Foreign Aid and Savings Nexus: A Meta-Review

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ABSTRACT

Foreign aid was one of the prominent development strategies of the early 20th century where developed nations would send foreign capital to their underdeveloped counterparts to remove bottlenecks in their development timeline. Surveying the theoretical and empirical literature on foreign aid and domestic savings spanning seven decades, this thesis examined the three schools of thought present in the aid-savings debate: the orthodox, revisionist, and agnostic camps. They believe that foreign aid complements, substitutes, or has no impact on domestic savings. The institutional mechanisms and the altered incentives by the exogenous introduction of foreign aid will be explored to illustrate the response in the savings behavior of developing countries' governments, consumers, and producers. Through a meta-regression analysis, this thesis does not find any clear evidence of publication bias. Instead, the meta-regression suggests that foreign aid has a negative relationship with domestic savings which supports the revisionist theories.

[1] We accept the statement of academic honesty

1. Introduction

Foreign aid policy is designed to provide economic assistance to underdeveloped economies to expedite their development by reducing the need to accumulate these resources internally. In doing so, the timeline of development is pushed forward and allows for these underdeveloped economies to "catch up" with the rest of the developed world. Some of the more prominent forms of foreign aid are long-term loans and public grants, which provided underdeveloped economies an injection of foreign capital for productive investments by supposedly supplementing domestic savings (Chenery and Strout, 1966). This relationship between foreign aid and the domestic savings of a developing economy is the core focus of this thesis.

Since a country's domestic savings is used to finance its investments, the mixed results on foreign aid's effects on a recipient country's domestic savings has been a pivotal point in foreign aid literature. This contention highlights the divergence in beliefs regarding the interaction between foreign aid and the saving behavior of underdeveloped countries. A survey of the literature reveals three distinct camps: the orthodox perspective, which believes that foreign aid complements domestic savings; the revisionist point of view, which argues that foreign aid substitutes domestic savings and is not properly allocated; and the agnostic viewpoint (that arose in response to the revisionists), which claim no clear or causal aid-savings relationship.

For the purposes of this thesis, foreign aid is defined quite liberally as injections of foreign capital into an underdeveloped economy with the intent of supporting its development. This broad definition of foreign aid is used due to the variety of forms aid takes as well as foreign capital's role in enabling investments and bridging the trade gap within the underdeveloped economy. Foreign capital inflows may resemble the previously mentioned grants and loans, which transferred funds from developed countries to underdeveloped economies. However, these inflows may also include other forms of capital, such as the provision of technical assistance or training as part of a donor country's foreign aid package. Meanwhile, the scope of this thesis is limited to the relationship of foreign aid and domestic savings in the context of developing countries only. This limitation is set because of the occurrence of developed countries receiving foreign aid from other developed countries, international organizations, and even developing countries despite having more mature economies (Griffin and Enos, 1970). Consequently, developing countries and recipients of foreign aid are synonymous terms in the context of this thesis. Similarly,

economic development and economic growth is used interchangeably due to the prevalent practice within foreign aid literature to assess economic development with respect to GDP or GNP.

The following sections will offer a review of the literature on the relationship between foreign aid and domestic savings within developing countries. In the theoretical review, this thesis will examine the orthodox, revisionist, and agnostic theories regarding this interaction between foreign aid and domestic savings. The empirical review will analyze the statistical results and methods to support each school of thought. The fourth section will then synthesize key findings of foreign aid literature and investigate the potential presence of publication bias through meta-regression analysis. Finally, the conclusion will synthesize the theoretical and empirical insights presented in this thesis to draw conclusions about the relationship between foreign aid and domestic savings within developing countries.

2. Theoretical Review

Most of the theoretical discussions surrounding the relationship between foreign aid and domestic savings of underdeveloped countries occurred during the 1960s and 1970s. In the aid-savings debate, the Harrod-Domar Model and Rostow's Stages of Growth are the primary frameworks that serve as the foundation for the arguments for foreign aid as a means of catalyzing economic development in underdeveloped countries (Mikesell, 1968). Put simply, the Harrod-Domar Model links national savings with economic growth while Rostow's Stages of Growth posits that growth in savings and investment allow economies to proceed with their take-off stage. Thus, foreign aid enters the conversation due to its capability to affect not just the amount of savings an underdeveloped country may have but also the kinds of investments it enables. However, this effectiveness is entirely contingent on how foreign aid policy interacts with the underdeveloped country's savings behavior and allocation of foreign aid resources in response to this injection of foreign capital into their economy. Despite the revisionist literature which argued against the effectiveness of foreign aid policy, the orthodox camp has enjoyed mainstream acceptance by international organizations and economic superpowers who continued to implement foreign aid policies (Easterly, 1999).

2.1 Growth and Development Frameworks

The overarching frameworks surrounding the discourse between foreign aid and domestic savings are extensions of the Harrod-Domar Model and Rostow's Stages of Growth. Both of these models highlight capital's role in economic development.

Independently crafted by both Roy F. Harrod in 1939 and Evsey D. Domar in 1946, the Harrod-Domar Model distinguished itself from growth models of its time by its emphasis on the role of an economy's savings on its growth rate. At its core, the Harrod-Domar Model emphasizes the necessity for an economy to operate at full employment, which hinges on the assumption that people's savings must equal their investments (Harrod, 1939; Domar, 1946). This assumption implies that there should be no idle resources within the economy. Looking to the supply-side, this assumption means that producers must have the appropriate amount of capital available for current production and this capital should increase at a rate that aligns with the expected future investments. Assuming a state of constant growth rate for relevant variables over time, this increased investment should lead to the growth of national income since the capital stock should grow in proportion to the output. Consequently, the equilibrium growth rate is the proportion of the savings rate and the capital-output ratio (Hann and Matthews, 1964).

Rostow's (1959) framework outlined five stages of economic growth, which provided a broad overview of the evolution of nations throughout history. The first stage, known as "Traditional Society," depicts agrarian economies characterized by limited production and restricted social mobility due to technological and social constraints. To progress beyond this stage, a society must transition to the "Preconditions for Take-off." This next phase requires the development of critical sectors within the economy, demanding significant increases in savings, investment, and technological innovation to enhance capital utilization in production. The third stage, "Take-off," represents a rapid industrial revolution marked by a dramatic shift in production methods over a short period. During the third stage, output, investment, savings, and technological innovation experience substantial growth. Subsequently, economies may enter the "Drive to Maturity" stage, marked by self-sustaining growth. The fourth stage involves a more diversified and sophisticated industrial sector, with an increased role played by the government in terms of regulation. Ultimately, nations aspire to reach the last stage, or "Age of High Mass Consumption." Economies become more consumer-driven, characterized by high levels of output and decreasing levels of unemployment.

This positive relationship between the savings and growth of an economy put forward by the Harrod-Domar Model suggested that foreign capital from foreign aid may either help or harm development depending on how foreign aid interacts with their savings rate. Meanwhile, foreign aid theory is primarily interested in pushing developing economies into their take-off stage by providing them the capital necessary to raise savings and investment for their key industries to blossom. Therefore, the Harrod-Domar Model and Rostow's Stages of Growth emphasize the role of savings as a key driver of economic development and achieve take-off.

2.2 Orthodox Theories

Orthodox theories are guided by the Harrod-Domar Model and Rostow's Stages of Growth frameworks to justify that externally financed investment through foreign aid would enable a developing country to develop further and reach take-off with foreign aid complementing underdeveloped countries' domestic savings.

Rosenstein-Rodan (1943) discussed the problems that plagued the economically depressed regions of Eastern and South-Eastern European economies. Specifically, he suggested that their industrialization process would be greatly expedited through extensive and externally-financed investment from the rest of the developed world. Rosenstein-Rodan argued that industrialization is the necessary condition for these depressed regions to raise incomes and achieve more equitable income distribution. While these economies could industrialize on their own, this process would be sluggish since capital would have to be supplied internally through their domestic savings. The best path forward would be through international collaboration to provide these underdeveloped countries with foreign capital to complement their low savings. While Rosenstein-Rodan focused specifically on the development of depressed Eastern and South-Eastern European economies, his work has since been used as justification for externally-financed investment, now commonly referred to as foreign aid, in the broader context of the developing world (Easterly, 2006).

