Effects of foreign direct investment on trade-based money laundering: The case of Vietnam

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Abstract: This paper investigates the effect of foreign direct investment (FDI) flows on trade-based money laundering (TBML). Trade misinvoicing, including export under-invoicing and import over-invoicing, is a proxy of TBML. Using an extended gravity model in trade with data from Vietnam from 2000 to 2019, our empirical results show that FDI flows are positively associated with TBML, which supports the FDI-fueled capital flight hypothesis. Departing from the current literature, we show that this effect becomes pronounced for export under-invoicing when Vietnam trades with low-income and lower-middle-income countries. Moreover, this effect is negatively moderated by government effectiveness and economic freedom. Our findings are appealing because Vietnam is an export-oriented, FDI-dependent economy; however, trade misinvoicing may offset the contribution of FDI to Vietnam’s economic development. Hence, our findings suggest a number of policy implications for policymakers in attracting FDI.

Keywords: Capital flight; FDI; trade misinvoicing; trade-based money laundering; Vietnam

1. Introduction

In Vietnam, recent decades have witnessed the increasing role of FDI flows as a crucial source of external capital to close the domestic savings-investment gap. During the period 2010–2017, Vietnam’s inward FDI accounted for about 60% of the whole external capital (Duong et al., 2021). Moreover, Vietnam has been successful in appealing for FDI flows; it is the third-largest recipient of...
FDI in its region and one of the ASEAN countries that have maintained stable growth in FDI inflow over the years. To illustrate, FDI flows into Vietnam in 2021 (19.74 billion US$) amounted to 110 times higher than those in 1990. However, as in other developing countries, the overall benefits from inward foreign capital regarding employment and welfare have been limited, generally because of poor spillovers in the domestic economy as these flows are often involved in money laundering mechanisms. FDI may provide ways to transfer capital beyond official channels. Therefore, capital flight can be viewed as a potential motivation for FDI, which can lead to the host country acting as a chain to transfer illicit financial outflows (Perez et al., 2012). Ndikumana and Sarr (2019) argued that the surge of foreign capital inflows has happened simultaneously with a fast rise in capital outflow misreports from a capital-starved continent, providing evidence of the Lucas paradox (Lucas, 1990). Hence, a thorough investigation of the connection between these two phenomena is warranted.

Globalization of both financial markets and organized crime have fostered the global money laundering (ML) industry (Lilley, 2003). Countries with low capacity and less effective legal frameworks are more likely to get involved in ML. Even though the financial system has been considered a vital ground for money launderers, there has been a shift from banks to non-bank financial institutions, including the bureau of exchange and remittance businesses (De Boyrie et al., 2005). ML has also been seen within a wide set of commercial intermediaries. It involves the compounding of licit and illicit money, the engagement of loan-back provisions, and the arrangement of multiple layers of transactions via offshore shell companies. As financial intermediaries are asked to submit suspicious transaction reports, money launderings have switched to alternative sectors, such as falsified trade. The trade-based ML mechanism is favorable due to the huge value of transactions and the shortage of sophisticated computer software, which inhibits government officials from identifying irregularly priced imports and exports.

Vietnam has fascinating geographical, social, economic, and legal backgrounds with regard to tainted money (Le, 2013). For instance, Vietnam is acknowledged as a predominantly cash-based economy surrounded by other cash-based countries, such as Cambodia, mainland China, and Laos PDR. Cash is simply exchanged and transmitted via Vietnam’s border. Furthermore, Vietnam is one of the fastest growing countries in the region with a weak legal framework that acts as another driving force of ML (Le, 2014).

While the current studies of ML in Vietnam have focused on the legal aspect (Le, 2013, 2014), the associated risks (Ba & Huynh, 2018), and ML detection for banking system (Cao & Do, 2012), there is no paper investigating the effect of FDI on trade misinvoicing. Therefore, the purpose of this paper is to examine the impact of Vietnam’s FDI inflow on the outflow of money from Vietnam to its trading partners through trade misinvoicing. Further, we investigate whether the institutional quality alters this relationship. To compute trade misinvoicing, we obtained the HS2 trade data for the 2000–2019 period from United Nations Commodity Trade Statistics Database (UN COMTRADE). The period 2000–2019 is chosen based on the availability of Vietnam’s bilateral FDI data. Moreover, the COVID-19 pandemic, which may have altered the effect of FDI on trade misinvoicing, is not a focus of our paper. The empirical results show that FDI inflow fosters trade misinvoicing. This effect becomes particularly strong for export under-invoicing in low-income and lower-middle-income nations. However, this effect is moderated by government effectiveness and economic freedom, which are proxies for institutional quality. This finding suggests that foreign investors have relied on trade-based activities to launder money.

The novelty of our paper lies in its effort to measure trade misinvoicing and examine the linkage between FDI and trade misinvoicing in Vietnam, a transition economy. The bilateral nature of the data allows us to control the bilateral factors that can affect the FDI-trade misinvoicing relationship, unlike Ndikumana and Sarr (2019), who used aggregate data of African countries.
The rest of the paper is structured as follows. Section 2 offers the literature review and hypothesis development. Section 3 describes the data and specifies the model. Section 4 shows the empirical results, and Section 5 offers the conclusion and policy implications.

