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Is Bilateral Aid Considered a Complement or a Substitute to Foreign Direct Investment for Least Developed Countries (LDCs).

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The views stated in this thesis are those of the author and not necessarily of those of the supervisor, second assessor, Erasmus School of Economics or Erasmus University of Rotterdam

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## Abstract

This paper seeks to assess whether Bilateral Aid and Foreign Direct Investment can be considered complements or substitutes for Least Developed Countries (LDCs). The OCED describes Bilateral aid as “the flow of money from official government sources directly to the recipient country” (OECD,2023). Foreign Direct Investment according to the OCED is “the objective of establishing a lasting interest by a resident enterprise in one economy in an enterprise (direct investment enterprise) that is resident in an economy other than of the direct investor” (OECD,2009).

The theory of Bilateral aid being a complement is underpinned by the notion that aid can be used to improve the recipient country’s overall infrastructure to attract more Foreign Direct Investment.

However, it is assumed that countries that receive constant flows of Bilateral aid show a lack of long-term financial planning. This notion has the effect that Aid could discourage Foreign Direct Investment. The contention is that Bilateral Aid would replace Foreign Direct Investment inflows. The premise of this argument is that if Bilateral Aid leads to less inflows of FDI then these two components would be seen as substitutes.

The results from this papers OLS regression with fixed effects support the hypothesis that Bilateral Aid and Foreign Direct Investment are complements for Least Developed Countries. However, applying the same methodology for more developed countries that still receive Bilateral Aid, the results show that Bilateral Aid and Foreign Direct Investment are substitutes.

## **Introduction**

This paper will contribute to the literature by assessing whether Foreign Aid and Foreign Direct Investment are considered complements or substitutes for LDCs economies.

Foreign aid can be distinguished into the following forms: humanitarian, charitable military and Bilateral Aid. This paper will only review the relationship between Bilateral Aid and Foreign Direct Investment. The closest variable of bilateral aid is Official Development Assistance (ODA), The OCED describes ODA as “government aid that promotes and specifically targets the economic development and welfare of developing countries” (ODA, 2023). The scope of this paper will be limited to establishing the narrow relationship between Bilateral Aid and Foreign Direct Investment, by assessing whether there are complements or substitutes.

The OCED’s definition of Foreign Direct Investment (FDI) is “the objective of establishing a lasting interest by a resident enterprise in one economy in an enterprise (direct investment enterprise) that is resident in an economy other than of the direct investor” (OECD, 2009). Foreign Direct Investment is also described as the purchase of equity capital and reinvestment of profits by foreign investors that act in the same way as domestic savings (Kosack and Tobin, 2006). Kosack and Tobin (2006) explain that inflows of FDI lead to the creation of new fixed assets and the use of better technology. The advanced technology and management practices will spill over to domestic industries.

The effect of Foreign Aid on Least Developed Countries (LDCs) has been studied extensively. The studies typically investigate whether Foreign Aid leads to economic growth. Burnside and Dollar’s (2000) working paper looked at the relationship between Foreign Aid, economic policies and the growth of GDP per capita. The authors concluded that aid had a positive impact on growth in developing countries with good macroeconomic policies. This theory was supported by Dalgaard et al (2004), using the Ramsey-Caas Koopmans model. Dalgaard et al (2004) concluded that aid will shift production technology upwards and as a result increase the return to investments for capital. This will stimulate long-run productivity and growth. However, Easterly (2003), Moyo (2009) and Raman and Arvind (2008) argue that aid has no impact on growth.

When it comes to the relationship between Foreign Aid and Foreign Direct Investment (FDI), there is a shortage of literature that provides deeper scholarly reviews. It stands to reason that such scarcity of literature would be a cause of concern for policymakers. Foreign Aid and Foreign Direct Investment (FDI) constitute important components in improving capital formation and achieving long-term economic growth.

Beludi and Oladi (2007) were the first authors to theoretically assess the relationship between Foreign Aid and Foreign Direct Investment. They concluded that Foreign Aid would lead to a crowding-out effect of Foreign Direct Investment.

However, empirical authors like Kimura & Todd (2010) found no significant relationship between aid and Foreign Direct Investment. But they found that Japanese infrastructure aid has a vanguard effect for Least Developed Countries.

Donaubauer's (2014) results suggested that Aid and Foreign Direct Investment are negatively correlated. He concluded that rent-seeking or crowding effect seems to dominate other potential Foreign Direct Investment attracting effects of aid. To conclude, the empirical evidence that analyses the relationship between Foreign Aid and Foreign Direct Investment is mixed.

In theory, Bilateral Aid should act as a catalyst to attract FDI inflows to LDCs. Bilateral Aid could be utilised to improve the country's infrastructure program and in turn, create an attractive business environment to attract more FDI inflows. Kapfer et al (2007) and Merwe (2021) support this notion as they concluded that the improved state of infrastructure would ideally be a persuasive instrument to attract more investment. This paper will build on this hypothesis to assess whether Bilateral Aid leads to more FDI inflows for the recipient country. If Bilateral Aid leads to an increase in FDI, then the relationship would be complementary. By the same token, if Bilateral Aid leads to a decrease in Foreign Direct Investment, then the relationship would be substitutional.

Moyo (2009) supports the neoclassical theory that foreign capital should flow from richer countries to poorer countries. She posits that the marginal increase of productivity from deploying a unit of capital amount should be higher in poor countries than in rich countries. The example she gave in her book *Dead Aid* stated that \$1 can produce only one pair of

shoes in a rich country, however, \$1 can produce 10 pairs of shoes in a poor country. Therefore, richer countries would get a greater return for their investments in poor countries for the same amount of capital outlay than in rich countries. However, the analysis of recent data provides a different picture.

The UN investment report in 2020 showed that in 2019, Foreign Direct Investment inflows to developed economies rose by 5 per cent to \$800 billion from their revised level of \$761 billion in 2018. In Europe alone, FDI inflows increase by 18 per cent to \$429 billion. The picture presented for FDI inflows to the Least Developed Countries declined by 6 per cent to \$21 billion in 2019. Africa alone received a total of \$45 billion in FDI inflows in 2019. The largest recipient of FDI in Africa was Egypt which received \$9 billion, this amount pales when compared to the \$78 billion Ireland received in 2019. In 2019, Official development assistance (ODA) totalled \$152.8 billion in US dollars. This was an increase of 1.4 per cent in real terms compared to 2018. The LDCs received \$28 billion in official development assistance. Developed countries provided \$7 billion more in official development assistance. Figure 1 in the appendix, graphically shows FDI inflows from 2001-2019. As part of the global movement of FDI funds, the LDCs on average received just a mere 1.3% of the world's FDI inflows between 2001-2019.

To critically assess whether Bilateral Aid is a complement or a substitute for Foreign Direct Investment for Least Developed Countries, an unbalanced panel dataset containing 7 Donor countries and 41 recipient countries between 1996-2019 was constructed. The picture depicted by our panel dataset is that Donor countries transferred both Bilateral Aid in the form of Net Official Development Assistance (ODA) and FDI inflows to the recipient countries at a bilateral level. The results suggest at the outset that Net ODA and FDI are complements with different forms of fixed effects for Least Developed Countries. However, applying the same methodology to lower-middle-income countries Bilateral Aid in the form of ODA and FDI behave as if they are substitutes.