As the *1956 Foreign Aid Bill* was under consideration in the US Congress, Walt Rostow and Max Millikan (1957) presented a preliminary draft of their paper (later published as a book) to members of Congress of both parties to convince them of the constructive role the United States ought to take in building a more stable world. They proposed that if the United States provided sufficient foreign aid to low-income economies, then it would lead to a plethora of beneficial outcomes not just for the United States but for the rest of the world. The proposal, they argued, would provide

an added incentive for underdeveloped countries to develop to become eligible for such aid. They believed that the resources provided through foreign aid would remove one bottleneck in its development, that being the lack of capital. As a result, foreign aid would not only provide the necessary amount of foreign capital to spur development, but this aid would also promote economically healthy behaviors within the recipient country. This incentive arises due to the fact that these countries need to meet certain eligibility requirements of foreign aid that would typically involve indicators of the country's development. Consequently, foreign aid resources would be effectively used to finance productive investments while having an embedded check and balance mechanism for its proper allocation. So, foreign aid would shift the burden to develop on the underdeveloped countries, to support their most critical sectors and promote savings in order to domestically finance other key investments. When countries receive foreign aid for a prolonged period of time, politicians and leaders of these underdeveloped countries cannot blame their lack of resources to explain the poor state of their country. The local population would eventually exert pressure on these leaders to properly use foreign aid and promote accountability. The gaps in investment and capital are then argued to be filled by foreign aid.

Hollis Chenery and Alan Strout's (1966) model served as the primary aid model in foreign aid literature. They believed that foreign aid may enable underdeveloped countries to reach not just take-off but also a long-term self-sustaining economic growth. This growth is achieved by alleviating their shortage of skills, savings, and imported commodities in the short-run as well as a boost to output. Similarly, the accompanying economic growth brought about by the injection of foreign capital from foreign aid would encourage an increase in savings. Then, economic growth would make the underdeveloped country more attractive to private investment, allowing private foreign capital to either substitute the magnitude of aid or boost domestic income, both of which would further enable saving. But its long-run impact to enable self-sustaining economic growth within the underdeveloped country is dependent on whether foreign aid resources are allocated towards increased savings and reduced trade gap. Specifically, the incremental gains in output as a result of foreign aid must be funneled back towards key industries which would have promoted savings and investment to avoid bottlenecks typically seen in underdeveloped countries. Allocating foreign aid this way highlights that while the short-term connection between foreign aid and savings might be direct, the long-term

relationship is contingent on the underdeveloped countries' effective use of it to prevent dependence on external capital.

2.3 Revisionist Theories

At the heart of the revisionist perspective is the view that foreign aid is detrimental to the development and growth of an underdeveloped country due to the altered incentives within these underdeveloped countries brought about by foreign aid policy.

Griffin and Enos (1970) contended that, in general, there is no correlation between foreign aid and economic growth. In some instances, foreign aid may even deter development. This claim comes from the fact that foreign aid actually substitutes the recipient country's domestic savings. When given a target growth rate, an underdeveloped economy would use foreign aid for consumption and reduce domestic savings which is calculated as the difference between the country's desired investment levels and the available foreign aid resources.

Griffin and Enos provided five mechanisms that illustrate this negative relationship between foreign aid and domestic savings. First, because governments want to attain their growth targets at the lowest viable cost in terms of reduced current consumption, domestic savings would be substituted by foreign aid. Even if foreign aid were tied to a specific investment or project, the fungibility of foreign aid resources is not really restricted in any way. Foreign capital finances government spending that may not necessarily contribute to investment and is just as likely to be spent on consumption like public servants' salaries or greater social security benefits. Meanwhile, if the received foreign aid is quite large relative to the overall levels of investment in the recipient country, the marginal productivity of capital and the real interest rate would fall, which reduces the incentive to save and promotes greater consumption within the economy. Following this trend, public savings would also decrease due to the underdeveloped country's altered incentives. There would be less incentive for tax increases or enforcement as a result of the greater levels of aid-financed government expenditure. Private savings could also fall since the foreign aid resources may be channeled to local private entrepreneurs, increasing their propensity to consume. Finally, foreign aid could also reduce domestic savings by encouraging importation. This increased availability of foreign aid may induce the recipient government to adopt or maintain inappropriate exchange rates or other trade policies.

Rahman (1967) argued this substitutive relationship between foreign aid and domestic savings through the lens of how foreign aid is provided. He pointed out that an

economy could only substitute foreign aid for domestic savings if the provided foreign aid resources exceeded the amount necessary to invest in their key industries with respect to some target growth rate. But this condition is contingent upon the terms tied to the foreign aid that are ultimately determined by bilateral or multilateral negotiations. Thus, a country may be expected to "play the political game to maximize the allocation of aid in its favor, and use foreign aid thus obtained for both higher growth and higher current consumption" (Rahman, 1967, p. 150). So, a recipient of foreign aid would substitute domestic savings if it can negotiate for more foreign aid than they would need to achieve a certain level of investment. This excess allows foreign aid to be used for both investment and consumption.

Easterly (2001) highlighted the perverse incentives that arose within recipient countries upon receiving foreign aid. Underdeveloped countries invest in the future when they would receive great returns on their investments; otherwise, they would not invest. Easterly pointed out that foreign aid does not necessarily change the profitability for an underdeveloped country to invest in itself and so underdeveloped economies instead redirect such resources towards consumption goods. Since foreign aid tends to be provided on the basis of the savings-investment gap, it provides no mechanism to motivate recipient countries to adjust their savings and investment behavior at all. Ironically, these economies have even more reason to maintain their poor savings rate since the larger the savings-investment gap, the larger foreign aid package is allocated. Thus, foreign aid would make underdeveloped countries go against using their own resources to develop.

2.4 Agnostic Theories

Agnostic literature positioned itself as neither orthodox nor revisionist. Such literature claimed that there is no clear causal relationship between foreign aid and domestic savings. Their reasoning primarily focused on the methodological and theoretical flaws from revisionist literature.

Papanek (1972) highlighted the conflicting and inappropriate definitions of foreign aid found throughout revisionist literature (e.g. Griffin and Enos, 1972; Weisskopf, 1972). Revisionists had equated foreign aid as net foreign capital inflows. But the problem with using this definition is that it also includes foreign private investment which may have different effects on an underdeveloped country than foreign aid. Due to the contamination of the variables employed, it rendered revisionist analyses inconclusive. Papanek also put forward plausible savings functions where foreign

capital inflows could lead to a positive effect on savings while substantially boosting investment. He did this to show that there are as many realistic savings functions that argue a positive aid-savings relationship as opposed to those argued by the revisionists. First, note that investment is dependent on the amount of foreign exchange available for local entrepreneurs to import capital goods to maintain the output and efficiency of their firms. So, foreign capital inflows then introduce more foreign exchange into the economy which would contribute to higher incomes and savings in the economy. Meanwhile, since savings are closely linked to the performance and growth of key industries, foreign capital inflows could raise domestic savings by increasing the income of these groups. Finally, since foreign aid is typically directly invested, the initial boost in incomes from foreign aid would lead to a corresponding boost in savings.

Papanek also pointed out that an accounting convention was responsible for the supposed negative relationship between foreign aid and domestic savings. Domestic savings are calculated as a residual, representing the difference between gross investment and foreign capital inflows. It is worth noting that not all foreign aid is intended entirely for investment, where a portion may be intended for consumption. As such, it is misleading to reduce domestic savings by the amount of foreign resources received for consumption purposes. Take, for example, the act of sending a gift of foreign food to a starving group. The gift has no effect on investment nor savings but this accounting practice would show a decline in savings since the group has consumed beyond its income. Griffin and Weisskopf's analyses have ignored the differences in foreign aid's uses and sources by just subtracting all foreign resources from investment in calculating for domestic savings.

