Does foreign aid with political strings dampen or heighten growth? An analysis of aid-growth nexus in Pakistan

Muhammad Imran Javed [1] and Rafi Amir-ud-Din [2]

Abstract

Pakistan has received around 1.3 billion dollars (current US$) on an annual basis from 1972 to 2014 in the form of bilateral and multilateral aid. While Pakistan's per capita GDP (current US$) rose from 152 US$ in 1972 to 1,315 US$ in 2014, the world per capita GDP increased from 979US$ to 10,755 US$ in the same period. A lot of empirical evidence suggests that the aid coming from the countries that attach political and strategic strings with the aid fails to contribute to economic growth significantly. Using data for the sample period 1972 – 2014 and employing the Vector Error Correction (VECM) estimation method, we find that aggregate official development aid has a significant and positive long-run impact on the GDP per capita. A 1% rise in aggregated Official Development Assistance increases Pakistan's GDP per capita by 0.75%. We also find that bilateral aid from very few countries such as Belgium, UK, and the US has a significant long-term impact on Pakistan's GDP.

Additionally, we fail to accept the hypothesis that aid coming from some countries with political and geostrategic strings has any adverse impact on the GDP per capita of Pakistan in the long run. Regarding the impact of different components of aggregate aid on Pakistan's GDP per capita, we see mixed effects. The results show that a 1 % increase in both Official Development Assistance (ODA) and technical cooperation decreases GDP per capita by 1.55% and 1.063%, respectively. Conversely, a one percent increase in grants leads to an increase of 2.71% in Pakistan GDP per capita in the long run. As Pakistan's

[1]Department of Economics, COMSATS University Islamabad, Lahore Campus, Lahore, Pakistan. Email: imranjaved594@gmail.com

[2]Department of Economics, COMSATS University Islamabad, Lahore Campus, Lahore, Pakistan. Email: rafi.amiruddin@gmail.com

economic problems have considerably deepened in recent years because of a variety of factors including Covid-19, Pakistan has been actively looking for economic bailouts from the IMF and other bilateral partners. This study is expected to provide important insights regarding the components of aid and their implications for economic growth.

1 Introduction

Pakistan has remained a major recipient of foreign aid in the past few decades. Pakistan received around 1.3 billion dollars (current US\$) on an annual basis from 1972 to 2014 in the form of bilateral and multilateral aid. While Pakistan's per capita GDP (current US\$) rose from 152 US\$ in 1972 to 1,315 US\$ in 2014, the world per capita GDP increased from 979US\$ to 10,755 US\$ in the same period. Put in other words, Pakistan's per capita GDP grew 7.6 times as against the 10 times growth in the world per capita GDP during this time. Most of the foreign aid to Pakistan was the result of Pakistan's participation in US-led wars against Russia, Iraq, and Afghanistan, and arguably came with a lot of political strings attached. A lot of empirical evidence suggests that the aid coming from the countries that attach political and strategic strings with the aid fails to contribute to economic growth significantly. This raises serious questions about the effectiveness and even desirability of making foreign aid the lynchpin of economic policy.

Does foreign aid significantly contribute to economic growth? This question continues to generate controversy among macroeconomists, development thinkers, and practitioners. The empirical evidence has not shown any clear relationship between foreign aid and growth. While some of the studies indicate that there exists a positive relationship between foreign aid and growth (Burnside & Dollar, 1997; Durbarry, Gemmell, & Greenaway, 1998; Mekasha & Tarp, 2013; Minoiu & Reddy, 2010), lot of studies have identified a set of preconditions which explain the positive impact of foreign aid on the economic growth. Burnside and Dollar (1997) found certain preconditions for this impact to

materialize, such as a stable macroeconomic policy environment and national income level. Similarly, if a nation has control over corruption, foreign aid would be more helpful to promote growth (Vázquez & Garvi, 2010). Moreover, an empirical study on bilateral aid shows a significant positive relationship with GDP and investment (Gebregziabher, 2014), but multilateral aid shows no significant association with GDP.

In contrast, several studies argue that a negative relationship exists between aid and growth (Adams & Atsu, 2014; Museru, Toerien, & Gossel, 2014), but Museru et al. (2014) find that aid volatility negatively affects GDP growth. Adams & Atsu, (2014) state that aid affects GDP growth negatively in the long run but positively affects economic growth in the short run. However, some of the literature argues that foreign aid did not affect GDP (Doucouliagos & Paldam, 2011; Rajan & Subramanian, 2008).

Pakistan has received a significant amount of foreign aid right from the beginning of its independence. Total Official Development Assistance (ODA) that Pakistan received from the major bilateral donors shows a consistently increasing trend from the 1970s onward (Figure 1). Around 72% of the aid comes in the form of Official Development Assistance (ODA) from bilateral agreements (Anwar & Michaelowa, 2006). The major donors are the US, Japan, Australia, UK, Netherland, European Union (EU), Germany, Canada, Switzerland, World Bank, and Asian Development Bank, according to the United Nations report of Pakistan 2014[3]. To what extent foreign aid has helped promote growth in Pakistan is not clear. Khan and Ahmed (2007) show that foreign aid has historically only an insignificant negative impact on economic growth. They explain that poor macroeconomic policies, corruption, and poor institutional quality have made foreign aid counterproductive in Pakistan. Conversely, another study demonstrates that foreign aid positively affects the GDP growth in Pakistan (Arshad, Zaid, & Latif, 2014).

---

[3] http://www.un.org.pk/wp-content/uploads/2014/04/Donor-Mapping-in-Pakistan-by-the-RCO.docx

Figure 1
Total Official Development Assistant (ODA) Pakistan received from bilateral donors (USD millions)
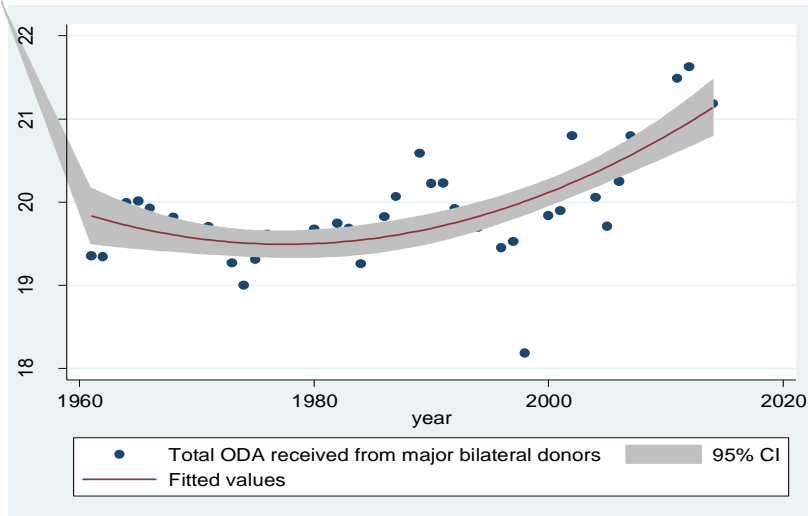
Source: World Development Indicators, 2017

