Exploring the Component of Misery Index During Different Regimes: A Case Study of Pakistan

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Abstract

The primary purpose of this study is to explore the major contributing component of the misery index during different regimes in Pakistan between 1975-2023. Inflation was found to be the primary - over 90% - contributor to the misery level in Pakistan, followed by the unemployment level, and lastly, the level of being a peaceful country (Global Peace Index). The Okun's Misery Index has been modified to consider the role of peace, which indirectly affects the economic growth rate in the country. The adjusted misery index (MMI) is obtained by adding the Global Peace Index (GPI) as a third component in Okun's index. The regression equations show that the impact of inflation on the misery index is more than unemployment, and the least of them all was the level of peace index. Furthermore, ways to decrease the misery index score have also been suggested in this article, which the original inventor of the misery index did not do.

Keywords: Misery Index, Inflation, Unemployment, Global Peace Index

Introduction

In order to find the impact of a lack or reduction of peace in the country on the misery index, we have included the Global Peaceful Index (GPI) as a third component in the Okun's misery index. It will be a better indicator of the misery level of the country.

The misery index measures economic distress felt by everyday people due to the risk of (or actual) joblessness combined with an increasing cost of living (inflation). It is calculated by adding the seasonally adjusted unemployment to the inflation rate.

It is evident from the data given in Tables 4 and 5 below that inflation was the major (80% to 90%) contributing factor to the misery index of Pakistan throughout the period under consideration. Besides, decreasing levels of peace and increasing levels of terrorism contributed to increasing the MMI index.

Literature Review

There are many indices to measure and compare the misery levels of different countries. For example, Arthur Okun created the misery index in the 1970s, initially called the Economic. Discomfort Index. It is the unweighted sum of unemployment and inflation rates.

Robert Barro (Harvard economist) modified the above index in 1999, which adds consumer lending interest rates and the gap between actual and potential GDP to Arthur Okun's misery index. In 2011, Steve Hanke (Johns Hopkins economist) modified Barro's misery index. It is the sum of unemployment, inflation, and bank lending rates minus the real GDP per capita change.

Tom Lee Misery Index he created the Bitcoin Misery Index (BTI) in 2018. It shows a value of zero to 100. This index indicates 'misery' when the value is below 27, which means that traders are not happy with the results of their trades.

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Many other papers have used the misery index to judge its impact and correlation between macroeconomic shocks and well-being (Blanchflower; Bell; Montognali and Moro (2013), impact of economic growth and good governance on misery index (Yadollah. *et al*, 2018), the effects of misery index on the rate of crime in the provinces of Iran (Yahya. et al., 2020), economic distress causes human capital outflow (Ali *et al.* (2015)), and Does the Misery Index Influence a U.S. President's Political Re-Election Prospects?, (Ardangi and Macri, 2019).

In line with that, we have used a new approach to compute the misery index. The aim is to show a simple way to decompose Okun's misery index by adding the third component, the Global Peace Index because a lack of peace is one of the burning topics of the day in Pakistan.

In Fig. 1, we have summarized the main effects of each component of MMI on different sectors of the economy.

Modified misery index = MMI = MI + GPI   where GPI stands for Global Peace Index

MI = Okun's misery index

MI = Unemployment rate + Inflation rate , and   MMI = MI + GPI

$MMI = f(U^+, I^+, G^+)$

The regression equation shows that inflation (I) has the maximum imapct on the MMI, then U and least of them all is the level of peace G.

For comparison purpose, we have run two regressions, one with two variables of Okun's misery index, inflation and unemployment rates, the other one with three variables of our modified misery index, inflation, unemployment and Global Peace Index.

