© *Pakistan Journal of Economic Studies*
https://journals.iub.edu.pk/index.php/pjes
Vol. 5, No. 1, June 2022, Pages: 215-240

ISSN 2708-1486 (E)
ISSN 2708-1478 (P)

Exploring Cyclical Behavior of Functional Heads of Public Expenditure in Pakistan

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Abstract

Fiscal policy is usually designed to stabilize business cycle fluctuations with its countercyclical properties. Policy makers adopt expansionary fiscal policies in recessions and contractionary fiscal policies in booms. However, it is argued that developing countries are unable to practice countercyclical fiscal policies. Thus, this study examines the cyclical behaviour of the fiscal policy of Pakistan in terms of the functional heads of government expenditure at the federal level in Pakistan. The time period covered by the study is from 1984-2019 and the analysis covers function wise current, development, and total expenditure. The study employs the novel non-parametric econometric technique, Multivariate Adaptive Regression Splines (MARS) in order to reveal the cyclical patterns of functional heads of federal public current and development expenditures. The results of the study show that current expenditure on either of the function does not respond to the business cycles. Total expenditure on General Public Service (GPS) shows procyclical behaviour while that on defense shows counter-cyclical behaviour. Development expenditure on education is counter-cyclical in nature, while development expenditure on economic affairs shows mixed cyclical behaviour. Finally, development expenditure on social protection shows procyclical behaviour. From policy perspective this study holds a lot of importance since it will help the policy makers to reconsider the expenditures being incurred in various sectors of the economy during booms and busts

Key Words: Fiscal Policy, Business Cycles, Government Expenditures, Institutions, Multivariate Adaptive Regression Splines
JEL Codes: E62, C32, E02, E31, E32

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1 Introduction

The reaction of fiscal policy to the state of the economy goes through two channels: automatic stabilizers[3] and discretionary changes in the fiscal policy. Lord Maynard Keynes considered as the godfather of modern fiscal policy emphasized the role of discretionary fiscal policy after Great Depression. According to Keynes, neither automatic stabilizers nor free market self-correcting mechanisms suffice to eliminate unemployment. Therefore, a discretionary fiscal policy is always needed in smoothening the business cycles or booms and busts in the economy. For instance, after the Global Financial Crisis (2007-08) and the years leading towards the crisis, the subject of cyclicality of fiscal policy again attracted greater attention internationally. Similarly, according to Aizenman, Jinjarak, Nguyen, & Noy (2021), all governments enacted budgetary assistance programs once COVID-19 hit the world in early 2020.

The cyclical nature of the fiscal policy has been subjected to various theories and tests. A large strand of literature focuses on the nature and determinants of the cyclical behavior of fiscal policy instruments. The first strand of literature examines whether or not the fiscal policy in a country procyclical or counter-cyclical. Earnesto & Vegh (2000) stated that one should observe a positive correlation between tax rates and output and negative correlation between government spending and output, which is a countercyclical fiscal policy. Kaminsky, Reinhart, & Vegh (2004) established this fact, "OECD countries are, by and large, either countercyclical or a-cyclical. In sharp contrast, developing countries are predominantly procyclical." The study for the OECD by Égert (2015) has shown that the evidence of stronger counter-cyclicality in the total as well as primary component of government expenditure. Moreover, cyclically adjusted government revenues are more procyclical while government

[3] According to https://www.investopedia.com/terms/a/automaticstabilizer.asp, "Automatic stabilizers are a type of fiscal policy designed to offset fluctuations in a nation's economic activity through their normal operation without additional, timely authorization by the government or policymakers. The best-known automatic stabilizers are progressively graduated corporate and personal income taxes, and transfer systems such as unemployment insurance and welfare. Automatic stabilizers are so called because they act to stabilize economic cycles and are automatically triggered without additional government action."

spending as a whole is acyclical. Another study by Mukherjee (2014) for India at Union Government level showed that government expenditure in India shows procyclicality, however, there is a difference in the procyclicality of different components of govt. expenditure. Procyclicality in the developmental expenditure is greater as compared to the non-developmental expenditure. A study by Beyer & Milivojevic (2019) showed that fiscal policy in South Asia amplifies booms and busts and thus is procyclical. Another study by Zakaria & Junyang (2015) also confirmed that that fiscal policy is strongly procyclical in these countries. Similarly, Khalid, Malik, & Sattar (2007) constructed fiscal policy reaction function for Pakistan using three variables, fiscal deficit as percentage of GDP, output gap and inflation.

The efficient utilization of public resources in every sector of the economy should be at the core of the government's reform plan since it is an important fiscal policy tool to sustain a higher and across-the-board economic growth. However, in case of Pakistan, the legacy of inept fiscal management poses manifold challenges for any government in power while allocating adequate resources to the different heads of expenditure especially to the priority areas. That is why whenever the economy of Pakistan experiences stronger growth, it gets unsustainable. Another main reason of this unsustainable growth is the consumption-led expenditure, rather than investment. Higher external and fiscal imbalances result from the non-productive character of such expenditure. As a result, further chances of economic growth are hampered. Thus, the nature of the behavior of public expenditure in various areas of the economy has an important role to play in order to tackle the ups and downs in the economic activity.