It is argued in the literature that donors' geostrategic[4] and political interests, among other factors, hinder economic growth (Ram, 2003). However, because of the very nature of this problem, it is hard to establish if any of the donors are committed to the development of the recipient country or have geostrategic interests in giving aid. Different ways to establish this have been tried. If a donor country has a commitment to the development in making aid decision or not is reflected in their preferences. If the donors give aid to democratic regimes, it is a measure of their commitment to the development. However, if the donor countries give aid to non-democratic regimes, it reflects that they have geostrategic interests in their decision to give aid (Alesina & Dollar, 2000; Dunning, 2004; Goldsmith, 2001; Scholl, 2009). Based on this criterion, we can see which countries have geostrategic interests at the heart of their aid decisions.

---

[4] Geostrategic interests broadly refer to the geographic and strategic interests of nations. Specifically, geostrategic interests of the donors in our study refers to the military interests of the donor countries in US-led wars in Afghanistan and Iraq.

Alesina and Dollar (2000) argue that the world's major bilateral donors, including the US, UK, Canada, and the Nordic nations, were paying more attention to a democratic nation, while Germany, France, and Japan give little importance to the democratic credentials of the recipient nations. Given the fact that foreign aid has not been effective in turning around Pakistan's economy, it would be interesting to identify what countries have geostrategic interests in their decision to extend aid to Pakistan and to see if the aid coming from these countries has any impact on the economic growth of Pakistan. It is hypothesized that aid coming from the countries with geostrategic strings attached to their aid to Pakistan may not significantly contribute to the development of Pakistan. We include a set of control variables to disaggregate the impact of the geostrategic interests on economic growth. The control variables include unemployment, inflation, and government expenditures on education, the latter of which is used as a proxy for technology.

The literature suggests that aid coming from countries with geostrategic interests in their decision to extend aid to developing countries does not positively affect GDP growth. There are different ways to identify if some country has geostrategic interests or not. Commitment to Development Index (CDI) 2015 report ranks the twenty-seven rich nations based on aid quantity, quality, and several policy measures in the domains of technology, finance, trade, migration, security, and environment (Krylová & Barder, 2015). Major bilateral donors to Pakistan are the US, Switzerland, Australia, which rank low on the CDI, suggesting that they are least committed to the development of recipient countries.

Interestingly, Nordic nations, especially Denmark, Sweden, Norway, Finland & Netherland, are at the top position in CDI. Nordic countries mainly provide aid to democratic economies for development purposes and are selective in offering aid to the closed economies (Gates & Hoeffler, 2004; Minoiu & Reddy, 2007).

Pakistan is a major recipient of foreign aid. Pakistan received around 1.3 billion dollars (current US$) on an annual

basis from 1972 to 2014 in the form of bilateral and multilateral aid but Pakistan's per capita GDP grew 7.6 times as against the 10 times growth in the world per capita GDP during this time. This raises serious questions about the effectiveness and even desirability of making foreign aid the lynchpin of economic policy. So, it would be crucial to see if the foreign aid from the donors that attach geostrategic and political strings to their aid affects GDP per capita.

2   Literature Review

Although the relationship between foreign aid and the economic growth of the recipients of the foreign aid has been thoroughly analyzed, no clear picture emerges if foreign aid promotes or dampens growth in the recipient countries. Some recent studies reveal that positive reltionship exists between aid and growth (Arndt, Jones, & Tarp, 2010; Asteriou, 2009). Clemens, Radelet, Bhavnani, and Bazzi (2012) add that aid has a positive but non-linear impact on GDP growth while the effectiveness of aid varies across regions. Furthermore, some authors contended that aid positively affects the GDP in developing nations based on certain preliminary conditions (Arndt, Jones, & Tarp, 2015; Galiani, Knack, Xu, & Zou, 2016; Young & Sheehan, 2014). Galiani et al. (2016) find that if a nation increases its physical investment, foreign aid may positively impact the GDP. Likewise, Young and Sheehan (2014) find that better economic conditions may positively influence foreign aid growth.

Similarly, Arndt et al. (2015) find that developing human and physical capital is a significant channel through which foreign aid positively affects economic growth. It is also found that if foreign assistance is devoted to promoting primary education, it may also promote GDP growth (Asiedu, 2014). Another side of this literature review shows negative and zero association between aid and growth. In his seminal research (Easterly, 2003) challenged the long-held view that "aid promotes growth in a good policy environment" and found that this relation is not robust to the inclusion of new data or alternative definitions of "aid," "policy," or "growth" (Easterly, 2003). Kourtellos, Tan, and Zhang (2007) claimed that the link between aid and growth is non-

linear, negative, and insignificant. It is also found that aid volatility adversely affects growth (Kodama, 2012). Ekanayake and Chatrna (2010) find that impact of foreign aid on growth differs in the developing countries based on their regional and income status. Doucouliagos and Paldam (2011) found in their meta-analysis that development aid has been ineffective in fostering economic growth in developing countries.

Some studies have tried to explain why foreign aid has not helped the economies of the recipient countries. One possible answer is that when donor countries' geostrategic and political interests drive their aid decisions, foreign aid fails to help the economies of the recipient countries to grow. Bearce and Tirone (2010) show that if the donors have only small strategic interests in their aid programs, the aid can positively contribute to the GDP growth of the recipient nations. They also assert that in the Post-Cold War era, the western donors have reduced their strategic interests, which has positively impacted the economic growth of the recipient nations. Headey (2008) found that throughout the time of the Cold war, bilateral aid had no significant contribution to the GDP, but after the 1990s, when the cold war period was over, both bilateral and multilateral assistance had a significant positive impact on GDP growth. He, however, found that bilateral assistance involved more significant geostrategic interests compared with multilateral aid.