Figure 1 Modified Misery Index and effects of its components on economy

$$\overbrace{\left(\begin{array}{c} Unemployment \\ rate \ (U) \end{array}\right) + \left(\begin{array}{c} Inflation \\ rate \ (I) \end{array}\right)}^{Okun's \ Misery \ Index} + \left(\begin{array}{c} Global \ Peace \\ Index \ (G) \end{array}\right) = \left(\begin{array}{c} Modified \ Misey \\ Index \ (MMI) \end{array}\right)$$

$$\Downarrow \qquad \Downarrow \qquad \Downarrow \qquad \Downarrow$$

$$\underbrace{\left(\begin{array}{c} People \ unable \\ to \ earn, \ dependency \\ ratio \ increases, \ income \\ tax \ revenue \ decreases, \\ crime \ rate \ increases \end{array}\right) \left(\begin{array}{c} Real \ income \\ decreases, \\ purchasing \\ power \ falls, \\ standard \ of \\ living \ falls \end{array}\right)}_{\substack{\text{Reduction in the standard of living, real wage rate decreases,} \\ \text{because of unemployment crime rate increases, social unrest rises,} \\ \text{owing to inflation income of foreign investors in term of their} \\ \text{currency decreases which in turn discourages foreign investment in} \\ \text{the country}}} \left(\begin{array}{c} GDP \ falls, \\ social \ unrest \\ increases, \\ FDI \ decreases, \\ inbound \ and \\ outbound \ tourism \\ decreases \end{array}\right) = \left(\begin{array}{c} Less \ resilient \ economy, \\ reduces \ local \ and \\ global \ GDP, \ tarnishes \\ image \ of \ the \ country, \\ causes \ political \ upheavel, \\ more \ people \ fall \ below \\ poverty \ line, \ brain \ drain \\ increases \end{array}\right)$$

Fig. 1 *Modified Misery Index and effects of its components on economy*

Fig. 1 summarizes the main effects of each component of MMI on the overall economy of the country. Need exists to mention that in this literature review we could not find any research done to show the effect of lack of peace on the misery index. It is hoped that inclusion of GPI as a third component in the misery index this study will fill that gap.

Data and Methodology

To conduct this study, we used time-series data from different sources mentioned below each table from 2075-2023. Simple regressions were run to obtain the coefficients of the variables. For comparison purpose, two regressions were run, one regression was run with two variables, unemployment and inflation rates for Okun's misery index, the other regression was run with three variables; unemployment rate, inflation rate and GPI for modified misery index (MMI).

Table 2. Summary Output of Modified Misery Index (MMI)

Regression Statistics	
Multiple R	0.99997
R Square	0.99994
Adjusted R square	0.928503
Standard Error	0.178959
Observations	17

ANOVA

	df	SS	MS	F	Significanc F
Regression	3	7438.311	2479.437	77418.7	6.99E − 28
Residual	14	0.448369	0.032026		
Total	17	7438.759			

	Coefficients	Standard Error	tStat	P − value	Lower 95%	Upper 95%	Lower 95%	Upper 95%
Intercept	0	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
U (X Variable 1)	0.996	0.253	39.349	9.75E − 16	0.9418	1.050	0.941	1.050
I (X Variable 2)	1.002	0.005	195.228	1.89E − 25	0.9918	1.013	0.991	1.013
G (X Variable 3)	0.977	0.030	32.404	1.44E − 14	0.9126	1.041	0.912	1.041

Regression equation is: $MMI = 0.99U + 1I + 0.977G$

Empirical Findings

$MI = Okun's\ misery\ index\ ,MI = Unemployment\ rate\ +\ Inflation\ rate$

$MI = f(U^{\alpha_0}, I^{\alpha_1})\ \ where\ \ U = unemployment\ rate\ \ and\ \ I = inflation\ rate$

$MI = \alpha_0 U + \alpha_1 I,\ \ the\ regression\ equation\ with\ two\ variables\ \ was$

$MI = 0.72U + 5.1I$

$$\frac{\partial MI}{\partial U} = 0.72,\quad \frac{\partial MI}{\partial I} = 5.1,\quad \frac{\left(\dfrac{\partial MI}{\partial I}\right)}{\left(\dfrac{\partial MI}{\partial U}\right)} = \frac{5.1}{0.72} = 7.08 \quad \Rightarrow \quad \frac{\partial MI}{\partial I} = 7.08\frac{\partial MI}{\partial U}$$

The impact of inflation on MI is 7 times more than unemployment.

The estimated coefficient of the unemployment and inflation rates are $\alpha_0 = 0.72$ and $\alpha_1 = 5.1$, respectively.

