Mirajul Haq* - Muhammad Luqman† - Ayesha Javaid Cheema ‡

DOES FOREIGN ASSISTANCE COMPLEMENT SAVINGS IN THE GROWTH PROCESS: EMPIRICAL EVIDENCE FROM SELECTED ASIAN COUNTRIES

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Abstract

The effectiveness of foreign aid in the macroeconomic performance of developing countries has been an issue of considerable disagreement. Although this issue has attracted enormous attention from researchers and development practitioners, less is known about the effects of foreign aid on internal potential for capital formation. Hence, the key objective of this study is to test the hypothesis that foreign assistance is a complement to or a substitute for domestic savings in the long-run growth process. For this purpose, we estimated an empirical model using data from 17 lower income and highly indebted Asian countries from 1990 to 2018. Overall, the results substantiate that foreign aid and savings complement the long-run growth process.

JEL CLASSIFICATION: E2; F35; O10; O47

KEYWORDS: FOREIGN AID; EXTERNAL DEBT; SAVINGS; ECONOMIC GROWTH; ASIA

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1. Introduction

The macroeconomic effectiveness of foreign assistance provided by the developed north to the less developed south has long been a hotly debated issue. In the early years of its provision, foreign aid attracted much optimism mainly due to the success of the Marshall Plan, which was designed for the restructuring and reconstruction of the war-torn economies of Europe after the Second World War. The perceived success of the Marshall Plan and its emphasis on physical capital accumulation in the theoretical underpinnings of Harrod’s (1939) and Domar’s (1946) growth models resulted in the notion that foreign aid could be a panacea for capital-deficient developing countries. The main idea was that, in developing countries, investment is constrained by a low level of domestic savings and the availability of foreign exchange for imports of machinery and other intermediate inputs. Earlier studies argued that foreign aid can be a suitable means to fix this problem by complementing domestic resources for long-term growth and development (Chenery and Bruno, 1962; Chenery and Strout, 1966). In agreement with the dual gap model, some studies later argued that the fiscal gap in developing countries limits the capacity of the public sector to invest in infrastructure requirements for long-run growth and development. Foreign aid again potentially relaxes this constraint as long as it is used for productive public sector development projects (Bacha, 1990; Taylor, 1990). Despite the existence of these three gaps, the earliest empirical studies emphasized the first gap and investigated the effects of foreign aid on domestic savings. These studies implicitly assumed that there is a one-to-one correspondence between foreign aid and domestic savings, implying that aid would complement domestic savings in the long-term process of economic growth (Rosenstein-Rodan, 1961). However, earlier empirical studies found a negative association between foreign assistance and domestic savings. For instance, Griffin (1970), Chenery and Eckstein (1970), Rahman (1968), and Weisskopf (1972) provided evidence of a negative association between foreign assistance and domestic savings. Griffin and Enos (1970) and Levy (1988) assumed anticipated aid inflow to be an exogenous shift in income and tested the alternative hypothesis that a one-to-one relationship could hold only when marginal propensity is one; otherwise, foreign aid would potentially be utilized for consumption purposes. These studies also found evidence for this hypothesis and empirically verified a negative relationship between domestic savings and
foreign aid. However, these studies were criticized on the grounds of methodology, estimation techniques, and spurious relationships (Nowak-Lehmann et al., 2012). In contrast, Tendulkar (1971), Grinols and Bhagwati (1976), and Morisset (1989) refuted the hypothesis that foreign capital inflows displace domestic savings.

Second-generation studies of the macroeconomic effectiveness of foreign aid argued that foreign aid expands the public sector, provides support to inefficient and corrupt governments, discourages domestic resource mobilization, and distorts income distribution in favour of rent seekers (Easterly, 2001; Mosely and Hudson, 1995, Jensen and Paldam, 2006). Mosley et al. (1987) attempted to answer the question of why foreign aid provides an effective stimulus to growth and development in some countries, while in other countries, it retards economic growth. They argued that foreign aid inflows are associated with two issues, namely fungibility and the Dutch disease, which retard economic growth in developing countries. To mitigate the negative effects associated with the fungibility of aid, Burnside and Dollar (2000) and Burnside and Dollar (2004) incorporated the role of the policy environment and the institutional quality of recipient countries into the macroeconomic effectiveness of foreign aid. These studies argued that foreign aid facilitates growth and development subject to the conducive policy environment and sound institutions of aid-receiving developing countries. Similarly, many other studies have substantiated that a good policy environment and sound political institutions play complementary roles in the macroeconomic effectiveness of foreign aid (Collier and Dehn, 2001; Collier and Dollar, 2002; Collier and Hoeffler, 2002; Fielding and Mavrotas, 2006; Young and Sheehan, 2014).

