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Foreign AID, Governance, and Foreign Direct Investment in Vietnam: A Dynamic Gmm Analysis

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ABSTRACT

Foreign direct investment (FDI) is essential for economic growth, and the attraction of FDI inflow is a solution to foster economic growth in developing countries. Literature has well documented that FDI is determined by many factors among which foreign aid has a controversial impact on FDI depending on complementary or substitute effects between these two capital flows. This study investigates the impacts of foreign aid on FDI and whether this impact is different across provinces with hetero-quality governance. Using the fixed-effect and dynamic generalized method of moments estimation models for balanced panel data for 2006–2017, this paper finds a negative impact of foreign aid on FDI at the provincial level, but the effect is different cross-province with different proxies of the quality of governance. These empirical results shed light on the foreign aid allocation policies and management to increase the attractiveness of FDI inflow in Vietnam.

ملخص

الاستثمار الأجنبي المباشر (FDI) عامل ضروري للنمو الاقتصادي، ويعتبر جذب تدفق الاستثمار الأجنبي المباشر الحل لتعزيز النمو الاقتصادي في البلدان النامية. وقد وثقت الأدبيات بشكل جيد أن الاستثمار الأجنبي المباشر يتم تحديده من خلال عدد من العوامل تشمل المساعدة الخارجية التي لها تأثير مثير للجدل على الاستثمار الأجنبي المباشر اعتمادا على الآثار التكميلية أو البديلة بين هذين التدفقين الرأسماليين. وتبحث هذه الدراسة في آثار المساعدات الخارجية على الاستثمار الأجنبي المباشر وما إذا كان هذا التأثير مختلفا عبر الولايات ذات الحوكمة غير المتجانسة.وباستخدام أسلوبي تقدير اللحظات المعمم الثابت والديناميكي لبيانات لوحة متوازنة للفترة 2006-2017، عُثر عن وجود

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تأثير سلبي للمساعدات الأجنبية على الاستثمار الأجنبي المباشر على مستوى الولايات، ولكن التأثير مختلف عبر الولايات ذات ممثلين مختلفين لجودة الحوكمة .كما تسلط هذه النتائج التجريبية الضوء على سياسات وإدارة تخصيص المساعدات الخارجية لزيادة جاذبية تدفق الاستثمار الأجنبي المباشر في فيتنام.

ABSTRAITE

Les investissements directs étrangers (IDE) sont essentiels à la croissance économique, et l'attraction des flux d'IDE est une solution pour favoriser la croissance économique dans les pays en développement. La littérature a bien montré que les IDE sont déterminés par de nombreux facteurs parmi lesquels l'aide étrangère a un impact controversé sur les IDE en fonction des effets de complémentarité ou de substitution entre ces deux flux de capitaux. Cette étude examine l'impact de l'aide étrangère sur les IDE et si cet impact est différent dans les provinces où la gouvernance est de qualité inégale. En utilisant les modèles d'estimation de la méthode des moments généralisés à effet fixe et dynamique pour des données de panel équilibrées pour 2006-2017, ce document trouve un impact négatif de l'aide étrangère sur les IDE au niveau provincial, mais l'effet est différent d'une province à l'autre avec différents proxys de la qualité de la gouvernance. Ces résultats empiriques mettent en lumière les politiques d'allocation et de gestion de l'aide étrangère afin d'augmenter l'attractivité des flux d'IDE au Vietnam.

Keywords: Foreign aid, governance, FDI, provincial level, Vietnam

JEL Classification: F35, O16, E22

1. Introduction

Foreign direct investment (FDI) plays a vital role in receiving countries, particularly developing countries. It promotes economic growth through an increase in capital, modern technology, managerial skills, better governance, more extensive market expansion, and a better business environment. FDI is affected by several factors, including natural and social resources, and institutional, economic, and financial factors (Asiedu, 2006; Asiedu et al., 2009; Azémar & Desbordes, 2009). Many studies emphasize the role of foreign aid in attracting FDI inflow (Harms & Lutz, 2006; Selaya & Sunesen, 2012; Yiheyis & Cleeve, 2018).