A few studies tried to capture the impact of different components of aid on economic growth. Literature suggests that different components of aid have different effects on growth. Aid coming from multilateral and bilateral donors in social, economic, and food aid adversely affects the growth rate (Rajan & Subramanian, 2008). Another study found that some aid components, including project aid, aid for a short-term period, and grants, leave a significant positive impact on GDP growth. In contrast, aid for technical assistance and program aid negatively affect economic growth (Doucouliagos & Paldam, 2011). But when all of these components are pooled together, they indicate no relationship with GDP growth (Doucouliagos & Paldam, 2011).

We hypothesize that bilateral and multilateral aid positively affects economic growth if it is independent of political and geostrategic interests of the donor countries.

3   Research Methodology and Data
3.1   Data Sources

We use time-series data on foreign aid and its various components from significant donors to Pakistan from 1972-2014. Data for bilateral aid (current US$) and other variables like GDP per capita (current US$), inflation (consumer prices in annual %), and net official development assistance ODA (current US$) is taken from World Development Indicators. The data on unemployment (in millions) is taken from the Pakistan Bureau of Statistics (Statistical Year Book 2012). Data on the government expenditures on education used as a proxy for technology is taken from the Handbook of Statistics, SBP 2014. Component of aid (grants & technical cooperation) and data of total ODA of major bilateral donors of Pakistan (US, Japan, Australia, UK, Netherland, European Union (EU), Germany, Canada & Switzerland) is taken from OECD statistics.

3.2   Research Methodology

When we use time-series data, cointegration among time series indicates a relationship between and among the variables. One of the preconditions for estimating the cointegrating relationship among time series is that they need to be integrated of the same order. Dicky-Fuller or Augmented Dicky-Fuller's unit root test is generally used to test the order of integration. So we first estimate the unit root test and then decide which technique is suitable for the analysis according to the order of integration. For example, if all the series are stationary at the order I(0), we may use the simple ordinary least square method (OLS). Suppose all the variables are stationary at the same order I(1). In that case, we may use Johansen's co-integration technique to find the long-run relationship among the series (Dickey & Fuller, 1979). Moreover, if variables are I(0) and I(1) but not I(2), then we may apply the autoregressive distributed lag (ARDL) approach (Pesaran, Shin, & Smith, 2001).

Model 1: Model of Aggregate Official Development Aid

We used the Vector Error Correction Model (VECM) to estimate the impact of Total Aggregated ODA on the GDP per capita. The general equation is as follows:

$$y_t = \sum_{j=1}^{p} \alpha_j\, y_{t-j} + \sum_{j=0}^{q} \beta'_{ij}\, X_{i,t-j} + \varepsilon_t \qquad (1)$$

Dependent variable y_t is Gross domestic product (GDP) per capita. The independent variables in vector $X_{i,t-j}$ include the net official development assistance (ODA) received in terms of (current US$) besides a set of control variables including inflation, Government Expenditure (Proxy for Technology), and Unemployment (Asiedu, 2016; Hudson and Mosely, 2008; Dreher and Langlotz, 2015). Here t indicates the periods from 1, 2,…, T.

Model 2: Impact of Bilateral Aid on per capita growth

We hypothesize that the aid from countries that attach strings to their aid does not significantly contribute to growth. The Commitment to Development Index (CDI) is used as a proxy for the commitment (or lack thereof) of the donors to the development of the recipient countries. CDI ranks 27 of the world's richest countries based on their commitment to the development of the recipient countries[5]. We select only 17 countries based on the size of their aid to Pakistan and see how aid from these countries affects the GDP level. We use the ARDL model to estimate the impact of bilateral aid on the GDP level and a set of control variables.

$$\Delta y_t = \sum_{j=1}^{p} \alpha_j\, y_{t-j} + \sum_{j=0}^{q} \beta'_{ij}\, X_{i,t-j}^{k} + \varepsilon_t \qquad (2)$$

The dependent variable y_t is the Gross domestic product (GDP) Per capita, $X_{i,t}$ is a vector of independent variables, which also includes a set of control variables, and ε_t is a residual term. Here t indicates the time periods from 1, 2…to T. The superscript

[5] The complete list of the countries in the CDI are given in Table S.1 in the Appendix

k refers to the country from where the bilateral aid is coming from. In this model, we shall have k equations. The estimates from these k equations will be compared to see if the impact of the aid coming from different countries on the national GDP varies, corresponding with the level of commitment of these countries to the development of Pakistan. We also present the ARDL estimates in error correction form (Frank, 2009).

To express the ARDL estimates in error correction form, we add y_{t-1} on both sides of Eq. 2.

$$y_t = \sum_{j=1}^{p} \gamma_j \, y_{t-j} + \sum_{j=0}^{q} \beta'_{ij} \, X_{i,t-j} + \varepsilon_t \qquad (3)$$

Where $\gamma_j = \alpha_j \; \forall \; j \neq 1 \; \& \; \gamma_j = \alpha_1 + 1$

After some expansion, we get:

$$\Delta y_t = \emptyset_i [y_{t-1} - \theta'_i X_{i,t}] + \sum_{j=1}^{p-1} \gamma_j \, \Delta y_{t-j} + \sum_{j=0}^{q-1} \beta'_{ij} \, \Delta X_{i,t-j} + \varepsilon_t \quad (4)$$

Where

$$\emptyset_i = - \left(1 - \sum_{j=1}^{p} \delta_i \right),$$

$$\theta_i = \sum_{j=0}^{q} \frac{\beta_{ij}}{1 - \Sigma_k \gamma_{ik}},$$

$$\gamma_j = - \sum_{m=j+1}^{p} \gamma_m,$$

$$\beta_{ij} = - \sum_{m=j+1}^{q} \beta_{im}.$$

Model 3: Impact of Different Components of Aid on per capita GDP

We use the Vector Error Correction Model (VECM) to estimate the impact of different aid components on GDP per capita. The following general equation of model 3 is:

$$y_t = \sum_{j=1}^{p} \alpha_j\, y_{t-j} + \sum_{j=0}^{q} \beta'_{ij}\, X_{i,t-j} + \varepsilon_t \qquad (5)$$

Here the dependent variable y_t is Gross domestic product (GDP) per capita. The independent variables consist of three components of foreign aid: Official Development Aid (ODA), total grants, and technical cooperation. According to the OECD statistics, technical cooperation is "grants to nationals of aid recipient countries receiving education or training at home or abroad''. These three components are the sum of major bilateral donors (US, Japan, Australia, UK, Netherland, European Union (EU), Germany, Canada, and Switzerland) according to the United Nations Report of Pakistan 2014[6].