2. Literature review and hypothesis development
The academic definition of ML remains controversial. Stessens (2000) explains that ML was used as a legal term in 1980s. In 1985, the American President’s Commission offered a definition: “Money laundering is the process by which one conceals the existence, illegal source, or illegal application of income, and then disguises that income to make it appear legitimate.” Based on this definition, many scholars described ML in their own words. For instance, Savona (2005) said that “Money laundering is an activity aimed at concealing the unlawful source of sums of money.” The term “proceeds” imply any property coming from or obtained, either directly or indirectly, via the commission of criminal activities.

Money launderers are involved in ML in order to guarantee reliable ownership of the proceeds and to hide the proceeds from suspicion, investigation, and seizure. To achieve these objectives, an extremely sophisticated ML process has been created, which is generally depicted as having three main steps: placement, layering, and integration (Gilmore, 1999). These steps can be split up, but some of them are applied at the same time. A vast mechanism may be conducted in ML operations such as currency, gold, silver, precious metals smuggling, banking system, remittance system, stock market, and trade-based ML (He, 2010).

2.1. Trade-misinvoicing
Trade misinvoicing is the misrepresentation of the price, quantity, or quality of imports and exports, generally motivated by the illegal movement of capital inflows or outflows between countries (Pakhlyan, 2020). Traditionally, import under-invoicing is motivated by evasion of either custom duties or VAT on imports. However, other forms of trade misinvoicing have emerged to allow economic agents to take control over foreign currency assets without the scrutiny of governments (Bohoslavsky, 2018; Umar, 2021). Export under-invoicing would be especially appealing to a firm that wants to move capital out of a country. This leads to reduced foreign exchange in the country. Meanwhile, import over-invoicing allows domestic importers to obtain a higher amount of foreign exchange as indicated in trading documents. In this regard, trade misinvoicing functions as a channel for capital flight, resulting from investors’ perceived risk of expropriation in the context of unsound economic policy or political instability (Schulze, 1994). Despite some flight, capital may be legally processed via normal financial channels in the form of portfolios or other short-term investments; however, some investment portfolios may be unappealing (low returns) or even illegal due to the imposition of capital controls by the home country. Consequently, misinvoicing of international trade transactions serves as a channel for illegal capital flows.

Trade misinvoicing could also facilitate legitimization of “dirty” money (mostly proceeds of criminal activities) through the use of trade transactions while keeping its value unchanged (Hendriyetty & Grewal, 2017). This practice is referred to as a trade-based money laundering mechanism (Umar, 2021). Trade misinvoicing can be tracked by the discrepancies in trading statistics between the importing and the exporting country (De Boyrie et al., 2007). Ideally, the observed export value from country A to country B should match the observed import value of country B from country A. In case the exports from country A to B are less than the declared imports of country B from A (converted into the same Incoterms pricing), either import over-invoicing by country B or export under-invoicing by country A is likely responsible.

2.2. Effects of FDI on capital flight and money-laundering
As a gateway for capital movement, FDI can facilitate both capital flight and money laundering in various ways. The linkage between FDI and capital flight could be explained by three underlying theoretical frameworks depending on whether the investment decisions are driven by (1) the investment climate, (2) the discriminatory treatment of capital, or (3) capital flight-bound FDI
(Ndikumana & Sarr, 2019). On the one hand, the investment climate approach explains capital flight as a response to the return differential between domestic and foreign assets. Higher returns to investment in an overseas market, when compared to the home country, would encourage capital outflows (Siddiqui, 2017). The increase of FDI would therefore indicate the lucrative investment climate in a country that, in turn, discourages capital flight of domestic investors. This suggests a negative linkage between FDI and capital flight. On the other hand, the discriminatory treatment of capital perspective suggests that capital flight is a result of biased treatment toward foreign investment by the government. Specifically, foreign investors may receive preferential taxation, better investment or exchange rate guarantees, and other privileges over domestic firms during a financial crisis (Kant, 2002). The biased treatment creates a significant difference between perceived risks for domestic investment compared to those for FDI. This, in turn, motivates capital flight (Lautier & Moreaub, 2012). The higher FDI indicates preferential treatment in favor of foreign investment, which leads to increased perceived risks for domestic investors. This, in turn, leads to more capital flight. Additionally, the positive linkage between FDI and capital flight is also supported by the capital flight-bound FDI perspective. Based on this approach, capital flight may be the actual motive of FDI. In such case, the host country functions as a transit for illicit capital flight. At the end of the day, the foreign investors would find ways to move the capital back to their home country. This phenomenon is empirically witnessed in transition economies where creating a new venture abroad is employed as a channel for moving and hiding illegal money, which would then come back in legal form (Perez et al., 2012). The literature suggests another approach when classifying the motives of FDI, one based on whether the purposes of FDI are legal or illegal. On the one hand, FDI may be induced by firms’ desire to obtain benefits from trade frictions (Qiu et al., 2019) or access to low-priced or non-tradable/rare inputs (Ishikawa & Horiiuchi, 2012). On the other hand, FDI may be used to facilitate the illicit movement of dirty money to hide its illegal origin, also known as money laundering (Reuter, 2005; Umar, 2021). The rise of FDI, therefore, may also increase the probability of money laundering.