There are two main strands of literature concerning the impacts of foreign aid on attracting FDI. The first encapsulates research stating that foreign

aid is supplementary to FDI. For example, foreign aid invested in projects improving the human resource, building infrastructures such as roads, railroads, electricity as well as improving institutions and the business environment, and this is termed as the "infrastructure effect" (Kimura & Todo, 2010). Foreign aid invested in these areas helps increase the marginal productivity of physical capital, resulting in more FDI inflows (Griffin & Enos, 1970; Harms & Lutz, 2006; Yiheyis & Cleeve, 2018). The second strand of literature indicates that foreign aid in companion with FDI builds domestic investment capital and directly contributes to production. For instance, foreign aid invested in production projects, such as producing goods and services, seek rent and this is termed as the "rent-seeking effect" (Kimura & Todo, 2010). As a result, the marginal product of capital would decline, and it would decrease the FDI inflows. Therefore, the theoretical impacts of foreign aids on FDI inflow are controversial and empirical results remain inconclusive. It is believed that the mixed empirical results can be explained by the high level of aggregation used for the foreign aid variable (Selaya & Sunesen, 2012).

With the collapse of the Soviet Union, a closed and major economic partner and donor of Vietnam, foreign aid to this country suddenly disappeared. However, the Vietnamese government successfully shifted its planned economy into a market-orientation economy with new policies calling for official development aid and FDI. Vietnam receives and effectively uses foreign aid resources, and this could be one of the reasons explaining the continuous increase in foreign aid disbursement to Vietnam. According to the statistics of the Ministry of Investment and Planning, the total cumulative foreign aid disbursed was nearly 86.6 billion USD by 2019. This foreign aid has contributed to the progress of poverty reduction, construction of infrastructures, improvement in education, public health, and other socio-economic fields. To accompany foreign aid, Vietnam attracted a considerable amount of FDI during 1989–2019, which accounted for 211.5 billion USD in approximately 33921 projects (GSO, 2021). This data poses the question of whether there is any interactive relationship between foreign aid and FDI attraction in the context of Vietnam.

This study examines the impacts of foreign aid on the inflow of FDI in Vietnam using balanced panel data from 63 provinces over the period 2006–2017. This research also discusses whether the impacts of foreign aid on FDI are different cross-province with better governance.

Estimations reveal that foreign aid has negative impacts on FDI inflows, or they substitute capital sources in the Vietnamese context. This impact is indifferent cross-provinces with better governance proxied by control of corruption, but the effect is stronger in the provinces with a higher level of transparency. This study is different from several perspectives. First, the paper uses disaggregated data on FDI and foreign aid at the provincial level within a post-communist developing country. Using the disaggregated data on foreign aid has two benefits. The FDI-attracting policies of the central government are common; thus, these effects are factored out. It overcomes the shortcoming of mixed empirical impacts of foreign aid on FDI due to the high aggregation of the measures. Second, the paper also investigates the role of provincial governance in moderating the effects of foreign aid on FDI inflows. Empirical results shed light on the adjustment of strategies on foreign aid attraction and allocation in Vietnam.

The rest of the paper is organized as follows. Section 2 provides a literature review on the impacts of foreign aid on FDI and the moderating role of governance. Section 3 mentions foreign aid and FDI in the Vietnamese context. Section 4 presents a theoretical model, empirically estimated models, and estimation issues. The data used in the paper is also presented in this section. Section 5 provides empirical results and discussion. Section 6 concludes the paper.

2. Literature Review

The theoretical impact of foreign aid on FDI is ambiguous whether it is positive or negative as foreign aid and FDI are complemented or substituted. The empirical finding shows positive, negative, and no impact of foreign aid on FDI inflows depending on the research sample and differences in economic conditions, technology, and typical characteristics of countries. Most researchers find a positive impact of foreign aid on FDI called the “infrastructure effects” (Kimura & Todo, 2010). Selaya and Sunesen (2012) found positive effects as foreign aid increases the productivity of private investments by financing complementary factors of production, such as infrastructure and human capital. Opoku (2015) studied the effect of aid on FDI in 42 African countries during 1996–2008 and found that total foreign aid to Africa has a positive effect on FDI regardless of the type of aid. Donaubauer et al.