Papanek also emphasized the problem of concluding causality. Underdeveloped countries that go through crises are characterized by low savings and economic growth rates. Since these countries receive more aid due to their poor economic conditions, both savings and economic growth would show a negative relationship with foreign capital inflows. If, for example, a country had a history of inflation, then it may develop behavior against savings and thus receive more foreign aid. Meanwhile, if a country had concentrated non-entrepreneurial income like the exportation of natural resources, it would most likely have greater savings and receive less savings. Similarly, when countries go through periods of crises, they tend to receive more foreign aid than they would on average in order to mitigate the

immediate threats to their economy. This tendency would have also led to a negative correlation between foreign aid and domestic savings but in this instance, it would highlight that low domestic savings (brought about by the crisis) caused more foreign aid to be sent to the country as opposed to the revisionist thesis that foreign aid substitutes domestic savings.

3. Empirical Review

The published evidence on the relationship between foreign aid and domestic savings is mixed due to the varying estimation techniques, disaggregations of foreign aid, and data sets employed. For most of these studies, the domestic savings of the underdeveloped country served as the dependent variable while the varying measures of foreign aid were employed as the explanatory variable. These different values of foreign aid typically were proxied by net foreign capital inflows (e.g. Griffin & Enos, 1970; Weisskopf, 1972), had disaggregated foreign aid into specific forms of aid like official development assistance and bilateral and multilateral aid (e.g. Hussein and Elakkad, 2021; Wambaka, 2022), and transformed foreign aid into a proportion of the underdeveloped country's GNP (e.g. Over, 1975; Rahman, 1968). Proponents of the orthodox view expect a positive coefficient for the foreign aid variable, revisionists anticipate a negative coefficient for the same variable, whereas agnostic literature would predict insignificant results.

The models used in the numerous studies surrounding the aid-savings relationship vary. These range from ordinary least squares used in earlier papers (e.g. Hansen and Tarp, 2000; Griffin, 1970; Rahman, 1968) to the simultaneous equation models used in more modern studies (e.g. Igbinedion and Olele, 2018; Wambaka, 2022). For context, 7 out of the 17 studies included in this section employed simultaneous equation models since these models can prevent endogeneity and better account for the impact of foreign aid on both domestic savings and economic growth (e.g. Hussein and Elakkad, 2021; Sabra and Eltalla, 2016).

Hansen and Tarp (2000) noted in their review that there were studies from the 1960s and 1970s that did not disaggregate foreign aid inflows from other types of foreign capital inflows. Most of the regressions that were analyzed included a clear variable definition of aid (i.e. official development assistance), while several others did not distinguish between foreign aid and other forms of foreign capital inflows (such as foreign direct investment). Additionally, most studies investigated not only the effect foreign aid had on savings, but also on the underdeveloped country's economic

growth and investment (e.g. Basnet, 2013; Papanek, 1973). Sometimes, economic growth is the principal variable being investigated by the empirical study, yet it is included due to its relation and discussion on the underdeveloped country's domestic savings. If economic growth is a function of savings and investment (as stipulated by the Harrod-Domar Model) and foreign aid can be used to supplement savings, then foreign aid can be used to attain economic growth. This link is important especially considering that foreign aid is usually given to supplement the recipient country's development initiatives (Sabra and Eltalla, 2016). Further, researchers have also investigated variables outside the traditional aid-savings models discussed earlier in the thesis. For instance, entrepreneurial skill can be considered as a factor in the attainment of efficient investments for development projects in underdeveloped countries because it creates business opportunities and draws in investors which would increase domestic savings. These savings would ideally be redirected to development programs, but an inflow of foreign aid in the absence of entrepreneurial skill and investments would lead to foreign aid substituting domestic savings used for consumption (Taslim and Weliwita, 2000). Another study by Wambaka (2022) also included institutional quality as a factor for domestic savings and as an interaction variable for foreign aid.

3.1 Orthodox Evidence

This section presents empirical evidence supporting the orthodox viewpoint that foreign aid has a positive impact on an underdeveloped country's domestic savings.

Over (1975) focused on the critique of foreign aid being endogenous instead of exogenous to the model. He argued that the use of the ordinary least squares estimation technique by Griffin and Enos (1970) implied that foreign aid is exogenous and investment as endogenous. However, the model assumed foreign aid to fill in the difference of investment and saving, where it is more likely that this difference would be directly proportional to the benefits to the donor. This assumption means that foreign aid would become endogenous, especially considering that investment can be exogenous since it is set by private investors and government development plans. Given these assumptions, it becomes clear that it is more appropriate to use the two stage least squares method to ensure the parameters remain consistent. Using this approach yields a statistically significant foreign aid coefficient of 0.96, with a p-value of 0.0323 for foreign aid, implying that one percentage point increase in

foreign aid (as a proportion of GNP) increases domestic savings (as a proportion of GNP) by 0.96 percentage points.

Hussein and Elakkad (2021) used time series data from 1965 to 2020 to analyze the impact of foreign aid on the domestic savings in Egypt. They wrote that Egypt has been a recipient of a significant amount of bilateral and multilateral aid. Official development assistance has also supported their economic growth and savings. They used a simultaneous equation model that is reflective of Chenery and Strout's two-gap model. To estimate the relationship between foreign aid and domestic savings, they used the two stage least squares method to prevent simultaneity bias resulting from endogeneity which can happen in single-equation models such as that of ordinary least squares. To reduce multicollinearity, the variables were also regressed in their natural logarithm form. In the regression model for domestic savings, they included official development assistance, gross domestic product per capita, and gross capital formation as regressors. The findings showed that official development assistance had a coefficient of 0.17 and p-value less than 0.00, showing that foreign aid boosted domestic savings by 0.17 percentage points.

Awino and Kioko (2022) focused on Kenya's economic growth and domestic savings from 1960 to 2019. They stated that Kenya is reliant on official development assistance for supplementing both the country's domestic savings and its economic growth, especially in periods of economic turmoil. Similar to Hussein and Elakkad's study, they made use of a two-equation model and employed two stage least squares with the natural logarithm forms of the variables to address potential endogeneity and multicollinearity issues respectively. Awino and Kioko also regressed domestic savings against official development assistance, government expenditure, and gross capital formation. They reported that the official development assistance variable had a positive and statistically significant coefficient of 0.7320 and a p-value of less than 0.000. This coefficient implied foreign aid has a greater impact on domestic savings than Hussein and Elakkad, specifically that a 1 percentage point increase in official development assistance would raise domestic savings by 0.732 percentage points, providing more evidence on the positive relationship between foreign aid and domestic savings.

Through time series data of Nigeria from 1980 to 2015, Igbinedion and Olele (2018) suggested that foreign aid can help resolve Nigeria's problem of low national savings. Similar to Awino and Kioko and Hussein and Elakkad, they also used a two-gap

model premised on the Harrod-Domar and Chenery and Strout models. Instead of two stage least squares, they use ordinary least squares to estimate a single-equation error correction model. The model linked savings to official development assistance. Furthermore, a Johansen cointegration test was performed to check for any long-run association between the variables. The foreign aid variable of official development assistance was the only variable that was stationary at level while the other regressors had to be first differenced to become stationary. The cointegration test also confirms at least two cointegrating equations exist. The regression revealed a positive and significant coefficient of 2.3716, with a p-value of less than 0.000. The coefficient for official development assistance is much higher than that of official development assistance variables in Hussein and Elakkad and Awino and Kioko. This meant that foreign aid complemented domestic savings in Nigeria.

3.2 Revisionist Evidence

This section discusses the empirical evidence supporting the revisionist perspective which posits that there is a negative relationship between foreign aid and domestic savings.