Pakistan has been subjected to mixed trends in fiscal performance over the decades. During 1970s, the role of the public sector was bigger. Due to the oil price shock in the Middle Eastern countries, the country enjoyed higher external financing at concessional terms which gave impetus to the public sector. Due to this, development expenditure a well as subsidies increased exorbitantly. At the end of 1970s, new Government took office and entered into the IMF Program. The fiscal adjustment during this period took the form of both expenditure cuts and revenue increases. The bulk of spending cuts (more than one percent of GNP) occurred in development spending, consistent with the

government's explicit goal of curtailing public involvement in productive activities and leaving these to the private sector. This improvement in the fiscal stance, however, didn't prove to be permanent during the mid of 1980s. Fiscal deficit reached to over 8 percent of GDP. Higher public consumption in the form of salaries, defence spending, and interest payments was the main reason. At the end of 1980s, there was a temporary improvement of 2.2 percentage points but due to the Middle Eastern Crisis and structural weakness, the fiscal situation again deteriorated. 1990s was the decade of high fiscal imbalances while during 2002-2007 we could see improvements in the country's fiscal performance. But again after 2006-07, fiscal performance deteriorated. According to the Fiscal Policy Statement (2018-2019), such a deterioration was due to high fiscal deficit of around 7% of GDP arising out of lower tax revenue due to lower economic growth and added expenditures due to floods, increased debt servicing and higher than planned subsidies in the budget.

Major fiscal indicators show a strong worsening in fiscal year (FY) 2019, with the total fiscal deficit rising to 9.1 percent of GDP due to a historic drop in tax revenue collection and a large increase in non-development expenditures. Previously, this figure was higher, at 8.8 percent in FY2012, and then 8.2 percent in FY2013 (Finance Division, 2020). Despite a considerable drop in PSDP (Pakistan Sector Development Programme) spending, a significant increase in current spending kept overall spending at a higher level. Development spending and net lending fell to 3.2 percent of GDP in FY2019, down from 4.7 percent in FY2018. Total spending reached 22.0 percent of GDP in FY2019, a rise of 18.7% of GDP in current expenditures. As a result of the expanding revenue and spending imbalance, the fiscal deficit increased to 9.1% of GDP in FY2019, up from 6.5 percent in 2018. It is important to consider the fiscal scenario after Covid 19 pandemic as well since the global economy got severely hit due to it. Due to rigorous spending control and better tax and non-tax revenue collection, the key fiscal indicators showed better-than-expected results in FY2020. However, the entire budget deficit surpassed the objective set for FY2020. COVID-19-related expenses put severe strain on the fiscal accounts in the fourth quarter (Q4) of FY2020. The budget deficit was 4.0 percent of GDP till Q3, while it was 4.1 percent of GDP in the Q4 of FY2020

alone. On the other hand, the primary balance, which had a surplus of Rs 286.5 billion in Q1 and Q2, went into deficit in the second half of FY2020, but had a total surplus of Rs 193.5 billion in the first three quarters (0.5 percent of GDP). As a result of these issues, the government has implemented various adjustment measures targeting demand from time to time in order to maintain economic and financial stability and boost growth prospects.

After having an idea of the fiscal scenario in the country, it is also important to look at the business cycles in Pakistan as well. According to Mahmood & Arby (2012), the real GDP growth in Pakistan has completed at least four business cycles since 1950s. The first cycle ended with a peak in 1964-65, the second ended in 1984-85 and the third ended with a peak in 2004-05. Since 2005-06, the economy was in recessionary phase of a fourth business cycle and it was predicted to be completed by 2011-2012. Even after 2012 till now, economic activity in Pakistan has been undergoing different phases.

Having this scenario in mind; where fiscal indicators are not very promising; it is important to analyze in depth the fiscal behavior in Pakistan responding to the ups and downs in the economic activity during business cycles. Thus, the objective of this study is to examine the cyclical behavior of fiscal policy in Pakistan, i-e, is it always procyclical, counter-cyclical, or is it showing some mix behavior.

As far as the contributions of this study is concerned, it takes into account a disaggregated analysis of the functional heads of federal government expenditure. This will help in reflecting the true fiscal policy stance which will give the policy makers a deep insight into the cyclical behavior of fiscal policy in Pakistan. This disaggregated analysis is missing in the previous literature related to Pakistan. The second contribution of this study is that it incorporates a novel non-parametric econometric technique "Multivariate Adaptive Regression Splines" in order to observe non-linear patterns in the cyclical behavior of federal government expenditures. It is more flexible and multi-dimensional technique and is an improvement over the existing regression techniques.

2 Literature Review

In order to resolve the various issues taken up in this study, it is important to analyse the related bulk of literature related to

business cycles and the reaction of fiscal policy. It is also important to analyse a detailed account of the various methodologies adopted to examine the cyclical behaviour of fiscal tools in the previous studies. Furthermore, a review of the various measures of business cycles and fiscal stances used in various studies is also mandatory to be done. Finally, this section also aims at summarizing the results of various studies while recognizing the reaction of fiscal policy to the business cycles.

2.1 Cyclicality of Fiscal Policy

A tool used by the governments to move an economy towards a desired level through taxation and public spending is referred to as the fiscal policy. On one hand, it can be used to affect an economy's overall demand, and resource distribution while on the other hand, it addresses market failures in order to achieve an equitable resource distribution. All these functions of the fiscal policy, if socially inclusive, will ensure long-run economic growth (Bogdanov, 2010). But for this it is important to know how fiscal policy reacts to the business cycle conditions of a country.