(2016) found that aid for infrastructure helps attract FDI by improving recipient countries' endowment with infrastructure. Yiheyis and Cleeve (2018) presented that the impact of foreign aid on FDI depends on whether the foreign aid was committed to complementary or productive activities in the recipient countries. Many other studies also shared the empirical results from different research samples and the use of foreign aid. In these cases, foreign aid helps increase marginal products of capital in the recipient countries, a complement source of capital that improves the recipient countries' infrastructure and well-functioning bureaucracy; thus, it is more attractive for FDI inflows (Blaise, 2005; Donaubauer et al., 2016; Griffin & Enos, 1970; Harms & Lutz, 2006; Selaya & Sunesen, 2012; Yasin, 2005; Yiheyis & Cleeve, 2018).

On the other hand, Harms and Lutz (2006) argued that foreign aid discourages productive rent-seeking behaviors leading to a drop in the marginal product of capital. This impact is called the "rent-seeking effect" (Kimura & Todo, 2010) or substitution between foreign aid and FDI capitals. When a country receives foreign aid, private firms may engage in competition for rent and ignore investment in increasing productivity and thus discourage FDI flows in the recipient countries. Karakaplan et al. (2005) shared a similar empirical result when they conducted an empirical study on the effects of foreign aid on FDI using a sample of 97 countries during 1960–2004. Their empirical finding is that foreign aid is not necessary to attract FDI in the recipient countries as foreign aid directly invested in increasing physical capital would crowd out individual investment. Kimura and Todo (2010) found a mixed empirical effect of foreign aid on FDI that Japanese aid promotes FDI from Japan but does not attract FDI from other countries and called this the "Vanguard effect."

A few studies on the impacts of foreign aid on FDI do not find a statistically significant effect. For example, Kimura and Todo (2010) investigated how foreign aid facilitates FDI flows into less developed countries and found that foreign aid, in general, does not have any significant effect on FDI. Frot and Santiso (2008) studied stylized facts about development aid and capital flows to developing countries and found that foreign aid is not a major source of finance for these countries anymore and there is no relationship between foreign aid and FDI within developing countries over time. Jansky (2012) studied the relationship between foreign aid and FDI and found that there is no evidence of the

causal relationship between foreign aid and FDI among 180 countries during 1971–2007.

Besides, some previous studies found the importance of institutional measures on the impacts of foreign aid on FDI inflows. For instance, Harms and Lutz (2006) found a positive impact of foreign aid on FDI in countries where the private sector suffers a high regulatory burden as institutions are a robust determinant factor of FDI inflows (Tintin, 2013). In this sense, a country with a poor regulation system encourages a rent-seeking effect that does not dominate the infrastructure effect, or the quality of governance does not affect the rent-seeking effect but the infrastructure effect. Karakaplan et al. (2005) studied the impact of foreign aid on FDI in the different development levels of the financial market and found that more developed financial markets reinforce the positive effect of foreign aid on maintaining FDI inflows.

Literature on the theoretical and empirical impacts of foreign aid on FDI is not rich but more empirically complicated. A few studies have focused on the impact of foreign aid on FDI inflows in a post-communist developing country where each province is hetero in its governance quality, which has not been sufficiently considered in the most existing literature. A study on the impact of foreign aid on FDI inflows among provinces with a post-communist country, in which the policies are centrally issued but the understanding and interpretation is hetero across provinces, sheds light on designing the strategy for foreign aid and FDI attraction and allocation in transitional countries.

3. FDI and ODA in Vietnam

In 1987, the Law of Foreign Investment in Vietnam was officially put into effect, which was the first legislative foundation for the attraction of FDI. However, the collapse of the Soviet Union sharply decreased foreign aid and FDI inflows to Vietnam as almost all foreign capital inflows to Vietnam were from the Soviet Union and other Central and Eastern European countries. According to MPI (2019), after more than 30 years (1987–2019) of "welcoming" FDI, Vietnam attracted more than 27,900 FDI projects with a total registered capital of more than 349 billion USD from 126 countries and territories globally. The disbursement of FDI was 194 billion USD, equal to 55% of the total registered capital. FDI was a

substantial foreign supplementary source (accounting for 25% of the total annual social investment) with high-quality capital in terms of technology and managing experience. However, in the first phase, FDI attraction was called for without any significant concerns relating to the negative effects of foreign capital, and it focused on the number of projects and the size of capital invested. Due to the high expectations of FDI attraction, many provinces offered FDI-favorable policies, which exceeded the "standard" in spreading the "red carpet" for FDI without any consideration on the quality of investment projects. As a result, 94% of FDI enterprises received low and out-of-date technology (MPI, 2019); only 4.3% of the total FDI projects implemented technology transference for FDI enterprises in Vietnam; there was a shortage of prominent investors from developed countries, such as Europe and the United States, and FDI enterprises seriously caused environmental pollution (MPI, 2019). Recently, Resolution 50-NQ/TW issued in 2019 on "Orientation for the completion of institutions, policies for the improvement of quality and efficiency of co-operation in foreign investment towards 2030" has provided instructions on attracting FDI. This resolution emphasizes the autonomy in FDI attraction with a selective basis, which should concentrate on quality, efficiency, technology, and environment protection.