4 Results and Discussion
Model 1: Model of Aggregate Official Development Aid

We used Augmented Dicky Fuller (ADF) test to test the stationarity of the variables, and each variable contains 42 observations in this model. We found that GDP per capita, Aggregated ODA, inflation, Government expenditures, and unemployment are non-stationary at the level. Moreover, at the first difference, all variables are stationary at the 1% level. To see the long-run association among the time series variables, we select the best lag order by utilizing the VAR approach for I(1) variables (Nielsen, 2001; Paulsen, 1984; Tsay, 1984). The VAR approach suggests that most of the information criteria such as FPE, AIC, HQIC, and SBIC imply that the optimal lag order for the I(1) series is 1. Next, we test the long-run association among the I (1) series. We have applied Johansen co-integration test. Using the trace method, we conclude that there is only one cointegrating vector.

The estimated long-run equation is:

$$GDP_t = -10.34 + 0.750\, AgODA_{t-i} + 0.014 INF_{t-i} + 0.20 GovtExp_{t-i}$$
$$\qquad\qquad\quad 0.110^{***} \qquad\quad 0.007^{**} \qquad 0.100^{**}$$

$$+0.33 Unem + EC$$
$$0.078***$$

Note: ** and *** demonstrate the significance level of variables at 5% and 1% level with respect to standard error (SD).

Long run estimation of the model shows the statistically significant positive effect of Net (ODA) on GDP per capita at 1% level. A 1% rise in aggregated Official Development Assistance is associated with a 0.75% increase in Pakistan's GDP per capita. The positive link between ODA and GDP per capita growth is consistent with the existing evidence (Arndt et al., 2010; Asteriou, 2009). A recent study by Bird and Choi (2020) found that foreign aid had a significant positive effect in the case of Africa. Das and Sethi (2020) found a significant and positive impact of foreign aid on the economic growth in Sri Lanka.

Impacts of control variables inflation, government expenditure, and unemployment on GDP per capita indicate significant positive signs, and they are significant at 1% and 5% levels. However, by assuming other things constant, the partial impacts of control variables are as follows: a 1% increase in inflation, Government expenditure, and unemployment labor force increase 0.014%, 0.20%, and 0.33% of Pakistan GDP per capita. The positive impact of unemployment on the GDP is counterintuitive.

Increase in government expenditures leads to improvement in technology, which in turn contributes to the Pakistan GDP per capita (Azam & Ahmed, 2015; Jalil & Idrees, 2013). Some earlier studies have also found a positive impact of inflation on GDP (Arndt et al., 2015; Galiani et al., 2016; Young & Sheehan, 2014). However, it is also found that an increase in inflation is helpful for economic growth up to a certain threshold level (Jha & Dang, 2012). Hence, the effect of foreign aid in absolute terms is larger than the impact of control variables on the economic growth of Pakistan. The positive and significant impact of Aggregated ODA on economic growth is also well-documented in the literature (Arndt et al., 2010, 2015; Asteriou, 2009; Young & Sheehan, 2014).

Model 2: Impact of Bilateral Aid with strings on per capita Growth

The variables in our model were found to be I(0) and I(1) but not I(2). Therefore, we use the ARDL model to find the impact of bilateral aid on the GDP per capita of Pakistan. Results from the ARDL model show that at a 5% level of significance, aid from only two countries has a significant impact on Pakistan's GDP growth (Table 1). Complete ARDL results are given in Tables S.2 and S.3 in the Appendix. Bilateral aid from New Zealand affects Pakistan's GDP growth negatively, while aid from the UK positively affects the GDP per capita of Pakistan contemporaneously. We also see the dynamic relationship between bilateral aid and GDP growth. The aid from Ireland, Norway, and Belgium positively affects GDP per capita after a lag of one year. However, the impact of bilateral aid from the remaining nations is insignificant.

Table 1
ARDL Model Results

GDP Per Capita	Ln(GDP)$_{t-1}$	*t*-stat	Bilateral Aid	*t*-stat	Bilateral Aid$_{t-1}$	*t*-stat	CDI Rank
Australia	0.783***	[10.60]	0.0356	[1.38]	0.0195	[0.88]	13
Austria	0.937***	[21.98]	-0.0073	[-0.46]	0.0248	[1.57]	11
Belgium	0.403**	[3.29]	0.00705	[0.48]	0.0385*	[2.91]	9
Canada	0.810***	[11.76]	0.0402	[1.20]	0.0139	[0.40]	19
Finland	0.885***	[15.34]	0.0217	[1.11]	0.0081	[0.46]	20
France	0.815***	[11.71]	0.0355	[1.56]	0.00368	[0.17]	16
Germany	0.825***	[11.78]	0.0355	[1.43]	-0.0232	[-0.96]	15
Ireland	0.841***	[10.73]	-0.00276	[-0.14]	0.0541*	[2.55]	26
Italy	0.812***	[5.35]	-0.0278	[-1.73]	-0.0105	[-0.64]	7
Japan	0.887***	[14.38]	0.00157	[0.05]	0.0249	[0.87]	17
Netherland	0.847***	[14.51]	0.0504	[1.28]	0.0476	[1.48]	22
N. Zealand	0.910***	[14.37]	-0.0434*	[-2.28]	0.0204	[1.22]	18
Norway	0.747***	[14.02]	0.00839	[0.32]	0.102***	[4.90]	23
Sweden	0.857***	[12.81]	0.0378	[1.89]	-0.0101	[-0.50]	25
Switzerland	0.888***	[13.66]	0.0186	[0.59]	-0.0215	[-0.72]	12
UK	0.790***	[10.60]	0.116*	[2.67]	-0.0412	[-0.79]	24
US	0.827***	[9.61]	-0.00097	[-0.03]	-0.0217	[-0.80]	8

t statistics in brackets
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Bird and Choi (2020) in their study of developing countries found that foreign aid had a generally insignificant effect on the economic growth except in Africa. Das and Sethi (2020) also found an insignificant impact of foreign aid on the economic growth in India. These findings are also consistent with

previous evidence which suggest that foreign aid is not growth-friendly (Doucouliagos & Paldam, 2011; Easterly, 2003; Kourtellos et al., 2007). The fact that aid only from Norway and Germany has a positive impact on growth is consistent with previous evidence that donors have no or little strategic interests in their aid programs (Bearce & Tirone, 2010).