The results suggest that for a one percent increase in the unemployment rate, the misery index of Pakistan will increase by 0.72 percent, and for a one percent increase in the inflation rate, the misery index of Pakistan will increase by 5.1 percent (Table 1). The inflation rate appears to have gained saliency for the misery index relative to the unemployment rate for the period (2001-2023) of this study.

Modified misery index $= MMI = MI + GPI$ *where GPI stands for Global Peace Index*

$MI = Okun's\ misery\ index$

$MI = Unemployment\ rate + Inflation\ rate$, *and* $MMI = MI + GPI$

$MMI = f(U^{+}, I^{+}, G^{+})$

$MMI = f(U^{\alpha_0}, I^{\alpha_1}, G^{\alpha_2})$ *where* $U = unemployment\ rate$, $I = inflation\ rate\ and\ G = GPI$

$MMI = \alpha_0 U + \alpha_1 I + \alpha_2 G$, *the multiple regression equation with three variables was*

$MMI = 0.99U + 1I + 0.98G$

$$\frac{\partial MMI}{\partial U} = 0.99, \ \frac{\partial MMI}{\partial I} = 1, \ \frac{\partial MMI}{\partial G} = 0.98$$

$$\frac{\left(\dfrac{\partial MMI}{\partial I}\right)}{\left(\dfrac{\partial MMI}{\partial U}\right)} = \frac{1}{0.99} = 1.01 \quad \Rightarrow \frac{\partial MMI}{\partial I} = 1.01\frac{\partial MMI}{\partial U} \Rightarrow \frac{\partial MMI}{\partial I} > \frac{\partial MMI}{\partial U} \qquad (i)$$

$$\frac{\left(\dfrac{\partial MMI}{\partial I}\right)}{\left(\dfrac{\partial MMI}{\partial G}\right)} = \frac{1}{0.98} = 1.02 \quad \Rightarrow \frac{\partial MMI}{\partial I} = 1.02\frac{\partial MMI}{\partial G} \Rightarrow \frac{\partial MMI}{\partial I} > \frac{\partial MMI}{\partial G} \qquad (ii)$$

$$\frac{\dfrac{\partial MMI}{\partial U}}{\dfrac{\partial MMI}{\partial G}} = \frac{0.99}{0.98} = 1.01 \quad \Rightarrow \frac{\partial MMI}{\partial U} = 1.01\frac{\partial MMI}{\partial G} \Rightarrow \frac{\partial MMI}{\partial U} > \frac{\partial MMI}{\partial G} \qquad (iii)$$

From (i), (ii) and (iii) $\dfrac{\partial MMI}{\partial I} > \dfrac{\partial MMI}{\partial U} > \dfrac{\partial MMI}{\partial G}$ *during* $(2015 - 2023)$ *and*

$$\dfrac{\partial MMI}{\partial I} > \dfrac{\partial MMI}{\partial G} > \dfrac{\partial MMI}{\partial U} \quad during \ (2007 - 2014)$$

In descending order of impact on the MMI, first comes inflation, then unemployment and then GPI during $(2015 - 2023)$, *while during* $(2007 - 2014)$, *GPI preceded unemployment. This is why we included GPI as a third component in the Okun's misery index.*

The estimated coefficients of the unemployment rate, inflation rate, and GPI score are, respectively (Table 2).
The results suggest that for a one percent increase in the unemployment rate, the modified misery index of Pakistan will increase by 1.01 percent, and for a one percent increase in the inflation rate, the adjusted misery index of Pakistan will increase by the same percentage, and a one percent increase in the peace index G the modified misery index of Pakistan will increase by 1.02 percent, The inflation rate appears to have the highest impact than the other two variables unemployment and level of peace on MMI of Pakistan.