According to the Ministry of Finance, Vietnam has received more than 80 billion USD from foreign aid sources and preferential loans. It makes the country one of the biggest foreign aid receivers globally. In the early stages, foreign aid was provided through grant aids, which account for a large proportion of foreign aid. When Vietnam became a lower-middle-income country, there was a dramatic decrease in the aids granted, while preferential loans and trade loans increased. It poses a big challenge for provinces in Vietnam to foster their capabilities and actively apply innovation in project implementation to promote foreign aid disbursement. The orientation for foreign aid attraction in Vietnam is pursuing a "mixture" loan policy, which would reasonably combine aid, and preferential and foreign loans for the socio-economic development of the country. The current regulation on foreign aid postulates that a province should continue searching for and take advantage of loans from foreign preferential sources based on their reciprocal capital, guarantee for repayment, debt security, and national financial security. Therefore, the efficiency of foreign aid allocation should be considered and prioritized in the construction of infrastructure, institutional reforms, and

business environment rather than being allocated to manufacturing sectors, which is the strength of the private sector.

4. Methodology and Data

4.1. Theoretical models

This paper sets up a theoretical model based on the assumptions of a small opened economy with output per capita y, which grows due to two factors: (i) the accumulation of physical capital per capita k, and (ii) improvement of total factor productivity A. Thus, the Cobb-Douglas production function of this economy can be written in a form as $y = Ak^{\alpha}$, in which α is a constant that satisfies $0 \leq \alpha \leq 1$. It is also assumed that foreign aid contributes to output by increasing physical capital accumulation k and through the complementary factor or total factor productivity[1].

Assume that a proportion θ of the aid inflow ($0 \leq \theta \leq 1$) contributes to complementary factors and (1-θ) helps increase physical capital accumulation. The foreign aid flow increasing the initial stock of the total factor productivity is $A = a_0 + \theta * aid$, where *aid* is the foreign aid per capita and a_0 is an initial value of foreign aid per capita. In a small open economy, physical capital accumulation is funded by both domestic savings and FDI. Thus, the capital accumulation per capita can be expressed as follows:

$$\dot{k} = sy - (n + \delta)k + (1 - \theta)aid + fdi, \text{ or}$$

$$\dot{k} = s(a_0 + \theta * aid)k^{\alpha} - (n + \delta)k + (1 - \theta)aid + fdi \qquad (1)$$

where *n* is the growth rate of the population; δ is the depreciation rate, which is constant; s is the saving rate; and *fdi* is the FDI per capita. According to the Solow model, in a steady state, the capital stock level does not change; as such, $\dot{k} = 0$ at any point in time.

[1]For example, if foreign aid is invested in applying modern technology in agricultural production or other productive sectors, it would be referred to as supplementary capital. When the aid is spent on road infrastructure projects or projects improving the quality of governance institutions, it is referred to a complementary factor or total factor productivity.

In a small, open economy with free international mobility of capital, the return to physical capital (or marginal products to capital, MPK) is the same across countries. Any increase in foreign capital should reduce the MPK in the recipient country and crowd-out the other sources of capital. When savings are given, any increase in foreign aid, partly increasing physical capital, tends to crowd-out the FDI. The other part of the foreign aid has a complementary effect on the total factor productivity through better governance or modern production technology, which increases the MPK and attracts more FDI inflows. Note that more physical capital results in higher income; as such, it increases domestic savings and investments. A higher domestic investment would lower the MPK and thereby reduce additional attracted FDI inflows.

