Dongni Wang

Evaluación de los Efectos de la Asistencia Oficial para el Desarrollo sobre la Inversión Extranjera Directa y la Participación Laboral: El Papel de las Instituciones Económicas

Director/es
Fillat Castejón, Carmen

Tesis Doctoral

EVALUACIÓN DE LOS EFECTOS DE LA ASISTENCIA OFICIAL PARA EL DESARROLLO SOBRE LA INVERSIÓN EXTRANJERA DIRECTA Y LA PARTICIPACIÓN LABORAL: EL PAPEL DE LAS INSTITUCIONES ECONÓMICAS

Autor

Dongni Wang

Director/es

Fillat Castejón, Carmen

UNIVERSIDAD DE ZARAGOZA
Escuela de Doctorado

Programa de Doctorado en Economía

2022

Universidad Zaragoza
1542

Tesis Doctoral

Evaluación de los Efectos de la Asistencia Oficial para el

Desarrollo sobre la Inversión Extranjera Directa y

la Participación Laboral:

El Papel de las Instituciones Económicas

Una Tesis presentada por

Dongni Wang

Directora

Carmen Fillat Castejón

Facultad de Economía y Empresa

2022

Universidad Zaragoza
1542

Doctoral Thesis

Assessing the Effects of Official Development Assistance

on Foreign Direct Investment and the Labour Share:

The Role of Economic Institutions

A Thesis presented by

Dongni Wang

Directed by

Carmen Fillat Castejón

Faculty of Economics and Business

2022

Acknowledgement

I'm extremely thankful to my supervisor Dr. Carmen Fillat-Castejón for her noble guidance and lasting support with encouragement and enthusiasm. This work would not have been possible without her efforts especially in such a special period. I would also like to thank the anonymous evaluators for their valuable suggestion.

I appreciate that my parents (Xiaofang Shi and Youmin Wang) have been loving and supporting me unconditionally which motivated me during the toughest period. My special thanks go to my uncle (Xiaomeng Shi) and cousin (Zhan Shi) for their support and company. I'm also grateful for all my family members and friends for supporting and trusting in me.

致 谢

谨以此文献给我的家人。感谢我的母亲施小芳在生活上对我无微不至的照顾，让我能够专注于论文的写作；感谢我的父亲王佑民在人生道路上给与我的指引，使我敢于向各种不可能发起挑战。是你们无条件的爱和支持陪伴我渡过了最艰难的时期。同时，衷心感谢我的所有家人以及朋友，你们永远是我最坚实的后盾。

Table of Content

<div align="center">**List of Tables**</div>

Introduction

In 2015, the United Nations General Assembly planed 17 interlinked goals which are expected to be achieved by 2030. The Sustainable Development Goals (SDGs) establish a global development framework with a wide coverage of subjects including 169 specific targets. To reach these goals and targets, development cooperation in general, and the Official Development Assistance (ODA) in particular, have been underlined due to their essential role in eradicating poverty in its all forms (SDG 1) and in reducing inequality within and between countries (SDG 10).

Regarding the SDG 1, Target 1.A specifies that strengthened development cooperation could activate the mobilisation of resources from multiple sources for recipient countries to implement programmes and policies to end poverty in all its dimensions. As for the inequality addressed in the SGD 10, Target 10.B suggests the channelling of public and private international flows, e.g., foreign aid and FDI, to the most needy countries according to their national plans and programmes. In addition, SDG 8, especially Target 8.A calls for increasing aid for trade so that developing countries may achieve sustainable economic growth. These three targets are in line with the two main objectives of ODA defined by the Organisation for Economic Co-operation and Development (OECD). That is, foreign aid is expected to promote the economic development and welfare of developing countries.

This thesis attempts to discuss aid effectiveness which is a chronically debated issue involving different aspects on an economic, social, political, institutional and even environmental level. The recognition encouraged scholars to reveal the effect of foreign aid on economic growth and development. However, there are no conclusive and consistent results. The survey conducted by Hansen and Tarp (2000) summarises the empirical findings of previous works.

Foreign aid was perceived as merely capital flows which constitute the capital stock of recipient countries. First and second-generation studies depict the effect of foreign aid on economic growth through the aid-savings-growth and aid-domestic investment-

growth linkages. That is, if a positive effect of aid on savings and investment is observed, a growth promoting effect of aid may be concluded. In the third-generation studies, economists incorporate other aspects such as institutional qualities into the discussion assuming a non-linear correlation between foreign aid and economic growth. One widely spread notion is that foreign aid performs better in countries with good policies (Burnside and Dollar, 2000).

However, theoretically, institutions are a concept involving multiple dimensions and, empirically, the expected effect would vary depending on which institution variable is used. Correspondingly, different institutions would alter the effect of foreign aid, strengthening it or worsening it. Therefore, a more detailed definition of the institution variable used would be required when carrying out empirical studies and interpreting the results. Moreover, many studies do not clarify the mechanism of how foreign aid promotes economic growth. The common assumption is that a higher level of savings and investment contributes positively to economic growth.

We have established an aid-FDI-growth linkage through the concept of *financing for development* proposed by a series of international development conferences, namely the Monterrey Consensus, Doha Declaration, and Addis Ababa Action Agenda. It is interesting to summarise some of the outcomes of these conferences.

The Monterrey Consensus proposed that ODA could be an important financial resource for countries that have less ability to attract private direct investment. ODA is also expected to enhance the capacity of attraction for recipient countries. Additionally, ODA plays an essential role in improving the environment for private sector activities and paves the way for robust growth. The Doha Declaration further recognized that foreign aid could play a catalytic role in helping developing countries in removing several constraints to sustainable development. The conference suggests that ODA could enhance institutions and promote FDI, trade and technological innovation and eradicate poverty. Later, the Addis Ababa Action Agenda reaffirmed the role of ODA in

catalysing additional resource mobilisation, suggesting that foreign aid could improve domestic enabling environments for other financial resources.

Along these lines, the first two chapters of this thesis seek to discuss the effect of foreign aid on FDI with regard to economic institutions. Chapter 3, meanwhile, investigates the effect of foreign aid and FDI on the labour share which illustrates the income disparity between capital and labour.

Chapter 1: Making Aid Work: Institutional Thresholds and FDI

Chapter 1 investigates the attraction of foreign aid for FDI in different economic institutional environments. The aid-FDI nexus remains controversial among the aid effectiveness studies. There is evidence of a positive, negative, and null effect of its contribution. Early works might suffer from the use of aggregate data which prevents detecting the specific effects. The Creditor Reporting System (CRS) of the OECD classified aid data into different types based on the target sectors. In addition, economists proposed different combinations of aid, suggesting that the effects could also vary. Their results, however, are still mixed.

Based on the relevant studies, especially that of Selaya and Sunesen (2012), we have constructed a theoretical model extended from a Solow growth model. It is assumed that foreign aid attracts FDI through the improved marginal products of capital (MPK) and it could also crowd out FDI via rent seeking activities. The overall effect is dominated by the one with greater influence. It is also assumed that the effects depend on institutional qualities. For instance, in a restricted economic institution, the negative effect is expected to be greater than the attraction effect, leading to an overall negative effect, i.e., foreign aid tends to crowd out FDI in countries with a restricted institutional burden.

It is worth referring to the definition of Economic Freedom of the Fraser Institute which is used to proxy economic institutions. This index is widely used by researchers to measure the ease of doing business in a country. The summary index is the average of five indicators which rate a country with a higher score if this country has a lower level of intervention in the economy (*government size*), an impartial legal system (*legal system*), a stable macroeconomy (*sound money*), less restrictions on the movement of capital and workers (*freedom to trade internationally*) and a relaxed regulatory environment (*regulations*).

The hypothesis of Chapter 1 is that an institutional threshold exists that divides the effect of foreign aid on FDI into two regions. The freer one is denoted as a good region (good institutional environment) while the restricted one is denoted as a bad region (bad institutional environment). As previously mentioned, in the good region, foreign aid is expected to attract FDI while in the bad one, it is expected to negatively affect FDI.

Our sample covers 62 developing countries over the period 2003 to 2016. The econometric technique fixed effect panel threshold requires a strongly balanced panel which limits the sample size. The requirement for an exogeneous threshold variable is satisfied. However, foreign aid appears to be endogenous which biases the estimates. We further apply the generalised method of moments (system-GMM) to address the endogeneity problem. Moreover, we also regress FDI on different types of foreign aid to detect more detailed effects and the five indicators of Economic Freedom have been individually treated as the threshold variable.

The empirical results confirm the threshold effect of aid on FDI. First, we find the threshold pattern holds for the summary Economic Freedom index, government size, legal system and regulations. Second, the aid invested in social infrastructure dominates the threshold feature. Third, the crowding-out effect of aid in bad institutions is robust after we address the endogeneity issue, while in good institutions, foreign aid has an insignificant effect.

Several policy recommendations could be derived from the empirical findings. We would not suggest donor communities to cease donating, since the current amount of aid flows is scarce to satisfy the needs of recipient countries to implement development plans. It is well recognised that the donation is far less than the commitment of 0.7% of GNI of donor countries. Therefore, we call on donor communities to increase the transfer of capital flows as well as capacity building which helps recipient countries to achieve institutional reforms.

Chapter 2: Official Development Assistance and FDI in Africa: A Structural Equation Modelling Study

Chapter 2 addresses the shortfalls of the previously mentioned third-generation studies. The widespread notion of *conditionality* of aid effectiveness does not describe the institutional effects of foreign aid. The aid-institutions discussion also lacks a theoretical basis to explain the ambiguous outcomes that foreign aid produces on institutions.

With respect to aid-FDI studies, economists find inconclusive results regarding whether foreign aid could attract or crowd out FDI. Similarly, the relationship between aid and institutions remains unclear. Alonso and Garcimartín (2011) review early empirical results concluding that foreign aid could be beneficial, harmful for institutions or could yield no effect at all. In turn, the effect of institutions on donation is not without controversy. Some find that donor communities intentionally allocate more aid flows to countries with a better institutional quality, which is known as the *selectivity* approach. Others find that aid has been transferred to counties with lower institutional qualities, suggesting that the aid has been used to help recipient counties to improve their institutional quality. This is known as the *capacity building* approach.

Structural equation modelling (SEM) enables us to investigate the direct effect of foreign aid and economic institutions on FDI, and it also allows us to depict the indirect effect of aid on FDI through economic institutions. It is an appropriate technique to address these inconclusive and mixed results with respect to aid, economic institutions and FDI. Nevertheless, we are still in need of a theoretical model to explain the controversial and sometimes contrary results.

In Chapter 2, we adopt and extend the model proposed by Acemoglu et al. (2005) which indicates that economic institutions determine economic outcomes as well as the distribution of resources in the future. The determinants of economic institutions are political powers which could originate from political institutions (*de jure* political power) and could be enabled by the resources distributed (*de facto* political power). The two types of powers represent the interests of two groups of people, the *de jure* and the *de facto* political groups, which are competing for dominating economic institutions to ensure the distributional policies in their favour.

One of the resources to be distributed, namely foreign aid, would enable the group of the *de facto* political power. In the best case, foreign aid would target the needy population, the poor for instance, and contribute to ending poverty. However, in practice, aid does not fully reach the needy and even produces some unexpected outcomes, e.g., rent seeking. Thus, it is reasonable to assume that the enabled group is the group of officials who work directly with donor communities. We use aid dependency, proxied by the ratio of foreign aid to government expenditure, to denote the *de facto* political group.

Our sample covers 42 African countries during the period 2002 to 2016. The data fail to meet the joint normality assumption and we have applied the quasi-maximum likelihood method which relaxes the assumption by imposing a robust standard error. Furthermore, we have transformed the data into 5-year nonoverlapping intervals to mitigate possible external shocks on aid flows.

The empirical results suggest that foreign aid has a positive direct effect on FDI. We can argue that this is due to the enhanced absorptive capacity through improvement in human capital and physical infrastructure. In line with other empirical findings, Economic Freedom positively impacts FDI showing its importance in constructing an investment promotion environment. Additionally, the indirect effect seems unclear since aid and aid dependency fail to significantly affect Economic Freedom. In turn, Economic Freedom positively affects foreign aid.

Following the theoretical model, we can observe the rationale justifying why recipient countries have no incentive to improve institutional qualities. The argument is that maintaining the current institutional quality would be the optimal choice for the group benefiting from receiving aid. Given that Economic Freedom has a positive effect on aid and FDI, the latter private international flows, as a resources to be distributed, would also empower a group of people which will raise the competition between the group of aid and FDI. On the other hand, lowering institutional qualities would not be an acceptable action for the group of aid since it would reduce the amount of aid.

The empirical findings of Chapter 2 could offer some implications. The most essential is the way in which aid has been given and what the aid embodies require a profound inquiry. Further development projects and programmes should ensure that foreign aid targets the most needy groups. Moreover, the capacity building and technical assistance designed to generate institutional reforms are as equally important as the financial assistance.

Chapter 3: Assessing the Effect of Foreign Aid and FDI on the Labour Share

Chapter 3 investigates the effect of foreign aid and FDI on the labour income share. It measures the income accruing to labour in comparison with that accruing to capital

which has a great implication in terms of inequality issues. Surveying the data on the labour share, we can observe that the situation of African countries is rather concerning. The labour share dropped to 44.1 percent in 2017 while the world's average level was 52.5 percent. However, its urgency does not receive enough attention among scholars, so the effects of the public and private international flows remain unclear.

The FDI-labour share studies produce inconclusive results, suggesting that FDI could create job opportunities which increases the labour share, while FDI also generates automation that lowers the income accruing to labour. We find that there is no research investigating the effect of foreign aid on the labour share. Economists generally study its effect on the Gini coefficient as it measures the income inequality between the rich and the poor.

Two theoretical approaches are available for us to explain the effect of aid and FDI on the labour share. For instance, the *shift-share* approach explains the variation in the labour share with the movement of workers between and within sectors. It is broadly applied in studies relating to FDI. The other approach developed from a constant elasticity of substitution (CES) production function suggests that the changes in the labour share are determined by the elasticity of substitution between labour and capital, technological progress, relative price of capital and capital intensity. This second approach provides the theoretical explanation relating the use of productive factors to the distribution of incomes. Thus, we have adopted this one as it allows us to include the variables of interest.

We first need to estimate the elasticity of substitution and then derive technological progress, since these data are not available elsewhere. The fact that in the CES function the elasticity of substitution is not unitary, and the exclusion of technological progress might produce inconsistent estimates.

An unbiased estimate requires more sophisticated data which explicitly measure the mixed income for the self-employed. We review some databases and their methodologies and find the data from the International Labor Office (ILO) are relatively comprehensive, using the imputed wages of three sub-groups of the self-employed, namely, own-account workers, contributing family workers and employers to estimate the labour share. Moreover, we can easily derive the required data, capital and labour income, as well as their rental rates.

In addition to the effects of the two international flows, we are also interested in investigating the performance of foreign aid in different economic institutions. The Economic Freedom index and the interactive terms with foreign aid are included in regressions. Given the broad coverage of Economic Freedom, the effects of the summary index and its five indicators are expected to be different and foreign aid in each institutional environment is expected to produce a distinct effect. Foreign aid has been further decomposed into different types to examine the effects at a disaggregate level.

We apply the fixed effect for the estimation. Furthermore, weighted least squares (WLS) and the generalised method of moments (system-GMM) are used to address heteroskedasticity and endogeneity. The empirical results suggest that capital and labour are gross substitutes. Labour-augmenting technological progress grows faster than capital-augmenting technological progress. As for the international inflows, we find FDI has a positive effect on the labour share, suggesting that the private foreign inflows could benefit the workers of host countries. The effect of overall aid is negative while the aid invested in production sectors positively affects the labour share. Regarding Economic Freedom, we find that the summary index has no significant effect while a lower degree of intervention and a restricted control over the movement of capital and personnel are associated with a lower labour share.

The negative effect of overall aid requires further research in order to understand the mechanisms. Rent seeking could be one. Meanwhile, we still urge donor countries to increase in aid flows so as to reach the needy groups and sectors which would positively contribute to the reduction of inequality. Additionally, we reiterate the importance of foreign aid in the forms of technical assistance and capacity building in order to help recipient countries to carry out institutional reforms.

References

Acemoglu, D., Johnson, S., & Robinson, J. (2005) Institutions as a Fundamental Cause of Long-run Growth. In Aghion, Ph. and S. Durlauf, (Eds.): *Handbook of Economic Growth*, Vol. 1A, Chapter 6, 385-472, North Holland.

Alonso, J., & C. Garcimartín. (2011). El Impacto de la Ayuda Internacional Sobre la Calidad de las Instituciones. *EKONOMIAZ, Revista Vasca de Economía*, 77(2), pp. 158-175.

Burnside, C., & D. Dollar. (2000). Aid, Policies, and Growth. *American Economic Review*, 90(4), pp. 847–68.

Hansen, H., & F. Tarp. (2000). Aid Effectiveness Disputed. *Journal of International Development*, 12(3), pp. 103–28.

Selaya, P., & Eva R. Sunesen. (2012). Does Foreign Aid Increase Foreign Direct Investment? *World Development,* 40(11), pp. 2155–76.

Chapter 1.

Making Aid Work: Institutional Thresholds and FDI

1.1 Introduction

The promotion of economic development and welfare of developing countries are well established objectives of foreign aid (OECD, 2009). Among the aid effectiveness studies, the aid-growth nexus receives a special attention in the development economics. However, the achievements of foreign aid in promoting economic development are a controversial issue which remains unclear from the scholar's perspective. Authors investigating the direct effects of foreign aid on economic growth find inconsistent results.[1] There is evidence of a positive effect when a good policy environment is met in the host country (Burnside and Dollar, 2000). However, other studies considering aid as well as the interaction with other circumstances find a positive, negative, or null effect of foreign aid on growth.

Other authors study the indirect effects of aid on growth by analyzing the relationship between aid and FDI. Their conclusions are not uncontroversial either. Some find that aid has a positive impact on FDI while others find negative or null effects. Among the works finding a positive effect, Todo and Kimura (2010) suggest a "Vanguard effect" of Japanese foreign aid, which is that the Japanese aid attracts exclusively the FDI from Japan without affecting the investments of other countries.

A potential cause of these inconclusive results might be the use of heterogeneous data on foreign aid. In early studies, the use of overall aid data might prevent the detection of an effect from a diversity of foreign aid. In recent studies, disaggregated data have been widely used. Todo and Kimura (2010) classify aid into infrastructure aid and non-infrastructure aid; Selaya and Sunesen (2012) categorize it into aid invested in complementary inputs and aid invested in physical capital. Again, their results do not coincide. In other studies, aid effectiveness is considered as "under the circumstances under which aid will positively affect growth" and this notion is brought into the study

---

[1] See Hansen and Tarp (2000) for a detailed review on literature addressing aid-growth nexus.

on the relationship between foreign aid and FDI. That is to say, the authors examine the interaction of aid with other variables that attract FDI, for example institutional quality. The results, however, are still mixed.

Following the recent studies, we have formulated and extended the Solow growth model. We assume that aid has a positive and a negative effect on FDI. The negative effect caused by the unproductive activities such as rent seeking which tends to crowd out FDI, while the positive effect of aid increases the marginal product of capital (MPK), encouraging FDI. Rather than including an interactive term, the fixed-effect panel threshold model developed by Wang (2015) enables us to examen our hypothesis that existing an institutional threshold, giving rise to a structure of effects of foreign aid on FDI depending on the institutional environment in the recipient country, with an encouraging effect of aid on FDI in a better institutional environment.

Our work has been limited by the requirement of a strongly balanced panel and data availability, which restrained the sample size. In addition to the fixed effect panel threshold method, we apply the generalized method of moments (GMM) to deal with the potential endogeneity problem. We find that overall aid has a threshold effect on FDI as expected. More specifically, in a bad institutional environment, aid tends to crowd out FDI while in a good environment, the effect becomes positive but insignificant. We argue that this insignificance might be due to the offset between foreign aid, saving level, and the MPK. That is, in a good institutional environment, foreign aid improves effectively the MPK, and spurs economic growth. Consequently, an increased saving level will lower again the MPK in the Solow context which undermines the effect of foreign aid. Another possible explanation could be the that the insufficient aid flows are incapable of fulfilling the development needs.[2]

---

[2] Excluding the spending in donor countries, the amount of aid received by recipient countries varies between 74,433 and 96,849 million dollars after 2004.

Our work contributes to the aid effectiveness debate since the global development actors are still facing the limited amount of aid issues, despite the requests of increasing the amount of aid raised by the development agendas. The insignificance of foreign aid in the good institutions doesn't imply that donor countries should withdraw donation, rather, the development communities should increase the flows in sectors targeting to improve social infrastructure. Moreover, aid projects should focus more on institutional reform through the well-defined needs for financial flows, technical assistance, and capacity building.

The chapter is structured as follows: Section 1.2 reviews the literature on aid effectiveness with a particular focus on the aid-FDI nexus. Section 1.3 proposes the theoretical model which allows us to incorporate our hypothesis of a threshold effect. Section 1.4 presents the data, sample, and econometric model. Section 1.5 reports the empirical results as well as provides some discussion. The last section concludes.

1.2 The Literature on Aid Effectiveness on FDI

In this section we review and summarize the relevant literature on the effectiveness of foreign aid on FDI and the importance of institutions to provide a basis for our theoretical model. The effect of foreign aid on FDI remains quite mixed and inconclusive. Economists find a positive, negative relationship between foreign aid and FDI. In addition, some works also suggest the two international flows are not correlated.

Regarding those studies finding no significant relationship between aid and FDI, Karakaplan et al. (2005) use aggregated data and find that aid has no effect on FDI in the low-and middle-income countries. Harms and Lutz (2006) assume that aid has two effects on FDI, the infrastructure effect and the rent seeking effect. The aid invested in

the economic and social infrastructure increases FDI whereas the rent seeking effect is caused mainly by the aid allocated in the unproductive sectors which crowds out FDI. Their empirical results suggest that, on average, foreign aid has no effect on FDI. Kosack and Tobin (2006) argue that aid and FDI are uncorrelated since the former concentrates more on government revenue and human capital while the latter focuses more on physical capital. They suggest that in low-income countries, aid and FDI are neither substitutes nor complements.

Other economists find that foreign aid is negatively correlated to investment. Asiedu et al. (2009) applied an empirical study for 28 sub-Saharan African counties and 35 low-income countries over the period 1983-2004. They find that foreign aid has a negative effect on FDI in both SSA countries and low-income countries. They also suggest that foreign aid is able to mitigate the adverse effect of expropriation risk on FDI. However, it is required to substantially increase the donation of aid to completely neutralize the adverse effect. Likewise, Herzer and Grimm (2012) argue that aid-financed public investment could explain the crowding out effect of foreign aid on private investment. Similarly, Rao et al. (2020) find that, for a sample of South-eastern Asia and South Asia, foreign aid flows negatively impact FDI flows as well as economic growth. Their data shows that economies such as Afghanistan, Pakistan, Thailand, Malaysia, Philippines, and PDR have experienced substantial decline in capital flows despite receiving significant amount of foreign aid. They suggest that foreign aid might enable governments to allocate funds to finance physical capital and channel direct transfers to the productive sectors, therefore, foreign aid ends up in crowding out FDI.

There is also a strand of works finding a positive effect of foreign aid. For instance, Kimura and Todo (2010) find that aid has a "Vanguard effect" on FDI. They collect the data of the five major ODA donor countries and find aid generally has no effect on FDI, but the Japanese ODA can attract FDI from Japan exclusively without affecting FDI from other countries. They suggest that it is because aid can lower the risk for FDI. Such effect is observed by Asiedu et al. (2009) as well.

Selaya and Sunesen (2012) incorporate the Solow model into their study and conclude that the effect of aid on FDI depends on the composition of aid. Accordingly, the aid invested in physical capital will lower the MPK, therefore crowding out other capital flows. When aid is invested in infrastructure sectors, it increases the total factor productivity (TFP). The improvement in TFP will increase the MPK and therefore attract more FDI. However, in the context of a Solow economy, an increase in domestic saving and investment will again lower the MPK, hence reducing FDI. Their empirical results confirm the positive effect of the aid in complementary inputs and the negative effect of the aid in physical capital. Moreover, they find the overall effect of aid on FDI is positive since the aid improves the absorptive capacity and increases the MPK in the host countries.

Bhavan (2014) finds that aid in both infrastructure and the production sector play an important role in attracting FDI. Opoku (2015) studies the aid-FDI nexus for African over the period 1996 to 2008. He concludes that the total aid positively affects FDI. Besides, the author also confirms the positive effect of a good government. Pham (2015) uses province-level data to analyze the effect on FDI in Vietnam. He finds that middle- and long-term aid can attract more FDI. The author explains that investors are willing to invest abroad when the aid projects are settled, and a proper infrastructural development is achieved in the host country. Moreover, he suggests that government quality needs to be at a certain level for aid to be conducted more efficiently.

