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REMITTANCES IN INDIA: PAST, PRESENT AND FUTURE

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Abstract : Growing remittances inflow in India has simply leveled the debate up over the changing dynamics of growth and development. Remittances have proved to be a very vital source of foreign exchange earnings and it requires a detailed analysis of how the trend has been all these years and how it is likely to be in the next decade. This will enable the policy-makers to implement and take corrective actions so that the benefits of remittances are harnessed in the most efficient manner. This study has considered the inflow of remittances from 1975 to 2022 and has made use of ARIMA for the forecast. In the process, a number of models have been evaluated and the final selection ended with (2,0,1) which had the lowest AIC. The study concluded that remittances may initially go up slightly but will have a slight dip afterwards and will have smooth and consistent trajectory throughout the decade. Since in the last few years of the time period considered in the study, there was Covid-19 and Russia-Ukraine War and many studies have also speculated the advent of a global recession, the likelihood of such a trend in remittances can be attributed to them.

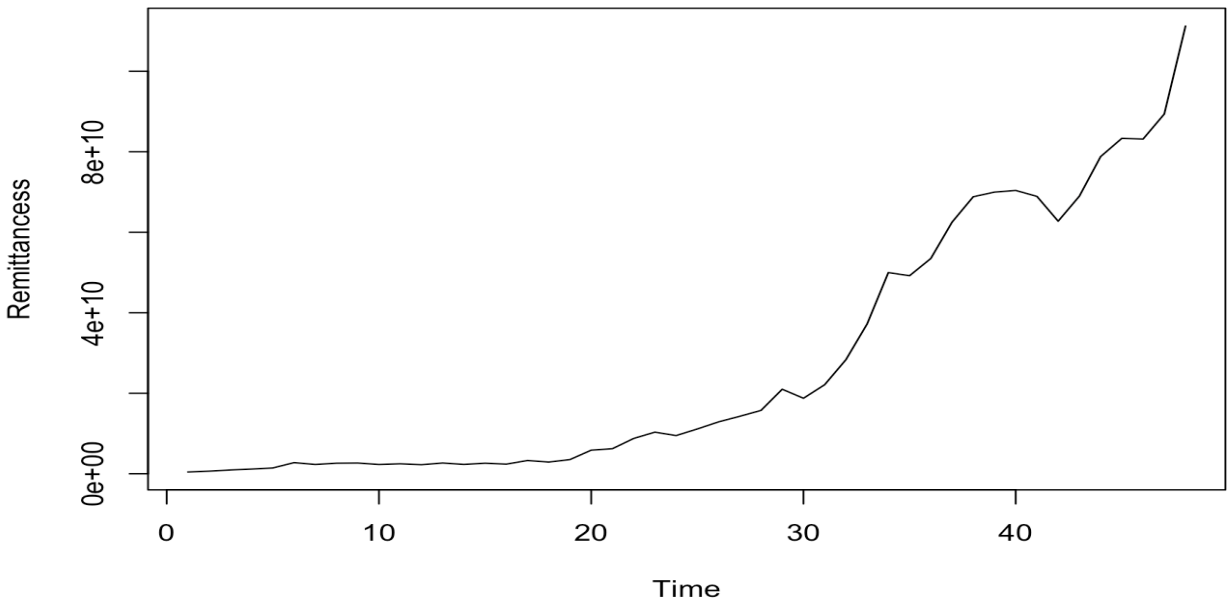
Key Words: Remittances, ARIMA, Indian Economy, Migration, Global Recession

1.Introduction

The influx of remittance into the country has widened the discussion over its impact on the economy. For various countries, it has proved to be a very vital instrument that has been a significant contributor to the growth of the economy. Foreign remittances, referring to the money sent by individuals living in foreign countries to their home country, have played a crucial role in India's economic development over the years. These monetary transfers constitute a behavior of significant economic importance, acting as an important source of external finance for the country's growth and development (Pandikasala et al., 2022). Remittances sent by migrants have provided considerable support to India's balance of payments, surpassing both foreign

aid flows and foreign direct investment flows. Moreover, remittances have proved to be a stable inflow of foreign currency, countering the cyclical nature of other financial flows during economic downturns. In fact, in many developing countries, including India, remittances exceed the receipts from the export of goods and services. The World Bank Report on Migration and Remittances highlights India's position as the top recipient country, accounting for 12 percent of total global remittances. This demonstrates the immense significance of remittances for India's economy (Azizi, 2021). Following the trend that remittances have followed over the years, what course of trajectory it is going to take in the coming ten years. In this paper, an attempt at assessing the same has been done using the ARIMA or the Auto-regressive Integrated Moving Average Model approach. ARIMA is said to be a highly refined curve-fitting device which makes use of the current and the past values in order to forecast the future values.