2.3. Effects of FDI on trade misinvoicing

Since trade misinvoicing is viewed as a method for both capital flight and money laundering, the association between FDI and trade misinvoicing comes into focus. Given that trade misinvoicing is illegal, the relationship between FDI and trade misinvoicing could be explained via the motivation for money laundering or illegal capital flight. Based on the investment climate approach, the increase of FDI implies the attractiveness of the domestic investment environment; therefore, the level of capital flight will likely be low, making it improbable that trade misinvoicing is being employed to facilitate illegal capital flight. Negative linkage between FDI and trade misinvoicing could therefore be expected.

H1a. There is a negative relationship between FDI and trade misinvoicing.

Both the discriminatory treatment of capital and capital flight-bound FDI suggest a positive association between FDI and capital flight, some of which may be illegal. To escape from governmental scrutiny and capital control policies, the illegal capital flight could be facilitated by trade misinvoicing. However, in both capital flight-bound FDI and money laundering, the investors desire to either hide their illicit ties to the funds (and make it appear legal) or expect to receive the funds back through illegal methods (Ndikumana & Sarr, 2019; Perez et al., 2012). Establishing a business presence in the host country is a popular technique (Ndikumana & Sarr, 2019) since this could strengthen the investor’s ownership of the assets legally while benefiting from the protection of favorable foreign legal systems and bilateral investment agreements between countries. Perez et al. (2012) confirmed the positive relationship between FDI and capital flight in transition economies, and they pointed out that about 10% of total FDI outflows and 20% of FDI to ML nations were made to aid illegal money flows. Using data of a set of African nations from 1970 to 2015, Ndikumana and Sarr (2019) provided
empirical evidence that shows that FDI inflows have a positive association with capital flight. For instance, a 1% increase in FDI inflow leads to 0.21%-0.40% increase in capital flight.

New ventures, often shell companies, could legitimize illicit cash inflows by reporting it as cash revenue since firms’ financial records could be easily falsified (Reuter, 2005). The money launderers would then receive back their laundered money as legal profits. However, if the amount of money being laundered is relatively huge, the financial records may come under suspicion from banks and authorities. In such cases, over- or under-invoicing is very likely to be used to facilitate the illicit movement of a large number of illegal funds (Biswas et al., 2022; De Boyrie et al., 2007). Moreover, the complexity of foreign firms, especially multinational corporations, in terms of ownership structure and residence, facilitates the success of trade misinvoicing.

Based on the above discussion, we propose the following hypothesis:

**H1b. There is a positive relationship between FDI and trade misinvoicing.**

### 2.4. Moderating effects of government effectiveness and economic freedom

Institutional quality, as in government effectiveness and economic freedom, may influence the linkage between FDI and trade misinvoicing in different ways. On the one hand, poor institutional quality negatively affects the investment environment, therefore making the investment climate approach less appealing. In other words, a low level of institutional quality could dampen the positive linkage between FDI and capital flight.

On the other hand, the ratio of “illegal” FDI and “legal” FDI, as based on motives, may depend on the perceived costs and risks of being detected by the government. In a host country with well-designed and effectively enforced institutions that enable the efficiency of banking systems and effectiveness of relevant laws, the transparency of bank transfers and the actual value of negotiable documents could increase the risk of being detected and the costs of illicit financial flows (Ofoeda et al., 2022). This, in turn, may discourage not only illegal capital flight and money laundering via FDI but also the use of trade misinvoicing as means of laundering money or engaging in illegal capital flight (Reuter, 2005). We, therefore, expect a negative moderating effect.

**H2: Institutional quality (as proxied by government effectiveness and economic freedom) negatively affects the relationship between FDI and trade misinvoicing.**

### 3. Methodology

#### 3.1. Measuring TBML

We calculate TBML by employing data from UNCOMTRADE at the 2 digits (HS2). The UNCOMTRADE database depicts bilateral merchandise exports and imports data between trading partners. However, trade misinvoicing is conducted for several reasons, including tax evasion, quota avoidance, smuggling, and ML (De Boyrie et al., 2007). Our paper concentrates on both export under-invoicing and import overinvoicing as possible ways of capital flight from Vietnam. Export underinvoicing occurs when Vietnamese exporters report a smaller value of money obtained than the value reported as imports by their trading partners. In import overinvoicing, Vietnamese importers report a larger value of money used for importing than the value reported as exports by their trading partners. The sum of the two refers to the total capital that flows illegally in and out of Vietnam. According to Patnaik et al. (2012) and Kwaramba et al. (2016), Vietnam’s misinvoicing trade can be calculated by considering the bilateral export and import data between Vietnam and its trading partners as follows:
Figure 1. Distribution of TBML (Tmis) and FDI (lnFDI) over year and countries.