4.1 Error Correction Model Results

The ARDL model, expressed in error correction terms, gives us the long-run and short-run relationships between the dependent and independent variables (Sargan, 1964). We estimated 17 models (Table 2) to measure the impact of aid from individual countries on the GDP per capita. Out of the seventeen countries in our model, aid from only three countries (Belgium, UK, and the US) significantly impacts Pakistan's economic growth. A unit increase in aid from Belgium, UK, and the US increase GDP per capita in Pakistan by 0.8%, 0.38%, and 0.25%.

Table 2
ARDL Long-Run Model Results

GDP per capita	Aid	(t)	Inflation	(t)	Govt. Exp	(t)	Unempl	(t)	CDI Rank
Australia	0.188	1.52	0.026	0.63	-0.214	-0.39	0.902***	4.41	13
Austria	0.319	0.90	0.063	0.92	-1.222	-0.86	0.657	1.02	11
Belgium	0.0806*	2.49	0.0326*	3.22	0.628*	3.17	1.292***	18.22	9
Canada	0.209	1.75	0.0658	1.92	-0.276	-0.46	1.218***	8.53	19
Finland	0.452	1.11	0.0135	0.18	-1.05	-0.75	0.788	1.03	20
France	-0.0784	-0.44	0.0589*	2.39	0.299	0.60	1.189***	9.51	16
Germany	0.415	1.18	0.0678	1.05	-0.673	-0.65	1.114***	4.69	15
Ireland	1.429	0.18	-0.166	-0.12	-3.89	-0.17	-7.346	-0.15	26
Italy	-0.0929	-0.17	0.0122	0.17	2.638	0.53	1.507*	3.30	7
Japan	0.0393	0.10	0.113	1.33	-1.217	-0.83	1.123**	3.07	17
Netherland	0.403	1.06	0.0751	1.57	-1.078	-1.07	1.155***	5.59	22
N. Zealand	0.599	0.95	-0.0091	-0.11	-1.202	-0.76	-0.269	-0.18	18
Norway	0.277	1.53	0.0575	1.50	-0.511	-0.71	0.994***	5.07	23
Sweden	0.218	1.40	0.0761	1.56	-1.087	-1.12	1.018***	4.71	25
Switzerland	0.289	0.42	0.131	1.02	-2.478	-0.77	0.702	0.84	12
UK	0.377*	2.34	0.0314	1.03	-0.275	-0.70	0.694**	3.18	24
US	0.247*	2.18	0.0390*	2.21	0.177	0.61	0.992***	7.74	8

t statistics in brackets
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Error correction model (ECM) also estimates the speed of adjustment after a departure from equilibrium in the short-run (Engle & Granger, 1987). Suppose the coefficient of lagged error

term shows a significant negative sign. In that case, it is an indication that variables are converging towards long-run equilibrium. However, if it shows a significant positive sign, it indicates that variables move away from the equilibrium point (Engle & Granger, 1987).

Table 1
ARDL Short-Run Model Results

	Adj. GDP$_{(t-1)}$	ΔGDP$_{(t-1)}$	ΔAid$_{(t)}$	ΔAid$_{(t-1)}$	Control variables	CDI Index
Australia	-0.133	0.0585	-0.0069	0.0176	Yes	13
	[-1.83]	[0.52]	[-0.33]	[1.05]		
Austria	-0.0718	0.0655	-0.0276	0.00702	Yes	11
	[-1.20]	[0.34]	[-1.36]	[0.40]		
Belgium	-0.667	-0.248	-0.0502	-0.0277	Yes	9
	[-2.03]	[-0.95]	[-1.98]	[-1.59]		
Canada	-0.143	0.0541	-0.0132	0.00886	Yes	19
	[-1.56]	[0.47]	[-0.49]	[0.31]		
Finland	-0.0657	-0.0522	-0.0186	0.0285	Yes	20
	[-0.83]	[-0.29]	[-0.71]	[1.52]		
France	-0.148	0.0486	0.0306	0.0318	Yes	16
	[-2.09]	[0.38]	[1.39]	[1.83]		
Germany	-0.123	0.143	-0.0319	-0.0186	Yes	15
	[-1.20]	[0.82]	[-0.72]	[-0.66]		
Ireland	-0.0531	-0.085	-0.0784	-0.0105	Yes	26
	[-0.18]	[-0.24]	[-1.35]	[-0.22]		
Italy	0.245	-0.0913	0.0423	0.0401	Yes	7
	[0.40]	[-0.26]	[0.67]	[1.43]		
Japan	-0.071	0.106	0.00543	0.0129	Yes	17
	[-1.28]	[0.85]	[0.21]	[0.62]		
Netherland	-0.0919	0.0558	0.00312	0.0252	Yes	22
	[-1.48]	[0.47]	[0.09]	[0.97]		
N Zealand	-0.0579	0.263*	-0.032*	0.0171	Yes	18
	[-1.14]	[2.39]	[-2.63]	[1.40]		
Norway	-0.109	0.103	-0.0281	0.0296	Yes	23
	[-1.38]	[0.83]	[-0.95]	[1.18]		
Sweden	-0.0877	-0.148	0.0196	0.0282*	Yes	25
	[-1.63]	[-1.23]	[1.38]	[2.23]		
Switzerland	-0.0508	0.0534	-0.0004	0.00453	Yes	12
	[-0.94]	[0.45]	[-0.02]	[0.19]		
UK	-0.166*	0.0458	0.00318	0.00672	Yes	24
	[-2.11]	[0.39]	[0.07]	[0.15]		
US	-0.249*	0.117	-0.0243	-0.0243	Yes	8
	[-2.53]	[0.84]	[-0.89]	[-1.13]		

t statistics in brackets
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

The short-run estimates show that only aid from New Zealand has a significant contemporaneous impact on GDP per capita and this impact is negative, while aid from Sweden has a

positive and significant impact on the outcome variable after the lag of one year. The results should not be surprising because the aid often impacts after sufficiently longer lags (Minoiu & Reddy, 2010). Control variables are omitted from the table for the economy of space. However, we see that inflation has a significant and positive impact on the aid equation for New Zealand for both the current and lagged period. In contrast, in all other equations, inflation shows an insignificant positive relationship effect on the GDP per capita. Government expenditures also show an insignificant impact on the GDP per capita in the short run. Again, the results are expected because the government expenditures, especially in the large development projects, make their presence felt after a sufficiently long period after the investment.

In sum, the results of the short-run and long-run relationship show that in the short run, only aid from Sweden has a positive and significant impact on the GDP per capita, and aid from New Zealand has a negative and significant impact. In the long run, aid from Belgium, UK, and the US has a significant positive impact on the GDP per capita. A unit increase in aid from Belgium, UK, and the US increase GDP per capita in Pakistan by 0.8%, 0.38%, and 0.25%, respectively, in the long run.