Griffin's (1970) initial study used ordinary least squares on cross-section data of 32 underdeveloped countries from 1962 to 1964 to estimate the impact of foreign capital inflows on domestic savings. Foreign capital inflow was used as the proxy variable for foreign aid. He obtained a coefficient of -0.73 with a p-value of 0.00001, which served as the empirical backing for his stance against foreign aid. However, Griffin implied that future studies on the foreign aid-domestic savings relationship can better explain the behavior of an economy over time by using time series or panel data. He also pointed out a weakness of his data where domestic savings is calculated as a residual. In another study from the same year, Griffin and Enos (1970) used ordinary least squares regression to estimate the impact of foreign aid on domestic savings. They analyzed 13 underdeveloped countries from 1962 to 1964, and obtained a coefficient of -0.82 with a p-value of 0.1431 for the variable of foreign savings as a percentage of GNP. They also performed the same test, estimating foreign aid on domestic savings, but omitted Israel since it was a "special case" as the country had no economic savings and received $3,000 million in foreign aid. From this regression, they obtained a negative and significant coefficient of -1.14 for foreign aid, with a p-value of 0.014 as opposed to the previously insignificant result when Israel was included in the regression.

Rahman (1968) also tested Haavelmo's hypothesis, which posited that domestic savings is not only a function of GDP, but of foreign capital inflows (including foreign aid) as well. Using Chenery and Strout's cross-country dataset of 31 developing countries in 1962, he tested Haavelmo's hypothesis through ordinary least squares, and obtained a coefficient of -0.2473 for foreign aid with a p-value of 0.0156. He concluded that foreign aid's inverse relationship with domestic savings could be due to its substitution of an underdeveloped country's domestic savings.

Weisskopf (1972) expanded on Griffin and Enos' study by focusing on foreign aid's ability to impact domestic savings given both savings and trade constraints. In his research, he utilized time series data from 44 underdeveloped countries spanning from 1953-1966. He used a simultaneous equation model that reflects standard macroeconomic relationships and the independent growth constraints of savings and trade, where trade is understood as the availability of foreign exchange for importation of goods. These constraints are based on the two-gap theory. The model is appropriate as foreign capital can fill both saving and trade gaps at the same time. He also grouped countries into 3 categories: countries with only an active savings constraint, countries with only an active trade constraint, and countries with both savings and trade constraint. Weisskopf also differentiated ex ante savings as desired or planned savings in contrast to ex post savings, or the actual savings after a particular period. He wrote that this distinction was important as it is only when the savings constraint is active that ex ante domestic savings can be predicted through time series data for ex post savings. Data from countries with only an active savings constraint were then used in an ordinary least squares regression estimating the impact of foreign capital inflows on ex ante savings. The coefficient for foreign capital obtained was -0.227 with a p-value of less than 0.000. The results of his analysis suggested that the negative coefficient of the response of ex ante domestic savings to a change in the level of foreign aid is a result of the substitution of domestic savings by foreign aid.

Through a simultaneous equation model and two stage least squares test, Basnet (2013) showed that the negative relationship between foreign aid and domestic savings is indicative of the crowding out of domestic savings by foreign aid and supplementing consumption. He used these estimation techniques to ensure that the independent variables are kept exogenous and to prevent simultaneity bias. He employed a pooled data set with time-series and cross-section data from 1960-2008

from 5 South Asian countries, namely, Bangladesh, India, Pakistan, and Sri Lanka. He also sought to study South Asian countries with available data as at the time, since it ranked 3rd in the World Bank's regional classification for recipients of foreign aid and that the region's nations also had similar cultural and economic contexts. Basnet also defined foreign aid as official development assistance as a proportion of GDP. His analysis showed that foreign aid had a significant coefficient of -0.64 and a p-value of 0.00001.

Sabra and Eltalla (2016) studied the impact of foreign aid on domestic savings in 8 Middle Eastern and North African countries by using panel data spanning 1977 to 2013. Just like Basnet, they also estimated savings and growth simultaneously as it allowed for testing of the ineffectiveness of foreign aid due to its displacement of domestic savings. Further, they explained that using ordinary least squares can result in biased and inconsistent estimators as the regressors are likely to be jointly determined. In this study, foreign aid was defined as the net official development assistance and official aid received. The two stage least squares test conducted reveals that foreign aid has a coefficient of -0.146, which is significant at the 10% level with a p-value of 0.0768. In addition to two stage least squares, Sabra and Eltalla also made use of a system dynamic panel data generalized method of moments estimation. This approach is widely used in empirical research on foreign capital flows. It also showed the connections between the model in the context of the region and time period chosen in the study. This model used the lagged variables of the dependent variable as well as the regressors. The results from this estimation supported the two stage least squares results, as it also produces a negative coefficient of -0.16 for foreign aid and a p-value of 0.00001, making it significant at the 1% level. Sabra and Eltalla attributed the results to crowding out of domestic savings by foreign aid in the included countries. These findings could also be the result of foreign aid being used for low-productivity investments and humanitarian relief rather than the increase of production capacity.

Wambaka (2022) pointed out, through a random effects model, that bilateral and multilateral aid can have a negative impact on domestic savings. He used panel data from 28 Sub-Saharan African countries dated from 1996 to 2015. This region is said to be one of the largest recipients of foreign aid, which is used to advance development outcomes, including enhancing domestic savings. He disaggregated the foreign aid variable into bilateral aid and multilateral aid to produce a better specified

model, and also included institutional quality as an interaction variable. The random effects model was chosen based on the Hausman test and assumes that the regressors and unobserved variables are uncorrelated. Wambaka's analysis showed that bilateral aid had a negative correlation to domestic savings even after the interaction of the foreign aid variables with institutional quality. In the tests including all 28 Sub-Saharan African countries, bilateral aid had negative and statistically significant coefficients. Without the institutional quality variable, it had a coefficient of -0.253 with a p-value of 0.0027. When institutional quality is included in the regression, bilateral aid has a coefficient of -0.388 and a p-value of 0.005. For middle-income Sub-Saharan countries in the study, both bilateral aid and multilateral aid had a negative and statistically significant relationship with domestic savings. Bilateral aid had a coefficient of -1.205 when interacted with institutional quality, a coefficient of -1.274. Both coefficients had p-values less than 0.0001. Multilateral aid had a coefficient of -1.977 and a p-value of 0.0059, while when it was interacted with institutional quality, its coefficient was -3.301, with a p-value of 0.0003. However, in low-income countries, both bilateral and multilateral aid had a positive and significant correlation with domestic savings, even after interacting with institutional quality. The results partially support the idea that foreign aid crowds out domestic savings because it motivates unproductive public spending as a result of corruption.

Akter's (2018) study used annual time series data from 1980 to 2015 from Bangladesh, India, and the Philippines. These countries are described to be dependent on foreign capital. In the study, foreign aid is understood as a percentage of the recipient country's GDP. He utilized a single linear equation that estimates the relationship of the independent variables (i.e. foreign aid, remittances, etc.) to domestic savings. The natural logarithm of the variables was also taken to standardize the variables. To ensure the ordinary least squares results were not spurious, the variables were also first differenced. The Johansen cointegration test conducted revealed the presence of 1 cointegrating equation. After running the regression, it is revealed that foreign aid and domestic savings have a negative, long-run association for all 3 countries included in the study. All the foreign aid coefficients are statistically significant at the 5% level. Bangladesh obtained a coefficient of -0.270 and a p-value of 0.00001, India had a coefficient of -0.257 with a p-value of 0.00001, and the Philippines obtained a coefficient of -0.445, with a p-value of 0.000051. The study also seemed to consider only tied foreign aid, as it notes that the decreasing

magnitude of foreign aid's impact on domestic savings can be a result of tied foreign aid's limited potential to raise savings, since they cannot be used for other development projects other than the one it was given for.

Taslim and Weliwita (2000) estimated the relationship between foreign aid and domestic savings in Bangladesh through time series data. The model used is a linear equation where gross domestic savings is a function of GDP, foreign aid disbursement (as a proxy for foreign aid), and gross domestic investment. After conducting a cointegration test, the cointegrating equation was normalized on gross domestic savings. The coefficient of -2.074 and a p-value of 0.00001 suggested that there is a long-run negative relationship between foreign aid and domestic savings in Bangladesh. The error correction model regression also confirmed that there is a negative association between foreign aid and domestic savings since the coefficient obtained for foreign aid was -1.14, and was described as statistically significant at the 5% level. The results implied that each dollar from foreign aid results in a decrease in domestic savings by 1.14 dollars.