Note: The mean value of Tmis is on the left-hand scale, and the mean value of lnFDI is on the right-hand scale. (Self-collected from the data collected)

\[
X_{\text{mis}}_{it} = \sum_{k=1}^{99} (M_{vikt} - cif \cdot X_{vikt})
\] (1)

\[
M_{\text{mis}}_{i} = \sum_{k=1}^{99} (M_{vikt} - cif \cdot X_{vikt})
\] (2)

Equation (1) computes Vietnam's export misinvoicing in year \( t \), where \( M_{vikt} \) reflects imports of country \( i \) from Vietnam in year \( t \) at sector \( k \) as reported by country \( i \). \( X_{vikt} \) represents Vietnam's exports to country \( i \) in year \( t \) at sector \( k \) as reported by Vietnam. The adjustment factor, \( cif \), captures the ratio of CIF's price to FOB's price. We follow Buehn and Eichler (2011), Patnaik et al. (2012), and Kwaramba et al. (2016) in assigning the value of 10% to \( cif \) in our paper. After adding up over the HS2 sectors, a positive value for \( X_{\text{mis}} \) would reveal Vietnam's export underinvoicing in year \( t \). Likewise, Equation (2) computes Vietnam's import misinvoicing in year \( t \), where \( M_{vikt} \) reflects imports of Vietnam from country \( i \) in year \( t \) at sector \( k \) as reported by Vietnam, and \( X_{vikt} \) represents country \( i \)'s exports to Vietnam in year \( t \) at sector \( k \) as reported by country \( i \). A positive value for in Equation (2) would indicate import overinvoicing by Vietnam in year \( t \). Finally, misinvoicing trade (Tmis) is computed as the ratio of the sum of export underinvoicing and import overinvoicing across sectors to country \( i \)'s GDP and zero otherwise.

Figure 1 illustrates the distribution of Vietnam's misinvoicing trade and FDI over the year. The left-hand side panel shows that both misinvoicing trade and FDI flow increase over time. Meanwhile, the right-hand side panel indicates that, in general, the distribution of TBML and of FDI comove across countries, except in the case of Lao PDR. Figure 2 shows the variance in the distribution of both series over income groups. While Vietnam attracts most FDI from HIC and UMC, trade misinvoicing mainly comes from LI & LMC.

Figure 2. Distribution of TBML (Tmis) and FDI (lnFDI) over income group.

Note: The mean value of Tmis is on the left-hand scale, and the mean value of lnFDI is on the right-hand scale. (Self-collected from the data collected)
3.2. Model specification
The bilateral nature of both trade misinvoicing and FDI enables us to adopt the trade gravity model. Walker (1995) showed that gravity model could be used to describe the laundered money flows across countries. He proposed that the share of proceeds from money launderers in one country remitted to country j is contingent on country j’s mass and its attractiveness, and the physical distance between the two nations. The mass factor is per capita income, whereas the attractiveness is the weighted average of some factors that contribute to the potential of country j for ML. This model is referred to as the Walker equation and is widely used to estimate ML flows. However, some scholars criticize its ad hoc and non-testable nature. Unger and Busuioc (2007) extended the Walker equation by introducing the three cultural determinants (common border, language, and colony) in the physical distance and redefining the attractiveness index. Walker and Unger (2009) and Ferwerda et al. (2013) indicated that the canonical gravity model can plausibly explain ML and trade-based ML.

We apply the prototype model of ML pioneered by Walker (1995), and developed by Walker and Unger (2009) and Ferwerda et al. (2013), for trade-based ML:

\[ Tmis_{it} = (D_{it}/D_i)(\text{Border}_{it}, \text{Lang}_{it}, \text{Colony}_{it})\text{Attractiveness}_{it} \]  

(3)

As Vietnam shares border with only three countries and has no common language with other countries, these variables are omitted. We replaced these variables by common religion (comrelig) and member of the same free trade area (rta).

Based on Ndikumena and Sarr (2019), we introduced the FDI flows and other socio-economic factors as a proxy for attractiveness to reflect how easy it is to launder criminal proceeds. The empirical trade misinvoicing equation is therefore specified as follows:

\[ Tmis_{it} = \beta_0 + \beta_1\ln\text{FDI}_{it} + \beta_2\text{Gravity}_{it} + \beta_3\text{OtherControl}_{it} + \alpha_i + \varepsilon_{it} \]  

(4)

in which subscript i and t refer to country and year, respectively. \( \alpha_i \) captures the country-fixed effect. \( Tmis_{it} \) is defined as Vietnam’s misinvoicing trade with country i at year t, and FDI is our main explanatory variable, which we collect from Vietnam’s General Statistics Office.