How to estimate the response of Pakistan's economy to the aid coming from the countries which attach greater political strings with their aid? One obvious way is to regress the long-run and short-run coefficients of the impact of bilateral aid on the GDP per capita on the rankings of the countries in the Commitment to Development Index (CDI). However, the problem with this approach is that aid from only three countries in our sample of 17 donors has a significant long-term impact on Pakistan's GDP per capita. In the short run, only two countries, namely New Zealand and Sweden, have a significant negative and positive impact on Pakistan's GDP per capita. So the estimates would not be reliable. With this caveat, we give the results in (Table 4 below).

We see that CDI rankings do not significantly predict the effect of aid on the GDP per capita. Therefore, we fail to accept the hypothesis that the aid coming from some countries with

political motives has an adverse impact on Pakistan's GDP per capita.

Table 2
The long run relationship between CDI ranks and impact of aid on GDP per capita

	Effect of Aid on GDP per capita (Long Run)	*p*-values
CDI Rank	0.00211	[0.695]
Inflation	-4.088**	[0.007]
Govt expenditure	-0.180**	[0.002]
Unemployment	0.0420	[0.430]
_cons	0.306**	[0.005]
N	17	
F	40.23	
p	0.000	
r2	0.931	

p-values in brackets
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

The situation in the short run is, however, different. We see that CDI ranks have a negative and significant impact (at a 10% confidence level) on the effect of aid on GDP per capita in the short run. The implication is that if a country becomes less committed to development in the short run, the aid from this country would have an adverse negative impact on the GDP per capita. The positive impact of aid on the GDP per capita in the previous period transmits to the present period. We see a significant positive relationship between the impact of aid on GDP per capita in the previous period and the current period ceteris paribus (Table 5).

Table 3
Short-run relationship between CDI ranks and impact of aid on GDP per capita

AID $_t$	Effect of Aid on GDP per capita (Short Run)	*p*-values
CDI Rank	-0.00176	[0.063]
Effect of Aid on GDP per capita $_{t-1}$	1.136***	[0.001]
_cons	0.00542	[0.722]

N	17
F	9.923
p	0.002
r2	0.586

p-values in brackets
$^{*}\ p < 0.05,\ ^{**}\ p < 0.01,\ ^{***}\ p < 0.001$

Model 3: Component of aid

Here we estimate the impact of various components of foreign aid on the economic growth of Pakistan. GDP per capita, Official Development Assistance (ODA) (sum of major bilateral donors), Grants and Technical Co-operation found to be I(1), and each variable includes 42 observations in this model. The VAR approach suggests that most of the information criteria such as FPE, AIC, HQIC, and SBIC imply that the optimal lag order for the I(1) series is 1. After confirming the optimal lag order (1), we implement the Johansen co-integration approach to discover the long-run association among the series. We, therefore, conclude that there is only one cointegrating vector. Hence, the following long-run equation is identified.

$$GDP_t = 23.10 - 1.55 ODA_{t-i} + 2.71 Grants_{t-i}$$
$$- 1.063 Tech_{t-i} + ECT$$
$$\quad\quad 0.228^{***} \quad\quad 0.226^{***} \quad\quad 0.220^{***}$$

Note: ** and *** demonstrate the significance level of variables at 5% and 1% level with respect to standard error (SD).

The long-run equation of GDP per capita demonstrates a significant negative impact of official development assistance (ODA) and technical cooperation (Tech) on GDP per capita at a 1% level. Ceteris paribus, in the long run, a 1 % increase in both Official Development Assistance (ODA) and technical cooperation decreases GDP per capita by 1.55% and 1.063%, respectively. Moreover, Grants exert a significant positive effect on the GDP per capita of Pakistan. One percent increase in grants leads to an increase of 2.71% in GDP per capita in the long run. Results of the current study show that different components of bilateral and multilateral aid have different effects on growth. Some earlier studies also confirm these results.

5 Conclusion

Pakistan has received around 1.3 billion dollars (current US$) on an annual basis from 1972 to 2014 in the form of bilateral and multilateral aid but its GDP per capita growth was significantly smaller than the world GDP per capita growth in this period. There is a lot of empirical evidence suggesting that the aid coming from the countries that attach political and strategic strings with the aid fails to significantly contribute to economic growth. We analyzed if aid helps growth in Pakistan and if aid coming from some countries is helpful for economic growth while it is not helpful for economic growth when it comes from certain other countries. We also analyzed if different components of bilateral and multilateral aid affect the growth rate uniformly or differently.

We found that aggregate official development aid has a significant and positive long-run impact on the GDP per capita. Bilateral aid from a very few countries such as Belgium, UK, and the US has a significant long-term impact on Pakistan's GDP. In the short run, bilateral aid from New Zealand has a significant contemporaneous impact on GDP per capita, which is negative. In contrast, aid from Sweden has a positive and significant impact on the outcome variable after the lag of one year.

Some further tests show that in the long run, aid coming from some countries with political and geostrategic strings does not seem to have an adverse impact on the GDP per capita of Pakistan. In the short run, we find that if a country becomes less committed to the development, this country's aid would adversely impact the GDP per capita.

In the long run, Official Development Assistance (ODA) and technical cooperation decreases GDP per capita respectively. Conversely, grants have a significant positive effect on the GDP per capita of Pakistan.

Given the ambiguous results regarding the impact of foreign aid with political strings on the GDP per capita growth, a clear policy recommendation is hard. However, based on our findings, the government may consider distancing itself from the

countries which are known to promote their agenda through their aid programs. But it must be insisted that this is only a short-term recommendation. The long-term recommendation would be to look for alternative ways to promote growth because foreign aid does not have a clear positive impact on the economic growth.

References

Adams, S., & Atsu, F. (2014). Aid dependence and economic growth in Ghana. *Economic Analysis and Policy, 44*(2), 233-242.

Alesina, A., & Dollar, D. (2000). Who gives foreign aid to whom and why? *Journal of economic growth, 5*(1), 33-63.

Anwar, M., & Michaelowa, K. (2006). The political economy of US aid to Pakistan. *Review of Development Economics, 10*(2), 195-209.

Arndt, C., Jones, S., & Tarp, F. (2010). Aid, growth, and development: have we come full circle? *Journal of Globalization and Development, 1*(2), 1-27.

