

How Will Indonesia's Remittance Value for The Next 5 Years Due to Covid-19? (Autoregressive Integrated Moving Average Approach)

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Article Info	Abstract
<p>Keywords: Remittance; Covid-19 Autoregressive Integrated Moving Average (ARIMA).</p>	<p>This study aims to explore how the value of Indonesia's remittances for the next 5 years due to the Covid-19 pandemic. Preliminary data obtained from the World Bank 1985-2020. By using the autoregressive integrated moving average approach, researchers can forecast the remittance value for the years 2021-2025. After processing the data, the forecast value of remittances for 5 consecutive years is 20.65%, 23.01%, 20.73%, 20.76%, and 2078%. The results of the study show that the value of Indonesian remittances has decreased by due to the pandemic compared to 2020, which is 22.95%. The decline was around 2.27%. This is interesting because although the number of Indonesian remittance transactions has decreased, the volume of remittances has increased. The remittances made large-scale remittances due to restrictions imposed by the government so that the remittance value remained stable when compared to 2008 which experienced a drastic decline. This achievement cannot be separated from government policies that have taken good preventive measures. However, it is hoped that from the forecast results, the government will continue to maximize its policies so that the value of Indonesia's remittances will increase rapidly and will make a large contribution to growth.</p>
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1. Introduction

Remittance is one of the international capital flows in a country that is obtained from routine financial transactions carried out by Indonesian workers (TKI) abroad (Shirazi et al 2018). The transactions carried out will then go through financial institutions which will then be consumed by their families. Consumption can be in the form of investment as well as capital to meet daily needs. Incoming remittances through formal banking channels not only promote the financial sector (Aggarwal, 2011) but also increase the foreign exchange reserves of the recipient country. Higher remittance inflows could boost developments in the monetary finance sector. This can trigger the government to carry out reforms for better access to banking (Shirazi et al., 2018). Remittances generated by migrants have the potential to increase state revenues and reduce poverty. In addition, remittances can also enhance the development of the financial sector, to encourage economic growth. Remittances are considered a vital and stable source of funding for economic development in a country.

But the big question is whether remittances can survive during the COVID-19 pandemic. Sayeh & Chami (2020) in their research predicts that the pandemic will deal a major blow to remittance flows that may be even worse than during the 2008 financial crisis. This can be proven by the global remittance report at the World Bank in Figure 1 below. Where remittances fell by around \$100 billion in 2020, which represents approximately a 20% decrease from 2019. Among

the reasons are the moratorium on sending migrant workers abroad, and because migrant workers suffer losses from their jobs, thus tending to reduce their remittances to families at home.

The decline in remittances due to COVID-19 was also felt in Indonesia (Kurniasih, 2020). Based on data from Bank Indonesia (2020) the number of labor remittances decreased by around 17.56% or \$9.43 billion in 2020 from the last four years. Where previously the number of remittances experienced significant growth. Not only that, but the number of remittances from foreign workers also decreased by 10.42% to \$3.01 billion in 2020. This decline was deeper than the previous two years, namely 1.30% in 2019 and 1.12% in 2018.

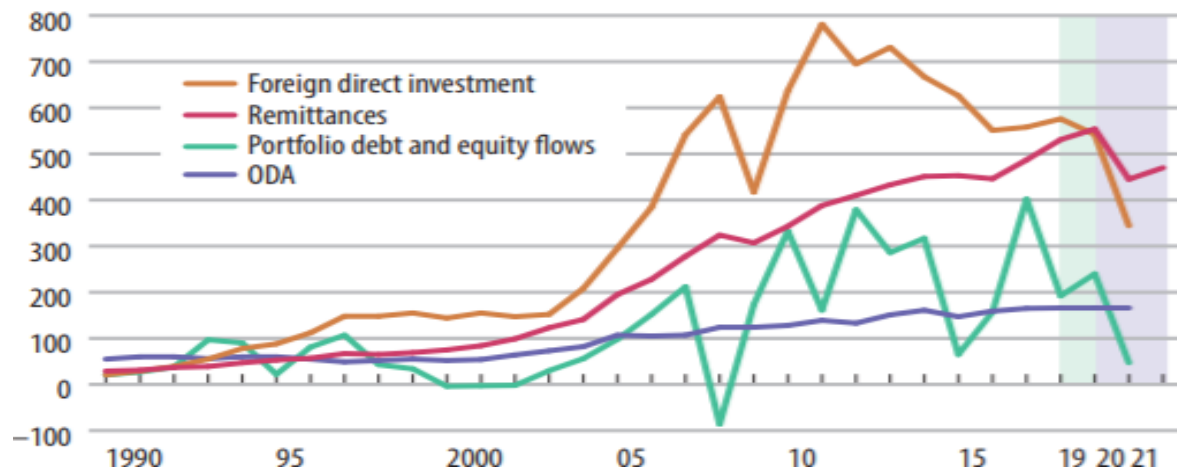


Figure 1. Remittance (Step Drop)

Source: World Bank

Kedar, Qayyum, Gammadigbe, & Mlachila (2021) in their research revealed that remittances had a negative impact during the global financial crisis, especially in low- and middle-income countries. At the same time, previous research has also found remittances to be less volatile compared to other foreign currency flows which are relatively stable during episodes of sharp business cycle volatility (De, Islamaj, Kose, & Reza Yousefi, 2019). Recently, Shimizutani & Yamada (2021) examined the impact of Covid-19 on a series of indicators of household welfare in Tajikistan. The main results of his research showed a detrimental effect due to a decrease in remittances in April and May 2020. Other results also showed that there was an increase in unemployment due to unstable remittances (Jaume, Medina-Cortina, & Winkler, 2021)

The decline is certainly a problem that must be faced and resolved by the government. So that the government can take good steps in overcoming these problems, forecasting is an alternative approach that needs to be considered. By knowing the value of remittances for the next few years, the government can determine the policies that need to be taken. This argument is the reason why researchers feel the need to forecast the movement of remittances for the next 5 years (2021-2025). This is important because remittances that enter Indonesia become an income injection for families of Indonesian migrant workers in the region's origin so that it can increase the purchasing power of lower-class households. Then it will continuously affect the distribution of income and output of the industrial sector.