Economists have studied the role of aid on FDI from different perspectives, yet the results remain inconclusive. In summary, three types of effect are observed in these studies: positive, null, and negative. The positive effect is rather straightforward. The well-targeted aid tends to attract private investment. While the negative effect of aid on FDI could be explained in several ways. First, the rent seeking effect decreases the productivity and then crowds out FDI (Svensson, 2000; Djankov, Montalvo, and Reynal-Querol, 2008; Economides, Kalyvitis, and Philippopoulos, 2008; Knack, 2001;

Haass, 2021). The second explanation is the micro-macro paradox (Mosley, 1986) which suggests that the aid effectiveness is high at the project level and is low at the macro level. And the third one could be economic and political interest of donor communities. For instance, Alesina and Dollar (2000) conclude the reason why aid does not promote growth and reduce poverty is because other factors such as the colonial past and voting pattern in the United Nations are valued more than the political institutions or economic policies of the recipient country. OECD (2018) reports that 76.2 percent of DAC bilateral ODA was reported as being untied in 2015 and the principal beneficiaries of the aid contract are still the enterprises of donor countries. All the listed causes prevent aid from targeting the desired sectors and therefore crowd out FDI.

Unlike the controversial results of the aid-FDI studies, the importance of other determinants, for instance institution or government quality, is highlighted by many authors (see; Karakaplan et al., 2005; Walsh and Yu, 2010; Bhavan, 2014; Opoku, 2015; Peres, Ameer, and Xu, 2018). For example, Asiedu (2006) finds that the legal system, the control of corruption and political stability have a positive effect on attracting FDI. Economic freedom has been confirmed as a determinant of FDI in recent less conventional economic studies. Amendolagine et al. (2013) and Ghazalian and Amponsem (2019) underline the role of Economic Freedom in creating a favorable investment environment. As for Chapter 1, institutions could influence the effect of foreign aid on FDI, for instance, Svensson (2000) suggests that the political liberalization should be prioritized by donor communities. Harms and Lutz (2006) conclude that removing institutional friction is the best way to attract foreign investment.

Figure 1.1 Effect of foreign aid on FDI regarding Economic

(a) EF<5   (b) EF<5.5
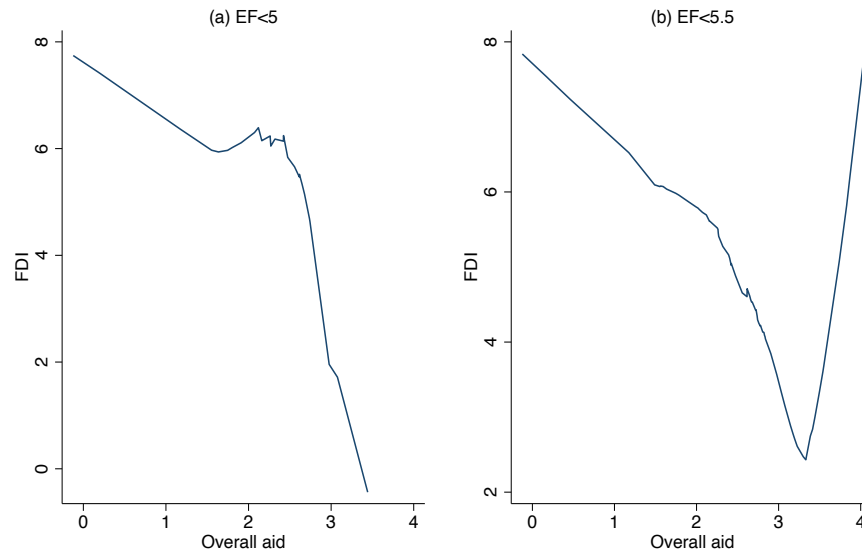
Note: EF denotes Economic Freedom
Source: Authors' own elaboration.

As suggested in the studies reviewed above, the effect of foreign aid varies in different institutional environments. To extend the current debate, we assume that this effect might not be linear. Specifically, in this chapter, we assume that Economic Freedom used to proxy the economic institution can prevent the rent seeking effect of aid and conducts aid projects to be implemented more efficiently. To achieve this goal, the quality of economic institutions must break a certain threshold to be vigorous enough to drive aid into the desirable sectors for FDI. We explore the data on aid and FDI and their relationship depending on the Economic Freedom index. Figure 1 (a) shows the effect of aid on FDI in an institutional environment characterized by an Economic Freedom index which scores under a certain level, 5 for instance, revealing a negative effect of aid on FDI. However, for an Economic Freedom index scoring over a certain level, 5.5 for instance, Figure (b) reveals a contrary trend. This supports our hypothesis that there must be a certain point in Economic Freedom, between 5 and 5.5, after which the effect becomes positive. Moreover, Figure (b) both visualizes and supports our hypothesis of a threshold effect of aid on FDI.

1.3 Theoretical Analysis of Aid, FDI and Institutions

This section discusses the effect of aid on FDI. We extend the model of Selaya and Sunesen (2012) which suggests that, in a Cobb-Douglas production function, foreign aid invested into infrastructure sectors AID_A improves total factor productivity (TFP), $A=A_0+AID_A$, while the aid invested in physical capital AID_K targets the accumulation of capital and has no effect on TFP.

$$y = Ak^\alpha \tag{1.1}$$

$$A = A_0 + AID_A \cdot C \tag{1.2}$$

Where, A_0, is the initial level of productivity, and C, $(0 \leq C \leq 1)$ denotes the conductive effect of institutions on aid. By equation (1.2) we assume that AID_A will not always reach the infrastructure sectors, instead, institutions have a conductive effect, C, on its arrival. Put differently, if a country has a better institutional quality, we assume that the conductive effect is higher and more AID_A will target infrastructure projects. Consequently, foreign aid increases TFP.

The accumulation of capita consists of saving share of GDP, FDI and aid:

$$\dot{k} = sy + fdi + aid_k - (n + \delta)k \tag{1.3}$$

Where, $\dot{k}$, denotes the accumulation of capital per capita, s denotes the saving rate, y denotes the GDP per capita, n is the population growth rate and δ is the depreciation rate.

According to Caselli and Feyrer (2007), the world real return of capital, r in a frictionless economy is:

$$r = MPK - \delta = A\alpha k^{\alpha-1} - \delta \qquad (1.4)$$

At a steady state, $\dot{k} = 0$, the optimal capital k^* from (1.4) is:

$$k^* = \left[\frac{A\alpha}{r}\right]^{\frac{1}{1-\alpha}} \qquad (1.5)$$

At the steady state, with optimal capital per capita k^* and income per capita y^*, the flow of FDI per capita is determined by:

$$fdi = -aid_k - sy^* + (n+\delta)k^* \qquad (1.6)$$

And the effect of aid on FDI is:

$$\frac{\partial fdi}{\partial aid} = \frac{\partial fdi}{\partial aid_k} - s\frac{\partial y^*}{\partial aid_A} + (n+\delta)\frac{\partial k^*}{\partial aid_A} \qquad (1.7)$$

In which, foreign aid into infrastructure tends to attract more FDI through the improvement in marginal product of capital (MPK):

$$\frac{\partial k^*}{\partial aid_A} = \frac{\partial}{\partial aid_A}\left(\left[\frac{A\alpha}{r}\right]^{\frac{1}{1-\alpha}}\right) = \frac{1}{1-\alpha}\left[\frac{A\alpha}{r}\right]^{\frac{\alpha}{1-\alpha}}\frac{L\alpha}{r}C \geq 0 \qquad (1.8)$$

With better institutions, i.e., when C approaches 1, more aid has been effectively invested in infrastructure sectors. Thus, aid has a larger attraction on FDI. And we also have the marginal effect of aid on output and savings:

$$-s\frac{\partial y^*}{\partial aid_A} = -s\frac{\partial(Ak^{*\alpha})}{\partial aid_A} = -s\left[CLk^{*\alpha} + A\alpha k^{*(\alpha-1)}\frac{\partial k^*}{\partial aid_A}\right] \qquad (1.9)$$

Substituting (1.8) into (1.9):

$$= -sCLk^{*\alpha} - sA\alpha k^{*(\alpha-1)}\frac{1}{1-\alpha}\left[\frac{A\alpha}{r}\right]^{\frac{\alpha}{1-\alpha}}\frac{L\alpha}{r}C \qquad (1.10)$$

$$= -sC\left[Lk^{*\alpha} + A\alpha k^{*(\alpha-1)}\frac{1}{1-\alpha}\left[\frac{A\alpha}{r}\right]^{\frac{\alpha}{1-\alpha}}\frac{L\alpha}{r}\right] \leq 0 \qquad (1.11)$$

As for saving, on the other hand, at the steady state of capital accumulation, an increase in the saving level will therefore crowd-out FDI. Regarding the aid invested in physical capital:

$$\frac{\partial fdi}{\partial aid_k} = -1 \qquad (1.12)$$

Aid invested in physical capital will always crowd-out FDI as the original model.[3]
The overall effect then:

$$\frac{\partial fdi}{\partial aid} = -1 - sC\left[Lk^{*\alpha} + A\alpha k^{*(\alpha-1)}\frac{1}{1-\alpha}\left[\frac{A\alpha}{r}\right]^{\frac{\alpha}{1-\alpha}}\frac{L\alpha}{r}\right] +$$

$$(n+\delta)\frac{1}{1-\alpha}\left[\frac{A\alpha}{r}\right]^{\frac{\alpha}{1-\alpha}}\frac{L\alpha}{r}C \qquad (1.13)$$

Which extends Selaya and Sunesen's model in that the effect of aid on FDI depends on the conductive effect of institutions, C. Given that C ranges from 0 to 1 indicating from the worst to the best conductive effect, the marginal effect of aid on FDI could be -1 in case of C equals 0. In case of C equals 1, the marginal effect could be negative, 0 and positive depending on the savings level, the population growth, and the depreciation rate. Then, there must be a conductive effect C for which: $\frac{\partial fdi}{\partial aid} = 0$.

We introduce the assumption that the conductive effect of institutions is larger when the institutional quality (*Ins*) is better:

$$\frac{\partial C}{\partial Ins} > 0 \qquad (1.14)$$

Rewriting (1.13) we obtain that the effect of aid on FDI monotonically depends on C:

---

[3] In appendix A, we further relax this assumption allowing institutions to redirect aid in productive sectors, i.e., the improved institutions can mitigate the negative effect.

$$\frac{\partial fdi}{\partial aid} = -1 - sC\left[Lk^{*\alpha} + A\alpha\left(\frac{r}{A\alpha}\right)\left(\frac{1}{1-\alpha}\right)\left(\frac{L\alpha}{r}\right)k^{*\alpha}\right] + (n+\delta)C\left(\frac{L\alpha}{(1-\alpha)r}\right)k^{*\alpha}$$

$$= -1 - sC\left[Lk^{*\alpha} + k^{*\alpha}\left(\frac{L\alpha}{1-\alpha}\right)\right] + (n+\delta)C\left(\frac{L\alpha}{(1-\alpha)r}\right)k^{*\alpha}$$

$$= -1 + Ck^{*\alpha}\left[-sL - sL\left(\frac{\alpha}{1-\alpha}\right) + L(n+\delta)\left(\frac{\alpha}{(1-\alpha)r}\right)\right] =$$

$$= -1 + Ck^{*\alpha}\left(\frac{L}{1-\alpha}\right)\left[(n+\delta)\left(\frac{\alpha}{r}\right) - s\right]$$

There must be an institutional threshold γ with a conductive effect $C_{Ins} < \gamma$ with a null effect on FDI. We get the well-known positive effect of good institutions above this threshold. However, a quality under that threshold is not harmless, but can reduce productivity and crowd out FDI.

Then consequently, we stylise our hypothesis that aid has larger attraction for FDI as institutions improve over a certain threshold but below it, aid can even expel FDI as follows:

$$\frac{\partial fdi}{\partial aid_{(Ins<\gamma)}} < 0 < \frac{\partial fdi}{\partial aid_{(Ins>\gamma)}} \qquad (1.15)$$

1.4 Empirical Strategy and Data

We use the fixed-effect panel threshold model proposed by Wang (2015). The basic regression is as follows:

$$FDI_{it} = X_{it} + ODA_{it}(Ins_{it}, \gamma) \qquad (1.16)$$

Where, FDI_{it} is the stock of FDI received by county i in year t, X_{it} is the set of control variables, ODA_{it} the aid received by country i in period t and Ins_{it} is the threshold variable, the Economic Freedom Index in our case. γ denotes the value of the threshold. We expand the regression as follows:

$$\log fdi_{pc_{it}} = \beta_0$$
$$+ \beta_1 \log gdp_{pc_{it}} + \beta_2 saving_{it} + \beta_3 openness_{it} + \beta_4 population_{it} +$$
$$\beta_5 \log oda_{pc_{it}} (Ins_{it} \leq \gamma) + \beta_6 \log oda_{pc_{it}} (Ins_{it} > \gamma) + u_i + e_{it} \qquad (1.17)$$

Where $loggdp_{pc}$ is the log of GDP per capita; *saving* is the gross saving per GDP; *openness* is the sum of export and import divided by GDP, and *population* is the growth rate of population. As mentioned in the theoretical analysis, GDP per capita, as a proxy for market size, is expected to have a positive effect. The effect of saving on FDI is expected to be negative because it will reduce the MPK. We expect the trade openness to have a positive contribution on attracting FDI since it represents the channel through which foreign firms allocate their investment. And the population growth rate is expected to negatively affect FDI.

In accordance with the hypothesis, we expect the institutional threshold to yield the effects of aid on FDI into two regions. The region with less restrictive institutions is

denoted as a *good* institutional environment in which the effect is expected to be positive while the region with heavily restrictive institutions is recognised as a *bad* institutional environment, and the effect is expected to be negative.[4] We expect the following relation to be found, which is $\beta_6 > \beta_5$. All variables are lagged by one year to avoid a potential endogeneity problem. Our regression can be rewritten as:

$$logfdi_{pc_{it}} = \beta_0 + \beta_1 loggdp_{pc_{it-1}} + \beta_2 saving_{it-1} + \beta_3 openness_{it-1}$$

$$+\beta_4 population_{it-1} + \beta_5 \log oda_{pc_{it-1}} (Ins_{it-1} \leq \gamma) +$$

$$\beta_6 \log oda_{pc_{it-1}} (Ins_{it-1} > \gamma) + u_i + e_{it} \tag{1.18}$$

Our sample is based on the ODA recipient country list of the Development Assistance Committee of the Organization for Economic Co-operation and Development (OECD-DAC). As a technical requirement of the threshold model, we have constructed a balanced panel with 62 countries for 2003 to 2016 (Appendix B.2).

The FDI stock is the dependent variable, collected from the UNCTAD Statistics. The aid data is collected from the Creditor Reporting System (CRS) of the OECD Statistics. It contains ODA loans, grants, and equity investment through all channels. We use total disbursement of aid rather than commitment since we believe that the total disbursement reflects the real flow of aid. According to Odedokun (2003), these two types of measurement are highly correlated. The donor countries are those of the Development Assistance Committee (OECD-DAC) and the recipient countries are those on the DAC list of ODA Recipients. Further, we decompose overall aid into individual sectors as well as different classifications in accordance with early works.

---

[4] We should clarify that imposing more restrictive institutions does not imply the conductive effect mentioned in the previous section. Their relationship, however, is expected to be negative. That is, in the region with less regulations, the conductive effect might be more effective.

According to the CRS classification, ODA has been grouped into the following sectors:

1. Social infrastructure and services

   Sub-sectors: education, health, population policies and reproductive health, water supply and sanitation, government and civil society and other social infrastructure and services.

2. Economic infrastructure and services

   Sub-sectors: transport and storage, communications, energy, banking and financial services and business and other services.

3. Production sectors

   Sub-sectors: agriculture, forestry, fishing, industry, mining, construction, trade policies and regulations, and tourism.

4. Multi-sector/ cross-cutting

   Sub-sectors: general environment protection, and other multisector.

5. Commodity aid/ general programme assistance.

   Sub-sectors: General budget support, development food assistance and other commodity assistance.

6. Action relating to debt

   Sub-sectors: action relating to debt, debt forgiveness, relief of multilateral debt, rescheduling and refinancing, debt for development swap, other debt swap and debt buy-back.

7. Humanitarian aid

   Sub-sectors: Emergency response, reconstruction relief and rehabilitation and disaster prevention and preparedness.

9. Administrative costs of donors

The foreign aid in sector 6. Action relating to debt, and sector 9. Administrative costs of donor are usually excluded from the empirical studies since they relate to donor countries' activities. Therefore, we have also excluded them. In addition to reporting

the results of the individual sectors, we also present the results of different combinations from previous studies. For instance, Selaya and Sunesen (2012) group aid into aid invested in complementary inputs comprising aid in social infrastructure and economic infrastructure. They also define aid in the production sector as the aid invested in physical capital which contributes to the accumulation of capital (Saidon et al., 2013). Moreover, Kimura and Todo (2010) define infrastructure aid as the sum of aid in social infrastructure, economic infrastructure, the production sector and the multi-sector. Moreover, they define non-infrastructure aid as the sum of commodity aid and humanitarian aid.

As for the threshold variable, we apply the Economic Freedom index from the Fraser Institute to represent the economic institution of the host country. The rating varies from 0 to 10, indicating the worst to the best economic institution. Moreover, its five main indicators, namely, *government size*, *legal system and property rights*, *sound money*, *freedom to trade internationally* and *regulations* will be treated individually as the threshold variable for the robustness check. According to the methodology, a *good* institutional environment in comparison to a *bad* one is when the governments intervene less in the economy, the legal system is less affected by powerful groups, the inflation level is more stable, the movement of capital and people is less controlled, and the number of the business regulatory restrictions is limited. In short, an environment with more freedom is expected to favour investment.

The control variables are GDP, saving, trade openness and population growth. All variables are collected from the database World Development Indicators of the World Bank. More details can be found in the descriptive statistics in Appendix B.1.

1.5 Empirical Results and Discussion

In this section we report the effect of foreign aid on FDI with respect different economic institutional thresholds. For the p-value of the threshold we apply the bootstrap method of 1000 replications and a 10% trimming percentage. All thresholds reported in the tables are set at a confidence level of 95% or better.[5] The thresholds yield the effect of aid into two or three regions in the case of a single or double threshold effect. In the case of a single threshold effect, region 0 is the most restricted region, denoting a bad institutional environment while region 1 is the freest region, denoting a good institutional environment. In the case of a double threshold effect, the implication of region 0 is maintained. Region 1 is the region with relatively less restrictions, implying a better institutional environment, while region 2 is the freest one, indicating the best institutional environment. As a robustness analysis, we consider the possibility that the threshold variable related to the economic institutions is endogenous, in which case we apply the generalized method of moments (GMM). We present the FE threshold analysis and then we test and deal with potential endogeneity.

Table 1.1 presents the effect of foreign aid on FDI regarding *Economic Freedom* and its five indicators. The results suggest that aid has a threshold effect when we take the summary index, *size of government*, *legal system*, and *regulations* as the threshold variable.

Column 1 of Table 1.1 reports that the threshold value for the summary index is 5.3879. Countries whose institutions score over this value tend to attract 0.11 percent of FDI per capita for every one percent of aid per capita received. While in countries scoring below the threshold, every one percent of aid per capita crowds out 0.23 percent of FDI per capita. The results of *regulations*, reported in column 6 exhibit the same pattern.

---

[5] Wang (2015) suggests running the threshold model again to detect one more threshold until the insignificant p-value of the *N* threshold effect is found, then this p-value is the acceptance value for *N-1* threshold effect.

The indicator *regulations* includes regulations on the credit market, labour market and business sectors. The regulatory threshold is 5.3850, suggesting that one percent of aid per capita in a bad regulatory environment crowd out 0.09 percent of FDI per capita while in a good institutional environment, it crowds in 0.13 percent of FDI per capita. Columns 2 and 3 report the results of *government size* and the *legal system*. The threshold values are 4.9626 and 2.9523, respectively. We find that in the bad institutional environment, aid has no effect on FDI while in the good environment a one percent increase in aid per capita tends to crowd in 0.13 percent of FDI per capita. As for their linear relationship, *Economic Freedom*, *government size* and *legal system* have been confirmed as determinants of FDI (see for example Ghazalian and Amponsem, 2019). In addition, Slesman et al. (2015) also suggest that when the *Economic Freedom*, *government size* and *legal system* are taken as the threshold variables, foreign inflows tend to promote economic growth in good institutional environments. Columns 4 and 5 indicate that we find no threshold for the monetary indicator and trade freedom, although a positive and significant effect in a good environment is found. Among the control variables, we find that GDP per capita and openness have a positive and significant effect on FDI as expectation.

The results reported in Table 1.1 confirm our hypothesis that foreign aid has a threshold effect on FDI. In the next step, we decomposed aid data into the individual sectors and combinations mentioned in previous sections in order to reveal the threshold pattern. Among the listed individual sectors, we find that only aid in social infrastructure has a threshold effect on FDI which is reported in Table 1.2 below.

Table 1.1 Overall aid FE threshold

Dep. Var. $logfdi_{pc}$	(1) Economic freedom	(2) Government size	(3) Legal system	(4) Sound money	(5) Trade freedom	(6) Regulation
Threshold	5.3879***	4.9626***	2.9523**			5.3850***
Region 0	-0.2317***	-0.0484	-0.0468	0.0463	-0.0842	-0.0903*
	(0.0570)	(0.0489)	(0.0511)	(0.0470)	(0.0604)	(0.0486)
Region 1	0.1102***	0.1330***	0.1338***	0.1345***	0.1126**	0.1259***
	(0.0424)	(0.0435)	(0.0440)	(0.0450)	(0.0440)	(0.0427)
GDP pc	1.2368***	1.2376***	1.2362***	1.2595***	1.2498***	1.2304***
	(0.0430)	(0.0439)	(0.0444)	(0.0447)	(0.0445)	(0.0433)
Savings	-0.0024	0.0010	-0.0015	0.0003	-0.0010	-0.0046
	(0.0033)	(0.0033)	(0.0034)	(0.0034)	(0.0034)	(0.0033)
Openness	0.0073***	0.0083***	0.0076***	0.0088***	0.0079***	0.0075***
	(0.0013)	(0.0013)	(0.0013)	(0.0014)	(0.0014)	(0.0013)
Population	-0.0161	-0.0032	-0.0131	-0.0095	-0.0090	-0.0123
	(0.0281)	(0.0287)	(0.0289)	(0.0293)	(0.0291)	(0.0282)
Constant	-3.8833***	-4.1477***	-4.0004***	-4.2431***	-4.1130***	-3.8592***
	(0.3445)	(0.3496)	(0.3545)	(0.3567)	(0.3559)	(0.3470)
Observations	806	806	806	806	806	806
R-squared	0.612	0.596	0.589	0.579	0.583	0.608
Time dummies	Yes	Yes	Yes	Yes	Yes	Yes

Note: Region 0 is the most restricted region, indicating a bad institutional environment, while region 1 is the freest region, indicating a good institutional environment.

Standard errors are in parentheses

*** p<.01, ** p<.05, * p<.1

Table 1.2 reports the result of aid in social infrastructure which contains the sub-sectors of basic health and education, reproductive policies etc. We find that aid in social infrastructure followed the same pattern as the overall aid, showing a single threshold effect with respect to *Economic Freedom, government size, legal system*, and *regulation*s. Regarding *Economic Freedom*, we find that the crowding out effect remained the same for aid in social infrastructure while in country with good institutions, the positive effect is significant at a 90% confidence level.

Table 1.2 Social infrastructure aid FE threshold

Dep. Var. $logfdi_{pc}$	(1) Economic freedom	(2) Government size	(3) Legal system	(4) Sound money	(5) Trade freedom	(6) Regulation
Threshold	5.3879***	4.9863**	2.5823**			5.3850***
Region 0	-0.3251***	-0.0900	-0.1038*	0.0007	-0.2157***	-0.2004***
	(0.0689)	(0.0550)	(0.0613)	(0.0533)	(0.0786)	(0.0587)
Region 1	0.0838*	0.1039**	0.0933*	0.1106**	0.0673	0.0735
	(0.0479)	(0.0490)	(0.0495)	(0.0511)	(0.0492)	(0.0479)
GDP pc	1.2567***	1.2608***	1.2623***	1.2748***	1.2699***	1.2577***
	(0.0435)	(0.0442)	(0.0447)	(0.0449)	(0.0446)	(0.0435)
Savings	-0.0028	0.0003	-0.0017	-0.0004	-0.0015	-0.0046
	(0.0033)	(0.0034)	(0.0034)	(0.0034)	(0.0034)	(0.0033)
Openness	0.0077***	0.0085***	0.0080***	0.0087***	0.0082***	0.0078***
	(0.0013)	(0.0013)	(0.0014)	(0.0014)	(0.0014)	(0.0013)
Population	-0.0176	-0.0085	-0.0167	-0.0151	-0.0120	-0.0154
	(0.0284)	(0.0288)	(0.0291)	(0.0293)	(0.0291)	(0.0284)
Constant	-3.9315***	-4.1680***	-4.0492***	-4.1958***	-4.1003***	-3.8969***
	(0.3497)	(0.3538)	(0.3588)	(0.3599)	(0.3582)	(0.3503)
Observations	806	806	806	806	806	806
R-squared	0.6034	0.5906	0.5820	0.5762	0.5817	0.6032
Time dummies	Yes	Yes	Yes	Yes	Yes	Yes

Note: Region 0 is the most restricted region, indicating a bad institutional environment, while region 1 is the freest region, indicating a good institutional environment.