Table 3 Modified Misery Index of Pakistan (2007-2023)

Year	Unemployment Rate % (U)	Inflation Rate (%) (I)	Global Peace Index Score (G)	MMI= MI+Col 4
2007	0.40 (4%)	7.6 (71%)	2.697 (25%)	10.697
2008	0.42 (2%)	20.3 (87%)	2.694 (11%)	23.414
2009	0.54 (3%)	13.6 (80%	2.859 (17%)	16.999
2010	0.65 (4%)	12.9 (78%)	2.905 (18%)	16.455
2011	0.80 (5%)	11.9 (76%)	3.050 (19%)	15.750
2012	1.85 (13%)	9.7 (66%)	3.107 (21%)	14.657
2013	2.95 (23%)	7.7 (59%)	3.107 (24%)	13.057
2014	1.83 (15%)	7.4 (60%)	3.107 (25%)	12.337
2015	3.57 (33%)	4.1 (38%)	3.049 (28%)	10.719
2016	3.78 (19%)	13.0 (65%)	3.145 (16%)	19.925
2017	3.92 (36%)	4.0 (36%)	3.058 (28%)	10.978
2018	4.08 (37%)	3.8 (35%)	3.079 (28%)	10.959
2019	3.54 (21%)	10.5 (61%)	3.072 (18%)	17.112
2020	4.30 (25%)	9.9 (58%)	2.973 (17%)	17.173
2021	4.35 (25%)	10.2 (59%)	2.868 (16%)	17.418
2022	6.20 (19%)	24.5 (73%)	2.789 (8%)	33.489
2023	6.40 (12%)	42.0 (81%)	3.232 (6%)	51.63

It is evident from Table 3 shows that the impact of GPI on the misery level index during (2007-2014) was more than unemployment U, but this trend reversed during (2015-2023). Put it differently, during (2007-2014), $\frac{\partial MMI}{\partial I} > \frac{\partial MMI}{\partial G} > \frac{\partial MMI}{\partial U}$, while during (2015-2023), $\frac{\partial MMI}{\partial I} > \frac{\partial MMI}{\partial U} > \frac{\partial MMI}{\partial G}$.

In Table 3, the average value of unemployment rate percentage component during (2007-2014) in the MMI was 8.6% and that of GPI was 20%. The average value of unemployment rate percentage component during (2015-2023) in the MMI was 25% and that of GPI was 18.6%. Hence, reversion of trend is confirmed. It reflects that deterioration of peace contributed more in the MMI during (2007-2014) than (2015-2023).

Table 4. The Misery Index by Prime ministers of Pakistan (1975 -2023)
MI= Unemployment rate + Inflation rate (lower number is better)

Prime Minister	Time Period	Average	Low	High	Start	End	Change	Major Contributing Factor
Benazir Bhutto	02.12.88 to 6.8.1990	10.6	10.1	11	11	10.1	-0.9	Inflation
Benazir Bhutto	19.10.1993 to 5.11.1996	14.8	14.3	15.4	14.3	15.4	+1.1	Inflation
Nawaz Sharif	6.11.90 to 18.4.1993	12.2	10.1	14.3	10.1	14.3	+2.2	Inflation
Nawaz Sharif	26.5.97 to 8.7.1998	14.5	11.9	17.2	17.2	11.9	-5.3	Inflation
Nawaz Sharif	2013 to 2017	8.93	7.92	9.95	9.95	7.92	-2.03	Inflation
Shaukat Aziz	28.8.2004 to 5.11.2007	7.86	7.7	8.02	8.02	7.70	-0.32	Inflation

Prime Minister	Time Period	Average	Low	High	Start	End	Change	Major Contributing Factor
Yousaf Raza Gillani	23.3.2008 to 25.4.12	16.13	11.55	20.72	20.72	11.55	-9.17	Inflation
R. Pervez Ashraf	22.06.2012 to 24.3.2013	10.7	9.95	11.55	11.55	9.95	-1.60	Inflation
Shahid Khaqan Abbasi	1.8.2017 to 31.5.2018	7.9	7.88	7.92	7.92	7.88	-0.04	unemployment
Imran Khan	28.8.2018 to 10.4.2022	19.29	7.88	30.7	7.88	30.7	+22.82 During 4 years	Inflation
M.Khan Junejo	23.8.1985 to 29.5.1988	10.3	9.6	11	9.6	11	+1.4	Inflation
M.Zia-ul-Haq	16.9.1977 to 17.8.1988	12.5	11	12	12	11	-1.0	Inflation
Pervez Mushraf	2001 to 2008	13.27	5.82	20.72	5.82	20.72	+14.90	Inflation
Asif Ali Zardari	2008 to 2013	15.33	9.95	20.72	20.72	9.95	-10.67	Inflation
Shehbaz Sharif	11.4.2022 to 3.3.23 only	34.7	30.7	38.7	30.7	38.7	+8.0 Within a year	Inflation