The business cycles fluctuations in the economy cause changes in public spending and taxation which induce governments to adjust their policies related to spending and revenue generation. In order to assess the direction of the movement of the fiscal policy stance and business cycles, Reinhart, Végh, & Kaminsky (2004) mentioned three types of fiscal policy reactions, naming acyclical, counter-cyclical and procyclical. Constant spending and tax rates during a business cycle means that fiscal policy changes are neither stabilizing nor reinforcing the business cycle. If government decreases (increases) it's spending and elevates (reduces) tax rates in good (bad) times, then the fiscal policy is said to be countercyclical. Conversely, if the movement of government spending, tax rates and business cycles is unidirectional, then the fiscal policy is considered to be procyclical.

2.2 Measures of Fiscal Stance

The fiscal policy stance adopted by countries depends on the state of the economy; it can be stimulus packages (observed more recently especially in case of developed economies) or consolidation measures (most prominent in case of developing economies). In order to analyse the cyclicality of fiscal policy, the

main thing to decide is the choice of the best indicator of the fiscal stance. Typically variables of fiscal stance include fiscal balance (cyclically adjusted or otherwise), public spending and government surplus. The first one is a frequently used measure of fiscal stance due to the fact that it manifests public sector demand and savings. But one thing which lacks in this measure and which makes it a poor indicator is that it does not reflect the discretionary engagements of the fiscal authorities. Follette & Lutz (2011) indicated that since this indicator is not directly measured and is not calculatd through a commonly accepted methodology, its use is fully on the choice of the researcher. All of the three define government sector spending but due to the absence of comparable data, occasionally, studies go with the government surplus as an indicator for fiscal stance. An alternate understanding is the use of government expenditure as a ratio to GDP to be used as an indicator of fiscal stance. Mackiewicz (2006) argued that generally government expenditure has a weak dependence on business cycles and only a few types of it react to it. Therefore, it can be used to measure fiscal expansiveness. But it should be noted that this indicator does not represent full picture therefore Mackiewicz (2006) used fiscal balance as an indicatior of fiscal stance.

2.3 Defining Business Cycles

There are two schools of thought explaining the business cycles presented by Cashin, McDermott, & Scott (1999) and Harding & Pagan (2002) The first of the two is known to be the classical rule. According to the classical rule, there exists a sequential pattern in the expansionary and contractionary movement of the economy at the aggregate level.

The repeated nature of the business cycle fluctuations has serious implications for the real economic activity. Cyclical asymmetry_ where economy reacts differently to the boom and bust phases of the business cycle_ is also one of the various characteristics of business cycles. Understanding the various phases of business cycle and their features has long been the center of focus in macroeconomic research which can be dated back to the work of Watson (1992).

According to Kydland & Prescott (1991) and Lucas (1981), aggregate real output deviating from the trend are termed as business cycles. Thus, before examining, first the trend

component is separated from the cyclical component of the data. There is a massive bulk of literature describing various theories on the nature, causes and diffusion of business cycle variations.

Keynesians are of the view that market expectations are the main cause of volatility in market conditions. Monetarists consider monetary growth rate as the root cause of the dissemination of business cycles while New Classicals consider unanticipated changes in aggregate demand and total factor productivity as the main cause of business cycles. With time all these theories have experienced notable improvemnets along with the developments in econometric and statistical methods (Burns & Mitchell,1946).

The other cause of business cycle fluctuations is the famous theory of Fisher (1933) known as debt deflation. This theory was proposed after Great depression. Financial Instability Hypothesis of Minsky (1992) also complements to this theory. Ali, Tariq, & Baig (2017) defined business cycles as a demonstration of irregular fluctuations in an economy's growth during boom and contraction periods. They described the characteristics of business cycles in Pakistan by saying that apparantely, the economic fluctuations of the country dispose the features typical to the business cycles of the developed world. Like the GDP of the country highly depends on the output from the manufacturing and services sector.

The study of the business cycles by policy makers, both in the developing and the developed world, has been given serious thought after the Great Depression. Several approaches have been developed and adopted for its measurement. There are various factors contributing towards determining the growth path of an economy. These may include structural changes, political ups and downs, capital formation, overall economic trends or the mixed effect of all these. Mahmood & Arby (2012) stated that it is important for the policy makers to judge whether these changes are everlasting, momentary, or reflecting business cycles. So the real GDP growth has to be examined for short term shocks, seasonal adaptations, long term trends, and business cycles. These four components can be detached from each other using statistical measures.

The first thing to start off with is to examine the output gap (Ladiray, Mazzi, & Sartori, 2003), but for the output gap one

needs to know the potential GDP which cannot be observed directly and thus needs to be calculated using statistical methods. The use of different statistical methods gives different results which can cause misapprehension of the actual economic scenario. Therefore, Bjornland, Brubakk, & Jore (2005) cautioned that extra indicators and professional verdict is needed to measure the output gap.

According to (Badar, Badar, & Malik, 2015), the structural and statistical methods to estimate output gap includes SVAR model, Production Function approach, HP filter method, Band pass filter, exponential smoothing, and various detrending methods. Each and every method has its own pros and cons and each one may signify a distintive phase of economic cycle. Thus reliance on only one method is not recommended. The results of their study showed that calculation of output gap through quadratic detrending depicts the history of Pakistan economy well. As far as the results from structural methods are concerned, they are also in line with the results from quadratic detrending method.

