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Policies Misalignment in Pakistan: Implications for Output Gaps

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ABSTRACT

Objective: Adjusting macroeconomic, monetary, and fiscal policies to maximize growth requires reliable production gap estimates. This research aims to determine sector-wise output gaps and their impact on macroeconomic production gaps.

Research Gap: In macroeconomics aggregate and static macro models are common but this type of modeling is inadequate due to macroeconomic aggregation assumptions and implied static interactions. Therefore, the inability to accurately model the output gap and growth trajectories miscalculates the policy projections leading to deviations between policy and its implementation. Insufficient technical integration of diverse policies and aggregative politically directed actions that do not match economic reality complicate policy misalignment. This study uses a detailed disaggregated examination of Pakistan's economy to increase empirical econometric knowledge of these gaps.

Design/Methodology/Approach: This study estimates sector wise potential output and output gap to assess policies' effectiveness across different sectors of the economy. The study employs Autoregressive Distributed Lag (ARDL) Model to estimate potential output at the aggregate level and for subsectors of the economy.

The Main Findings: We find a strong correlation between the growth rates of potential output in industry and services sectors at the aggregate level while the correlation with the agriculture sector is the weakest. Shocks in aggregate economic activity adversely impact industrial sector, followed by the services sector. However, the agriculture sector is least affected by these shocks. In case of monetary policy shocks, agricultural output is insensitive to interest rate, while industrial and service sector output gaps are significantly affected. Contrary to this, impact of fiscal policy shocks impact on output gaps of all three sectors is insignificant.

Theoretical/Practical Implications of the Findings: It is observed that the policy is confronted with a dilemma specifically demand management policies are limiting the potential growth of output in Pakistan. There is need to focus on supply side of sectors and policy reorientation towards stimulation of investments.

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1. Introduction

This study explores Pakistan's macroeconomic instability, specifically misaligned monetary and fiscal policy interventions due to biased aggregate parameter estimates of target and response functions used to construct and monitor them.

In past agricultural sector contributed to the Pakistan economy as major chunk of output came from basic, variable, and natural agriculture. Agriculture-based GDP was volatile but later it was stabilized by the textile industry, which relied on agriculture. Trade openness, price volatility, agriculture, aid dependence, and political stability may affect GDP. Managing these factors may reduce GDP growth volatility. Ahmad & Ilyas (2011) found that the services sector has grown in recent decades. However, agriculture and industry still control production and fluctuation. The inability to make precise output projections in the given period and inadequate attention to sectoral policy interventions, timing, and unequal impact compounded policy measures to meet this fluctuating target. In addition to effective implementation, research-based policy understanding of underlying restrictions and regional variations in issues such falling farm size and fragmentation, rural poverty, market development, and institutions is essential (Malik et al.,2016).

When the production gap was positive, emergency cooling operations put more strain on the economy because output was lower than expected. Development spending must be lowered to reduce the budget deficit due to tax collection concerns. Misguided economic stabilization attempts worsened volatility, gaps, macroeconomic imbalances, and public debt (IMF, 2023). The banking money multiplier, inflation, demand for goods and services, and productivity have all been affected by central bank interest rate manipulation. Considering only the aggregate production gap for policies may hurt sectoral performance, and raising interest rates may increase public debt instead of repairing the economy.

Thus, this study evaluates sectoral production disparity. The need to study Pakistan's economy and growth policies drives the research. Modern macroeconomic analysts agree prior movements were non-cyclical. Predictable seasonal variations like business cycles simplify policy instrument design. Unexpected disturbances cause economic swings (Orphanides, & Norden, 2002).

GDP trend and deviation are tracked. The output gap is the economy's real-potential production gap. Potential production is an economy's maximum output. Central bankers prioritized production and output gap forecasts. In monetary policy analysis, output gaps show how far the economy is from maximum productivity. Due to inflation, production differential may affect policy. In a positive production gap economy, overproduction creates inflation. Negative production gaps lower inflation and imply economic instability. Supply-side factors affect long-term economic growth in sectors and aggregate. Close the aggregate output gap policies may mislead (Kiley, 2013). Because of sectoral behavior differences, sectoral analysis is superior to aggregate. Interdependencies exist between sectors. Agricultural output is used for final and industrial intermediate consumption. Industry in Pakistan is based on agriculture. Examine sectoral-related policies and their timing and order. Demand-side policies like interest rate policy may also fail. Internal and external imbalances from unaligned demand management policies can produce boom-and-bust cycles, uncertainty, and constrained investment decisions.

Pakistan's growth always remained unsustainable. Typical macro models are aggregate and static. Aggregate macro modeling output estimation is inadequate due to macroeconomic aggregation assumptions and static interactions. Gaps alter policy predictions and reality. Central banks utilize these output predictions from these models to encourage economic growth by utilizing interest rates to set the equilibrium money supply to maintain inflation based on expectations and influence economic growth.

1.1. Problem Statement

Adjusting macroeconomic, monetary, and fiscal policies to maximize growth requires reliable production gap estimates. We hypothesized that aggregate modeling and analysis hide huge inequities among sectors and sub-sectors, thus one-size-fits-all approaches cannot work. Assess the weighted sum of sectoral gaps and disaggregate the effects of monetary and fiscal policy on growth and debt management. The research aims to determine sector-wise output gaps and their impact on macroeconomic production gaps.

We investigated if the Pakistani sectors' long-term output disparities and growth pathways differ considerably.

Potential aggregate and sectoral output have been used to compute output gaps, equilibrium interest rate, cyclically adjusted fiscal magnitudes, the country's inflation target, and monetary policy reaction function and parameters. As usual, no estimation strategy is optimum. The pragmatic approaches used were best for the data, supported by economic theory and current empirical testing.

Thus, the policy implications need more specificity and actionable steps for sector-specific policies, addressing fiscal policy shortcomings, and managing debt levels effectively. Providing concrete strategies and remedies would enhance the recommendations' practicality and impact.

Pakistan lacks quarterly micro-level national accounts and labor market position data. Real quarterly data suits our sophisticated analyses and policy consequences. When appropriate, we use statistics to convert annual data to quarterly observations. Quarterly national accounts data avoids this limitation.

2. Research Methodology

The methodology used here is somewhat different from the traditional approaches (Denis et al., 2002). The main reason is the ambition to remain close to neo-classical supply-side theory and at the same time avoid the use of mechanical filters for some of the explanatory variables. The derivation is based on a traditional cost minimization approach with Cobb-Douglas production technology. However, even this derivation is somewhat non-conventional because of the necessity to circumvent the absence of data on the prices of production factors capital, and labor.

The production function relates the generation of GVA to increased inputs of Capital (K) and Labor (L) and technological progress. In a Cobb-Douglas production technology (with constant returns to scale and absence of technological progress):

$$GVA_t = AK_t^{\alpha} L_t^{1-\alpha} \tag{1}$$

Where A is a proportional technical coefficient and α is the technical coefficient of the production factor K. Technological progress can take different forms. Neutral disembodied technological progress neither uses nor saves capital or labor. Embodied technical change can be capital or labor-saving. The easiest way to incorporate neutral technical progress in the Cobb-Douglas case is to allow the scale parameter A to vary over time in the form: $A_t = A_0 e^{\gamma . t}$. Where A_0 is a constant, t is a time trend, γ is the rate of technical progress, e is the Napierian number. If the growth rate of GFCF is a stationary variable (which in Pakistan it is), we can assume the existence of a steady state growth rate g, such that along the steady state:

$$\frac{GFCF_{t-1}}{GFCF_t} = \frac{1}{1+g} \tag{2}$$

$$\Delta GVA = \frac{A_0 e^{\gamma . t}}{\lambda^{1-\alpha}} \left(\frac{g+\gamma}{g+\delta} \right) GFCF \tag{3}$$

Equation (3) shows an inverse Incremental Capital Output Ratio (ICOR). But due to technical changes, the effect of additional GFCF has an increasing output effect. This implies that the same amount of investment spending has a larger output effect today as compared to the past. The reason is that the economy increasingly gains in efficiency, making GFCF expenditures increasingly more productive. Thus, the data do not show a trend in A.

Here is the methodology of decomposing TGVA into potential level and deviations from potential: the output gap. These calculations will be applied to the overall country GDP and the main sectors: Agriculture, Industry, and Services. The economy-wide equilibrium equation links the Total economy GVA (TGVA) to the Total economy-wide GFCF (TGFCF):

Therefore, rewriting equation 3 with no trend then leads to the abbreviated version written as:

$$\Delta TGVA = \gamma . GFCF \quad (4)$$

Equivalently, the equation (4) can be written for the three sectors of the economy i.e., Agriculture, Industry, and Services:

$$\Delta TGVA_i = \gamma_i . GFCF_i . \quad (5)$$

Whereas (i = Agriculture, Industry and Services). When both sides of this equation are divided by GVA:

$$\frac{\Delta GVA_i}{GVA_i} = \gamma_i . \frac{GFCF_i}{GVA_i} \quad (6)$$

The interpretation of equilibrium condition can now be interpreted as the fundamental long-run potential growth rate of the economy/sectors determined by their respective propensities to invest.

To take account of delayed adjustments with which new GFCF creates additional output (GVA), an ARDL equation is used. Recent empirical papers also include the so-called Autoregressive Distributed Lag (ARDL) test. This examination is based on (Pesaran & Shin, 1999) as well as (Pesaran et al., 2001). This method reportedly offers numerous benefits. The test is based on a single ARDL equation as opposed to a VAR as in Johansen, thereby reducing the number of estimated parameters. In addition, unlike the Johansen method, the restrictions on the number of delays can be applied independently to each variable. Additionally, the ARDL method does not require pre-testing for the order of integration (0 or 1) of the model's variables.

1.3. The Rationale for Estimating Output Gaps Sector wise

The output gaps in the different sectors may behave differently (Marcellino & Musso, 2011). The contemporaneous correlation coefficient between the OG in the agricultural sector with the other sectors is not statistically significant. And the correlation coefficient between industry and services is less than 0. These observations in themselves advance an argument for sectoral disaggregation. Furthermore, a classical aggregation problem presents itself when estimating and using aggregate OG for policy purposes. In each period t, the Output Gaps in each of the sectors i are defined as the percentage difference between the current Gross Value Added (GVA) and its Potential GVA (PGVA):

$$OG_{it} = \frac{GVA_{it}}{PGVA_{it}} \quad i = 3 \text{ (AGRI, IND, SER)} \quad (7)$$

3. Data Collection and Variables Selection

All of the variables used in the research are macroeconomic variables. The frequency of most of the variables is annual. Secondary sources for data on these variables have been used. The data on these variables have been taken either from Annual Reports published by the State Bank of Pakistan or the Pakistan Economic Survey published by the Ministry of Finance.

Potential Output & Output Gap is studies for overall Economy & Sectoral Disaggregation. The variables used are given as follows:

Table 1: Variables Used in Analysis of Potential Output & Output Gap

Abbreviation used	Variable	Description
TGVA	Gross Value Added	It is the total output (Agriculture + Industry + Services) Gross Value Added (GVA) at basic prices calculated after subtracting Intermediate consumption. Intermediate Consumption refers to the expenditure on goods and services used up in the production process before the final product is created. This expenditure is measured at the prices paid by the purchasers.