\text{Gravity}_{it} \) is a set of gravity variables that is common in the literature, consisting of physical distance (D), common colony (comcol), common religion (comrelig), member of the same free trade area (rta), and gross domestic product (GDP). Physical distance reflects the cost to launder money and is expected to have a negative correlation with Tmis. Variables comcol and comrelig represent the cultural affinity that is considered as a driving force of ML. When both nations are members of the same trade block, they are more effective in thwarting ML. This set of variables is obtained from CEPII.

Based on the present literature of trade-based ML, we also add other control variables, OtherControl, (Buehn & Eichler, 2011; Kwararoma et al., 2016; Patnaik et al., 2012). The level of capital account liberalization (kaopen) is a determinant that is expected to prevent capital flight by lowering market distortions. In a nation with an open capital account, ML primarily happens via the capital account rather than misinvoicing trade. For our study, we collect kaopen from Chinn and Ito (2006). A nation with a severe current account deficit undergoes capital flight because of the consequence of the seizure of private assets. We take the ratio of the current account to GDP (CAGDP) from the World Bank Database. ML tends to occur in nations that have low degree of political stability as citizens look for a way to reduce the risk of asset nationalization and future portfolio losses. We obtain the political stability index (Political) from the Political Risk Services database. We also take into account inflation (Inflation) and exchange rate (EX) that are derived from World Bank Database.

We clean the data by removing the missing observations and winsorizing the outliers. We received 1,064 observations from 66 countries, including 20 low- and lower-middle-income (L1 & LMC) countries, 18 upper-middle-income (UMC) countries, and 28 high-income countries (HIC) for
the 2000–2019 period. We report the list of Vietnam’s trading partners in Table A1 of the Appendix. To show the general picture of the data sample used in our paper, Table 1 displays the statistical description of the variables in terms of number of observation, average value, standard deviation, minimum, and maximum. The average share of trade misinvoicing to GDP is 0.08%, whereas the maximum value accounts for 2.43% of the GDP.

Next, we conduct the panel unit root test to check for stationarity of data. As our data is unbalanced and with gaps in each individual time series, we cannot use the Levin-Lin-Chu unit-root test built by Levin et al. (2002) nor the Im-Pesaran-Shin unit root test created by Im et al. (2003). We instead apply the Phillips-Perron unit root test pioneered by Breitung and Franses (1998), which accepts unbalanced and time-gap data. The result in the last two columns of Table 1 confirms the stationarity of the level or the first difference of variables.

In our sample, the zero observation of Tmis accounts for 25%, hence we adopt the Poisson pseudo-maximum likelihood (PPML) estimator (Silva & Tenreyro, 2006). The advantages of PPML can be interpreted as follows: (i) It successfully deals with the heteroskedasticity in the trade flows, which results in inconsistent OLS estimates; and (ii) because of multiplicative form, PPML makes use of the information embedded in the zero trade flows.

4. Empirical results and discussions

4.1. Benchmark results

Table 2 displays the benchmark results of the regression of Equation (4). We start by regressing Tmis on InFDI only and report the estimation result in column (1). In columns (2) and (3), the control variables are added. Furthermore, column (3) is incorporated with the country-fixed effects to control the specific determinants in each trading partner but in varying over time. It can be seen that the inflow of FDI fosters the volume of capital outflows from Vietnam through trade in all model specifications. The coefficient of InFDI in three columns is positive and statistically significant at 1%, 1%, and 5%, respectively. Specifically, a 1% increase in the FDI inflow leads to about 11% increase in trade misinvoicing. This result supports hypothesis H1b. The potential

| Table 1. Statistical summary |
|-------------------------------|
| count | mean | sd | min | max | Phillips-Perron unit-root test (p-value) | Phillips-Perron unit-root test (p-value) |
| Tmis  | 1,064 | 0.08 | 0.30 | 0.00 | 2.43 | 0.0002 |
| InFDI | 1,064 | 1.55 | 2.39 | 0.00 | 8.63 | 0.0000 |
| kaopen | 1,064 | 0.72 | 1.53 | -1.92 | 2.33 | 0.0049 |
| CAGDP | 1,064 | 0.00 | 0.10 | -0.65 | 0.48 | 0.0049 |
| LnEX  | 1,064 | 2.64 | 2.65 | -2.43 | 9.50 | 0.9059 |
| Inflation | 1,064 | 6.24 | 14.59 | -3.85 | 325.00 | 0.0000 |
| Political | 1,064 | -0.01 | 0.96 | -2.81 | 1.62 | 0.0000 |
| GDP   | 1,064 | 0.71 | 2.18 | 0.00 | 19.52 | 0.0000 |
| D     | 1,064 | 8.65 | 0.90 | 5.86 | 9.82 | 0.0000 |
| comcol | 1,064 | 0.07 | 0.26 | 0.00 | 1.00 | 0.0000 |
| comrelig | 1,064 | 0.01 | 0.01 | 0.00 | 0.04 | 0.0400 |
| rta   | 1,064 | 0.19 | 0.39 | 0.00 | 1.00 | 0.0000 |

