# Aid for Trade and Foreign Direct Investment: Effects on Poverty Reduction

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**Abstract:**

We assess the role of aid for trade (AFT) and foreign direct investment (FDI) in poverty reduction. We analyze their impacts across different country-level income groups and between agriculture-dependent economies and those that are not. Based on data for 91 developing countries, and employing fixed effects and random effects models, our empirical analyses indicate that AFT flows have a robust and positive effect on poverty reduction but the effect differs across countries by income groups and the impact is largest in LDCs. The analyses also show that while AFT may be effective, the extent to which it reduces poverty depends on the policies and quality of institutions in the recipient country. AFT is most effective in reducing poverty: (1) when directed to infrastructure and to trade policies and regulations; and (2) for economies with relatively small dependencies on agriculture. Also, AFT directed to infrastructure and trade policies and regulations increase, while AFT to productive capacity reduces net FDI inflows.

**JEL Codes:** F35, I32

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**Abstract**

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**Introduction**

Poverty eradication has long been a top priority for most developing countries' governments and international development agencies because high levels of poverty can hinder growth and development. In spite of progress made, the number of people living in abject poverty globally remains unsatisfactorily high, so poverty reduction efforts remain more than worth the attention of policy makers. Many least developed countries' governments have resorted to relying on foreign assistance (bilateral, multilateral and through non-governmental organizations) from developed countries as a means of capital formation to foster growth and a major supplement to government expenditures to reduce poverty.

Official Development Assistance (ODA), commonly known as foreign aid, has numerous developmental objectives premised on a long-standing assumption that aid reduces poverty. Yet its effectiveness continues to be debated in the development economics discourse, because many aid-dependent countries have long remained at the top of the poverty rankings. Also, empirically, there is no clear consensus about the effectiveness of foreign aid in poverty reduction (Collier and Dollar, 2002; Dalgaard et al., 2004; Dalgaard and Hansen, 2001 and Moyo, 2009). Because some types of aid may be used effectively to reduce poverty, the World Trade Organization (WTO) in collaboration with the Organization of Economic Corporation and Development (OECD) launched the Aid for Trade (AFT) initiative in 2005. This initiative seeks to increase the amount of ODA that targets trade-related activities in order to maximize trade benefits and to use trade as an instrument for growth and poverty alleviation.

The effects of foreign direct investment (FDI) on poverty in host countries has also caught the attention of researchers (OECD, 2008). In fact, a growing body of literature explores whether FDI is accompanied by poverty reduction in host countries (Klein et al., 2001; Ucal, 2014; Gohou, and Soumaré, 2009). Overall, these studies conclude that net FDI inflows reduce poverty in host economies. Further, most studies find an interaction between aid and FDI though they are two different types of capital flows (Bhavan et al., 2011). A recent extension of these studies compares the impacts of aid and FDI and whether they are complements or substitutes (Kang et al., 2011; and Kimura and Todo, 2010).

We attempt to extend existing work by analyzing the individual effects of aid for trade (AFT) and FDI on poverty levels in recipient countries, all of which are developing countries. AFT and FDI may contribute to poverty reduction through different transmission channels such as growth, export expansion, export upgrades and employment under the conditions of good governance and pro-poor policies (De Matteis, 2013; and Ghimire, 2013). Thus, we attempt to answer two main questions: (1) whether AFT and FDI flows into developing countries reduce poverty levels, and (2) to what degree AFT and FDI act as substitutes or complements across the different income groups.

While assessing the impact of AFT and FDI on poverty, we are particularly interested in analyzing their impacts on poverty levels in developing countries. Specifically, we examine the effect of the different components of AFT on poverty reduction by using the three categories of AFT as defined by the OECD (OECD, 2006). We also analyze the effect of the different components of AFT on FDI to examine whether AFT creates an enabling environment to attract, or crowds out, foreign investments. That is, we assess the substitutability or complementarity between AFT and AFT. Lastly, we assess the effectiveness of AFT in economies with high levels of employment tied to the agricultural sector and those with low agricultural employment.

Most existing work on the relationship between aid and poverty reduction uses aggregate ODA as a measure of international assistance, but we focus on AFT instead of aggregate ODA. We do so because AFT prioritizes poverty reduction as the second most important objective (OECD/WTO, 2011). Another reason for using AFT lies in the fact that there is scant empirical evidence on the impact of AFT on poverty, though AFT is often assumed to produce net positive impacts on reducing the incidence of poverty. A relatively large number of studies assessing AFT's impacts employ qualitative approaches in the form of case studies, surveys and reports conducted by the OECD/WTO AFT Committee. The few other studies employing quantitative analysis limit their focus on assessing the impact of AFT on trade and do not consider its role in reducing poverty. Thus, this study is unique in the sense that we examine the impact of AFT and FDI on poverty.

In the following, we provide a brief overview of existing work, our conceptual framework, variable selection, and our model structure. We then discuss our estimation techniques, data analyses and results, followed by conclusions and implications.

**Previous Work**

In the following we provide a brief overview of poverty and its indicators or measurements. Second, we describe the historical evolution of foreign aid and the AFT initiative. Third, we briefly describe empirical studies on aid, AFT and FDI, and lastly we identify gaps in the literature.

Analyzing poverty in developing countries is difficult due to the lack of reliable poverty data. Also, poverty is multi-dimensional and lacks a clear-cut definition or measurement. Poverty is context-specific, so researchers use different poverty measures, broadly classified as monetary and nonmonetary measures of poverty (Alkire et al, 2015). The former is measured based on income or consumption, so people who fall below a predefined sufficient income threshold, or those who cannot afford a basket of food deemed to provide necessary nutrients for normal human growth are classified as poor. The consumption measure is mostly preferred to the income measure of poverty because the former reflects a household's actual standard of living and ability to meet basic needs.