TGVAAGRI	Gross Value added in Agriculture	To estimate value added, the sector has been subdivided into Crops, Livestock, Forestry, and Fishing. Crop production and animal husbandry are the two primary agricultural activities. Cotton ginning has been categorized as an agricultural activity rather than a manufacturing one, and consequently moved to the cereals sub-class. The flower yield has been estimated via survey and is included in the subclass. Animal husbandry and hunting (both non-government and therefore private) are modified concurrently with livestock.
TGVAIND	Gross Value Added in Industry	Gross Value Added (GVA) in the industrial sector encompasses Mining and Quarrying, Manufacturing, Construction, Electricity, Gas, and Water Supply. The manufacturing sector is the largest, consisting of two sub-sectors: large-scale manufacturing and small-scale manufacturing. Large-scale manufacturing encompasses establishments that are registered under the Factories Act of 1934 or meet the criteria for registration, which includes having a workforce of 10 or more employees. This category also includes repair and service industries. Small-scale manufacturing encompasses manufacturing establishments that are not included in large-scale manufacturing.
TGVASER	Gross Value Added in Services	The (internationally agreed upon) Central Product Classification (CPC) is used to classify services as products. They could theoretically be produced or supplied by any industry. Real estate services, for instance, may be provided by any type of enterprise with under-utilized building capacity that can be rented out. Other examples include research or educational services that may be produced as a secondary activity by units classified as manufacturers based on their primary activity. Wholesale & Retail Trade, Transport, Storage & Communication, Finance & Insurance, Housing Services (including home ownership), General Government Services, and Other Private Services are the subcomponents.
TGFCF	Gross Fixed Capital Formation	Gross fixed capital formation (GFCF) is the investment as it includes manufactured fixed assets used in manufacturing operations for more than a year. It is subdivided into public, general government, and private. For detail, the Pakistan Bureau of Statistics website can be visited
TGFCFAGRI	GFCF in Agriculture	Gross Fixed Capital Formation (GFCF) in agriculture has been computed by PBS separately for the private and public sectors due to variations in data sources. The primary elements of private sector gross fixed capital formation (GFCF) in agriculture include domestic production and imports of agricultural machinery, the installation of tube wells, cultivated assets such as livestock and timber, and land improvement. The elements of rural infrastructure include farms, buildings, wells, farm transport, water courses, orchards, and non-monetized gross fixed capital formation (GFCF).
TGFCFIND	GFCF in Industry	PBS provides estimates of the Gross Fixed Capital Formation of each component of the industry for the Private and Public Sectors as well as the General Government.
TGFCFSER	GFCF in Services	PBS provides estimates of the Gross Fixed Capital Formation of each component of Services for the Private and Public Sectors as well as General Government

Source: Author's compilation based on literature.

After determining potential output, the output gap is estimated and analysed. The output gaps in agriculture, industry, and services are TGVAGAPAGRI, TGVAGAPIND, and TGVAGAPSER. Policy Rate (PR) is used to inspect monetary policy, whereas Primary Fiscal Balance to GDP ratio (PFBR) is used for fiscal policy.

The accuracy of Pakistani official data is unclear. We discussed this with PBS staff. Our talks led us to decide that Pakistan Statistical Yearbooks (PSY) data is final. The yearbooks are released annually. '50 Years of Pakistan Volume III' NA data differs from PSY data since they cover different time periods. For several periods, the Economic Survey (ES) and State Bank of Pakistan's Handbook differ. Periodic data updates, modified in the PSY but not across all time periods in the other publications, explain the observed differences. PSY has provided detailed NA data for these reasons. The PBS website lists NA key aggregates at constant prices in Table 2. Prices from 1980-81, 1999-00, and 2005-06 are listed. The thesis uses data from 1959-60, 1980-81, 1999-00, and 2005-06. With the change in base year, overlapping data for the relevant year is provided to calculate Conversion Factors (CF) for translating historical data to the new base period.

4. Results and Discussion

Potential Output & Output Gap is analyzed for overall Economy and for sectoral disaggregation.

4.1. Incremental Capital Output Ratio (ICOR)

The Incremental Capital Output Ratio (ICOR) serves as a proxy indicator for assessing the efficiency of investment in an economy. ICOR holds significant importance in academic circles and policy-making as a crucial concept and it is an analytical tool for economic growth theory and development planning. The ICOR is a measure that quantifies the relationship between changes in capital and changes in output. The Harrod-Domar Model, for instance, attributes the decline in potential growth to reduced investments and an increasing Incremental Capital Output Ratio (ICOR).

Thus, the equilibrium Inverse Incremental Capital Output Ratio (IICOR) was obtained. The observed volatility of the reverse ICOR is partly due to delayed responses of GVA to shocks in GFCF. The estimation result of the equation is shown below:

Table 2: Estimated Result of Overall ARDL Equation

Dependent Variable: D(D(TGVA))

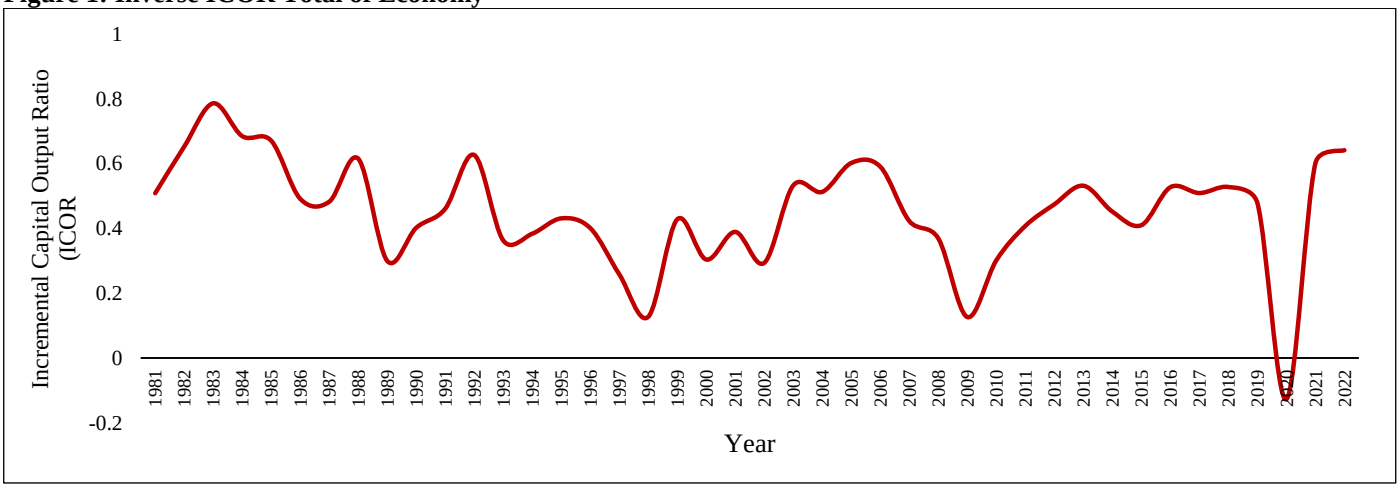
D(D(TGVA)) = C(2)*D(TGVA(-1))+C(3)*TGFCF(-1)

	Coefficient	Std. Error	t-Statistic	Prob.
C(2)	-0.851261	0.186640	-4.560984	0.0000
C(3)	0.213417	0.048794	4.373854	0.0001
R-squared	0.346332	Mean dependent var		45421.34
Adjusted R-squared	0.329571	S.D. dependent var		538631.9
S.E. of regression	441030.4	Akaike info criterion		28.87917
Sum squared residuals	7.59E+12	Schwarz criterion		28.96275
Log-likelihood	-590.0229	Hannan-Quinn criterion		28.90960
Durbin-Watson stat	1.755239			

Source: Author's Estimation

The ratio –c(3)/c(2) is the equilibrium IICOR which shows that in the long run, economy-wide, one Rupee spent on GFCF adds 0.25 Rupee. It makes sense because a house's original worth equals its investment. However, its imputed income (value added) is less than the house's value. The return on capital would exceed 100% otherwise. COVID-19 is responsible for creating huge difference between the estimated equilibrium (potential) TGVA value and the observed value in FY2020. Adding a dummy variable for that year equalizes the estimated equilibrium and observed TGVA. This suggests an output gap = 0, implying COVID generated a possible output shock. We believe COVID was an output gap shock that significantly deviated from potential output. Thus, no dummy variable was added. Introduce a dummy or not would simply affect 2020's interpretation. The projected long-run equilibrium value of the IICOR changes slightly across the data period: 0.25 without the dummy and 0.27 with it.

Figure 1: Inverse ICOR Total of Economy



Source: Author's Estimation

It is notable that in the long run, Inverted ICOR is never larger than 1. Historically, the national accounts data shows no significant long-term trend in the ΔGVA/GFCF ratio which implies the absence of any trend in the IICOR (Figure 1). In fact, the series shown in figure 1 is tested by Augmented Dicky Fuller (ADF) test and it was found that Inverse ICOR (IICOR) is stationary not only in the case of the overall economy but also at the sectoral level.

4.2. Sectors of the Economy

In the study, we estimated the sectoral inverse ICOR with the analogy of methodology used in estimating overall inverse ICOR for agriculture, industry, and services inverse ICOR.

Table 3: Estimated Result of Agriculture ARDL Equation

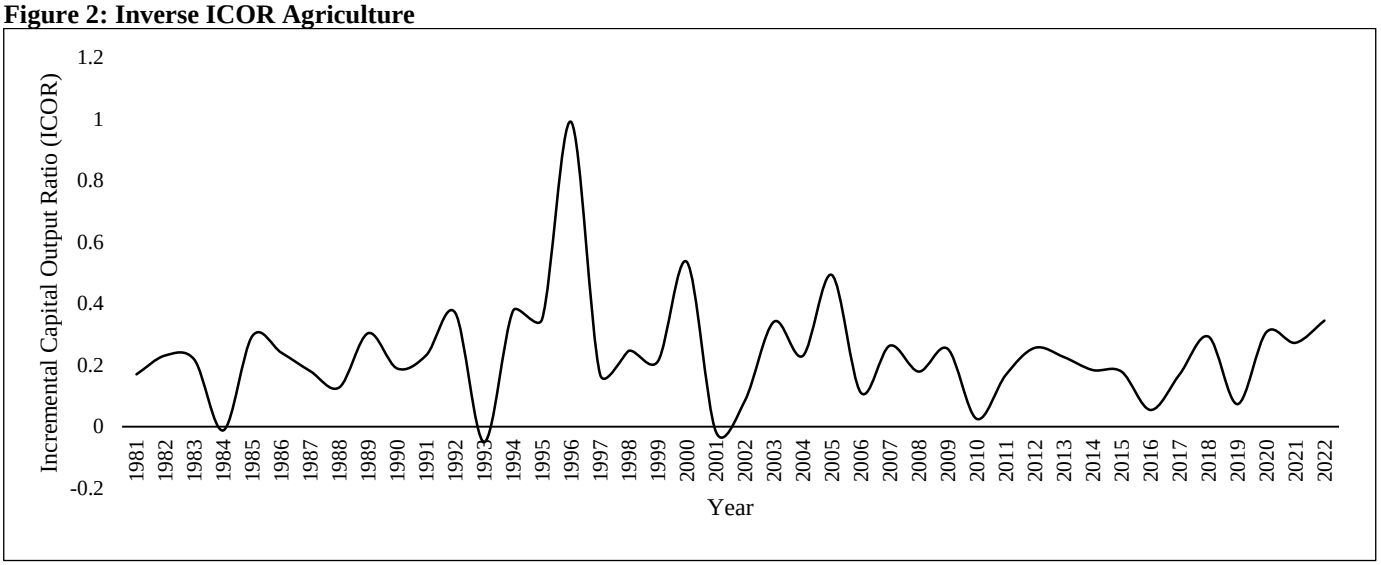
Dependent Variable: D(D(TGVAAGRI))				
D(D(TGVAAGRI))=-1*D(TGVAAGRI(-1))+C(3)*TGFCFAGRI(-1)				
	Coefficient	**Std. Error**	**t-Statistic**	**Prob.**
C(3)	0.235012	0.023679	9.924817	0.0000
R-squared	0.550092	Mean dependent var		7380.456
Adjusted R-squared	0.550092	S.D. dependent var		161216.9
S.E. of regression	108136.5	Akaike info criterion		26.04426
Sum squared residual	4.68E+11	Schwarz criterion		26.08606
Log-likelihood	-532.9074	Hannan-Quinn criterion.		26.05948
Durbin-Watson stat	2.162459			

Source: Author's Estimation

In the agricultural sector, the coefficient of D(TGVAAGRI) has been found statistically insignificantly different from unity, implying that total adjustment takes place within one year. The C(3) coefficient, therefore, measures the long-run effect of GFCF on additional value-added creation in the agricultural sector.