Source: na.gov.pk/en/priministerlist.php

The index started decreasing from 10.3 in 1984 to 9.8 in 1989, then it started rising sharply from 10.1 in 1990 to 17.2 in 1997, it took a downturn from 11.9 in 1998 to 7.7 in 2007. It started shooting up from 14.04 in 2019 with inflation rate 75 per cent during the Imran Khan regime and continued the same trend and reached the highest level 38.7 in 2023 with inflation rate 85 per cent of the total misery index during Shehbaz Sharif's regime. For comparison purpose, it is crystal clear that the overall performance of Shehbaz Sharif is worse than both Musharraf Pervez and Imran Khan.

Table 5 Inflation rate by prime ministers of Pakistan (1975 -2023)

Prime Minister	Time Period	Average	Low	High	Start	End	Change	Major Contributing Factor
Benazir Bhutto	02.12.88 to 6.8.1990	10.6	10.1	11	11	10.1	-0.9	Inflation
Benazir Bhutto	19.10.1993 to 5.11.1996	14.8	14.3	15.4	14.3	15.4	+1.1	Inflation
Nawaz Sharif	6.11.90 to 18.4.1993	12.2	10.1	14.3	10.1	14.3	+2.2	Inflation
Nawaz Sharif	26.5.97 to 8.7.1998	14.5	11.9	17.2	17.2	11.9	-5.3	Inflation
Nawaz Sharif	2013 to 2017	8.93	7.92	9.95	9.95	7.92	-2.03	Inflation

Shaukat Aziz	28.8.2004 to 5.11.2007	7.86	7.7	8.02	8.02	7.70	-0.32	Inflation
Yousaf Raza Gillani	23.3.2008 to 25.4.12	16.13	11.55	20.72	20.72	11.55	-9.17	Inflation
R. Pervez Ashraf	22.06.2012 to 24.3.2013	10.7	9.95	11.55	11.55	9.95	-1.60	Inflation
Shahid Khaqan Abbasi	1.8.2017 to 31.5.2018	7.9	7.88	7.92	7.92	7.88	-0.04	Unemployment
Imran Khan	28.8.2018 to 10.4.2022	19.29	7.88	30.7	7.88	30.7	+22.82 During 4 years	Inflation
M.Khan Junejo	23.8.1985 to 29.5.1988	10.3	9.6	11	9.6	11	+1.4	Inflation
M.Zia-ul-Haq	16.9.1977 to 17.8.1988	12.5	11	12	12	11	-1.0	Inflation
Pervez Mushraf	2001 to 2008	13.27	5.82	20.72	5.82	20.72	+14.90	Inflation
Asif Ali Zardari	2008 to 2013	15.33	9.95	20.72	20.72	9.95	-10.67	Inflation
Shehbaz Sharif	11.4.2022 to date	34.7	30.7	38.7	30.7	38.7	+8.0 Within a year	Inflation

Source: na.gov.pk/en/priministerlist.php

How to Reduce the Level of Misery?