The nonmonetary definition of poverty cuts across different aspects of welfare, including health, education, security, and social relations, among others. An example is the capability approach by Sen (1999), which describes poverty as the lack of specific crucial capabilities to function in society in the areas of education, health care and ability to act freely. However, the nonmonetary definition lacks a clearly defined scope and has no specific measurement.

Most researchers resolve to the use of the poverty lines proposed by the World Bank (2016), which currently uses a $1.90 per day poverty line at international prices. This is the average national poverty line in the world's poorest countries measured in international dollars, so a nation's national poverty line was converted to 2011 dollars using the individual consumption purchasing power parity (PPP) to its internationally comparable poverty line. The World Bank develops different indicators of monetary poverty based on this poverty line. One such measure is the poverty headcount ratio (HCR) at $1.90 a day. Another is the poverty gap index which not only reports on the incidence of poverty but also takes into account the depth of poverty. It is defined as "the mean shortfall from the poverty line (counting the non-poor as having zero shortfall) as a percentage of the poverty line." A final measure is the poverty gap squared which accounts for inequality among the poor, estimated by squaring the poverty gap for each household before calculating the average shortfall.

Foreign aid dates back to the late 1940s and began as international post-war assistance as part of the Marshall Plan with the aim of reconstructing war-devastated Western European economies (Edwards, 2015). Its success raised hopes that international financial transfers in the form of foreign aid could also help low-income countries, so foreign aid became a necessity for the economic development of many developing countries. This contributed to the formation of key international organizations such as the United Nations, International Monetary Fund (IMF) and World Bank, charged with the responsibilities of allocating international funds.

In the 1990s, some developing countries stagnated and struggled to repay the loans, leading to debt relief (Phillips, 2013). Questions were raised about the effectiveness of aid as some recipient countries remained poverty gripped, and eventually donors switched aid policies towards social programs such as health and education targeted at poverty reduction and human development. Increasingly, the emphasis was on the contribution of openness and export expansion to growth inspired by the work of Krueger and Bhagwati (1973). Aid became increasingly conditioned on developing countries' willingness to adopt trade liberalization policies, such as reducing import tariffs and eliminating quantitative import restrictions.

Neoclassical trade theory argues that increased openness to trade in a non-distorted way can improve the returns to those factors of production that are relatively less scarce in a nation. In least developed countries, this would mean redistributing wages in favor of the poor, which would then result in poverty reduction (Page, 2007). However, due to supply-side capacity limitations, some developing countries are unable to exploit fully the benefits from trade to embark on sustained economic growth in general, and reduce poverty in particular. Upon detecting the supply-side constraints, the WTO and OECD realized that the interactions between trade, aid, and broader development policies and reforms are important, so they launch the AFT Initiative at the Hong-Kong WTO Ministerial Conference in support of Millenium Development Goal 8 (developing a global partnership for development) targeted at facilitating multilateral trade, and improved market-access including duty-free, quota-free market access to trade for least developed countries.

The main AFT objectives include enhancing effective participation and competition in local, regional and international markets; building supply-side capacity and trade-related infrastructure to facilitate market access; facilitating, implementing and adjusting trade reforms; and assisting in trade agreement implementation AFT priorities that are focused on competitiveness, economic infrastructure and export expansion to satisfy a broad development agenda such as economic growth and poverty reduction (WTO, 2011).

Cali and te Velde (2011) argue that unlike other types of aid, AFT addresses some of the market and governance failures which impede the success of foreign aid. If employed effectively, AFT can be useful in achieving a number of trade-related targets. These include improving trade policy co-ordination (the trade development category); developing standards to improve access for exports (the trade facilitation category); enhancing skill formation (the trade-related adjustment category); improving infrastructure (the infrastructural AFT category); and overcoming governance failures, such as weak institutions or weak administrative procedures (the trade policy and regulations).

Unfortunately, AFT is a broad concept with no clearly-defined limits. This, sometimes coupled with data limitations, makes it problematic to estimate the impact and effectiveness of aid for trade. Thus, most studies have relied on data-driven definitions provided by the WTO/OECD Taskforce.

**Effects of Aid and AFT on Poverty**

The aid-poverty literature can be categorized into three broad strands. The first is skeptical about aid and concludes that aid is ineffective, causes the Dutch Disease and labels aid as harmful (e.g. Moyo 2009, Boone 1996, Rajan and Sunramanian 2011, Corden and Neary 1982, Wijnbergen 1985, and Rajan and Sunramanian 2011. The second concludes that aid is effective in poverty reduction (e.g. Sachs 2005, Kosack 2003, Senbeta 2009, Hansen and Tarp 2001). The last group assumes an intermediate position that aid effectiveness in poverty reduction is contingent on recipient country characteristics (e.g., Stockemer et al. 2011, Burnside and Dollar 2004, Collier and Dollar 2002, Beynon 2003, De Matteis 2013, Kasuga 2008, Verschoor and Kalwij 2006, Guillaumont (2008), and McGillivray 2003.

Though trade-related assistance has existed for decades, it did not gain major research attention until the launch of the AFT initiative in 2005, and relatively few published studies on the impact of AFT programs on the poor exist. Further, the evidence of the impact of AFT on poverty reduction could be likened to the impact of trade on poverty, where positive linkages exist only when considering specific aspects of AFT. While there is no coherent evidence that AFT has a harmful impact on economic performance and poverty, AFT impact tends to vary substantially depending on the type of AFT policy intervention, GDP, location of the recipient country, and the sector to which AFT flows are channeled, as reported by Turner (2013), OECD/WTO (2011), Helble et al. (2009), Busse et al. (2011), De Melo and Wagner (2015), Porto (2005), Porto et al. (2011), Diop et al. (2005), Ivanic et al. (2006), Basnett et al. (2015), Hallaert and Munro (2009), Hayashikawa (2009), and Higgins and Prowse (2010). To date, Little research has been done to assess its impact on poverty, in spite of AFT gaining so much prominence among donors and recipients of aid.