From figure 2, data shows the volatility in the IICOR. An extraordinary performance was observed in 1995-1996 as almost 11.7% growth was observed in Agriculture while GDP growth remained at 6.6%[1]. There could be many reasons. One reason was the extraordinary growth of the livestock sector based on the results of the census of Livestock in 1996; the other was the huge subsidy. 6.3 billion rupees on wheat[2]. Likewise, the construction of Small Dams, funded by the Asian Development Bank (ADB) in the 1990s also helped in significant growth in Agriculture.

Figure 2: Inverse ICOR Agriculture



Source: Author's Estimation

[1] https://www.pbs.gov.pk/sites/default/files/tables/national_accounts/2021-22/Table_1.pdf
[2] https://peri.punjab.gov.pk/node/219

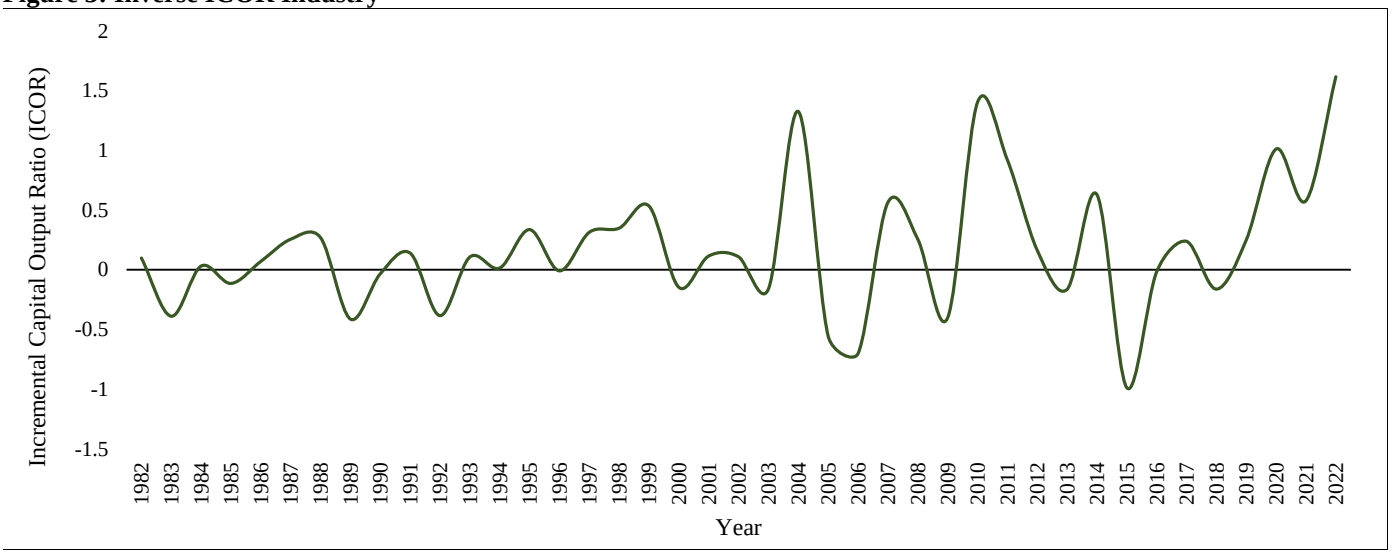
Table 4: Estimated Result of Industry ARDL Equation

Dependent Variable: D(D(TGVAIND))				
D(D(TGVAIND))=C(2)*D(TGVAIND(-1))+C(3)*TGFCFIND(-1)				
	Coefficient	**Std. Error**	**t-Statistic**	**Prob.**
C(2)	-0.904797	0.169176	-5.348261	0.0000
C(3)	0.128255	0.036396	3.523890	0.0011
R-squared	0.422522	Mean dependent var		10100.63
Adjusted R-squared	0.407715	S.D. dependent var		252006.0
S.E. of regression	193944.0	Akaike info criterion		27.23608
Sum squared residual	1.47E+12	Schwarz criterion		27.31967
Log-likelihood	-556.3396	Hannan-Quinn criterion		27.26652
Durbin-Watson stat	1.887134			

Source: Author's Estimation

The ratio –c(3)/c(2) is the equilibrium IICOR which shows that in the industrial sector, every Rupee invested in production capacity yields 0.14 Rupees of additional value added in that same sector. Historically, the data in figure 3 shows a change in the pattern after 2003.

Figure 3: Inverse ICOR Industry



Source: Author's Estimation

Textile exports from both Large-Scale Manufacturing (LSM) and Small-Scale Manufacturing (SSM) sectors grew due to factors such as stable exchange rates, low refinance rates, expanded market access (including a 15 percent increase in quotas by the EU and duty-free access to value-added textile products), and the free cotton trade regime. Moreover, these favorable advancements have also stimulated investment in the textile industry for the purposes of Balancing, Modernization, and Replacement (BMR), as well as expanding existing capacity.

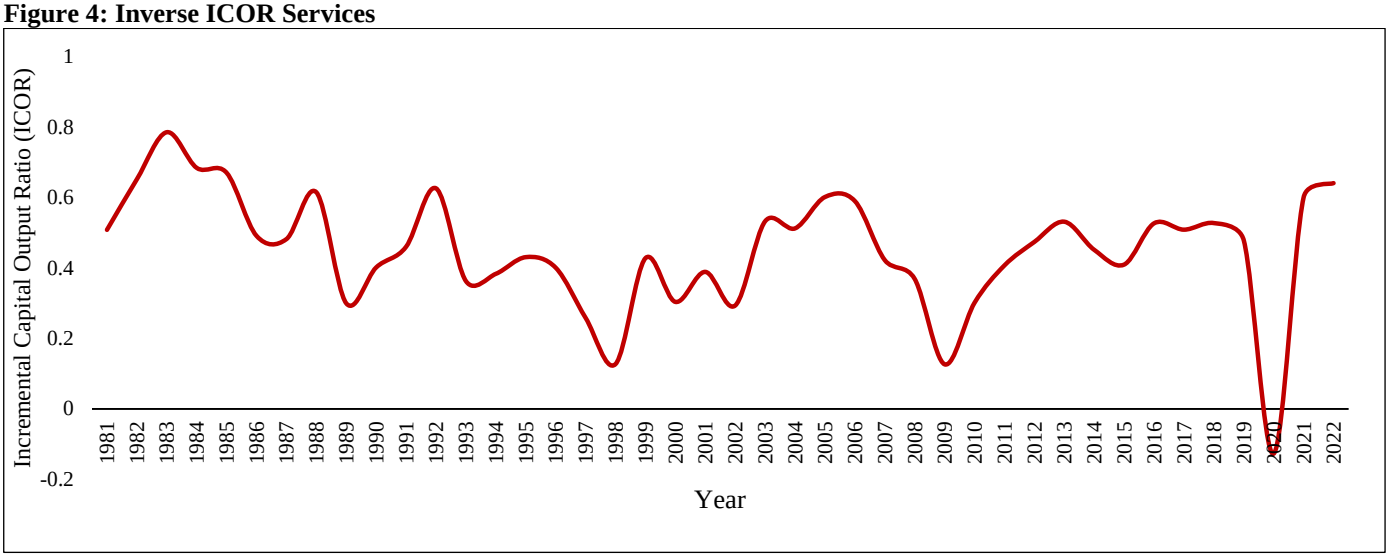
Table 5: Estimated Result of Services ARDL Equation

Dependent Variable: D(D(TGVASER))				
D(D(TGVASER))=C(2)*D(TGVASER(-1))+C(3)*TGFCFSER(-1)				
	Coefficient	**Std. Error**	**t-Statistic**	**Prob.**
C(2)	-0.985723	0.183880	-5.360679	0.0000
C(3)	0.307220	0.059147	5.194190	0.0000
R-squared	0.423754	Mean dependent var		27940.25
Adjusted R-squared	0.408978	S.D. dependent var		326344.2
S.E. of regression	250886.7	Akaike info criterion		27.75094
Sum squared residual	2.45E+12	Schwarz criterion		27.83453
Log-likelihood	-566.8943	Hannan-Quinn criterion		27.78138
Durbin-Watson stat	1.687216			

Source: Author's Estimation

The ratio –C(3)/C(2) is the equilibrium ICOR which shows that the effect of one Rupee spent on services sector productive capacity increases income by 0.31. This is huge compared to agriculture and double the industry effect. However, the services sector accounts for about 60% of GDP and is the largest. Due to State Bank of Pakistan's accommodative policies in the 2000s, the banking and insurance sector grew rapidly, boosting the service sector. High ICOR means capital is inexpensive compared to output. High wholesale price index increases swiftly passed to the cost of capital, while people's income, the key input cost in the services sector, did not change as quickly or in the same proportion. High economic growth in 2001 was fueled by US and other bilateral and multilateral aid. Exports, remittances, and FDI increased, particularly in IT, telecommunications, the social sector, and education. Over the previous seven years, services value added has grown almost twice as fast. In figure 4 it is noted that the impact of COVID-19 was more severe in Services Sector which in turn negatively affected overall GDP growth.