Along with domestic savings, many studies have investigated the role of foreign aid in other aggregate economic outcomes, such as investment and

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1 Griffin (1973) argued that the negative relationship is associated with less effort on the part of government for tax collection, an inelastic tax base and allocation of aid to unproductive expenditures by government. Colman and Nixon (1978) criticized Griffin (1970) on the grounds of simple mathematical flaws since he used consumption as functional income and foreign aid while using savings as a function of income alone. However, Gupta (1970) and Bowles (1987) attempted to question the association between domestic savings and foreign aid and found an ambiguous relationship between these variables.

2 Easterly (2006) and Riddell (2007) argued that foreign aid does not provide a sustainable solution; it perpetuates the process in the way that it compels the aid-receiving countries to accept further aid.

3 Many studies have argued that foreign aid inflows deteriorate the quality of political institutions, hampering the long run growth process (Moss et al., 2008; Booth, 2011; Deaton, 2013). However, on the empirical front, other studies have negated this argument (Jones and Trap, 2016; Tavares, 2003).
economic growth. Nevertheless, earlier empirical studies of aid-growth nexuses also provided inconclusive results. Rosenstein-Rodan (1961) emphasized the marginal rate of savings for self-sustaining growth; otherwise, foreign aid cannot help to improve the living standards of developing countries. This finding implies that foreign aid can only contribute to long-run self-sustaining economic growth when it complements domestic savings. All of the existing literature has explored the complementary role of different factors by incorporating an interactive term into the growth equation. However, few studies have incorporated the role of domestic saving into the growth equation. Hence, the key objective of this study is to test the hypothesis that foreign assistance is a complement to or a substitute for domestic savings in the long-run growth process. To meet the desired objective, we have incorporated an interactive term of foreign aid and domestic savings into our growth equation. For empirical analysis, we used the data of seventeen highly indebted lower and lower middle-income countries in Asia.

The rest of the paper is organized as follows. In Section 2, we briefly review the existing literature. Section 3 is dedicated to a brief description of the empirical model, data and methodology. Empirical findings and their interpretation are presented in Section 4. The paper concludes with Section 5, which offers some final remarks.

2. Review of Relevant Literature

As mentioned in the introductory part of this study, the growth effectiveness of foreign aid has been a topic of discussion since the Marshall Plan of the 1960s. In this association, one comprehensive work was performed by Rosenstein-Rodan (1961), which emphasized the complementary role of foreign aid in the long-run growth process. The author argued that the marginal rate of savings must be greater than the average savings rate for the self-sustained growth process and that it should be a principal condition for aid disbursement. Due to this strong theoretical prior, many earlier empirical studies, instead of investigating the impact of foreign aid on outcomes, such as economic growth and investment, tested its complementary relationship with savings. However, instead of incorporating the interaction term of domestic savings and foreign aid into the growth equation, these studies estimated the equation with domestic savings as the dependent variable. For instance, Griffin and Enos (1970) investigated the savings displacement role of foreign aid using the data of thirty-two developing countries and found that foreign aid was negatively related to domestic savings. For robustness of results, they repeated the empirical exercise using the data of thirteen Asian
and Middle Eastern countries and time series data from Colombia and found similar results. Ahmed (1971) found similar results and authenticated the savings displacement hypothesis for the fifty developing countries. Chenery and Eckstein (1970), in their country-specific study of sixteen Latin American countries, found a negative relationship in the case of twelve countries. In an earlier attempt, Rahman (1968) found similar results for the time series data of Pakistan, while Weisskopf (1972) verified these results using cross-country data. However, the theoretical rationale for negative results was already established by Haavelmo (1963), who argued that foreign capital inflows displace domestic savings. However, these studies were criticized on the grounds of a short time span of data and omission of variable bias since savings are also influenced by many other behavioural and demographic factors and estimation methodologies. For instance, Newlyn (1973) argued that the interpretation of a negative coefficient is irrelevant in the aid-savings context. Gupta (1970) tested Haavelmo’s hypothesis using cross-country data and found evidence of a complementary role of foreign aid. Moreover, he further observed that foreign aid enhances the efforts of recipient countries for domestic resource mobilization, especially savings. Similarly, Grinols and Bhagwati (1976) provided empirical support for the complementary role of foreign aid. However, Bowels (1987) used the Granger causality test to assess the causal relationship for twenty developing countries and found that foreign aid does not result in domestic savings in more than half of the cases.