Based on equation (1), we now derive FDI per capita as a function of foreign aid per capita in the steady state:

$$fdi = (n + \delta)k^* - s(a_0 + \theta aid)\, k^{*\alpha} - (1 - \theta)aid$$

in which $k^*$is the level of capital in the steady state. By taking the partial derivatives with respect to *aid*, we obtain:

$$\frac{\partial fdi}{\partial aid} = (n + \delta)\frac{\partial k^*}{\partial aid} - \alpha k^{*\alpha-1}\, s(a_0 + \theta\ aid)\frac{\partial k^*}{\partial aid} - s\theta k^{*\alpha} - (1 - \theta) \leq \geq 0. \quad (2)$$

Equation (2) shows the components involved in the effect of foreign aid on FDI, which can be used to theoretically conclude that foreign aid has mixed effects, either positive, negative, or no impacts on FDI. Therefore, the net impact of foreign aid on FDI is ambiguous in theory. It is worthy to further investigate the empirical evidence to predict the relationship between foreign aid and FDI, and whether corruption influences the impacts of foreign aid on FDI to shed light on policies of foreign aid and FDI management in a specific context.

4.2. Empirical model

Literature reveals that many factors affect FDI inflows (Tintin, 2013). The importance of infrastructure, economic development, governance, culture, and social factors of the host countries in attracting FDI inflows has been found in many previous studies (Asiedu, 2006; Asiedu et al.,

2009; Dunning, 2004; Egger & Winner, 2006; Globerman & Shapiro, 2002; Opoku, 2015; Yiheyis & Cleeve, 2018). Together with the above factors, this paper argues that foreign aid is an important factor determining FDI inflow. However, it is different from the others that the impacts of foreign aid on FDI are examined at the provincial level, where political regime, institutional, and cultural factors insignificantly vary. We argue that foreign aid has a positive impact on FDI inflows, and this effect is stronger in the provinces where there is better governance. The model is possibly specified as follows:

$$\log FDI_{it} = \alpha + \gamma logAID_{it} + X_{it}\beta + \theta logAID_{it}X_{it} + \vartheta_i + \varphi_t + \varepsilon_{it} \quad (3)$$

in which the dependent variable is FDI inflow measured in a logarithm, actual AID is in a log form, X_{it} is a vector of other control variables of province i at time t, ϑ_i is unobservable province-specific factors, φ_t is unobservable time factors, and ε_{it} is independent and identically distributed error terms, which are unobservable both from province-specific and time factors. The vector X includes common factors that determine FDI inflow in the literature, such as GDP, level of openness, human capital, population, quality of governance, and state budget size. No further control variable is added here because the omitted variables bias is substantially reduced by including a full set of time dummies, individual province effects, the initial level of GDP per capita, and the lagged level of the dependent variable.

4.3. Estimation issues and methods

The estimated model specified in equation (3) may have the following potential issues. First, it is common in the macro data that aggregation and measurement errors are potential in the annual time-series variables. To overcome these problems and in recognition of the fact that foreign aid and FDI may take time before their effects are felt, we use a 3-year-averaged series, which is suggested by Kimura and Todo (2010) and Yiheyis and Cleeve (2018) for the relatively short sample period. The 3-year-average time-series also possess the advantage of dealing with missing observations. In this case, estimation methods controlling for province-specific effects, such as fixed effects and random effects, which are specified in equation (3), should be used.

Second, the AID variable may possibly show endogeneity. As Harms and Lutz (2006) argue, international donors systematically disburse more foreign aid to those neglected by private foreign investors. It would raise the issue of potential endogeneity and simultaneity bias. The estimated procedure to overcome endogeneity is as follows: (i) We start to estimate the model specified in equation (3) with an instrumentation strategy that follows cross-province studies and uses lags of the own foreign aid variables and lags of other control variables included in the model. (ii) We then use the dynamic generalized method of moments (GMM) for the panel data method introduced by Arellano and Bond (1991), which relies on lagged levels and differences as instruments for regressions in first differences. The difference GMM is used in this paper because of the two following reasons: (i) eliminating the unobservable province-specific factors (individual effect), which helps reduce the chance of endogeneity; (ii) using lagged levels and differences in both dependent and independent variables as instruments to deal with endogeneity. The estimated model specified in equation (4) and the dynamic GMM for the panel data with robust procedures are applied in this regard. Therefore, the estimated model is specified as follows:

$$\log FDI_{it} = \alpha + \rho \log FDI_{i,t-1} + \gamma logAID_{it} + X_{it}\beta + \theta logAID_{it} x X_{it} + \vartheta_i + \varphi_t + \varepsilon_{it} \quad (4)$$