Figure 4: Inverse ICOR Services



Source: Author's Estimation

4.3. Comparison of Inverse ICORs at Aggregate and Sectoral Level

The results for the estimates of the parameters α and β are C(2) and C(3) coefficients for the total economy and each of the main sectors are presented below:

Table 6: Relationship between Estimates

	α		*β*		*γ*
	Coefficient	**T-stat**	**Coefficient**	**T-stat**	
Total economy	-0.9	-4.6	0.2	4.4	0.25
Agriculture	-1		0.2	9.9	0.24
Industry	-0.9	-5.3	0.1	3.5	0.14
Services	-0.99	-5.2	0.3	5.2	0.31

Source: Author's Estimation

Since the absolute value of the estimated coefficient marginally exceeded 1, it was restricted to -1

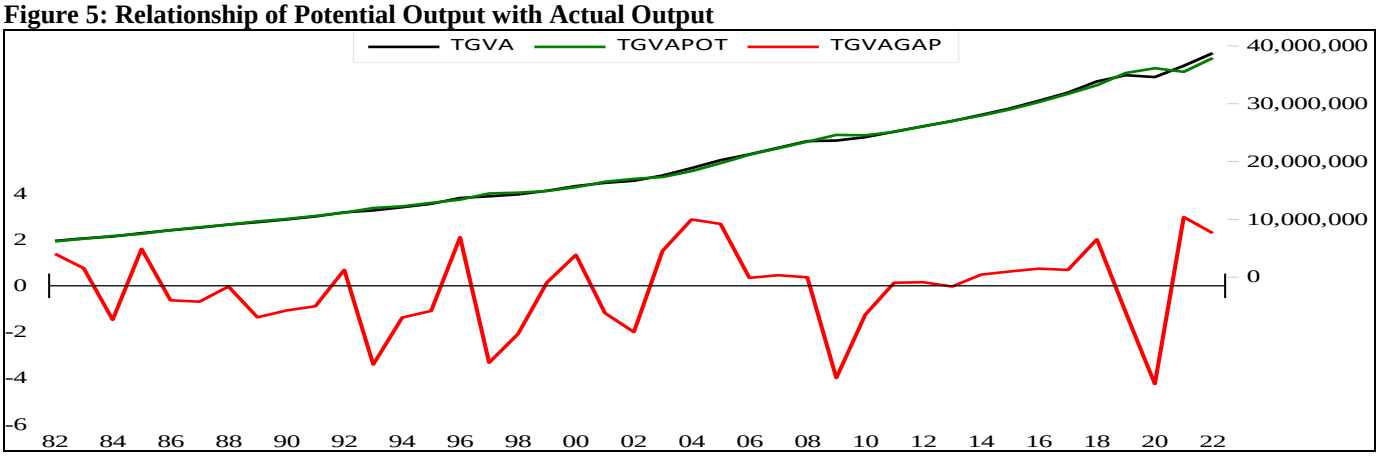
The γ parameter indicates the additional value-added that can be generated by one unit of GFCF. The higher the value of this parameter, the more effective is GFCF to generate additional output. The overall effect is 0.25. This implies that one-rupee GFCF is twice more effective in generating additional value added at constant prices in the services sector as compared to the industrial sector. The reason is that output in the agriculture sector is not only dependent on input but some other uncontrollable variables like weather conditions, government policies related to agriculture, etc. In the services sector, the main input is wages and salaries of people working which are usually sticky.

4.4. Potential Output and Actual Output

The Incremental Capital Output Ratio (ICOR) can be used as an indicator for assessing the efficiency of investment expenditures. If this efficiency is markedly different across sectors, it is useful to extend an aggregate approach to sectoral decomposition.

As discussed earlier, historically, the economy of Pakistan faced macroeconomic imbalances many times mainly due to an overheated economy i.e., potential output was below the actual output. At levels, the following figure shows periods when the potential output was above the actual output and when it remains below the actual output.

Figure 5: Relationship of Potential Output with Actual Output



Source: Author's Estimation

In the figure, TGVA is the observed Actual Gross Value Addition at constant prices, TGVAPOT is the Potential Output, and TGVAGAP is the difference. The difference between observed and potential reveals the economic cycle position. Over- or under-spending might cause discrepancies. Overspending increases the danger of trade balance imbalances, foreign exchange losses, and currency depreciation. Possible TGVA growth and net business cycle accelerations (the TGVAGAP) drive economic growth.

TGVA was mostly below potential from FY1993 to FY2002. Pakistan signed nine IMF agreements between 1988 and 2000. Many other arrangements were not completed, leaving approximately half of the allocated amount unutilized. Pakistan's economy declined during the 1990s, known as the 'lost decade' The program ran uninterrupted from 2000 to 2002, and the 2001 Poverty Reduction and Growth Facility (PRGF) is on schedule. The external sector is stable and macroeconomic indicators are strong. Low growth and slow poverty reduction have persisted. Pakistan's economy struggled in the 1990s. Macroeconomic stability and external sector security are good. Weak results have been achieved in poverty reduction and economic growth. Government reserves and the rupee rose in the fourth quarter of 2001 due to favorable external occurrences. Exports fell 3% from the prior quarter as exporters honored pre-9/11 contracts. Low oil and petroleum product imports reduced imports by 9%. The slowdown in manufacturing, the depletion of stocks accumulated in anticipation of rupee depreciation, the transition of many enterprises to domestic gas and coal, and the decline in demand for petroleum products for re-export to Afghanistan after the military campaign all contributed to the volume drop. Investment reduced machinery and capital equipment imports. Projects were disrupted by 9/11. The trade balance improved significantly.

After substantial and widespread growth in 2004, the global economy declined significantly in 2005. Global imbalances including the US external deficit and Asian, European, and oil-exporting surpluses led to this predicament. Rising energy prices, natural calamities, and geopolitical uncertainty threatened developing nations. However, bumper cotton production of 14.3 billion bales in 2004-05 and 13.1 billion in 2005-06 helped Pakistan achieve 7.5 and 5.6 percent economic growth. The global financial crisis of 2008 harmed Pakistan's economy. In 2010 and 2011, the crisis was followed by a V-shaped recovery.

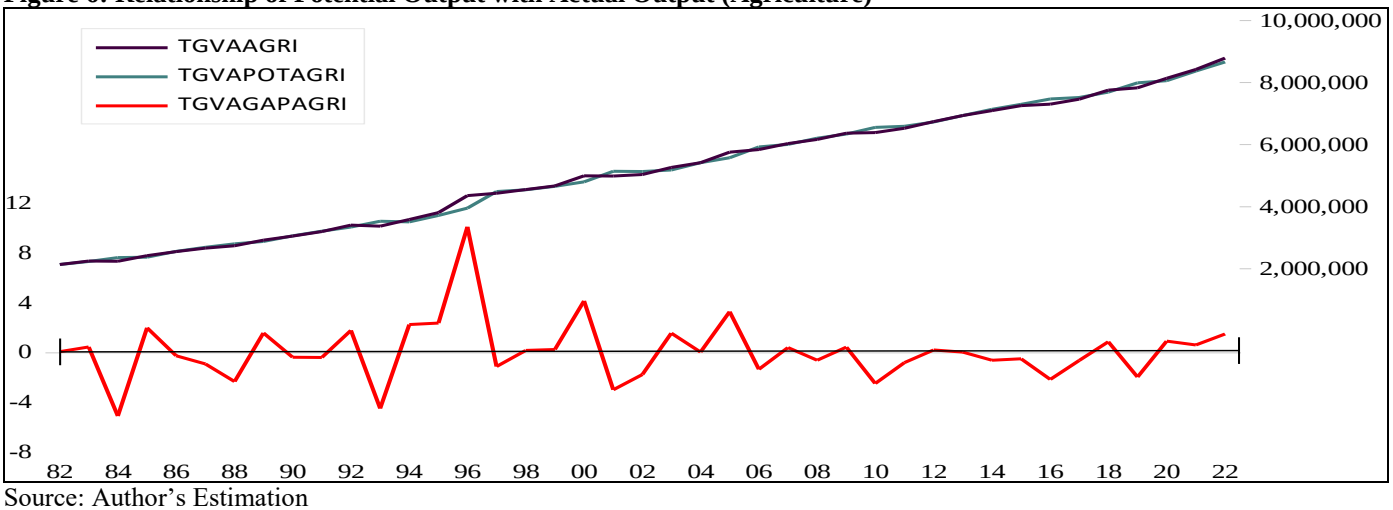
Due to huge and rising fiscal and current account deficits, Pakistan's GDP grew unsustainable in 2010 and 2018. Pakistan's economy had twin deficits in 2018. Additional attempts to manage inflation and stabilize the exchange rate have increased domestic demand. Imports increased due to rising demand and government spending. Due to the 2018 election, fiscal account and currency rate changes were delayed. This delay reduced foreign reserves and increased monetary borrowing.

The COVID-19 epidemic caused the global recession in 2020. Fiscal and monetary expansion drove a fast V-shape recovery in FY2021 and 2022. However, the Current Account Balance was sharply negative before currency depreciation and foreign exchange reserve loss.

4.4.1. Agriculture Sector's Potential and Actual Output

In the figure, TGVAAGRI represents the Total Gross Value Addition in Agriculture at constant prices (observed), TGVAPOTAGRI is the Potential Output of Agriculture and TGVAGAPAGRI is the percentage difference between Actual and Potential output in agriculture. The distinction between observed and potential reflects the position of the economic cycle. Differences between observed and potential values may be attributed to either excessive or insufficient expenditures

Figure 6: Relationship of Potential Output with Actual Output (Agriculture)



Source: Author's Estimation

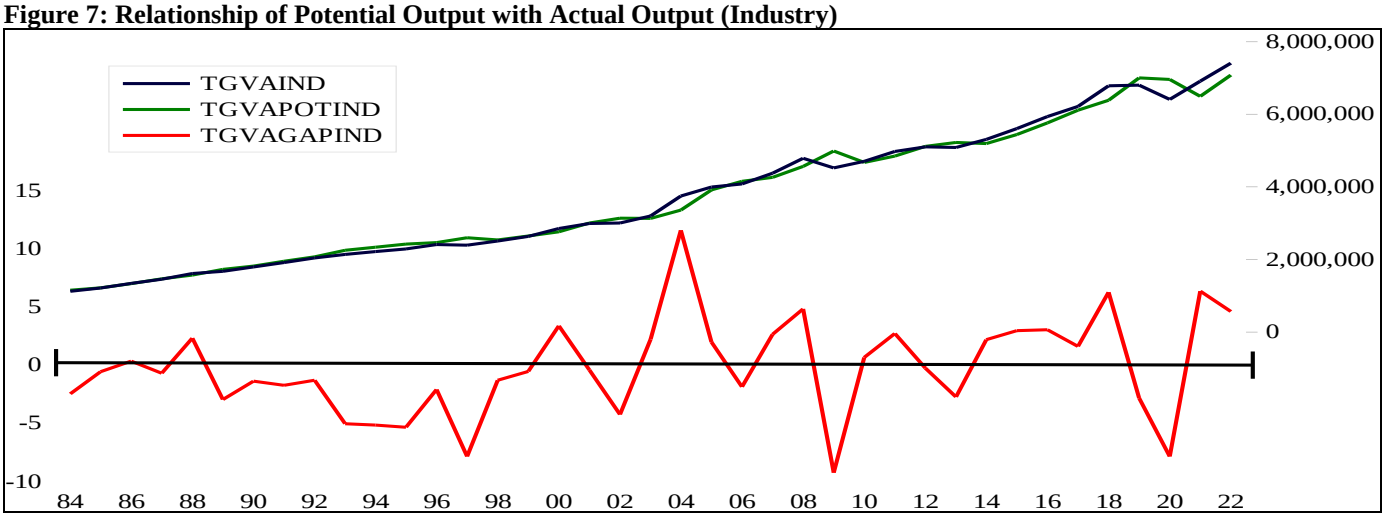
During the 1990s, there was a significant fiscal issue as the budget deficit remained at approximately 6 percent of the Gross Domestic Product (GDP). As anticipated, this was accompanied by a decline in economic performance, with growth slowing to an average of 4 percent per year, compared to an average annual rate of 6 percent in the 1980s. Inflation rates reached double-digit levels, with an average annual rate of 12 percent. The current account balance experienced a significant decline, leading to a decrease in foreign exchange reserves to a level equivalent to two weeks of imports by the end of 1996.