Standard errors are in parentheses

*** p<.01, ** p<.05, * p<.1

Table 1.3 reports the results of aid invested in complementary inputs (Selaya and Sunesen, 2012) which consists of aid in social infrastructure plus aid invested in economic infrastructure. The latter includes sub-sectors such as energy, transportation, and communications. Column 1 reports a doble threshold effect regarding *Economic Freedom*. The threshold values are 5.1314 and 5.3879, dividing the effect of foreign aid on FDI into region 0, 1, and 2. In region 0, one percent of foreign aid per capita tends to crowd out 0.53 percent of FDI per capita. While in region 1, i.e., when institutional quality scores between 5.1314 and 5.3879, the negative effect drops from 0.53 to 0.22. Meanwhile, in region 2, the effect becomes positive but insignificant. The double

threshold effect is also found for the *legal system* and the threshold values are 2.4787 and 2.5823. We find that only in region 1, this type of aid has a negative and significant effect while in region 2, the effect becomes positive but insignificant. As for the rest of indicators, we find that the *government size* and *regulations* have a single threshold effect and this type of aid has a negative impact in a bad institutional environment and positively in a good one.

Table 1.3 Complementary input aid FE threshold

Dep. Var. $logfdi_{pc}$	(1) Economic freedom	(2) Government size	(3) Legal system	(4) Sound money	(5) Trade freedom	(6) Regulation
Threshold 1	5.1314***	4.9863***	2.4784*			5.3850***
Threshold 2	5.3879*		2.5823**			
Region 0	-0.5285***	-0.0941*	0.0571	-0.0101	-0.2053***	-0.1718***
	(0.0733)	(0.0488)	(0.0601)	(0.0473)	(0.0712)	(0.0523)
Region 1	-0.2236***	0.0992**	-0.3968***	0.0999**	0.0624	0.0719*
	(0.0650)	(0.0431)	(0.0767)	(0.0446)	(0.0433)	(0.0423)
Region 2	0.0646		0.0679			
	(0.0414)		(0.0426)			
GDP pc	1.2391***	1.2476***	1.2621***	1.2668***	1.2627***	1.2482***
	(0.0445)	(0.0460)	(0.0457)	(0.0467)	(0.0465)	(0.0455)
Savings	-0.0031	0.0011	-0.0013	-0.0001	-0.0013	-0.0044
	(0.0032)	(0.0034)	(0.0033)	(0.0034)	(0.0034)	(0.0033)
Openness	0.0073***	0.0084***	0.0077***	0.0088***	0.0082***	0.0078***
	(0.0013)	(0.0013)	(0.0013)	(0.0014)	(0.0014)	(0.0013)
Population	-0.0213	-0.0077	-0.0150	-0.0148	-0.0129	-0.0159
	(0.0278)	(0.0287)	(0.0285)	(0.0292)	(0.0291)	(0.0284)
Constant	-3.7199***	-4.0949***	-4.0342***	-4.1439***	-4.0538***	-3.8446***
	(0.3493)	(0.3580)	(0.3575)	(0.3646)	(0.3633)	(0.3569)
Observations	806	806	806	806	806	806
R-squared	0.6193	0.5932	0.5985	0.5779	0.5822	0.6006
Time dummies	Yes	Yes	Yes	Yes	Yes	Yes

Note: Region 0 is the most restricted region, indicating a bad institutional environment; region 1 denotes the relatively freer region denoting a relatively better institutional environment; while region 2 is the freest region, indicating the best institutional environment.

Standard errors are in parentheses

*** p<.01, ** p<.05, * p<.1

In Table 1.4, we add foreign aid in production and the multi-sector to the complementary inputs aid which forms the infrastructure aid (Kimura and Todo, 2010). We find that the results in column 1 report a double threshold effect. As the institutional quality improves over 5.1314, the negative effect improves from -0.4768 to -0.1877 while this type of aid has an attractive effect for FDI in region 2 whereby one percent of aid per capita tends to attract about 0.09 percent of FDI per capita. Regarding the *government size*, *legal system,* and *regulations*, we find a single threshold effect. In a good institutional environment, foreign aid attracts FDI. Moreover, we find that this type of aid crowds out FDI in a bad regulatory environment while it has no significant effect when we treat the *government size* and *legal system* as threshold variables.

The fixed-effect panel threshold model was developed by Hansen (1999) who suggests that the threshold variable should be exogenous. Therefore, we apply the endogeneity test as suggested in Wooldridge (2012), i.e., including the residual estimated from the reduced equation into the structural equation. We find that the threshold variable is not endogenous since we already apply lagged *Economic Freedom* as the threshold variable. This fulfilled the requirement of the exogenous threshold variable. Furthermore, we repeat the endogeneity test for foreign aid, finding that the residual in the structural equation has a significant impact, i.e., foreign aid is endogenous.[6] To deal with the endogeneity issue, the system-GMM technique is then applied. In order to reveal the switching characteristic of the effect of aid on FDI, we first identify the threshold level that defines the regions where the effect of aid on FDI are different, that is 5.3879; then, we divide the values of the endogenous variable aid above and below the estimated threshold in order to obtain the different effects in each region by addressing the endogeneity of foreign aid.

---

[6] Selaya and Sunesen (2012) suggest that in aid-FDI study, aid should be considered as endogenous. Moreover, Harms and Lutz (2006) suggest that if donors systematically disburse more aid to those countries that are neglected by private foreign investors, aid would be endogenous.

Table 1.4 Infrastructure aid FE threshold

Dep. Var. $logfdi_{pc}$	(1) Economic freedom	(2) Government size	(3) Legal system	(4) Sound money	(5) Trade freedom	(6) Regulation
Threshold 1	5.1314***	4.9626***	2.9523**			5.3850***
Threshold 2	5.3879**					
Region 0	-0.4768***	-0.0539	-0.0711	0.0320	-0.1554**	-0.1190**
	(0.0697)	(0.0509)	(0.0542)	(0.0489)	(0.0674)	(0.0520)
Region 1	-0.1877***	0.1222***	0.1271***	0.1280***	0.0996**	0.1094**
	(0.0622)	(0.0448)	(0.0452)	(0.0462)	(0.0450)	(0.0441)
Region 2	0.0965**					
	(0.0429)					
GDP pc	1.2265***	1.2357***	1.2333***	1.2497***	1.2477***	1.2285***
	(0.0438)	(0.0458)	(0.0461)	(0.0465)	(0.0461)	(0.0451)
Savings	-0.0033	0.0009	-0.0014	0.0000	-0.0012	-0.0043
	(0.0032)	(0.0034)	(0.0034)	(0.0034)	(0.0034)	(0.0033)
Openness	0.0069***	0.0083***	0.0077***	0.0087***	0.0079***	0.0075***
	(0.0013)	(0.0013)	(0.0014)	(0.0014)	(0.0014)	(0.0013)
Population	-0.0206	-0.0064	-0.0160	-0.0137	-0.0116	-0.0144
	(0.0275)	(0.0288)	(0.0289)	(0.0292)	(0.0290)	(0.0283)
Constant	-3.6880***	-4.0800***	-3.9429***	-4.1110***	-4.0343***	-3.7902***
	(0.3419)	(0.3545)	(0.3580)	(0.3605)	(0.3580)	(0.3522)
Observations	806	806	806	806	806	806
R-squared	0.6275	0.5926	0.5883	0.5786	0.5854	0.6040
Time dummies	Yes	Yes	Yes	Yes	Yes	Yes

Note: Region 0 is the most restricted region, indicating a bad institutional environment; region 1 denotes a relatively freer region, indicating a relatively better institutional environment; while region 2 is the freest region, indicating the best institutional environment.

Standard errors are in parentheses

*** p<.01, ** p<.05, * p<.1

Table 1.5 reports the results for overall aid, aid in social infrastructure, complementary inputs and infrastructure, respectively. At the bottom of the table, we apply the Wald test to examine the null hypothesis that the coefficients of foreign aid in the two regions are identical. If the null hypothesis is rejected, we denote a non-linear effect, i.e., after controlling for endogeneity, the threshold pattern remains. In Table 1.5 we can observe

that the threshold effect of foreign aid on FDI is robust. In a bad institutional environment, foreign aid tends to crowd out FDI while in a good one, the effect is positive but becomes insignificant.

Table 1.5 System-GMM threshold

Dep. Var. $logfdi_{pc}$	(1) Overall aid	(2) Social infrastructure	(3) Complementary input	(4) Infrastructure
Threshold	5.3879***	5.3879***	5.3879***	5.3879***
Region 0	-0.5345**	-0.6782**	-0.6715**	-0.5858*
	(0.3078)	(0.2960)	(0.3127)	(0.3116)
Region 1	0.0130	0.0303	0.0431	0.0952
	(0.1968)	(0.1166)	(0.1918)	(0.1549)
GDP pc	1.2599***	1.2686***	1.2472***	1.2267***
	(0.0979)	(0.0866)	(0.1071)	(0.1091)
Savings	-0.0281***	-0.0249***	-0.0263***	-0.0243***
	(0.0088)	(0.0055)	(0.0085)	(0.0078)
Openness	0.0135***	0.0137***	0.0137***	0.0126***
	(0.0033)	(0.0021)	(0.0031)	(0.0025)
Population	0.0071	0.0216	-0.0121	-0.0106
	(0.0562)	(0.0683)	(0.0379)	(0.0504)
Constant	-3.7213***	-3.8926***	-3.6759***	-3.6239***
	(1.0123)	(0.7813)	(1.0339)	(1.1069)
Observations	806	806	806	646
Groups	62	62	62	62
Instruments	27	27	27	27
Wald test statistics	6.37	6.59	6.99	6.82
Wald test p-value	0.0116	0.0102	0.0082	0.0090
AR2 statistics	-1.51	-1.39	-1.38	-1.41
AR2 p-value	0.130	0.163	0.167	0.160
Hansen statistics	18.57	17.93	22.12	21.49
Hansen p-value	0.485	0.527	0.278	0.310
Time dummies	Yes	Yes	Yes	Yes

Note: Region 0 is the most restricted region, indicating a bad institutional environment, while region 1 is the freest region, indicating a good institutional environment.

Robust standard errors are in parentheses

*** p<.01, ** p<.05, * p<.1

One advantage of adopting this strategy is that we can now include additional control variables. We then repeat the regressions adding more control variables which are determinants of FDI. For instance, we have included domestic credit (*dc*) to the private sector to proxy the development of the financial market and the number of installed telephones per 100 people (*tele*) as a proxy for infrastructure development (Tampakoudis et al., 2017).[7] The inclusion of additional variables is merely to test the consistency of the threshold effect when other factors may affect the endogeneity of the regressors and threshold variables as well as the size of the effect.

Table 1.6 repeats the regression of Table 1.5 with additional controls. We find that the threshold pattern holds after the inclusion of additional variables. The negative effect of foreign aid on FDI regarding bad institutional environment is robust while in a good institutional environment, foreign aid has no significant effect on FDI. The negative effect in a bad institutional context is consistent with our theoretical model that when institutions have a weak conductive effect, foreign aid might be misused for unproductive purposes and then crowds out FDI. However, we find that after controlling for endogeneity, foreign aid has no longer any significant effect in a good institutional environment.

In summary, we can detect a threshold effect of foreign aid on FDI regarding *Economic Freedom*. The results confirm our theoretical model that in a bad institutional environment where foreign aid cannot be conducted effectively, it tends to crowd out FDI. After addressing the endogeneity issue, foreign aid has no significant effect in a good institutional environment. The crowding out effect does not imply that donor communities should withdraw their donation, rather, donor communities should work closer with recipient countries to build a favourable institutional environment for investment. There are several arguments for why foreign aid works against FDI in countries with a poor institutional quality.

---

[7] Adding these control variables makes the panel unbalanced, therefore not estimable by the fixed effect panel threshold method.

Table 1.6 System-GMM threshold with additional controls

Dep. Var. FDI $logfdi_{pc}$	(1) Overall aid	(2) Social infrastructure	(3) Complementary input	(4) Infrastructure
Threshold	5.3879***	5.3879***	5.3879***	5.3879***
Region 0	-0.5363**	-0.6968*	-1.0029*	-0.6910*
	(0.2379)	(0.3781)	(0.5977)	(0.3699)
Region 1	0.0472	-0.0211	-0.2427	-0.0154
	(0.1328)	(0.1575)	(0.3370)	(0.2133)
GDP pc	1.2103***	1.3227***	1.3132***	1.2130***
	(0.0806)	(0.0887)	(0.1169)	(0.1177)
Savings	-0.0258***	-0.0269***	-0.0320**	-0.0241**
	(0.0076)	(0.0072)	(0.0131)	(0.0100)
Openness	0.0135***	0.0145***	0.0177***	0.0140***
	(0.0034)	(0.0035)	(0.0051)	(0.0034)
Population	-0.0282	0.0201	-0.0221	-0.0407
	(0.1628)	(0.1079)	(0.1677)	(0.1728)
Domestic credit	0.0004	-0.0000	-0.0004	-0.0008
	(0.0029)	(0.0036)	(0.0039)	(0.0037)
TeleLine	0.0077	0.0008	-0.0053	0.0106
	(0.0130)	(0.0118)	(0.0195)	(0.0208)
Fuel exp	0.0040	0.0033	0.0025	0.0031
	(0.0038)	(0.0043)	(0.0048)	(0.0040)
Constant	-3.5661***	-4.3140***	-3.6997***	-3.4783***
	(0.9496)	(0.8281)	(1.3341)	(1.2242)
Observations	646	646	646	646
Groups	60	60	60	60
Instruments	30	30	30	30
Wald test statistics	9.99	5.13	4.30	6.77
Wald test p-value	0.0016	0.0236	0.0322	0.0093
AR2 statistics	-1.69	-1.57	-1.78	-1.63
AR2 p-value	0.091	0.116	0.076	0.104
Hansen statistics	14.52	14.32	21.80	20.38
Hansen p-value	0.752	0.765	0.295	0.372
Time dummies	Yes	Yes	Yes	Yes

Note: Region 0 is the most restricted region, indicating a bad institutional environment, while region 1 is the freest region, indicating a good institutional environment.

Robust standard errors are in parentheses

*** p<.01, ** p<.05, * p<.1

First, Mosley (1986) suggests the notion of a "micro-macro paradox" which refers to a situation in which every single aid project has the expected result at the project-level. However, at the macro level these projects barely make any contribution to the recipient country achieving economic growth. For instance, a donor country decides to allocate aid to the educational sector of a recipient country because it is much easier than other sectors, such as the health sector. But the health sector is precisely the weakness of the recipient country due to the lack of knowledge and skilled manpower which require extra assistance. Therefore, although each educational project has a plausible outcome, the recipient country makes no progress in development after receiving aid. The term institutional laziness offered by Banerjee and He (2008) could be one explanation which indicates the problem in the aid delivering procedure: donors are trying to help, but the final need is not usually targeted in the recipient country. Even if the need is satisfied, without a proper design of aid projects the cost-effectiveness ratio could be extremely high.

The second argument is related to tied aid, which has been subject to a critical debate in the aid effectiveness discussions. According to the existing estimations, tied aid could raise the cost of aid projects by 15 percent to 30 percent which considerably hinders the implementation of these projects. It is true that DAC countries have achieved great progress under the recommendation on untying. However, 76.2 percent of DAC bilateral ODA was reported as being untied in 2015 and the principal beneficiaries of the aid contract are still the enterprises of donor countries (OECD, 2018). To make things worse, the increasing number of donors operating in recipient countries tends to lower the share of aid. Therefore, donor countries are more likely to tie their aid (Knack and Smets, 2013). The extensive cost of tied aid is one issue, the other is the bad quality of goods and services associated with tied aid. Moreover, Lents et al. (2017) estimate that the arrival of tied aid gives rise to delays of up to 13 weeks compared to local procurement.

The third argument is more specific, underlying the importance of cooperation between NGOs and recipient countries. In practice, some NGOs operating in recipient countries are openly hostile to any government action that seems to control their independence (Jayasuriya et al., 2005). Certain governments, 39 of the world's 153 low- and middle-income countries, perceive the requirement of institutional reforms associated with aid as a threat to their power and impose restrictive laws (Dupuy et al., 2016). As a result, donor countries reduced aid flows to these countries in the following years (Dupuy and Prakash, 2018). In addition, a weak institution also implies weak coordination between domestic NGOs and International NGOs. Domestic NGOs (DNGOs) usually have a knowledge of the local context: what people need and how aid would work since many of them have been working in the same area for years. International NGOs (INGOs) are more capable of financing large projects. Intuitively, one could expect them to work together since they pursue the same objective. However, as Jayasuriya et al. (2005) illustrate, in practice, the trend is quite the opposite; the relationship between DNGOs and INGOs is more competitive. Without coworking, the aid projects cannot be fully established and the real needs of the local area cannot be met. The lack of coordination also means no information is shared between the two organisations, leading to a scenario in which one destination, due to its accessibility, receives a large amount of aid while another destination is still waiting for the first arrival.

Rent seeking activities constitute another channel through which foreign aid might affect FDI. Budget support aid provides recipient countries with a windfall which is likely to generate rent seeking activities if the government lacks control. In such an environment, aid fuels activities, such as corruption, that discourage productivity. In turn, the investment environment is endangered and foreign investors withdraw their money. Along the same lines, Svensson (2000) suggests that the inflow of aid does not necessarily result in general welfare gains and the reduction of economic liberty may be one reason for this. Another reason, confirmed by Svensson, could be that donor countries do not systematically allocate aid to countries where there is less corruption.

We have listed some of the possible channels through which foreign aid negatively affects FDI. As for the insignificant effect of foreign aid in a good institutional environment, we can argue that, in such an environment, countries might depend less on financial assistance, i.e., the financial gap could be satisfied by private investments and savings, which, as illustrated in our theoretical model that foreign aid increases the MPK, therefore, attracts FDI and promotes economic growth. The effect might not be direct. Another explanation that seems more realistic is that foreign aid donation is far less than the commitment of 0.7 of GNI of the donor countries. In 2017, only five countries fulfilled this requirement (OECD, 2018). The insufficient resources are incapable of financing the development projects that have been planned.[8]

1.6 Conclusions

The existing studies on the relationship between foreign aid and FDI produce inconclusive results, indicating the possibility of the existence of a threshold effect of foreign aid on FDI regarding economic institutions. The fixed-effects panel threshold model enables us to test our hypothesis that foreign aid has an institutional threshold effect on FDI. We find that foreign aid has a robust and negative effect on FDI in heavily restricted environments. Specifically, a heavily restricted environment is recognised as a *bad* institutional environment characterised by excessive intervention in the economy, restrictions over the interchange of capital and people and numerous regulations of the credit and labour market and business sectors. In addition, we find that in a freer institutional environment the effect of foreign aid becomes positive but insignificant. Furthermore, we decomposed aid into different classifications and find that the threshold pattern is primarily dominated by the foreign aid invested in social infrastructure sectors.

---

[8] As argued in Asiedu et al. (2009) that foreign aid can mitigate the adverse effect of expropriation risk on FDI, but the insufficient flows is unable to neutralize the adverse effect.

The empirical evidence offered in the study does not encourage donor countries to stop the transfer of aid. Rather, development projects that require institutional reforms are preferred. Several development policies could be derived based on our empirical results. First, donor communities could increase the amount of aid targeting the needy sectors, such as social infrastructure, since the current flows might be not sufficient to finance development. Second, the transfer of education, training and capacity building is as equally important as financial flows in improving institutional quality.[9] Third, it is important for recipient countries to identify the gap remaining between their current institutional quality and the thresholds. As we reported that the government size, legal system, and regulations are significant threshold variables, their reform would suggest good starting points in the most needy cases.

Among the shortcomings of our analysis, we can highlight the requirement of a strongly balanced panel and the availability of data that limit our sample size when using the FE panel threshold estimation. In our sample, the threshold variable is exogenous and we have been able to combine the estimation of the threshold variable with a system-GMM estimation, addressing the endogeneity of aid. However, it is possible that in other samples or specifications the threshold variable is endogenous and a GMM estimation with additional controls might yield different threshold values. Further research is needed in order to assess the detailed effect of foreign aid on the attraction of FDI, technical assistance and capacity building.

---

[9] The role of foreign aid in establishing a favourable investment environment is recently underlined by OECD (2022)

References

Alesina, A., & D. Dollar. (2000). Who Gives Aid to Whom and Why? *Journal of Economic Growth*, 5(1), pp. 33-63.

Amendolagine, V., A. Boly, N. Coniglio, F. Prota, & A. Seric. (2013). FDI and Local Linkages in Developing Countries: Evidence from Sub-Saharan Africa. *World Development*, 50, pp. 41-56.

Asiedu, E. (2006). Foreign Direct Investment in Africa: The Role of Natural Resources, Market Size, Government Policy, Institutions and Political Instability. *World Economy,* 29(1), pp. 63–77.

Asiedu, E., Y. Jin, & B. Nandwa. (2009). Does foreign Aid Mitigate the Adverse Effect of Expropriation Risk on Foreign Direct Investment? *Journal of International Economics*, 78(2), pp. 268-275.

Banerjee, A., & R. He. (2008). *Making Aid Work*. The MIT Press.

Bhavan, T. (2014). Effectiveness of Foreign Aid in Facilitating Foreign Direct Investment: Evidence from Four South Asian Countries. *Asian Economics and Financial Review*, 4(12), pp. 1770-1783.

Burnside, C., & D. Dollar. (2000). Aid, Policies, and Growth. *American Economic Review,* 90(4), pp. 847–68.

Caselli, F., & J. Feyrer. (2007). The Marginal Product of Capital. *Quarterly Journal of Economics,* 122(2), pp. 535–68.

Djankov, S., J. G. Montalvo, & M. Reynal-Querol. (2008). The Curse of Aid. *Journal of Economic Growth,* 13(3), pp. 169–94.

Dupuy, K, & A. Prakash. (2018). Do Donors Reduce Bilateral Aid to Countries with Restrictive NGO Laws? A Panel Study, 1993-2012. *Nonprofit and Voluntary Sector Quarterly,* 47(1), pp. 89–106.

Dupuy, K, J. Ron, & A. Prakash. (2016). Hands Off My Regime! Governments' Restrictions on Foreign Aid to Non-Governmental Organizations in Poor and Middle-Income Countries. *World Development,* 84, pp. 299–311.

Economides, G., S. Kalyvitis, & A. Philippopoulos. (2008). Does Foreign Aid Distort Incentives and Hurt Growth? Theory and Evidence from 75 Aid-Recipient Countries. *Public Choice,* 134(3–4), pp. 463–88.

Ghazalian, P. L., & F. Amponsem. (2019). The Effects of Economic Freedom on FDI Inflows: An Empirical Analysis. *Applied Economics,* 51(11), pp. 1111–32.

Haass, F. (2021). The Democracy Dilemma. Aid, Power-Sharing Governments, and Post-Conflict Democratization. *Conflict Management and Peace Science,* 38(2), pp. 200–223.

Hansen, B. E. (1999). Threshold Effects in Non-Dynamic Panels: Estimation, Testing, and Inference. *Journal of Econometrics,* 93(2), pp. 345–68.

Hansen, H., & F. Tarp. (2000). Aid Effectiveness Disputed. *Journal of International Development*, 12(3), pp. 103–28.

Harms, P., & M. Lutz. (2006). Aid, Governance and Private Foreign Investment: Some Puzzling Findings for the 1990s. *The Economic Journal*, 116(513), pp. 773–90.

Herzer, D., & M. Grimm. (2012). Does Foreign Aid Increase Private Investment? Evidence from Panel Cointegration. *Applied Economics,* 44(20), pp. 2537–50.

Jayasuriya S., P. Steele, D. Weerakoon, M. Knight-John, & N. Arunatilake. (2005). Post-Tsunami Recovery: Issues and Challenges in Sri Lanka. ADBI Research Paper Series 71.

Karakaplan, U., B. Neyapti, & S. Sayek. (2005). Aid and Foreign Direct Investment: International Evidence. Discussion Paper No. 2005/12, Turkish Economic Association, Ankara.

Kimura, H., & Y. Todo. (2010). Is Foreign Aid a Vanguard of FDI? A Gravity-Equation Approach. *World Development*, 38(4), pp. 482-497.

Knack, S. (2001). Aid Dependence and the Quality of Governance: Cross-Country Empirical Tests. *Southern Economic Journal,* 68(2), pp. 310–29.

Knack, S., & L, Smets. (2013). Aid Tying and Donor Fragmentation. *World Development,* 44, pp. 63–76.