The inventor of the misery level index did not tell us how to reduce the index value. Reduction in misery level requires reducing its components: inflation and unemployment. To achieve this, we have to improve the economy's supply side, which will shift the aggregate supply (AS) curve to the right to increase productivity and output levels from Y0 to Y1. Higher production means more employment of workers, which will decrease unemployment; thus, structural unemployment will fall. Inflation will diminish from P0 to P1 (Fig.2). Also, authorities should formulate and implement policies to increase employment levels and reduce inflation of all sorts, such as cost-push, demand-pull, or imported inflation. According to the Phillips curve, there is a trade-off between inflation and unemployment. That is, higher inflation will decrease unemployment and vice versa. But a caveat is in order: rising oil prices could cause cost-push inflation, which will shift the aggregate supply curve to the left, which in turn will cause inflation and unemployment (stagflation) that will increase the misery index.
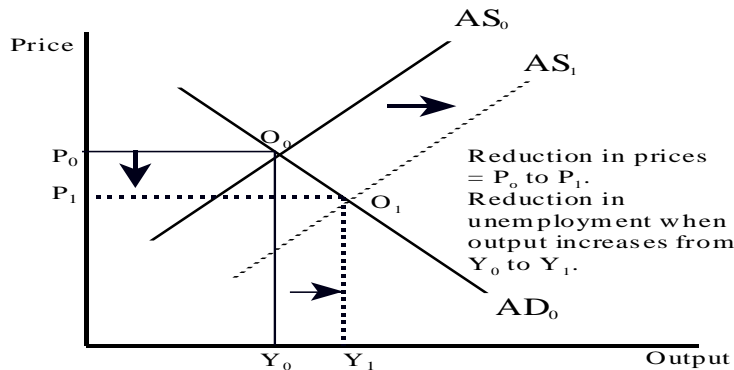
Figure 2 Impact of increase in Price on equilibrium in good market

Fig. 2 Impact of increase in AS on prices and
equilibrium in the goods market

We must tackle macroeconomic variables such as unemployment and inflation rates to decrease the misery level index. For this, we should focus on increasing our exports in international trade which will increase demand for our currency by foreign importers from Pakistan, as shown by shifting of the demand curve from Do to D1 (Fig.3). At the same time, we should decrease our imports by producing importable goods within the country, as less imports means less supply of our currency in the international markets which is shown by shifting of the supply curve from So to S1 in Fig.3. New equilibrium point is O1 showing rise in the exchange rate from eo to e1. According to the Fisher equation, E x Plevel = Pworld, where E stands for the exchange rate of currency, P represents the price level in the country and Pworld in the world. According to his equation, the price level decreases when the exchange rate increases. Thus, increasing exports and decreasing imports will reduce both components of the misery index.

Figure 3 Impact of Trade on Exchange Rate
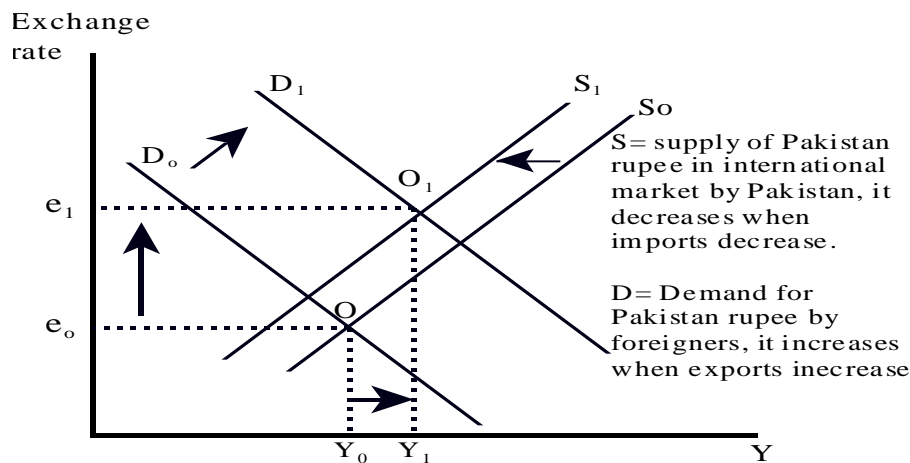
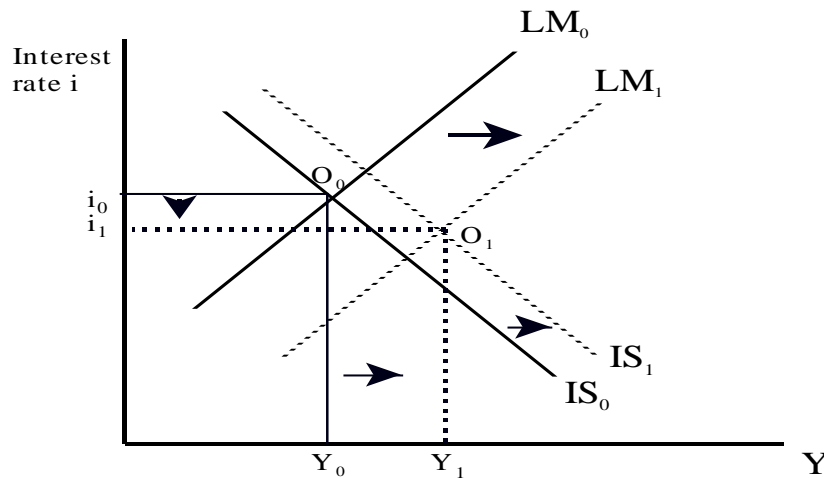
Fig. 3. Impact of trade on exchange rate