The rest of the paper will follow this structure. Section 2 will be a theoretical framework. Section 3 will present a literature review of the relationship between Aid and FDI. Section 4 will be about data and empirical methodology. Section 5 will be the results of the regressions, followed by concluding remarks in Section 6.

## **Section 2: Theoretical Framework**

The hypothesis of this paper is to critically assess whether Bilateral Aid will lead to an increase or decrease in Foreign Direct Investment. The central tenet of the paper seeks to portray the hypothesis that increasing Bilateral Aid could induce more FDI inflows because Aid will improve the infrastructure of the recipient country. This improvement in infrastructure will lead to more investment going into the recipient country (Merwe, 2021).

Kapfer et al (2007) argued that infrastructure aid plays a significant role in attracting FDI. This is mainly due to the effect that infrastructure aid would have been instrumental in the development of those aspects which create better networks for communication, transportation and energy transfer within a country. The net effect will be that the increased infrastructure will benefit the overall commerce of the recipient country.

Thangamani et al (2011) support this notion as their paper argued that poor levels of infrastructure are the reason for low levels of Foreign Direct Investment in some South-Asian countries. The authors believed that Foreign Aid could play an essential role in fulfilling the savings gap and developing infrastructure. The authors' results show that aid for human and infrastructure development serves as a complementary factor that is likely to attract FDI in South Asian countries.

Wang and Balasubramanyam (2011) drew similar conclusions when they looked at the relationship between Foreign Aid and Foreign Direct Investment in Vietnam. They argued that Foreign Aid has been utilised to promote infrastructure, quality of economic management and human capital development. These changes in the Vietnamese economy have attracted FDI to Vietnam and contributed to its efficiency in promoting and reducing poverty. They found that the provinces in Vietnam which received high volumes of aid appear to receive high volumes of FDI.

Bilateral Aid could also promote investment by improving the country's balance of payments. It will also improve the recipient country's ability to finance the outflows of profits from FDI projects. Bilateral aid can help transmit business practices from donor to recipient which will make it a more attractive investment location (Merwe, 2021). This theory is supported by Kimura & Todd (2010) who concluded that bilateral aid from Japan has led to a positive vanguard effect.

Garriga and Phillips (2014) argue that aid provides a signalling mechanism to donor countries. The authors argue that before investing in these countries firms look at a variety of signals. The authors explain that the decision to send aid to a country signals the donors' trust in the authorities. Therefore, it supports the view that the concession to grant aid generally indicates that a degree of credibility has been bestowed upon the recipient government. This cements the argument that foreign development aid can become a useful signal for investors and that we could expect a complementary relationship between Bilateral Aid and FDI.

A contradicting view is postulated in that increasing Foreign Aid could lead to negative spill over effects which would discourage FDI. Dambisa Moyo a prominent aid critic argued that aid dependency provides no incentive for long-term financial planning (Moyo, 2009). The lack of long-term financial planning might scare foreign investors as they would be fearful of not generating any profits. The investment environment in the recipient country even with Foreign Aid might still not be attractive to foreign investors. According to Moyo (2009), the business environment in Africa is stifling FDI inflows. She explains that high levels of corruption and needless bureaucracy are to blame for Africa's low levels of FDI. Moyo (2009) explains that aid encourages corruption which undermines the institutions in place.

Morrissey (2015) and Moss et al (2006) both agree with Moyo's analysis of aid when it comes to the effect it has on institutions. Moss et al (2006) stated in their paper that aid is not integrated into national budgets, and it poses real sustainability problems for these countries. Moss et al (2006) explain that local officials are not included in policy planning they tend to view aid projects as a set of scarce private goods to be allocated.

The critical assessment from Moyo (2009) and Moss et al (2006) shows that aid could lead to a decrease in FDI due to how it creates financial and political instability in recipient countries and concomitantly will discourage foreign investors.



### **Section 3: Literature Review**

The literature that analyses the relationship between Foreign Direct Investment and Foreign Aid is mainly answered through empirical evidence. There's more literature suggests that Aid and FDI are complements. However, there are some papers that show a different perspective and state that there's no significant relationship between Foreign Aid and Foreign Direct Investment. While some papers suggest that Aid and FDI are substitutes. When it comes to a deeper theoretical explanation for the relationship between Foreign Direct Investment and Foreign Aid, the literature is very scarce.

According to Beladi and Oladi (2007), Foreign Aid is used to finance public consumption goods in the recipient country. Beladi and Oladi (2007) argue that the exportable sector is at the forefront of Foreign Direct Investment based on the behavioural assumption of multinational corporations in developing countries.

The authors conclude that Foreign Aid may crowd out Foreign Direct Investment. The authors arrived at this conclusion due to differences in capital intensity between the competing importing and exporting sectors.

If foreign aid is used to expand the public goods sector, resources will flow from both the exporting and importing sectors to the public goods sector. This phenomenon occurs if the exporting sector is more capital intensive than the importing sector.

On the other hand, if the importing competing sector is more capital-intensive than the exporting importing sector then fewer resources will be allocated to the public goods sector.

Another key assumption of Beladi and Oladi's (2007) theory is domestic capital is fixed while Foreign Aid is variable. As a result of this assumption, the economy substitutes domestic capital for foreign capital. Foreign aid is at the forefront of substituting domestic capital for foreign capital. As a result, Foreign Aid crowds out Foreign Direct Investment.

When it comes to the relationship between Foreign Direct Investment and Foreign Aid, Selaya and Sunesen (2012) were the first to bridge the empirical and theoretical literature gap.

Selaya and Sunesen (2012) used an open-economy, Solow Model with perfect mobility to explain the relationship between Foreign Direct Investment and Foreign Aid. Their empirical methodology was based on a panel dataset of 84 countries from 1970 to 2001. Selaya and Sunesen's (2012) open economy Solow Model shows a positive correlation if aid and FDI are invested in complementary factors. The authors describe social infrastructure projects as an example of complementary factors. They argue that aid invested in complementary factors will increase the recipient country's marginal propensity for capital.

The Model shows that aid invested in physical capital such as manufacturing projects increases competition. This leads to fewer private firms investing in the physical capital sector. According to their findings, every dollar invested in physical capital through foreign aid reduces FDI by 0.94.

To conclude, Selaya and Sunesen (2012) contend that Foreign Aid and Foreign Direct Investment complement each other if aid is invested in the recipient country's social infrastructure. Physical capital sectors, such as manufacturing, however, increase competition, resulting in Foreign Aid crowding out Foreign Direct Investment.

The empirical evidence for the relationship between Foreign aid and Foreign Direct Investment is mixed. According to Harms and Lutz (2006), Foreign Aid has complementary factors for recipient countries with low regulatory quality. Using a sample of low-income and middle-income countries from 1988-1999. The authors discovered that Foreign Aid has no effect on Foreign Direct Investment in a recipient country with an average regulatory burden. Foreign Aid and Foreign Direct Investment, on the other hand, are complementary factors for recipient countries with low regulatory quality.