Kosack, S., & J. Tobin. (2006). Funding Self-Sustaining Development: The Role of Aid, FDI and Government in Economic Success. *International Organization*, 60(1), pp. 205-243.

Lentz, E. C., C. B. Barrett., & M. I. Gómez. (2012). The Impacts of Local and Regional Procurement of US Food Aid: Learning Alliance Synthesis Report. Cornell University.

Mosley, P. (1986). Aid-Effectiveness: The Micro-Macro Paradox. *Ids Bulletin-Institute of Development Studies,* 17(2), pp. 22–27.

Odedokun, M. (2003). Analysis of Deviations and Delays in Aid Disbursements. *Journal of Economic Development,* 28(1), pp. 137-169.

OECD. (2009). *Managing Aid: Practices of DAC Member Countries*. Paris: OECD.

OECD. (2018). DAC Recommendation on Untying Official Development Assistance. OECD/LEGAL/50515, Paris: OECD.

OECD (2022). FDI Quality Policy Toolkit. Paris: OECD.

Opoku, E. (2015). The Puzzling Effects of Foreign Aid (ODA) on FDI: Examining Africa's Experience. *Journal of Economics and Sustainable Development*, 6(16), pp. 2222-2855.

Peres, M., W. Ameer, & H. L. Xu. (2018). The Impact of Institutional Quality on Foreign Direct Investment Inflows: Evidence for Developed and Developing Countries. *Economic Research-Ekonomska Istrazivanja,* 31(1), pp. 626–44.

Pham, H. (2015). The Impact of Official Development Assistance on Foreign Direct Investment: Evidence from Vietnam. *Master's Theses*, University of San Francisco.

Rao, D., N. Sethi, D. Dash, P. Bhujabal. (2020). Foreign Aid, FDI and Economic Growth in South-East Asia and South Asia. *Global Business Review*, doi:10.1177/0972150919890957

Saidon, R., Z. Yusop, N. W. Ismail, & L. S. Hook. (2013). Sectoral Foreign Aid and Income Inequality. *International Journal of Economics and Finance,* 5(9): pp. 117-122.

Selaya, P., & Eva R. Sunesen. (2012). Does Foreign Aid Increase Foreign Direct Investment? *World Development,* 40(11), pp. 2155–76.

Slesman, L., A. Z. Baharumshah, & M. E. Wohar. (2015). Capital Inflows and Economic Growth: Does the Role of Institutions Matter? *International Journal of Finance & Economics,* 20(3), pp. 253–275.

Svensson, J. (2000). Foreign Aid and Rent-Seeking. *Journal of International Economics*, 51(2), pp. 437-461.

Tampakoudis, I. A., D. N. Subeniotis, G. Kroustalis, & M. I. Skouloudakis. (2017). Determinants of Foreign Direct Investment in Middle-Income Countries: New Middle-Income Trap Evidence. *Mediterranean Journal of Social Sciences,* 8(1), pp. 58–70.

Walsh, J., and J. Yu. 2010. Determinants of Foreign Direct Investment: A Sectoral and Institutional Approach. IMF Working Papers. 10.

Wang, Q. Y. (2015). Fixed-Effect Panel Threshold Model Using Stata. *STATA Journal,* 15(1), pp. 121–34.

Wooldridge, J. M. (2012). *Introductory Econometrics. A Modern Approach*. Mason. Ohio: South-Western Cengage Learning. 2012.

Appendix A: Alternative theoretical model

The assumption on aid in infrastructure remains the same. And we impose a restriction on aid invested in physical capital (A.2), i.e., institutions can reduce the negative effect of aid invested in physical capital:

$$A = A_0 + AID_A \cdot C \qquad (A.1)$$

$$(1 - C)AID_k \qquad (A.2)$$

Where, A_0, is the initial level of productivity, and C, ($0 \leq C \leq 1$) denotes effect of aid regarding to institutional environment.

The accumulation of capita consists of saving share of GDP, FDI and aid:

$$\dot{k} = sy + fdi + (1 - C)aid_k - (n + \delta)k \qquad (A.3)$$

Where, $\dot{k}$, denotes the accumulation of capital per capita, s denotes the saving rate, y denotes the GDP per capita, n is the population growth rate and δ is the depreciation rate.

According to Caselli and Feyere (2007), the world real return of capital, r^w, in a frictionless economy is:

$$r^w = MPK - \delta = A\alpha k^{\alpha-1} - \delta \qquad (A.4)$$

At a steady level, $\dot{k} = 0$, the optimal capital k^* from (A.4) is:

$$k^* = \left[\frac{A\alpha}{r}\right]^{\frac{1}{1-\alpha}} \qquad (A.5)$$

Where, $r=r^w+\delta$, denotes the world gross return to capital.

Rewriting (A.3) when $\dot{k} = 0$, we have:

$$fdi = -(1-C)aid_k - sy^* + (n+\delta)k^* \qquad (A.6)$$

The overall effect of aid on FDI is:

$$\frac{\partial fdi}{\partial aid} = -(1-C) - sC\left[Lk^{*\alpha} + A\alpha k^{*(\alpha-1)}\frac{1}{1-\alpha}\left[\frac{A\alpha}{r}\right]^{\frac{\alpha}{1-\alpha}}\frac{L\alpha}{r}\right] +$$

$$(n+\delta)\frac{1}{1-\alpha}\left[\frac{A\alpha}{r}\right]^{\frac{\alpha}{1-\alpha}}\frac{L\alpha}{r}C \qquad (A.7)$$

The only change is that the aid invested in physical capital now depends on the conductive effect of institutions. Country with better institutions, less aid will be invested in physical capital therefore, crowds-out less FDI.

Appendix B: Description Statistics

Table B.1 Descriptive Statistics

Var. Name	Obs.	Mean	Std. Dev.	Min	Max
FDI	868	6.140831	1.668881	-0.0406482	9.309031
Total aid	806	2.818174	1.025063	-0.1414684	5.372792
Complementary input aid	806	2.410952	1.011513	-0.4407419	4.841186
Infrastructure aid	806	2.666805	1.002895	-0.1512202	4.937525
Non-infrastructure aid	806	-0.3431659	2.286808	-8.037114	5.103128
Economic Freedom	806	6.454373	0.7352793	4.425725	8.147588
Size of government	806	6.902001	1.252733	2.362745	9.49172
Legal system	806	4.392057	1.12255	1.349007	7.069014
Sound money	806	7.61548	1.277763	3.193494	9.806742
Freedom to trade internationally	806	6.793739	0.9016525	3.599649	8.710062
Regulation	806	6.56859	0.8447281	4.330071	8.655698
GDP	806	7.608773	1.082889	4.732418	9.739549
Saving	806	21.86353	10.8987	-12.88073	57.47493
Population	806	1.718474	1.156555	-9.080639	7.78601
Openness	806	74.31223	33.43176	21.44693	210.3738

Table B.2 Country sample

Albania	Costa Rica	India	Nicaragua	Uruguay
Algeria	Côte d'Ivoire	Indonesia	Niger	Viet Nam
Argentina	Democratic Republic of the Congo	Jamaica	Nigeria	
Armenia	Dominican Republic	Jordan	Pakistan	
Azerbaijan	Ecuador	Kenya	Panama	
Bangladesh	Egypt	Madagascar	Paraguay	
Benin	El Salvador	Malawi	Peru	
Bolivia	Gabon	Malaysia	Philippines	
Botswana	Georgia	Mali	Senegal	
Brazil	Ghana	Mauritius	Sierra Leone	
Burundi	Guatemala	Mexico	Sri Lanka	
Cameroon	Guinea-Bissau	Morocco	Thailand	
China (People's Republic of)	Guyana	Mozambique	Tunisia	
Colombia	Haiti	Namibia	Turkey	
Congo	Honduras	Nepal	Uganda	

Chapter 2.

Foreign Development Assistance and FDI in Africa:

A Structural Equation Modelling Study

2.1 Introduction

It is an undeniable fact that African countries have advanced somewhat in social dimensions, such as basic health care and education. However, although this continent has been receiving Official Development Assistance (ODA) for decades, we still cannot refer to these achievements as the result of a development process. The aid-development debate is controversial. Some studies find a positive effect of aid on growth while others find a negative effect or no impact. The nexus is not direct, according to Burnside and Dollar (2000), who suggest that aid can boost growth only in countries with a good political environment. Subsequently, the study of foreign aid widens its scope and incorporates its effect on different outcomes, with special attention to institutions.

The relationship between aid and institutions can be summarised in two approaches. Early studies suggest that aid has a *capacity building* effect on institutions. Given the successful experience of Europe, economists of this approach suggest that one role of aid is to improve the institutions of the recipient countries. However, in the case of Africa, some economists find that foreign aid has not produced the expected results. The governments in the recipient countries have been blamed for not having the capacity to absorb aid. The second approach proposed by economists is known as *selectivity*, which maintains that aid should be given to countries with a good government so that the effectiveness of aid can be ensured. However, it seems that neither of these approaches can provide a complete explanation as to why Africa has achieved little in development after receiving an unprecedented amount of aid for a long period.

Early studies treat foreign aid as a mere inflow of capital when assessing its effect on economic outcomes and ignore its institutional effect which might indirectly affect FDI. To fill this gap, Chapter 2 adopts and extends the model proposed by Acemoglu et al. (2005) to contribute to the discussion on aid effectiveness. The model assumes that

there are two political groups, the *de jure* and the *de facto* political group. The former has the *de jure* political power which originates in the political institutions. This group tends to shape the economic institutions to ensure the distribution of resources in their favour. Under these economic institutions, certain groups will become richer than others and this will increase its factual political power and form a *de facto* political group. Consequently, to maintain their benefits, they will use this *de facto* political power to influence the economic institutions. In this study, we specify that foreign aid and aid dependency are the *resources* to be distributed, and the *de facto* political group, respectively. Therefore, assessing the overall effect of foreign aid on FDI requires us to determine the indirect institutional effect.

Structural equation modelling (SEM) enables us to discover the indirect effect of aid on economic outcomes via institutions, also known as the transmission effect. Moreover, this technique provides us the ability to determine the mixed effects of aid and institutions on economic outcomes. In the case of a null effect of aid on economic performance, we have found that the positive effect of aid has been neutralised by its negative effect on institutions. Furthermore, we can also investigate the inverse effect.

Although our final goal is to discuss the role of aid in development, we have not attempted to explain development or economic growth. Rather, we have chosen foreign direct investment (FDI), another controversial variable given that, as a source of foreign capital, FDI to Africa has also been subject to much discussion. Some authors find that it can spur economic growth (Lumbila, 2005) while others find that its effect is insignificant or even harmful for growth (Alfaro, 2003; Habiyaremye and Ziesemer, 2006). Our results suggest that economic institutions and aid have a positive effect on FDI while aid dependency has a negative effect on it.

The rest of the chapter is structured as follows: In section 2.2 we review the literature investigating the relationship between foreign aid, institutions and FDI. Section 2.3 provides a theoretical model to explain why we should consider the institutional aspects.

In section 2.4 we report the path diagram, empirical mode, and data. Section 2.5 presents the empirical results and section 2.6 the conclusions.

2.2 Literature Review on aid, FDI and Institutions

Our structural model analyses the effects that aid and institutions have on each other and their mixed effects on FDI. To do this, our SEM estimation uses three endogenous variables, respectively, foreign aid, economic institutions and FDI.[10] In this section we sum up the literature on their interaction that underpins our analysis.

Before we study the relationship between the three variables, it is useful to review the long-discussed and controversial aid-growth issue, as it shows the necessity of applying a structural model study. In their survey study, Hansen and Tarp (2000) classify the aid-growth nexus into 3 generations. In the first generation, aid affects economic growth by reducing the gap between savings and investment. Some pro-aid economists such as Rosenstein-Rodan (1961) find that foreign resources lead to an increase in both savings and investment while others find a negative effect on the growth rate (Griffen and Enos, 1970). The Solow growth model has been incorporated into the second-generation studies, where economists suggest that aid affects growth via domestic investment. A large number of studies conclude that aid has no effect on growth. However, Hansen and Tarp (2000) find a consistent pattern in all of these results: aid increases savings and domestic investment, so there is a positive relationship between aid and growth. In the third-generation studies, the interactive term of government and institutions with aid has been applied to capture the non-linear effect. Of these papers, the one by Burnside and Dollar (2000) is noteworthy for suggesting that aid spurs growth only in countries with a good policy environment, despite that their results are sensitive to sample selection and specifications.

---

[10] In SEM, the endogenous variable refers to the dependent variable, while the exogenous variable refers to the explanatory variable which has not been treated as a dependent variable in any equation.

Although a link between aid and domestic investment has been found, early studies assume that aid has no effect on private and foreign inflows. However, recent literature on aid effectiveness, such as the study by Dollar and Pritchett (1998), suggests that aid can attract FDI by providing a good policy environment. The Monterrey Consensus (UN, 2002) and its subsequent conferences also inform that aid can serve as a catalyst in attracting FDI. For instance, the Conference in Doha in 2008 proposes that aid can be beneficial to developing countries in improving the social, institutional, and fiscal infrastructure and fostering FDI. Since then, economists have been focusing on the relationship between aid and FDI which, within the framework of the Sustainable Development Goals would together represent an important mobilisation of financial flows.

a) *Effects of foreign aid and institutions on FDI*

The aid-FDI nexus is no less controversial than the aid-growth debate. Economists propose different models to explain the relationship, yet the results remain inconclusive. Some of them find that aid has a crowding in effect on FDI (Thangamani, 2014; Opoku, 2015) while others find a negative effect (see for example Arellano et al., 2008). Moreover, Karakaplan et al. (2005) and Kosack and Tobin (2006) find that aid has no significant effect on FDI. The ambiguous results can be explained by the selection of sample (Opoku, 2015) or the donors' practices (Kimura and Todo, 2010; Minasyan et al., 2016), while others find that the composition of aid matters for assessing its effects (Harms and Luts, 2003; Selaya and Sunesen, 2012).

The extensive literature on institutions highlights both economic and political institutions due to their importance in attracting FDI (Karakaplan et al., 2005; Walsh and Yu, 2010; Thangamani, 2014; Opoku, 2015; Peres et al., 2018). Asiedu (2006) and Radu (2015) confirm the positive effect of political stability on creating a favourable investment environment.

b) *Effects of foreign aid on institutions*

Beyond the economic outcomes, economists have recognised that aid effectiveness is a complex issue which involves economic and non-economic variables. Therefore, they focus on the effect of aid on government, although this is a puzzle yet to be understood.[11] As Alonso and Garcimartín (2011) suggest, we can classify the aid-institutions literature into groups according to whether the studies find a positive or negative effect.

As for the literature finding a positive effect of foreign aid on institutions, Goldsmith (2001) finds a small and positive effect of aid on democracy and economic freedom for African countries. Jones and Tarp (2015), using disaggregated aid data and different metrics of political institutions, find that aid has a small and positive impact on political institutions. They also suggest that the positive effect is mainly driven by stable flows of aid. Likewise, Alonso and Garcimartín (2011) find that, after considering the determinants of institutions, foreign aid tends to improve the institutional quality for the recipient countries. The return to scale is decreasing, indicating a non-linear relationship between foreign aid and institutions. This strand of literature suggests that aid has a *capacity building* effect on institutions, which is considered as an important role of foreign aid.

Nevertheless, other authors do not observe the expected outcomes. For instance, Knack (2004) uses a large sample of recipient countries for the period 1975-2000 and finds no evidence that aid encourages democracy. Likewise, Moss et al. (2006) and Kalyvistis and Vlachaki (2012) also confirm the negative democratic effect of aid. The former focus on Sub-Saharan African countries while the latter study its effect on a wider selection of recipients. Djankov et al. (2008) use panel data of 108 countries between 1960 and 1999, finding a negative institutional effect of aid. Jablonski (2014) also

---

[11] The term government refers to governance, policies, political and economic institutions.

suggests that aid has been used by incumbents to maintain their power. Other economists find that aid has a negative effect on tax revenue (Brautigan and Knack, 2004) and accountability (Moss et al., 2006). Svesson (2000) finds that aid fuels corruption in recipient countries where the powerful social groups tend to appropriate the foreign aid, which, therefore, does not usually reach the needy people. Even in the same strand of literature, there are still some inconclusive results. For instance, Asongu and Nwachukwu (2016) find that aid deteriorates economic institutions but has no effect on political institutions, while Young and Sheehan (2014) suggest that aid flows are detrimental to both economic and political institutions. Moreover, some studies suggest that the effect of aid is not simple and monotonic. Asongu and Jellal (2013) conclude that aid channelled through government expenditure increases corruption while aid channelled via private investment and tax effort decreases corruption. Dutta et al. (2013), whose study and results have inspired our work, suggest that aid has an amplification effect that strengthens democracy for countries which are already democratic and increases the dictatorship of countries which are already dictatorial. Rather than aid itself, some economists suggest that aid dependency produces negative outcomes. Remmer (2004) argues that aid dependency reduces tax revenue. Guyer (1992) and Hoffman and Gibson (2005) find a negative relationship between aid dependency and democracy in African countries.

c) *Effects of institutions on foreign aid*

In the literature relating institutions to foreign aid there is a strand which is contrary to the *capacity building* approach. Here, some economists suggest that aid should be given to countries with good governance or institutions to ensure its effectiveness (Burnside and Dollar, 2000; World Bank, 1998).[12] This approach is also known as *selectivity.* However, other economists suggest that selectivity does not produce the expected outcomes (Layton, 2008; Azam and Laffont, 2003).

---

[12] Empirically, research finding a positive effect of institutions on aid concludes a *selectivity* approach while the studies finding a negative effect, conclude a *capacity building* approach.

d) *FDI and growth*

Finally, we will review some outstanding literature addressing the effect of FDI on economic growth. Although this study seeks to reveal the effect of foreign aid on FDI, attracting FDI is not the ultimate goal of foreign aid, rather, improving development and the well-being of the people are the established objectives. The FDI-growth debate is also ambiguous. Lumbila (2005) finds that FDI can spur economic growth for African countries. However, Habiyaremye and Ziesemer (2006) find that investment has no significant effect in Sub-Saharan Africa because most of the capital is invested in the primary sector. Additionally, Alfaro (2003) finds that FDI in the primary sector tends to lower growth. Thus, we focus on the literature stressing the relevance of FDI besides the role of institutions. Amendolagine et al. (2013) suggest that FDI generates backward linkages with local firms in Sub-Saharan African countries, where good institutions, particularly a reliable legal system, are pre-conditions for boosting such linkages. Many economists highlight the spillover effect of FDI (De Mello, 1997). FDI can increase the productivity in the host country through transfers of capital stock, technology, human resource and infrastructure, and the existence of a domestic environment for investment boosts productivity (Fillat and Woerz, 2004). Javorcik (2004) finds that the productivity spillover is associated with backward linkages. Specifically, one-standard-deviation increase in foreign presence produces a 15 percent increase in the output of host firms.

2.3 Theoretical Model

In this section we present our theoretical model, which is developed from that of Acemoglu et al. (2005) explaining how aid has an influence on economic institutions and the subsequent effect on economic performance.

We start with economic institutions, as Acemoglu et al. (2005) suggest economic institutions not only determine the aggregate economic growth potential but also the distribution of resources in the future which includes the distribution of wealth, physical and human capital. We denote it as:

Notion 1: Economic institutions$_t$ => Economic performance$_t$ & distribution of resources$_{t+1}$

Notion 1 shows that economic institutions determine economic outcomes as well as the distribution of resources in the future (denoted by the subscript t+1). In other words, under the determined economic institutions, certain individuals or groups will be richer than others.

Notion 2: Political power$_t$ => Economic institutions$_t$

Economic institutions are determined as a collective choice, but we have no reason to believe that all individuals and groups will have the same preferences over the sets of economic institutions, as one implication of notion 1 is that different economic institutions produce different economic outcomes as well as different distributional mechanisms.

Acemoglu et al. (2005) argue that it is the political powers that determine economic institutions. In the case of two groups with different preferences, the one with greater political power likely dominates the preferences.

Notion 3: Political institutions$_t$ => de jure political power$_t$

It is essential to introduce two different types of political power, the *de jure* and de facto political power. Notion 3 shows that the *de jure* political power originates in the political institutions. We specify the group possessing the *de jure* political power as the *de jure* political group. Combining Notion 1 and 2, one implication of Notion 3 is that this *de jure* political group will shape economic institutions to ensure the distribution of resources in its favour.

Notion 4: Distribution of resources$_t$ => de facto political group$_t$ => de facto political power$_t$

According to Acemoglu et al (2005), the *de facto* power is determined by two resources. The first is the group's ability to solve its collective action problem, while the second is the economic resources. Notion 4 shows that the distribution of resources enriches a certain group, giving it the *de facto* power to influence and determine economic institutions in order to maintain or improve the distributional mechanisms favouring itself.

Putting all of this together, Figure 2.1 illustrates the theoretical basis of our analysis. We specify that foreign aid denotes a resource to be distributed. In the best scenario, aid would be transferred to the neediest population, e.g., the poor people. This would help them to overcome poverty. However, under the current economic institutional region, in which aid has been misused for activities such as rent seeking, the enriched group instead would be the officials who work directly with donor communities (Svensson, 2000). Therefore, aid dependency is adopted to proxy the *de facto* political group which tends to determine the economic institutions so as to maintain the reception of foreign aid in the future.

By rethinking the two sources of the *de facto* political power, we find that the resources to be distributed come in varied forms, such as FDI in this study. A group of entrepreneurs or stakeholders will get richer than others which gives them the ability (*de facto* political power) to determine the economic institutions.

Figure 2.1 Theoretical model
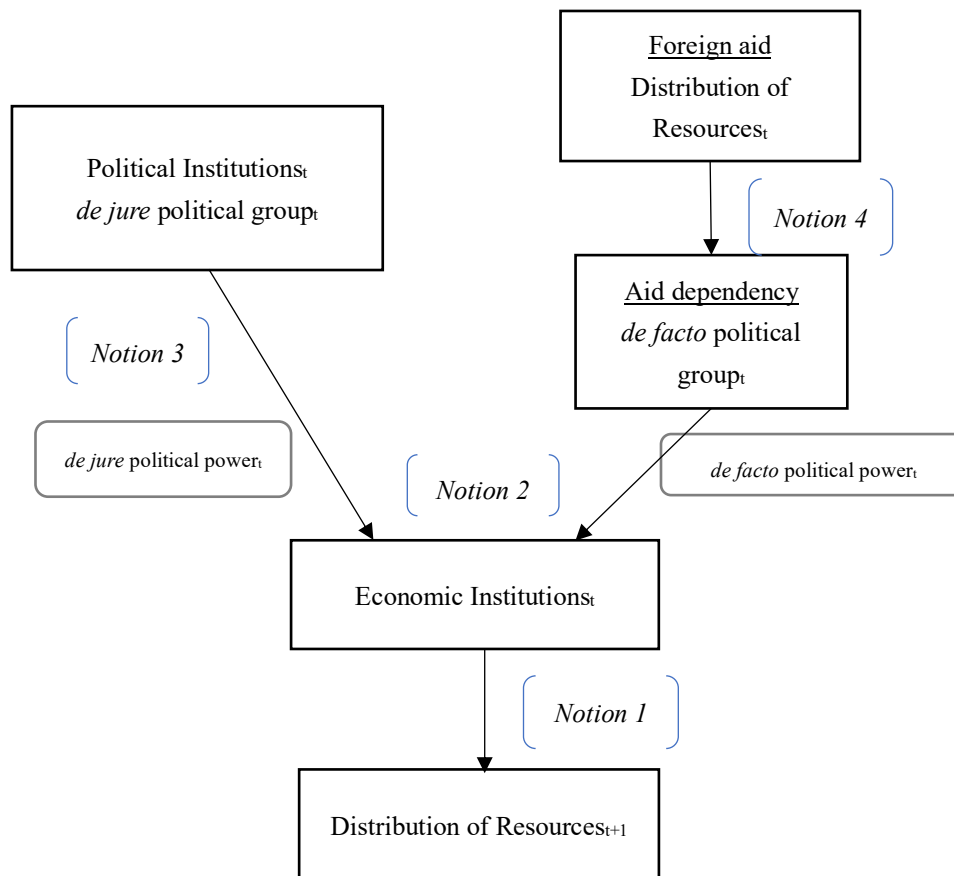
Source: Authors' own elaboration

2.4 Empirical Strategy and Data

Figure 2.2 shows the simplified path diagram that illustrates the hypothesis of Chapter 2. The overall effect of aid on FDI is made up of its direct effect (path c) and the indirect effect (path a*b). The overall effect of economic institutions on FDI is composed of their direct effect (path b) and their indirect effect (path d*c).

For simplicity, we have omitted the path representing the effect between foreign aid and dependency since they are assumed to be positively correlated. Also, in the regressions, aid dependency is treated as an exogenous variable.

