Sri Lanka Journal of Advanced Social Studies
National Centre for Advanced Studies in Humanities & Social Sciences
Volume 10, Number 01, June 2020
ISSN : 2012 9149
ISSN : 2386 1266 (online)

Impact of Japanese ODA Economic Growth and Development in Sri Lanka

Dunusinghe, P.[1]

Abstract

In recent years, there emerged a debate on debt burden over foreign loans and economic impact of foreign-funded development projects. The debate on debt burden is centered around the sheer size of the debt owned by development partners rather than looking at the generosity and impact of ODA offered by different development partners. Addressing these gaps, this study analyses generosity of Japanese ODA and its impact on economic growth and development in Sri Lanka. This study employs both descriptive and regression analyses for data analysis. Japanese ODA to Sri Lanka has grown at an average annual rate of around 6 per cent (in current US$ terms). Sri Lanka has been one of the priority countries for Japanese ODA largely due to the cordial relationship the two countries has maintained over the last several decades. Reflecting the unique feature of Japanese ODA, a greater majority of assistance has channeled into economic infrastructure development/improvements in the country. More importantly, Japanese ODA has contained higher grant element compared to ODA offered by other major development partners such as ADB, World Bank, and China. Our regression analysis clearly indicates that there is a strong positive relationship between Japanese ODA and economic growth and development in the country. Our findings are consistent with the findings of previous research studies. The findings imply that social and economic infrastructures developed with assistance of Japanese ODA have contributed to economic growth and development in the country. This impact was further supported through the micro-level evidence found in ex-

[1]*Department of Economics, University of Colombo, Email: pmdunu@yahoo.com*

post impact evaluations and third party impact evaluations. Overall evidences clearly reflect that Japanese ODA has not contributed to current foreign debt burden faced by the country.

Keywords: Japanese ODA, Concessanality, Economic impact, Sri Lanka

1. Introduction

Japan started extending Official Development Assistance (ODA) to Sri Lanka in 1954 and since then, she continued providing ODA in various forms such as grants, technical assistance, and loans aiming at, among other things, enhancing Sri Lanka's economic growth performance. Sri Lanka has remained one of the priority countries for Japanese ODA during the last six decades. In relative terms, during 1970-2019, Japanese ODA accounted for nearly 5 per cent of gross domestic savings (GDS), 3 per cent of gross fixed capital formation (GFCF), and 1 per cent of gross domestic products (GDP). In particular, during 1986-2005, Japanese ODA accounted for nearly 6 per cent of GFCF and 2 per cent of GDP. Out of the total disbursed Japanese ODA, over two-third invested on economic infrastructure; 26 per cent in ground transport, 21 per cent in power & energy, 9 per cent port & shipping, 5 per cent in telecommunication, and 4 per cent on irrigation & related activities. The ultimate impact of ODA is determined by a few factors such as concessanality of ODA, project costs, and returns to ODA funded projects. Although few studies have attempted in examining the overall impact of Japanese ODA on economic growth and development in Sri Lanka, as far as author knows, no attempt has been made in understanding concessanality attached to Japanese ODA. Level of concessanality is a key element which determines the economic burden of repayment. Do terms of lending differ across donors? What are the interest rates, margins, commitment charges, commissions, management & services charges, maturities, and grace periods associated with Japanese ODA? These some of the questions that are yet to explore in the context of Japanese ODA in Sri Lanka. Exploring these questions

Volume 10, Number 01, June 2020
ISSN : 2012 9149
ISSN : 2386 1266 (online)

are very much relevant in the context of growing debt burden in Sri Lanka.

The aims at analyzing the impact of Japanese ODA on Sri Lanka's economic growth and development. With respect to Japanese ODA in Sri Lanka, it is expected to analyses (a) magnitude and sectoral distribution, (b) the level concessanality associated, and (c) overall economic impact. Section two deals with related literatures followed by a discussion on relative size, sectoral distribution, and concessanality of Japanese ODA in section three. Section four deals with the econometric specification while section five discuss the estimated results. Last section makes some concluding remarks.

2. Brief Literature Review

A number of studies have been conducted in investigating the impact and effectiveness of foreign aid on economic growth Arndt et.al.,2010; Burnside and Dollar, 2000, Easterly, 2003; Hansen and Tarp, 2001; Juselius et. al, 2014; Rajan and Subramanian, 2008). Burnside and Dollar (2000) initiated a new research direction, namely aid-policy-growth association, and argued that impact and effectiveness of aid on growth depend on quality of policy framework. According to authors, aid promotes growth in countries with good policies. In subsequent years, aid-policy-growth hypothesis was intensely debated and, recently, Jia and Williamson (2019) revisited this hypothesis and argued that there is a weak evidence to suggest that aid promote growth in the presence of good policies[2]. The authors concluded that the overwhelming majority of the results suggest aid conditional on policy is ineffective. Nevertheless, in a recent study, Mekasha and Tarp (2019) employed a meta-analysis to provide an overall assessment on effectiveness of aid and the authors concluded that empirical evidence confirm the increasing consensus about the positive evidence of foreign aid's impact on growth. Highlighting the complexity of on-going debate over aid effectiveness, Gisselquist and Tarp (2019) alerted readers as follows;

[2] *The authors use new data for the same set of countries, which were covered by Burnside and Dolloar (2000) study, over an extended period (1962-2013).*

"It is well established in the literature that great care has to be exercised in avoiding to overextend the use of insignificant statistical parameters in aid debates. To be sure, an insignificant parameter reflects our lack of evidence" [3].

As discussed in Gisselquist and Tarp (2019), possible reason for the lack of evidence of aid effectiveness is due to poor targeting to the needs of recipient countries though aid is regularly justified with reference to the needs of recipient countries[4]. In particular, Gisselquist and Tarp (2019) argued lack of domestic ownership of foreign aid programmes is a one of the other reasons for poor aid effectiveness. Despite the fact that local ownership is set out as a fundamental principle for aid effectiveness in a number of international conventions/agendas (such as Paris Declaration, Accra Agenda for Action, and Busan Partnership), aid continues to be disbursed by donors without proper coordination with national institutional structures[5]. Similarly, aid effectiveness could also be influenced by the donor motivation. Citing Reinsberg (2019) study, Gisselquist and Tarp (2019) conclude that bilateral aid is indeed used for geopolitical purposes. At the same time, it is argued that development assistance is in many ways a political project by donor countries and such motivation could have a negative impact on overall aid effectiveness (Gisselquist and Tarp, 2019).