Correspondingly, Karakaplan et al (2005) drew similar conclusions regarding the governance of the country. Their results showed that good governance developed financial markets which helped to reap the positive effects of aid and FDI in the form of leading to further FDI flows.

When examining the relationship between FDI and Foreign Aid, Asiedu et al (2009) took a different approach. According to the authors a country's ability to attract FDI may influence donor's decision to provide aid. Furthermore, an increase in aid to a country may result in. an increase in physical capital, which affect FDI flows.

Using a data set consisting of 89 countries for the period 1983-2004. The authors found that risk has negative effects on FDI and Aid mitigates risk. They discover that the amount of aid required to eliminate the adverse effect of risk on FDI is implausibly high.

Donaubauer et al (2013) investigated whether an increase in educational aid and would result in an increase in FDI. The authors' central hypothesis is that aid for education is an effective means to increase FDI flows to host countries. The authors contended that, from the perspective of a foreign direct investor, education and qualifications in Latin America are insufficient. The authors presented a fixed effects estimates of the impact of aid education on FDI. They employed a panel dataset covering 21 Latin American countries over the period from 1984 to 2008. Their results provide strong empirical evidence that aid for education is indeed associated with higher net FDI inflows to developing countries in Latin America. An increase in the ratio of aid for education over GDP by one standard deviation raises the FDI-to-GDP ratio by more than 1 percentage point.

However, Donaubauer (2014) presented a different set of results, when he looked at aggregate aid on FDI. Donaubauer (2014) used a large panel data set covering 63 developing countries over 43 years. His results suggested that in the long run and on average aid and FDI are negatively correlated. Thus, rent-seeking or crowding-out effects seem to dominate other potentially FDI attracting effects of aid.

This paper is closely related to Kimura & Todd (2010) in terms of dataset and estimation strategy. Kimura & Todd (2010) paper extended the existing literature on the impact of Foreign Aid on FDI by using disaggregated data on FDI and Aid. Their initial hypothesis was Foreign Aid had a positive vanguard effect. The vanguard effect comes from the fact that aid could provide information on the local business environment of the recipient country and can be transferred to firms of the donor country. The authors employed two types of estimation methods. The first estimation method was an OLS regression. The second estimation method was a System Generalized Method of Moments (GMM) developed by Blundell and Bond (1998). Their sample consists of country pairs during the period 1990-2002. They used the top 5 Donor countries which were Japan, the United Kingdom, Germany, France and the United States of America. Based on the author's results total aid from Donor country to recipient is positive but statistically insignificant. This evidence suggests that the total effect of Foreign Aid on FDI is not substantial. However,

when they looked at Aid flows sent by individual donors, Japan has a positive and significant (at the 5% level) effect on FDI. By the same token aid from the United States has a negative effect. Foreign aid from Japan does not promote FDI in general. But it supports the vanguard hypothesis of Foreign aid in the case of Japanese aid. The authors expressed that while Foreign Aid has no effect on FDI in general, Foreign Aid from Japan is likely to promote FDI from Japan. The concluding remarks from Kimura & Todd (2010) are there is no significant relationship between Foreign Aid and FDI. However, there is robust evidence that infrastructure aid from Japan has a vanguard effect.

This paper differentiates from Kimura & Todd (2010) by comparing whether FDI and Foreign Aid are complements or substitutes for countries with different income statuses. Kimura & Todd (2010) paper focuses on the Least Development Countries (LDCs) only, while this paper also includes lower middle-income countries in the analysis. Another differentiation between this paper and Kimura & Todd (2010) is the control variables used and period covered. The inclusion of Korea and Denmark as Donor countries is another difference between this paper and Kimura & Todd (2010).

## **Section 4: Data and Empirical Methodology**

### **4.1 Data**

To study whether there is a causal relationship between Foreign Direct Investment and Bilateral Aid an unbalanced panel dataset was used. The dataset covers the years 1996-2019 and includes 41 recipient countries (30 Sub-Saharan African, 7 Asian countries, 1 Middle East and 3 island nations) as shown in Table 1 of the appendix. These recipient countries were taken from the UN list of Least Developed Countries in 2019. There were 184 bilateral flows observed, this included countries not receiving FDI from the Donor for a certain period. However, during the same period, the countries were receiving Bilateral Aid. The total number of observations were 4,423. Foreign direct investment and Bilateral Aid data were collected from the OCED website.

Net ODA is an appropriate variable for examining Bilateral aid flows. This paper uses Net ODA because it is defined government aid aimed at promoting the economic development and welfare of developing countries (OECD, 2023). Net ODA was used in Karakaplan et al (2005) and Chauvet and Mesple-Soms's (2006) analysis of Foreign Aid and Foreign Direct Investment.

The selection of the donor countries included the top 5 donor countries according to the OECD which are the United States of America, France, the United Kingdom, Germany and Japan. These countries contributed 65.2% of the Net ODA flows between 1996-2019. This calculation was taken from table 3 in the appendix.

The additional two donor countries are Denmark and Korea. Denmark was selected because it has a similar Foreign Aid regime to the main donor countries as well as being economically comparable to the top 5 donor countries. Korea was selected as a donor country because at one stage Korea was a recipient of Foreign Aid. However, Korea has transformed its economy and is now an official donor according to the OCED. These two countries are also members of the OECD development committee assistance. The OCED did have some constraints on Foreign Direct Investment as it only provides Foreign Direct Investment flows until 2013 (OECD Statistics 2022). The rest of the data was collected by International Trade Centre and UNCTAD. (InvestmentMap,2022).

The data for our control variables GDP per capita donor and recipient were collected from the World Development Indicator which is a database of the world bank (World Development Indicators 2022). The Trade Value of exports for both donor and recipient countries were collected from the UN Comtrade website. The Trade Value of exports was the total of all HS commodities reported in that year. The UN Comtrade website is a repository of official international trade statistics and relevant analytical tables. (UN Comtrade International Statistics, 2022). Gross fixed capital formation as a percentage of GDP was extracted from the world development indicator. Gross fixed capital formation was formally known as gross domestic fixed investment it includes land improvements fences, ditches and drains (World Development Indicators, 2023). This is a control for domestic capital. The final control variable Distance was taken from the CEPII geodist dataset.

## **4.2 Descriptive Statistics**

Tables 4 and 5 provide a summary of statistics for the dependent and independent variables used in this paper. The average FDI donor flows for the Least Developed Countries is 18.58 US current millions of dollars as a ratio of GDP. However, the average for the lower-middle income countries the average of FDI donor flows is -40.09. The lower-middle income countries are receiving significantly less FDI inflows on average compared to the least developed countries.

Compared to Lagged Net Official Development Assistance, the lower-middle income countries have an average of 15.55, while the least developed countries have an average of -1.598.

There is no evidence of a positive correlation between FDI donors and Official Development Assistance (ODA) for both Least Developed Countries and lower-middle income countries. This is shown in Figure 2-3 in the appendix. Figure 2 shows the majority of FDI donor flows were clustered between 0 and 20 USD millions. There were a few anomalies of countries receiving negative flows of FDI and ODA. Figure 2 shows certain countries receiving up to 2.5 billion USD of ODA.