**FDI's Impact on Poverty**

Benefits accruing from FDI are generally assumed to include the creation of employment, technology and knowledge spillovers, and competitive business environments leading to production efficiency, all of which tend to reduce poverty (Jenkins, 2005). However, these benefits are contingent on the absorptive capacity of the host country (Wu and Hsu, 2012). Few researchers have tried to estimate the direct impact of FDI on poverty but found no significant results. FDI may directly impact poverty at the micro level through spillovers to the private sector, both as backward and forward linkages, and as vertical spillovers for domestic producers, or as positive horizontal spillovers through increased competition and new technologies. For FDI to reduce poverty, FDI must be channeled into labor-intensive sectors such as agriculture where it can spike pro-poor growth.

At the macroeconomic level, most studies analyzing the impact of FDI on poverty find that FDI is a means to an end (Mold 2004), so even if FDI does not impact poverty directly, it increases growth just as do other investments. Tambunan (2005) studied the impact of FDI on poverty in Indonesia and showed that FDI causes poverty reduction only through export, and that the positive impact of FDI can only be realized if FDI is complemented with pro-poor policies. Gohou and Soumaré (2009) investigate the regional differences in the impact of FDI on poverty in Africa. Using the assumption that growth implies poverty reduction, they choose per capita GDP as a proxy for the Human Development Index (HDI), and find that the impact of FDI on poverty differs across regions. Similarly, Igberi and Ogunniyi (2014) show that FDI has a positive but insignificant impact on real per capita income, and conclude that FDI does not have the potential of reducing poverty in Nigeria due to under-development of human capital and crowding out of domestic investment. In contrast, Assadzedeh and Pourqoly (2013) find that FDI significantly reduced poverty in 21 countries.

Overall, this work suggest FDI's impact on poverty depends on the absorptive capacity of the recipient country. For example, it depends on how adequate and prepared the human capital in the host economy is to absorb the technological changes associated with FDI. This may explain why the conclusions are mixed in these studies.

**Foreign Aid and FDI Interaction**

An essential part of the aid effectiveness debate is the question of the degree to which foreign aid supports a private sector-enabling environment. Kimura & Todo (2010) find that foreign aid in general has very little positive effect on FDI inflows, but they find robust evidence that Japanese aid has a significantly positive effect on attracting FDI from Japan but not from other countries. Selaya and Sunesen (2012) find that aid invested in factors complementary to physical capital increases FDI, while

aid directly channeled into physical capital crowds out FDI. Bhavan et al. (2011) find that both aid directed to physical capital and aid to human capital and infrastructural development have a long-run positive effect on FDI in some, but not other countries.

This overview points out (1) a lack of consensus on the specification of the aid-poverty relationship, and (2) the assumption that increased economic growth indicates poverty reduction is debatable because growth can only lead to poverty reduction if the former occurs in sectors where the poor are economically involved. Similar gaps exist in the FDI-poverty literature. Given these shortcomings, we first analyze the impact of aid and FDI directly on poverty, and then conduct a robustness test by analyzing the effect of the different components of AFT in reducing poverty for the aggregate group of developing countries and for the different income groups. Another contribution of our work is that we group countries into low- and high-agricultural economies, based on the proportion of labor in agriculture in each country, to assess the effectiveness of AFT in reducing poverty in both groups.

**Theoretical Framework**

Based on earlier findings, we expect that AFT interventions lead to poverty reduction in host countries under conditions of favorable policies and governance. Also, we expect FDI to reduce the incidence of poverty in host countries after controlling for other variables. Further, we expect a complementary relationship between AFT and FDI, leading to poverty reduction. Lastly, the effect of AFT on donor countries' exports is expected to be ambiguous.

We employ three AFT categories, as defined by the OECD (2006), to analyze the effect of AFT on poverty: (1) economic infrastructure AFT, comprising transport, communications, and energy generation supply, (2) productive capacity AFT, including agriculture, financial services, business and other services, industry, mineral resources and mining, fishing and tourism, and (3) trade policy and regulations AFT which includes trade policy and regulations and trade-related adjustments. We expect a positive relationship between each AFT component and poverty.

Based on the conventional Heckscher-Ohlin (H-O) model of international trade – which suggests capital (labor)-abundant countries produce capital (labor) intensive goods – and the empirical studies reviewed, we assume that FDI inflows to developing countries are channeled into labor-intensive production sectors. Accordingly, an increase in FDI would be expected to drive up the demand for labor, increase employment and wages, which would tend to reduce poverty in the presence of an equitable income distribution. Therefore, and in line with Agarwal and Atri (2015), we expect FDI will contribute to poverty reduction. Following Selaya and Sunesen (2012) we adopt the Solow growth model for a small

open economy. In this model, output per capita, $y$, grows with the accumulated physical capital per capita, $k$ (financed by domestic and foreign investments), and improvements in total factor productivity, $A$ (which comprise all factors complementary to the accumulation of physical capital per capita, such as technological progress, favorable policies and institutions) such that

$$y = Ak \tag{1}$$

We assume foreign aid has two components: aid that increases physical capital and the other increases complementary factors. The former may be thought of as aid going directly into productive sectors and the latter as aid for improving infrastructure, policies and institutions complementary to physical capital.

When foreign capital mobility is unrestricted, the marginal product of capital would be the same across countries, so foreign aid channeled directly into productive sectors would reduce the return to capital in the recipient country and crowd out FDI. However, foreign aid targeted to improving complementary factors such as infrastructure and technological progress would tend to increase returns to capital and attract additional FDI. Hence, the effect of total aid on FDI would be ambiguous, which may explain why some empirical studies that use total aid find insignificant or ambiguous results. We therefore assume that the effect of aid on FDI depends on the composition of aid; thus, we use a disaggregate measure of aid to model this relationship.