As briefly reviewed above, the impact and effectiveness of aid on growth has been investigated directly as well as indirectly. Furthermore, possible factors influencing on aid effectiveness have also been investigated extensively in the literature. Nevertheless, the debate on aid effective is far from settle thereby requiring additional research inputs.

[3] *To support their argument further, the authors quoted Temple (2010), following way: "an insignificant coefficient should usually be seen as absence of evidence, not evidence of absence, at least until the economic implications of a confidence interval have been explored."*

[4] *The authors cited Carment and Samy (2019) study and highlighted its key findings to support their argument. Carment and Samy (2019) found, for a set of fragile and conflict-affected states, aid is poorly targeted in fragile states. Further Carment and Samy (2019) argue that aid's impact would be improved through better targeting to address core challenges of legitimacy and authority that are important to understanding why states are fragile.*

[5] *The authors argue that conventional literature justified such practice with reference to efficiency while recent justifications have shifted to refer to corruption and weak implementation capacity.*

Volume 10, Number 01, June 2020
ISSN : 2012 9149
ISSN : 2386 1266 (online)

Amidst growing concerns on aid effectiveness, a number of studies attempted in examinging the effectiveness of Japanese aid arguing that Japanese aid is unique in terms of its focus. It is often argued that Japanese aid, compared to other bi-lateral and multi-lateral aid, mostly focus on growth enhancing infrastructure development thereby removing key barriers to growth and competiveness in economies. Momita, et.al.,(2019) examined the aid-growth relationship by employing an econometric analysis using a panel dataset of 117 countries from 1980 to 2010 and disaggregated ODA flows from five major donors and the sum of all the other donors. The authors found that Japanese aid has significantly contributed to the growth of industrial output in the countries thereby contributing to economic growth. Momita, et.al.,(2019) found that aid-growth relationship for most other donors either remained insignificant or negative during the study period. Kawasaki (2004) examined the effect of Japanese ODA on six Asian countries and found that Japanese ODA has significantly contributed to the economic development in China, Indonesia, Malaysia, the Philippines, Thailand, and Vietnam. It is estimated that real GDP gains, due to Japanese ODA, range from 0.1 to 1.6 per cent annually in those countries. Cooray (2003) examined the impact of Japanese ODA on Sri Lanka's economic development for the period of 1960-2000. In particular, the author examine the impact of Japanese ODA on domestic savings, gross capital formation, and GDP. His results provides some evidences to suggest that Japanese ODA has positively contributed to the development in the country. The author argued that it is imperative to do further research in exploring this relationship using both macro-economic and/or micro-economic approaches.

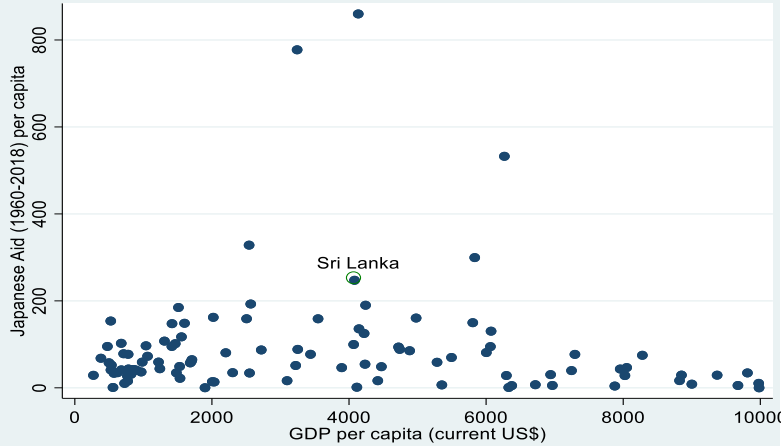
3.Magnitude, Sectoral Distribution, and Concessanality in Japanese ODA

Magnitude

Sri Lanka has been one of the priority countries for Japanese ODA since Japan commencement of extending ODA to Sri Lanka. Figure 1 depicts the relationship between Japanese ODA per capita (cumulative Japanese ODA during 1960-2018 divided by 2018

population in recipient country) and per capital income of recipient countries[6]. Except for few Asian countries - Bhutan, Fiji, Iraq Lao PDR, Mongolia, and Maldives – Sri Lanka has received higher amount of Japanese ODA in per capita terms. This reflects that Japan has given special consideration to Sri Lanka when extending ODA to economic development in developing countries. One of the main reasons for this special treatment is the fact that Sri Lanka and Japan developed and maintained a very cordial relationship throughout the last several decades. Partly due to this special treatment, some Sri Lankan academics started calling Japan as Sri Lanka's distant neighbor (Lakshman, 2003). In per capita terms, Sri Lanka has received around US$ 250 ODA during 1960-2018. All South Asian countries, except Bhutan and Maldives, received less Japanese ODA compared to Sri Lanka. Out of the total Japanese ODA – received up to 2002 -, loans account for around 56 per cent while grants and technical assistance accounted for around 30 per cent and 14 per cent respectively (Cooray, 2003)[7]. However, in recent years, the share of grants and technical assistance in total ODA, declined sharply, partly in response to financial constraints of the donor and Sri Lanka's economic development.

Figure 1: Level of Economic Development and Japanese Aid



Source: Author's construction based on data extracted from OECD Database.