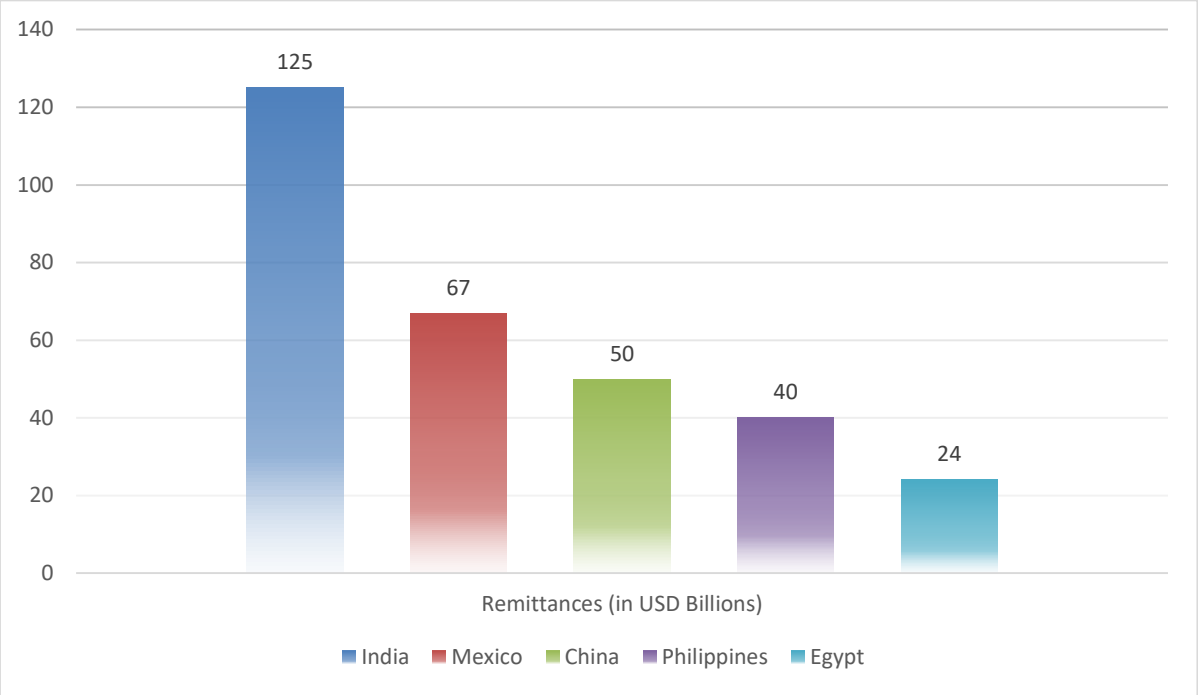
Chart 1- Remittance inflow since 1975 to 2022



Source: created using the data from World Bank

Although it is highly debatable that how remittances are going to affect any economy, since every economy differs in terms of financial infrastructure, level of development and awareness regarding productive uses that remittances can be put to. In case of various countries remittances have surpassed other financial inflows such as aids and private capital flows (Aggarwal et al 2011; Rao and Hassan, 2012; Nyamongo et al, 2012). According to a press release by The World Bank on December 18th 2023 India receives the largest share of remittance.

Chart 2- Highest remittances receiving economies



Source : Based on the data published by World Bank

Considering the importance of remittances as a source of financial inflow for the country, its future prospects and trend needs to be analyzed for better policy framework.

2.Review of Literature

Remittances inflow for the coming decade has been forecasted using ARIMA in case of Nigeria by Adedokun (2013), where this evaluation was done at the backdrop of expected shortage of aid inflow due to debt-for-aid agreements and found that it will grow at the average of 6% per annum and will reach 11.4% by 2019. Khan and Gunwant (2023,2024) did a similar study in case of Turkey and Yemen using ARIMA and forecasted remittances in case of both the countries inflow from 2020 to 2026 and projected it to reach 36.83% of Country's GDP for Yemen while for Turkey they considered the data from 1974 to 2019 and forecasted remittances inflow for next eleven years to drop by -1.00% of GDP in 2030. Nyoni (2019) undertook a similar study in case of Bangladesh for the time period concerning 1976 to 2017 and concluded a downward trajectory and suggested policy improvements. Also in case of Bangladesh only, Hassan et al., (2020) taking the data for the time period of 1996 to 2017 have forecasted for an increasing trend in the remittances inflow for the coming ten years using this very model. Devkota and Pokhrel (2023) made use of the same technique for forecasting remittances in case of Nepal. Majumder et al., undertook a study to forecast remittances inflow for South Asian developing countries to analyze the impact of Covid-19 on the remittances inflow. Khan and Akhtar (2022) used ARIMA approach in case of South-Asian economies namely, India, Pakistan, Sri Lanka, Bangladesh, Nepal Bhutan and Afganistan and forecasted the trend for next ten years, i.e. till 2030 and concluded a resilient response of remittances in the region.