However, Figure 3 shows that there's more dispersion for FDI donor flows and official development assistance for the lower-middle income countries.

Figure 4 in the appendix provides a historical overview of Net ODA flows of the 7 Donor countries. The United States is the largest contributor of Net ODA and Korea is the smallest. However, Korea officially became a member of the DAC committee on the 1<sup>st</sup> of January 2010. Between 1996 and 2010 Korea began motions of becoming a DAC committee member, hence why their Net ODA flows were significantly lower than the other countries. The 7 Donor countries even during the midst of the financial crisis in 2008 were still sending Net ODA with the United States of America contributing 34 billion dollars.

### **4.3 Empirical Methodology**

Equation 1 is the main regression used to find whether there is a causal relationship between Foreign Aid and Foreign direct investment. This equation is closely related to Harms and Lutz (2006), Karakapan and Neyplai (2005) and Kimura & Todd (2010).

$$\begin{aligned}
 FDIoutflows_{ijt} = & \beta_1 NetODA_{ij-1} + \beta_2 GDP\ per\ capita_{it-1} + \\
 & \beta_3 GDP\ per\ capita_{jt-1} + \beta_4 Trade\ Value\ Exports_{it-1} + \\
 & \beta_5 Trade\ Value\ Exports_{jt-1} + \beta_6 Distance_{ij} + \beta_7 Gross\ Capital\ Formulation_{jt-1} + \alpha_{it} + \delta_{ij} + \\
 & \gamma_{jt} + \epsilon_{ijt} \text{ (Equation 1)}
 \end{aligned}$$

i= Donor Country

j= Recipient Country

t=Time

$\alpha_{it}$  = Origin Year fixed effects (Donor country year fixed effects)

$\gamma_{jt}$  = Destination Year fixed effects (Recipient country year fixed effects)

$\delta_{ij}$  = Bilateral Fixed Effects between Donor and Recipient

$\epsilon_{ijt}$  = Error Term

### **Dependent Variable**

Our dependent variable *FDIoutflows<sub>ijt</sub>*. This variable is measured in US millions current prices. The observations consist of different Donor countries providing FDI flows to the Recipient continuously over the 24-year period. There are some exceptions whereby a recipient country will

not receive any FDI for a period then the Donor country will provide FDI later. However, the recipient country will be receiving Foreign Aid. This variable is divided by the annual GDP per capita of the Recipient countries as a percentage. By dividing this variable by the GDP per capita of the recipient countries it will make *FDIoutflows<sub>ijt</sub>* a ratio of GDP. The coefficients will be interpreted as a level-level regression.

### **Independent Variable**

The main variable of interest is *NetODA<sub>ij-1</sub>*. *NetODA<sub>ij-1</sub>* is measured in US millions current prices. However, the variable was divided by annual GDP per capita of the Recipient countries (%). Dividing the independent variable by the annual GDP per capita recipient as a percentage will make *NetODA<sub>ij-1</sub>* a ratio of GDP.

### **Control Variables**

The Control variables  $\beta_2$  *GDP per capita<sub>it-1</sub>*,  $\beta_3$  *GDP per capita<sub>jt-1</sub>* and *Gross Capital Formulation<sub>jt-1</sub>* are already measured as percentages. The variables  $\beta_2$  *GDP per capita<sub>it-1</sub>* and  $\beta_3$  *GDP per capita<sub>jt-1</sub>* are measured as an annual percentage. While *Gross Capital Formulation<sub>jt-1</sub>* is measured as a percentage of GDP on an annual basis. Distance is measured in Km.

$\beta_4$  *Trade Value Exports<sub>it-1</sub>* and  $\beta_5$  *Trade Value Exports<sub>jt-1</sub>*, the unit of measure was in US dollars.  $\beta_4$  *Trade Value Exports<sub>it-1</sub>* was divided by annual GDP per capita of the donor country (%).  $\beta_5$  *Trade Value Exports<sub>jt-1</sub>*, was divided by annual GDP per capita of the recipient country (%).

Equation 1 contains origin year fixed effects which capture the time invariant attributes of the donor countries across the different years. The equation contains destination year fixed effects which capture the time invariant attributes of the recipient countries across the different years. Bilateral fixed effects were used to capture the invariant attributes between donors and recipients at a bilateral level.



## **Endogeneity Problems**

The estimation strategy applied to Equation 1 was an OLS regression with different types of fixed effects. However, there are still some time-varying variables that are not readily observed. The literature that assesses the relationship between Foreign Aid and Foreign Direct Investment argues that simultaneity biases occur because of the endogeneity of Foreign Aid and other dependent variables. In the context of this paper, the endogeneity occurs because the Foreign Aid variable is correlated with the error term and the control variables such as GDP per recipient. Endogeneity will lead to biased estimates of our coefficients. There are two different solutions to correct for this endogeneity. The different solutions are an Instrumental variable or Generalised Method of Moments (GMM).

Magesan (2016) used an instrumental variable approach when analysing the causal effect between Foreign Aid and economic growth. The author used Human right treaties participation as the IV for foreign aid.

Galiani et al (2014) looked at the effect of aid on economic growth using countries crossing the IDA operational cut-off as an instrumental variable. The authors argue that donor countries use the IDA threshold as an informative signal to allocate development aid.

Using an instrumental variable approach comes with complications, the first complication is finding the right instrumental variable that satisfies the assumptions of meaningful first stage, independence, exclusion restriction and monotonicity. The second complication finding the right instrumental variable that satisfies the assumptions theoretically, statistically these IVs are weak. This is expressed by Clemens et al (2012) as the authors spoke about the poor quality of instruments used in the debate on the effectiveness of foreign aid.

An alternative method for solving the endogeneity bias is using a GMM. A system GMM is the best method for correcting for the endogeneity biases. Under a system GMM, the lagged regressors can be employed as instruments because there are predetermined. Therefore, it can be argued that there is no correlation with the contemporaneous error term. Another reason why using a GMM estimation could be the right method for estimation is because there will not be any weak instruments. Therefore, the regressors will not have unit-root properties compared to that of a difference GMM (Blundell and Bond, 1998).

Instead of using an IV or Generalised Methods of Moments to correct for the endogeneity problems, this paper opted for the use of lagged variables. The reason for using lagged variables in this equation is to facilitate the causal interpretation for other explanatory variables (Woolridge, 2019).

Kimura & Todd (2010) and Chauvet and Mesplé-Somps (2006) support this concept by using lagged variables in their empirical methodology. Chauvet and Mesplé-Somps (2006) applied lagged variables because the lagged variable of aid suggests the existence of a permanent component of aid flows. An advantage of using lagged variables is that the aid variable is not randomly assigned. Hence a lagged aid variable will help observe the Bilateral Aid flows between donors and recipients. The lagged variables will control for the endogeneity problems caused by aid in the main equation.

## **Section 5: Results**

Table 7 shows the results of the regression with origin year fixed effects only. Column 1 labelled least developed countries total shows that if Lagged Net ODA increases by 10 percentage points then FDI flows from the donor to the recipient will increase by 0.643 percentage points. This result is statistically significant at a 5% level. This result supports the hypothesis that increasing Bilateral Aid will increase FDI flows. Therefore, we can conclude that Bilateral Aid and FDI are complements.