3.3 Agnostic Evidence

Several authors presented their empirical findings that argued against a significant causal relationship between foreign aid and domestic savings (Bowles, 1987; Snyder, 1990). This belief comes as a result of Granger causality tests, regressing previous studies specifications using more modern data, and insignificant regression results.

While Bowles (1987) acknowledged the negative correlation between foreign aid and domestic savings presented in various studies (Griffin and Enos, 1970; Weisskopf, 1972), he wrote that it is the causal direction from foreign aid to domestic savings that was mistaken. On one hand, the negative relationship could be a result of the poor economic status of a country that would make them eligible for foreign aid. As Papanek similarly argued, countries are more likely to receive foreign aid in times of crisis. When countries are in crisis, their savings tend to be lower due to the uncertainty felt by consumers and producers alike brought about by this exogenous disruption.

Bowles employs Granger's definition of causality which claims that there is a causal relationship between two variables, say X and Y, if better predictions of variable X's future values can be made by including variable Y in addition to its own past data. Bowles then expresses the causal relationships through a bivariate model with uncorrelated error. He then creates three categories by which causality between

variables can be grouped in. First, if the coefficient of domestic savings is positive, then domestic savings causes foreign aid, and implies that a country would receive foreign aid as a result of low savings rates. This result would mean that the savings coefficient would be insignificant and the coefficient of foreign aid would be negative yet insignificant. Conversely, foreign aid inflow causes savings if the coefficient of foreign aid is positive. This outcome suggests that foreign aid would be given due to political factors that are not completely related to the achievement of development objectives (Bowles, 1987). If both the coefficients of domestic savings and foreign aid are positive, then there is bidirectional causality between the two variables.

Bowles used a data set of 20 underdeveloped countries from 1960-1981. He also included one-period lagged versions of the variables of the domestic savings rate and foreign aid. In this study, foreign aid was measured through net disbursements from both Development Assistance Committee countries and multilateral agencies. It was also limited to funds intended for development objectives and containing at least a 25% grant element. Bowles conducted simple regression analysis for savings rate on foreign aid and vice versa. However, he did not include the resulting coefficients. From the results, he categorized countries into 5 classifications: domestic savings causes foreign aid (Nigeria, Somalia, and Bolivia), foreign aid causes domestic savings (India, Tanzania, Taiwan, Turkey, and Burma), bidirectional causality (Greece and Paraguay), no causality but negative correlation (Thailand, Peru, and Jamaica), and no causality or correlation (Ghana, Philippines, Honduras, Brazil, Uruguay, Colombia, and Sri Lanka). However, because of the small sample size and short time period, it is difficult to generalize these possibilities.

Papanek (1973), who is cited by Bowles, analyzed the aid-savings relationship in a different way. Although his research focused on economic growth, Papanek also discussed foreign aid's impact on domestic savings. He performed a correlation test and cross-country regression on 85 countries with data from the 1950s and 1960s. The correlation between domestic savings and foreign aid had a correlation coefficient of -0.56 in Papanek's correlation matrix. However, Papanek suggested that statistical results from studies that test the relationship between foreign aid and domestic savings may not be as satisfactory. But a regression done on domestic savings and other factors revealed a strong negative association (coefficient of -1) between domestic savings and foreign aid.

One concern with the revisionist position was that it was a spurious result of omitted variables like per capita income. According to Snyder (1990), several critics pointed out that compared to countries with high per-capita income, low per-capita income countries would receive more foreign aid assuming that aid would be disbursed according to need (e.g. Papanek, 1972; Papanek, 1973; Bowles, 1987). The negative correlation would be spurious since this group of countries experience both low savings rates and high aid inflows. Apart from this tendency, other exogenous variables that could have been omitted (like political disturbances) may also impact domestic savings. Foreign aid in the study was measured with official development assistance as a proportion of GNP while the same was also done for domestic savings. Therefore, to investigate the relationship between foreign aid and domestic savings, Snyder runs Griffin's regression equation using panel data from the 1960s to early 1980s, and included 50 developed countries. He employed ordinary least squares to regress the foreign aid against domestic savings. This specification yields a negative coefficient of -0.40, which was consistent with Griffin's findings. But when Snyder includes the per capita income variable, the effect of foreign aid on domestic savings diminished down to a coefficient of -0.11. Snyder then employs a two-equation model to conduct a fixed effects regression so that the influence of omitted variables can be mitigated or even eliminated in case any important variables are not covered in the model. The fixed effects regression found that the foreign aid coefficient remained small and negative at a value of -0.17. For all of these regressions, the foreign aid variable was found to be small, negative, and statistically insignificant. Consequently, Snyder noted that it is difficult to compare these results with earlier revisionist literature due to their use of foreign capital inflows as a proxy for foreign aid (e.g. Griffin, 1972; Weisskopf, 1972). Another limitation he highlighted was the potential simultaneous-equation bias present in his regression model.

Finally, Newlyn (1973) noted a significant observation regarding the coefficients of regression equations in the aid-savings debate. Negative values of the coefficient, ranging from 0 to -1, actually signify negligible changes in the absolute amount of national resources being used for investment. Instead, the coefficient would represent the extent to which foreign resources have been utilized for consumption. He argued that a substitution effect may only be claimed if the negative value exceeds unity (an absolute value of 1), while a complementary effect on investment may manifest if the positive value exceeds unity.

4. Discussion

This section has a dual purpose: firstly, to employ meta-regression analysis to assess potential publication bias in the foreign aid literature, and secondly, to synthesize findings and insights from the theoretical and empirical literature on foreign aid.

The scope of this meta-regression analysis was limited primarily to published content such as journal articles and books that discuss the aid-savings relationship. However, we also included studies whose main focus was foreign aid's relationship with economic growth if they had incorporated a discussion on foreign aid and savings. Studies that made use of both linear, simultaneous equation, and error correction models, along with various estimation techniques such as ordinary least squares, two stage least squares, and random effects were included. Some studies in the empirical literature were excluded from the meta-regression data set because certain tests used did not provide specific estimates of foreign aid's impact on domestic savings. These estimates, typically obtained through regression coefficients, are essential for conducting the meta-regression analysis. Specifically, studies that only used correlation or Granger causality tests to estimate the relationship between foreign aid and domestic savings did not have their results included in the meta-regression analysis data set. Overall, the collected empirical evidence are results of quantitative testing of foreign aid's impact on domestic savings through regression analysis.

A table summary of the estimates used in the meta-regression analysis is presented in *Table 18* of the Appendix. This table reveals that a great number of the surveyed studies found that foreign aid reduced the domestic savings of underdeveloped countries. However, as Newlyn argued, a foreign aid coefficient exceeding unity would represent a truly substitutive or supplementary effect on domestic savings. So if the coefficient is between 0 and -1, then it would only reflect the degree to which foreign aid is used for consumption. Only some studies find a clear substitution of domestic savings using foreign aid while most other studies suggest a reduced, yet notable, displacement of domestic savings. The same is also true for orthodox studies with most coefficients that are positive yet below unity.

Publication bias may be defined as the preference of researchers, journals, and the academic community towards statistically significant findings. That is, studies that are statistically significant are more likely to be published as opposed to papers with insignificant findings (Stanley, 2005). So, when investigating the foreign aid literature for publication bias, we first begin by creating a funnel graph of the studies' precision

and non-standardized effect (See *Figure 1* in the Appendix). These values are measured by the reciprocal of the study's standard error and the regression coefficient reported by the study respectively. This funnel graph serves as a preliminary signal of the lack of publication bias in the selected foreign aid literature since it has a relatively symmetrical shape, indicating that the estimated effects vary randomly rather than in a biased manner (Stanley, 2005).