3.Selected Variables and Methodology

This study attempts to forecast remittances inflow into India for over a decade i.e. till 2032 for which data from 1975 to 2022 has been considered and the data has been extracted from World Bank database. ARIMA or Auto-regressive Integrated Moving Average Model has been used, which is also a widely used technique for forecasting and has been considered as the best way to analyze the future pattern depending on the past trend.

$$Yt=c+\beta1Yt-1+\beta2Yt-2+...+\beta pYt-p+\theta1\varepsilon t-1+\theta2\varepsilon t-2+....+\theta q\varepsilon t-q+\varepsilon t$$

Where;

Y_t is the value of time series at time t.

C is constant or the intercept.

$\beta1, \beta2.... \beta p$ are autoregressive coefficients

$\theta1, \theta2,.... \theta q$ are moving average coefficients

εt is the error term

$\varepsilon t-1, \varepsilon t-2.... \varepsilon t-q$ are lagged values

Based on this following equation has been formulated after duly analyzing the result that has been obtained:

$$InRem = Intercept + ar1InRem_{(t-1)} + ar2InRem_{(t-2)} + ma1et-1$$

Where, InRem stands for Remittances inflow in India and its dependence on previous trends for the future course of trend.

4.Results and Discussion

In order to go on with the analysis, the data has first undergone the stationarity check. Using the Phillips-Perron Unit Root Test and the data came to be stationary after the first difference. A similar approach has been made by Adedokun (2013) for forecasting remittances in case of Nigeria using ARIMA.

Table 1- Stationarity results

Phillips-Perron Unit Root Test		
At level	p-value	0.99
At first difference	p-value	0.01
	alternative hypothesis:	stationary

Source: Author's own calculation

Next to have considered in the process was the selection of the best model for the forecast, the evaluation consisted of a number of set of combinations and out of which the one with lowest Akaike Information Criterion has been selected;

Table 2- Akaike Information Criterion for various models

Sr. No.	ARIMA Model	AIC
1.	(1,2,1)	-7.2
2.	(2,2,2)	-11.77
3.	(3,2,0)	-0.47
4.	(2,2,0)	4.73

5.	(1,2,0)	26.64
6.	(0,2,1)	12.26
7.	(2,2,1)	-13.61
8.	(1,2,2)	-12.38
9.	(2,0,1)	-23.74
10.	(3,0,1)	-23.53
11.	(3,0,2)	-22.81

Source: Author's own calculation

As can be seen in the table that combination (2,0,1) has the lowest AIC so that has been selected for formulating the model. This implies that the model that has been chosen is robust and is free of any autocorrelation which can drastically affect the forecasted result.

Table 3- Specifications obtained from model (2,0,1)

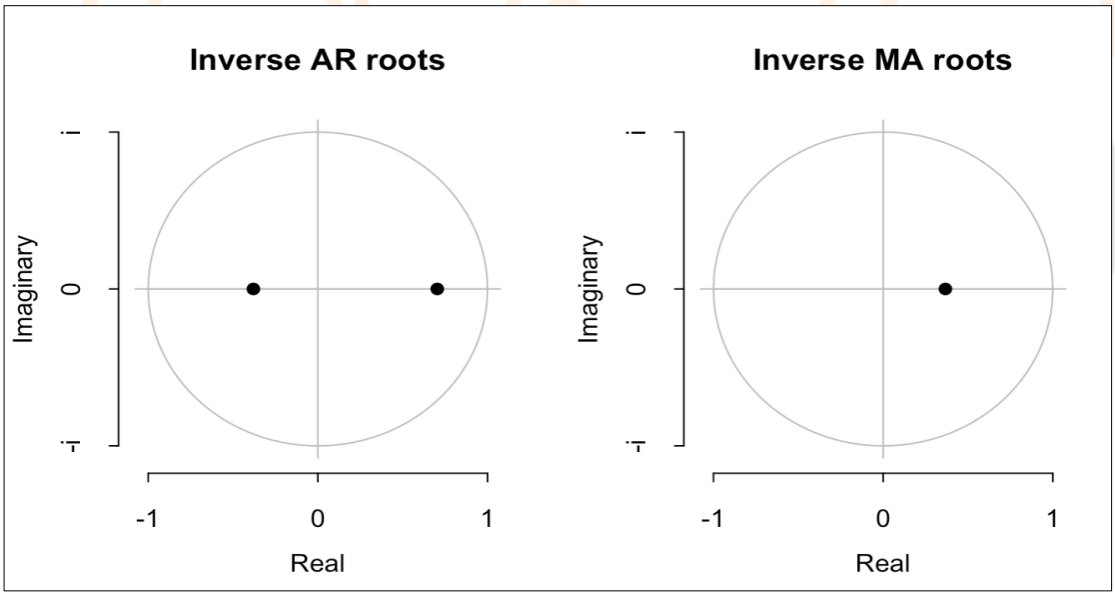
Coefficients				
	ar1	ar2	ma1	Intercept
	0.3239	0.2674	-0.3669	0.1252
s.e.	0.2881	0.1475	0.2701	0.0377