**Empirical Approach and Data**

Several empirical studies have attempted to examine the impact of aid on growth and poverty in developing countries (e.g. Yontcheva and Masud 2005), Kosack 2003) and Beynon 2003), but their conclusions differ widely. Our approach differs in that we (1) explicitly model this relationship using AFT instead of total ODA, (2) examine the direct effect of aid and FDI on poverty using the headcount ratio at the $ 1.90/day poverty line, and (3) assess the effect of AFT in reducing poverty in low- and high-agricultural developing economies.

Our analysis is based on an unbalanced panel dataset comprising 91 AFT-recipient countries spanning 2000-2014. AFT data are from the OECD Creditor Reporting System Database and data on the remaining variables are from the World Bank's World Development Indicators (WDI) database. In all the databases, countries are classified according to region, income or continents.

The original dataset contained all AFT-recipient developing countries including low income countries (LICs), lower middle income countries (LMICs) and upper middle countries (UMICs). We dropped all countries with fewer than two observations for the poverty headcount ratio measure, and also dropped war-prone counties such as Afghanistan and Syria. The remaining sample contains 91

countries which still represent all income levels, continents and regions, and includes 23 LICs, 35 LMICs and 33 UMICs. This explains the data's heterogeneity, which is evident in the minimum and maximum values of the variables shown in Table *1*1.

**Model**

Our model is a basic specification of the growth-poverty relation used by Datt and Ravallion (1992) and others to test the relative roles of growth and income distribution in poverty reduction, as follows:

$$Pov_{it} = \alpha_0 + \beta_1 GINI_{i,t} + \beta_2 GDP_{i,t} + \gamma_i + u_{i,t} \qquad (2)$$

where $i$ and $t$ represent country and year, respectively, $Pov_{i,t}$ is the measure of poverty, $GDP_{i,t}$ and $GINI_{i,t}$ are the real per capita income and the Gini Coefficient for country $i$ at time $t$, respectively. The $\gamma_i$ term represents unobserved country-specific characteristics and the $u_{i,t}$ term is the idiosyncratic error. The sum of the error terms $\gamma_i$ and $u_{i,t}$ yields the classical model's error term: $\varepsilon_{it} = \gamma_i + u_{i,t}$.

We augment Model 2 to yield Model 3 by including AFT flows to country $i$ at time $t$, $AFT_{i,t}$ as an additional variable that explains changes in poverty, and other policy variables that may affect poverty. Model 3 is used to estimate the effect of total AFT on poverty while controlling for income inequality, policy, GDP and the level of human capital in the recipient countries. It also captures the effect of FDI and the aid-policy interaction effect on poverty.

$$Pov_{it} = \alpha_0 + \beta_1 \text{AFT}_{i,t} + \beta_2 Policy_{i,t} + \beta_3 \{AFT_{i,t} * Policy_{i,t}\} + \beta_4 FDI_{i,t} + \beta_5 GINI_{i,t} + \beta_6 GDP_{i,t} +$$
$$\beta_7 HumCap_{i,t} + \gamma_i + u_{i,t} \qquad (3)$$

We do a robustness check of Model 3 by analyzing the impact of the three individual AFT components on poverty, by replicating Model 3 but replacing aggregate AFT with the disaggregated AFT and excluding the interaction term to yield Model 4.

$$Pov_{it} = \alpha_0 + \beta_1 AFT_{i,t}^{pc} + \beta_2 AFT_{i,t}^{infr} + \beta_3 AFT_{i,t}^{pol} + \beta_4 Policy_{i,t} + \beta_5 GINI_{i,t} + \beta_6 GDP_{i,t} +$$
$$\beta_7 HumCap_{i,t} + \gamma_i + u_{i,t} \qquad (4)$$

The $AFT^{PC}$, $AFT^{infr}$ and $AFT^{pol}$ variables in Model 4 represent AFT for productive capacity, AFT for infrastructure and AFT for trade policy and regulations, respectively.

Following <u>Selaya and Sunesen (2012)</u>, we specify the FDI-aid relationship as:

$$FDI_{i,t} = \alpha_0 + \beta_1 AFT_{i,t}^{PC} + \beta_2 AFT_{i,t}^{infr} + \beta_3 AFT_{i,t}^{pol} + \beta_4 GDP_{i,t} + \beta_5 Policy_{i,t} + u_{i,t} \quad (5)$$

The FDI variable represents foreign direct investment, measured by net per capita FDI inflows in constant values spread of the recipient nation. The variables *GDP, HumCap* and *GINI* represent per capita GDP, secondary school enrollment and the Gini index, respectively, and are included in the model to control for the growth effect or growth elasticity of poverty, human capital and the distribution effect

of poverty, respectively. The *Policy* variable measures political rights and civil liberty in a country. A country is rated (7 to 1) based on its scores for the degree of political rights and civil liberties ratings obtained through questionnaires administered by Freedom House, with 1 indicating the highest degree of freedom and 7 the lowest. Countries whose average rating for political rights and civil liberties is between 1 and 3 are categorized as 1 (Good policies) and 0 (Bad policies) if otherwise.

Most existing studies on aid and FDI adopt regression models analogous to Model 3. Ours is unique in that the response variable is poverty instead of GDP growth as used in most previous studies, whereby aid and FDI effectiveness in poverty reduction are inferred from their effect on growth. Also, aid – one of the main variables of interest – is replaced with AFT rather total ODA.

All three datasets are structured as panel data, and we employ two linear panel data estimators for the analysis, the fixed effect and random effect estimators. Panel data analysis enables controlling for unobserved heterogeneity between countries without accruing omitted variable bias. Put differently, using panel data can correct for endogeneity if its source is variation among countries. This is achieved using the fixed effect estimator if one assumes that country-specific characteristics are time-invariant. If country-specific characteristics are independent from the regressors, then using the random effect estimator yields consistent estimation of all parameters. The Hausman test helps us choose between the random and fixed effect estimator.

Note, the use of panel data and panel data estimators only corrects for endogeneity attributed to time-invariant country-specific characteristics. This model might still suffer from other types of endogeneity arising from bi-causal relationships between poverty and aid or FDI.