2.4 Business Cycles in Pakistan

Studies by Mahmood & Arby (2012) concluded that since 1950s to 2005, Pakistan's economy has completed three full fledged business cycles and is in the phase of fourth business cycle. The details are given in the following table.

Table: 1

Business Cycles in Pakistan

Business Cycle	Recession	Trough	Recovery	Peak
First cycle: 1949-1965 (16 years)	1949-58 (9 years)	1958	1959-65 (7 years)	1965
Second cycle: 1966-1985 (20 years)	1966-75 (10 years)	1975	1976-85 (10 years)	1985
Third cycle: 1986-2005 (20 years)	1986-97 (12 years)	1997	1998-2005 (8 years)	2005
Fourth cycle: 2006-	2006-12*	2012*		

Source: Mahmood & Arby (2012)

Khan & Jawed (n.d.) also used two methods for dating the business cycles of Pakistan, that is the HP filter approach and Markov switching model. The sample period used by this study is from 1951-2015. The results of the HP filter approach showed similarity with (Mahmood & Arby, 2012), that the fourth business cycle is in progress, while the third one was the longest of all. The recessions were due to the events like East Pakistan tragedy, Global Financial Crisis, and Asian Financial Crisis.

3 Materials and Methodology

3.1 Data

Pakistan's fiscal year starts from 1st July and ends at 30th June. Every year the federal budget is presented in June before the Parliament. The provincial budgets of the four provinces are announced in a few days after that. Budget preparation process comprises of many steps which takes almost 2.5 months to complete. The actual expenditures are available in the third year after the budget announcement. In between, revised and provisional figures are available. The time span for this study is from 1982-2019. While working on this paper, the actual figures of the functional heads of federal expenditure were available up to 2019 therefore the time span of the study is taken till 2019. Chart of Accounts is a document which has been published by Auditor General of Pakistan Revenue (AGPR) and is available on its website. The document gives a detailed overview of the functional classification and object classification of all the expenditure categories. The Function-cum-Object Classification system gives information on the expenditure from two different angles. The Functional Classification provides information about the purpose on which money will be spent. There are ten functional heads of expenditure but this study deals with only seven due to data consistency in previous and recent years. The functional heads include General Public Service (GPS), Economic Affairs (ECO), Defence Affairs and Services (DEF), Public Orders and Safety Affairs (L&O), Health, Education Affairs (EDU), and Social Protection (SP)[4].

Output Gap is a proxy used for economic cycles which has been calculated using quadratic de-trending method (see appendix

[4] For further details, see Appendix B

A). For this the real GDP data has been taken from State Bank of Pakistan. Data on financial constraints (domestic credit to the private sector), financial depth (total external debt), terms of trade, and monetary policy (discount rate) has also been taken from the annual publications of State Bank of Pakistan. Data on the stock of public debt is taken from various issues of Pakistan Economic Survey published by the Ministry of Finance.[5] Finally, an index has been constructed for institutional quality using principal component analysis for which data has been taken from the International Country Risk Guide (ICRG). The details related to all the variables and their sources are given in the following table:

Table: 2

Description of the Variables in the Study

Variables	**Description**
Functional Heads of Government Expenditure	Disaggregated data on log of General Public Service, Economic Affairs, Defence Affairs and Services, Public Orders and Safety Affairs, Health, Education Affairs, and Social Protection *Source:* Published reports of AGPR, and MoF
Economic Cycles	Output gap (deviation of actual GDP from potential) *Source:* Economic Surveys of Pakistan
Terms of Trade	Ratio of export price index to the import price index *Source:* State Bank of Pakistan (SBP)
Stock of Public Debt	Total public debt is defined as debt of the government (including Federal Government and Provincial Governments) serviced out of consolidated fund and debts owed to the International Monetary Fund. *Source:* Economic Surveys of Pakistan
Inflation	Growth rate of consumer price index

[5] Total public debt is defined as debt of the government (including Federal Government and Provincial Governments) serviced out of consolidated fund and debts owed to the International Monetary Fund.

	Source: Economic Surveys/Bureau of Statistics
Financial Constraints	Net foreign debt as a share of GDP *Source:* (annual publications of SBP)
Financial Depth	Domestic credit to private sector *Source:* (annual publications of SBP)
Institutional Quality	International Country Risk Guide (ICRG) political risk index. It is scaled between 0 and 100. Lower values show higher risk (low quality) and higher values show lower risk (high quality)
Monetary Policy	Discount rate (annual publications of SBP)

To measure the fiscal stance for this study, the differenced values of the natural log of real expenditure on General Public Service, Defence, Economic Affairs, Public Order and Safety Affairs, Education, Health, and Social Protection have been used. Prior to modelling, economic time series are mostly differenced or natural log converted. These modifications are often used to make a series stationary in terms of level and variance. (Keogh, 2005) did a series of simulations to evaluate if data transformation is required before using Time Series Multivariate Adaptive Regression Splines (TSMARS) modelling. This topic is important because the adoption of an improper transformation can degrade the quality of the TSMARS approximation in terms of both level and variance. However, the study found that while differencing does not significantly enhance the accuracy of the estimates, it can improve precision of the data which is borderline stationary. Therefore, prior to modelling using TSMARS, economic time series should be differenced, and 'log' transformed.