Figure 2.2 Path diagram of the model
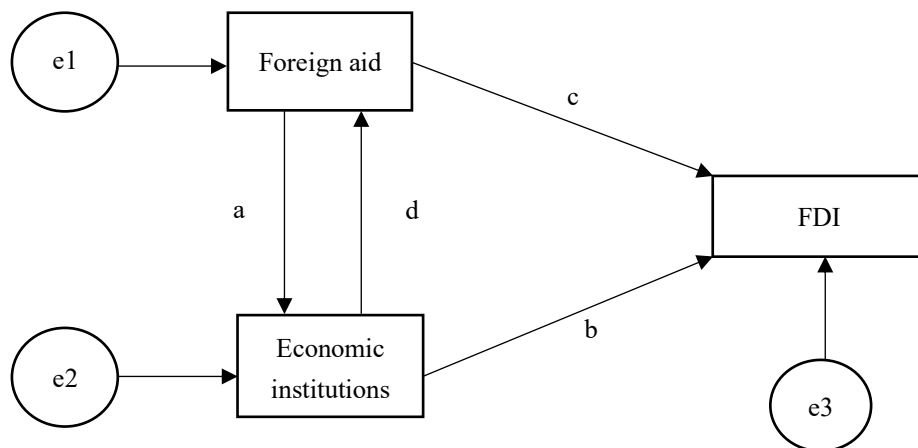
Source: Authors' own elaboration

We have applied SEM to capture the direct and indirect effects among our exogenous and endogenous variables. Although SEM with latent variables is known as the full model, we have only contemplated the observed variables. Our data fail to meet the assumption of multivariate normality. We have applied the quasi-maximum likelihood method (QML).[13]

---

[13] QML relaxes the normality assumption by imposing a robust standard error. We also apply the Asymptotic Distribution Free (ADF) estimates which relax the joint normality assumption. The results

The first equation in our specification establishes the determinants of foreign aid (*aid*). Many economists suggest that aid allocation is based on the donors' interests, the recipients' needs and government performance (for more discussion see Neumayer, 2003a, 2003b). There is little doubt that the donors' economic and political interests play an important role in the aid given. Issues such as tied aid have been repeatedly discussed. Following the work of Neumayer (2003b), we use data on arms imports (*arms)* and military expenditure (*military*) to represent the donors' political and strategic interests. We assume that countries with more military expenditure and arms imports will receive less aid. We also use fuel exports (*fuel*) to show the donors' economic interests in the recipient country. The variables that represent the recipients' needs are their growth rate of GDP (*gdp*) and population (*population*) and their Human Development Index (*HDI*).[14] To capture government performance, we consider the Economic Freedom Index (*EF*) from the Fraser Institute to represent the economic institutions. We add a score for the political regime authority spectrum, ranging from hereditary monarchy to consolidated democracy, the variable *Polity2,* from the Center for Systemic Peace, to represent the political institutions of the recipient country. If a positive effect of institutions on aid is observed, this may indicate that donors have applied the *selectivity* approach in giving aid; a negative effect may imply that donor countries believe that recipient countries need aid to improve institutions (*capacity building*). Aid dependency (*dependency*) is the ratio of foreign aid to government expenditure which we use to proxy the *de facto* political group.[15] It is expected to work in favour of aid as it is empowered by the recipient of foreign aid.

---

remain the same.

[14] We have replaced the Physical Quality of Life Index (PQLI) of the original paper with HDI since the new one has been broadly used recently.

[15] The World Bank (1998) proposes 4 alternatives to measure the aid dependency ratio, namely, aid as a percentage of GNP; aid as a percentage of gross domestic investment; aid as a percentage of imports of goods and services; aid as a percentage of government expenditure. We apply the last one as it may be more appropriate both theoretically and empirically (Bauer, 1984; Moore, 1998; Knack, 2000)

$$aid_{it} = \beta_1 EF_{it} + \beta_2 polity2_{it} + \beta_3 dependency_{it} + \beta_4 population_{it} + \beta_5 GDP_{it}$$
$$+ \beta_6 fuel_{it} + \beta_7 HDI_{it} + \beta_8 military_{it} + \beta_9 larms_{it} + \beta_{10} SSA$$
$$+ \beta_{11} LDC + e_{it} \qquad (2.1)$$

In the equations we include dummy variables *SSA* and *LDC*, controlling for the Sub-Saharan African and least developed countries. Some studies find that poorer countries receive more aid (Taylor, 1998) although others find a contrary result (McGillivray, 2011; Briggs, 2016).

The second equation establishes the determinants of economic institutions (*EF*), based on the scarce existing literature studying their determinants. Integrating the works of Brown (2010) and Tarp and Jones (2016), the control variables are growth rate of GDP (*gdp*) and population (*population*), life expectancy at birth (*life*), urban population growth rate (*urban*), fuel exports (*fuel*), economic openness (*openness*), political institutions (*Polity2*). We have also included a one-year-lagged *EF* due to the persistency. The variable of interest in our model is the disbursement of aid (*aid*) and aid dependency (*dependency*). The inclusion of political institutions is to establish whether the *de jure* political power is greater than the *de jure* political power.

$$EF_{it} = \gamma_1 aid_{it} + \gamma_2 polity2_{it} + \gamma_3 EF_{t-1} + \gamma_4 dependency_{it} + \gamma_5 population_{it}$$
$$+ \gamma_6 GDP_{it} + \gamma_7 fuel_{it} + \gamma_8 life_{it} + \gamma_9 SSA + \gamma_{10} LDC$$
$$+ e_{it} \qquad (2.2)$$

Finally, we establish the regression for FDI, as:

$$FDI_{it} = \delta_1 aid_{it} + \delta_2 EF_{it} + \delta_3 Polity2_{it} + \delta_4 dependency_{it} + \delta_5 population_{it}$$
$$+ \delta_6 GDP_{it} + \delta_7 open_{it} + \delta_8 fuel_{it} + \delta_9 dc_{it} + \delta_{10} inflation_{it}$$
$$+ \delta_{11} teleline_{it} + \delta_{12} HDI + \delta_{13} SSA + \delta_{14} LDC + e_{it} \qquad (2.3)$$

In order to explain FDI we have followed the work of Tampakoudis et al. (2017), using the economic and political institutions (*EF* and *Polity2*) and aid dependency (*dependency*), to which we have added foreign aid (*aid*). Parameters δ_1 and δ_2 report the direct effects of foreign aid and economic institutions on FDI. There is a controversy

in the literature regarding the effect of aid since it could be positive, negative, or insignificant. *DC* is the domestic credit to private sector that we have drawn from the World Bank. We have included it to represent domestic financial development since a high domestic financial level may influence foreign inflows (Dutta and Roy, 2011). The variable *teleline* is the fixed telephone subscriptions per 100 people, representing the infrastructure of recipient countries. The Human Development Index (*HDI*) represents the recipient's absorptive capacity.

Our data cover 42 African countries and the available data for aid disbursement have limited our sample to the period 2002-2016. Data on foreign aid are the bilateral aid from the *Development Assistance Committee* (DAC) countries to the recipient countries in the DAC recipients list. We have gathered the aid data from the *Creditor Reporting System* (CRS) of OECD. Data on FDI and Economic Freedom have been drawn from the World Development Indicators of the World Bank and the *Fraser Institute*, respectively. More details can be found in the descriptive statistics in Appendix A. As for the robustness check, we have estimated our model with the modified *Economic Freedom* without the sub-indicator *Freedom to trade internationally* since it could cause a multicollinearity issue. Furthermore, keeping the modified economic institutions, we have transformed our data into 5-year intervals. By doing so, we can minimise the external impacts to aid flows such as economic crises and development conferences. We are also able to capture the real variation of economic institutions since recipient countries would act deliberately well in certain years to ensure the donation of aid (Layton, 2008). Moreover, we can reveal the long-term effect among variables.

2.5   Empirical Results

The empirical findings are presented in three subsections. In subsection 2.5.1 we first report the result of the baseline model in which only core variables are included. The results are interpreted based on the theoretical model. In subsection 2.5.2 we have

recalculated *Economic Freedom* to address the potential endogeneity issue. Furthermore, we have transformed our dataset into 5-year intervals and report the results. Finally, in subsection 2.5.3, we have depicted the path diagrams with the estimated coefficients and provide some discussion on the empirical findings.

2.5.1 Baseline results

Table 2.1 reports the results of the baseline model. We first report the statistics of goodness-of-fit at the bottom of the table. Since QML is applied, only the standard root mean squared residual (SRMR) and the coefficient of determinants (CD) statistics have been reported. As the former approaches 0 while the latter approaches 1, we can conclude that the model fits the data well. We can now move on to these coefficients.

Column 1 reports the determinants of foreign aid. *Economic Freedom* (*EF*) positively affects the donation of aid while political institutions (*polity2*) have a negative effect. Aid dependency has a positive effect, indicating that a country that depends heavily on aid will receive more inflows of aid. As for the determinants of *Economic Freedom* in column 2, we find that only the lagged *Economic Freedom* (*EF t-1*) has a positive and statistically significant effect, suggesting the persistency of economic institutions. Column 3 reports the determinants of FDI. Foreign aid has a positive effect, and we can argue that this could be due to the enhanced absorptive capacity through the aid invested in education, training, and physical infrastructure (Selaya and Sunesen, 2012; Donaubauer et al., 2015). Another explanation could be that the accumulation of capital has not reached the threshold when one crowds out another. *Economic Freedom* has an attraction effect on FDI while the effect of political institutions (*polity2*) is negative. Aid dependency tends to crowd out FDI.

Table 2.1 shows that economic institutions positively affect foreign aid and FDI. The theoretical model explains that under the current economic institutions, foreign aid and FDI, as two kinds of resources to be distributed, are attracted into this country. Moreover, the distributed resources would grant the *de facto* political power to the

corresponding groups. Thus, the beneficiary groups will compete to determine the economic institutions in order to maintain the benefits.[16] Improving institutional qualities would not be preferred from the perspective of the group of aid, given the positive correlation between FDI and economic institutions. Once the need for capital is satisfied by FDI, donor communities might cease to donate. Meanwhile, worsening institutional qualities would lead to a decline in the inflows of aid which would not be the best choice for this group. This explains why we find an insignificant effect of aid dependency on economic institutions in column 2.

Table 2.1 Baseline model

Dep. Var.	(1) aid	(2) EF	(3) FDI
aid		-0.0104	0.8867***
		(0.0094)	(0.0621)
EF	0.3266***		0.3401***
	(0.0707)		(0.1090)
polity2	-0.0242**	0.0011	-0.0452***
	(0.0108)	(0.0018)	(0.0149)
EF t-1		0.9636***	
		(0.0141)	
dependency	0.3986***	0.0295	-0.8093**
	(0.0912)	(0.0312)	(0.4081)
population growth	0.2514***	0.0017	-0.1491
	(0.0532)	(0.0130)	(0.0923)
GDP growth	0.0354***	-0.0019	0.0366*
	(0.0129)	(0.0031)	(0.0209)
Constant	3.0013***	0.3006***	-0.8439
	(0.4501)	(0.1036)	(0.7747)
Observations	495	495	495
Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1			
Goodness-of-fit statistics			
SRMR	0.01		
CD	0.965		

---

[16] In addition to the two beneficiary groups, the model shows that the *de jure* political power originates in the political institutions, which also tends to determine economic institutions.

Table 2.2 reports the results with all control variables included. The SRMR and CD statistics at the bottom of the table indicate that the model has a good goodness-of-fit. Comparing the results with that of Table 1, we find that the variables of interest have not changed the sign and significance.

Column 1 of Table 2.2 reports the determinants of foreign aid. Similarly, we find that economic institutions have a positive effect. Moreover, political institutions fail to show a statistically significant effect. Again, we find that aid dependency has a positive effect on foreign aid. As for the recipients' needs, HDI has a negative impact on foreign aid which is consistent with our expectation that the needy countries usually have a lower level of HDI. Regarding the donors' strategic interests, we find that only the imports of arms (*arms*) show a positive and statistically significant effect at the level of 1%. The dummy variables *SSA* and *LDC* have a negative effect on foreign aid, which confirms the findings of McGillivray (2011) and Briggs (2016). Kosak and Tobin (2006) also suggest that recipient countries with an extremely low level of human capital do not absorb aid and aid even works against development, which evidences the *selectivity* approach applied by donor countries.

Column 2 reports the determinants of *Economic Freedom*. We find that the results are consistent with those in Table 2.1 whereby only the lagged *Economic Freedom* has a positive and statistically significant effect.

Table 2.2 Results with all control variables

Dep. Var.	(1) aid	(2) EF	(3) FDI
aid		-0.0225	0.9698***
		(0.0162)	(0.1727)
EF	0.7682***		0.3785*
	(0.0915)		(0.2173)
polity2	0.0153	-0.0000	-0.0180
	(0.0110)	(0.0028)	(0.0166)
EF t-1		0.9586***	
		(0.0206)	
dependency	1.4132***	0.1081	-3.2839***
	(0.2998)	(0.0874)	(0.8567)
population growth	0.5693***	-0.0041	0.2765
	(0.1339)	(0.0354)	(0.2288)
GDP growth	-0.0276	0.0021	0.0675**
	(0.0176)	(0.0044)	(0.0339)
openness			0.0195***
			(0.0052)
fuel	0.0019	-0.0002	0.0195***
	(0.0020)	(0.0005)	(0.0041)
dc			0.0070*
			(0.0039)
inflation			0.0518***
			(0.0195)
teleline			-0.0266
			(0.0271)
HDI	-4.0691***		2.5344*
	(0.9656)		(1.441)
SSA	-1.5311***	-0.0471	-0.2939
	(0.2080)	(0.0628)	(0.4000)
LDC	-0.6153***	0.0002	0.3652
	(0.1844)	(0.0479)	(0.2853)
military	-0.0259*		
	(0.0153)		
arms	0.1295***		
	(0.0323)		
life		-0.0025	
		(0.0029)	
urban		-0.0004	
		(0.0146)	
Constant	1.4342*	0.5936**	-5.4990***
	(0.7848)	(0.2747)	(1.8329)
Observations	201	201	201

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Goodness-of-fit statistics			
SRMR	0.025		
CD	0.988		

2.5.2 Robustness Checks

After including control variables, we find that the results remain unchanged. Although the variables of interests in the baseline are consistent with our model, there are some concerns that we need to address. We suspect that the variable openness might cause endogeneity problems with one indicator of the *Economic Freedom* which is the freedom to trade internationally. To solve this, first, we recalculated the Economic Freedom Index by dropping the fourth sub-indicator, freedom to trade internationally, and included it in the third equation while the rest of the equations remained the same. We then ran the model again. Second, we transformed our data into 5-year intervals. By doing so, we can mitigate the impact of external shocks on aid flows, such as economic crises or development aid conferences. By working with intervals, we can observe the real variation of economic institutions since we believe some recipient countries would purposely act in specific years in a way to ensure the donation of aid. Moreover, we can discover the relationship between variables from a long-term perspective.

Table 2.3 reports the results for the first alternative, in which we have recalculated the Economic Freedom Index. Column 1 shows that economic institutions have a positive effect on aid as in the baseline. Population growth, HDI, aid dependency, arms imports, SSA and LDC show the same effects as in the baseline. In column 2 we confirm again that foreign aid and aid dependency have no significant effect on *Economic Freedom* while its past value does have an impact. Column 3 shows that after modification, economic institutions have a similar positive and statistically significant effect at 90% as in the baseline. Moreover, the effect of openness remains positive and significant. We find that the model is robust to the first alternative specification. Now we turn to the second specification. Since foreign aid exhibits a high level of volatility and fluctuation and the donation is not a constant and yearly process, we transform our data into 5-year intervals to level the potential impact from short-term perspective.

Table 2.3 Results with modified Economic Freedom

Dep. Var.	(1) aid	(2) EF	(3) FDI
aid		-0.0225	0.9835***
		(0.0162)	(0.1698)
EF	0.7682***		0.3785*
	(0.0915)		-0.2173
polity2	0.0153	-0.0001	-0.0156
	(0.0110)	(0.0028)	(0.0170)
EF t-1		0.9586***	
		(0.0206)	
dependency	1.4132***	0.1081	-3.3130***
	(0.2999)	(0.0874)	(0.8509)
population growth	0.5693***	-0.0041	0.2575
	(0.1339)	(0.0354)	(0.2258)
GDP growth	-0.0276	0.0021	0.0657*
	(0.0176)	(0.0044)	(0.0338)
openness			0.0200***
			(0.0054)
fuel	0.0019	-0.0003	0.0195***
	-0.0020	(0.0005)	(0.0043)
dc			0.0069*
			(0.0039)
inflation			0.0509***
			(0.0197)
teleline			-0.0267
			(0.0273)
HDI	-4.069***		2.5438*
	(0.9656)		(1.4611)
SSA	-1.5311***	-0.0471	-0.2949
	(0.2080)	(0.0628)	(0.4041)
LDC	-0.6153***	0.0002	0.4020
	(0.1844)	(0.0479)	(0.2872)
military	-0.0259*		
	(0.0153)		
arms	0.1295***		
	(0.0323)		
life		-0.0025	
		(0.0029)	
urban		-0.0004	
		(0.0146)	
Constant	1.4342*	0.5936**	-5.3905***
	(0.7848)	(0.2747)	(1.8175)
Observations	201	201	201

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Goodness-of-fit statistics	
SRMR	0.024
CD	0.988

Table 2.4 5-year-interval

Dep. Var.	(1) aid	(2) EF	(3) FDI
aid		-0.0526	0.9929***
		(0.0457)	(0.2606)
EF	0.6092***		0.3785*
	(0.1949)		-0.2173
polity2	0.0188	-0.0004	-0.0100
	(0.0187)	(0.0066)	(0.0255)
EF t-1		0.9559***	
		(0.0700)	
dependency	1.0424**	-0.0283	-2.1944**
	(0.4636)	(0.1701)	(1.0755)
population growth	0.5623***	0.0810	-0.3688
	(0.1909)	(0.1045)	(0.4939)
GDP growth	0.0206	0.0478**	-0.0054
	(0.0552)	(0.0234)	(0.0567)
openness			0.0204**
			(0.0081)
fuel	-0.0028	-0.0020	0.0267***
	(0.0039)	(0.0014)	(0.0074)
dc			0.0037
			(0.0075)
inflation			0.0150
			(0.0230)
teleline			-0.0314
			(0.0298)
HDI	-5.5091***		-1.2794
	(1.5472)		(2.7944)
SSA	-1.3129***	0.0259	-0.4667
	(0.3842)	(0.1868)	(0.6096)
LDC	-0.8587***	-0.0472	0.4323
	(0.2521)	(0.0758)	(0.4699)
military	-0.0383		
	(0.0313)		
arms	0.2569***		
	(0.0789)		
life		-0.0015	
		(0.0080)	
urban		-0.0278	
		(0.0487)	
Constant	1.0026	0.5128	-2.8844
	(1.5251)	(0.6689)	(2.4609)
Observations	58	58	58

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Goodness-of-fit statistics			
SRMR	0.02		
CD	0.989		

Table 2.4 shows that the model has a goodness-of-fit, but the number of observations drops to 58 which might influence the estimates. Column 1 reports the determinants of aid. From a long-term perspective, the *selectivity* approach is again confirmed, given that *Economic Freedom* has a positive effect on aid. The aid dependency of recipient countries continues to act as a driving factor of aid and the rest of the results remain the same. Column 2 shows that foreign aid and aid dependency have no significant effect on economic institutions. As for FDI, the results in column 3 remain unchanged from a long-term perspective. Aid and economic institutions are positively associated with FDI while aid dependency still has a massive crowding-out effect.

2.5.3 Summary and Discussion

The results are robust to alternative specifications and different variables. As for the determinants of aid, we find that aid dependency and *Economic Freedom* have a positive effect on aid. The control variables representing the donors' interests and the recipients' needs demonstrate the corresponding effects. As for the determinants of *Economic Freedom*, only the lagged value has a positive and significant effect indicating the persistency of economic institutions. Regarding the determinants of FDI, foreign aid and *Economic Freedom* have a positive effect while aid dependency negatively affects FDI. Among other control variables, openness and fuel exports are positively associated with FDI.

Figure 2.3 depicts the path diagram of Table 2.2, showing the relationship between foreign aid, economic institutions and FDI which is the core element of this study. First, foreign aid has a positive direct effect on FDI. The mechanisms remain unknown, but it could be the aid invested in education, training, and physical infrastructure which improves the absorptive capacity. Second, *Economic Freedom* has a positive effect on foreign aid and FDI. The attraction for aid (0.7682) is larger than that for FDI (0.3785) suggesting that the current economic institutions prefer aid over FDI. This is particularly important to explain that aid has no significant effect on *Economic Freedom*,

i.e., its indirect institutional effect is insignificant.[17] The theoretical explanation is that a better institution tends to attract more foreign aid as well as FDI.[18] The *de facto* political group (aid dependency) attempts to maintain the current situation in which donor countries continue to donate, while avoiding attracting more FDI since it would form another *de facto* political group and raise competition. The model can explain the controversial results that government has no incentive to improve institutions after receiving extraordinary flows of aid (Svensson, 2000; Bauer, 1993; Azam and Laffont, 2003; Brautigam and Knack, 2004).

Figure 2.3 Path diagram of Table 2.2
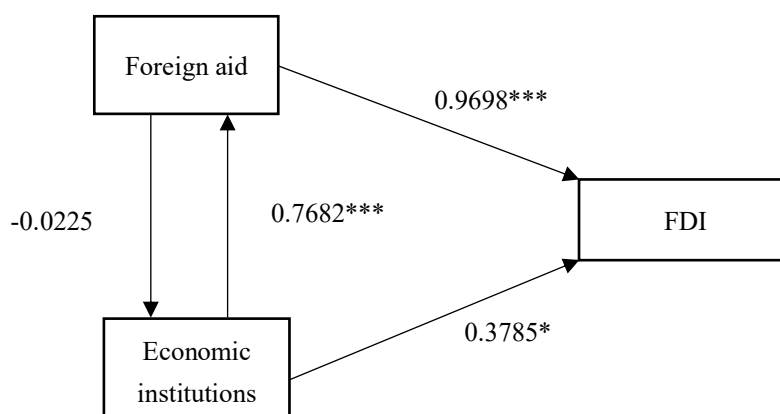
Source: Authors' own elaboration based on the results in Table 2.2

2.6 Conclusions

The results of aid-growth and aid-institutions analysis remain controversial, especially for the continent of Africa. Economists have found positive, negative, and null economic and institutional effects of foreign aid, with results varying across countries.

---

[17] It should be noted that for the sake of simplicity, a positive correlation between foreign aid and aid dependency is assumed.
[18] As institutional qualities grow, one country might depend less on foreign aid.

The aid-institution discussion stresses the important role of aid in improving the institutional quality of recipient countries. However, the results in Africa are not as expected.

Most studies merely treat aid as a source of foreign flows and discuss its effect on economic outcomes, ignoring its indirect institutional effect. Hence, this chapter adopts and extends the theoretical model of Acemoglu et al. (2005), specifying that foreign aid has formed a *de facto* political group which is proxied in our analysis by aid dependency. The results suggest that foreign aid has a positive direct effect on FDI while the indirect institutional effect is not statistically significant. In turn, we find that economic institutions positively affect foreign aid and FDI. An explanation derived from the model is also provided, confirming the finding. The governments of recipient countries which might be the beneficiary group of aid have no incentive to improve institutional qualities as donor countries might withdraw the donation when institutional qualities improve considerably and the attraction for other private international flows will increase which also makes the country less dependent on foreign aid.

We can also derive some political implications from the empirical results. First, countries heavily dependent on foreign aid have no incentive to implement institutional reforms since they can benefit from cooperating with development communities, and aid will not target the needy groups. Therefore, we suggest that, rather than cease the donation, the way in which aid is given should be improved, and the content which aid embodies should be reconsidered. That is, in addition to the capital flows, foreign aid should contain more education, technical assistance and capacity building which helps recipient countries to identify and complete the institutional reforms.

References

Acemoglu, D., Johnson, S., & Robinson, J. (2005) Institutions as a Fundamental Cause of Long-run Growth. In Aghion, Ph. and Durlauf, S. (Eds.): *Handbook of Economic Growth, Vol. 1A*, Chapter 6, 385-472, North Holland.

Alonso, J., & C. Garcimartín. (2011). El Impacto de la Ayuda Internacional Sobre la Calidad de las Instituciones. *EKONOMIAZ, Revista Vasca de Economía*, 77(2), pp. 158-175.

Alfaro, L. (2003). Foreign Direct Investment and Economic Growth: Does the Sector Matter? *Journal of Development Economics,* 91(2), pp. 242-256

Amendolagine, V., Boly, A., Coniglio, N., Prota, F. & Seric, A. (2013). FDI and Local Linkages in Developing Countries: Evidence from Sub-Saharan Africa. *World Development*, 50(c), pp. 41-56.

Arellano, C., Bulir, A., Lane, T. D., & Lipschitz, L. (2008). The Dynamic Implications of Foreign Aid and Its Variability. *Journal of Development Economics*, 88(1*)*, pp. 87-102.