The Federal Government increased the assessment rate of land to Rs. 400 per Produce Index Unit (PIU) and eliminated certain exemptions and loopholes in the 1996/1997 budget. As a result, the revenue generated from land assessment increased from Rs. 30 million in 1994/95 to Rs. 110 million in 1996/97. Ali (2004) discovered that Total Factor Productivity (TFP) experienced a consistent annual growth rate of 2.3% throughout the period from 1960-61 to 1995-96. This constitutes approximately 58% of the overall increase in output within the country during this specific time frame. Productivity growth has been a major factor contributing to the performance of the agriculture sector in Pakistan for a period of 36 years. The primary driver of growth in total factor productivity (TFP) has been the technological advancements found in high-yielding varieties of grains and cotton (Chaudhry, 2009). This progress has been supported by public investments in irrigation, agricultural research and extension (R&E), and physical infrastructure. To sustain and enhance Pakistan's agricultural productivity, it is necessary to strengthen and deepen agricultural markets and increase funding for agricultural research.

4.4.2. Industrial Sector's Potential and Actual Output

In the figure, TGVAIND represents the Total Gross Value Addition in Industry at constant prices (observed), TGVAPOTIND is the Potential Output of the Industry and TGVAGAPIND is the percentage difference between the Actual and Potential output in the industry.

Figure 7: Relationship of Potential Output with Actual Output (Industry)



Source: Author's Estimation

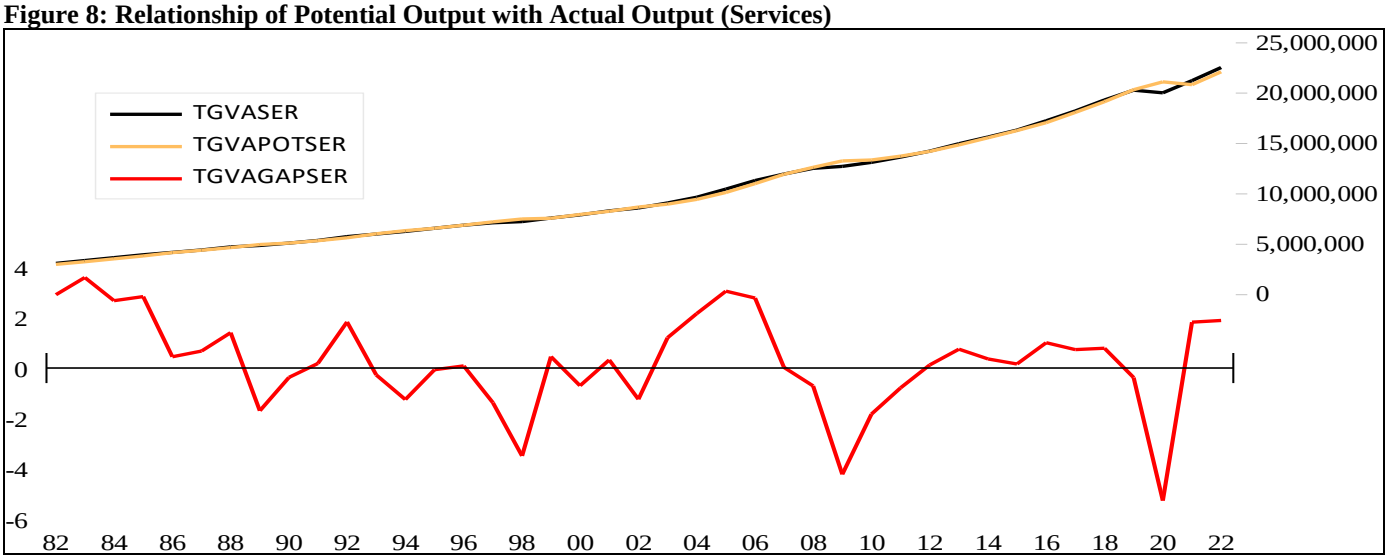
The industrial sector in Pakistan initially faced structural issues, leading to sluggish growth rates in investment, output, and exports. Some factors contributing to the lack of competitiveness of Pakistani products in the global market are the absence of diversification, and inefficiencies in allocation and technology. Additionally, the poor quality of products and low levels of research and development activities further hinder productivity growth rates. Traditional industries, such as food and textile, continue to dominate the manufacturing sector in terms of output. From 2002 through 2006, the country experienced a significant growth in GDP, averaging above 7 percent, primarily driven by remittances and a surge in consumption. However, this growth declined to 4 percent in 2008 and further dropped to 2 percent in 2009, partly due to the global economic crisis. Large-scale manufacturing experienced a significant increase of 20 percent in 2005. However, it subsequently faced a sharp decline due to factors such as declining aggregate demand, severe power shortages, and worsening security conditions. From 2013 to 2015, the growth of the large-scale manufacturing (LSM) sector, a significant component of the industry, was negatively impacted by various factors. These included energy shortages, decreasing prices of cotton and edible oil, increasing production costs, and a lack of demand for cotton yarn, cloth, and cement in international markets. In the fiscal year 2015-16, there was a notable acceleration in the growth of Large-Scale Manufacturing, resulting in significant growth.

4.4.2. Services Sector's Potential and Actual Output

In the following figure, TGVASER represents the Actual Gross Value Addition in Services at constant prices (observed), TGVAPOTSER is the Potential Output of the Services and TGVAGAPSER is the percentage difference between the Actual and Potential output in the Services.

In the late 1990s, the reform of policies in the services sector presented a significant opportunity for policymakers to enhance employment, productivity, and innovation. The period from 1990 to 2005 witnessed significant growth in services, primarily driven by the rapid expansion of communication services, financial services, business services (specifically IT), and community services. Factors such as high-income elasticity of demand for services, increased input usage of services by other sectors, rising exports, as well as supply side factors like reforms and technological advances, were all significant in driving services growth during the period 1990-2005. Presently, the services sector is contributing almost 60% to GVA.

Figure 8: Relationship of Potential Output with Actual Output (Services)

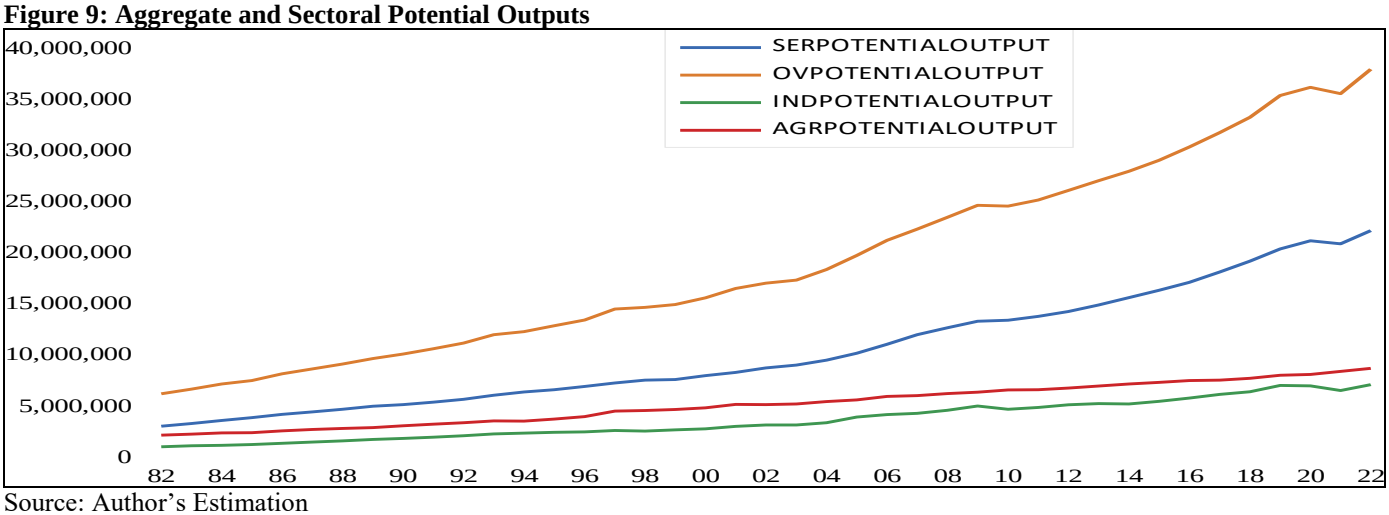


Source: Author's Estimation

From the figures 6 to 8, it is depicted that the cyclical volatility was lowest in the services sector. The standard deviation of the services output gap was 1.9 percent, which is lower than in agriculture i.e., 2.5 percent and markedly lower than in industry i.e., 4.2 percent. The observed cyclical volatility in Pakistan's economy can therefore be mainly attributed to the pronounced volatility in industrial activity.

Further, it has been observed that the most dynamic sector in terms of the creation of potential value added has been the services sector. It has been observed that the services sector exhibits a higher growth rate compared to both the agriculture and industrial sectors. The services sector contributes approximately 58% to the Gross Domestic Product (GDP) and slightly over one-third of the total employment. The services sector is closely interconnected with other sectors of the economy, as it plays a vital role in providing necessary inputs to both the agriculture and manufacturing sectors.

Figure 9: Aggregate and Sectoral Potential Outputs



Source: Author's Estimation

Further, from the above figure, it can also be depicted that the share of potential output in the services sector has been increasing since the early 2000s at the expense of the declining share of agriculture. It implies that the services sector has attracted an increasing share of total GFCF to the detriment of both other sectors.

4.5. Sectoral Correlation with total growth of potential GVA

Potential GVA growth in each sector is correlated with total potential output growth. However, the correlations of industrial and services sectors with total growth of potential GVA are strong and statistically significant. Those of the agricultural sector are much weaker. Moreover, potential output growth in the

agriculture sector is insignificantly correlated with that in the industry and services sector. In terms of growth rates of potential GVA, the following correlations have been estimated:

Table 7: Correlations between growth rates of potential GVA (t-stats in parentheses)

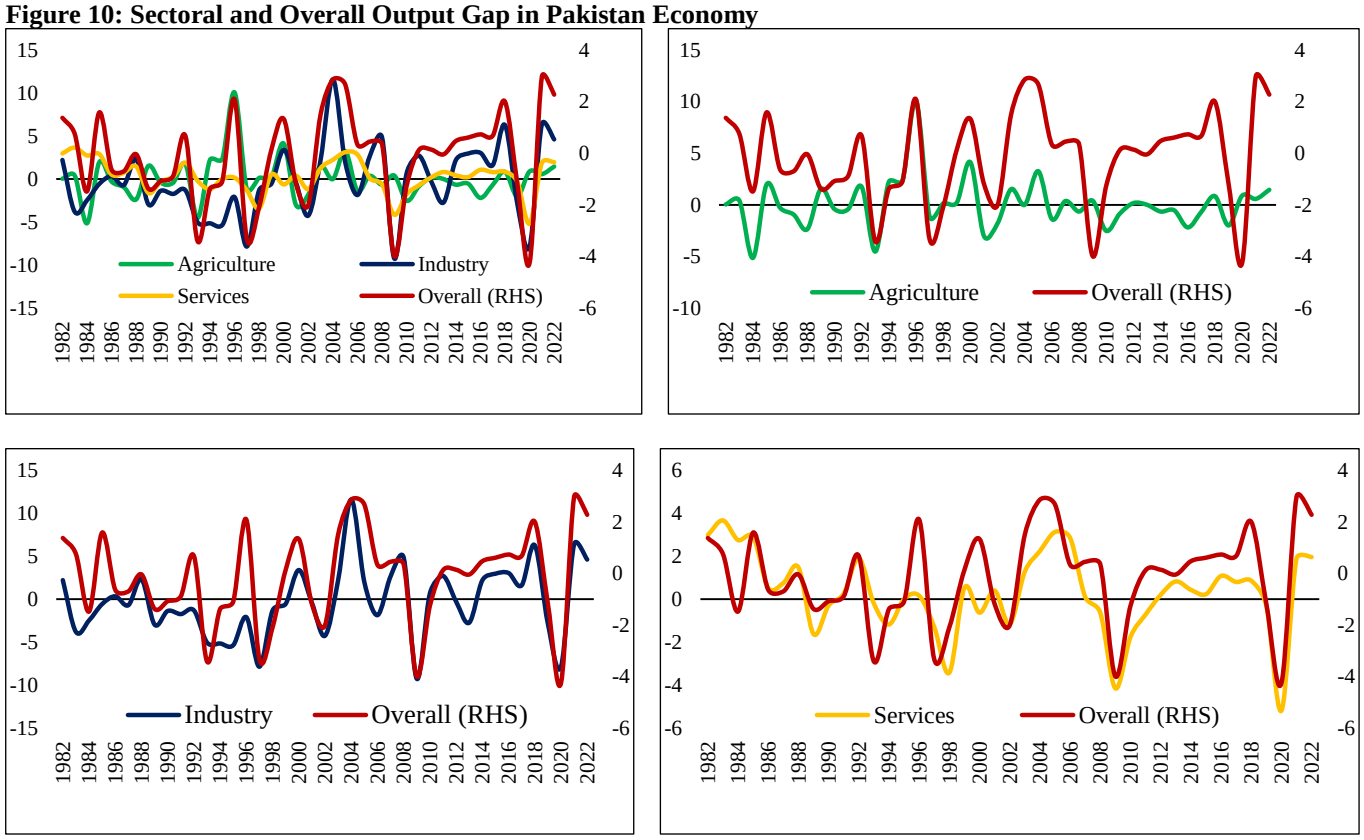
	Total Economy	Agriculture	Industry	Services
Total economy	1			
Agriculture	0.55 (4.0)	1		
Industry	0.83 (9.1)	0.21 (1.3)	1	
Services	0.83 (9.0)	0.12 (0.8)	0.6 (5.1)	1