[6] *For easiness of presentation, countries whose per capita income is less than US$ 10,000 by 2018 considered.*
[7] *Japan has provided around US$ 1.3 billion worth of grants by 2019.*

Volume 10, Number 01, June 2020
ISSN : 2012 9149
ISSN : 2386 1266 (online)

Sectoral distribution

Table 1 reports sectoral distribution of Japanese ODA during 1960-2019. Accordingly, Japanese ODA to support economic infrastructure has remained prominent. This is one of the unique features in Japanese ODA to developing countries (Momita, et.al.,2019). From her inception of providing ODA, Japan has strongly believed that one of the bottlenecks for economic growth and development in developing countries is the lack of economic infrastructure (Momita, et.al., 2019). In Sri Lanka, Japanese ODA heavily supported to sectors such as power & energy, ground transport, roads & bridges, telecommunication, ports & shipping, and irrigation. In addition, in recent years, Japan focused some social infrastructures such as water supply & sanitation, and environment. Moreover, as one of the strong believer of private sector led growth and development, Japan has extended ODA for private sector development (see Table 1). Japan also provided technical assistance in improving human resources in Sri Lanka. A number of academics, professionals, and public servants received training under various Japanese technical programmes while Japan also supported key educational and training/research institutes such as University of Colombo School of Computing, University of Moratuwa, University of Kelaniya, University of Peradeniya, Medical Research Institute, and a number of trainings institutes. Japan also extended its ODA to upgrade regional hospitals and medical research institutes. In addition, a number of key medical staff received training opportunities under Japanese Technical assistance. Altogether, over 23,000 Sri Lankan, from all the fields, have been trained under the Japanese technical assistance cooperation by 2018 (JICA Annual Report Data Book, 2019)[8]. A sizable share of Japanese ODA has also been channeled into rural development and poverty reduction during 1960-2019. A number of rural development programmes were launched with the support of Japanese ODA. Moreover, Japan played a key role in rehabilitation activities in the post-tsunami and post-war periods.

[8] *Under the technical assistance, Japan has extended around ¥ 84.6 billion ODA to Sri Lanka by 2018.*

Table 1: Japanese ODA Disbursement by Sector: Cumulative of 1960-2019

Sector	US $ Mn	Share
Agriculture	28.68	0.4
Air transport	171.26	2.5
Budget support	85.34	1.2
Environment	308.16	4.5
Finance, Insurance, etc.	132.15	1.9
Ground transport	896.31	13.1
Health & social welfare	46.89	0.7
Industrial development	32.58	0.5
Irrigation & related	282.30	4.1
Plantation	51.03	0.7
Ports & shipping	595.98	8.7
Power & energy	1,460.35	21.3
Private sector development	171.33	2.5
Rehabilitation	191.51	2.8
Roads, and bridges	931.51	13.6
Rural development	135.22	2.0
Telecommunication	311.97	4.6
Tourism & hotel industry	26.71	0.4
Tsunami rehabilitation	88.23	1.3
Water supply & sanitation	595.92	8.7
General	65.97	1.0
Other	242.39	3.5
Total	6,851.78	100

Source: (Ministry of Finance, year)

Concessanality

To compare the concessionality of different donors' ODA to Sri Lanka, one needs to define concessionality in a way that can be consistently applied across different financing institutions. Following Morris, et. al., (2020), this study defines concessionality as a measure of the generosity of a financing package, or the extent to which financing is offered at below market rates.

The IMF defines the grant element of a loan as "the difference between its nominal value (face value) and the sum of the discounted future debt-service payments (net present value) to be made by the borrower, expressed as a percentage of the face value of the loan." 18 This measure varies from 0% to 100%, so loans provided on market terms have a grant element of zero, and pure grants have a

Volume 10, Number 01, June 2020
ISSN : 2012 9149
ISSN : 2386 1266 (online)

grant element of 100%. 19 To calculate the grant element of a loan that is provided on below-market (concessional) terms, one needs to calculate the discounted cost (or "net present value") of the future debt service payments that will be made by the borrower.

The grant element calculation takes the following form:

$$\left(1-\frac{\frac{r}{n}}{d}\right)*\left[1-\left(\frac{\frac{1}{(1+d)^{(n*g)}}-\frac{1}{(1+d)^{(n*m)}}}{d*(n*m-n*g)}\right)\right], where\ d=(1+D)^{\left(\frac{1}{n}\right)}-1$$

In the above equation, *r* = interest rate, *m* = maturity length in years, *g* = grace period in years, *n* = number of repayment per annum (assumed twice a year), *D* = discount rate (following World Bank and OECD, assumed 7%), and equal principal payment is assumed.

The grant element ratios generated by this formula can be used in several ways:

- to identify whether individual loans are concessional or non-concessional generally, anything above the 35% threshold is considered concessional at the IMF and the World Bank, and anything over the 25% threshold was considered concessional at the OECD prior to 2018
- to measure the average concessionality of loans; and
- to calculate the absolute amount of grant funding nested within one or more loans-by multiplying the grant element (concessionality rate) of a loan by the nominal (face) value of a loans.

In addition to above World Bank-IMF loan concessanality estimation procedure, this study estimates the grant element of a foreign loan based on the IMF procedure which is available online (https://www.imf.org/external/np/pdr/conc/calculator/). This IMF formula (or calculator) allows researchers to take into account some addition information such as, upfront commission, management fees, face value of the loan, and grant amount, when estimating the grant element of a foreign loan. However, it evaluates the grant element

at 5 per cent discount rate and does not allow researchers to set a discount of their interest. Hence, estimates, obtained from the two different procedures, are not comparable.

This study examines concessanality of foreign loans whose agreements were signed during 2012-2019. In this study, all individual loan agreements with a value of US $ 50 million or more were considered for the analysis (see appendix 1 for the list of loan agreements in the sample). This cut-off value is determined arbitrarily to keep the sample size manageable for the study. Further, this study considers on foreign loans obtained from four major donors, namely Asian Development Bank, China, Japan, and World Bank. Our sample consists of 83 foreign loans obtained from the above four donors during 2012-2019. The study period was determined on the basis of data availability. It is important to note that we consider loan commitments (or committed amounts) rather than disbursement. It is possible that there is a discrepancies on amount committed and disburshed. Moreover, some of the commitments, in particular in recent once, are yet to be disbursed. This study use the average LIBOR-6 month US$ interest rate (average over 2012-2019) when evaluating concessanality of loans which were offered under variable interest rate of LIBOR-6 month US$ terms. In the case of Japanese loan agreements, most of such loans offered under two different interest rates, 0.1- 0.3 per cent per annum for the Tranche 1 and 0.01 per cent per annum for the Tranche 2. When estimating the concessanality, Tranche 1 rate was considered since data for the amount of loans under two different scheme were not readily available to the researcher.