Another strand of the literature has emphasized public sector fiscal behaviour in response to foreign aid inflows in developing countries (for instance, Heller, 1975; McGuire, 1987; Khilji and Zampelli, 1991; Iqbal, 1997; McGillivray and Ahmed, 1999; McGillivray and Morrissey, 2001; Gomanee et al., 2005; Feeny and McGillivray, 2010; Morrissey, 2015). Most of these studies found evidence of a negative relationship of foreign aid inflows with tax revenue and other recurrent revenue (McGillivray and Morrissey, 2001; Mavrotas and Ouattara, 2006; Feeny and McGillivray, 2010). Mosely (2015) emphasized the tax structure and expansion of the tax base for the macrocosmic effectiveness of foreign aid, while Morrissey (2015) concluded that there is no systematic relationship between foreign aid inflows and tax revenue. McGillivray and Morrissey (2001), using a microeconomics framework, argued that, due to aid illusions, foreign aid inflows increase public spending and discourage domestic savings.

More recently, some studies have investigated the savings displacement hypothesis. For example, Okafor and Tyrowicz (2010) found evidence that
foreign debts displace domestic savings in the long run. Similarly, Ouattara (2009) found empirical support for the savings displacement hypothesis only in the case of project aid, while all other foreign aid inflows work as productive supplements to domestic savings. Moreover, Nowak-Lehmann et al. (2012) provided empirical support for the argument that foreign aid crowds out domestic savings. Paradoxically, Irandoust and Ericsson (2005) used the panel cointegration technique for econometric analysis and provided empirical support for the complementary role of foreign aid in the case of African developing countries. Similarly, Balde (2011) also found evidence of a positive association between foreign aid inflows and domestic savings. Afawubo and Mathey (2017) explored the roles of aid volatility and domestic institutions in the macroeconomic effectiveness of foreign aid, especially their impacts on investment and domestic savings. The study supported the hypothesis that aid volatility discourages domestic saving, while the quality of domestic institutions mitigates the negative effect of foreign aid on savings. In a similar vein, Quibria (2017) argued that controlling for corruption in aid-receiving countries further increases aid effectiveness. However, Nieto-Matiz and Schenoni (2020) found evidence that political motives on the part of donors’ countries reduce the effectiveness of foreign aid. Similarly, Whang et al. (2019) provided empirical support for the argument that United States foreign aid programs are strategic in nature and largely aim for the policy compliance of aid-receiving countries. Hossain (2014) investigated the impact of different foreign capital inflows on domestic savings in sixty-three aid-receiving developing countries. An empirical analysis study allowed for cross-sectional dependence and parameter heterogeneity and found evidence of the complementary role of foreign aid inflows. Moreover, another strand of the literature has argued that there is a nonlinear relationship between the foreign capital inflow in the form of assistance and aggregate economic outcomes due to diminishing returns on foreign assistance (Dalgaard and Hansen, 2001; Hansen and Trap, 2001; Hudson and Mosley, 2001; Lu and Ram, 2001; Lensink and White, 2001; Luqman et al., 2013).