**Results**

Table *2*2 lists the correlation matrix, which shows that all AFT variables (AFT for infrastructure, AFT for productive capacity and AFT for trade policies and regulation) are negatively correlated with the poverty headcount ratio. The correlation between AFT for trade policies and regulations and poverty is the most negative. Also, AFT for infrastructure has a strongly positive correlation with total AFT, because the former forms the greatest part of total AFT. Further, the policy variable is positively correlated with poverty, which make sense because large values of the policy variable indicate unfavorable policy.

**Error! Reference source not found.**3 shows Model 3's results, which analyzes the effect of total AFT and FDI on poverty. Columns 2 through 5 show the regression results for the aggregate group of developing countries and for LICs, LMICs and UMICs, respectively.  The results show that total AFT has negative and significant effects on poverty in all developing countries and in each income group but it is insignificant for UMICs, indicating that an increase in AFT reduces the poverty headcount ratio in

developing countries. The results show that on the average, a dollar increase in AFT per capita reduces the percentage of poor people by 0.167 percentage points in developing countries overall. The estimate for the AFT and policy interaction term is positive, suggesting AFT is more effective in countries with favorable policy environments than in those with unfavorable policies. This means that a range of contextual factors (such as political rights and civil liberty) affects the extent to which AFT contributes to poverty reduction, confirming the conclusion by Dollar and Collier (2002) that foreign aid is more effective in a favorable policy environment.

The regression results also show that a dollar increase in per capita FDI on average reduces the poverty headcount ratio by 0.4 percentage points, suggesting that AFT is more effective in reducing poverty than FDI for the aggregate group of developing countries. Surprisingly, the FDI coefficient is positive and insignificant for low-income countries, indicating that AFT is ineffective in those countries. **Error! Reference source not found.**3 also shows that income inequality strongly worsens poverty, while an increase in human capital significantly reduces the poverty headcount ratio by 0.1 percentage points. Further, the results show that policies in recipient countries (overall group and LICs) have strong effects on the poverty headcount ratio but the policy coefficient is not significant for LMICs and UMICs.

Lastly, the coefficient for GDP growth per capita is positive and insignificant, which means that GDP growth is not effective in reducing the poverty headcount ratio across all income groups. However, the parameter estimate for GDP growth per capita is only statistically significant at the ten percent level for UMICs, and it is not significant for LMICs, LICs nor the aggregate group of developing nations. This finding provides unexpectedly strong support for the earlier expressed suspicion that economic growth does not necessarily imply poverty reduction.

Table *4*4 presents the results of Model 3, which are similar to **Error! Reference source not found.**3, but AFT is replaced with a four-year-lagged AFT to account for the time AFT disbursements take to affect poverty. The number of lags used was determined after a regression of AFT lags 1 through 5 on poverty showed that the four-year-lagged AFT was significant.  Thus, AFT is replaced with its lag in the regression to examine the long run effect of AFT.

The results indicate that a dollar increase in per capita AFT significantly reduces the poverty headcount ratio for the aggregate group of developing countries by 0.098 percentage points in developing countries. The AFT lag parameter estimate is negative and statistically significant for LMICs but it is positive and insignificant for LICs and UMICs, suggesting the lagged AFT's effect on reducing poverty is limited in the latter two groups of nations. Comparing the results of Tables 3 and 4 suggests AFT is more effective in reducing the poverty headcount ratio that the lagged AFT, indicating that AFT is

more effective in reducing poverty in the short run than in the long run. That is, AFT reduces the poverty headcount ratio by 0.16 as compared with 0.098 percentage points in the long run.

Once again, income inequality has a strongly positive effect on poverty across all income groups except in LMICs, where income inequality reduces the percentage of the population living under 1.90 dollars a day. Furthermore, an increase in human capital strongly reduces poverty. While policy shows no significant effect on poverty directly, the positive parameter estimate of the AFT-Policy interaction variable suggests AFT is more effective in countries with favorable policies than in countries with unfavorable policies using the aggregate group of developing countries. However, the effect is insignificant in the individual income groups. Also, the results show that FDI reduces poverty significantly in LMICs and UMICs.

**Error! Reference source not found.**5 shows the results from Model specification 5, which analyzes the effects of the three different AFT components on poverty reduction. The estimates indicate that an additional million dollars in AFT directed to infrastructural development and AFT targeting trade policy and regulations are effective in reducing the poverty headcount by 0.016 and about 0.079 percentage points in developing countries, respectively. Similar results were found for the UMIC income group, although with different magnitudes. For the LMIC group of countries, AFT targeted to improving trade policies and regulations is significant in reducing poverty, but for LIC nations, none of the three AFT variables are significant. Similar to findings by Bussel et al. (2011), AFT invested in trade policy and regulation has the largest magnitude of effectiveness in reducing poverty of the three AFT categories. In contrast to conclusions by De Melo and Wagner (2014), the negative parameter estimate of AFT for productive capacity suggests that it has a reducing effect on poverty albeit insignificant.

Table 6 reports the results of similar regressions, but with the inclusion of a dummy variable called SEC, representing high and low levels of the total workforce employed in the agricultural sector, where SEC =1 denotes a large segment of total employment in agriculture, and SEC = 0 otherwise. The results show that total AFT is effective in reducing poverty in all developing nations on average, but it is less effective in high-agricultural than in low-agricultural economies. While the coefficients of productive capacity AFT and infrastructural AFT are insignificant, trade policies and regulations AFT is significant in reducing poverty. Also, while AFT targeting productive capacity and infrastructural AFT appear to be less effective in high agricultural economies, AFT to trade policies and regulations seem to be more effective in reducing poverty in high-agricultural than in low-agricultural economies. The SEC coefficient is positive, indicating that countries with a greater percentage of their labor force in agriculture have

higher levels of poverty. The coefficients of the remaining variables did not change much from results in previous earlier regressions.