Preliminary observations on interest rate, other charges, and grace & maturity periods suggest that Chinese loans are relatively expensive for Sri Lanka compared to the loans obtained from the other donors. During the study period, most of the ADB loans were offered under variable interest rate schemes and the interest rate was anchored to LIBOR-six month US$ rate. For instance, out of the total loan agreements (31), nearly 75 per cent (23 agreements) was under the variable interest rate. In the case of Chinese loans, most

Volume 10, Number 01, June 2020
ISSN : 2012 9149
ISSN : 2386 1266 (online)

of them were under fixed interest rate of 2 per cent per annum. Japan also offered most foreign loans under a fixed interest rate ranging from 0.1 to 0.3 per cent per annum[9]. The World Bank offered loans on both on variable interest rate (LIBOR-6 months US$) and fixed interest rate ranging from 1.25 to 2 per cent per annum. It is also noticeable that ADB, China, and World Bank add a margin on top of the LIBOR rate for most loan agreements and charge a commitment fee for most loans. In addition, most Chinese loans contained a management fee and/or service fee ranging from 0.25 to 0.75 per cent. The grace and maturity period for most Chinese loans were relatively less lengthy compared to the other donors. Among the all donors, Japan offered lowest interest rate and a longer grace period as well as a maturity period for its loans. The estimated results are reported in Table 2-5 and the based on the results followings observations could be made. First, Japanese foreign loans have relatively higher concessanality compared to other bilateral donors, namely Chinese loans. For instance, Japanese loans consist of 58 per cent grant element compared to 24 per cent grant element in Chinese loans. This higher concessanality is due to lower interest rate and lengthier grace and maturity periods. According to Verite Research (2020) estimation, average weighted interest rate of 38 Japanese loans obtained during 2005-2020 was 0.73 per annum, the lowest among all Sri Lanka's donors. Interestingly, Japanese loans have higher grant element even when comparing to multi-lateral donors, namely the World Bank and ADB loans. Higher grant element in a foreign loan significantly reduce the debt burden of the borrower. Second, Chinese loans contains the lowest grant element among the four donors considered. The effective interest rate (adding all costs – interest rate, margin, commitment charge, management fee, service charge etc.) of most of Chinese loans were around 3-4 per cent per annum. Verite Research (2020), confirmed that fact that weighted average interest rate of Chinese loans stands at 3.26 during 2005-2020. Finally, Results, indicate that some of the Chinese foreign loans do fail to

[9] *With respect to Japanese foreign loans, most of such loans charged 0.1-0,3 per cent for the Tranche 1 whereas Tranche 2 was offered at a lower rate. Tranche 2 money is generally spent for the consultancy related expenses. There were few loan agreements which were offered charging either LIBOR-6 month US$ terms and/or a fixed rate which is slightly above 1 per cent per annum.*

fall into the category of foreign aid. According to OECD standards (before 2018), there should be at least a 25 per cent grant element in a foreign loans to classify as a foreign aid.

Results in Table 2 indicates that some loans offered by China cannot be considered as 'foreign aid' from OECD standards. Hence, greater reliance on Chinese loans may have increase Sri Lanka's repayment capacities. Finally, it is observable that concessionality attached to large scale projects, financed by China, remain relatively low (for instance, Central Expressway, Moragahakanda, and some road projects).

Volume 10, Number 01, June 2020
ISSN : 2012 9149
ISSN : 2386 1266 (online)

Table 3: Concessionality in Chinese Loans

Agreement year	Project	Commitment in USD	IMF grant element calculation	World Bank-IMF grant element equation	Grant amount
2013	Matara Beliatta section of Matara Kataragama Railway extension	200.0	24.1	28.6	57.1
2013	Matara Beliatta section of Matara Kataragama Railway extension	82.9	25.6	28.6	23.7
2013	Hambantota port development phase 1 for ancillary work and suppy of equipment	154.5	26.5	26.8	41.5
2013	Greater Kurunagala water supply and sewerage	79.6	24.3	26.1	20.8
2014	Improvement and rehabilitation of priority road project 2 (phase 1)	300.0	11.4	14.3	42.8
2014	Improvement and rehabilitation of priority road project 2 (phase 2)	100.0	11.4	14.3	14.3
2014	Construction of outer circular highway project - phase iii	494.0	25.0	26.8	132.6
2014	Southern expressway extension-section 4 from Mattala to Hambantota	411.4	25.0	26.8	110.4
2014	Hambantota hub development project	253.2	25.0	26.8	68.0
2014	Southern expressway extension - section 1 from Matara-Beliatta	683.5	25.0	26.8	183.5
2016	Construction of extension of Southern expressway, section 2 from Beliatta to wetiya project	360.3	25.0	26.8	96.7
2017	Kandy north pathadumbara integrated water supply project	248.8	28.1	27.7	69.0
2017	Consultancy-extension of southern expressway	87.7	28.1	27.7	24.3
2017	Thalpitigala reservoir project	147.9	22.4	24.0	35.5
2018	Widening and improve–ement of 64.31KM roads and reconstruction of 13 bridges in central and Uva provinces	85.0	4.1	7.1	6.0
2019	Central expressway project section - 1 from Kadawatha to Meerigama	989.5	23.5	23.0	227.6
2012	Moragahakanda	214.2	0.7	6.9	14.8
2012	Hambantota port development - Phase II	51.0	-6.9	-1.6	-0.8
2012	Hambantota port development project - phase ii	158.0	23.4	27.7	43.8
2012	Hambantota port development project - phase ii	600.0	23.4	27.7	166.3
Unweighted mean				22.16	
Weighted mean				24.17	