Applying the same OLS regression with origin year fixed effects based on geographical locations provide different results. Column 2 in table 7 labelled Asian countries, show that if Lagged Net ODA increases by 10 percentage points FDI donor flows increase by 0.0517 percentage points. This result shows that there is a complementary relationship between Bilateral Aid and FDI. This result is statistically significant at a 5% level.

By the same token, Column 3 of table 7 labelled African countries shows that if lagged Net ODA increases by 10 percentage points then FDI donor flows will increase by 3.26 percentage points. This result is statistically significant at a 1% level.

The result in Column 3 is supported by Chauvet and Mesplé-Somps theory of aid having a direct effect on African countries. According to Chauvet and Mesplé-Somps (2006) aid is being used to finance infrastructure projects to attract additional FDI flows.

The results in both Column 2 and 3 can be explained by Selaya and Sunesen (2012) theory of aid being used in social infrastructure projects. This will increase the marginal propensity of capital. The increase in capital will lead to more FDI inflows. Therefore, we can conclude that with origin year fixed effects, Bilateral Aid and Foreign Direct Investment are complements.

As for the control variables, Annual GDP per capita of the donor was removed because of the fixed effects applied to the regression. Column 1 and 3 of Table 7 shows a substitutable relationship between FDI flows of the donor and trade value exports of the recipient to the donor. In Column 1 if the trade value of exports from the recipient to the donor increases by 10 percentage points, then FDI donor flows will decrease by 0.142 percentage points. Column 3 has the same conclusion with a decrease of 0.236 percentage points for Sub-Saharan African countries. The findings support

Markusen et al (1995) model which suggests that trade and FDI are substitutes because they become similar when factor endowments and technologies are considered.

Another control variable that has produced surprising results is Distance. Conventional wisdom states that distance adds more costs in terms of transportation and communication. This is supported by Brainard's (1997) paper looking at the proximity concentration trade-off for US FDI. She concluded that an increase in distance between the US and the host country would decrease US affiliate sales by 8 to 18 percent.

Lerner (1995) had the same conclusion when looking at the representation of venture capitalist on the boards of private firms. He argued that Venture capitalist should invest in local firms to minimise the costs associated with distance. However, Column 3 labelled African countries shows that a 10-percentage point increase in Distance will increase FDI donor flows by 0.159. This is significant at a 10% level. But for Asian countries the results are more in line with conventional wisdom. Column 2 labelled Asian Countries shows that a 10-percentage point increase in Distance decrease FDI donor flows by 0.00979 percentage points. This result can be explained through trade literature. Grossman (1998) expressed that Distance is an important component of international trade. Common language and familiarity are part of Distance as a variable. The donor countries included in our dataset have a long history in Africa, particularly France and the United Kingdom. A result of this shared history has led to a linguistic and cultural affinity between the donor and recipient countries in Africa. This could be the reason why distance has a positive coefficient for African Countries.

Table 8 shows the results of the regression with destination year fixed effects only. The results show a positive relationship between Lagged Net ODA and FDI flows. Column 1 and 3 of table 8 support the hypothesis of Bilateral Aid and FDI being complements. Column 1 shows that an increase in Lagged Net ODA by 10 percentage points increases FDI donor flows by 0.741 percentage points. This result is statistically significant at a 10% level. Column 3 shows an increase in Lagged Net ODA by 10 percentage points increases FDI donor flows by 4.2 percentage points. This is statistically significant at a 1% level. The OLS regression with destination fixed effects shows a complementary relationship between Bilateral Aid and FDI donor flows.

Table 9, which shows the results for regression with origin year fixed effects and bilateral fixed effects shows a positive relationship between Lagged Net ODA and FDI donor flows. This

relationship is statistically significant for the Least-developed countries African countries. Overall, the results with the different types of fixed effects support the theory that Foreign Aid and Foreign Direct Investment are complements.

However, for slightly more developed nations that still receive Bilateral Aid the relationship between Foreign Aid and FDI is opposite.

For lower-middle income countries, the results of this paper suggest that Foreign Direct Investment and Foreign Aid are substitutes. Table 10 shows that with origin year fixed effects if Lagged Net ODA increase by 10 percentage points then FDI donor flows decrease by 2.17 percentage points. This result is significant at a 10% level.

Table 11, the regression with destination year fixed effects has similar readings as a 10-percentage point increase in Lagged Net ODA leads to a decrease in FDI donor flows by 4.2 percentage points. This result is statistically significant at a 1% level.

To conclude, the results in Table 10,11,12 show that for more developed economies Foreign Aid and Foreign Direct Investment are substitutes. This phenomenon can be explained by Chauvet and Mesplé-Somps (2006) argument of increased levels of development tends to reduce the impact of Foreign Aid.

**Table 7: Least Developed Countries: Origin Year-Fixed Effects**

<b>VARIABLES</b>	<b>(1)</b>	<b>(2)</b>	<b>(3)</b>
	<b>Total Least Developed Countries</b>	<b>Asian Countries</b>	<b>African Countries</b>
Lagged Net ODA	0.0643** (0.0293)	0.00517** (0.00201)	0.326*** (0.0948)
Lagged GDP per capita (Donor)	-	-	-
Lagged GDP per capita (Recipient)	-0.441 (3.683)	0.269 (0.214)	-1.859 (5.729)
Lagged Gross Capital Formation (% of GDP)	1.351 (0.932)	0.0199 (0.0393)	2.442* (1.441)
Lagged Trade value Exports (donor to recipient)	-0.000849 (0.00221)	-5.47e-05 (0.000129)	-0.000868 (0.00310)
Lagged Trade value recipient (recipient to donor)	-0.0142* (0.00746)	0.000642 (0.000738)	-0.0236** (0.0105)
Distance Km	0.00523 (0.00463)	-0.000979** (0.000459)	0.0159* (0.00880)
Constant	-41.73 (41.15)	10.84*** (3.556)	-144.6* (76.95)
Observations	4,045	896	2,712
R-squared	0.033	0.206	0.055

Bilateral FE  
Donor FE

No  
Yes

No  
Yes

No  
Yes

---

Standard errors in parentheses  
\*\* p<0.01, \* p<0.05, \* p<0.1

**Table 8: Least Developed Countries: Destination Year Fixed Effects**

VARIABLES	(1)	(2)	(3)
	Total Least Developed Countries	Asian Countries	African Countries
Lagged Net ODA	0.0741* (0.0416)	0.00204 (0.00212)	0.420*** (0.123)
Lagged GDP per capita (Donor)	-4.216 (8.085)	0.521* (0.282)	-7.514 (12.39)
Lagged GDP per capita (Recipient)	-0.515 (4.542)	0.432** (0.178)	-1.939 (6.941)
Lagged Gross Capital Formation (% of GDP)	-	-	-
Lagged Trade value Exports (donor to recipient)	-0.000708 (0.00206)	-0.000241** (0.000106)	-0.000464 (0.00284)
Lagged Trade value Exports (recipient to donor)	-0.0121 (0.00863)	-0.00483*** (0.000740)	-0.0213* (0.0120)
Distance Km	0.00661 (0.00480)	0.000922*** (0.000177)	0.00972 (0.00749)
Constant	-21.34 (40.77)	-3.646* (1.871)	-40.94 (60.59)
Observations	3,952	895	2,643
R-squared	0.149	0.347	0.153
Bilateral FE	No	No	No
Recipient Year FE	Yes	Yes	Yes