Asiedu, E. (2006). Foreign Direct Investment in Africa: The Role of Natural Resources, Market Size, Government Policy, Institutions and Political Instability. *The world Economy*, 29(1), pp. 63-77.

Asongu, S. & Jellal, M. (2013). On the Channels of Foreign Aid to Corruption. *Economics Bulletin*, 33(3), pp. 2191-2201.

Asongu, S. & Nwachukwu, J. C. (2016). Foreign Aid and Governance in Africa. *International Review of Applied Economics*, 30(1), pp. 69-88.

Azam, J.-P., & J. Laffont. (2003). Contracting for Aid. *Journal of Development Economics*, 70(1), pp. 1203-1228.

Bauer, P. (1984). *Reality and Rhetoric: Studies in the Economics of Development*. Cambridge: Harvard University Press.

Bauer, P. (1993). Development Aid: End It or Mend It. Occasional Paper No. 43, International Center for Economic Growth. San Francisco: ICS Press.

Brautigam, D. & Knack, S. (2004). Foreign Aid, Institutions, and Governance in Sub-Saharan Africa. *Economic Development and Cultural Change, 52(2)*, pp. 255-285.

Brown, M. E. (2010). Determinants of Economic Institutions. Dissertation, The Florida State University. Retrieved from http://purl.flvc.org/fsu/fd/FSU_migr_etd-2916

Briggs, R. C. (2017). Does Foreign Aid Target the Poorest? *International Organization*, 71(1), pp. 187-206.

Burnside, C. & Dollar, D. (2000). Aid, Policies, and Growth. *American Economic Review*, 90(4), pp. 847-868.

De Mello, L. R. (1997). Foreign Direct Investment in Developing Countries and Growth: A Selective Survey. *The Journal of Development Studies*, 34(1), pp. 1-34.

Dijkstra, G. (2018). Aid and Good Governance: Examining Aggregate Unintended Effects of Aid. *Evaluation and Program Planning*, 68, pp. 225-232.

Djankov, S., Montalvo, J. G. & Reyneal-Querol, M. (2008). The Curse of Aid. *Journal of Economic Growth*, 13(3), pp. 169-194.

Dollar, D., & Pritchett, L. (1998). Assessing Aid – What Works, What Doesn't, and Why (English). World Bank Policy Research Report. Washington, D.C.

Dutta, N. & Roy, S. (2011). Foreign Direct Investment, Financial Development and Political Risks. *Journal of Developing Areas*, 44(2), pp. 303-327.

Dutta, N., Leeson, P. T. & Williamson, C. R. (2013). The Amplification Effect: Foreign Aid's Impact on Political Institutions. *Kyklos*, 66(2), pp. 208-228.

Ederveen, S., de Groot, H. & Nahuis R. (2006). Fertile Soil for Structural Funds? A Panel Data Analysis of the Conditional Effectiveness of European Cohesion Policy. *Kyklo*s, 59(1), pp. 17-42.

Fillat, C., & Woerz, J. (20). Good or Bad? The Influence of FDI on Productivity growth. An industry-level analysis. *The Journal of International Trade and Economic Development: An International and Comparative Review*, 20(3), pp. 292-328.

Goldsmith, A. (2001). Foreign Aid and Statehood in Africa. *International Organization*, 55(1), pp. 123-148.

Griffin, K. B. & Enos. J. L. (1970). Foreign Assistance: Objectives and Consequences. *Economic Development and Cultural Change*, 18(3), pp. 313-327.

Guyer, J. (1992). Representation Without Taxation: An Essay on Democracy in Rural Nigeria, 1952-1990. *African Studies Review*, 35(1).

Habiyaremye, A. & Ziesemer, T. (2006). Absorptive Capacity and Export Diversification in SSA Countries. United Nations University MESR Working Papers, No. 2006-030.

Hansen, H. & Tarp, F. (2000). Aid Effectiveness Disputed. *Journal of International Development*, 12(3), pp. 375-398.

Harms, p. & Lutz, M. (2003). Aid, Governance, and Private Foreign Investment: Some Puzzling Findings and a Possible Explanation. HWWA Discussion Paper, No.246.

Hoffman, B., D. & Gibson, C., C. (2000). States and Power in Africa: Comparative Lessons in Authority and Control. Princeton, NJ: Princeton University Press.

Jablonski, R. S. (2014). How Aid Targets Votes: The Impact of Electoral Incentives on Foreign Aid Distribution. *World Politics*, 66(2), pp. 293-330.

Javorcik, B. S. (2004). Does Foreign Direct Investment Increase the Productivity of Domestic Firms? In Search of Spillovers Through Backward Linkages. *American Economic Review*, 94, pp. 605-627.

Jones, S. & Tarp, F. (2015). Does Foreign Aid Harm Political Institutions? *Journal of Development Economics*, 118, pp. 266-281.

Kalyvitis, S. & Vlachaki, I. (2012). When Does More Aid Imply Less Democracy? An Empirical Examination. *European Journal of Political Economy*, 28(1), pp. 132-146.

Karakaplan, U., Neyapti, B. & Sayek, S. (2005). Aid and Foreign Direct Investment: International Evidence. Working Papers 0505, Department of Economics, Bilkent University.

Kimura, H. & Todo, Y. (2010). Is Foreign Aid a Vanguard of Foreign Direct Investment? A Gravity-Equation Approach. *World Development*, 38(4), pp. 482-497.

Knack, S. (2000). Aid Dependence and the Quality of Governance. Policy Research Working Papers No. 2396. World Bank.

Knack, S. (2004). Does Foreign Aid Promote Democracy? *International Studies Quarterly*, 48(1), pp. 251-266.

Kosack, S. & Tobin, J. (2006). Funding Self-Sustaining Development: The Role of Aid, FDI and Government in Economic Success. *International Organization*, 60(1), pp. 205-243.

Layton, T. (2008). The Effects of Foreign Aid on Income Inequality. *Journal of Political and International Studies*, 26(4), pp. 35-55.

Lumbila, K. N. (2005). What Makes FDI Works? A Panel Analysis of the Growth Effect of FDI in Africa. Africa Region Working Papers, No. 80.

McGillivray, M., Fielding, D., Torres, S. & Knowles, S. (2011). Does Aid Work for the Poor? Economics Discussion Papers 1114, University of Otago.

Minasyan, A., Nunnenkamp, P. & Richert, K. (2016) Does Aid Effectiveness Depend on the Quality of Donors? Kiel Working Papers, Kiel Institute for the World Economy.

Moore, M. (1998). Death Without Taxes: Democracy, State Capacity, and Aid Dependence in the Fourth World. In G. White, and M. Robinson (Eds.): *Towards a Democratic Developmental State*. Oxford: Oxford University Press.

Neumayer, E. (2003a). *The Pattern of Aid Giving – The Impact of Good Governance on Development Finance*. London: Routledge.

Neumayer, E. (2003b). The Determinants of Aid Allocation by Regional Multilateral Development Banks and United Nations Agencies. *International Studies Quarterly*, 47(1), pp. 101-122.

Opoku, E. (2015). The Puzzling Effects of Foreign Aid (ODA) on FDI: Examining Africa's Experience. *Journal of Economics and Sustainable Development*, 6(16), pp. 119-133.

Peres, M., Ameer, W. & Xu, H. (2018). The Impact of Institutional Quality on Foreign Direct Investment Inflows: Evidence for Developed and Developing Countries. *Economic Research-Ekonomska Istrazivanja,* 31, pp. 626-644.

Radu, M. (2015). Political Stability - A Condition for Sustainable Growth in Romania? *Procedia Economics and Finance*, 30, pp. 751-757.

Remmer, K. (2004). Does Foreign Aid Promote the Expansion of Government? *American Journal of Political Science*, 48(1).

Rosenstein-Rodan, P. N. (1961). International Aid for Underdeveloped Countries. *The Review of Economics and Statiscs*, 43(2), pp. 107-138.

Selaya, P., & Eva R. Sunesen. (2012). Does Foreign Aid Increase Foreign Direct Investment? *World Development,* 40(11), pp. 2155–76.

Soysa, I., Krieger, T. & Meierrieks, D. (2020). Oil Wealth and Property Rights. Discussion Paper 2020-03, Albert-Ludwigs-Universitat Freiburg.

StataCorp. (2017). Stata Structural Equation Modeling Reference Manual Release 15. College Station, Texas 77845, Stata Press.

Svensson, J. (2000). When Is Foreign Aid Policy Credible? Aid Dependence and Conditionality. *Journal of Development Economics*, 61(1), pp. 61-84.

Tampakoudis, I. A., Subeniotis, D. N., Kroustalis, I. G. & Skouloudakis, M. I. (2017). Determinants of Foreign Direct Investment in Middle-Incomes Countries: New Middle-Incomes Trap Evidence. *Mediterranean Journal of Social Sciences*, 8(1), pp. 58-70.

Thangamani, B. (2014). Effectiveness of Foreign Aid in Facilitating Foreign Direct Investment: Evidence from South Asian Countries. *Asian Economic and Financial Review*, 4(12), pp. 1770-1783.

UN. (2002). Monterrey Consensus on Financing for Development. International Conference on Financing for Development, Conference paper.

Walsh, J. & Yu, J. (2010). Determinants of Foreign Direct Investment: A Sectoral and Institutional Approach. IMF Working Papers.

World Bank (1998). World Development Indicators. Washington DC: The World Bank.

Young, A. T. & Sheehan, K. M. (2014) Foreign Aid, Institutional Quality, and Growth. *European Journal of Political Economy*, 36, pp. 195-208.

Appendix A. Descriptive Statistics

Variables	Obs	Mean	Sta. Dev.	Min	Max
ln (aid)	123	5.791695	1.114586	2.802036	8.20765
ln (FDI)	121	5.764523	1.1749407	-2.02346	8.926746
polity2	121	2.499174	4.7973	-6	10
Economic Freedom	121	6.004738	0.7839757	3.342308	8.059003
Domestic credit	122	24.34568	26.84382	1.133388	147.6032
Inflation	118	6.658427	6.662071	0.2327713	57.38448
Openness	121	70.23098	26.76312	29.72717	151.626
Telephone Line	123	3.318574	5.521059	0	29.94892
Fuel	109	16.10054	28.29805	0	97.52242
GDP growth	123	4.746276	2.69932	-8.173843	14.96461
Population growth	123	2.412807	0.8928296	-0.4551081	4.077692
HDI	123	0.4977085	0.1164744	0.276	0.781
Military	122	7.313355	4.085228	0.6464525	27.32674
Arms	104	16.64489	1.624142	13.52783	20.77946
Life expectancy	123	58.37299	7.917055	43.3754	75.8726
Urban population	123	3.654504	1.350388	-0.0833646	6.658123
Aid dependency	119	0.3632028	0.4143713	0.0042557	2.79827
sub-Saharan (dummy)	123	0.902439	0.2979337	0	1
LDC (dummy)	123	0.5853659	0.4946738	0	1

|			
Algeria	Chad	Guinea-Bissau	Rwanda
Egypt	Comoros	Kenya	Sao Tome and Principe
Libya	Congo	Lesotho	Senegal
Morocco	Côte d'Ivoire	Liberia	Seychelles
Tunisia	Democratic Republic of the Congo	Madagascar	Sierra Leone
Angola	Djibouti	Malawi	Somalia
Benin	Equatorial Guinea	Mali	South Africa
Botswana	Eritrea	Mauritania	South Sudan
Burkina Faso	Eswatini	Mauritius	Sudan
Burundi	Ethiopia	Mozambique	Tanzania
Cabo Verde	Gabon	Namibia	Togo
Cameroon	Gambia	Niger	Uganda
Central African Republic	Ghana	Nigeria	Zambia
	Guinea		Zimbabwe

Chapter 3.

Assessing the Effect of Foreign Aid and FDI

on the Labour Share

3.1 Introduction

The UN Sustainable Development Goals (SDGs), specifically, the SDG 10, call for a reduction in inequality within and between countries and also recognise the role of foreign aid and foreign direct investment (FDI) in achieving it. Despite the great importance of the labour share in personal income inequalities (Atkinson, 2009), social justice and tax-treatment (Ghortareas and Noikokyrios, 2020), it receives little attention in aid effectiveness studies.

Figure 3.1 illustrates the average labour share trend for our sample which contains 41 African countries. The labour share shows an obvious and constant decreasing trend throughout the period, declining from 44.3 percent in 2004 to 44.1 percent in 2017. Meanwhile, the world's average level in 2017 was 52.5 percent. Africa, with a relatively lower labour share with respect to the rest of world, also experiences a decrease in the labour share. Additionally, this continent has been receiving a large number of international flows, e.g., foreign aid and FDI. The results of investigating the effects of these flows on the labour share could directly illustrate the amount accruing to labour relative to capital which is essential to the inequality issue.

Figure 3.1 African average labour share trend
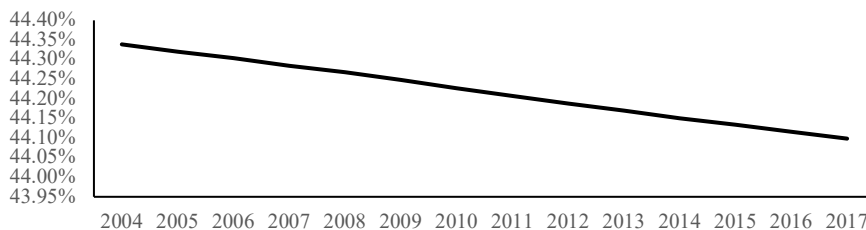
Source: Authour's own elaboration.

Analysing the labour share has a number of difficulties. One is the measurement of the income of the self-employed. Some early studies merely apply the ratio of compensation for employees to value added to proxy the labour share (Rodrick, 1999). However, the use of unadjusted data would give rise to an underestimation of the labour

share. Johnson (1945) proposes accruing two thirds of the mixed income to labour and the rest to capital. This adjustment had been widely applied (Guscina, 2006; Izyumov and Vahaly, 2015). However, it is not an appropriate adjustment for cross-country studies since it ignores the heterogeneity as the composition of self-employment varies across countries and it might underestimate the labour share in developing countries. Another adjustment proposed by Kravis (1959) suggests accruing all mixed income to labour which could overestimate the labour share. Atkinson (1983) proposes subtracting mixed income from the denominator, considering pure labour and capital incomes. However, it has been found that this could produce some unrealistic results with the value of the labour share being greater than one (Bernanke and Gürkaynak, 2001). Collin (2002) adjusts the mixed income in accordance with the composition of the workforce. Guerriero (2019), based on Collin's adjustment, subtracts the employers from the workforce. In Chapter 3 we use the labour share data drawn from the International Labor Office (ILO), given that it provides a relatively comprehensive coverage of data for African countries and the data on capital income can be easily computed.

Another difficulty is the availability of a methodology of analysis and a theoretical basis to explain factor income distribution. On the one hand, the existing studies at the industry-level often apply the shift-share approach to explain the variation in the labour share, which disentangles the variation that is caused by the within-industry labour share shift and the one that is caused by the between-industry labour share shift (see Young, 2010; Bai and Qian, 2010 for a single country study, and Dimova, 2019 for a cross-country study). On the other hand, studies at the macro-level apply the constant elasticity of substitution (CES) production function in discussing the change in the labour share and suggest that it is caused by the elasticity of substitution and the variation in the capital intensity (Elsby et al., 2013; Karabarbounis and Neiman, 2013; Lawrence, 2015). We adopt this second approach since it provides an explanation that relates the use of productive factors to the distribution of their revenues, and it also allows the inclusion of other potential determinants, such as foreign aid and FDI.

Our sample covers 41 African countries from 2002 to 2019. We find that after addressing heteroskedasticity and endogeneity, FDI positively affects the labour share. Meanwhile, foreign aid, in general, has a negative effect on the labour share and this effect varies in different economic institutional contexts. The composition of the aid influences the effect as we find aid invested in the production sector tends to increase the labour share while aid invested in other sectors has a negative effect.

The rest of the chapter is organised as follows. The literature review in Section 3.2 aims to build a theoretical background and identify the remaining gap which our work attempts to cover. In Section 3.3 we develop a theoretical model to allow us to incorporate aid and FDI to the determinants of the labour share. Next, Section 3.4 describes the data and empirical strategy. Section 3.5 reports the empirical results and in the final section we present the conclusion and discussion.

3.2 Literature Review on the Determinants of the Labour Share

In this section we review the literature that allows us to analyse the effects of international flows of aid and FDI on the labour share. We consider the approaches to the measurement of the labour share, the theoretical and empirical basis to explain it and lastly, the relationship with the international flows of aid and FDI as determinants of the income distribution.

First, we review the literature on the measurement of the labour share. Theoretically, the labour share refers to the amount of value added accrued to labour as a ratio to total value added. Some papers use the ratio of the compensation for employees to value added net of direct taxes to proxy the labour share (Daudey and García-Peñalosa, 2007; Jaydadev, 2007). However, since it ignores the income of the self-employed, comprising income of both labour and capital, the unadjusted measurement

underestimates the labour share. Johnson (1954) proposed a commonly used adjustment that accrues two thirds of mixed income to labour and the rest to capital. However, to carry out a cross-country study, it is arbitrary to assume that the composition of the mixed income is identical across different countries. Another adjustment is proposed by Kravis (1959), who suggests attributing all mixed income to labour since he points out that in developing countries, most self-employed workers perform purely labour tasks. As illustrated, this adjustment will always overestimate the labour share. Atkinson (1983) proposes an adjustment that subtracts mixed income from the denominator of the calculation. It implies that the new denominator is the value-added net of indirect taxes and consumption of fixed capital. It has been widely used in academic research (Ryan, 1996; Rognlie, 2015). However, Bernanke and Gürkaynak (2001) suggest that this adjustment may give rise to an unrealistic value of the labour share greater than one. Collin (2002) assumes that there are no systematic differences between the return to employees and to the self-employed and he divides compensation for employees by the number of employees to derive the average compensation for employees then multiplies by the total workforce to impute the total compensation for employees. Similarly, according to the author, this adjustment will generate an unrealistic value of the labour share greater than one. Later, Guerriero (2019) extended Collin's adjustment by eliminating the employers from the workforce.

Finding a consistent measurement is rather crucial at the empirical level since Bai and Qian (2010) suggest that 42.16 percent of the reported decline in the labour share of China from 1995 to 2007 is due to the changes in the way the National Bureau of Statistics of China (NBS) breaks down the operating surplus. Based on the works of Young (1995) and Collin (2002), the ILO estimates the labour share by using the imputed wages of the three sub-groups of the self-employed, namely own-account workers, contributing family workers and employers.[19] One advantage of applying ILO's data, as noted by ILO (2019), is that the gross capital income share can be

---

[19] See ILO (2019) for a more detailed discussion.

computed as one minus the adjusted labour share.[20] This provides us with the essential data required by the theoretical model in the next section, labour, and capital income, as well as the rental rate of labour and capital. Moreover, the dataset has a wide coverage in terms of countries and the time period.

Second, the literature studying the labour share uses a number of theoretical and empirical approaches that can be highlighted. On the one hand, Serres et al. (2002) propose the fixed-weight aggregation method, also known as the shift-share approach in later studies (Karabarbounis and Neiman, 2014; Young, 2010;). The approach explains the variation in the labour share from two perspectives. The first is the between-sector shift which suggests that the decline of the labour share is due to the shift from a sector with a higher labour share to one with a lower labour share, e.g., from industry to services. The second is the within-sector shift which explains that the decline of the aggregate labour share is caused by the decrease in the sectoral labour share. Their work suggests that in the 1970s and 1980s the decline of the labour share in Germany, France, Italy, and the US was dominated by the between-sector shift, finding that in Germany, the within-sector share rose.

Dimova (2019) studies the variation in the labour share for 28 EU countries between 2002 and 2016. The author suggests that, in most countries, the decline of the labour share is driven by the within-sector shift which generates the job polarisation that harms mid-skilled workers. However, the author also finds that for some advanced economies such as Denmark, Hungary and Italy, the decline is due to the between-sector shift from a sector with a high share to one with a low share. Dao et al. (2017) demonstrate that between 1991 and 2014 the labour share declined in 29 of the largest 50 economies. By applying the shift-share approach, they suggest that the within-sector change can explain about 90 percent of the decline. One exception is China whose decline originated in the structural change from agriculture to services which confirms the

---

[20] ILO (2019) highlights the necessity of finding a measurement for low- and middle-income countries.

previous findings of Bai and Qian (2010) who suggest that 61.31 percent of the decline can be explained by the between-sector shift while the rest can be explained by the within-sector change.

Other economists explain the variation of the labour share using the superstar firm approach (Autor et al., 2017; Barkai, 2020; Pariboni and Tridico, 2019) which suggests that the leading firm or a small number of firms with a large market share tend to lower the bargaining power of workers and charge a mark-up. Consequently, market concentration yields a decline of the labour share.

On the other hand, the approach based on the Constant Elasticity of Substitution (CES) production function has been popular in studying the variation in the labour share. The traditional theory assumes an elasticity of unity, i.e., a Cobb-Douglas production function, in which the technological progress does not alter the labour share since labour and capital will change in the same proportion and direction. The CES production function, however, explains the variation through the elasticity of substitution between capital and labour σ, capital-labour ratio (capital intensity) and the factor-augmenting technological progress. The capital-augmenting technological progress is denoted as A_K, and the labour-augmenting technological progress is A_L. In the case where factors are paid their marginal products, a labour-augmenting technological progress implies that the technological progress raises the marginal product of labour by more than the marginal product of capital. In the case where $\sigma<1$, in which factors are gross complements, an increase in the effective capital-labour ratio (A_K*K/A_L*L) tends to increase the labour share; in the case where $\sigma>1$, in which factors are gross substitutes, an increase in the effective ratio tends to lower the labour share.[21]

---

[21] Ignoring that factor-augmenting technological progress might undermine the effect of capital intensity on the labour share in the case that the technological progress and capital intensity change in the same proportion but in the opposite direction. As Lawrence remarks, traditional theory based on the Cobb-Douglas function assumes $\sigma=1$ and the direction of technological progress is irrelevant for the income distribution. In a CES world, $\sigma\neq1$ has profound implications for growth theory and factor income distribution.

Most of the studies estimating σ concentrate on the US economy. Knoblach and Stockl (2019) review 49 studies published between 1961 and 2017 and conclude that most studies estimate an elasticity of less than 1 with some peaks of around 0.3 and 0.7. For instance, Antras (2004), using the private sector of the US economy from 1948 to 1998 and allowing biased technological progress, finds that the elasticity is lower than one, ranging from 0.64 to 0.89, and the growth rate of labour efficiency is higher than that of capital i.e. a purely labour-augmenting technological progress. Similarly, Wei (2014) finds that the aggregate country-level elasticity is about 0.62 and 35 of the 40 investigated counties show a net labour-augmenting technological progress. Lawrence (2015) finds that the elasticity of substitution in the US is actually less than 1 and concludes that the decline of the labour share since 1980 is due to the decline in the effective capital-labour ratio. Glover and Short (2020), using the investment price and a transitional term which represents the rise of consumption in response to lower investment price to proxy the rental rate of capital, find that the elasticity is around 0.97. Therefore, the authors suggest that the reason for the global decline in the labour share may not be capital deepening.

Instead, other economists find that the elasticity is greater than one. For instance, Karabarbounis and Neiman (2014) use cross-sectional variation to estimate the elasticity and find capital and labour are gross substitution i.e. σ>1. They suggest that the decline of the relative price of investment could roughly explain half of the decline in the global labour share. Likewise, Koh et al. (2020) find the σ for the US economy is above one.

Finally, several studies relate the labour share to other potential determinants, such as international financial flows and the activity of foreign firms. Some of these studies focus on more specific variables, such as FDI. Decreuse and Marrek (2015) apply a study for 98 developing countries from 1980 to 2000 and find that inward FDI is negatively related to the labour share. However, Doan and Wan (2017) point out that the FDI data used in the work of Decreuse and Darrek refer to the whole economy while

the data for the labour share correspond to the manufacturing sector. In their own work, they find that FDI has no significant effect on the labour share. Recently, Hu et al. (2020) find that for a sample of 29 Asian countries during 1984-2014, the inward FDI had a positive effect on the labour share. They argue that this is because the FDI into Asian countries is mainly intermediate material, machinery and equipment which would complement domestic labour inputs.

Some other studies consider that foreign aid, a very important source of income in less developed countries, has a potential effect on income distribution. However, the relevant literature generally addresses the inequality through the Gini coefficient. Sharma and Abekah (2017) find that for a sample of 71 African and South American countries from 1970 to 2014, foreign aid had a positive effect on the Gini coefficient. Similarly, Layton (2008) finds that foreign aid increases the Gini coefficient, suggesting that foreign aid may be helping the poor, but it benefits the rich more. Bjornskov (2009) also confirms the increasing effect of foreign aid on the Gini coefficient. However, Shafiullah (2011) finds that the ODA growth rate is negatively correlated with the Gini coefficient concluding that foreign aid reduces income inequality. Some other economists such as Chong et al. (2009) who apply a simple cross-section and dynamic panel estimation for a sample of 133 countries over the period 1975 to 1995, find no significant effect of aid on the reduction of poverty and income inequality. Additionally, Saidon et al. (2013) applying an GMM estimation for a sample of 75 countries for 1995-2009, find that the composition of aid matters for the effect. Specifically, aid invested in the social sector has no significant effect on income inequality; aid invested in the economic sector reduces income inequality while aid invested in the multi-sector increases inequality.