Source: Author's Estimation

4.6. Output Gaps: Relationship between Overall Economy and its Sectors

The output gaps in figure 10 show the cyclical movements in the overall economy and in the different sectors. The data shows an oversupply resulting from decreased demand during the specified period. Periods of excess capacity were followed by frequent fluctuations in demand and supply pressures. Supply pressure persisted, but at times it contracted due to the frequent emergence of demand pressures. It is mentionable that overall, OG remained positive from 2002 to 2008. The reason being; this was because of the huge remittance inflow and consequent expansionary monetary policy after 9/11.

Figure 10: Sectoral and Overall Output Gap in Pakistan Economy



Source: Author's Estimation

4.6.1. Impact of Shocks

To look at sectoral dependencies VAR model is estimated. The Vector Autoregressive (VAR) model enables the consideration of feedback or reverse causality between dependent and independent regressors by incorporating their past values. The general VAR model assumes that all regressors are endogenous; therefore no exogenous variables are required. In this approach, we want to estimate the dependence of each sector's output gap on country-wide shocks, represented by the overall country OG (which therefore from a sectoral point of view is an exogenous variable). In the endogenous part of the VAR, the sectoral output gaps (OG's) are included as endogenous variables.

As mentioned earlier that the cyclical positions of sectoral OGs are influenced by various factors, including monetary and fiscal policies. The correlation analysis and VAR model estimation demonstrate that the

sectors exhibit varied responses to shocks in the variables that influence the overall economy. Let us focus on the relationship between monetary policy stance (SMP) and the Output Gap in each sector (i) over time t. We have used a simple partial adjustment mechanism for this purpose.

Cyclical volatility is in principle addressed by demand management policies (monetary and fiscal policy). These results show that when these policies are based on cyclical information on the overall economy, they are in fact addressed to the industry and services sectors only. Given the absence of a correlation between the cyclical stance in agriculture and the other sectors, it requires that specific policies for agriculture should be designed.

It is also mentionable that VAR is inferior to VECM in the case of I(1) variables. As in our case VAR uses I(0) variables, all traditional econometric techniques remain valid, including standard error and t-values on estimated coefficients, hence significance tests are valid. Furthermore, in that case, there is no problem in applying a general to a specific approach, eliminating insignificant coefficients. The imposed restrictions were:

$$\begin{bmatrix}\text{TGVAGAPAGRI}\\ \text{TGVAGAPIND}\\ \text{TGVAGAPSER}\end{bmatrix}=\begin{bmatrix}a_{11} & a_{12} & a_{13} & a_{14}\\ a_{21} & a_{22} & a_{23} & a_{24}\\ a_{31} & a_{32} & a_{33} & a_{34}\end{bmatrix}\begin{bmatrix}\text{TGVAGAPAGRI}(-1)\\ \text{TGVAGAPIND}(-1)\\ \text{TGVAGAPSER}(-1)\\ \text{TGVAGAP}\end{bmatrix}$$

Restrictions imposed: a11 = a12 = a13 = a21 = a22 = a23 = 0:

$$\begin{bmatrix}\text{TGVAGAPAGRI}\\ \text{TGVAGAPIND}\\ \text{TGVAGAPSER}\end{bmatrix}=\begin{bmatrix}0 & 0 & 0 & a_{14}\\ 0 & 0 & 0 & a_{24}\\ a_{31} & a_{32} & a_{33} & a_{34}\end{bmatrix}\begin{bmatrix}\text{TGVAGAPAGRI}(-1)\\ \text{TGVAGAPIND}(-1)\\ \text{TGVAGAPSER}(-1)\\ \text{TGVAGAP}\end{bmatrix}$$

It is also mentioned that although there is no AR part in the first two equations, however, it remains a system of equations. Contemporaneous country-wide shocks affect the industrial sector the most. The long run coefficient of a one percentage point increase in the country-wide OG affects the industry sector OG by 1.9 percentage points;

i. Output gaps are deviations from PO and PR in percentage form hence refer the degree of responsivness or elasticities. Thus, the overall shock has the second largest impact on the services sector and the long-run elasticity is 1.1.
ii. The agricultural sector is leeast affected and has an elasticity value of 0.58.
iii. Contemporaneous country-wide shocks are passed through within t time-lapse of one year in the agricultural and industrial sectors, whereas they last longer than one year in the services sector.

4.7. Impact of Monetary Policy Shock

It is mentionable that systematic country-wide shocks can be attributed to shocks originating in the rest of the world, and in domestic fiscal and monetary policy shocks. Further, other unsystematic shocks such as climatological or political shocks are also present but these are unpredictable.

Considering monetary policy shock as one particular shock of interest country-wide, the specific effect of changes in the Policy Interest Rate (PR) is investigated. Thus, to perform VAR, we selected the Overall Output gap (TGVAGAP), Sectoral Output gap (TGVAGAOIND), Policy rate (PR), Primary Balance Ratio to GDP (PFBR), and Inflation (GRCPI) and estimated lag length from lag length selection criteria. The result is given below:

To evaluate the effectiveness of monetary and fiscal policy on the overall and sector-specific output gaps, researchers may opt to employ a structural vector autoregression (SVAR) model instead of a VAR model.

This involves imposing suitable constraints on the structural parameters during estimation. The purpose of this model is to represent the sequence of events that impact important variables. As a result, the structure of the model is designed to accurately depict the timeline of reactions. Assuming the central bank foresees a forthcoming inflationary rise.

The results suggest that its impact on the different sectors may be substantially different in both magnitude and duration. It seems to be the case that the industrial sector is affected the most, followed by the services sector in which the shock needs more time to be fully reflected in economic activity in that sector. The agricultural sector is the least affected. These asymmetric effects confirm the results in terms of correlation analysis.

As the results demonstrate that the policy rate (PR) does not affect the agricultural output gap (OG), but has strong negative effects on both other sectors. We, therefore, complete the analysis by excluding the agricultural OG from the analysis and restricting insignificant coefficients to zero.

From the analysis, the following results can be drawn:

i. Changes in the PR have the most effects on the industrial OG: a 1 %point change in the PT inversely affects industrial OG by 0.94% points;
ii. The effect on the services OG is also very significant: the long-run effect of a 1% point change has an inverse effect on the services OG by 0.57% points;
iii. The effects of PR need more time to materialize in the services sector as compared to the industry.

4.7.1. Structural Vector Autoregression (SVAR)

To evaluate the effectiveness of monetary and fiscal policy on the overall and sector-specific output gaps, researchers may opt to employ a structural vector autoregression (SVAR) model instead of a VAR model. This involves imposing suitable constraints on the structural parameters during estimation. The purpose of this model is to represent the sequence of events that impact important variables. As a result, the structure of the model is designed to accurately depict the timeline of reactions. Thus, keeping in view the variables affected by monetary and fiscal policy, we selected Overall Output gap (TGVAGAP), Policy rate (PR), Primary Balance Ratio to GDP (PFBR), and Inflation (GRCPI) and estimated lag length from lag length selection criteria.

Assuming the central bank foresees a forthcoming inflationary rise. To address this upward trend, the central bank has the option to increase its primary policy rate. Inflation persists in its upward trajectory. Similar to fiscal policy, the use of SVAR prevents us from drawing the incorrect conclusion that raising the policy rate leads to an increase in inflation. Thus, to perform SVAR, a total of n(n-1)/2 restrictions are required on the matrix of structural parameters, which are imposed in order to uniquely determine the system. Restrictions imposed are given in the following matrix:

$$\begin{bmatrix} e^{TGVGAP} \\ e^{TGVGAPX_i} \\ e^{pfbr} \\ e^{GRCPI} \\ e^{pr} \end{bmatrix} = \begin{bmatrix} S_{11} & 0 & 0 & 0 & 0 \\ S_{21} & S_{22} & 0 & 0 & 0 \\ S_{31} & S_{32} & S_{33} & 0 & 0 \\ S_{41} & S_{42} & S_{43} & S_{44} & 0 \\ S_{51} & S_{52} & S_{53} & S_{54} & S_{55} \end{bmatrix} \begin{bmatrix} \varepsilon^{TGVGAP} \\ \varepsilon^{TGVGAPX_i} \\ \varepsilon^{pfbr} \\ \varepsilon^{GRCPI} \\ \varepsilon^{pr} \end{bmatrix}$$

Xi implies that it is used for Agriculture, Industry, and Services separately. In this case, we started with the policy rate being the first variable to be affected. The reason is that the monetary policy is presented approximately eight times in a fiscal year in Pakistan. In certain circumstances, special monetary policy may also be implemented. The State Bank of Pakistan (SBP) releases a semiannual schedule of Monetary Policy Committee (MPC) meetings to increase predictability and openness in monetary policymaking. Thus, the policy rate is the first one which can directly be affected. Next is the CPI, linking it with the cost

of borrowing. Then the primary balance to GDP ratio, after then the sectoral output gap, and last is the overall output gap.