More recently, some studies have explored the role of structural features of recipient countries, such as political instability and local financial structures, in the macroeconomic effectiveness of foreign aid (Guillamumont and Chauve, 2001; Nkusu and Sayek, 2004; Ang, 2009; Elbadawi et al., 2008; Luqman et al., 2013). Similarly, Giuliano and Ruiz-Arranz (2009), Bettin and Zazzaro (2012), and Luqman and Haq (2016) tested the hypothesis that foreign remittances and local financial development complement the long-run growth process and found evidence of a complementary role of workers’ remittances in the long-run growth process. In line with Burnside and Dollar
(2000), these studies incorporated the interactive term into the growth equation to test the complementary roles of different factors, such as political instability, local financial sector development, and political institutions, in the macroeconomic effectiveness of foreign aid. However, few studies have incorporated the role of domestic savings into the macroeconomic effects of foreign aid. Hence, this consequent study incorporates the interaction term of foreign aid and domestic saving into the growth equation to test the complementary role of domestic saving in the macroeconomic effectiveness of foreign aid.

3. Econometric Methodology and Data

To investigate the impact of foreign aid on economic growth, our baseline specification is represented in the following equation.

\[ g_{it} = \alpha_0 + \alpha_1(ODA_{it}) + \sum^n_j \gamma_j X_{it} + \varepsilon_{it} \]  

(1)

where \( g_{it} \) is growth in real GDP, \( ODA_{it} \) denotes the ratio of official development assistance to GDP, \( X_{it} \) is a set of control variables that includes the population growth rate, physical capital is measured as the ratio of gross fixed capital formation to GDP, human capital is measured as the proportion of secondary school enrolment, trade openness is measured as the ratio of exports plus imports to GDP, and \( \varepsilon_{it} \) is a random error term.

To test our hypothesis that foreign assistance is a complement of or a substitute for domestic savings in the long-run growth process, we incorporate an interactive term of domestic savings and foreign aid into our baseline specification in line with Burnside and Dollar (2000), Nkusu and Sayek (2004), Giuliano and Ruiz-Arranz (2009), Ang (2009), and Bettin and Zazzaro (2012).

\[ g_{it} = \alpha_0 + \alpha_1(ODA_{it}) + \alpha_2(S_{it}) + \alpha_3(ODA \ast S_{it}) + \sum^n_j \gamma_j X_{it} + \varepsilon_{it} \]  

(2)

where \( S_{it} \) is the ratio of national savings to GDP, and \( (ODA \ast S)_{it} \) it is the
interaction term of national savings and foreign aid inflows. In line with Bandyopadhyay et al. (2015), we also incorporate the external debt (ED) into our baseline equation.

\[ g_{it} = \alpha_0 + \alpha_1(ED_{it}) + \alpha_2(S_{it}) + \alpha_3(ED \times S_{it}) + \sum_{j=1}^{n} \gamma_j X_{it} + \epsilon_{it} \] (3)

In line with Feeny and Fry (2014), Haq and Luqman (2014), and Kathavate and Mallik (2012), we estimate Equation (3) with the generalized method of moments (GMM). Arellano and Bond (1991) first introduced the difference-GMM, while Blundell and Bond (1998) pioneered the system-GMM technique. Identification in both techniques is based on the first-difference estimates, and lagged values of endogenous variables are used as instruments. The GMM estimates provide more reliable and efficient results if there is the possibility of heteroskedasticity. Moreover, it also avoids the potential endogeneity in the model under consideration.

We used the data of seventeen economies over the period of 1990-2018 for the empirical analyses. The selection of these seventeen economies is justified on two grounds. First, most of these countries depend on foreign assistance, which might explain foreign aid’s role in the growth process of these countries and is also more suitable for our study. Second, these economies are on the same level of development and have the same growth fundamentals. Hence, this fact helps us to avoid potential heterogeneity, which is one of the main disadvantages of panel data analysis. The variables and data sources are available in Table A1 in Appendix A.