Applying the procedure of Arellano and Bond (1991), equation (4) considers the first difference to eliminate the individual effect ϑ_i. The estimated model becomes a difference GMM and has its form in equation (5).

$$\Delta\log FDI_{it} = \rho\, \Delta\log FDI_{i,t-1} + \gamma \Delta logAID_{it} + \Delta X_{it}\beta + \theta \Delta logAID_{it} x \Delta X_{it} + \Delta\varphi_t + \Delta\varepsilon_{it} \quad (5)$$

4.4. Data

In this study, the provincial data are collected from two main sources: the General Statistics Office of Vietnam (GSO) and the Vietnam Chamber of Commerce and Industry (VCCI), which cover 63 provinces/cities in Vietnam over the period 2006–2017. The first data source comprises provincial data related to GDP, foreign aid, FDI, export turnover, import turnover, and state budget revenues, which are all measured in billion dongs at the 2010 constant prices. In this database, the seasonality is

adjusted by the Holt-Winter technique. The other two variables of population and trained labor are measured in terms of number of people. The above data are exogenously processed and tested for consistency and homogeneity by the GSO.

The second source includes two sub-indexes of the provincial competitiveness index (PCI) that are exogenously calculated by VCCI and with assistance from the U.S. Agency for International Development (USAID). These indexes reflect the quality of governance in provinces/cities, including transparency and informal charges/corruption control. The transparency index measures whether firms have access to appropriate planning and legal documents necessary to run their businesses, whether those documents are equitably available, whether new policies and laws are communicated to firms and predictably implemented, and the business utility of the provincial webpage. Informal charges/corruption control measures how much firms pay in informal charges, how much of an obstacle those extra fees pose for their business operations, whether the payment of those extra fees results in expected results or "services," and whether provincial officials use compliance with local regulations to extract rents.

These two sub-indexes are standardized among all provinces/cities and calculated with variation from 0 to 10. When the number is higher, the quality of governance is expected to be better.[1] Basic statistics of the variables are clarified in Table 1.

Table 1: Some descriptive statistic of variables

Variables	Mean	Std. Dev.	Min	Max
Log of FDI	6.019	2.468	0	10.748
Log of AID	5.586	1.879	0	10.101
Log of GDP	9.987	0.925	7.505	13.362
Openness	1.091	1.662	0.003	16.399
Log of population	7.053	0.571	5.670	9.022
Log of state revenue	8.434	0.997	5.997	12.329
Log of trained labor	4.520	0.768	2.532	7.404
Transparency	5.909	0.827	2.150	8.850
Corruption control	6.063	1.021	2.810	8.940

[1] Their computation methods are presented at http://eng.pcivietnam.org/about/pci-methodology/.

5. Empirical results and discussion

The paper checks if multicollinearity exists among independent variables in both estimated models. The Pearson correlation matrix is computed and presented in Table 2.

Table 2: Pearson correlation matrix of independent variables

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Log of AID	1.000							
Log of GDP	0.313	1.000						
Openness	0.108	0.433	1.000					
Log of population	0.366	0.839	0.250	1.000				
Log of state revenue	0.036	0.215	0.171	0.089	1.000			
Log of trained labor	0.310	0.841	0.363	0.848	0.158	1.000		
Transparency	0.107	0.297	0.144	0.201	0.055	0.257	1.000	
Corruption control	-0.023	0.009	-0.063	0.025	-0.045	-0.194	0.015	1.000

The correlations among the variables are so low that no evidence of multicollinearity is suspected. To estimate the impacts of foreign aid on FDI specified in equation (3), it is necessary to test if the fixed-effects or random-effect model is consistent. Hausman test results indicate that the fixed-effects model is consistent, and it is used to estimate the impacts of foreign aid on FDI in Vietnam. The fixed-effects models are used for annual panel data and 3-year average panel data as suggested by Kimura and Todo (2010) and Yiheyis and Cleeve (2018). Further, the dynamic GMM for panel estimation models is used to deal with potential endogeneity in the relationship between foreign aid and FDI developed by Arellano and Bond (1991). According to Arellano and Bond (1991) and Blundell and Bond (1998), a sample of N=65 and T=12 should be a good size of the dataset for dynamic GMM estimation. As discussed above, the difference GMM estimation of dynamic panel models was used in this study. The estimated results are presented in Table 3.