Arndt, C., Jones, S., & Tarp, F. (2015). Assessing foreign aid's long-run contribution to growth and development. *World Development, 69*, 6-18.

Arshad, Z., Zaid, M., & Latif, A. (2014). Relative Effectiveness of Foreign Debt and Foreign Aid on Economic Growth in Pakistan. *Interdisciplinary Journal of Contemporary Research In Business, 6*(1), 51.

Asiedu, E. (2014). Does foreign aid in education promote economic growth? Evidence from Sub-Saharan Africa. *Journal of African Development, 16*(1), 37-59.

Asteriou, D. (2009). Foreign aid and economic growth: New evidence from a panel data approach for five South Asian countries. *Journal of policy modeling, 31*(1), 155-161.

Azam, M., & Ahmed, A. M. (2015). Role of human capital and foreign direct investment in promoting economic growth: evidence from Commonwealth of Independent States. *International Journal of Social Economics, 42*(2), 98-111.

Bearce, D. H., & Tirone, D. C. (2010). Foreign aid effectiveness and the strategic goals of donor governments. *The Journal of Politics, 72*(03), 837-851.

Bird, G., & Choi, Y. (2020). The effects of remittances, foreign direct investment, and foreign aid on economic growth: An empirical analysis. *Review of Development Economics, 24*(1), 1-30.

Burnside, A. C., & Dollar, D. (1997). Aid, policies, and growth. *World Bank policy research working paper*(569252).

Clemens, M. A., Radelet, S., Bhavnani, R. R., & Bazzi, S. (2012). Counting chickens when they hatch: Timing and the effects of aid on growth. *The Economic Journal, 122*(561), 590-617.

Das, A., & Sethi, N. (2020). Effect of foreign direct investment, remittances, and foreign aid on economic growth: Evidence from two emerging South Asian economies. *Journal of Public Affairs, 20*(3), 1-12.

Dickey, D. A., & Fuller, W. A. (1979). Distribution of the estimators for autoregressive time series with a unit root. *Journal of the American statistical association, 74*(366a), 427-431.

Doucouliagos, H., & Paldam, M. (2011). The ineffectiveness of development aid on growth: An update. *European journal of political economy, 27*(2), 399-404.

Dunning, T. (2004). Conditioning the effects of aid: Cold War politics, donor credibility, and democracy in Africa. *International organization*, *58*(2) 409-423.

Durbarry, R., Gemmell, N., & Greenaway, D. (1998). *New evidence on the impact of foreign aid on economic growth*: Centre for Research in Economic Development and International Trade, University of Nottingham Nottingham.

Easterly, W. (2003). Can foreign aid buy growth? *The journal of economic perspectives, 17*(3), 23-48.

Ekanayake, E., & Chatrna, D. (2010). The effect of foreign aid on economic growth in developing countries. *Journal of International Business and Cultural Studies, 3*, 1-13.

Engle, R. F., & Granger, C. W. (1987). Co-integration and error correction: representation, estimation, and testing. *Econometrica: journal of the Econometric Society*, *55*(2) 251-276.

Frank, M. W. (2009). Inequality and growth in the United States: Evidence from a new state-level panel of income inequality measures. *Economic Inquiry, 47*(1), 55-68.

Galiani, S., Knack, S., Xu, L. C., & Zou, B. (2016). *The effect of aid on growth: Evidence from a quasi-experiment*.

Gates, S., & Hoeffler, A. (2004). Global aid allocation: are Nordic countries different. *Centre for the Study of African Economies Working Paper Series (34)*.

Gebregziabher, F. (2014). The Long-Run Macroeconomic Effects Of Aid And Disaggregated Aid In Ethiopia. *Journal of International Development, 26*(4), 520-540.

Goldsmith, A. A. (2001). Foreign aid and statehood in Africa. *International organization, 55*(01), 123-148.

Headey, D. (2008). Geopolitics and the effect of foreign aid on economic growth: 1970–2001. *Journal of International Development, 20*(2), 161-180.

Jalil, A., & Idrees, M. (2013). Modeling the impact of education on the economic growth: Evidence from aggregated and disaggregated time series data of Pakistan. *Economic Modelling, 31*, 383-388.

Jha, R., & Dang, T. N. (2012). Inflation variability and the relationship between inflation and growth. *Macroeconomics and Finance in Emerging Market Economies, 5*(1), 3-17.

Khan, M. A., & Ahmed, A. (2007). Foreign aid—Blessing or curse: Evidence from Pakistan. *The Pakistan Development Review*, *46*(3) 215-240.

Kodama, M. (2012). Aid unpredictability and economic growth. *World Development, 40*(2), 266-272.

Kourtellos, A., Tan, C. M., & Zhang, X. (2007). Is the relationship between aid and economic growth nonlinear? *Journal of Macroeconomics, 29*(3), 515-540.

Krylová, P., & Barder, O. (2015). Commitment to Development Index 2015. Retrieved from https://www.cgdev.org/publication/ft/commitment -development-index-2015

Mekasha, T. J., & Tarp, F. (2013). Aid and growth: What meta-analysis reveals. *The journal of development studies, 49*(4), 564-583.

Minoiu, C., & Reddy, S. (2007). Aid does matter, after all: revisiting the relationship between aid and growth. *Challenge, 50*(2), 39-58.

Minoiu, C., & Reddy, S. G. (2010). Development aid and economic growth: A positive long-run relation. *The Quarterly Review of Economics and Finance, 50*(1), 27-39.

Museru, M., Toerien, F., & Gossel, S. (2014). The impact of aid and public investment volatility on economic

growth in Sub-Saharan Africa. *World Development, 57*, 138-147.

Nielsen, B. (2001). *Order determination in general vector autoregressions.IMS lecture notes, 52*(1), 93-112.

Paulsen, J. (1984). Order determination of multivariate autoregressive time series with unit roots. *Journal of time series analysis, 5*(2), 115-127.

Pesaran, M. H., Shin, Y., & Smith, R. J. (2001). Bounds testing approaches to the analysis of level relationships. *Journal of applied econometrics, 16*(3), 289-326.

Rajan, R. G., & Subramanian, A. (2008). Aid and growth: What does the cross-country evidence really show? *The Review of economics and Statistics, 90*(4), 643-665.

Ram, R. (2003). Roles of bilateral and multilateral aid in economic growth of developing countries. *Kyklos, 56*(1), 95-110.

Sargan, J. D. (1964). Wages and prices in the United Kingdom: a study in econometric methodology. *Econometric analysis for national economic planning, 16*, 25-54.