Regarding Phillips-Perron test, the null hypothesis is “All panels contain unit root” and the alternative hypothesis is “At least one panel is stationary.”
Interpretation is that foreign investors launder money via the commodity trade. Our finding is consistent with Ndikumana and Sarr (2019), who investigated the impact of FDI on capital flight via commodity trade in Africa. They showed that a 1% increase in FDI inflows causes 0.21%–0.40% increase in capital flight. The coefficient of FDI in our study is much larger due to a number of reasons. First, we focus on trade misinvoicing, whereas Ndikumana and Sarr (2019) study capital flight that contains trade misinvoicing. Hence, the trade misinvoicing may be more sensitive to FDI flows. Next, we express trade misinvoicing as shares of GDP while they express capital flight in absolute value. Lastly, the bilateral structure of data allows us to control the bilateral factors that may alter the FDI-trade misinvoicing relationship. We can see that the R-squared significantly increases in the last two columns when adding the control variables. Moving to the bottom of Table 2, the skewness/kurtosis tests for normality of residuals indicates that all the residuals are normally distributed. Hence, the selection of the linear models is appropriate.

| VARIABLES       | (1)     | (2)     | (3)     |
|-----------------|---------|---------|---------|
| lnFDI           | 0.12*** | 0.11*** | 0.12**  |
|                 | (0.029) | (0.037) | (0.064) |
| kaopen          | 0.03    | 0.02    |         |
|                 | (0.051) | (0.063) |         |
| CAGDP           | −2.34***| −5.92***|         |
|                 | (0.834) | (1.431) |         |
| LnEX            | −0.03   | 1.04*** |         |
|                 | (0.024) | (0.343) |         |
| Inflation       | −0.01   | −0.01   |         |
|                 | (0.011) | (0.011) |         |
| Political       | 0.59*** | 0.71*** |         |
|                 | (0.107) | (0.163) |         |
| GDP             | −0.02   | 0.18*** |         |
|                 | (0.024) | (0.035) |         |
| D               | −1.22***|         |         |
|                 | (0.082) |         |         |
| comcol          | 1.22*** |         |         |
|                 | (0.240) |         |         |
| comrelig        | 34.07***|         |         |
|                 | (4.927) |         |         |
| rta             | 0.34*** | 0.46*** |         |
|                 | (0.128) | (0.119) |         |
| Constant        | −2.72***| 6.32*** | −8.43***|
|                 | (0.162) | (0.758) | (0.512) |
| Observations    | 1,064   | 1,032   | 1,020   |
| R-squared       | 0.009   | 0.772   | 0.790   |
| Country FE      | NO      | NO      | YES     |
| Skewness test   | 0.000   | 0.000   | 0.000   |
| Kurtosis test   | 0.000   | 0.000   | 0.000   |
| Joint Skewness and Kurtosis test | 0.000 | 0.000 | . |
Concerning other explanatory variables, the negative sign and statistical significance of CAGDP imply that the current account deficit fosters capital flight through trade. One possible explanation is that when countries suffer a current account deficit, the governments are more likely to devalue the domestic currency and thereby disincentivize investment in domestic assets. Consequently, investors find alternative ways to acquire foreign assets. The physical distance and cultural affinity play a role in orienting the false invoicing trade. The physical distance hinders trade misinvoicing as it is costly and riskier when shipping the goods to further destinations. Having colonial ties, common religion, and regional trade agreements (RTA) nurture the trade-based ML as cultural closeness can reduce information asymmetry and connect the money launderers in different countries together. These findings are consistent with Unger and Busuioic (2007). The political stability of trading partners is an important force in attracting capital flight from Vietnam. When country-fixed effects are used, the exchange rate and GDP do play a role. The effects of other variables, including capital account liberalization and inflation, are mute.

Next, we consider the impact of FDI inflow on export underinvoicing (Xmis) and import over-invoicing (Mmis). We exhibit the estimation result in Table 3. It turns out that the coefficient of lnFDI is statistically significant at 1% only in the regression on Xmis, which implies that foreign investors may collude with exporters to launder money by using exporting activities. One potential reason is that as Vietnam has executed export-oriented policies to develop its economy, the monitoring of export activities is not as strict as that of import ones. In addition, FDI enterprises account for more than 60% of Vietnam’s export turnover (Nguyen, 2020).

Lastly, the nexus between FDI and trade misinvoicing may vary across income groups. In our sample, high-income countries (HIC) account for 41.92%, followed by upper-middle income countries (UMC) (29.79%) and low-income and lower-middle-income countries (LI&LMC) (28.29%). We run a regression of each sub-sample of income groups and describe the results in Table 4. It can be seen that the impact of FDI inflow on trade misinvoicing becomes more evident when countries become poorer. For instance, 1% increase in the FDI leads to 24% increase in trade misinvoicing in LI&LMC, which is nearly double to that in HIC and UMC. This suggests that foreign investors from LI&LMC view Vietnam as a mere transit for illegal financial outflows.