4. Empirical Findings and Interpretation

As mentioned above, the key objective of this study is to test the hypothesis that foreign assistance is a complement of or a substitute for domestic savings in the long-run growth process. Hence, in our empirical indication, Table 1 presents the empirical findings of our growth equation (Equation 1), in which we regress $GDP_{it}$ (growth of real GDP) on $ODA_{it}$ (ratio of official development assistance (ODA) to GDP) and (ratio of external debt (ED) to GDP), along with the set of control variables. From the table onwards for specification 1 (Column 2), we perform a sensitivity analysis. In line with the

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4 The selected lower income and lower-middle income countries are Armenia, Bangladesh, Bhutan, Cambodia, Georgia, India, Indonesia, Kyrgyz Republic, Laos, Mongolia, Nepal, Pakistan, the Philippines, Sri Lanka, Tajikistan, Ukraine, and Vietnam.
existing literature on dynamic panel models, we introduce the lag dependent variable (GGAPit–1) as an explanatory variable.

**Table 1. Estimated Results (Dependent Variable Is Growth of GDP).**

<table>
<thead>
<tr>
<th>Variables</th>
<th>S_1</th>
<th>S_2</th>
<th>S_3</th>
<th>S_4</th>
<th>S_5</th>
</tr>
</thead>
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<td>GGDpit–1</td>
<td>0.529***</td>
<td>0.552***</td>
<td>0.509***</td>
<td>0.541***</td>
<td>0.611***</td>
</tr>
<tr>
<td></td>
<td>(0.000)</td>
<td>(0.000)</td>
<td>(0.000)</td>
<td>(0.000)</td>
<td>(0.000)</td>
</tr>
<tr>
<td>GPOPit</td>
<td>-0.824**</td>
<td>-1.30*</td>
<td>-1.02*</td>
<td>-1.623**</td>
<td>-1.389***</td>
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<tr>
<td></td>
<td>(0.033)</td>
<td>(0.110)</td>
<td>(0.223)</td>
<td>(0.050)</td>
<td>(0.010)</td>
</tr>
<tr>
<td>HCit</td>
<td>-0.081*</td>
<td>0.100*</td>
<td>-0.105*</td>
<td>-0.127*</td>
<td>-0.126*</td>
</tr>
<tr>
<td></td>
<td>(0.261)</td>
<td>(0.100)</td>
<td>(0.105)</td>
<td>(0.060)</td>
<td>(0.081)</td>
</tr>
<tr>
<td>TOPit</td>
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<td>8.357***</td>
<td>7.764***</td>
<td>7.328***</td>
<td>9.008**</td>
</tr>
<tr>
<td></td>
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<td>(0.001)</td>
<td>(0.001)</td>
<td>(0.003)</td>
<td>(0.023)</td>
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<td>52.30***</td>
<td>52.30***</td>
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<td>(0.001)</td>
<td>(0.001)</td>
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</tr>
<tr>
<td>EDit</td>
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<td>5.44***</td>
<td>5.44***</td>
<td>5.44***</td>
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</tr>
<tr>
<td></td>
<td>(0.020)</td>
<td>(0.006)</td>
<td>(0.006)</td>
<td>(0.006)</td>
<td>(0.006)</td>
</tr>
<tr>
<td>Sit</td>
<td>0.065***</td>
<td>0.644***</td>
<td>0.644***</td>
<td>0.644***</td>
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<td>(0.008)</td>
<td>(0.009)</td>
<td>(0.009)</td>
<td>(0.009)</td>
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<tr>
<td>INVit</td>
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<td>25.92***</td>
<td>25.92***</td>
<td>25.92***</td>
<td>25.92***</td>
</tr>
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<td>(0.000)</td>
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<tr>
<td>ODASit</td>
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<td></td>
<td></td>
<td>0.005**</td>
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<td>EDSit</td>
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</table>

- **Number of observations**: 476
- **Number of countries**: 17
- **Number of instruments**: 28
- **Sargan’s P value**: 0.91

i) The P values appear in parentheses.
ii) Equations are corrected for heteroskedasticity where needed.
iii) ***, **, and * show the levels of significance at 1%, 5%, and 10%, respectively.
Does foreign assistance complement savings in the growth process: empirical evidence from selected asian countries