Source: Developed by Authors

Table 4: Concessionality in Japanese Loans

Agreement year	Project	Commitment in USD	IMF grant element calculation	World Bank-IMF grant element equation	Grant amount
2013	Greater colombo transmission and distribution loss reduction	166.4	64.0	64.0	106.5
2013	Major bridge construction project of the national road network	129.2	64.0	65.4	84.5
2013	Landslide disaster protection project of the national road network	79.5	38.4	38.2	30.3
2013	Anuradhapura north water project	53.9	38.4	38.2	20.6
2014	New bridge construction over the Kelani river	342.8	64.0	66.8	228.9
2014	Digitalization of terrestrial television broadcasting project	132.1	64.0	66.8	88.2
2015	National transmission and distribution network development and efficiency improvement project	199.9	64.0	64.0	128.0
2016	Development policy loan	97.1	38.4	38.2	37.1
2017	Rural infrastructure development project	113.8	38.4	38.2	43.4
2017	Kalu ganga water supply extension project 1	279.5	38.4	38.2	106.7
2018	Health and medical service improvement project	95.8	68.6	68.6	65.7
2019	Establishment of light raid transit project system in Colombo	270.5	68.4	68.6	185.5
2012	Habarana-veyangoda transmission line project	52.0	63.8	64.0	33.3
2012	Improvement of basic social services targeting emerging regions	50.0	65.4	65.4	32.7
2012	Bandaranayaka international airport development project - phase ii	367.0	65.4	65.4	240.0
Unweighted mean				56.65	
Weighted mean				58.92	

Source: Developed by Authors

Volume 10, Number 01, June 2020
ISSN : 2012 9149
ISSN : 2386 1266 (online)

Table 5: Concessionality in World Bank Loans

Agreement year	Project	Commitment in USD	IMF grant element calculation	World Bank-IMF grant element equation	Grant amount
2017	transport connectivity management	127.9	22.4	27.7	35.4
2014	Disaster risk management development policy loan with a catastrophe differed drawn option cat-Ddo	102.0	27.2	26.9	27.4
2019	Primary health care system strengthening project	200.0	42.5	45.3	90.6
2013	Second health sector development	196.4	39.0	30.1	59.1
2014	Climate resilience improvement management	110.9	30.4	37.8	41.9
2014	Strategic cities development project	144.2	30.4	37.8	54.5
2014	Additional financing for Dam safety & water resources planning project	81.5	30.4	37.8	30.8
2014	skill development project (portion A)	78.3	30.4	37.8	29.6
2015	Early childhood development project	50.0	30.4	37.8	18.9
2016	Additional financing for strategic cities development project	55.8	30.4	37.8	21.1
2016	Competitiveness transperancy and fiscal sustainability development policy	100.0	15.3	14.5	14.5
2017	Agriculture modernization	119.7	30.4	37.0	44.3
2017	Financial sector modernization	78.2	16.2	15.5	12.1
2018	General education, modernization	100.0	37.6	37.5	37.5
2019	Climate smart irrigated Agriculture	125.0	43.3	46.1	57.7
2019	Local development support project	70.0	43.3	46.8	32.8
2012	Transforming the school education system	64.1	32.2	37.0	23.7
Unweighted mean				34.76	
Weighted mean				35.02	

Source: Developed by Authors

4. Econometric Specification and Data

In the light of the recent cross-country findings, this paper aims at examining the impact of Japanese ODA on Sri Lanka's economic growth and development. Japan has undertaken impact evaluation exercises related some of the ODA projects implemented in Sri Lanka, nevertheless, as highlighted by Cooray (2003), limited attempts have been made in investigating the impact of Japanese ODA on the macroeconomic variables. This study will certainly be an important addition to that limited studies.

Based on the literature, this study specify following regression model;

$$y_t = \beta_1 + \sum_{i=1}^{k} \gamma_i \, y_{t-i} + \sum_{t=0}^{k} \rho_i GFCF_{t-i} + \sum_{t=1}^{k} \theta_i \, Japan_{t-i} + \sum_{t=1}^{k} \delta_i \, ADB_{t-i} + \sum_{t=1}^{k} \alpha_i \, WB_{t-i} + \varepsilon_t$$

In the above regression specification, y is our dependent variable. In this study, three alternative dependent variables are considered; namely growth of GDP, growth of GDP per capita, and growth of industrial value added. In respective models, lags of the dependent variable enters in the regression model as independent variables as y_{t-i}. In the above equation, GFCF is the gross fixed capital formation. Current as well as lags of GFCF are considered as explanatory variables in the model. Three different ODA flows are considered in the analysis, namely Japan ODA, Asian Development Bank ODA, and World Bank ODA[10]. The ODA variables enters into the model in their lag form to avoid any simultaneous bias. Following Momita et. al., (2019), it is assumed that impact of ODA on growth and development differ across donors. In particular, it is assumed that Japanese ODA to produce far better growth and development outcomes than ODA provided by the other donors. In the regression equation, ε_t is a white noise term. In particular, lags of the dependent variables will be introduced into models to avoid any serial correlation among the disturbance terms.

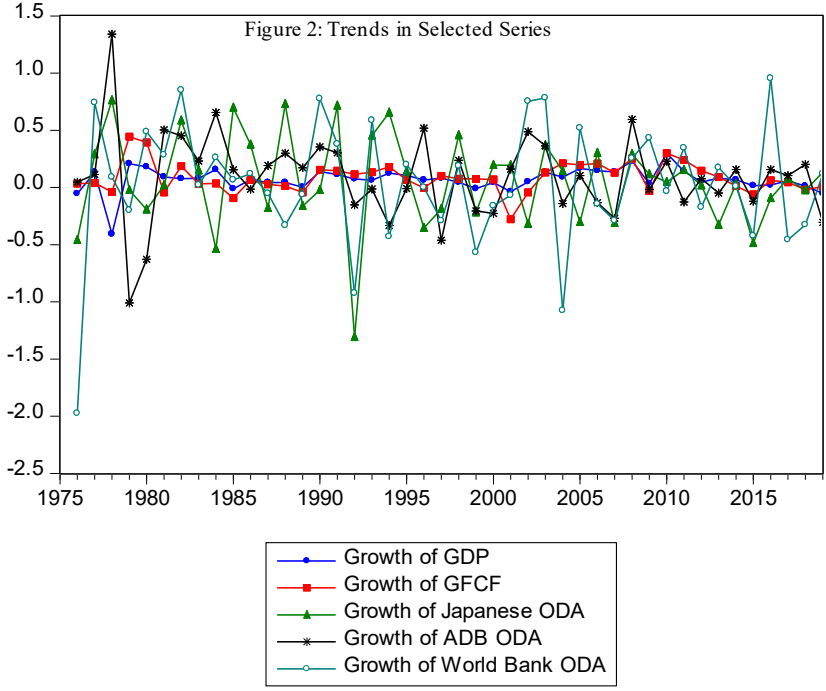
[10]Other donors were not considered due to lack of data long enough for a time series analysis. In this paper, a short-run model is estimated since there is no co-integration relationship among the variables. Results of both Johansen cointegration test and Autoregressive Distributed Lag Model (ADLM) cointegration test confirm that the variables are not cointegrated. In other words, there is no long-run relationship among the variables.