To further investigate any presence of publication bias, we proceed with a simple meta-regression analysis model which regressed the individual study's standard error against the regression coefficients presented in the studies (See *Equation 10* in the Appendix). Stanley (2005) explained that there is publication bias when the coefficient of the reported effect is statistically significant. However, to account for risks of heteroskedasticity, weighted least squares is employed to obtain more robust estimates (See *Equation 11* in the Appendix).

Table 19 presents the results of the meta-regression analysis. These results found little evidence of publication bias and prompted us to accept the null hypothesis that β_1 is statistically insignificant since its p-value is greater than 0.05. This finding implied that there was no publication bias in the selected foreign aid literature. A possible explanation for this conclusion is the inclusion of studies from the agnostic literature whose main thesis is the lack of clear, distinct, and causal relationship between the two variables. So including agnostic results meant including statistically insignificant findings on the aid-savings relationship. As such, since the agnostic evidence had been represented alongside the orthodox and revisionist results, bias towards statistically significant results is unlikely to manifest.

On top of the absence of publication bias, the simple meta-regression model also reveals the precision or "true value" of the selected literature. That is, since β_0 had a negative sign, the meta-regression analysis suggests that foreign aid has a negative relationship with a recipient country's domestic savings and is in support of revisionist analyses. Based on Newlyn's proposition, since the magnitude of this precision does not exceed unity, we do not claim that there is a substitutive relationship between foreign aid and domestic savings, but instead recognize the displacement of some savings when receiving aid.

There was an attempt to improve the model by adding dummy variables identifying orthodox and revisionist literature, with the agnostic perspective serving as the base category. However, since this new model only yielded insignificant results, we

focused our meta-regression analysis using *Equation 10* (See *Equation 11* for this alternative model specification and *Table 20* for its results in the Appendix).

The review of literature on the foreign aid-savings relationship and corresponding meta-regression showed that answers to the question of foreign aid's impacts on domestic savings are conflicting. Most studies tested the validity of the Harrod-Domar model, Rostow's stages of growth, and Chenery and Strout's two-gap model that premise the aid-savings relationship: foreign aid complements savings and can therefore enable growth in underdeveloped countries (Chenery and Strout, 1966; Hussein and Elakkad, 2021; Igbinedion and Olele, 2018) versus foreign aid substituting domestic savings instead and can be channeled into unproductive investments and consumption (Sabra and Etalla, 2016; Wambaka, 2022). However, another stream of studies argued that there is no clear causal relationship between foreign aid and domestic savings due to the lack of clarity on the direction of the aid-savings relationship (Bowles, 1987; Newlyn, 1973), neglected relevant variables (Papanek, 1973; Snyder, 1990), and the misleading accounting convention for calculating domestic savings (Papanek, 1972).

One contentious point in the aid-savings debate lies in the actual definition of foreign aid and the variables used as a proxy to measure its impacts on domestic savings. Considering that the discourse surrounding foreign aid's impact on domestic savings began towards the middle of the 20th century, there were likely issues in attaining the data of an underdeveloped countries' net inflows of foreign aid resources. As such, most early literature had to use data on their net capital inflows (Griffin and Enos, 1972; Weisskopf, 1972; Rahman, 1968). Later on, due to greater data availability, research disaggregated foreign aid into its various forms: official development assistance, grants, and bilateral and multilateral aid to gain more specific insight on the effects of various types of aid on savings (Awino and Kioko, 2013; Wambaka, 2022).

The position of agnostic literature also is a point of interest in the foreign aid discourse. For context, agnostic literature had arisen in response to revisionists' arguments against foreign aid with a primary thesis that there is no clear causal relationship between foreign aid and domestic savings. However, in doing so, agnostic authors had inadvertently criticized the methodologies and findings of orthodox literature. When concluding that there is no clear causal link between foreign aid and domestic savings, it not only argues against the negative case posited

by revisionists but also the positive one represented by orthodox literature. In spite of both revisionist and agnostic literature undermining the orthodox view of the aid-savings relationship, foreign aid policy persisted well into the 21st century and had been justified by orthodox arguments to justify political goals (Easterly, 2001).

The primary mechanism at hand that determines the effect of foreign aid on domestic savings is its allocation and fungibility. Stronger explicit and implicit checks and balances that are included in the foreign aid agreement may deter the improper use of foreign aid resources. By explicit, we mean better monitoring systems from the developed country to ensure aid resources are properly invested or require transparency measures from the underdeveloped country when making use of their foreign aid. By implicit, one of the primary suggestions of the foreign aid literature is to "tie" these resources with the underdeveloped countries' savings rate or to specific investments in order to mitigate the moral hazard created in the allocation of such aid once it is received (Easterly, 2001; Chenery and Strout, 1966).

Lastly, foreign aid literature had the tendency to conclude a causal relationship between foreign aid and domestic savings despite only having established a correlation between the two variables. As the agnostic literature emphasized, correlation does not necessarily entail causation. It may, as Papanek posited, be that countries with low savings could attract more aid or that they are simultaneously related to one another. This causal relationship between foreign aid and domestic savings was only actually tested twice through Granger causality analysis (Taslim and Weliwita, 2000; Bowles, 1987). For the vast majority of the literature, however, correlation matrices were used to further justify the relationship between foreign aid and domestic savings.

5. Conclusion

The thesis presented a range of perspectives within the aid-savings debate. The orthodox literature argued in favor of foreign aid as a means to supplement the domestic savings of underdeveloped countries, with the aim of facilitating productive investments, introducing internal checks and balances for development, and accelerating industrialization. Conversely, revisionists challenged this viewpoint, having asserted that foreign aid could create moral hazards within recipient countries, potentially leading to foreign aid substituting for domestic savings. In contrast, agnostic literature criticized the methodology of revisionist studies, highlighting issues such as accounting conventions, omitted exogenous variables, and data-related

concerns, ultimately casting doubt on the existence of a clear causal link between foreign aid and domestic savings. This critique inadvertently questioned and weakened the foundations of orthodox literature as well. Given the representation of each school of thought and the significant data-related challenges encountered in early literature on the aid-savings debate, it is important to note that a substantial portion of empirical findings included statistically insignificant results. Furthermore, the absence of publication bias was confirmed through the meta-regression analysis and the visualization of the funnel graph, underscoring the complexities and nuances of this academic discourse, as it unfolded in the past. Notably, the meta-regression results suggested that the revisionist school of thought may be more accurate in claiming that domestic savings are reduced upon receiving foreign aid, but not to the extent of having a substitutive relationship.

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Appendix

Equation 1: Estimating the impact of investment on foreign aid

$$f = -4.49 + 0.51\,(i), \qquad R^2 = 0.135$$
$$(3.8) + (0.22) \qquad n = 36$$

Equation 2: Estimating the impact of fitted values of foreign aid on domestic savings assuming that foreign aid is endogenous instead of exogenous

$$s = 8.96 + 0.96\,(\widehat{f}), \qquad n = 36$$
$$(1.93) + (0.43)$$

Source of equations: Over (1975)

Table 1: 2SLS Regression of impact of Official Development Assistance (ODAID) on domestic savings

Dependent Variable	Independent Variable	Coefficient	T-Stat	Standard Error	N
Gross domestic saving	ln(Official Development Assistance)	0.17	4.0476	0.042	56

Source: Hussein and Elakkad (2021)

Table 2: 2SLS Regression of impact of Official Development Assistance (ODAID) on domestic savings

Dependent Variable	Independent Variable	Coefficient	T-Stat	Standard Error	P-Value	N
Ln Gross domestic saving	Ln ODA received	0.732	7.6569	0.0956	0	60

Source of table: Awino and Kioko (2022)

Table 3: Error Correction Model regressing Official Development Assistance (ODA) on savings

Dependent Variable	Independent Variable	Coefficient	T-Stat	Standard Error	N
Differenced domestic savings	Differenced ODA (official development assistance)	2.3716	6.0231	0.3549	32

Source: Igbinedion and Olele (2018)