Moreover, Chong et al. (2009) interact foreign aid with the corruption index and find that aid tends to lower income inequality in less corrupt countries. However, their study does not provide robust empirical evidence in this regard. Layton (2008) finds that the interaction of foreign aid and democracy has a positive effect on the Gini coefficient.

To the best of our knowledge, there is no study addressing the concern about the relationship between foreign aid and the labour share.[22] Given the importance of the factor share distribution in inequality emphasised in the Sustainable Development Goals (SDGs), this chapter attempts to fill the gap by investigating the effect of foreign aid and FDI on the labour share for African countries. Following the relevant works by Antras (2004), Lawrence (2015) and Kol et al. (2020), we have developed a theoretical model based on a CES production function which allows us to include our core variables of interest, i.e., foreign aid and FDI and to better understand how these important sources of income for African countries affect their income inequalities.

3.3 Theoretical Model

In this section we present the theoretical model developed from the CES production function. First, we define the labour share as the ratio of compensation for employees to total income:[23]

$$LS_t = \frac{w_t L_t}{w_t L_t + r_t K_t} \tag{3.1}$$

Where *LS* is the labour share, *w*, the wage per worker, *L*, the employment, *r*, the return to capital and *K*, the capital stock.

Rearrange (3.1):

$$LS_t = \frac{1}{1 + \frac{r_t K_t}{w_t L_t}} \tag{3.2}$$

Where, *r/w* stands for the relative price of capital and *K/L* the capital intensity.

Now we derive the relative price of capital from a CES production function with biased technological progress:

$$Y_t = \left[\delta(A_k K_t)^{\frac{\sigma-1}{\sigma}} + (1-\delta)(A_l L_t)^{\frac{\sigma-1}{\sigma}}\right]^{\frac{\sigma}{\sigma-1}} \tag{3.3}$$

Where *Y* is the output; A_k and A_l are the capital- and labour-augmenting technological progress; σ is the elasticity of substitution between capital and labour.

Assuming a competitive market that factors are paid their marginal cost:

$$r_t = \frac{\partial Y_t}{\partial K_t} = \theta \delta A_k^{\frac{\sigma-1}{\sigma}} K_t^{\left(\frac{\sigma-1}{\sigma}\right)-1} \tag{3.4}$$

$$w_t = \frac{\partial Y_t}{\partial L_t} = \theta(1-\delta) A_l^{\frac{\sigma-1}{\sigma}} L_t^{\left(\frac{\sigma-1}{\sigma}\right)-1} \tag{3.5}$$

Where $\theta = \frac{\sigma}{\sigma-1}\left[\delta(A_k K_t)^{\frac{\sigma-1}{\sigma}} + (1-\delta)(A_l L_t)^{\frac{\sigma-1}{\sigma}}\right]^{\left(\frac{\sigma}{\sigma-1}\right)-1}$

The relative price of capital *r/w* is:

$$\frac{r_t}{w_t} = \frac{\delta A_k^{\frac{\sigma-1}{\sigma}} K_t^{\left(\frac{\sigma-1}{\sigma}\right)-1}}{(1-\delta) A_l^{\frac{\sigma-1}{\sigma}} L_t^{\left(\frac{\sigma-1}{\sigma}\right)-1}} \tag{3.6}$$

Substituting (3.6) into (3.2):

$$LS_t = \frac{1}{1 + \left(\dfrac{\delta A_k^{\frac{\sigma-1}{\sigma}} K_t^{(\sigma-1)/\sigma)}}{(1-\delta)A_l^{\frac{\sigma-1}{\sigma}} L_t^{(\sigma-1)/\sigma}} \right)} \tag{3.7}$$

Taking the logarithm transformation for equation (3.7) we obtain:

$$logLS_t = -\log\left(\frac{\delta}{1-\delta}\right) - \left(\frac{\sigma-1}{\sigma}\right)\log\left(\frac{A_k}{A_l}\right) - \left(\frac{\sigma-1}{\sigma}\right)\log\left(\frac{K_t}{L_t}\right) \tag{3.8}$$

Following Antras (2004), we estimate the technological progress dividing (3.5) by (3.4):

$$\frac{w_t}{r_t} = \frac{(1-\delta)A_l^{\sigma-\frac{1}{\sigma}} L_t^{\left(\sigma-\frac{1}{\sigma}\right)-1}}{\delta A_k^{\sigma-\frac{1}{\sigma}} K_t^{\left(\sigma-\frac{1}{\sigma}\right)-1}} \tag{3.9}$$

Rearranging and taking logarithm transformations we obtain:

$$\log\left(\frac{w_t}{r_t}\right) = \log\left(\frac{1-\delta}{\delta}\right) + \left(\frac{1}{\sigma}\right)\log\frac{K_t}{L_t} + \left(\frac{1-\sigma}{\sigma}\right)\log\left(\frac{A_k}{A_l}\right) \tag{3.10}$$

Putting the last term into the error ξ, equation (3.11) gives us an estimate of σ that can be used to solve the difference between labour and the capital augmenting progress.[24] Finally, we can include this estimation of the technological progress $log(A_k/A_l)$ into

---

[24] Alternatively, Antras (2004) and Lawrence (2015) estimate the biased technological progress by assuming that both capital- and labour-augmenting technological progress have an annual constant exponential growth rate of λ_k and λ_l respectively, implying that $A^k = A_0^k e^{\lambda_k t}$ and $A^l = A_0^l e^{\lambda_l t}$. So, they first estimate the elasticity, then substitute into the coefficient of time trend $\left(\frac{1-\sigma}{\sigma}\right)(\lambda_l - \lambda_k)$ to derive the net direction of factor augmenting technological progress.

equation (3.8). Since the focus of this chapter is to investigate the effect of international inflows, i.e., foreign aid and FDI on the labour share, we have extended the model by including them as additional determinants of the labour share.

$$\log\left(\frac{w_t}{r_t}\right) = \log\left(\frac{1-\delta}{\delta}\right) + \left(\frac{1}{\sigma}\right)\log\frac{K_t}{L_t} + \xi_t \tag{3.11}$$

3.4 Empirical Strategy and Data

As mentioned in the previous section, excluding technological progress might undermine the effect of capital intensity, so we must first estimate the elasticity of substitution and then the technological progress. The estimation requires data on employment (L), capital stock (K), average salary (w) and return to capital (r). First, we multiply GDP by ILO's labour share to obtain total employee compensation. We then subtract compensation from GDP to obtain capital income (ILO, 2019). Finally, we divide the compensation by employment to obtain the average wage (w) and divide the capital income by the capital stock of PWT10 to obtain the return to capital (r).

We estimate equation (3.10) by assuming that the biased technological progress is included in the error term, i.e., equation (3.11). Subsequently, the equation to be estimated first is equation (3.12):

$$log\left(\frac{w_t}{r_t}\right) = \gamma_1 + \gamma_2 \log\left(\frac{K_t}{L_t}\right) + e_t \tag{3.12}$$

The coefficient of capital intensity γ_2 represents $1/\sigma$. Consequently, σ, as well as technological progress, can be derived from the predicted error.

Second, we can estimate the effects of aid and FDI on the labour share as follows:

$$logLS_{it} = \alpha + \beta_1 \log\left(\frac{K_{it}}{L_{it}}\right) + \beta_2 \log\left(\frac{AID_{it}}{L_{it}}\right) +$$

$$\beta_3 \log\left(\frac{FDI_{it}}{L_{it}}\right) + \beta_4 EF_{it} + \beta_5 \log\left(\frac{AID_{it}}{L_{it}}\right) * EF + \beta_6 \log\left(\frac{A_k}{A_l}\right) + u_i + \epsilon_{it} \quad (3.13)$$

We prefer the fixed-effects over the random-effects since the assumption that the time-invariant individual characteristic u_i is uncorrelated with explanatory variables is hardly fulfilled and also due to the many advantages of fixed-effects, such as controlling omitted variables (Wooldridge, 2012).[25] For instance, Alesina and Dollar (2000) reveal that the colonial past is one of the determinants of foreign aid. Therefore, removing the individual characteristic by the within transformation allows us to have an unbiased estimation.

Another issue emerges immediately after estimating equation (3.13), which is heteroskedasticity.[26] That is, the variance might differ across individuals, and the statistics used to test the hypothesis are not valid. We apply the weighted least squares (WLS) method to address the heteroskedasticity, weighting all variables by the estimated technological progress. Although we do not know the exact form of heteroskedasticity, and this transformation might be arbitrary, applying robust standard errors could mitigate this problem (Wooldridge, 2012). More importantly, it performs better in cases of strong heteroskedasticity. We can then rewrite equation (3.13):

$$log(ALS_{it}) = A\alpha + \beta_1\left[A\log\left(\frac{K_{it}}{L_{it}}\right)\right] + \beta_2\left[A\log\left(\frac{AID_{it}}{L_{it}}\right)\right] +$$

$$\beta_3\left[A\log\left(\frac{FDI}{L}\right)\right] + \beta_4[AEF_{it}] + \beta_5\left\{A\left[\log\left(\frac{AID_{it}}{L_{it}}\right) * EF_{it}\right]\right\} +$$

$$\beta_6\left[A\log\left(\frac{A_k}{A_l}\right)\right] + Au_i + A\epsilon_{it} \quad (3.14)$$

Where $A = \left[\log\left(\frac{A_k}{A_l}\right)\right]^{-1}$

---

[25] We will report the results of FE and RE as well as the Hausman test in the next section.
[26] We have carried out the modified Wald statistic for groupwise heteroskedasticity in the residuals of a fixed effect regression model (Green, 2000, p. 598), and we reject the null hypothesis of homoskedasticity.

Now, the intercept of the transformed equation is the coefficient β_6 of the technological progress in the original model (3.13), and the constant α in the original model (3.13) is the coefficient of the inverted technological progress $A = \left[\log\left(\frac{A_k}{A_l}\right)\right]^{-1}$ in the transformed model. In the case of a positive and significant constant, we can conclude a labour-augmenting technological progress and *vice versa*.

An alternative way is to estimate the logarithm transformed equation (3.2), as shown in equation (15) where the labour share is now determined negatively by the relative price of capital (*r/w*) and capital intensity (*K/L*). This one is unable to detect the direct effect of technological progress on the labour share. Its indirect effect could be depicted through equation (3.16). However, a substantial endogeneity issue occurs when estimating equation (3.15) as capital intensity is one of the determinates of the relative price. A GMM method would be required to address the endogenous variable. Another problem that would emerge is that if we estimate the effect of technological progress on the labour share through equation (3.15), its effect could be offset by the elasticity of substitution. Therefore, we will focus on equation (3.14).

$$logLS_t = -\log\left(\frac{r}{w}\right) - \log\left(\frac{K}{L}\right) \tag{3.15}$$

$$\log\left(\frac{r}{w}\right) = \log\left(\frac{\delta}{1-\delta}\right) + \left(\frac{\sigma-1}{\sigma}\right)\log\left(\frac{A_k}{A_l}\right) + \left(-\frac{1}{\sigma}\right)\log\left(\frac{K_t}{L_t}\right) \tag{3.16}$$

Due to data availability, our sample contains 41 African countries covering the period 2002 to 2019. *AID* is the disbursement of bilateral and multilateral foreign aid from the Development Assistance Committee (DAC) of OECD which is collected from the Creditor Reporting System (CRS) of the OECD statistics. The recipient countries are those on the recipient list of DAC. Data on FDI (*FDI*) is drawn from the World Development Indicators of the World Bank. We have obtained the *Economic Freedom* data from the Fraser Institute, which ranges from 0 (the worst institution or the most

restrictive institution) to 10 (the best institution or the freest institution). The labour share and all the numerical variables i.e., capital intensity, aid and FDI per labour are taken in their logarithm transformations in accordance with the theoretical model.

We have no certain expectation of the effect of total foreign aid (*AID*) on the labour share as its performance depends on the composition (Saidon et al., 2013). Therefore, we have further decomposed aid into these types: aid for social infrastructure, economic infrastructure, production sector, multilateral sector and commodity and general programmes. In addition, a positive effect of FDI is expected since it creates job opportunities (Layton, 2008). We will decompose *Economic Freedom* into its five main indicators, namely, *government size*, *legal system*, *sound money*, *freedom to trade internationally*, and *regulations*. We assume that each indicator would yield a different effect on the labour share due to the wild coverage of the indicators. The foreign aid in each institutional context would also differ.

3.5 Empirical Results and Discussion

In this section we first report the estimation of the elasticities of substitution σ and the technological progress $log(A_k/A_l)$. Then, we provide empirical evidence of the effect of foreign aid and FDI on the labour share. Finally, we will offer some discussion regarding the empirical results.

Table 3.1 reports the estimation of the elasticity which generally scores slightly above one. Specifically, among the 41 countries, 21 have an elasticity greater than one, while 18 countries find an elasticity lower than one. Furthermore, we find that the elasticities for Rwanda and Tanzania are not statistically significant. Guinea's elasticity is very striking at 2.1096. It is the only one which exceeds 2. Therefore, we apply the perpetual inventory method to calculate the capital stock, then we estimate the elasticity in order

to confirm its consistency.[27] We have collected data for the gross fixed capital formation and its growth rate from the World Bank and the depreciation rate from the PWT10. The alternative estimate reports a similar extreme elasticity of 2.1128.

Table 3.1 Elasticity of substitution (σ)

Country	σ	Country	σ	Country	σ
Algeria	1.0015	Eswatini	1.0895	Namibia	0.8767
Angola	1.0246	Gabon	0.8017	Niger	1.1410
Benin	0.7545	Gambia	1.0503	Nigeria	1.1315
Botswana	1.0184	Ghana	0.9595	Rwanda	INSIG
Burkina Faso	1.9205	Guinea	2.1096	Senegal	0.8611
Burundi	1.0174	Guinea-Bissau	0.7657	Sierra Leone	0.9714
Cameroon	1.2573	Kenya	0.8706	South Africa	1.2323
Central Africa	0.9480	Liberia	0.8918	Sudan	0.9695
Chad	0.9396	Madagascar	1.0382	Tanzania	INSIG
Comoros	0.9859	Mali	0.4193	Togo	1.4566
Congo	1.0226	Mauritania	0.9809	Tunisia	1.0078
Cotedivor	1.1788	Mauricio	1.0947	Uganda	0.8879
Demo Congo	0.8776	Morocco	1.0440	Zimbabwe	0.9851
Egypt	1.1463	Mozambique	1.4057		

It should be noted that as the elasticity of substitution is greater than one in general, we could expect the capital intensity to negatively affect the labour share as capital and labour are gross substitutes. We can now derive the technological progress and make the transformation noted in equation (3.14). In Table 3.2 we will report the results with and without controlling heteroskedasticity to show how this issue affects the estimates.

Table 3.2 reports the results of the baseline model. Column 1 to 3 demonstrate the untransformed model, i.e., equation (3.13) while columns 4 and 5 report the results after the transformation. In the first three columns we find that capital intensity, *log(K/L)*, is negatively correlated with the labour share and it is statistically significant in a pooled regression. Similarly, the technological progress in the untransformed model is positive

---

[27] It has been widely used in estimating the capital stock (for instance, Barkai, 2020).

and statistically significant in column 1. When we only control the group-wise heteroskedasticity in column 2 and 3, the two variables show no significant effect. In column 4 and 5, the results of the transformed model are reported. We find it has a positive effect, meaning that the labour-augmenting technological progress grows faster than capital-augmenting technological progress. We find either in the fixed effect or the random effect estimates that capital intensity negatively impacts the labour share which is consistent with our expectation. The Hausman test reported at the bottom of the table favours the RE over the FE estimate. However, there is no plausible reason to accept that the time-invariant individual characteristics are uncorrelated with the explanatory variables. Wooldridge (2012, p. 493) suggests that a failure to reject the null hypothesis means that both the RE and FE estimates are sufficiently close so that it does not matter which is used.

Table 3.2 Baseline model

Dep. Var. log(labourshare)	(1)	(2)	(3)	(4)	(5)
	Pooled	FE	RE	WLS-FE	WLS-RE
log(K/L)	-0.0246***	-0.0160	-0.0169	-0.1138***	-0.1148***
	(0.0067)	(0.0238)	(0.0216)	(0.0264)	(0.0266)
Technological progress	0.0043*	0.0044	0.0044	0.5587***	0.5616*
	(0.0024)	(0.0046)	(0.0046)	(0.1218)	(0.3285)
Constant	-0.5841***	-0.6728***	-0.6635***	0.4075*	0.4176*
	(0.0692)	(0.2485)	(0.2261)	(0.2410)	(0.2431)
Observations	574	574	574	574	574
R-squared	0.0275	0.0501	0.0501	0.9940	0.9940
Hausman p-value		0.9424		0.4585	

Standard errors are in parentheses. WLS is Weighted Least Squares.

*** p<.01, ** p<.05, * p<.1

Note: Columns 1 to 3 report the results of the untransformed model while columns 4 and 5 report the results of the transformed model. In columns 4 and 5, the technological progress corresponds to the constant term of equation (3.14) while the constant term corresponds to β6 of equation (3.14).

After reporting the baseline model, in Table 3.3 we have included the variable of interests, FDI, (*log(FDI/L))*, foreign aid, (*log(AID/L))*, *Economic Freedom* and their interaction (*log(AID/L)*Economic Freedom*). All variables are also weighted. The

results of the fixed effect estimates are tabulated in columns 1 to 4 and in column 5 we report the system-GMM estimates to address the endogeneity issue. That is, if donor countries intentionally make the transfer to countries with a lower labour share, which is one of the main objectives of foreign aid, there must be a variable affecting foreign aid which we are unable to justify and include in the regressions.[28]

Table 3.3 Results of FE and system-GMM (WLS)

Dep. Var. log(labourshare)	(1)	(2)	(3)	(4)	(5)
	FE	FE	FE	FE	Sys-GMM
log(K/L)	-0.1125***	-0.1204***	-0.0944***	-0.1345***	-0.1121***
	(0.0226)	(0.0204)	(0.0178)	(0.0412)	(0.0363)
Technological progress	0.4903*	0.6256**	0.5509**	0.4939*	-1.3826
	(0.2843)	(0.3011)	(0.2325)	(0.2503)	(1.4422)
log(AID/L)	-0.0825***	-0.0941***	-0.0583***	-0.0630***	-0.0678***
	(0.0075)	(0.0109)	(0.0136)	(0.0131)	(0.0113)
log(FDI/L)		0.0186**	0.0298**	0.0458**	0.0372
		(0.0079)	(0.0145)	(0.0219)	(0.0262)
Economic Freedom			-0.0765	0.0022	-0.0280
			(0.0463)	(0.0776)	(0.0629)
log(AID/L)*Economic Freedom				0.0000	0.0000
				(0.0000)	(0.0000)
Constant	0.8068***	0.8600***	0.8302***	0.7228***	0.7422***
	(0.2191)	(0.1906)	(0.2125)	(0.1880)	(0.1751)
Observations	574	546	487	487	487
Year dummy	Yes	Yes	Yes	Yes	Yes
Time effects	Insignificant	Insignificant	Insignificant	Insignificant	Insignificant
Groups					40
Instruments					30
AR2 statistics					0.39
AR2 p-value					0.693
Hansen statistics					0.289
Hansen p-value					0.289

Standard errors are in parentheses WLS is Weighted Least Squares.

*** p<.01, ** p<.05, * p<.1

Note: The technological progress corresponds to the constant term of equation (3.14) while the constant term corresponds to β6 of equation (3.14).

---

[28] This addresses the concern of Layton (2008) who suggests that there may be a reciprocal causation between foreign aid and inequality. Foreign aid might cause income inequality and donor countries might try to help countries with a higher level of inequality**.**

The autocorrelation test (AR2) and the overidentication test (Hansen) reported at the bottom of the table suggest that the instruments are valid. Table 3.3 also controls time effects, and it is jointly insignificant, so in the following results we have excluded the time effects.

First, capital intensity maintains a negative effect on the labour share in all five columns. We can also observe that foreign aid has a negative effect before and after we instrument it, which could indicate that foreign aid may generate certain unproductive activities such as rent seeking (Svensson, 2000). We will test its robustness and discuss it at the end of the section. FDI has a positive and significant effect in FE estimates and loses its significance in column 5. *Economic Freedom*, meanwhile, has no significant effect. However, the negative sign seems counter-intuitive at first sight. We can argue that the *Economic Freedom* of the Fraser Institute has a wide coverage and its principal aim is to measure the ease of doing business in a country. The index measures the degree to which governments intervene in the economy (*government size*); the impartiality of the law (*legal system*); the stability of the money supply and inflation (*sound money*); the openness to trade and movement of capital and workers (*freedom to trade internationally*); and the regulations regarding credit the labour market and business (*regulations*). After reviewing their methodology, we find that the *government size* and *freedom to trade internationally* might have a direct impact on the labour share while the *legal system* and *sound money* might indirectly affect it. As for the *regulations*, a country will receive a lower score, i.e., less freedom if the county imposes more regulations even if the regulations could protect the labour rights.[29] Therefore, we would expect regulations to have a negative effect on the labour share.

The broad coverage of *Economic Freedom* also prevents us from detecting a significant effect of the interaction on the labour share. The popular notion that foreign aid

---

[29] For instance, if a country sets a minimum wage, it receives lower scores.

performs better in a good institutional environment needs to be reconsidered. In previous works, *Economic Freedom* has been used to proxy the economic institutions which is expected to attract FDI or to spur economic growth. However, when the labour share is the dependent variable, as discussed above, *Economic Freedom*, its indicators and the interactions with foreign aid might yield a different effect. Therefore, in Table 3.4, we report the results decomposing *Economic Freedom* into its 5 indicators. We interact foreign aid with each indicator to reveal its performance in different institutional contexts.

Table 3.4 Results of Economic Freedom indicators (WLS, system-GMM)

Dep. Var. log(labourshare)	(1)	(2)	(3)	(4)	(5)
	Government size	Legal system	Sound money	**Freedom to trade**	Regulations
log(K/L)	-0.1173***	-0.1250***	-0.1311***	-0.0946***	-0.1207**
	(0.0200)	(0.0270)	(0.0264)	(0.0178)	(0.0492)
Technological progress	0.4148	0.4839*	0.4562*	0.4178*	0.4850*
	(0.2646)	(0.2682)	(0.2536)	(0.2529)	(0.2598)
log(AID/L)	-0.0621***	-0.0523***	-0.0608***	-0.0413***	-0.0508**
	(0.0065)	(0.0144)	(0.0124)	(0.0086)	(0.0214)
log(FDI/L)	0.0200	0.0446**	0.0463**	0.0282**	0.0405
	(0.0222)	(0.0186)	(0.0194)	(0.0136)	(0.0290)
Economic Freedom	0.0455**	-0.0189	-0.0019	-0.0776**	-0.0201
	(0.0236)	(0.0356)	(0.0455)	(0.0308)	(0.0582)
log(AID/L)*Economic Freedom	0.0000**	0.0000*	0.0000***	-0.0000	0.0000
	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)
Constant	0.3868*	0.6640***	0.7035***	0.7427***	0.6863***
	(0.2002)	(0.1726)	(0.2357)	(0.1379)	(0.1806)
Observations	487	487	487	487	487
Groups	40	40	40	40	40
Instruments	30	30	30	30	30
AR2 statistics	-1.21	-0.65	-0.63	-1.17	-0.62
AR2 p-value	0.226	0.519	0.527	0.243	0.533
Hansen statistics	29.25	29.81	25.88	25.41	28.99
Hansen p-value	0.172	0.155	0.307	0.330	0.181

Standard errors are in parentheses. WLS is Weighted Least Squares.

*** p<.01, ** p<.05, * p<.1

Note: Technological progress corresponds to the constant term of equation (3.14) while the constant term corresponds to β6 of equation (3.14).

Column 1 of Table 3.4 reports the results of the *government size* which measures (a) the ratio of public consumption to total consumption, (b) government transfers and subsidies as a share of GDP, (c) government investment as a share of total investment; the marginal tax rate, (d) state ownership of the economy. A higher level of intervention indicates less freedom. We find that capital intensity, foreign aid, FDI, and technological progress maintain the same effects as in the previous tables. The *government size* has a positive and significant effect on the labour share meaning that a higher level of intervention tends to a lower labour share. This result is consistent with our expectation since a lower tax rate is favourable. The positive effect of the interaction is as expected although its magnitude seems mild, i.e., economically insignificant. We can argue that, for these developing countries and less developed countries in our sample, foreign aid is an important budget source, and in a more rigorous government, it will be spent more appropriately, generating less rent seeking activities.

