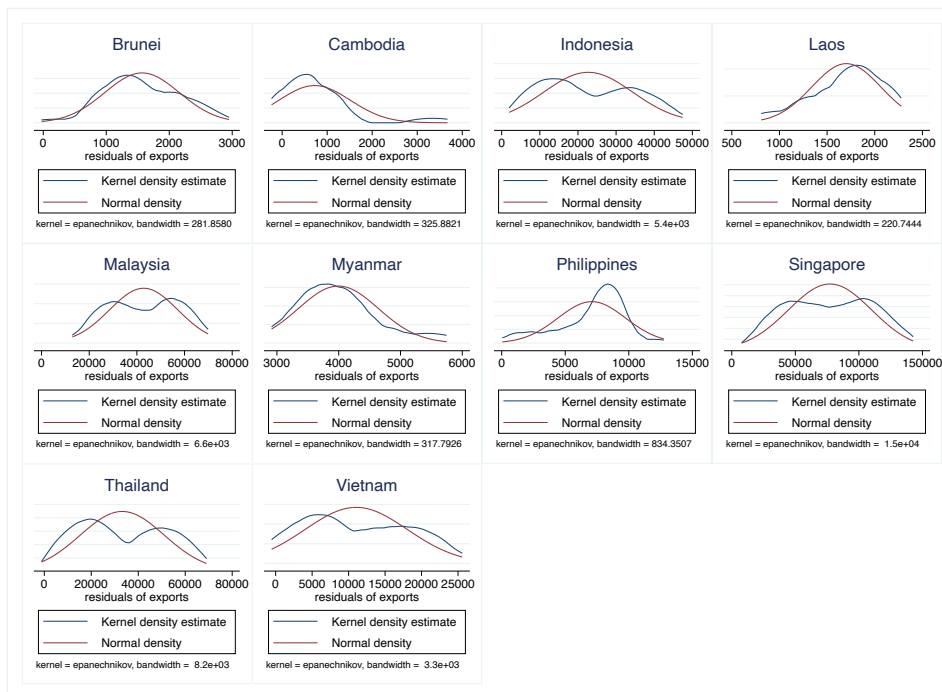


Figure A.6: Kernel Density Estimate for Normally Distributed Residuals; Source: International Monetary Fund (2022)

Appendix

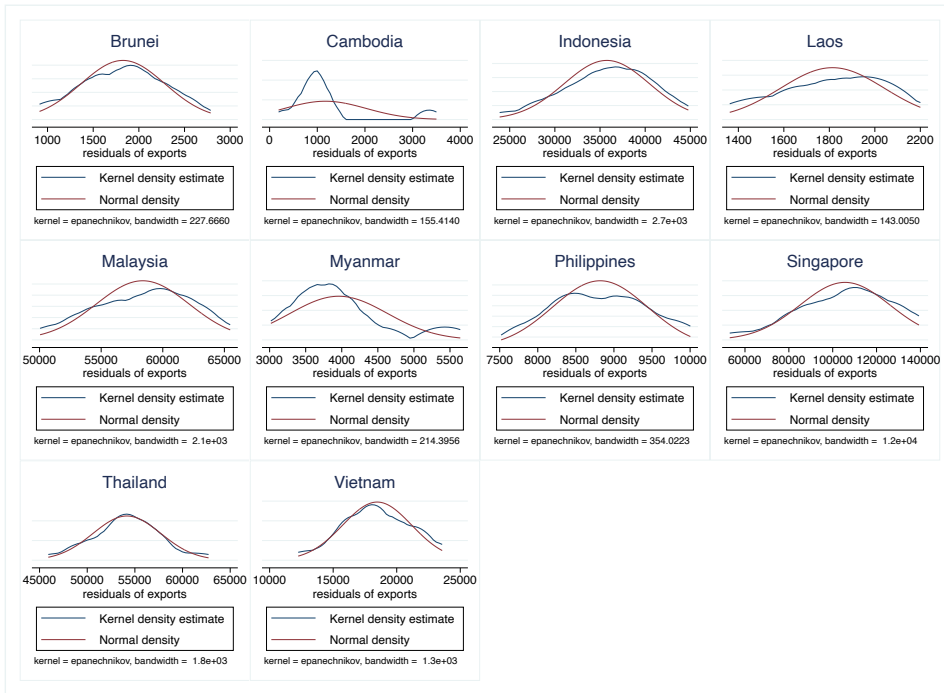


Figure A.7: Kernel Density Estimate for Normally Distributed Residuals from 2011 to 2020;
Source: International Monetary Fund (2022)

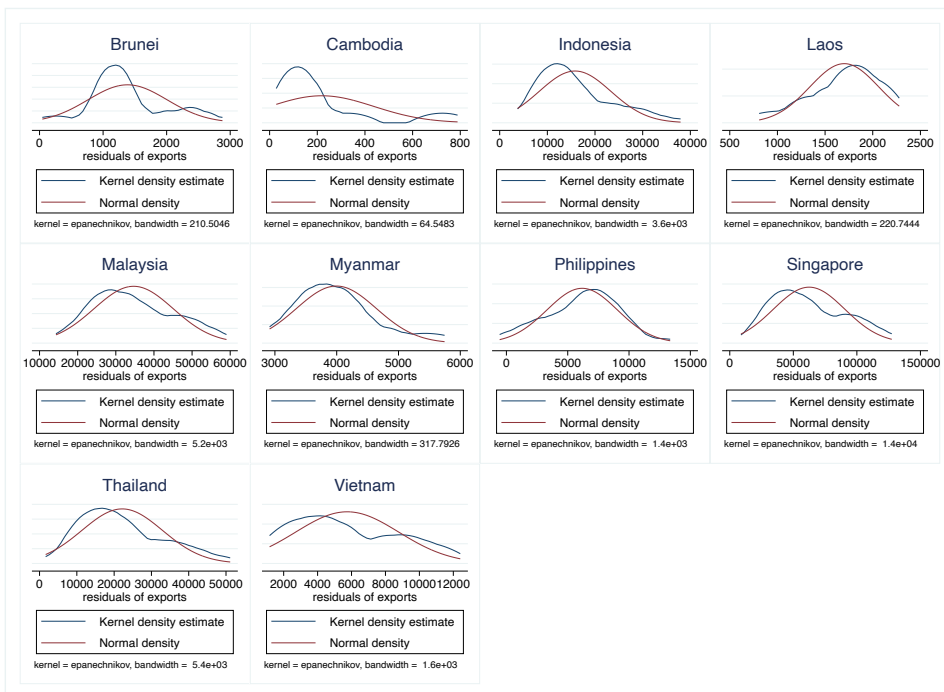


Figure A.8: Kernel Density Estimate for Normally Distributed Residuals from 1992 to 2011;
Source: International Monetary Fund (2022)