Scholl, A. (2009). Aid effectiveness and limited enforceable conditionality. *Review of Economic Dynamics, 12*(2), 377-391.

Tsay, R. S. (1984). Order selection in nonstationary autoregressive models. *The Annals of Statistics, 12*(4), 1425-1433.

Vázquez, S. T., & Garvi, M. G. (2010). Inequality, aid and growth: macroeconomic impact of aid grants and loans in Latin America and the Caribbean. *DT cooperation and development 2010/03.*

Young, A. T., & Sheehan, K. M. (2014). Foreign aid, institutional quality, and growth. *European journal of political economy, 36*, 195-208.

Appendix
Table S.1: *Commitment to Democracy Index (2015) rank of bilateral donors*

Rank	Country	Score
1	South Korea*	3.94
2	Slovakia*	4.07
3	Greece*	4.07
4	Poland*	4.08
5	Hungary*	4.13
6	Czech Republic*	4.19
7	Italy	4.21
8	United States	4.22
9	Belgium	4.26
10	Spain*	4.34
11	Austria	4.51
12	Switzerland	4.51
13	Australia	4.72
14	Portugal*	4.88
15	Germany	4.91
16	France	5
17	Japan	5.07
18	New Zealand	5.12
19	Canada	5.33
20	Finland	5.45
21	Luxembourg*	5.48
22	Netherlands	5.56
23	Norway	5.98
24	United Kingdom	6.07
25	Sweden	6.5
26	Ireland	6.52
27	Denmark	6.57

Source: Centre for Global Development (http://www.cgdev.org/cdi-2015)
* Indicates that these countries are not included in the analysis

Table S.2; *ARDL estimates (Countries 1-9)*

GDP per capita	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(17)
	Australia	Austria	Belgium	Canada	Finland	France	Germany	Ireland	Italy	US
L.ln_gdp	0.783***	0.937***	0.403**	0.810***	0.885***	0.815***	0.825***	0.841***	0.812***	0.827***
	(10.60)	(21.98)	(3.29)	(11.76)	(15.34)	(11.71)	(11.78)	(10.73)	(5.35)	(9.61)
aid	0.0356	-0.00730	0.00705	0.0402	0.0217	0.0355	0.0355	-0.00276	-0.0278	-0.000971
	(1.38)	(-0.46)	(0.48)	(1.20)	(1.11)	(1.56)	(1.43)	(-0.14)	(-1.73)	(-0.03)
L.aid	0.0195	0.0248	0.0385*	0.0139	0.00810	0.00368	-0.0232	0.0541*	-0.0105	-0.0217
	(0.88)	(1.57)	(2.91)	(0.40)	(0.46)	(0.17)	(-0.96)	(2.55)	(-0.64)	(-0.80)
inflation	-0.00166	0.00543	0.00966	0.000308	0.00774*	0.000648	-0.00292	0.00473	-0.00226	-0.000855
	(-0.38)	(1.44)	(1.84)	(0.07)	(2.07)	(0.16)	(-0.66)	(0.87)	(-0.35)	(-0.20)
gov_exp	0.0916	-0.0416	0.131	0.0563	-0.0670	0.0621	-0.0198	-0.109	0.108	0.136
	(1.43)	(-1.04)	(1.18)	(0.98)	(-1.48)	(0.84)	(-0.21)	(-1.84)	(0.70)	(1.78)
ln_unemployment	0.206*	0.0433	0.394**	0.255**	0.0632	0.244*	0.205*	-0.0546	0.233	0.247*
	(2.48)	(0.77)	(3.10)	(2.84)	(1.14)	(2.73)	(2.36)	(-0.55)	(1.14)	(2.56)
L.inflation			0.0138**	0.00895*		0.00974*	0.0119*		0.0114*	0.0122**
			(3.40)	(2.41)		(2.58)	(2.56)		(2.75)	(3.03)
L.gov_exp			0.171				0.157		0.170	
			(1.76)				(1.82)		(1.73)	
L.ln_unemployment			0.428**							
			(3.42)							
_cons	4.248**	1.428	12.82***	3.473*	2.556*	3.633*	3.676*	3.705	4.474	4.231*
	(2.75)	(1.45)	(4.85)	(2.50)	(2.08)	(2.23)	(2.48)	(2.09)	(1.45)	(2.54)
N	41	37	24	41	35	37	34	23	23	35

Table S.3: *ARDL estimates (Countries 10-17)*

GDP per capita	(11) Netherland	(12) Nzealand	(13) Norway	(14) Sweden	(15) Switzerland	(16) UK	(17) US
L.ln_gdp	0.847***	0.910***	0.747***	0.857***	0.888***	0.790***	0.827***
	(14.51)	(14.37)	(14.02)	(12.81)	(13.66)	(10.60)	(9.61)
aid	0.0504	-0.0434*	0.00839	0.0378	0.0186	0.116*	-0.000971
	(1.28)	(-2.28)	(0.32)	(1.89)	(0.59)	(2.67)	(-0.03)
L.aid	0.0476	0.0204	0.102***	-0.0101	-0.0215	-0.0412	-0.0217
	(1.48)	(1.22)	(4.90)	(-0.50)	(-0.72)	(-0.79)	(-0.80)
inflation	0.00105	-0.00117	0.00739*	-0.00150	-0.00181	-0.00391	-0.000855
	(0.26)	(-0.28)	(2.67)	(-0.38)	(-0.39)	(-0.98)	(-0.20)
gov_exp	-0.0235	-0.0200	0.0112	0.00621	0.0190	0.0225	0.136
	(-0.44)	(-0.36)	(0.26)	(0.11)	(0.29)	(0.43)	(1.78)
ln_unemployment	0.177*	0.180*	0.237***	0.166*	0.153	0.176*	0.247*
	(2.42)	(2.13)	(3.82)	(2.08)	(1.82)	(2.45)	(2.56)
L.inflation	0.00728	0.0151**		0.00831*	0.00934*	0.00939*	0.0122**
	(1.96)	(3.63)		(2.16)	(2.04)	(2.67)	(3.03)
L.gov_exp							
L.ln_unemployment							
_cons	2.077	2.404	4.281***	3.007*	2.696	3.717*	4.231*
	(1.57)	(1.64)	(3.89)	(2.10)	(1.83)	(2.73)	(2.54)
N	41	39	41	41	39	41	35

t statistics in parentheses
* p < 0.05, ** p < 0.01, *** p < 0.001
L indicates lag of the variable