Figure 4 Impact of Decrease in Inflation on Interest Rate

Fig. 4 Impact of decrease in inflation on interest rate, S, I and equilibrium in goods and money markets

A fall in the price level due to an increase in AS (Fig.2) will cause the LM to shift to the right (Fig.4) because the natural supply of money (M/P) increases. It will cause a fall in the interest rate from i0 to i1, as shown in Fig.4. Low inflation implies a rise in the value of savings, lower interest rate and a rise in the value of savings results in an increase in investment, thus IS curve also shifts to the right from IS0 to IS1 as shown in Fig. 4. The new equilibrium O1 depicts a lower interest rate i1. A decrease in interest rate leads to a rise in investment, which in turn increases production (from Y0 to Y1 in Fig.4), which leads to a reduction in unemployment, an increase in the standard of living, and a reduction in the dependency ratio. It will result in a decrease in the misery level index.

Table 6 Misery Index during different regimes in Pakistan

Regime	Okun's Misery Index Column (3+4)	Unemployment Rate %	Inflation Rate %
M. Khan Junejo (1985-1988)	8.95	3.3	5.65
Zia-ul-Haq[1] (1977-1988)	10.85	3.62	7.23
Benazir Bhutto (1988-1990)	11.96	2.06	9.9
Nawaz Sharif (1990-1993)	15.02	4.32	10.7
Benazir Bhutto (1993-96)	15.92	4.6	11.32
Nawaz Sharif (1997-1999)	12.83	5.6	7.23
Pervez Musharraf (1999-2008)	8.76	1.75	7.01
Asif Ali Zardari (2008-2013)	5.9	1.2	4.7
Nawaz Sharif (2013-2017)	10.31	3.21	7.1
Shahid Khaqan Abbasi (2017-18)	7.9	4.0	3.9
Imran Khan (2018-2022)	23.15	4.49	18.7
Shehbaz Sharif (2022-todate)	47.3	6.3	41.0

Source: NB. Values of unemployment rate and inflation rate are average during the regime period.

Conclusion

It could be concluded that all three components of MMI are essential to decreasing the misery level. Still, inflation impacts the misery index more than unemployment and peace in Pakistan. A rising misery level reduces local and global GDP, reduces people's standard of living, increases the dependency ratio, discourages foreign investment (FDI), tarnishes the country's image, and causes human capital outflow.

The misery index was lowest during the Pervez Musharaf's regime and highest during Shehbaz Sharif's current tenure. The index was also very high during the Nawaz Sharif and Benazir Bhutto regimes (Table 5).

The Phillips curve states that there is an inverse relationship between the unemployment level and the inflation rate. This relationship does not apply to Pakistan. It is evident from Fig.4 and 5 that both inflation and unemployment graphs moved upward in tandem, not opposite directions, so the Phillips curve applies to Pakistan. Pakistan is facing stagflation due to slow economic growth, rising prices (inflation), and increasing unemployment. According to the Global Terrorism Index score and ranking of Pakistan, it was 8.16/10 and 6/163, respectively, in 2022. The composite impact of these components of the MMI gives us a somewhat gloomy picture of Pakistan.

In addition to tackling two main macroeconomic variables, inflation, and unemployment, the authorities concerned must handle a high level of terrorism and deterioration of peace in the country to reduce the misery level index. Unless corrective measures are taken, the misery index will continue to rise unabatedly.

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