Table 3: Estimated results of the impacts of foreign aid on FDI

	Fixed Effect Models for three-year average data		Fixed Effect Models for annual data		Random Effect Models for annual data		Dynamic GMM Models for annual data	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Lag of log FDI							0.1462**	0.1436**
							(0.0585)	(0.0586)
Log of AID	-0.1337*	-0.1381*	-0.0537*	-0.0505*	-0.0493*	-0.0517*	-0.0619**	-0.0680**
	(0.0761)	(0.0802)	(0.0306)	(0.0293)	(0.0286)	(0.0278)	(0.0283)	(0.0293)
Log of GDP	1.125***	1.152***	1.300***	1.584***	0.970***	1.102***	0.0818	0.1083
	(0.3330)	(0.3180)	(0.4070)	(0.4060)	(0.2370)	(0.2290)	(0.6170)	(0.6180)
Openness	0.231***	0.235***	0.154***	0.139***	0.153***	0.148***	-0.0158	-0.0166
	(0.0670)	(0.0662)	(0.0420)	(0.0422)	(0.0341)	(0.0344)	(0.0552)	(0.0551)
Log of population	0.5653	-0.00704	-3.307**	-2.912*	-2.437*	-2.356*	2.6168	2.8562
	(0.5040)	(0.5020)	(1.4720)	(1.5010)	(1.2600)	(1.2610)	(2.8100)	(2.8140)
Log of state budget revenue	0.3876*	0.3672*	0.0953	0.0768	0.0216	0.00837	0.1036	0.0972
	(0.2030)	(0.2000)	(0.0671)	(0.0675)	(0.0546)	(0.0550)	(0.0765)	(0.0767)
Log of trained labor	0.0341	0.6238*	-0.1571	-0.1600	0.102	0.238	0.0868	0.0258
	(0.3310)	(0.3560)	(0.2890)	(0.2950)	(0.1960)	(0.2040)	(0.3690)	(0.3730)
Transparency	0.225*		0.207***		0.128**		0.0761**	
	(0.1207)		(0.0607)		(0.0636)		(0.0390)	
AID*Transparency	0.3081*		0.5584*		0.00216		0.8641*	
	(0.1784)		(0.3306)		(0.0330)		(0.5065)	
Corr. Control		0.642*		0.9182**		0.751**		0.3096*
		(0.3730)		(0.4030)		(0.3789)		(0.1869)
AID*Corr. Control		-0.049		23.7409		-0.0206		2.8831
		(0.0648)		(15.4953)		(0.0195)		(3.4090)
Constant	-8.095*	-9.318***	15.172*	8.213	9.001***	9.313***	-14.673	-16.348
	(4.4120)	(3.4720)	(8.7142)	(9.4253)	(2.2020)	(1.9050)	(15.7709)	(16.1702)
Observations	252	252	756	756	756	756	630	630
Adj. R-sq	0.21	0.21	0.23	0.24	0.24	0.23		

Note: Standard errors in parentheses;

, **, and * denote statistical significance at 10%, 5%, and 1%, respectively*

The results presented in columns (1) and (2) are estimated from equation (3) by using the fixed-effects models for the 3-year average panel data in which the quality of provincial governance is proxied by the transparency and corruption control indexes, respectively. Columns (3) and (4) of Table 3 present estimated results using the fixed-effects models, while columns (5) and (6) provide estimates from the random-effect models for annual panel data. Similarly, empirical results presented in columns (7) and (8) are estimated from the dynamic GMM models for annual panel data, which is described in equation (4). Table 3 also provides evidence of a robustness check when four different model specifications are estimated, and in each model, two proxies for provincial governance are used. The estimated results in Table 3 indicate that robustness of results is achieved. The study also conducted two post-estimation tests to check whether the estimated model is specified. First, the study conducted a test for autocorrelation. The test result indicated auto-correlation in first-differenced residuals confirming no misspecification in the estimated model. Second, the Sargan test of overidentifying restrictions was performed and its result failed to reject the null hypothesis, meaning that it was not weakened by many instruments. The results of those tests showed that the dynamic GMM estimated models are specified.