Standard errors in parentheses  
\*\* p<0.01, \* p<0.05, \* p<0.1



**Table 9: Least Developed Countries: Bilateral and Destination Year Fixed Effects**

VARIABLES	(1) Total Least Developed Countries	(2) Asian Countries	(3) African Countries
Lagged Net ODA	0.0542* (0.0299)	0.00236* (0.00131)	0.277*** (0.0968)
Lagged GDP per capita (Donor)	-	-	-
Lagged GDP per capita (Recipient)	-0.371 (4.291)	0.121 (0.174)	-0.845 (6.160)
Lagged Gross Capital Formation (% of GDP)	0.898 (1.575)	0.00353 (0.0417)	0.617 (2.332)
Lagged Trade Value Exports (Donor to Recipient)	-0.00162 (0.00232)	-6.28e-05 (8.53e-05)	-0.00160 (0.00326)
Lagged Trade value Exports (Recipient to Donor)	-0.0153** (0.00770)	0.000529 (0.000690)	-0.0235** (0.0107)
Distance Km	-	-	-
Constant	7.360 (30.41)	4.026*** (1.108)	13.80 (44.90)
Observations	4,045	896	2,712
R-squared	0.077	0.690	0.094
Bilateral FE	Yes	Yes	Yes
Donor Year FE	Yes	Yes	Yes
Recipient Year FE	No	No	No

Standard errors in parentheses  
\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

**Table 10: Lower-Middle Income Countries: Origin Year Fixed Effects**

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VARIABLES	(1) Total Lower-Middle Income Countries
Lagged Net ODA	-0.217* (0.123)
Lagged Annual GDP donor	-
Lagged Annual GDP recipient	25.00* (14.16)
Lagged Gross Capital Formation (% of GDP)	4.326 (5.032)
Distance Km	-0.00311 (0.0128)
Lagged trade Value Exports (Donor to Recipient)	0.000732 (0.000704)
Lagged Trade value Exports (Recipient to Donor)	0.000776 (0.000480)
Constant	-197.3 (172.7)
Observations	2,182
R-squared	0.064
Bilateral FE	No
Donor Year FE	Yes

---

Standard errors in parentheses  
\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

**Table 11: Lower-Middle Income Countries: Destination Year Fixed Effects**

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VARIABLES	(1) Total Lower-Middle Income Countries
Lagged Net ODA	-0.420*** (0.133)
Lagged GDP per capita (Donor)	14.00 (25.45)
Lagged GDP per capita (Recipient)	-
Lagged Gross Capital Formation (% of GDP)	901.5*** (280.3)
Distance Km	-0.0290** (0.0128)
Lagged trade Value Exports (Donor to Recipient)	-0.000574 (0.000571)
Lagged trade Value Exports (Recipient to Donor)	0.000569 (0.000483)
Constant	-21,940*** (6,866)
Observations	2,182
R-squared	0.262
Bilateral FE	No
Recipient Year FE	Yes

---

Standard errors in parentheses  
\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

**Table 12: Lower-Middle Income Countries: Bilateral and Origin Year Fixed Effects**

VARIABLES	(1) Total Lower-Middle Income Countries
Lagged Net ODA	-0.159 (0.123)
Lagged GDP per capita (Donor)	-
Lagged GDP per capita (Donor)	27.98* (14.93)
Lagged Gross Capital Formation (%)	3.268 (9.517)
Distance Km	-
Lagged Trade value exports (Donor to Recipient)	0.000528 (0.000715)
Lagged trade value recipient (Recipient to Donor)	0.000536 (0.000485)
Constant	-198.6 (241.5)
Observations	2,182
R-squared	0.129
Bilateral FE	Yes
Donor FE	Yes

Standard errors in parentheses  
\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

## **Section 5: Conclusion**

The purpose of this paper is to critically assess whether Foreign Aid in terms of Bilateral Aid is a complement or a substitute for Foreign Direct Investment. The theory of Bilateral Aid being a complement is underpinned by the notion that aid will improve the stock of infrastructure programs which will attract more Foreign Direct Investment. Furthermore, another relevant theory to support the complementary relationship between Foreign Aid and Foreign Direct Investment is that Foreign Aid provides a signalling mechanism. This signalling mechanism indicates that the donor countries trust the recipient countries, which attracts foreign investors.

However, countries with Foreign Aid additionally send bad signals to foreign investors. Moyo (2009) expressed that countries that are reliant on Foreign Aid show a lack of long-term financial planning. By having constant flows of Aid, tend to lead to high levels of corruption which contradicts Garringa and Phillips (2014) theory that aid is a signalling mechanism of trust between donor and recipient countries.

The results for Least Development Countries (LDCs) with different forms of fixed effects support the hypothesis that Bilateral Aid and Foreign Direct Investment are complements. When we divide the analysis by geographical location, we see that African countries have experienced the greatest percentage point increase in FDI flows. It's worth mentioning that the endogeneity issues in this paper have not been fully addressed which could lead to bias in our estimates. But, there is enough evidence to conclude that Bilateral Aid and Foreign Direct Investments are complements for Least Developed Countries (LDCs). This hypothesis was supported by both Thangamani et al (2011) and Wang and Balasubramanyam (2011). As their paper emphasised the improvement of infrastructure in attracting more Foreign Direct Investment for recipient countries. By the same notion, Chauvet and Mesplé-Somps (2006) theory of aid being used to finance infrastructure projects to attract more Foreign Direct Investment supports the results showing a complementary relationship between Foreign Direct Investment and Bilateral Aid.

Furthermore, applying the same methodology to countries that are slightly more developed the results show that Bilateral Aid and Foreign Direct Investment are substitutes.

The conclusion that foreign aid is still useful for Least Developed Countries (LDCs) will have a cascading impact. This impact will be for NGOs and other aid-affiliated organisations, especially as

aid budgets are decreasing. The UK government spend over £11 million on ODA in 2021. This budget was down from £14.5 million in 2020 (Loft & Brien, 2022). The decrease in aid budgets has been echoed by the German government. The German government is looking to cut to their cut to €10.8 billion (Kinkartz, 2022).

Concerning future research into the effectiveness of Foreign Aid in attracting Foreign Direct Investment, the main argument presented in this paper is that Foreign Aid helps recipient countries state of infrastructure. With the world becoming more digital the next question is whether Foreign Aid improves digital infrastructure for Least Developed Countries (LDCs)? Will the improvement in digital infrastructure as a result of Foreign Aid increase FDI flows to Least Developed Countries (LDCs)?