4.2. Further analysis
In this part, we investigate the moderating effect of institutional quality on the FDI-trade misinvoicing nexus by using government effectiveness (GovEff) and economic freedom (EconFree) as proxies. Government effectiveness index captures the quality of public services, civil service, policy formulation, policy implementation, and credibility of a government’s commitment to enhance these qualities or maintain them well. We obtain this index from World Bank database. Economic freedom measures the degree of economic freedom in different countries. We collect this data from The Heritage Foundation.

To examine the moderating effects, we incorporate the interaction terms of lnFDI and institutional quality variables into equation (4) as follows:

\[ Tmis_{it} = \beta_0 + \beta_1 \text{lnFDI}_{it} + \beta_2 \text{Gravity}_{it} + \beta_3 \text{OtherControl}_{it} + \beta_4 \text{lnFDI}_{it} + \text{InstitutionalQuality}_{it} + \alpha_i + \epsilon_{it} \]  

(5)

Our main interest is the sign and statistical significance of the interaction term, \( \beta_4 \). The estimation results in Table 5 show that the coefficient of the interaction is negative and statistically significant, as expected. This supports hypothesis H2.

4.3. Endogeneity problem
Up to this point, we have abstracted the fact that FDI flow might be endogenous in our proposed model. There may exist a reverse causality due to simultaneity between FDI and trade misinvoicing, which, however, could cause our results to be biased. Ndikumana and Sarr (2019) reveal that
capital flight could be the true motivation of FDI. Perez et al. (2012) provided supporting empirical evidence from a sample of transition nations, which showed that forming businesses in foreign nations via FDI paves the way for aiding more old-fashioned ways of transferring illicit money abroad. With regard to the omitted variables, there are also unobserved determinants of FDI. The above arguments imply the potential existence of an endogeneity problem that can distort our analysis. Therefore, we employ the instrumental variable method to mitigate the endogeneity issue that arises from the reverse causality and the omitted variables. The instrument variable is the bilateral investment treaties (BITs), which reflect bilateral agreements through which host nation governments commit themselves to binding obligations such as the entry of foreign investors, profit transfer, and dispute settlement. Busse et al. (2010) argued that bilateral contractual agreements provide a more credible commitment. It is worth noting that BITs may or may not influence trade misinvoicing directly. The implementation of BITs, for example, should not have an impact on trade misinvoicing. In this paper, we concentrate on the FDI flow that possibly drives up trade misinvoicing. Hence, the variables reflecting variants in FDI activities such as BITs can serve as good IVs to address the endogeneity issue. The BITs data is obtained from the Database of Bilateral Investment Treaties.

Table 3. Regression results on export under invoicing and import over invoicing

| VARIABLES | (1) | (2) |
|-----------|-----|-----|
| lnFDI     | 0.16*** | 0.06 |
| kaopen    | −0.05 | 0.08 |
| CAGDP     | −3.32*** | −0.49 |
| LnEX      | −0.10*** | 0.04 |
| Inflation | −0.02*  | −0.01 |
| Political | 0.30*** | 0.84*** |
| GDP       | −0.01  | −0.08* |
| D         | −1.10*** | −1.14*** |
| comcal    | 0.38   | 1.59*** |
| comrelig  | 30.36*** | 37.58*** |
| rta       | 0.00   | 0.89*** |
| Constant  | 5.07*** | 4.32*** |

Observations: 1,032
R-squared: 0.490
Country FE: NO

Perez et al. (2012) provided supporting empirical evidence from a sample of transition nations, which showed that forming businesses in foreign nations via FDI paves the way for aiding more old-fashioned ways of transferring illicit money abroad. With regard to the omitted variables, there are also unobserved determinants of FDI. The above arguments imply the potential existence of an endogeneity problem that can distort our analysis. Therefore, we employ the instrumental variable method to mitigate the endogeneity issue that arises from the reverse causality and the omitted variables. The instrument variable is the bilateral investment treaties (BITs), which reflect bilateral agreements through which host nation governments commit themselves to binding obligations such as the entry of foreign investors, profit transfer, and dispute settlement. Busse et al. (2010) argued that bilateral contractual agreements provide a more credible commitment. It is worth noting that BITs may or may not influence trade misinvoicing directly. The implementation of BITs, for example, should not have an impact on trade misinvoicing. In this paper, we concentrate on the FDI flow that possibly drives up trade misinvoicing. Hence, the variables reflecting variants in FDI activities such as BITs can serve as good IVs to address the endogeneity issue. The BITs data is obtained from the Database of Bilateral Investment Treaties.
We perform endogeneity tests for the validity of instrumental variable and show the results in Table 6. First, the Hausman test of endogeneity indicates significant $\chi^2$ in the model using lnFDI. The results reveal that the endogeneity of FDI flows may cause a problem in our study. Hence, the potential endogeneity should not be ignored. Next, the LM statistics of the under-identification test show that the $\chi^2$ statistics are significant, implying that our instrumental variable is proper. Lastly, we specify the significant Cragg-Donald Wald F-statistic, which indicate that our instrumental variables are powerful enough to mitigate the endogeneity problem. These tests show evidences that suggest that our instrumental variable is valid.