Columns 2 and 3 report the results of the *legal system* and *sound money*. The former measures the independency and impartiality of the legal system and the protection of property rights while the latter measures the growth rate of the money supply and the inflation level. The empirical results suggest that the *legal system* and *sound money* have no direct implication on the labour share. However, we find that foreign aid tends to increase the labour share in countries with a legal system being less affected, and with a more stable economy.

Regarding the *freedom to trade internationally* in column 4, we find a negative effect. This institution measures the ease of exporting and importing and also the difficulty of the entry and exit of capital and workers. A freer country is one with less restrictions. Therefore, we can argue that it is a capital favouring indicator which lowers the cost of using capital. As expected, the interaction also has a negative effect, although it is statistically insignificant.

As for the *regulations* in column 5, we find that they have no significant effect on the labour share. Its negative sign is due to the fact that the labour-protecting regulations such as minimum wage or fixed working hours are associated with less freedom. However, the regulations also apply to the credit market and business sectors which makes it insignificant.

Table 3.5 Results of production sector aid (WLS, System-GMM)

Dep. Var. log(labourshare)	(1)	(2)
	Government size	Freedom to trade
log(K/L)	-0.1222***	-0.0955***
	(0.0180)	(0.0222)
Technological progress	0.2892	0.3597
	(0.2228)	(0.2584)
log(AID/L) Production sector aid	0.0480***	0.0301***
	(0.0091)	(0.0090)
log(FDI/L)	0.0307**	0.0415***
	(0.0136)	(0.0155)
Economic Freedom	0.0855***	-0.0940***
	(0.0236)	(0.0303)
log(AID/L)*Economic Freedom	0.0000***	-0.0000
	(0.0000)	(0.0000)
Constant	-0.3413	0.4761**
	(0.2163)	(0.2064)
Observations	487	487
Groups	40	40
Instruments	30	30
AR2 statistics	-0.83	-1.02
AR2 p-value	0.407	0.306
Hansen statistics	26.93	0.254
Hansen p-value	0.259	0.254

Standard errors are in parentheses. WLS is Weighted Least Squares.

*** p<.01, ** p<.05, * p<.1*

Note: Technological progress corresponds to the constant term of equation (3.14) while the constant term corresponds to β6 of equation (3.14).

The rest of the variables maintained the sign and significance. The empirical evidence confirmed our expectation that the *government size* and *freedom to trade internationally* have a direct implication on the labour share while others affect the labour share indirectly. For the next step, we decompose foreign aid into different types and interact the *government size* and the *freedom to trade internationally*.

The hypothesis that the effect of foreign aid depends on its composition is further tested. The results indicate that foreign aid invested in social and economic infrastructure, multi-sectors and commodity and general programmes has a negative effect while aid invested in the production sector has a positive effect on the labour share. Table 3.5 reports the results of production sector aid regarding the *government size* and *freedom to trade internationally*. This type of aid targets sectors such as agriculture, forestry, fishing, industry, mining, construction, trade policies and tourism. We can say that the primary sectors covered by the production sector aid require lower-skilled workers who are abundantly available in African countries. In addition, receiving aid could make them countable since some jobs may be informal.

In summary, Section 3.5 first reports the estimates on the elasticity of substitution. We find that the elasticity is generally around one or slightly greater than one. Given the estimated elasticity, capital and labour should be gross substitutes and our empirical results support this. Moreover, we find that technological progress is labour-augmenting, meaning that the labour-augmenting technological progress grows faster than that of capital. FDI has a positive effect on the labour share. Regardless of the type, FDI may create job opportunities. This argument is similar to that of Hu et al. (2020) who suggest that inward FDI is combined with local labour to produce goods exclusively for export. This result holds only for low-income countries in their study.

As for foreign aid, the empirical results suggest that it has an overall negative and significant effect on the labour share. We can argue that this is due to the rent seeking activities caused by foreign aid (Svensson, 2000). Rent seeking could be the channel

through which foreign aid lowers the labour share. Budget support aid provides recipient countries with a windfall which is likely to generate rent seeking activities. In such an environment, aid fuels activities such as corruption, which would likely harm both labour and capital income. Along the same lines, Svensson (2000) suggests that the inflow of aid does not necessarily result in general welfare gains and the reduction of economic liberty may be one reason for this.

The work of Layton (2008) illustrates several mechanisms regarding how foreign aid affects income inequality. Although his work focuses on the Gini coefficient, it can still have some implications on the labour share. Layton argues that, as rational politicians, they would act to please their supporters who are usually made up of a group of high-income private citizens with special interests. Therefore, the donation of aid would not reach the people most in need, i.e., the poor. Boone (1996) also confirms this finding. He divides countries into those with elitist governments, egalitarian governments, and laissez-faire governments and suggests that all three types of government favour the high-income political elite. Layton further argues that even if the aid is equally distributed among the poor and the rich, the inequality would increase due to the larger poor population. In addition, Easterly (2003) also suggests that governments have no such incentive to increase the productive potential of the poor since the political standing of the empowered group would be threatened.

We could image a scenario in which the rich receive foreign aid and invest it domestically, which would create job opportunities and spur economic growth. However, this situation barely happens (Easterly, 1999). Investors prefer foreign markets since they know the institutions are imperfect in the own country and investing abroad would generate a more stable return. Following this assumption, we can image another situation in which foreign aid is invested domestically. Given the current institutional context, i.e., corruption, restrictive regulations, rent seeking, and the distributive and redistributive policies which favour the smaller group (Svensson, 2000), the inequality between the rich and the poor and between labour and capital will also

increase. Bjornskov (2010) even finds an extreme case in which foreign aid benefits the richest part of the population in the presence of democracy.

Layton (2008) also argues why the conditionality approach does not work for aid effectiveness. Recipient countries could choose to not fully implement the policies or repeal the politics as soon as they receive the donation because their priority is to stay in power and continue receiving aid. Therefore, the conditionality would not reduce inequality. This has a major implication since the positive effect of the interaction intuitively leads to a conclusion of conditionality. However, Economic Freedom, more precisely, a proper government size can have a positive effect on the labour share and can also mitigate the negative effect of foreign aid.[30] Ignoring the capacity building effect of foreign aid through the transfer of capital flow, technical assistance, training, and education, a country which lacks such resources would not be able to improve its institutions by itself given the costly process. Moreover, foreign aid might erode institutions even for the country with a better institutional quality.

3.6 Conclusions

Income inequality has been the focus of constant debate. However, the discussion on the labour share remains controversial. Economists concentrate on assessing the elasticity of substitution between labour and capital, suggesting that it is essential to study the effect of the productive factors. The estimate of elasticity is not unanimous for single and cross-country studies. Reducing poverty and income inequality is one of the objectives of foreign aid, however, aid literature generally focuses on the Gini coefficient while study tends to fill the gap investigating the effect of foreign aid on the income distribution between labour and capital.

---

[30] Its effect seems economically insignificant. Early works focus on political institutions such as corruption and democracy while ours makes the attempt to investigate the role of economic institutions in the labour share. One possible explanation could be that Acemoglu et al. (2004) suggest that political institutions tend to form an economic institution which favours themselves.

We apply a panel study for 41 African countries between 2002 and 2019. First, capital and labour are found to be gross substitutes, i.e., we estimate an elasticity of substitution greater than one. Then, our empirical results suggest a negative effect of capital intensity on the labour share which confirms the estimates on elasticity. We also find that the labour-augmenting technological progress grows faster than that of capital. As for FDI, we find that it has a positive effect on the labour share. Moreover, foreign aid in general has a negative effect and we can argue that foreign aid may generate rent seeking and appropriate the income both for capital and labour. In addition, foreign aid invested in the production section shows a positive effect on the labour share while the other types of aid negatively affect the labour share. Our empirical results also suggest that a higher degree of intervention and freer movement of capital and people tend to lower the labour share. The interactive terms of foreign aid with *government size*, *legal system*, and *sound money* positively affect the labour share. However, these effects are economically insignificant.

The empirical results provide some policy implications. The negative effect of foreign aid does not imply that donor countries should withdraw their flows of aid. Rather, the donation should embody, other than the capital flows, more capacity building, technical assistance, training, and education which are more favourable for recipient countries to improve their institutional quality. The expected institutional reforms refer to lowering the degree of intervention and increasing the ease of movement of personnel. In addition, donor countries could also focus on the primary sectors since we find that aid invested in sectors such as agriculture, forestry, and fishing contribute to increasing the labour share.

Our work has several limitations. First, the availability of data reduced the sample size, and the data quality might affect the estimates. Second, the complexity of foreign aid in terms of sectors, forms and the nature of donation agencies might hinder the detection of its effects. Future research could assess more detailed effects of foreign aid on the

labour share as well as on income inequality. For instance, a decrease in the labour share could also imply a change in the composition of mixed income. That is, a self-employed individual could increase the income level from receiving reward from a purely labour task to receiving income from both labour and capital tasks by improving his or her qualifications.

References

Acemoglu, D., Johnson, S., & Robision, J. (2005). Institutions as a Fundamental Cause of Long-run Growth. In Aghion, Ph. and Durlauf, S. (Eds.): *Handbook of Economic Growth*, Vol. 1A, Chapter 6, pp. 385-472. North Holland.

Alesina, A., & D. Dollar. (2000). Who Gives Aid to Whom and Why? *Journal of Economic Growth*, 5(1), pp. 33-63.

Antras, P. (2004). Is the US Aggregate Production Function Cobb-Douglas? New Estimates of the Elasticity of Substitution. *The B. E. Journal of Macroeconomics*, 4(1).

Atkinson, A. B. (1983). *The Economics of Inequality*. Oxford: Clarendon Press.

Atkinson, A. B. (2009). Factor Shares: The Principal Problem of Political Economy? *Oxford Review of Economic Policy*, 25(1), pp. 3-16.

Autor, D., D. Dorn, L. F. Katz, C. Patterson, & J. van Reenen. (2017). The Fall of the Labor Share and the Rise of Superstar Firms. NBER Working Papers No. 23396. National Bureau of Economic Research.

Bai, C., & Z. Qian. (2010). The Factor Income Distribution in China: 1978-2007. *China Economic Review*, 21(4), pp. 650-670.

Barkai, S. (2020). Declining Labor and Capital Shares. *The Journal of Finance*, 75(5), pp. 2421-63.

Bernanke, B. S., & R. S. Gürkaynak. (2001). Is Growth Exogenous? Taking Mankiw, Romer, and Weil Seriously. *NBER Macroeconomics Annual*, 16, pp. 11-57.

Boone, P. (1996). Politics and the Effectiveness of Foreign Aid. *European Economic Review*, 40(2), pp. 289-329.

Burnside, C., & D. Dollar. (2000). Aid, Policies, and Growth. *American Economic Review,* 90(4), pp. 847–68.

Bjornskov, C. (2009). Do Elites Benefit from Democracy and Foreign Aid in Developing Countries? *Journal of Development Economics*, 92(2010), pp. 115-124.

Chong, A., C. Calderon, & M. Gradstein. (2009). Foreign Aid, Income Inequality, and Poverty. *Public Choice*, 140(1/2), pp. 59-84.

Ghortareas, G., & E. Noikokyrios, (2020). Investment and Labor Income Shares. *Economic Change and Restructuring*, 54, pp. 807-820.

Gollin, D. (2002). Getting Income Shares Right. *The Journal of Political Economy*, 110(2), pp. 458- 474.

Green, W. (2000). *Econometric Analysis*, New York: Prentice Hall.

Dao, M., M. Das, Z. Koczan, & W. Lian. (2017). Why Is Labor Receiving a Small Share of Global Income? Theory and Empirical Evidence. IMF Working Papers No. 2017/169. International Monetary Fund.

Daudey, E., & C. Garcia-Penalosa. (2007). The Personal and the Factor Distributions of Income in a Cross-Section of Countries. *Journal of Development Studies*, 43, pp. 812-829.

Decreuse, B., & P. Marrek. (2015). FDI and the Labor Share in Developing Countries: A Theory and Some Evidence. *Annals of Economics and Statistics*, 119/120, pp. 289-319.

Dimova, D. (2019). The Structural Determinants of the Labor Share in Europe. IMF Working Papers No. 2019/067. International Monetary Fund.

Doan, H. T. T., & G. Wan. (2017). Globalization and the Labor Share in Nation Income. ADBI Working Papers No. 639. Asian Development Bank Institute.

Easterly, W. (2003). Can Foreign Aid Buy Growth? *Journal of Economic Perspectives*, 17(3), pp. 23-48.

Easterly, W. (1999). The Ghost of Financing Gap: Testing the Growth Model Used in the International Financial Institutions. *Journal of Development Economics*, 60(2), pp. 423-438.

Elsby, M., B. Hobijn, & A. Sahin, (2013). The Decline of the US Labor Share. *Brookings Papers on Economic Activity*, Fall 2013, pp. 1-52.

Glover, A., & J. Short. (2020). Can Capital Deepening Explain the Global Decline in Labor's Share? *Review of Economic Dynamics*, 35(2020), pp. 35-53.

Guerriero, M. (2019). The Labor Share of Income Around the World: Evidence from a Panel Dateset. ADBI Working Papers No. 920. Asian Development Bank Institute.

Guscina, A. (2006). Effects of Globalization on Labor's Share in National Income. IMF Working Paper No. 06/294. International Monetary Fund.

Hu, X., G. Wan, & J. Wang. (2020). The Impacts of Globalization on the Labor Share: Evidence from Asia. *Singapore Economic Review*, 65, pp. 57-73.

Jayadev, A. (2007). Capital Account Openness and The Labour Share of Income. *Cambridge Journal of Economics*, 31, pp. 423-443.

Johnson, D. G. (1945). The Functional Distribution of Income in the United States, 1850-1952. *The Review of Economics and Statistics*, 36(2), pp. 175-182.

Karabarbounis, L., & B. Neiman, (2013). The Global Decline of The Labor Share. NBER Working Papers No. 19136. National Bureau of Economic Research.

Knoblach, M., & F. Stockl. (2019). What Determines the Elasticity of Substitution Between Capital and Labor? A Literature Review. CEPIE Working Papers No. 01/19. Technische Universitat Dresden, Center of Public and International Economics.

Koh. D., R. Santaeulalia-Llopis, & Y. Zheng. (2020). Labor Share Decline and Intellectual Property Products Capital. *Econometrica*, 88(6), pp. 2609-28.

Kravis, I. B. (1959). Relative Income Shares in Fact and Theory. *The American Economic Review*, 49(5), pp. 917-949.

Lawrence, R. (2015). Recent Declines in Labor's Share in US Income: A Preliminary Neoclassical Account. NBER Working Papers No. 21296. National Bureau of Economic Research.

Layton, T. (2008). The Effects of Foreign Aid on Income Inequality. *Journal of Political and International Studies*, 26(4), pp. 35-55.

Izyumov, A., & J. Vahaly. (2015). Income Shares Revisited. *Review of Income and Wealth*, 61(1), pp. 179-188.

Pariboni, R., & P. Tridico. (2019). Labour Share Decline, Financialisation and Structural Change. *Cambridge Journal of Economics*, 43(4), pp. 1073-1102.

Rodrick, D. (1999). Democracies Pay Higher Wages. *The Quarterly Journal of Economics*, 114(3), pp. 707-738.

Rognlie, M. (2015). Deciphering the Fall and Rise in the Net Capital Share: Accumulation or Scarcity? *Brookings Papers on Economic Activity*, pp. 1-69.

Ryan, P. (1996). Factor Shares and Inequality in the UK. *Oxford Review of Economic Policy*, 12(1), pp. 106-126.

Saidon, R., Z. Yusop, N. W. Ismail, & L. S. Hook. (2013). Sectoral Foreign Aid and Income inequality. *International Journal of Economics and Finance*, 5, pp. 117-122.

De Serres, A., S. Scarpetta, & C. de la Maisonneuve. (2002). Sectroal Shifts in Europe and the United States: How They Affect Aggregate Labour Shares and the Properties of Wage Equations. OECD Economics Department Working Papers No. 326. OECD Publishing.

Shafiullah, M. (2011). Foreign Aid and Its Impact on Income Inequality. *International Review of Business Research Papers*, 7(2), pp. 91-105.

Sharma, B., & J. Abekah. (2017). Foreign Direct Investment, Foreign Aid and Incomes Inequality: Empirical Insights from African and South American Countries. *Transnational Corporations Review*, 9(1), pp. 1-7.

Svensson, J. (2000). Foreign Aid and Rent-seeking. *Journal of International Economic*, 51(2), pp. 437-461.

Wei, T. (2014). Estimates of Substitution Elasticities and Factor-Augmented Technical Changes. *SSRN Electronic Journal*. Available at: 10.2139/ssrn.2417300

Wooldridge, J. M. (2012). *Introductory Econometrics. A Modern Approach.* Mason. Ohio: South-Western Cengage Learning. 2012.

Young, A. (2010). One of the Things We Know That Ain't So: Is US Labor's Share Relatively Stable? *Journal of Macroeconomics*, 32(1), pp. 90-102.

Appendix A. Summary Statistics

Var. Name	Obs.	Mean	Std. Dev.	Min	Median	Max
Untransformed						
Labour share	574	-0.840	0.199	-1.363	-0.804	-0.386
Capital intensity	738	10.415	1.247	7.145	10.112	13.292
Foreign aid	738	4.662	1.098	-1.136	4.752	8.070
FDI	700	4.570	1.741	-4.392	4.655	7.814
Economic Freedom	658	6.003	0.811	2.839	5.933	8.248
*Aid*EF*	658	27.611	7.693	-6.247	28.075	56.704
Transformed						
Labour share	574	-1.025	104.791	-1324.526	-0.090	1795.704
Capital intensity	574	20.070	1509.046	-2.56e+04	1.166	20370.582
Foreign aid	574	7.855	822.159	-1.45e+04	0.136	10137.540
FDI	546	3.679	702.198	-1.27e+04	0.749	7726.292
Economic Freedom	514	6.740	972.234	-1.65e+04	0.619	11778.084
*Aid*EF*	514	29.770	4870.297	-8.46e+04	0.725	53565.465

Note: Foreign aid, FDI are expressed in per labour. All variables except for the Economic Freedom are taken the log transformation.

Appendix B. Country list

Algeria	Eswatini	Namibia
Angola	Gabon	Niger
Benin	Gambia	Nigeria
Botswana	Ghana	Rwanda
Burkina Faso	Guinea	Senegal
Burundi	Guinea-Bissau	Sierra Leone
Cameroon	Kenya	South Africa
Central Africa	Liberia	Sudan
Chad	Madagascar	Tanzania
Comoros	Mali	Togo
Congo	Mauritania	Tunisia
Cotedivor	Mauricio	Uganda
Demo Congo	Morocco	Zimbabwe
Egypt	Mozambique	

Conclusions

This thesis seeks to investigate aid effectiveness in terms of the two objectives established by the OECD, namely promoting economic development and improving welfare. Given the wide range of aspects covered by these objectives, targets 1.A and 10.B of the Sustainable Development Goals (SGDs) specify the relevant role of foreign aid in eradicating poverty and reducing inequality.

With respect to the promotion of economic development, Chapters 1 and 2 address the controversial aid-FDI debate incorporating economic institutions into the discussion. As for the improvement of welfare, Chapter 3 investigates the effects of foreign aid and FDI on the labour share contributing to the inequality debate.

In Chapter 1 we review the literature addressing the aid-FDI analysis. The conclusions remain controversial. We adopt the fixed effect panel threshold technique to test the hypothesis of the existence of an institutional threshold dividing the effect of foreign aid on FDI into two regions. In a region attractive for FDI which is proxied by a freer economic institution, foreign aid works in favour of FDI while in a restricted environment, aid tends to crowd out FDI.

We also propose a theoretical model developed from a Solow production function to explain why aid would yield different effects on FDI in a freer or restricted economic institutional environment. It is assumed that aid increases the marginal products of capital (MPK) if it has been properly used. In this case, foreign aid will have an attraction effect on FDI; in the case where aid has been misused for rent seeking, foreign aid tends to crowd out FDI. We expect to observe that, in a freer institutional environment, more aid flows will be channelled to increase the MPK and the overall effect could be positive. In turn, foreign aid is more likely to be misused in a restricted environment, negatively affecting FDI.

The empirical results confirm that foreign aid has an institutional threshold effect on FDI. We find that foreign aid has a negative effect in countries with a restricted

economic institutional environment where the intervention in the economy is higher, where the legal system is likely to be affected by powerful groups and where there is a high level of restrictive regulations. We can argue that in such an institutional environment, foreign aid cannot be effectively channelled to the needy groups, and it would generate rent seeking activities that crowd out FDI. This crowding out effect is robust after we considered endogeneity problem, while aid in a freer institutional environment fails to demonstrate a significant impact. The reason for this is that the insufficient aid flows cannot finance the development plans of recipient countries.

Chapter 2 investigates the effect of foreign aid on FDI taking into account its indirect effect through economic institutions. The studies analysing the direct effect of aid on FDI generate inconclusive results while the works which interact foreign aid with institutions and suggest aid only attracts FDI in good institutions often leave out the institutional effect of aid. Therefore, structural equation modelling (SEM) is applied to analyse the direct effect and indirect effect of aid via economic institutions on FDI.

A theoretical model has been developed in Chapter 2 to depict the relationship between foreign aid, FDI and economic institutions. In short, under the current economic institutions, the beneficiary group of resources, which is proxied by aid dependency, has a stronger power to determine future economic institutions and maintain the receipt of aid. Therefore, we can say that any effect of aid dependency benefits this group.

The empirical results suggest a positive direct effect of foreign aid on FDI. The enhanced absorptive capacity through training, education and physical infrastructure could explain this. As for the aid-institutions-FDI path, we find that a freer institutional environment tends to attract more FDI which is consistent with previous empirical evidence. However, the effect of foreign aid on economic institutions is insignificant, suggesting an insignificant indirect effect of aid on FDI. As explained in the theoretical model, the beneficiary group of aid would not willingly give up the rights to continuously receive aid. This group has accumulated the power to determine economic

institutions which decide the future distribution of resources. Lowering institutional qualities leads to a decline in the amount of aid flows while improving the qualities would empower other competing groups. Therefore, maintaining the current level would be the best choice.

Chapter 3 shifts the focus to income inequality. We investigate the effects of foreign aid and FDI on the labour share for African countries to illustrate how, after receiving an unprecedented level of international flows, both public and private, the income has been distributed between capital and labour. FDI has been found to affect the labor share positively or negatively while there are no studies addressing the effect of foreign aid on the labour share.

The theoretical model is based on a constant elasticity of substitution (CES) production function which explains the variation of the labour share due to technological progress, the relative price of capital and capital intensity. The model also allows us to include the variables of interest since it relates the use of productive factors to the distribution between one another.

The results indicate that in the African countries of our sample, capital and labour are gross substitutes and the net direction of the technological progress is labour augmenting. Furthermore, we find that FDI positively affects the labour share since it could bring more job opportunities to host countries. The overall effect of aid on the labour share is negative while aid invested in production sectors has a positive effect. Besides, a higher degree of intervention and unrestricted movement of capital and people are negatively associated with the labour share.

This thesis contributes to the study of aid effectiveness in several aspects. First, Chapter 1 extends the commonly accepted recognition that foreign aid works better in good institutions. The results of Chapter 1 suggest that this relationship is not linear, i.e., foreign aid does not attract more FDI as economic institutional qualities improve.

Instead, foreign aid in a bad and restricted institutional environment has a robust crowding out effect on FDI while in a good and freer environment, the current aid flows are insufficient to finance development projects. Second, Chapter 2 further incorporates economic institutions into the aid-FDI analysis. The SEM allows us to investigate the direct and indirect effect via economic institutions on FDI when the reciprocal effects between aid and institutions have been considered simultaneously. Lastly, Chapter 3 provides a new insight into the aid-inequality investigation by studying the effect of foreign aid on the labour share while early studies investigate its effect on the Gini coefficient.

The whole study recognises the essential role of international development cooperation, particularly foreign aid in achieving sustainable economic development and improving the welfare fort people. We encourage donor communities to significantly increase the aid flows transferred to the most needy countries, since aid is an important complementary financial source for the countries which are less attractive for private capital flows. It is also affirmed that foreign aid could mobilise other private international flows domestically. That is, recipient countries could attract FDI through the enhanced absorptive capacity by foreign aid. Thus, we encourage donor and recipient countries to strengthen the cooperation, ensuring that the development projects and programmes are effectively implemented. In addition to the financial assistance, we also stress the relevance of foreign aid in the form of capacity building. The focus should be laid on improving institutional capacity among other aspects which will pave the way for the effective use of foreign aid.

Given the complexity of aid effectiveness, this thesis only decomposes aid into different groups based on the target sectors and the data on ODA have been used ignoring other aid flows. Future research would focus on aid invested in specific areas such as aid for trade, as well as the effect of the South-South cooperation. In addition, the lowering effect of aid on the labour share would motivate future studies to reveal the mechanisms at play.