Table 1 shows the regression results of Equation 6's model specification, which estimates the impact of the different AFT categories on FDI. Columns 1, 2, 3, and 4 represent the regression results for total AFT, infrastructural AFT, productive capacity AFT and trade policies and regulations AFT, respectively. The results are very consistent with both theoretical and empirical evidence. AFT targeting infrastructure and AFT for policies and regulations strongly and significantly increase FDI inflows to all developing countries including LICs, LMICs and UMICs. However, while AFT targeting productive capacity is positively associated with FDI inflows, its parameter estimate is not significant. Hence, and consistent Selaya and Sunesan (2012), AFT directed to infrastructure and trade policy and regulations support a private sector-enabling environment.

Among all AFT variables, AFT directed towards improving trade policy and regulations is the most effective in attracting FDI inflows in developing countries. Also, GDP growth attracts foreign investments into recipient countries. Further, policy was included as a numerical variable on a scale from one (beneficial policies) to 7 (harmful policies). Consistent with expectations, favorable policies contributed to increased FDI inflows for the combined group of developing countries and for the UMICs, but the policy variable is not significant for LICs and LMICs.

**Concluding Comments**

AFT has long been viewed as a crucial tool for helping developing countries improve their trade capacity, optimize the gains from global trade expansion, and ultimately to reduce poverty (Basnett et al., 2012). AFT has increased over the years to about 30 percent of ODA, even in the era of the prolonged global financial crisis (De Melo and Wagner, 2015). In spite of the increased interest among policy makers to invest in AFT initiatives, there is scant evidence on its effectiveness overall and in achieving poverty reduction in particular. This study attempts to fill that gap by assessing the effect of AFT and FDI on poverty reduction and further tests the effect of specific AFT focus areas on poverty reduction.

Most of our findings are in line with theory and previous empirical studies, but with a few deviations. Overall, our findings indicate that AFT is an effective tool for reducing poverty in developing countries; in particular, AFT to infrastructure and AFT to trade policy and regulations are most effective. Specifically, an increase in AFT per capita by 1 dollar reduces the percentage of people living in poverty by 0.15 percentage points in developing countries overall, but it is least effective in UMICs relative to the two other income groups of developing nations. For the individual AFT components, our findings show that AFT targeted to infrastructure and AFT targeted to trade policy and regulations each has a strong

effect on reducing poverty, whereas AFT to productive capacity is ineffective. In addition, our findings show that FDI is effective in achieving poverty reduction across all income groups except for LICs, where FDI is not only ineffective but exacerbates poverty. The latter finding could be attributable to the low absorptive capacity (including the inadequate availability of human capital) in LICs, which prevents full optimization of the gains from foreign investments. Our findings of the effects of AFT on FDI show that AFT targeted toward infrastructural development and AFT targeting trade policies and regulations attract FDI inflows into recipient countries. Finally, AFT is less effective in high-agricultural economies than in low-agricultural economies in reducing poverty.

In contrast to a major strand of research that finds a negative or no link between ODA and poverty reduction, our findings indicate that AFT as a targeted form of ODA is effective in reducing poverty in developing nations overall. In particular, AFT getting infrastructure investments and improving trade policies and regulations reduced the incidence of poverty in LMICs. Hence, donors may wish to consider prioritizing their AFT investment in infrastructure as well as trade policy and regulations, particularly in lower middle income countries where AFT is most effective in poverty reduction. The effectiveness of AFT in reducing poverty in LMICs could also be attributed to the large amount of AFT they received, which suggests that an increase in the amount of AFT to LICs and UMICs could increase the effectiveness of AFT in poverty reduction. Lastly, AFT directed towards infrastructure improvements and AFT intended to improve trade policies and regulations attract FDI inflows, which in turn reduce poverty.

A caveat of our work is that data on the poverty variable (headcount ratio) used in this study suffer from a substantial amounts of missing data. Also, the study is based on a limited time period because data on AFT are only available from 2000 to 2014. Furthermore, the policy variable is difficult to measure but one would think it has a significant effect on poverty reduction.

The effect of AFT on poverty reduction depends on the measure of aid, the income group and the type of data, so future research could focus on finding a good instrument for poverty in order to overcome the issue of data inadequacy. Also, future studies could include analyses on how political changes may impact changes in recipient country's allocations of AFT funds toward initiatives focused on reducing poverty. Trivially, another area worth analyzing is the difference in effectiveness of multilateral AFT relative to bilateral AFT in reducing poverty.

***Table 1***. ***Descriptive statistics***

| Statistics | N | Mean | St. Dev. | Min | Max |
|---|---|---|---|---|---|
| Poverty (HCR at $1.90/day) | 524 | 17.030 | 19.479 | 0.000 | 84.120 |
| AFT Infrastructure (million dollars) | 1365 | 8.044 | 200.038 | 0.000 | 286.298 |
| AFT Prod. capacity (million dollars) | 1365 | 6.188 | 133.169 | 0.000 | 183.643 |
| AFT policy (million dollars) | 1363 | 0.252 | 5.189 | 0.000 | 8.865 |
| Total AFT (million dollars) | 1365 | 14.484 | 300.187 | 0.000 | 331.000 |
| FDI (million dollars) | 1354 | 128.070 | 295.210 | -842.350 | 5083.23 |
| GINI | 511 | 42.240 | 9.639 | 16.23 | 64.79 |
| GDP per capita growth (annual %) | 1361 | 3.110 | 4.210 | -37.925 | 33.030 |
| Agriculture (% GDP) | 1307 | 19.013 | 12.345 | 2.032 | 58.362 |
| Human capital (% population) | 626 | 53.541 | 24.392 | 3.194 | 99.465 |
| Policy (scale) | 1365 | 3.86 | | 1 | 7 |

Note: Most of the low income countries had insufficient records for poverty variable and this could affect the reliability of the regression result.