The result reported in Table 7 shows that our conclusion on the effects of FDI on trade misinvoicing still remains the same, but their effects become more pronounced when controlling for the endogeneity problem.

To check robustness, we use the generalized method of moments (GMM) estimator developed by Arellano and Bond (1991). In this technique, the endogeneity problem is solved by calculating an estimated instrumental variable for the first-difference equation via the application of the second and higher-order lags of the endogenous and regressand variables and the first-difference of the exogenous variables as instruments. The result of Table 8 exhibits the same direction as those in
In the lower section of Table 8, the Sargan test indicates no evidence of misspecification. Additionally, the Arellano-Bond serial correlation tests reveal that there is first-order autocorrelation of the residuals but no second-order autocorrelation of the residuals, which is consistent with the assumptions of the selection of instruments.

5. Conclusion
This paper investigated the effects of FDI on trade misinvoicing—a proxy of TBML—by using data from 66 trading partners of Vietnam from 2000 to 2019. The paper also examines whether the quality of institution has had a moderating effect on the nexus between FDI and trade misinvoicing. Our empirical
results indicate that FDI flows are positively correlated with trade misinvoicing, which advocates the FDI-fueled capital flight hypothesis. This impact becomes more evident for export under-invoicing in low-income and lower-middle-income nations. Furthermore, this impact is negatively moderated by government effectiveness and economic freedom, both of which reflect the quality of institution.
Our findings suggest a number of policy implication. Although attracting FDI is pivotal for developing economies, Vietnamese government should keep an eye on this flow as FDI may be used to transfer illegal capital, especially when receiving FDI from low-income and lower-middle-income countries. As the effect of FDI on trade mis invoicing is stronger for export under-invoicing, a stricter anti-money laundering regulation should be imposed on the export of FDI firms. Finally, the Vietnamese authorities should implement policies to enhance institutional quality.

With its focus on Vietnam, our paper has not explored the characteristics of home countries. Hence, one direction for further study is to expand the sample of home nations beyond Vietnam so as to generalize our findings and explain the role of factors related to the home countries.
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Appendix

Table A1. List of Vietnam’s trading partners

| No. | Partner | Percent | No. | Partner | Percent |
|-----|---------|---------|-----|---------|---------|
| 1   | AGO     | 1.69    | 34  | LKA     | 1.69    |
| 2   | AUS     | 1.69    | 35  | LVA     | 1.32    |
| 3   | BFA     | 1.22    | 36  | MAR     | 1.69    |
| 4   | BGD     | 1.69    | 37  | MDV     | 1.6     |
| 5   | BGR     | 1.69    | 38  | MEX     | 1.69    |
| 6   | BLR     | 1.69    | 39  | MLT     | 0.75    |
| 7   | BRA     | 1.69    | 40  | MNG     | 1.69    |
| 8   | BRN     | 1.6     | 41  | MUS     | 1.69    |
| 9   | CAN     | 1.69    | 42  | MYS     | 1.69    |
| 10  | CHE     | 1.69    | 43  | NGA     | 1.69    |
| 11  | CHN     | 1.69    | 44  | NOR     | 1.69    |
| 12  | CRI     | 1.69    | 45  | NPL     | 1.6     |
| 13  | CYP     | 0.75    | 46  | NZL     | 1.69    |
| 14  | DNK     | 1.69    | 47  | OMN     | 1.6     |
| 15  | ECU     | 1.69    | 48  | PAK     | 1.69    |
| 16  | EGY     | 1.69    | 49  | PAN     | 1.69    |
| 17  | EST     | 1.03    | 50  | PHL     | 1.69    |
| 18  | GBR     | 1.69    | 51  | POL     | 1.32    |
| 19  | GTM     | 1.69    | 52  | ROU     | 1.41    |
| 20  | HKG     | 1.69    | 53  | SAU     | 1.69    |
| 21  | HUN     | 1.69    | 54  | SGP     | 1.69    |
| 22  | JDN     | 1.69    | 55  | SLE     | 1.03    |
| 23  | IND     | 1.69    | 56  | SVK     | 0.85    |
| 24  | IRN     | 0.09    | 57  | SVN     | 0.66    |
| 25  | ISR     | 1.69    | 58  | SWE     | 1.69    |
| 26  | JOR     | 1.69    | 59  | SYR     | 0.75    |
| 27  | JPN     | 1.69    | 60  | THA     | 1.69    |
| 28  | KEN     | 1.69    | 61  | TUR     | 1.69    |
| 29  | KHM     | 1.69    | 62  | UKR     | 1.69    |
| 30  | KOR     | 1.69    | 63  | URY     | 1.69    |
| 31  | KWT     | 1.6     | 64  | USA     | 1.69    |
| 32  | LAO     | 1.69    | 65  | VEN     | 0.47    |
| 33  | LBN     | 0.85    | 66  | ZAF     | 1.69    |