3.2 Methodology

3.2.1 Econometric Model

The study assesses the cyclical pattern of fiscal policy by examining the cyclical behavior of government expenditure, therefore, the following econometric model following (Zakaria & Junyang, 2015) has been used.

$$F_t = \propto + \theta\, Gap_t + \rho X_t + \mu_t \qquad (1)$$

F_t is the fiscal policy indicator showing functional heads of expenditure of the federal government. Gap_t represents output gap as a proxy for business cycles. X_t is a matrix of independent

variables representing potential determinants of the cyclical behavior of fiscal policy in Pakistan. These include terms of trade (TOT), Stock of Public Debt (D), Inflation (π), Financial Constraints (FC), Financial Depth (FD), Institutional Quality (I), and monetary policy (m). Further elaboration of equation 1 is given below:

$$F_{t,c} = \propto + \theta\, Gap_{t-1} + \rho_1 F_{i,t-1,d} + \rho_2 TOT_{t-1} + \rho_3 D_{t-1} + \rho_4 \pi_{t-1} + \rho_5 FC_{t-1} + \rho_6 FD_{t-1} + \rho_7 I_{t-1} + \rho_8 m_{t-1} + \mu_t \quad (2)$$

$$F_{t,d} = \propto + \theta\, Gap_{t-1} + \rho_2 TOT_{t-1} + \rho_3 D_{t-1} + \rho_4 \pi_{t-1} + \rho_5 FC_{t-1} + \rho_6 FD_{t-1} + \rho_7 I_{t-1} + \rho_8 m_{t-1} + \mu_t \quad (3)$$

$$F_{t,T} = \propto + \theta\, Gap_{t-1} + \rho_2 TOT_{t-1} + \rho_3 D_{t-1} + \rho_4 \pi_{t-1} + \rho_5 FC_{t-1} + \rho_6 FD_{t-1} + \rho_7 I_{t-1} + \rho_8 m_{t-1} + \mu_t \quad (4)$$

Equation 2 models current expenditure on all the functional heads of expenditure given in section . Equation 3 models development expenditure on all the functional heads of expenditure while equation 4 models total expenditure on the given functional heads of expenditure.

3.2.2 Multivariate Adaptive Regression Splines (MARS)

The most practical and realistic approach to examine the cyclical behavior of fiscal policy is to assume different behavior of the function in response to the positive and negative output gap. This has led us to adopt MARS as an estimation technique for the present study used by (Manasse, 2014) to see what role shocks, various types of fiscal rules and institutions play in the cyclical behavior of a large panel of countries. It is a non-parametric technique developed by (Friedman, 1991) for the purpose of modeling a flexible multidimensional data regression, which serves as an improvement over the existing techniques. The goal of this technique is to overcome some of the problems related to the traditional procedures. It is a generalization of the "recursive partitioning regression". It divides the data into partitions and a linear regression is run on each partition separately. The algorithm operating behind this technique selects the significant variables, search for the linearities and non-linearities in the functional form and any type of interactions between the predictors. It takes into account the fact that the coefficient for each and every value of a predictor variable might not be the same Moreover, this technique

has the power of dealing with any heterogeneity issues in the model.

The MARS model proceeds with two steps. First it proceeds with the creation of a set of basis functions for each and every predictor variable. These basis functions represent the partitions of the predictor variables. For each partition, a separate linear regression is run. The connecting point between the two linear regressions is called knot such that each knot has a pair of basis functions. The main function of the log algorithm is to determine the exact location of the knot. The second step of the procedure estimates a least square model. This time the basis functions act as the predictor variables. In case of time series, MARS becomes TSMARS and the predictor variables become the lagged values.

4 Results of the Study

4.1 Exploratory Data Analysis

This section gives a graphical representation of function wise current and development expenditure over the years. These graphs show the actual picture of federal spending in the current and development heads of each function. The area shaded green shows current expenditure while that shaded blue shows development expenditure.

The scale of the graph shows that General Public Service is the largest sector in terms of real expenditure in billions of rupees shown by figure 1. Expenditure on Defence Affairs (figure 2), and Economic Affairs (figure 6) come after that. While the share of expenditure on social sectors (education, health, social protection) is quite low as illustrated by figure 4, 5 and 7 respectively. It is also evident from these figures that the share of development expenditure in case of General Public Service, Defence, Law and Order, and Social Protection is negligible in comparison to the current expenditure in these sectors. However, looking at Health, Education, and Economic Affairs, along with current expenditure in these sectors, the share of development expenditure is considerably larger as compared to the other sectors.

Figure: A
Function Wise Current and Development Expenditure Over the Years

Figure: 1 *Real Current (Curr) and Development (Dev) Expenditure* on General Public Service (GPS)

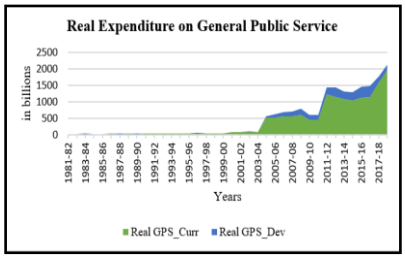


Figure: 2 *Real Current (Curr) and Development (Dev) Expenditure on Defence Affairs (DEF)*