Volume 10, Number 01, June 2020
ISSN : 2012 9149
ISSN : 2386 1266 (online)

The study period confines to 1975-2019 and it is purely determined on the basis of data availability. Data for the study are extracted from two main sources, namely from the External Resources Department, Ministry of Finance, Sri Lanka and World Development Indicator online database. In this study, all the variables are expressed in current US$ terms. An attempt is not made to convert the figures into real values since it is quite difficult to find out appropriate price indices. All the level data were converted to natural logarithm form before calculating growth rate (first difference of a log series represents the growth rate).

5. Estimation and Discussion

Figure 2 depicts trends in selected variables. Accordingly, it is quite evident that year-to-year fluctuations in macro variables, namely GDP growth and growth of gross fixed capital formation, were relatively smaller compared to ODA series. In particular, ODA provided by World Bank fluctuated widely over the years. Table 2 reports some summary statistics related to variables which are used for the regression analysis. Accordingly, annual average growth of GDP is around 7 per cent while per capita GDP has grown at an annual average rate of around 6 per cent during the study period. It is important to note that all the variables are measured in current US$ terms. Japanese ODA has grown at an annual average rate of 6 per cent while ODA from ADB has grown at an annual average rate of around 9 per cent. Standard deviation statistics clearly indicate that variability if ODA series is relatively higher than that in macroeconomic variables.



Source: Developed by Authors

Table 2: Summary Statistics (1st difference of natural logarithm series)

	Mean	Median	Maximum	Minimum	Std. Dev.
Growth of GDP	0.070	0.072	0.298	-0.406	0.103
Growth of Per Capita GDP	0.059	0.059	0.292	-0.424	0.104
Growth of Industrial Output	0.071	0.073	0.243	-0.456	0.104
Growth of gross fixed capital formation	0.085	0.067	0.443	-0.278	0.129
Growth of Japanese ODA	0.058	0.062	0.762	-1.310	0.404
Growth of ADB ODA	0.090	0.108	1.341	-1.010	0.337
Growth of World Bank ODA	0.032	0.043	0.955	-1.974	0.547

Source: Author's estimation

Table 7 reports estimated regression results. Standard errors are reported in parentheses and asterisk signs indicate the estimated coefficients are statistically significant at conventional levels (i.e. 1%, 5% or 10%). In each model, the growth of Japanese ODA up to three lags enters into the regression model. In the case of ADB and World Bank ODA, only first lag is introduced based on the statistical validity test.

Volume 10, Number 01, June 2020
ISSN : 2012 9149
ISSN : 2386 1266 (online)

Model 1 examines the determinants of GDP growth. The growth of Japanese ODA (second lag) is positive and statistically significant in the model indicating Japanese ODA is effective in promoting GDP growth with some time lag. In model 2, where the dependent variable is per capita GDP growth, the growth of Japanese ODA is positive and statistically significant at 5 per cent level. In model 3, where the dependent variable is the growth of industrial output, the growth of Japanese ODA is positive and statistically significant at 10 per cent level. Our results are in consistent with previous research (Momita, et. al., 2019, Kawasaki, 2004, Cooray, 2003). Momita, et. al., (2019) found, for a panel dataset of 117 countries, Japanese ODA is positively related with the growth of industrial output whereas Kawasaki (2004) found, for a set of six Asian countries, that Japanese ODA contributed to enhance GDP growth rate in recipient countries by around 0.6-1.6 per cent per annum. Similarly, Cooray (2003) found Japanese ODA is positively correlated with gross fixed capital formation in Sri Lanka during 1960-2000. In addition to Japanese ODA, our regression model include variables representing ADB and World Bank ODA to Sri Lanka. According to regression results, the growth of ADB ODA, with a time lag, has a negative relationship with the growth of both GDP and per capita GDP during 1975-2019. However, the estimated coefficients are marginally significant (significant at 10 per cent level). This negative effect may partly be due the fact that ADB loans, though largely channeled into economic infrastructure, had relatively lower grant elements. For instance, weighted average grant element in ADB loans was 32 per cent whereas this figure for Japanese loans was 56 per cent. A lower grant element indicates that repayment burden remains relatively high and, as a results, a larger share of the benefits, generated through loan funded projects, move out of the country for repayment requirements. In other words, leakages from the economy remain high thereby having an adverse impact on the economy of the recipient country. In contrast to both Japanese and ADB ODA to Sri Lanka, the growth of World Bank ODA has no effect on GDP growth, per capita GDP growth or industrial output.

Table 7: Effect of Japanese ODA on Growth of GDP, GDP Per Capita, and Industrial Output

Variable	GDP Growth	Per capita GDP growth	Growth of Industrial Output
Constant	0.033	0.023	0.034
	(0.013)**	(0.012)*	(0.012)**
Growth of GDP (lag 1)	-0.001	-	-
	(0.083)		
Growth of GDP (lag 2)	0.139	-	-
	(0.73)*		
Growth of Per capita income (lag 1)	-	0.001	-
		(0.082)	
Growth of Per capita income (lag 2)	-	0.152	-
		(0.072)**	
Growth of industrial output (lag 1)	-	-	0.041
			(0.085)
Growth of industrial output (lag 2)	-	-	0.010
			(0.067)
Growth of gross fixed capital formation	0.413	0.414	0.458
	(0.055)***	(0.055)***	(0.055)***
Growth of Japanese ODA (lag 1)	0.016	0.015	0.036
	(0.020)	(0.020)	(0.020)*
Growth of Japanese ODA (lag 2)	0.043	0.041	0.039
	(0.021)**	(0.020)**	(0.021)*
Growth of Japanese ODA (lag 3)	0.010	0.001	0.017
	(0.021)	(0.021)	(0.026)
Growth of ADB ODA (lag 1)	-0.039	-0.040	-0.014
	(0.023)*	(0.023)*	(0.025)
Growth of World Bank ODA (lag 1)	0.030	0.029	-0.003
	(0.019)	(0.019)	(0.020)
R^2	0.70	0.70	0.73
F-statistics	9.347	9.489	10.820
Durbin-Watson statistic	1.73	1.72	1.61
No of observations	41	41	41

Note: In the table, standard errors are reported in parentheses and *, **, and *** indicate the estimated coefficients are statistically significant at 10%, 5%, and 1% respectively.