***Table 2. Correlation matrix***

| | POV | GINI | GDP | Policy | HUMCAP | AFT$^{INFR}$ | AFT$^{POL}$ | AFT$^{PROD}$ | AFT$^{TOT}$ | FDI |
|---|---|---|---|---|---|---|---|---|---|---|
| **POV** | 1 | | | | | | | | | |
| **GINI** | 0.20 | 1 | | | | | | | | |
| **GDP$^{GR}$** | -0.11 | -0.17 | 1 | | | | | | | |
| **Policy** | 0.21 | -0.28 | 0.09 | 1 | | | | | | |
| **HUMCAP** | -0.59 | -0.17 | 0.17 | -0.09 | 1 | | | | | |
| **AFT$^{INFR}$** | -0.10 | -0.09 | -0.02 | -0.20 | 0.07 | 1 | | | | |
| **AFT$^{POL}$** | -0.12 | -0.15 | -0.04 | -0.23 | 0.15 | 0.44 | 1 | | | |
| **AFT$^{PROD}$** | -0.16 | -0.14 | 0.00 | -0.10 | 0.14 | 0.18 | 0.35 | 1 | | |
| **AFT$^{TOT}$** | -0.13 | -0.13 | -0.03 | -0.24 | 0.12 | 0.92 | 0.75 | 0.31 | 1 | |
| **FDI** | -0.31 | -0.10 | 0.05 | -0.24 | 0.22 | 0.09 | 0.15 | 0.16 | 0.14 | 1 |

*Table 3. Effect of aggregate AFT and FDI on poverty*

| | Dependent variable: Poverty | | | |
|---|---|---|---|---|
| | Developing | LIC | LMIC | UMIC |
| **AFT<sup>TOT</sup>** | -0.167*** | -0.552*** | -0.168** | -0.035 |
| | (0.035) | (0.176) | (0.059) | (0.0362) |
| **GINI** | 1.134*** | 1.319*** | 0.952*** | 0.765*** |
| | (0.091) | (0.207) | (0.143) | (0.089) |
| **GDP** | 0.049 | 0.318 | 0.064 | 0.054* |
| | (0.065) | (0.318) | (0.157) | (0.044) |
| **HumCap** | -0.099* | -0.371*** | -0.049 | -0.135*** |
| | (0.055) | (0.101) | (0.071) | (0.043) |
| **Policy** | -1.729* | -13.902*** | -0.105 | -1.029 |
| | (1.019) | (5.136) | (1.943) | (0.859) |
| **FDI<sup>PC</sup>** | -0.004** | 0.051 | -0.029** | -0.004** |
| | (0.002) | (0.056) | (0.010) | (0.001) |
| **AFT<sup>TOT</sup>\*Policy (1)** | 0.122** | 0.865** | -0.048 | 0.035 |
| | (0.040) | (0.383) | (0.074) | (0.036) |
| **Constant** | | 19.474* | -9.514 | |
| | | (9.818) | (8.872) | |
| **Observations** | 524 | 64 | 194 | 266 |
| **R$^2$** | 0.515 | 0.642 | 0.471 | 0.532 |
| **Adj. R$^2$** | 0.508 | 0.598 | 0.451 | 0.451 |
| **F-Statistic** | 77.056*** | 14.394*** | 23.328*** | 36.658*** |
| | (df= 7, 516) | (df =7, 56) | (df= 7, 186) | (df = 7, 226) |
| **Hausman test** | 90.653*** | 4.347 | 9.334 | 36.084*** |

Notes: (1) $*p < 0.1$; $**p < 0.05$; and $***p < 0.01$, and (2) The policy variable was included as a binary categorical variable, where countries with freedom ratings from 1-3 were coded as 1 and those rated 4-7 were coded as 0.

*Table 4. Long run effect of AFT on poverty*

| | Dependent variable: Poverty | | | |
|---|---|---|---|---|
| | Developing | LIC | LMIC | UMIC |
| **AFT$^{TOT}$(4)** | -0.098*** | 0.010 | -0.141 *** | 0.001 |
| | (0.029) | (0.184) | (0.040) | (0.055) |
| **GINI** | 0.913 *** | 1.288 *** | -0.698*** | 0.457*** |
| | (0.102) | (0.263) | (0.162) | (0.071) |
| **GDP** | -0.019 | -0.279 | 0.109 | 0.037 |
| | (0.058) | (0.423) | (0.121) | (0.047) |
| **HUMAP** | -0.164 ** | -0.368 ** | -0.111 | -0.152 *** |
| | (0.053) | (0.108) | (0.071) | (0.039) |
| **Policy** | -0.322 | -2.912 | -0.016 | -0.521 |
| | (0.971) | (6.166) | (1.586) | (1.054) |
| **FDI$^{PC}$** | -0.003* | 0.067 | -0.018 * | -0.003** |
| | (0.001) | (0.183) | (0.009) | (0.001) |
| **AFT$^{TOT}$(4)*Policy(1)** | 0.092 * | 0.307 | 0.032 | 0.009 |
| | (0.043) | (0.431) | (0.085) | (0.057) |
| **Intercept** | | 14.382 | 1.870 | -0.290 |
| | | (11.849) | (9.158) | (5.031) |
| **Observations** | 413 | 51 | 369 | 321 |
| **R2** | 0.408 | 0.542 | 0.444 | 0.467 |
| **Adj. R-Squared** | 0.228 | 0.467 | 0.417 | 0.448 |
| **F-Statistic** | 31.106*** | 7.268 | 15.803 *** | 25.157 *** |
| | (df=7, 316) | (df=7, 43) | (df=7, 142) | (df=9, 311) |
| **Hausman Test** | 37.983*** | 3.762 | 4.558 | 7.335 |

Note:   *p<0.05; **p<0.01; and ***p<0.001.