Source: Author's own calculation

The equation that was formulated using the specifications of (2,0,1) model is;

$$InRem = 0.1252 + 0.3239InRem_{(t-1)} + 0.2674InRem_{(t-2)} + (-0.3669)et\text{-}1$$

Figure 1 – Inverse AR and MA roots



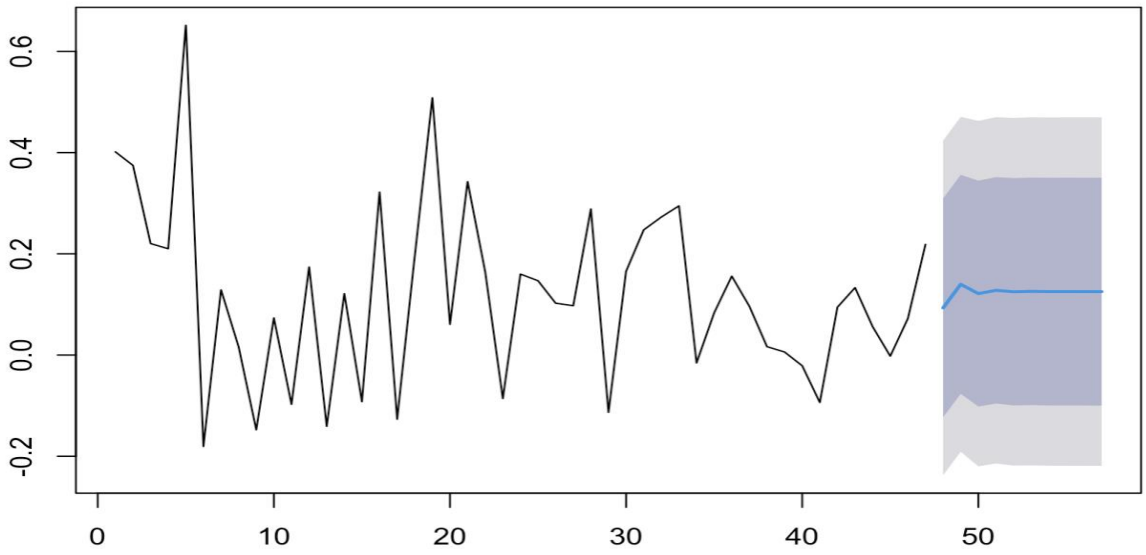
Source: Author's own calculation

The model (2,0,1) chosen is stating that the future trend of the remittances depends on the past trends and since the volume of remittances are considered in the study, this means that there is no strong seasonality in the previous trend depending on which the future trend could be determined. This is the reason behind the gap

which can be seen before the forecasted trend in the diagram given below. The trend is absolutely random and irregular.

After the model selection and appropriation the forecast result obtained are;

Figure 2 – ARIMA(2,0,1) forecast results



Source: Author's own calculation

The given chart is the graphical representation of the forecast of next ten years and the upper and the lower limits at 80% and 95% each.