Source: Developed by Authors

Why the impact of Japanese ODA is different from that of the other donors considered? As Momita et. al., (2019) argued one of the main reasons for this differentials impact may be due to the fact that Japanese ODA's focus on removal of growth constrains in the area of economic infrastructure. According to Momita et.al., (2019), since very inception, Japanese ODA has prioritize economic infrastructure since Japan strongly believe poor and or lack of economic infrastructure is key to poor growth and development performance in developing countries. This position was partly derived from her own experience in the post-war period. Japan also received ODA from the World Bank during the post-second world war period and most of such ODA channeled into build/re-build

Volume 10, Number 01, June 2020
ISSN : 2012 9149
ISSN : 2386 1266 (online)

key infrastructures in the economy. Such investments contributed a lot in revitalizing the economy which was devastated by the war. Table 8 reports some data related to the distribution of ODA by donor and sector (cumulative ODA as at 31st of December, 2019). Out of the total Japanese ODA during 1960-2019, around 68 per cent channeled into economic infrastructure while this figure for ADB and the World Bank remains at 45 per cent and 27 per cent respectively. In particular, Japanese ODA for improving developing power & energy sector, port, airport, and shipping sector, and telecommunication is remarkable compared to other donors' ODA.

Table 8: Share of ODA (out of Cumulative during 1960-2019) by Sector

Sub-sector	Japan	ADB	World Bank
Road, bridges, and ground transport	0.27	0.26	0.12
Power & energy	0.21	0.12	0.04
Port, shipping and air transport	0.11	0.05	0.00
Telecommunication	0.05	0.01	0.02
Irrigation and related	0.04	0.02	0.09
Sub-total	0.68	0.45	0.27

Source: External Resources Department, Ministry of Finance, Sri Lanka

Macro-level findings go hand-in-hand with micro-level evidence gathered through ex-post evaluations of development projects carried out by Japanese International Cooperation Agency (JICA) and independent Country Assistance Evaluation reports. Table 9 reports data related to findings of some of the Japanese ODA (loan) projects completed in recent years. Accordingly, nearly 77 per cent of total development projects, funded via loans, were evaluated as satisfactory and of which 38 per cent of projects were evaluated as highly satisfactory. Interestingly, most of the projects which were carried out to improve/develop economic infrastructure reported satisfactory status. Similarly Country Assistance Evaluation reports also re-affirms that development project carried out under Japanese ODA delivered expected outcomes. Country Assistance Evaluation (2008) concluded;

"The contribution of Japan's ODA to the development of economic infrastructure such as roads, electricity, water and sanitation was found to be high. Therefore, positive impacts are expected for the socio-economic development of targeted project areas."

Table 9: Selected Ex-post evaluation outcomes (since 2008) - Japanese Loans Projects

Project(s)	Partially satisfactory	Fairly satisfactory	Satisfactory	Highly satisfactory
Upper Kotmale Hydro Power Project (II)			Yes	
Vavuniya-Kilinochchi Transmission Line Project (Phase I&II)				Yes
Eastern Province Water Supply Development Project				Yes
Provincial/Rural Road Development Project (Eastern Province)				Yes
Southern Highway Construction Project (II)			Yes	
Poverty Alleviation Micro Finance Project II				Yes
Pro-Poor Rural Development Project				Yes
Water Sector Development Project (II)			Yes	
Pro-Poor Eastern Infrastructure Development Project			Yes	
Sri Lanka Tsunami Affected Area Recovery and Takeoff Project			Yes	
Tourism Resources Improvement Project			Yes	
Environmentally Friendly Solution Fund Project (II)	Yes			
Small and Micro Industries Leader and Entrepreneur Promotion Project (III)			Yes	
Small-scale Infrastructure Rehabilitation and Upgrading Project (2)			Yes	
Water Sector Development Project			Yes	
Provincial Road Improvement Project & Provincial			Yes	
Plantation Reform Project (II)	Yes			
Power Sector Restructuring Program (suspended prematurely)	Yes			
Power Sector Restructuring Project			Yes	
Pro-Poor Economic Advancement and Community Enhancement Project			Yes	
Small-scale Infrastructure Rehabilitation and Upgrading Project (1)			Yes	
Upper Kotmale Hydro Power Project (I)			Yes	
Colombo City Electricity Distribution Development Project			Yes	
Lunawa Environment Improvement and Community Development Project			Yes	
Greater Kandy Water Supply Project				Yes
Improvement of National Blood Transfusion Services Project				Yes
Southern Highway Construction Project			Yes	
Bandaranaike International Airport Development Project				Yes
Poverty Alleviation Micro Finance Project			Yes	
Road Network Improvement Project			Yes	
Urgent Upgrading of Colombo Port Project		Yes		
Medium Voltage Distribution Network Reinforcement Project			Yes	
Transmission and Substation Development Project (2)			Yes	
Kalu Ganga Water Supply Project for Greater Colombo				Yes
Mahaweli System C Upgrading Project			Yes	
Greater Colombo Flood Control and Environment Improvement Project (3)		Yes		
Towns North of Colombo Water Supply Project			Yes	
Walawe Left Bank Irrigation Upgrading and Extension Project (I&II)				Yes
Port of Colombo North Pier Development Project (I&II)		Yes		
Greater Colombo Flood Control and Environment Improvement Project (I&II)		Yes		
Walawe Left Bank Irrigation Upgrading and Extension Project (E/S)				Yes
Port of Colombo North Pier Development Project (1)		Yes		
Walawe Left Bank Irrigation Upgrading and Extension Project (E/S)				Yes