## Appendix 1- Graphs and Figures

**Figure B.** | **FDI inflows, 2001–2019** (Billions of dollars and per cent)



Figure 1: A historical overview of global FDI inflows from 2001-2019 measured in both Billions of dollars and per cent taken from the UN Investment Report in 2020

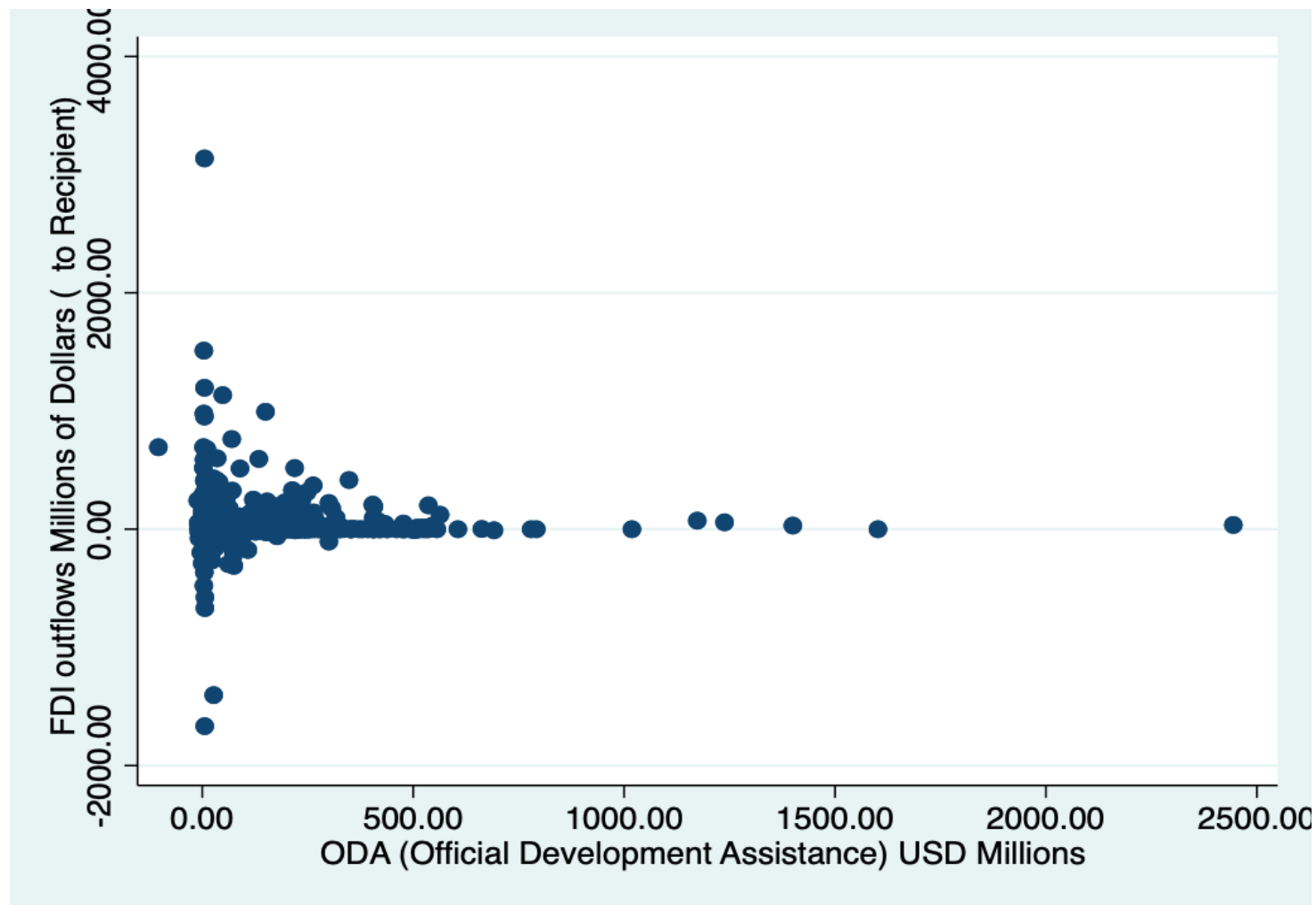


Figure 2: A scatter graph highlighting the relationship between Foreign Direct Investment and Official Development Assistance between 1995-2020 with the variables used in this paper for Least Developed Countries.



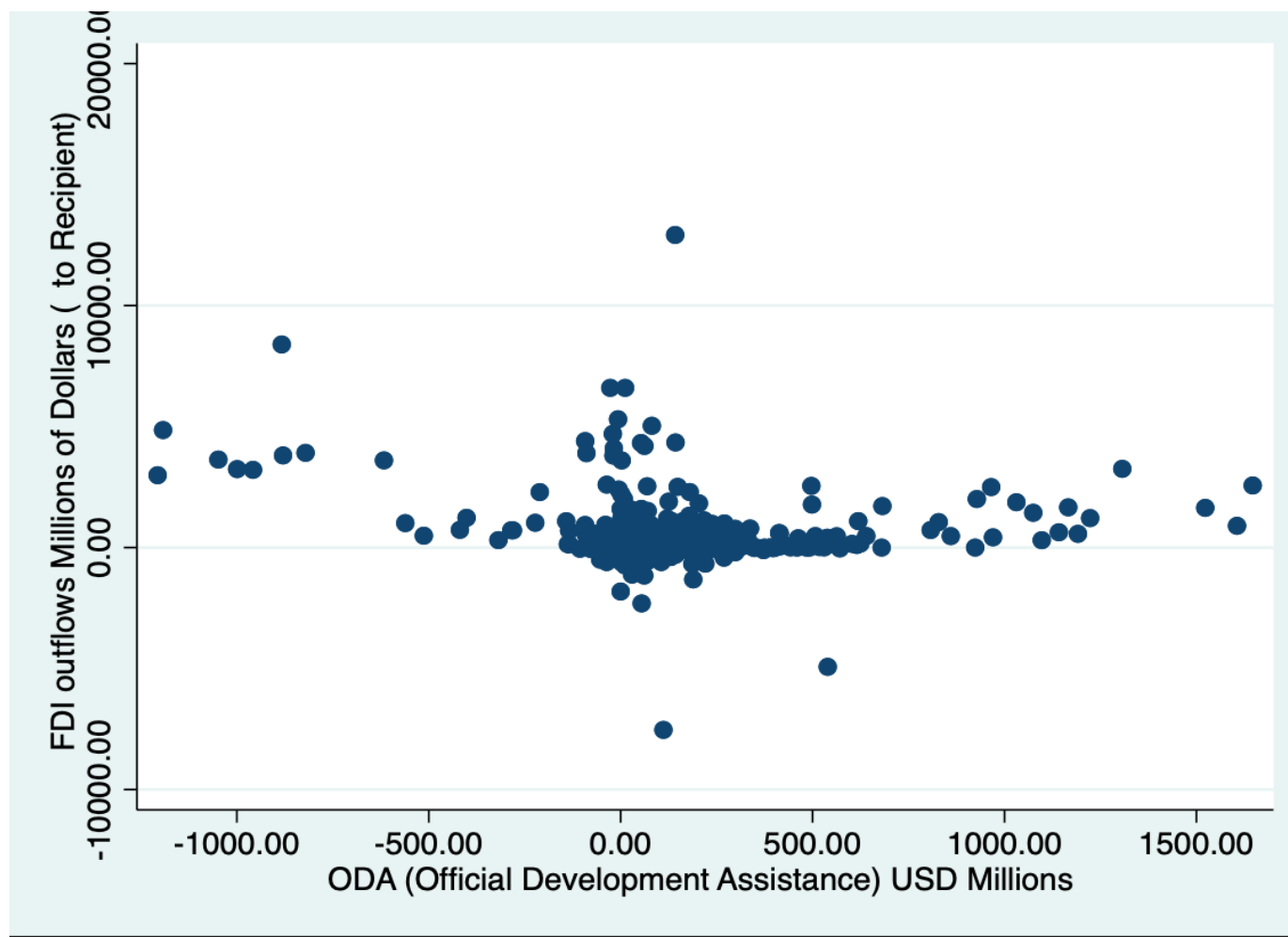


Figure 3: A scatter graph highlighting the relationship between Foreign Direct Investment and Official Development Assistance between 1995-2020 with the variables used in this paper for Lower Middle-Income Countries.