Equation 3: Estimation of Foreign capital inflows as a proportion of GNP on gross domestic savings as a proportion of GNP

$$\frac{S}{Y} = 11.2 - 0.73\,\frac{A}{Y}\,;\; R^2 = 0.54$$
$$(0.11)$$

Source: Griffin (1970)

Equation 4: Estimation of impact of foreign savings on gross domestic savings

$$\frac{Sd}{Y} = 16.1 - 0.82\frac{Sf}{Y};\ R^2 = 0.71$$
$$(0.52)$$

Source: Griffin and Enos (1970)

Equation 5: Estimation of Foreign capital inflows as a proportion of GNP on Domestic savings as a proportion of GNP

$$\frac{S(t)}{Y(t)} = 0.1427 - 0.2473 \frac{H(t)}{Y(t)}$$

Source: Rahman (1968)

Equation 6: Estimating domestic savings with active savings constraint and inactive trade constraint

$$S = a + b\overline{Y} + c\overline{F} + d\overline{E}$$

Equation 7: Estimating domestic savings with both active savings and trade constraints

$$S = \lambda + (\mu - 1)\,\overline{F} + v\overline{E}$$

Equation 8: Estimating domestic savings with binding trading constraint

$$S = -\alpha/\gamma - \beta/\gamma\overline{Y} + (1 - \gamma)/\gamma\overline{F} + 1/\gamma\,\overline{E}$$

Equation 9: Pooled regression estimating impact of foreign aid on ex ante savings

$$S = a + (0.183)Y - 0.227F + 0.176E$$
$$(t = 65.9),\ (t = -5.3),\ (t = 4.6)$$

Source: Weisskopf (1972)

Table 4: 2SLS Regression estimating impact of foreign aid on domestic savings in Bangladesh, India, Nepal, Pakistan, and Sri Lanka

Dependent Variable	Independent Variable	Coefficient	T-Stat	Standard Error	N
Saving rate (ratio of gross savings to GDP)	Foreign aid (ODAs and official aid) as a proportion of GDP	-0.64	-6.4	0.1	245

Source: Basnet (2013)

Table 5: 2SLS Regression estimating impact of foreign aid on domestic savings in select Middle East and North African (MENA) countries

Dependent Variable	Independent Variable	Coefficient	T-Stat	Standard Error	N
Domestic savings	Foreign aid	-0.146	-1.825	0.08	36

Source: Sabra and Etalla (2016)

Table 6: System dynamic panel data regression estimating impact of foreign aid on domestic savings in select Middle East and North African (MENA) countries

Dependent Variable	Independent Variable	Coefficient	T-Stat	Standard Error	N
Domestic savings	Foreign aid	-0.16	-5.9259	0.027	36

Source: Sabra and Etalla (2016)

Table 7: Random effects estimation of impact of foreign aid on domestic savings in all 28 Sub-Saharan African countries

Dependent Variable	Independent Variable	Coefficient	T-Stat	Standard Error	N
Gross domestic saving	Bilateral aid	-0.253	-3.0119	0.084	560
Gross domestic saving	Multilateral aid	-0.189	-1.1118	0.17	560

Source: Wambaka (2022)

Table 8: Random effects estimation of impact of foreign aid on domestic savings in all 28 Sub-Saharan African countries with interaction variables for aid and institutional quality included

Dependent Variable	Independent Variable	Coefficient	T-Stat	Standard Error	N
Gross domestic saving	Bilateral aid	-0.388	-2.8116	0.138	560
	Bilateral aid (after interacting with institutional quality/INST)	-0.21	-1.2209	0.172	560
	Multilateral aid	0.201	0.7309	0.275	560
	Multilateral aid (after interacting with institutional quality/INST)	-0.59	-1.7933	0.329	560

Source: Wambaka (2022)

Table 9: Random effects estimation of impact of foreign aid on domestic savings in low-income Sub-Saharan African countries with interaction variables for aid and institutional quality included

Dependent Variable	Independent Variable	Coefficient	T-Stat	Standard Error	N
Gross domestic saving	Bilateral aid	0.027	0.1753	0.154	300
	Bilateral aid (after interacting with institutional quality/INST)	0.66	2.8448	0.232	300
	Multilateral aid	0.527	1.9234	0.274	300
	Multilateral aid (after interacting with institutional quality/INST)	1.043	3.2191	0.324	300

Source: Wambaka (2022)

Table 10: Random effects estimation of impact of foreign aid on domestic savings in middle-income Sub-Saharan African countries with interaction variables for aid and institutional quality included

Dependent Variable	Independent Variable	Coefficient	T-Stat	Standard Error	N
Gross domestic saving	Bilateral aid	-1.205	-4.5472	0.265	260
	Bilateral aid (after interacting with institutional quality/INST)	-1.274	-4.5177	0.282	260
	Multilateral aid	-1.977	-2.7767	0.712	260
	Multilateral aid (after interacting with institutional quality/INST)	-3.301	-3.7048	0.891	260

Source: Wambaka (2022)

Table 11: Estimation of first normalized long-run cointegrating equation: dependent variable as gross savings for Bangladesh, India, and the Philippines

Dependent Variable	Independent Variable	Coefficient	T-Stat	Standard Error	N
Ln Domestic savings	ln of Foreign aid as percentage of GDP (f) - Bangladesh	-0.27	-8.1818	0.033	36
	ln of Foreign aid as percentage of GDP (f) - India	-0.257	-10.28	0.025	36
	ln of Foreign aid as percentage of GDP (f) - Philippines	-0.445	-4.6354	0.096	36

Source: Akter (2018)

Table 12: Estimation of cointegration vector normalized on gross domestic savings

Dependent Variable	Independent Variable	Coefficient	T-Stat	Standard Error
Gross domestic savings	Foreign aid disbursement	-2.074	-37.0357	0.056

Source: Taslim and Weliwita (2000)

Table 13: Error correction model estimation regression of foreign aid and the first lag of gross domestic savings on gross domestic savings

Dependent Variable	Independent Variable	Coefficient	T-Stat	Standard Error
Gross domestic savings	First lag of GDS	-0.23	0.1742	-1.32
Differenced Gross domestic savings	Differenced Foreign aid	-1.14	0.3248	-3.51
Differenced Gross domestic savings	Differenced First lag of foreign aid	0.66	0.4648	1.42

Source: Taslim and Weliwita (2000)

Table 14: Summary of regressions grouping sample of underdeveloped countries in study by causality and correlation

$S \Rightarrow A$	$A \Rightarrow S$	$S \Leftrightarrow A$
Nigeria	India	Greece
Somalia	Tanzania	Paraguay
Bolivia	Taiwan	
	Turkey	
	Burma (+ve)	
No causality, negative correlation	No causality, no correlation	
Thailand	Ghana	
Peru	Philippines	
Jamaica	Honduras	
	Brazil	
	Uruguay	
	Colombia	
	Sri Lanka	

Source: Bowles (1987)

Table 15: Correlation among savings and other foreign resource inflows

	Aid	Investment	Other
(Domestic) savings	−0.56	−0.22	−0.19
(Foreign) aid	...	0.13	0.14
(Foreign private) investment	...	...	0.23

Source: Papanek (1973)

Table 16: OLS estimation of overseas development assistance as a proportion of GNP on gross domestic savings as a proportion of GNP

Dependent Variable	Independent Variable	Coefficient	T-Stat	Standard Error	N
Gross domestic savings as a proportion of GNP	Overseas development assistance as a proportion of GNP	-0.4	-5.37	0.0745	150
		-0.11	-1.16	0.0948	150

Source: Snyder (1990)

Table 17: Fixed effects estimation of overseas development assistance as a proportion of GNP on gross domestic savings as a proportion of GNP

Dependent Variable	Independent Variable	Coefficient	T-Stat	Standard Error	N
Gross domestic savings as a proportion of GNP	Overseas development assistance as a proportion of GNP	-0.17	-1.42	0.1197	150