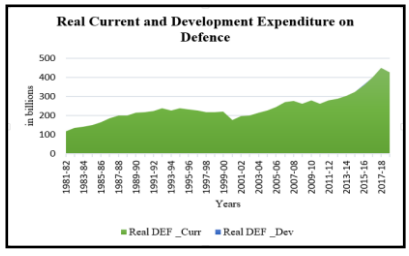


Figure: 3 *Real Current (Curr) and Development (Dev) Expenditure on Public Order and Safety Affairs (L&O)*

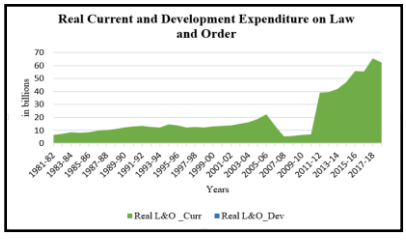


Figure: 4 *Real Current (Curr) and Development (Dev) Expenditure on Education (EDU)*

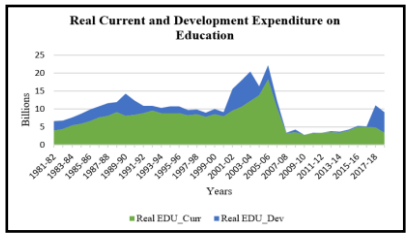


Figure: 5 Real Current (Curr) and Development (Dev) Expenditure on Health

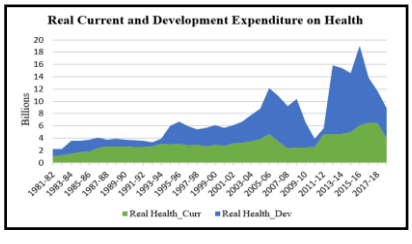


Figure: 6 *Real Current (Curr) and Development (Dev) Expenditure on Economic Affairs (ECO)*

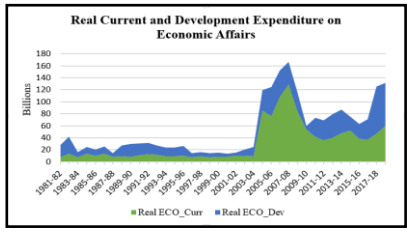
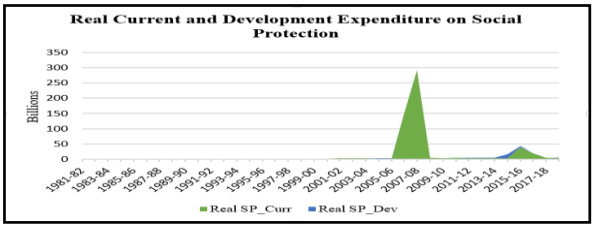


Figure: 7 *Real Current (Curr) and Development (Dev) Expenditure on Social Protection (SP)*



4.2 Empirical Results

This section displays the results of MARS model. Since it is a non-parametric and non linear model therefore two models have been estimated for each target variable. The first one is an additive model (degree 1) with no interaction term while the second one (degree 2) captures the interaction terms if any. Comparison has been made between the two models in order to see which one is a better approximation on the basis of Root Mean Square Error (RMSE). The following table presents only the the best model with lower RMSE.

Table: 3

Regression Analysis of Cyclicality of Functional Heads of Expenditure

	Current	*Development*	*Total*
General Public Service			
$h(OG_{t-2}-0.0744304)$			1.675
Defence			
$h(OG_{t-1}-0.123854)$			-1.147
Education			
$h(-0.0690154-OG_{t-1})$		-2.692	
Economic Affairs			
$h(OG_{t-1}-0.0744304)$		1.315	
$h(OG_{t-2}- -0.0230465)$		-3.780	
$h(0.0744304-OG_{t-2})$		-0.836	
$h(OG_{t-2}-0.0744304)$		5.363	
$h(0.0744304-OG_{t-1})$ * Inf_{t-2}			-0.101
$h(OG_{t-1}-0.0744304)$ * MP_{t-1}			1.223
Social Protection			
$h(SPDev_{t-1}-18.0943)$ * OG_{t-1}		5.687	
$h(SPDev_{t-1}-18.9154)$ * OG_{t-1}		10.499	

OG=Output Gap, Inf= Inflation, SPDev= Development Expenditure on Social Protection, MP= Monetary Policy, t-1, t-2 =1st and 2nd lag respectively

The results in the above table show that current expenditure on either of the function does not respond to the business cycles since the hinge functions for output gap are not significant. This result makes sense because current expenditure (including mostly salaries, wages, and administrative costs) is mostly fixed and does not change with respect to the business cycles.

As far as the overall expenditure on general public service is concerned, it shows a pro-cyclical change of 1.6 percent for every 1 percent increase in the output gap if the value of output gap is greater than 0.07. This result is also consistent with the previous studies by Burnside & Meshcheryakova (2005), Kaminsky, Reinhart, & Vegh (2004) and Zakaria & Junyang (2015) which showed that the expenditure in the developing countries is mostly procyclical. The reason given by Alesina & Tabellini (2005) included mistrust of the voters in the corrupt government when they demand reduction in taxes and increase in expenditure (for example wages, salaries, subsidies, etc.) when the economy is hit hard by shocks. Another reason mentioned by the same is the credit constraints.