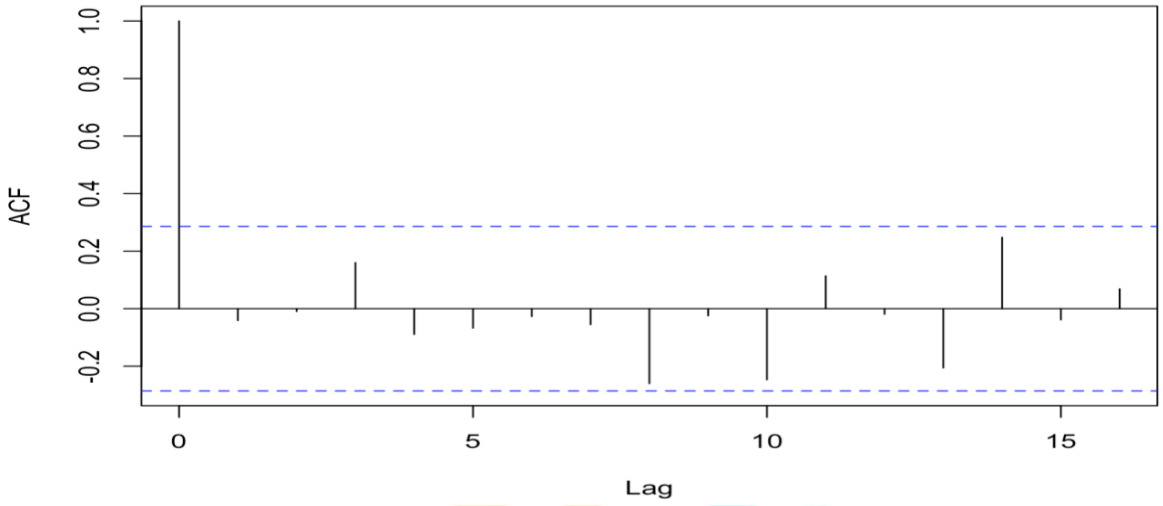
Table 4- Forecast results with high and low limits of 80% and 95%

Years	Point Forecast	Lo 80	Hi 80	Lo 95	Hi 95
2023	0.09320894	-0.12297829	0.3093962	-0.2374209	0.4238388
2024	0.13984041	-0.07654691	0.3562277	-0.1910954	0.4707763
2025	0.12139016	-0.10182794	0.3446083	-0.2199925	0.4627728
2026	0.12788424	-0.09585491	0.3516234	-0.2142953	0.4700637
2027	0.12505375	-0.09954197	0.3496495	-0.2184358	0.4685432
2028	0.12587359	-0.09896408	0.3507113	-0.217986	0.4697331
2029	0.12538221	-0.99622056	0.350385	-0.2187298	0.4694942
2030	0.1254423	-0.09962965	0.3505142	-0.2187755	0.4696601
2031	0.12533036	-0.09977914	0.3504399	-0.2189449	0.4696056
2032	0.12531017	-0.09981704	0.3504374	-0.2189922	0.4696125

Source: Author's own calculation

As can be seen from the results of the forecast that remittances may see an increasing trend till 2024 after which a slight dip can be predicted and are expected to have a smooth and linear trajectory till the year 2032. In order to assess the stability of the given model certain diagnostic checks have been applied, firstly the residuals have been checked for any kind of correlation among them. In case there is any correlation that would mean that there is some information that has been left unrecognized in the process.

Figure 3 – ACF result



Source: Author's own calculation

As can be seen in the above graph that the residuals are well within the upper and lower limits and are not correlated, so there is no vital information left that has not been included in the analysis. Further, the accuracy of the model has been checked with the help of Box-Pierce Test;

Table 4- Box-Pierce test

Box-Pierce Test		
x-squared = 8.146	df = 7	p-value = 0.3199

Source: Author's own calculation

Since the p-value obtained is more than 0.05 level of significance which means that the residuals are independent and are not correlated. So the given model is appropriately tracing the prediction for the next ten years.

5.Conclusion

The fluctuations in the trend of remittances inflow can be attributed to various reasons, policies related to migration, level of economic activity in the host as well as the home country. This study has considered the time frame of years ranging from 1975 to 2022 and remittances throughout the course has seen a number of phases. The trend that remittances seem to have followed is of irregular nature and no symmetric patterns have been identified. Due to this irregular trend, the forecast for next ten years expects slight increase in the volume of remittances but the same will be followed by a dip and then will have a smooth and constant trend. A number of reasons can be attributed to this, migration stock can be an underlying reason in the wake of speculations and anticipations of the likelihood of a global recession as pointed out by many studies including that of Guenette, et al., (2023), Benaned and Bulgaru (2023), Binduja, (2023) that the arrival of recession at the global level may hamper economic activities in a number of ways around the world. The last few years of the time period considered in this study has not only seen a global pandemic in the form of COVID-19 but also Russia-Ukrain War that has significantly altered the political and economic dynamics of the world. So the volume of remittance inflow may also get affected with the backdrop of such immense economic upheavals. Similar prediction have been made by Khan and Akhtar (2022) where they found remittances to

have a constant trend in their forecast from 2020 to 2030 where the countries they considered included India as well among the other South-Asian economies.

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