Location ▾	▾ 1996	▾ 1997	▾ 1998	▾ 1999	▾ 2000	▾ 2001	▾ 2002	▾ 2003	▾ 2004	▾ 2005	▾ 2006	▾ 2007	▾ 2008	▾ 2009	▾ 2010	▾ 2011	▾ 2012	▾ 2013	▾ 2014	▾ 2015	▾ 2016	▾ 2017	▾ 2018	▾ 2019
<b>DAC Countries</b>	71 100	66 358	72 795	73 474	76 833	78 912	84 593	88 706	94 179	124 229	117 247	107 755	120 417	122 266	129 084	127 936	123 074	129 619	131 725	139 821	155 155	154 892	151 256	150 533
<b>Denmark</b>	2 383	2 456	2 562	2 671	2 885	2 843	2 646	2 314	2 404	2 422	2 494	2 555	2 549	2 629	2 737	2 647	2 565	2 682	2 724	2 774	2 557	2 561	2 563	2 651
<b>France</b>	9 074	8 685	7 916	8 095	6 709	6 923	8 423	9 119	9 532	11 062	11 336	9 450	9 669	11 562	12 326	11 706	11 585	10 491	9 777	9 841	10 453	12 013	12 874	12 508
<b>Germany</b>	8 853	7 839	7 528	7 736	8 196	8 258	8 260	8 665	8 655	11 530	11 769	12 490	13 362	11 742	13 187	13 487	13 199	13 780	15 760	20 042	27 356	26 725	25 699	24 946
<b>Japan</b>	8 646	9 484	11 669	11 752	12 521	10 400	10 245	9 221	8 740	13 253	11 991	8 447	9 342	8 361	9 352	8 656	8 354	11 087	9 778	10 623	10 767	12 225	10 567	12 072
<b>Korea</b>	172	227	316	471	296	408	404	488	527	829	467	681	912	1 027	1 305	1 393	1 687	1 784	1 799	1 932	2 279	2 129	2 270	2 518
<b>United Kingdom</b>	4 315	4 428	4 850	4 346	6 000	6 281	6 377	7 245	7 946	10 583	11 757	8 314	10 402	11 621	13 414	13 417	13 416	17 109	17 239	17 799	19 243	19 852	20 196	20 581
<b>United States</b>	14 571	10 506	13 272	13 622	14 500	16 281	18 641	22 447	26 395	36 281	29 648	26 727	31 821	34 482	35 048	35 851	34 836	34 922	36 286	33 637	36 995	36 634	34 806	33 378

Information on data for Israel: <http://oe.cd/israel-disclaimer>. Information on the data for Cyprus: <https://oe.cd/cyprus-disclaimer>.

.. Not available; | Break in series; e Estimated value; f Forecast value; x Not applicable; p Provisional data; s Strike; - Nil;

Figure 4: A historical overview of Net ODA outflows of the seven Donor countries used in this paper from 1996-2019.

## **Appendix (B) Tables**

<b>Countries</b>
Afghanistan
Angola
Bangladesh
Benin
Bhutan
Burkina Faso
Burundi
Cambodia
Central African Republic
Chad
Congo, Republic
Eritrea
Ethiopia
Gambia
Guinea
Guinea-Bissau
Haiti
Kiribati
Lao PDR
Lesotho
Liberia
Madagascar
Malawi
Mali
Mauritania
Mozambique
Myanmar
Nepal
Niger
Rwanda
Sao Tome and Principe
Senegal
Sierra Leone
Solomon Island
Sudan
Tanzania
Timor-Leste
Togo
Uganda
Yemen Republic
Zambia

Table 1: A list of all the Least Developed Countries according to the UN

**Countries**

Algeria  
Egypt  
Ghana  
Indonesia  
Iran  
Kenya  
Morocco  
Nicaragua  
Pakistan  
Papua New Guinea  
Philippines  
Ukraine  
Vietnam

Table 2: A list of all the Lower-Middle Income countries that are more developed than the Least Developed Countries but still receive Bilateral Aid from the Donor's selected.

## Appendix 2-Tables

	(1)	(2)	(3)	(4)	(5)
Least Development Countries	N	mean	sd	min	max
Year	4,416	2,008	6.923	1,996	2,019
FDI Flows (Donor to Recipient/Annual GDP per capita recipient)	4,413	18.58	689.9	-2,796	44,930
Distance Km	4,416	7,798	3,081	2,476	15,017
Pairs	4,416	92.50	53.12	1	184
Lagged Net ODA (Donor to Recipient/ Annual GDP per capita recipient)	4,238	-1.598	402.5	-18,853	3,522
Lagged Gross Capital Formation (% of GDP)	4,238	17.30	13.03	-2.424	70.33
Lagged Annual GDP per capita Donor (%)	4,238	1.632	2.160	-5.812	10.68
Lagged Annual GDP per capita Recipient (%)	4,238	1.291	3.463	-30.70	27.83
Lagged Trade Value Donor (Divided by annual GDP per capita Donor)	4,238	881.7	6,674	-137,596	174,448
Lagged Trade value Recipient (Divided by annual GDP per capita Recipient)	4,238	58.43	1,560	-62,486	30,253

Table 4: Summary Statistics for Least Developed Countries

VARIABLES	(1) N	(2) mean	(3) sd	(4) min	(5) max
Year	2,280	2,008	6.924	1,996	2,019
FDI flows (Donor to Recipient/Annual GDP per capita Recipient)	2,278	-40.09	2,022	-78,333	15,013
Distance Km	2,280	7,188	3,845	1,204	14,570
Pairs	2,280	48	27.43	1	95
Lagged Net ODA (Donor to Recipient/Annual GDP per capita Recipient)	2,185	15.55	419.5	-10,037	11,035
Lagged Gross Capital Formation (% of GDP)	2,185	24.51	9.124	0	50.78
Lagged GDP per capita Recipient (%)	2,185	2.498	3.402	-14.76	17.47
Lagged Annual GDP per capita Donor (%)	2,185	1.614	2.214	-5.812	10.68
Lagged Trade value donor (divided by annual GDP per capita donor)	2,185	9,975	78,652	-1.915e+06	1.307e+06
Lagged Trade value recipient (divided by annual GDP per capita recipient)	2,184	6,308	107,644	-493,581	4.342e+06

Table 5: Summary Statistics for Lower Middle-Income Countries

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