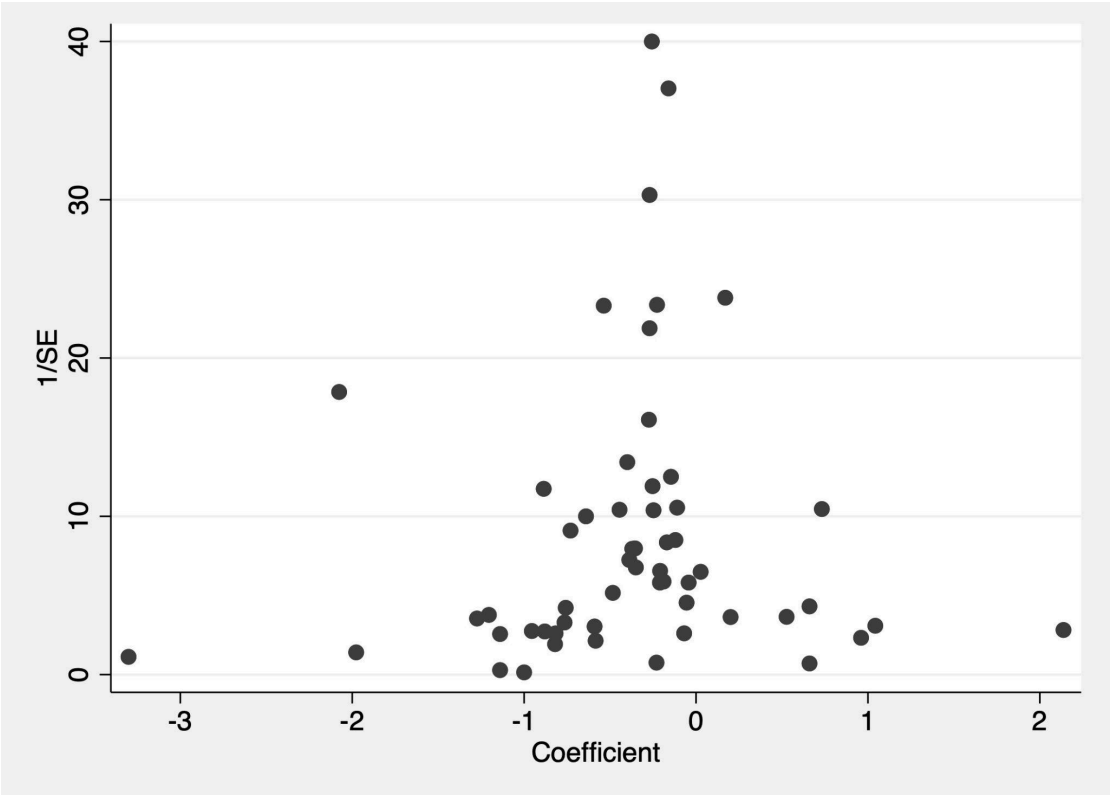
Source: Snyder (1990)

Table 18: Summary Table of Foreign Aid Literature Estimates

Study	Coefficient	T-Statistic	Standard Error
Shirin Akter	-0.27	-8.1818	0.033
Shirin Akter	-0.257	-10.28	0.025
Shirin Akter	-0.445	-4.6354	0.096
Mead Over, Jr.	0.96	2.2326	0.43
Md Anisur Rahman	-0.2473	-2.568	0.0963
Keith Griffin	-0.73	-6.64	0.1099
Keith Griffin	-0.82	-1.5769	0.52
Keith Griffin & JL Enos	-1.14	-2.9231	0.39
Thomas E. Weisskopf	-0.484	-2.5	0.1936
Thomas E. Weisskopf	-0.069	-0.18	0.3833
Thomas E. Weisskopf	-0.584	-1.25	0.4672
Thomas E. Weisskopf	-0.765	-2.52	0.3036
Thomas E. Weisskopf	-0.355	-2.83	0.1254
Thomas E. Weisskopf	-0.88	-2.4	0.3667
Thomas E. Weisskopf	-0.27	-5.91	0.0457
Thomas E. Weisskopf	-0.886	-10.4	0.0852
Thomas E. Weisskopf	-0.955	-2.63	0.3631
Thomas E. Weisskopf	-0.274	-4.41	0.0621
Thomas E. Weisskopf	-0.055	-0.25	0.22
Thomas E. Weisskopf	-0.209	-1.37	0.1526
Thomas E. Weisskopf	-0.758	-3.2	0.2369
Thomas E. Weisskopf	-0.537	-12.51	0.0429
Thomas E. Weisskopf	-0.817	-2.13	0.3836
Thomas E. Weisskopf	-0.371	-2.95	0.1258
Thomas E. Weisskopf	-0.043	-0.25	0.172
Thomas E. Weisskopf	-0.227	-5.3	0.0428
Donald Snyder	-0.4	-5.37	0.0745
Donald Snyder	-0.11	-1.16	0.0948
Donald Snyder	-0.17	-1.42	0.1197
Donald Snyder	-0.35	-2.37	0.1477
Donald Snyder	-0.12	-1.02	0.1176
M.A. Taslim and A. Weliwita	-2.076	-37.07142857	0.056
M.A. Taslim and A. Weliwita	-0.23	-0.1742	1.32
M.A. Taslim and A. Weliwita	-1.14	-0.3248	3.51
M.A. Taslim and A. Weliwita	0.66	0.4648	1.42
Sunday Osahon Igbinedion and Enoh Hilda Olele	2.3716	6.0231	0.3549
Mahmoud Mohammed Sabra	-0.146	-1.825	0.08
Mahmoud Mohammed Sabra	-0.16	-5.9259	0.027
Hem Basnet	-0.64	-6.4	0.1
Kosea Wambaka	-0.253	-3.0119	0.084
Kosea Wambaka	-0.189	-1.1118	0.17
Kosea Wambaka	-0.388	-2.8116	0.138
Kosea Wambaka	-0.21	-1.2209	0.172
Kosea Wambaka	0.201	0.7309	0.275

Kosea Wambaka	-0.59	-1.7933	0.329
Kosea Wambaka	0.027	0.1753	0.154
Kosea Wambaka	0.66	2.8448	0.232
Kosea Wambaka	0.527	1.9234	0.274
Kosea Wambaka	1.043	3.2191	0.324
Kosea Wambaka	-1.205	-4.5472	0.265
Kosea Wambaka	-1.274	-4.5177	0.282
Kosea Wambaka	-1.977	-2.7767	0.712
Kosea Wambaka	-3.301	-3.7048	0.891
Rasha M. Elakkad and Asmaa M. Hussein	0.17	4.0476	0.042
Omenda Purity Awino and Urbanus Mutuku Kioko	0.732	7.6569	0.0956
Gustav Papanek	-1	-0.1408	7.1

Figure 1: Funnel Graph of Selected Foreign Aid Literature



Equation 10: Simple Meta-Regression Analysis Equation

$$effect_i = \beta_0 + \beta_1 SE_i + \varepsilon_i$$

Equation 11: WLS Meta-Regression Analysis Equation

$$t_i = \beta_1 + \beta_0 \frac{1}{SE_i} + \frac{\varepsilon_i}{SE_I}$$

Source: Stanley (2005)

Table 19: Meta-Regression Results (Simple Model)

Dependent Variable = t_i	
Moderator Variables	FA-DS
Constant	-0.3151607 (-0.31)
1/SE	-0.2871288 (-3.49)***

Note: Numbers in parentheses are t-statistics with * = $p < 0.10$, ** = $p < 0.05$, *** = $p < 0.01$

Table 20: Meta-Regression Results (Included Dummies)

Dependent Variable = t_i	
Moderator Variables	FA-DS
Constant	-0.4138553 (-0.43)
1/SE	-0.2110049 (-0.85)
Orthodox	0.5253598 (1.74)*
Revisionist	-0.130186 (-0.55)

Note: Numbers in parentheses are t-statistics with * = $p < 0.10$, ** = $p < 0.05$, *** = $p < 0.01$