Empirical results from the fixed effect (for both 3-year average and annual data), random effect, and dynamic GMM panel data models consistently indicate that foreign aid hurts FDI. The results suggest that foreign aid and FDI are substitutes and that foreign aid contributes to economic growth by increasing physical capital. When foreign aid is invested as a substitute for FDI, it decreases the marginal product of capital and then lowers FDI inflow as theoretically predicted. This empirical result suggests that foreign aid allocated into provinces has not been served as a supplementary capital source for provincial capitals, such as investments in the human capital, infrastructures, institutional reforms, and quality of governance. Therefore, the contribution of foreign aid has not fostered the marginal product of capital and FDI inflow at the provincial level. This result is explainable at the provincial level, where they can use foreign aid resources without strict responsibility for their investment. It would lead to the lower efficiency of foreign aid allocation and use, corruptive local government, and then restrict the attraction of more FDI inflow into the provinces. These empirical results of rent-seeking effects of foreign aid and FDI at the provincial level within a country are similar to the findings (Harms & Lutz, 2006; Karakaplan et al., 2005; Kimura & Todo, 2010).

Another estimated result is that the negative impacts of foreign aid on FDI are indifferent across-province with varying quality of governance. The estimated result indicates that interaction terms between foreign aid and governance variables, including transparency and corruption control, turned out to be mixed, statistical insignificance for the interaction terms of foreign aid and corruption control, but statistical significance at 10% for the interaction term of foreign aid and transparency. These empirical results suggest that foreign aid allocation based on transparency can mitigate the attractiveness of recipient provinces to foreign private investors. In other words, foreign aid would be a more supplementary capital source of FDI in more transparent provinces. However, the impacts of foreign aid on FDI are indifferent among provinces where their corruption control varies. It is common in places where corruption is considered a norm (Le et al., 2021; Nguyen et al., 2016).

Further, there are some interesting empirical results. Provinces with higher openness of their economy would attract more FDI and provinces with a better quality of governance have statistically significant effects on FDI inflows. These results also suggest the importance of integration and quality of provincial governance on FDI attractive policies.

6. Conclusion

This paper investigates the impacts of foreign aid on FDI at the provincial level in Vietnam during 2006–2017. Theoretically, the impacts of foreign aid on FDI are ambiguous as foreign aid may have two opposite effects: substitution and complementary on FDI inflows. The empirical results obtained using the difference GMM for panel data estimation techniques reveal that foreign aid harms FDI inflows and the impact is stronger in more transparent provinces. The results suggest that foreign aid has been used as a substitute for FDI, or in other words, it has not improved the attractiveness of recipients to foreign private investors. It may naturally raise the question of discovering an optimal balance between foreign aid to developing countries and how they should be distributed between physical capital and complements to capital. The positive effects of two proxies for quality of governance on FDI inflow into provinces imply that foreign aid should be allocated to make institutional changes, making foreign aid more meaningful in signaling investment to foreign investors.

The paper has two limitations. Data availability does not allow to check whether the "Vanguard effect" exists. It is believed that foreign aid from Korea and Japan may have the "Vanguard effect" as Vietnam has received a huge amount of foreign aid and FDI from Korea and Japan. This is a potential issue for further research on the impacts of foreign aid on FDI in an emerging/transitional country such as Vietnam. Another limitation of this paper is the availability of foreign aid by types of commitment. A further study can break foreign aid down into various parts and better understand the far-reaching effects of foreign aid on FDI inflows.

Although the study has some limitations, it may provide several implications. From a theoretical perspective, the impact of foreign aid on FDI inflows not only depends on the types of aid commitment but also the quality of governance. The complement or substitute effects of foreign aid on FDI are moderated by governance quality. From a managerial perspective, the study may provide some policy implications. First, foreign aid attraction and allocation should focus on areas that would increase the attractiveness of FDI inflows. It should be considered a new agenda for foreign aid allocation and management in Vietnam. Foreign aid should not be allocated to state-owned enterprises for their production expansion or other substitutes for FDI capital. Second, the provincial government should gradually improve its quality of governance, focusing on transparency and corruption control. Actions that make provincial governance better would increase the attractiveness of foreign investors. They also increase the impacts of foreign aid on FDI at the provincial level. Third, potentially, a decrease in foreign aid when Vietnam becomes a lower medium-income country could be offset by FDI inflows because of the substitution effects empirically found between foreign aid and FDI inflows. It could be opened for FDI capital invested in state-owned enterprises in the sectors that do not require state control.

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