Figure 11a: Impact of Monetary Policy (Policy Rate) on Agriculture Output Gap

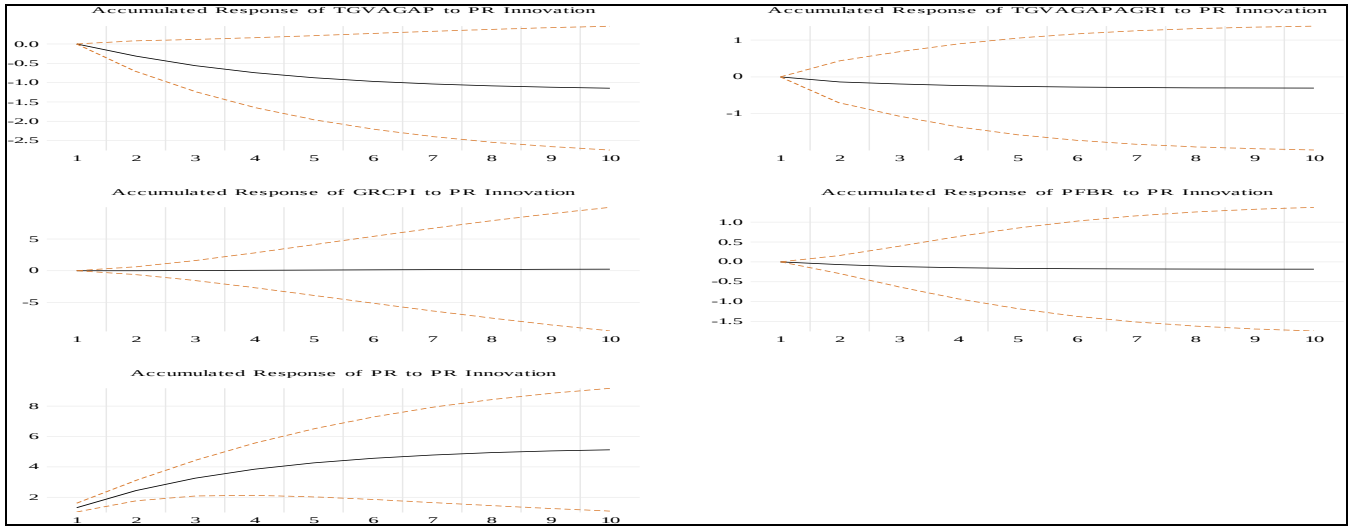


Figure 11b: Impact of Monetary Policy (Policy Rate) on Industry Output Gap

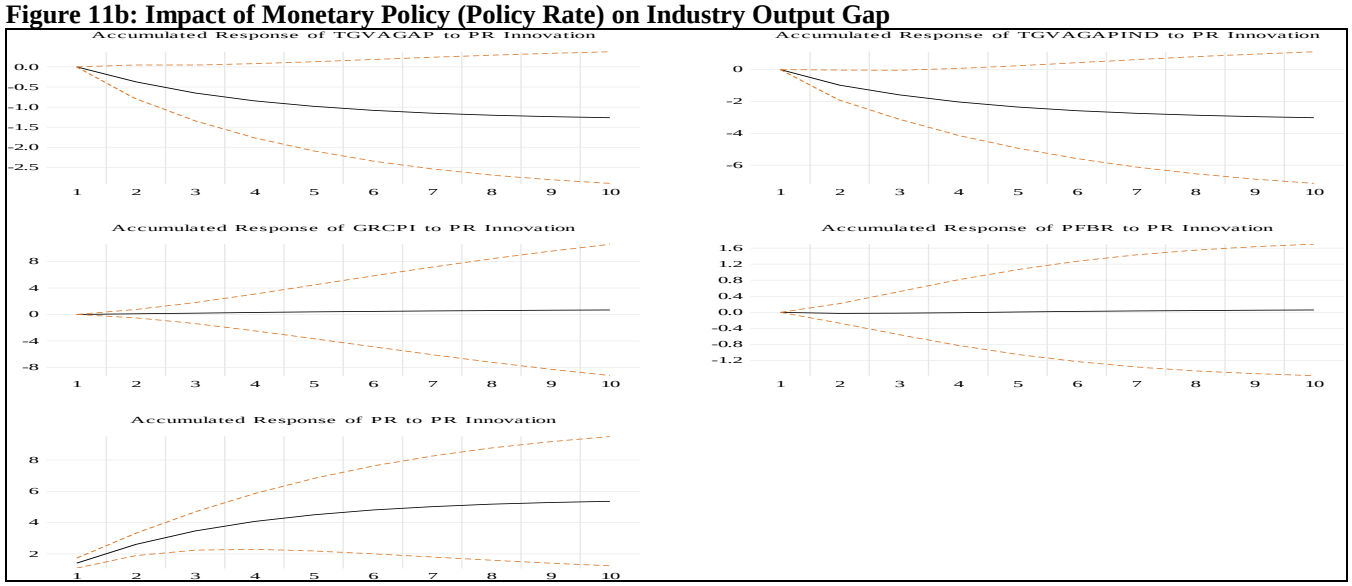
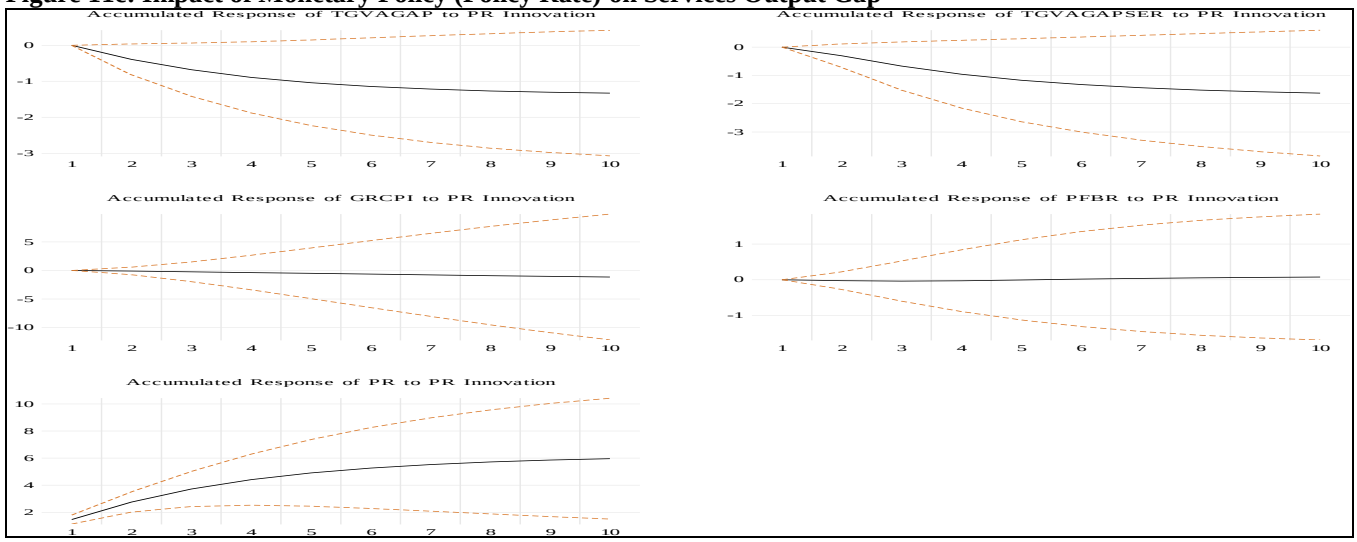


Figure 11c: Impact of Monetary Policy (Policy Rate) on Services Output Gap



Source: Author's Estimation

4.8. Impact of Fiscal Policy Shock

Fiscal Policy Shock can also be one country-wide shock. Thus, an attempt has been made to analyze the specific effect of changes in fiscal policy. However, no significant results were obtained using fiscal policy tools like Primary Fiscal Balance to GDP Ratio (PFBR).

On the basis of estimation, it can be argued that monetary policy has significant effects on the output gaps in the industrial and services sectors. On the other hand, fiscal policy, measured by the primary balance, is insignificant to sectoral output gaps. These results cast doubt on the effectiveness of fiscal policy as a cyclical demand management policy instrument. There are many reasons for fiscal policy ineffectiveness. The government does not utilize complete information while making the policy. Likewise, during the course of time within the fiscal year, fiscal policy becomes less responsive to the changes happening in the economy. The government decides the fiscal policy not on the basis of economic conditions but in response to the reaction of the general public. Further, Neo-Ricardian equivalence, proposed by Barro, suggests that individuals are forward-thinking and consider the government's budget constraint when making consumption choices. However, more research is needed in defining more precise indicators for the stance of fiscal policy (cyclical neutral expenditure and revenue indicators). In the absence of these, no clear prescriptions to the role of fiscal policy as policy instrument can be derived. But in any case, the estimation results do not support the use of fiscal rules in the function of cyclical conditions. The estimation results do show that long-run potential economic growth depends on the propensity to invest. Fiscal policy can contribute to this by reserving a significant proportion of the available resources towards GFCF. Therefore, a long-run fiscal policy rule in which the primary deficit is a constraint to equal the efficient part of Public Development Expenditures (PSDP) expenditure may be recommended.

The government's fiscal stance can be observed from the primary balance. The central bank also foresees a forthcoming inflationary pressure so can address it by changing policy rates. Restrictions imposed are given in the following matrix:

$$\begin{bmatrix} e^{pfbr} \\ e^{TGVGAPX_i} \\ e^{TGVGAPX_i} \\ e^{GRCPI} \\ e^{pr} \end{bmatrix} = \begin{bmatrix} S_{11} & 0 & 0 & 0 & 0 \\ S_{21} & S_{22} & 0 & 0 & 0 \\ S_{31} & S_{32} & S_{33} & 0 & 0 \\ S_{41} & S_{42} & S_{43} & S_{44} & 0 \\ S_{51} & S_{52} & S_{53} & S_{54} & S_{55} \end{bmatrix} \begin{bmatrix} \varepsilon^{pfbr} \\ \varepsilon^{TGVGAP} \\ \varepsilon^{TGVGAPX_i} \\ \varepsilon^{GRCPI} \\ \varepsilon^{pr} \end{bmatrix}$$

In our case, we again started with the assumption that the policy rate can change more quickly than other mentioned variables. Next is the CPI, linking it with the cost of borrowing. In Fiscal Policy, the primary balance to GDP ratio will be the last one to respond.

Figure 12a: Impact of Fiscal Policy (Primary Balance to GDP Ratio) on Agriculture Output Gap

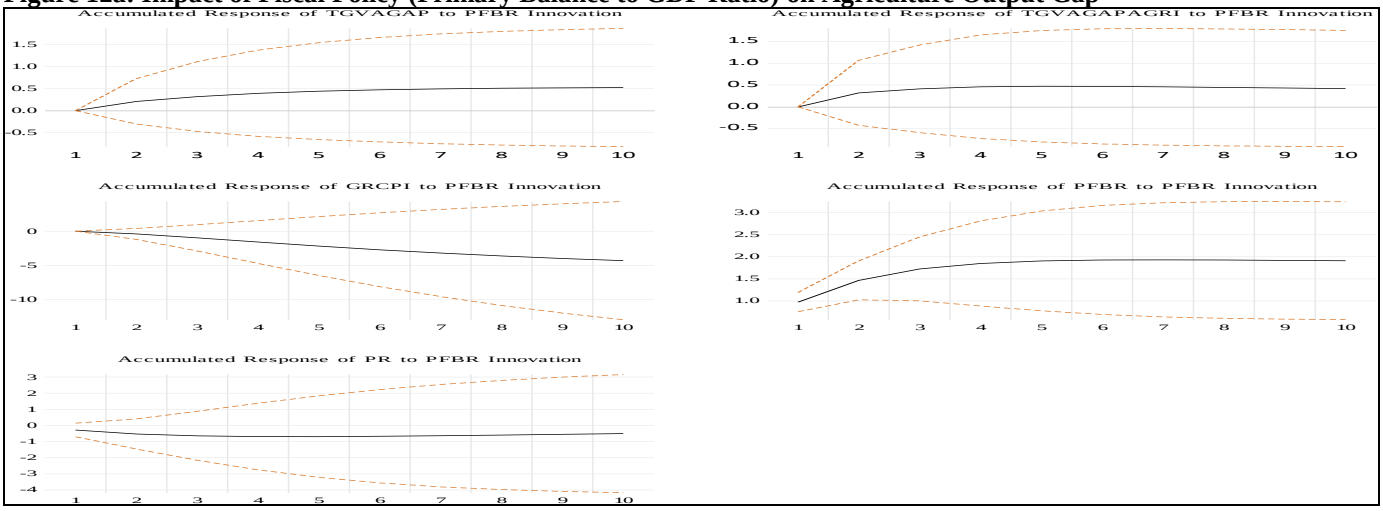


Figure 12b: Impact of Fiscal Policy (Primary Balance to GDP Ratio) on Industry Output Gap