Source: (JAUCA,2019)

Similarly, Country Assistance Evaluation (2014) briefly summarized the findings of the evaluation as follows;

"Overall, Japan's assistance to Sri Lanka was characterized as very effective"

Volume 10, Number 01, June 2020
ISSN : 2012 9149
ISSN : 2386 1266 (online)

Japan, unlike most other bi-lateral donors, has reformed her aid programme to reflect the concerns of the donor community as well as the recipient countries (Momita, et. al., 2019). As a result, Japan has been able to develop an effective ODA delivery mechanism to ensure recipient countries achieve maximum benefits out of Japanese ODA. The effective ODA delivery mechanism and higher concentration of economic infrastructure has made Japanese ODA more productive to developing countries compared to ODA of other donor countries. As far as author know, newly emerged donor countries, such as China and India, are yet to carry of ex-post evaluation of development projects and/or third party evaluation into the effectiveness of ODA programme in delivering expected outcomes. As a result, a little is known about the effectiveness of ODA funded projects carried out by newly emerged donors.

6. Conclusion

This study examines the impact of Japanese ODA on economic growth and development in Sri Lanka. Japanese ODA to Sri Lanka has grown at an average annual rate of around 6 per cent (in current US$ terms). Sri Lanka has been one of the priority countries for Japanese ODA largely due to the cordial relationship the two countries has maintained over the last several decades. Reflecting the unique feature of Japanese ODA, a greater majority of assistance has channeled into improve/develop economic infrastructure in the country. During the study period, Japan has provided foreign loans Sri Lanka on better terms than any other bi-lateral or multi-lateral organizations. Lower interest rates associated longer grace and maturity period have resulted a higher grant element in Japanese foreign loans. In addition, project costs associated with Japanese loans are lower than that of the other donors. Available literature does not report failures associated with Japan funded projects. All these indicate that Japanese foreign loans are less costly for Sri Lanka and highly productive for the economy. In contrast, Sri Lanka has received Chinese foreign loans at a relatively higher interest and associated costs and shorter grace and maturity period. Among the four donors – ADB, China, Japan, and World Bank – Chinese foreign loans contain the lowest grant element. Adding to that, project costs

associated with Chinese funded projects are higher than that of the other donors. Our regression analysis clearly indicate that there is a strong positive relationship between Japanese ODA and economic growth and development in the country. Our findings are consistent with the findings of previous research studies. It is evident that economic infrastructure developed with assistance of Japanese ODA has contributed to economic growth and development in the country. This impact was further supported through the micro-level evidence found in ex-post impact evaluations and third party impact evaluations.

References

Arndt, C., S. Jones, and F. Tarp (2010). What Is the Aggregate Economic Rate of Return to Foreign Aid?. *The World Bank Economic Review*, 30(3), 2015, 446–74.

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

Cooray, N.S. (2003). *Does aid work? Case of Japanese ODA to Sri Lanka*. IUJ Research Institute Working Paper 03-1, International Development Series.

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

Gisselquist, R.M. and F. Tarp (2019). Aid Impact and Effectiveness: Introduction and Overview. Politics and Governance*,* 7(2), pp. 4

Hannes, O. and N.P.D. Axel (2011). Does Conditionality Work? A Test for an Innovative US Aid Scheme. CESinfo Working Paper. No 3454, Center for Economic Studies and Ifo Institute (CESifo), Munich

Hansen, H., and F. Tarp (2001). Aid and Growth Regressions. *Journal of Development Economics*, 64 (2), pp. 547–70.

Japan International Cooperation Agency (JICA), *Ex-post Evaluation Reports (various issues)*, access via https://www2.jica.go.jp/en/evaluation

Jia S. and C.R. Williamson (2019). Aid, Policies, and Growth: Why So Much Confusion?. *Contemporary Economic Policy,* 37(4), pp.30-45.

Volume 10, Number 01, June 2020
ISSN : 2012 9149
ISSN : 2386 1266 (online)

Juselius, K., N. F. Møller, and F. Tarp (2001). The Long-Run Impact of Foreign Aid in 36 African Countries: Insights from Multivariate Time Series Analysis. *Oxford Bulletin of Economics and Statistics*, 76(2), pp. 153–84.

Kawasaki, K. (2004). The impact of Japanese economic cooperation on Asian economic development. *Review of Urban and Regional Development Studies*, 16(1), pp. 14 - 32

Karunaratne, H.D. (2012). A Journey in Harmony: Sixty Years of Japan-Sri Lanka Relations. Colombo: University of Colombo and JAGAAS.

Lakshman, W.D. (2003). The Distance Neighbours: Fifty Years of Japan-Sri Lanka Relations. Colombo: Faculty of Graduate Studies, University of Colombo.

Mekasha, T.J. and F. Tarp (2019). A Meta-Analysis of Aid Effectiveness: Revisiting the Evidence. *Politics and Governance*, 7(2), pp. 5-28.

Ministry of Foreign Affairs of Japan (2008). Country Assistance Evaluation of Sri Lanka. Tokyo: Ministry of Foreign Affairs of Japan.

Ministry of Foreign Affairs of Japan (2014). Country Assistance Evaluation of Sri Lanka. Global Link Management Inc.

Momita, Y., Matsumoto, T., and K. Otsuka, (2019). Has ODA contributed to growth? An Assessment of the impact of Japanese ODA. *Japan & the World Economy*, 49, pp. 161-175.

Morris, S., Parks, B., and A. Gardner (2020). Chinese and World Bank Lending Terms: *A Systematic Comparison Across 157 Countries and 15 Years*. CGD Policy Paper 170, Center for Global Development.

Rajan, R. G., and A. Subramanian (2008). Aid and Growth: What Does the Cross-Country Evidence Really Show?. *Review of Economics and Statistics*, 90(4), pp.643–65.

Verite Research (2020). Financing Infrastructure: The (Non) Concessionality of Concessional Loans. Colombo: Verite Research Publication.