<table>
<thead>
<tr>
<th>Variables</th>
<th>S_6</th>
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<th>S_8</th>
<th>S_9</th>
<th>S_10</th>
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<td>GGDpit -1</td>
<td>0.612***</td>
<td>0.590***</td>
<td>0.544***</td>
<td>0.586***</td>
<td>0.580***</td>
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<td></td>
<td>(0.000)</td>
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<td>(0.000)</td>
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<tr>
<td>GPOPit</td>
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<td>-1.165***</td>
<td>-1.76**</td>
<td>-1.051**</td>
<td>-0.853*</td>
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<tr>
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<td>(0.033)</td>
<td>(0.016)</td>
<td>(0.033)</td>
<td>(0.021)</td>
<td>(0.321)</td>
</tr>
<tr>
<td>HClit</td>
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<td>-0.158**</td>
<td>-0.159**</td>
<td>-0.121*</td>
<td>-0.077**</td>
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<td>(0.028)</td>
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<td>(0.09)</td>
<td>(0.023)</td>
</tr>
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<td>(0.001)</td>
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<tr>
<td>ODAit</td>
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<td>-------</td>
<td>-------</td>
<td>36.76**</td>
</tr>
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<td>(0.022)</td>
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<tr>
<td>EDIt</td>
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<td>-------</td>
<td>-------</td>
<td>-------</td>
<td>4.34**</td>
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<td>(0.026)</td>
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<tr>
<td>Sit</td>
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<td>(0.001)</td>
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<td>(0.040)</td>
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<td>EDSit</td>
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<td>0.0001**</td>
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<td>(0.059)</td>
<td>(0.031)</td>
<td>(0.050)</td>
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Number of observations: 476 476 476 476 476
Number of countries: 17 17 17 17 17
Number of instruments: 28 28 28 29 29
Sargan’s P value: 0.89 0.92 0.93 0.92 0.90

P values appear in parentheses.
Equations are corrected for heteroskedasticity when needed.
***, **, and * show levels of significance at 1%, 5%, and 10%, respectively.

The coefficient of the lag of the dependent variable is statistically significant with a positive sign, indicating that the current growth of GDP depends on its lag GDP growth. In specification 1, the interest variable of our study, that is, \( (ODA_{it}) \), is also statistically significant with the expected positive sign, implying that foreign assistance in the form of ODA positively contributes to economic growth. These results are consistent with existing theoretical and empirical literature (for instance, Chenery and Bruno, 1962; 5

5 The coefficient of \( (ODA_{it}) \) is too high in all of the specifications because it is basically a ratio of official development assistance to GDP, and when we apply estimation of ratios, the resultant coefficient is always high. The same patterns are observed in the case of external debt \( (ED_{it}) \).
Chenery and Strout, 1966; Papanek, 1973; Gulati, 1975; Dowling and Hiemenz, 1982; and Gupta and Islam, 1983; Fielding and Mavrotas, 2006; Young and Sheehan, 2014).

The coefficient of our control variable human capital \( HC_{it} \) that enters into specification one is statistically significant and has an unexpected negative sign at the five- and ten-percent levels of significance. One possible justification is that we have used primary enrolment as a proxy for human capital, and to some extent it is an investment. It could have a lag effect, but right now, it negatively affects economic growth. The coefficient of the growth rate of the population (GPOP\(_{it}\)) that enters the model is also statistically significant with the expected negative sign. These findings are also in line with the existing empirical literature (for instance, Moreira, 2005; Asteriou, 2009; Feeny and Fry, 2014). They endorse the negative role of the population growth rate in boosting macroeconomic performance. Another control variable \( TOP_{it} \) (imports plus exports as a percentage of GDP) enters the specification and is statistically significant, with the expected positive sign indicating that economies that are highly open to international trade have a rapid pace of economic growth. The findings are in line with the existing studies conducted by Feeny (2005), Asteriou (2009), and Feeny and Fry (2014), supporting the trade liberalization regime. This outcome also supports the claim that countries that are more liberalized and have good trade policies can accelerate long-term economic growth. Trade openness also creates more opportunities to diffuse knowledge, as well as new technologies. Control variable \( S_{it} \) (ratio of total savings to GDP) also enters into the model with a statistically significant and expected positive sign.