As far as the individual effect of output gap on total expenditure on defence is concerned, it is countercyclical in nature. If OGt-1 is greater than 0.12, then a 1 percent increase (decrease) in output gap will decrease (increase) total expenditure on defense by 1.15 percent. However, the individual behavior of current and development expenditure on defence shows that this function of expenditure do not respond to the business cycles which is also supported by Pérez-Forniés, Cámara, & Dolores Gadea (2014). Their study on cyclical properties of Spanish defence expenditure concludes that variations in national defence expenditure do not arise from economic growth within the national economy.

Expenditure on public order and safety affairs, and health does not show any cyclical behavior therefore these two functions have not been presented in the table. This result also makes sense since the expenditure on maintaining law and order is related to the law and order situation of the country rather than economic cycles. The acyclicality result is kept in case of expenditure of health as well which is also supported by Afonso & Jalles (2013). When Covid-19 hit the world, governments all over the world increased health expenditure even when the world faced economic recession. But this increase in expenditure was not due to the economic conditions rather due to the pandemic.

Development expenditure on education shows countercyclical response if OGt-1 is less than -0.07 supported by (Nunes, 2003). While current and overall expenditure on education do not show any cyclical behavior.

Development expenditure on economic affairs shows a mix cyclical behavior. If lag 1 and lag 2 of the output gap is greater than 0.07, it shows a pro-cyclical behavior of 1.3 and 5.4 percent respectively. This means that in case of booms, expenditure on economic affairs shows procyclical behavior. This result is also supported by Abbott & Jones (2011). However, if OGt-2 is less than 0.07, it shows counter cyclical behavior of -0.8 percent. Moreover, if OG is greater than -0.02, it shows a countercyclical behavior of -3.8 percent. Total expenditure on economic affairs shows mix cyclical behavior if interactions of inflation and monetary policy are included. The higher (smaller) the previous year inflation, smaller (greater) will be the response of total expenditure on economic affairs to an increase (decrease) in the output gap. Furthermore, the higher (lower) the discount rate, the greater (smaller) will be the effect of output gap on total expenditure on economic affairs.

As far as development expenditure on social protection is concerned, it shows a pro-cyclical behavior when it interacts with the previous year OG and previous year development expenditure on social protection is concerned. The greater the previous year output gap, the higher will be the response of development expenditure on social protection (5.7 and 10.5 percent) if the previous year development expenditure on social protection is greater than 18.09 and 18.91. Procyclicality of social protection expenditure holds in case of developing countries since the automatic stabilizers are weak in these countries. According to Afonso & Jalles (2013), the procyclicality of social protection spending increased over time in several of the analysed nations (e.g., Bangladesh, Congo, Honduras, Kenya, and Romania).

5 Summary and Conclusion

The role of governments in smoothening the business cycles has been a source of contention for millennia. In terms of advanced economies, governments utilize their capacity to change fiscal policy by expanding and contracting it in response to economic volatility. But as far as the under developing economies are concerned, they face various constraints in terms of weak institutions (corruption, bad governance, political stability, bureaucratic quality, democratic accountability), lack of finances (pushing the economy into a debt trap), and inflation while taking use of their fiscal policy handles. These constraints do not allow

the government to effectively use the power of fiscal policy to cope up with the ups and downs of the economy. At the start of this study, it has been pointed out that most often the fiscal policy in the advanced economies act counter-cyclically (considered as the most optimal solution) while in the less advanced economies, it behaves pro-cyclically. However, the reaction may differ when it comes to a disaggregated analysis of various functional heads of expenditure. Therefore, this study holds relevance with respect to public policy. Three kinds of responses by the fiscal policy can be observed. First, the fiscal policy may not show any relationship with the business cycles, second it can either be procyclical or countercyclical, and third, it might have a mixed behavior (a non-linear relationship), encountering both procyclicality and counter-cyclicality. Thus, this study focused on finding out the response of the fiscal policy of the Federal Government of Pakistan_ in terms of government expenditure as a fiscal policy stance_ to the ups and downs in the economy. The functional heads include general public service, defence, law and order, economic affairs, education, health, and social protection. The analysis takes into account the response of function wise current, function wise development, and function wise total expenditure to the ups and downs in the economy measured by the output gap. This study holds importance in many ways. First, it analyses function-wise expenditure at one place. Secondly, it examines the current and development part of expenditure on each function as well. Thirdly, it also digs out the non-linearities in the behavior of the fiscal policy handles.

Starting with general public service, it consumes the largest amount of total federal budget. It was around 17 percent of the GDP in 2018-19. The results of the study show that the overall expenditure on General Public Service responds pro-cyclically to the ups and downs in the economy. This is in line with the results of most of the studies which conclude that fiscal policy in the developing nations is mostly pro-cyclical.

As far as defence is concerned, Pakistan is not fully transparent about its military spending (Siddiqa, 2021). The budget does not reflect major military acquisitions, spending on the public sector development plan (PSDP), spending on the nuclear programme and paramilitary forces, payments for military pensions, a newly established national security division, and a few

minor military expenses. Even the Chart of Accounts does not show the minor details of expenditure on defence which makes it difficult to do a better analysis about its response to the business cycles situation of the country. According to the results of the study, the overall expenditure on defence does show a counter cyclical behavior but when the current and development expenditure are analysed separately, it can be seen that the situation is different. Both current and development expenditure on defence does not respond to business cycles which is something not unusual in case of Pakistan because appropriations by the defence sector do not behave according to the economic conditions of the country. The military feels that reducing the amount of money available to the armed forces will hinder their capacity to combat the country's many challenges. This is why it is hesitant to cut expenditure in order to free up budgetary space for the government to satisfy the needs of the poor and vulnerable in crisis. It also has no intention of exposing its fiscal intentions to public scrutiny.