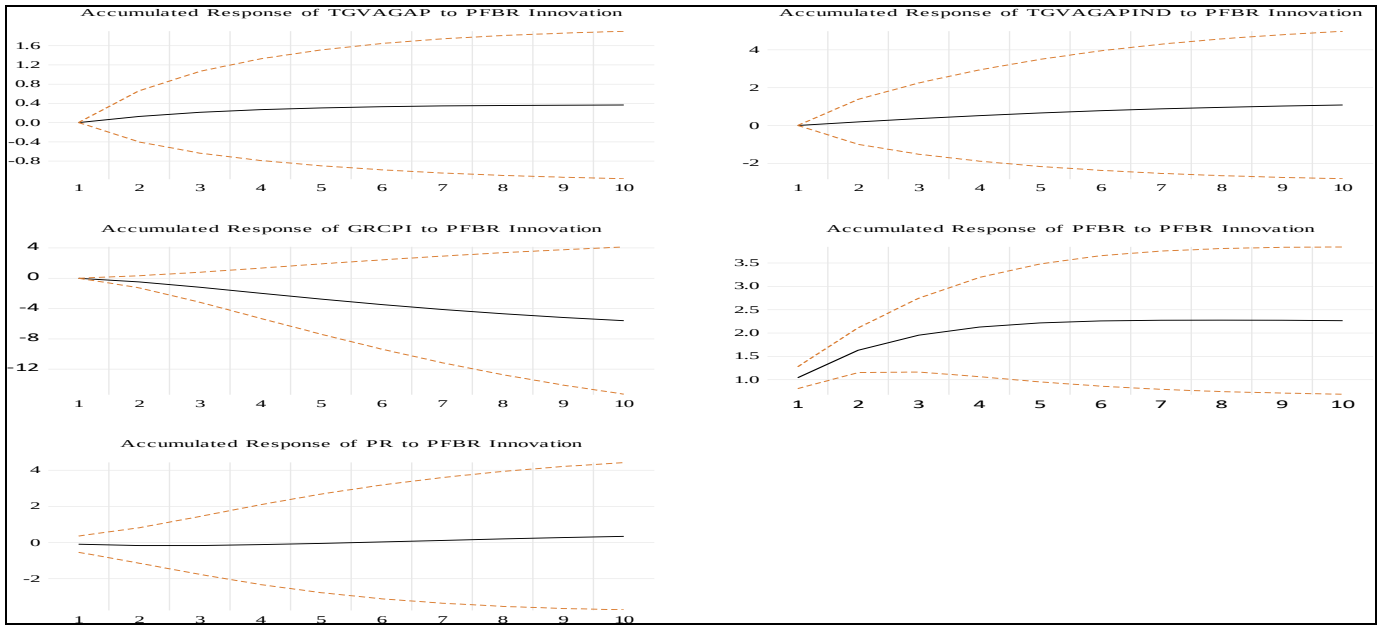
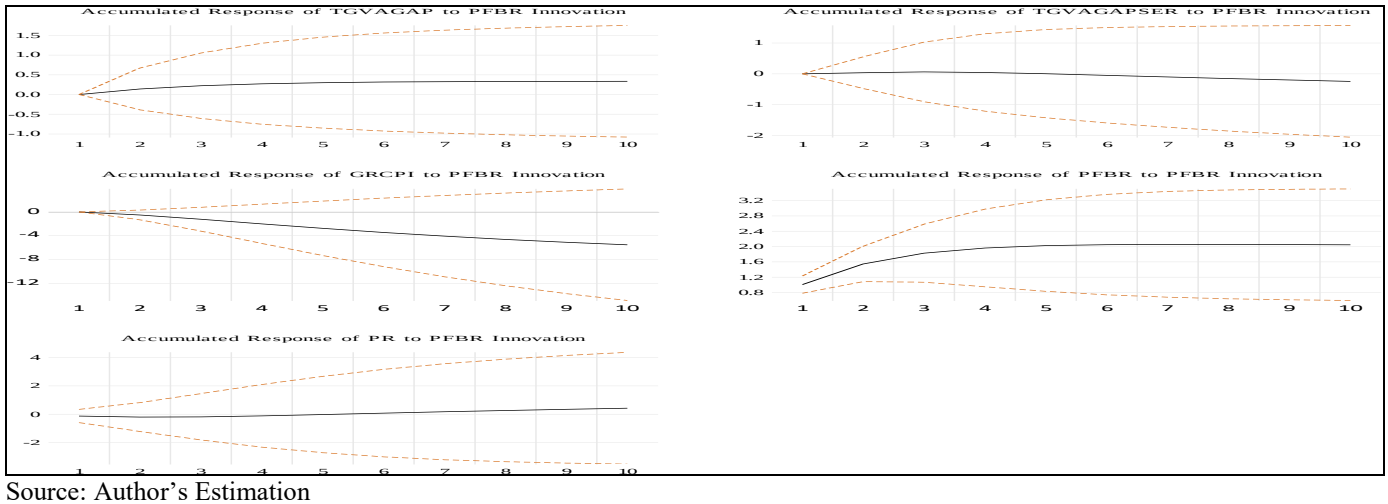


Figure 12c: Impact of Fiscal Policy (Primary Balance to GDP Ratio) on Services Output Gap



Source: Author's Estimation

Most modern macroeconomic models come from central banks. Pakistan follows suit. The basic goal of these models is optimal monetary policy. The output gap and inflation gap determine optimal monetary policy reaction functions. Therefore, monetary policy models solely include aggregate output and inflation gaps.

These models anticipate economic growth as the total of potential growth and output gap change, which is beneficial from a broader economic perspective but may not be enough. Sectoral disaggregation seems more perceptive and useful for economic policy. It's necessary to determine whether sectoral potential growth rates and production gaps react similarly to shocks and policies. This study first answers this question for agriculture, industry, and services. This analysis yields various policy recommendations.

Industrial and services sector potential production (measured as value added) growth rates are highly and significantly connected with economic growth rates. Additionally, industry and service growth rates are strongly connected. However, agriculture's potential growth rate, while statistically significant, is less connected with aggregate potential growth and not with industry and services. This outcome is crucial. It reveals that aggregate output and aggregate output gap policies, as used in Pakistan, work better for industry and services than for agriculture. Nearly 37% of the population relies on agriculture (Labour Force Survey 2020-21). Thus, aggregate output and output gap estimates misalign economic stabilization policies.

These sectors' cyclical postures also provide similar effects. The percentage difference of current from potential output determines each sector's cyclical position. Industry and service output gaps are highly and significantly connected with the total economy output gap, but agricultural output gaps are less so. Industrial and services output gaps are strongly and statistically significant associated, while agriculture's output gap is not. Structural VAR analysis demonstrates that country-wide shocks hit industry hardest. Services are affected second and agriculture last. Nationwide shocks affect industry and agriculture within a year, but services take longer.

The structural VAR analysis also demonstrates that policy interest rate does not alter agricultural output gap. However, it greatly impacts industry and service cyclicality. Industry is hit worst and fastest, whereas services take longer and are weaker. This is significant because it shows that monetary policy works better for industry than services and not agriculture. Most importantly, fiscal policy did not affect the cyclical postures of any of the three sectors. While this finding needs further research before drawing out conclusions, it strongly supports the assertion of structural rigidities in the fiscal system and the general belief that these policies only focus on government revenue needs and not stabilization or growth.

These results show that the agriculture sector behaves differently, hence aggregating the three sectors to estimate output and output gaps will produce biased results. Thus, aggregate estimate-based policies are misaligned to maximize growth and minimize the output gap. Our analysis shows that the agricultural sector performs differently from the other two sectors in terms of long-term potential production growth and short-term output gap volatility. Also, the agriculture sector would be impacted differently by economy-wide shocks than industry and services. Additionally, the agriculture sector's cyclical position remained unaffected by demand management tools like monetary policy.

5. Conclusions & Policy Recommendations

Pakistan's macroeconomic stability has been hampered by domestic and external imbalances and implementation of suitable rules has been essential to correcting these gaps. As economic activity boomed and busted, lowering the average growth rate, and inflation stayed in double digits, fiscal and monetary policies were less effective. This study hypothesizes that Pakistan's economy's poor response was due to fiscal policy's focus on debt servicing and monetary policies disregard for sectoral asymmetries. However, sectoral research is scarce, limiting knowledge.

Different methods have been used to achieve these goals. Inverse Incremental Capital-Output ratios measure output gaps in the economy and sectors. Structural Vector Autoregressive Model estimates fiscal and monetary policy' output gap stabilization effectiveness. Impulse response functions were approximated to establish short- and long-term policy multipliers for Pakistan's economy using appropriate identifying limitations. The equilibrium interest rate was computed using an Autoregressive Distributed Framework for money market equilibrium. The partial adjustment model calculated how the interest rate gap between actual and equilibrium affects overall and sectoral output shortfalls. After estimating the debt equation in an ARDL framework, debt sustainability analysis is performed. The analysis covers 1981–2022 with annual frequency.

Sector-specific potential gross value addition is closely associated with total potential output growth. Industrial and services sectors have better relationships than agriculture sector. The most surprising finding is that agriculture cyclical changes are unrelated to industry and services. However, industrial and services output gaps are strongly correlated. Monetary policy has significant negative effects on overall and two sectors—industry and services—output gaps, while fiscal policy has insignificant effects on overall and all sectors' output gaps.

These findings cast doubt on fiscal policy's ability to manage economic cycles. More study is needed to find better fiscal policy indicators. Without these, fiscal policy's role as a policy instrument cannot be determined.

5.1. Policy Recommendations

As it has been found that the increase in policy rates is very devastating to industry and to a lesser extent to services. Thus, these are also very detrimental to public finances. Since SBP independence no monetary financing is being done so deficits need to finance by debt outside SBP, therefore cost of financing becomes crucial. The crowding out of private investments and reducing the fiscal space with larger proportions of revenues to be spent on interest payments. In the past, demand management policies were used to stimulate growth over and above potential output, but these policies failed to produce its impact as it is contributing to external deficits and to manage external liquidity crises, monetary policy to curb the demand. This led to economic instability and recourse to the IMF. So there is need to revamp this practice and must be avoided in the future.

The policy makers should be well aware of the economy's directions and blind policy management should be avoided. This research shows that under current circumstances potential output growth is limited to around 3.5%. It also shows what is necessary to increase this steady state growth rate.

In the long run growth is determined by investments in productive capital. Fiscal policy should be reoriented towards stimulation of investments, no to support demand. Higher steady state growth will also increase steady revenues.

As it stands now, policy is confronted with a dilemma. The policy rate is kept elevated to fight currency depreciation, inflation, and external deficits and to protect SBP reserves. At the same time these high interest rates discourage GFCF expenditures which are necessary to increase the potential growth rate. Demand management policies not effective in agriculture. Agricultural policies should focus on supply side. Increase potential output growth by investments in capital, better seeds, and better research.

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