From columns three to eleven, sensitivity analysis is performed to test the reliability and robustness of our results. It is important in this stage to emphasize that the lag of the dependent variable \( GGDP_{t-1} \), population growth \( GPOP_{it} \), human capital \( HC_{it} \), and trade openness \( TOP_{it} \) are common to all specifications. However, in specification two (column three), we replace our variable of interest \( ODA_{it} \) with external debt \( ED_{it} \), which enters the model significantly and with a positive sign. The results reveal that, in the case of the selected countries, an increase in external debt has a positive effect on economic growth. These results are also consistent with the existing empirical literature. For instance, Sulaiman and Azeez (2012) and Siddiqui and Malik (2001) reported the same findings for South Asian countries. In specification three, column four, we replace our variable of interest \( ED_{it} \) with \( ODA_{it} \) again, which enters into the model significantly and with a positive
sign. We also replace savings \( S_{it} \) with investment as a percentage of GDP \( \text{INV}_{it} \), which is also statistically significant with the expected positive sign. These findings are also in line with the existing empirical literature (Hansen and Tarp, 2001; Siddique et al., 2015).

From Column 6 (specification 5) to Column 11 (specification 10), we have included different interactive terms with our set of control variables. Our first interactive term of official development assistance and saving \( ODAS_{it} \) in specifications 5, 6, and 10 appears highly significant and with the expected positive signs, indicating that foreign assistance enhances the growth capacity of domestic savings. The positive and significant entrance of the interaction term into these growth specifications indicates that foreign assistance complements domestic savings in the long-term growth process of the selected Asian countries. Similarly, our second interaction term of the external debt and saving \( EDS_{it} \) in specifications 7 and 9 carries a positive sign that is significant, revealing that this component of foreign assistance also complements domestic savings in the long-run growth process. These results are consistent with the earlier theoretical and empirical literature on the subject (Chenery and Strout, 1966; Rosenstein-Rodan, 1961; Gupta, 1970; Grinols and Bhagwati, 1976).

5. Conclusion

The key objective of this study is to test the hypothesis that foreign assistance is a complement to or a substitute for domestic savings in the long-run growth process. The empirical investigation was performed in 17 selected aid-receiving countries in Asia over the period of 1990-2018. Overall, the results substantiate that both official development assistance and external debt are positively associated with the long-term economic growth of the sample countries. The main finding of the study is that the interaction term of official development assistance with savings shows a relatively stronger effect on economic growth compared with the individual terms of official development assistance. This result indicates a complementary relationship between foreign assistance and savings. Similarly, the interaction term of external debt and savings also shows a stronger effect on economic growth compared with individual terms of external debt. This finding also supports the claim that foreign debt plays a complementary role to domestic savings in the long-run growth process. Hence, it can be safely concluded that foreign assistance in the form of official development assistance and external debt acts as a
complement to domestic resource mobilization and helps to increase economic growth in these selected developing countries.

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50


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Appendix A: Variables and Data Sources

<table>
<thead>
<tr>
<th>Variable</th>
<th>Description</th>
<th>Source</th>
<th>Measurement</th>
</tr>
</thead>
<tbody>
<tr>
<td>$GGDP_{it}$</td>
<td>Growth of GDP</td>
<td>WDI</td>
<td>Annual Percent</td>
</tr>
<tr>
<td>$ODA_{it}$</td>
<td>Official development assistance</td>
<td>WDI</td>
<td>Percent of GDP</td>
</tr>
<tr>
<td>$ED_{it}$</td>
<td>External debt</td>
<td>WDI</td>
<td>Percent of GDP</td>
</tr>
<tr>
<td>$GPOP_{it}$</td>
<td>Growth of population</td>
<td>WDI</td>
<td>Annual Percent</td>
</tr>
<tr>
<td>$S_{it}$</td>
<td>National savings</td>
<td>WDI</td>
<td>Percent of GDP</td>
</tr>
<tr>
<td>$INV_{it}$</td>
<td>Investment</td>
<td>WDI</td>
<td>Percent of GDP</td>
</tr>
<tr>
<td>$HC_{it}$</td>
<td>Primary enrollment in gross percentage</td>
<td>Penn World Table 7.1</td>
<td>Gross Percent</td>
</tr>
<tr>
<td>$TOP_{it}$</td>
<td>Trade openness</td>
<td>WDI</td>
<td>Total trade percent of GDP</td>
</tr>
</tbody>
</table>