The most crucial sector in Pakistan is the social sector (education, health, and social protection). Development expenditure on education also shows countercyclical behavior while current and overall expenditure on education do not show any cyclical behavior. This result is consistent with the findings of the previous studies that developmental expenditure is less rigid than the current/revenue expenditure. More specifically, social sector expenditure is mostly prone to changes than expenditure in the other sectors.

As far as expenditure on health, it does not show any cyclical behavior. Other research, on the other hand, have shown different outcomes. According to some studies, health spending in low-income nations is counter-cyclical to business cycles. But in case of Pakistan the budget allocated to the health sector is bare minimum which does not change either in good times or bad times.

Development and total expenditure on economic affairs also respond to the business cycles in the economy both pro-cyclically and counter-cyclically. While current expenditure on economic affairs does not respond to the ups and downs in the economy.

The last function to be analyzed is the expenditure on social protection. As far as the current and total expenditure on social protection is concerned, these two categories do not respond to any kind of volatility in the economy. While the development part of the expenditure on social protection do respond to the ups and downs in the economy both pro-cyclically and counter-cyclically.

The overall conclusion of the study is that it is the development expenditure (mostly in case of social sectors) which gets affected by the business cycles of the country. Thus, it is the development expenditure which can be steered according to the economic prospects of the country. Primarily, the government should plan its expenditure in such a way that a large proportion is spent on the developmental projects. Secondly, it should handle the developmental expenditure in a counter-cyclical manner, that is, in downturns, it should increase public spending on development projects, while in upturns it can shift the funds to the sector where it is most required.

This study also has certain limitations. It could only handle seven functions of expenditure out of a total of ten because of the inconsistencies within the data available. For future research, the cyclical behavior of object-wise classification of government expenditure can also be taken into consideration. Furthermore, this study can be extended to the subnational level taking into account the functional expenditure of all the provinces.

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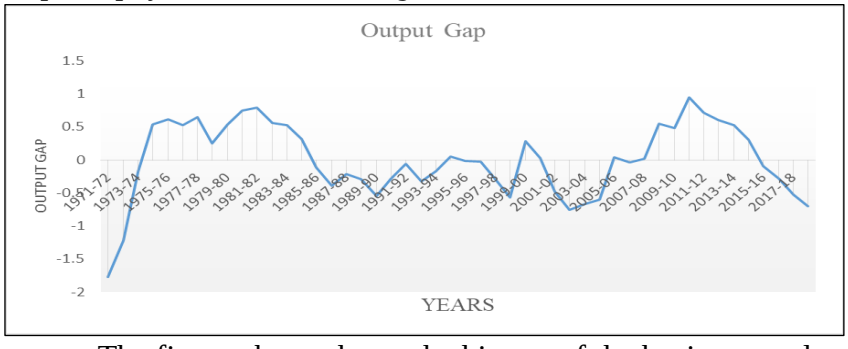
Appendix A

The output gap for this study has been calculated using quadratic detrending method.

Figure : 1A

Output Gap by Quadratic Detrending Method



The figure above shows the history of the business cycles in Pakistan from 1971-72. So accordingly, it can be interpreted that two business cycles have been completed and the recessionary phase of the current business cycles in its progress. The mismanagement of the economy increased the country's public debt which led to a slower growth in 1970s. The 1965 war and the separation of East Pakistan in 1971 deteriorated the economic growth as can be seen in the figure 4.1, the output gap is negative. The economy is working below its capacity. Apart from the national issues, there were certain global issues like the oil crisis, further pushed the economy into recession. Before the nationalization phase in the mid-1970s, the economy recovered abruptly but for a very short period of time. 1980s was the era of deregulation and privatization. The start of eighties showed positive signs of recovery due to increase in the remittances from expatriates. The output gap remained positive till the mid-1980s but during nineties the growth again dwindled due to poor governance. Pakistan's economy faced twin deficits complemented with a debt crisis, increased poverty, and a lower Human Development Index. The initial years of the new millennium had been tough but after 2006-07, the economy showed some positive performance. New jobs were created, foreign reserves increased, debt to GDP ratio declined, and investment rate grew. Along with that, inflation rate declined, and exchange rate also showed stability during this period.

Appendix B

Functions	Sub-categories
General Public Service	Executive and Legislative organs, Financial and Fiscal affairs, External Affairs, Foreign economic aid, public debt, transfers to provincial and district administration, research and development, and the administration of the general public services.
Defence Affairs	Military as well as civil defence, R&D and administration defence.
Economic Affairs	General economic, labor and commercial affairs, agriculture, food, irrigation, forestry and fishing, fuel and energy, mining and manufacturing, construction and transport, communication, industries, research and development.
Public Order and Safety Affairs	Expenditure on law courts, police, fire protection, prison administration and operation, R&D and administration.
Education	Pre-primary and primary education, secondary education and tertiary education, expenditure on archives, libraries, and students' hostel.
Health	Expenditure on medical products, appliances and equipment, outpatient services, hospital services, public health services, and research and development.
Social Protection	Rehabilitation and resettlement, housing, Zakat and Ushr, Baitul Mal, etc.