*Table 5. Disaggregated effect of AFT on poverty*

| | Dependent variable: Poverty | | | |
|---|---|---|---|---|
| | Developing | LIC | LMIC | UMIC |
| AFT<sup>INFR</sup> | -0.016 ** | -0.016 | -0.009 | -0.036*** |
| | (0.006) | (0.051) | (0.008) | (0.010) |
| AFT<sup>PROD</sup> | -0.014 | -0.047 | -0.004 | -0.022 * |
| | (0.010) | (0.066) | (0.016) | (0.011) |
| AFT<sup>P0L</sup> | -0.079 *** | -0.845 | -1.101 *** | -0.489 *** |
| | (0.145) | (0.651) | (0.273) | (0.125) |
| GINI | 0.092 *** | 0.135 ** | 0.069 | 0.008 |
| | (0.025) | (0.047) | (0.049) | (0.032) |
| GDP | -0.002 | -0.003 | -0.071 | 0.048 * |
| | (0.021) | (0.044) | (0.046) | (0.019) |
| HUMCAP | -0.184 *** | -0.165 *** | -0.237*** | -0.105 *** |
| | (0.015) | (0.034) | (0.033) | (0.017) |
| Policy | 0.182 | 0.253 | 0.192 | 0.207 |
| | (0.161) | (0.317 ) | (0.336) | (0.186) |
| Constant | 32.892 *** | 45.827 *** | | |
| | (2.0918) | (3.840) | | |
| Observation | 523 | 64 | 193 | 266 |
| R<sup>2</sup> | 0.480 | 0.612 | 0.488 | 0.498 |
| Adjusted R<sup>2</sup> | 0.472 | 0.555 | 0.346 | 0.412 |
| F-Statistic | 58.326 | 10.832 | 17.939 | 32.044 |
| | (df = 7, 514) | (7, 33) | (7, 150) | (7, 226) |
| Hausman Test | 73.835*** | 17.930* | 1.397 | 10.075 |

Notes: (1) $p<0.05$; $p<0.01$; $p<0.001$, and (2) Policy is included here as a numerical variable, so a positive estimate indicates that a move away from favorable policies would worsen poverty.

*Table 6. Effect of AFT in low-agricultural and high-agricultural economies*

**Dependent variable: Poverty**

| | 1 | 2 | 3 | 4 |
|---|---|---|---|---|
| **AFT$^{TOTAL}$** | -0.031* | | | |
| | (0.026) | | | |
| **AFT$^{INFR}$** | | -0.053 | | |
| | | (0.047) | | |
| **AFT$^{PROD}$** | | | -0.020 | |
| | | | (0.042) | |
| **AFT$^{POLICY}$** | | | | -1.587*** |
| | | | | (0.474) |
| **GINI** | 1.078 *** | 1.084* ** | 1.076*** | 1.055*** |
| | (0.083) | (0.083) | (0.083) | (0.084) |
| **GDP** | 0.060 | 0.072 | 0.089 | 0.099 |
| | (0.065) | (0.066) | (0.065) | (0.065) |
| **HUMCAP** | -0.187*** | -0.194*** | -0.220*** | -0.229 |
| | (0.044) | (0.044) | (0.043) | (0.045) |
| **Policy** | 1.869 | 1.644*** | 1.718** | 1.745*** |
| | (0.044) | (0.532 ) | (0.527) | (0.528) |
| **SEC (1)** | 23.195 | 21.984*** | 22.379*** | 19.731*** |
| | (3.540) | (3.495) | (3.526) | (3.516) |
| **AFT$^{TOTAL}$*SEC(1)** | -0.118*** | -0.082 | -0.307*** | 0.943 |
| | (0.043) | (0.062) | (0.101) | (0.844) |
| **Constant** | -27.537 *** | -27.517 *** | -25.768*** | -23.946 |
| | (6.664) | (6.697) | (6.684) | (6.684) |
| **Observations** | 524 | 524 | 524 | 524 |
| **R$^2$** | 0.535 | 0.530 | 0.531 | 0.529 |
| **Adjusted R$^2$** | 0.529 | 0.523 | 0.524 | 0.523 |
| **F Statistic** | 84.350 | 82.555 | 82.793 | 82.342 |
| | (7, 516) | (7, 516) | (7, 516) | (7, 516) |

Notes: (1) $p<0.05$; **$p<0.01$; ***$p<0.001$, and (2) The aggregate group of developing countries is divided into low- and high-agricultural economies based on the proportion of the labor force in agriculture in each country, to create a dummy variable called SEC ('1', % of labor force in agriculture is 30% or more and '0' otherwise).

*Table 1*. *Disaggregated effect of AFT on FDI*

| | Dependent variable: FDI | | | |
|---|---|---|---|---|
| | Developing | LIC | LMIC | UMIC |
| **AFT_I** | 1.357** | 0.92011* | 0.933*** | 4.524* |
| | (0.445) | (0.402) | (0.139) | (1.847) |
| **AFT_P** | 0.889 | 0.783 | 0.308 | 1.330 |
| | (0.741) | (0.513) | (0.278) | (2.040) |
| **AFT_PO** | 47.399*** | -5.701 | 11.336* | 71.861** |
| | (10.584) | (5.524) | (4.759) | (23.372) |
| **GDP** | 1.627 | 0.430 | 2.163** | 2.5341 |
| | (1.466) | (0.364) | (0.816) | (3.464) |
| **Policy** | -24.893** | -2.598 | 0.034 | -47.565*** |
| | (9.399) | (2.157) | (3.875) | (1.875) |
| **Constant** | 191.396*** | 20.982 | 37.239* | 373.4837*** |
| | (44.197) | (10.834) | (18.452) | (106.030) |
| | | | | |
| **Observations** | 1349 | 343 | 605 | 485 |
| **R²** | 0.040 | 0.062 | 0.116 | 0.063 |
| **Adj. R²** | 0.036 | 0.0479 | 0.108 | 0.054 |
| **F-Statistic** | 11.062*** | 4.441*** | 13.419*** | 6.549*** |
| | (df = 5, 1343) | (df = 5, 337) | (df = 5, 605) | (df = 5, 485) |
| | | | | |

Note: p<0.05; **p<0.01; and ***p<0.001.

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