Remittance is an important indicator to promote economic growth in a country (Meyer & Shera, 2017). Bank Indonesia (2009) defines remittances as part of the salary or income of Indonesian workers sent from their families who work abroad to their families who are at home. Remittances can increase household consumption in a country, both rural and urban, and can even

cause a large multiplier effect because they are more likely to spend on domestic goods production (Ratha, 2005).

Giuliano & Ruiz-Arranz (2009) explain that remittances or remittances can increase capital allocation, increase development and accelerate economic growth. Akay (2012) defines remittances as a form of remittance that becomes large cash for the whole world, where when workers in the country have high mobility, remittances are also abundant.

The International Monetary Fund defines remittances into 3 categories (IMF, 2008), namely: (1) worker remittances or transfers in the form of cash or the like from foreign workers to their families at home. (2) compensation for employment or income, salary, or remuneration in cash or the like paid to individuals working in another country where their existence is legal. (3) money transfer of a foreigner which refers to the transfer of capital from financial assets made by the foreigner as his transfer from one country to another and his residence for more than one year.

In this regard, remittances have an effect on the economy on a micro and macro scale (Lubambu, 2014). On a micro-scale, remittances have a role in increasing an individual's income and increasing the individual's possibility to access various facilities, such as health, education, and assets. Meanwhile, on a macro scale, remittances have the potential to reduce poverty levels, increase consumption levels of individual recipients of remittances, and increase inequality between remittance recipients and non-remittance recipients (Sari, 2018).

Cismaş, Curea-Pitorac, & Vădăsan (2020) divide two concepts of remittances, namely (1) for low-income countries, remittances are the last financing used mostly for subsistence costs. Meanwhile (2) for middle-income countries, remittances are part of a diversified financial portfolio and can stimulate the financial sector. For this study, remittances are defined as the flow of funds in the form of cross-border remittances made by workers (TK) to their families or relatives through Indonesian financial institutions within a certain time. This transaction is usually carried out by workers every month to meet the needs of families in the area where the workers come from.

2. Research Method

This research uses quantitative methods with secondary data types. Remittance data is obtained from reports issued by the World Bank during the period from 1985 to 2020. As for the object of research itself, namely the state of Indonesia.

The steps that must be taken in analyzing the data using the Box-Jenkins technique are as follows.

Identification of Model

Selection of p , d , q , tentatively. This selection is done by stationary first. After that, calculate and match the ACF and PACF samples from the transformed and differentiated data. The following is the theoretical pattern of ACF.

Table 1. Theoretical Patterns of ACF

Process	Sample of ACF	Sample of PACF
AR (p)	Declines towards zero exponentially	Above the maximum interval limit (barley line) to lag to p and below the limit at lag $> p$

MA (q)	Above the maximum interval limit (barley line) to lag to q and below the limit at lag > q	Declines exponentially	towards zero
ARMA (p, q)		Declines exponentially	towards zero

Parameter Estimation

At this stage, we choose a good model estimate by testing the hypotheses for the parameters. With a tolerance level used of 5%, the parameters used are as follows.

H0: Parameters are not significant

H1: Parameters are significant

Diagnostic Test

After getting the ARIMA estimator, the next step is to choose a model that can explain the data well. The trick is to see if the residual is random so that it is a relatively small residual. If not, then you must go back to the first step to choose another model.

Forecasting

After obtaining the appropriate model, the next step is to use the model for forecasting.

3. Results and Discussions

Based on Figure 1 below, it can be seen that the value of Indonesian remittances tends to increase significantly from year to year, except in 2016 and 2020 which decreased. Where in 2015 the remittance value was 9.66 then it fell to 8.91 in 2016. Meanwhile, in 2019 the remittance value of 1,166.3 fell to 9.65 in 2020. This drastic decline was caused by several factors, one of which was the economic downturn due to the COVID-19 pandemic.

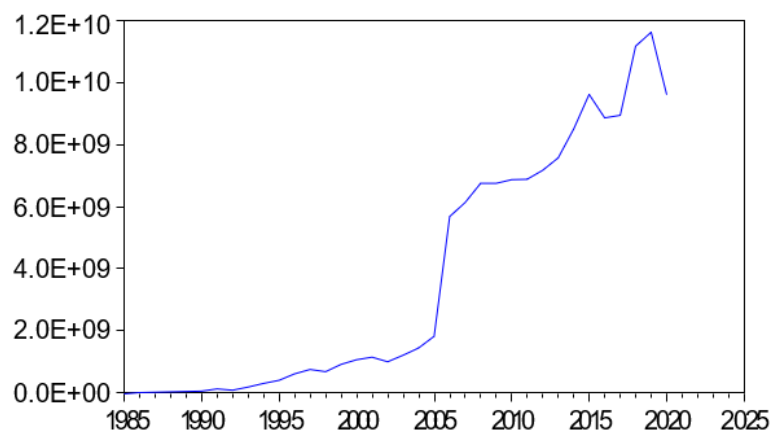


Figure 1. Movements in the value of Indonesian remittances

We first determine the value of d by performing a stationarity test, where: (a) level, the value of $d=0$; (b) 1st difference, value $d=1$; and (c) 2nd difference, the value of $d=2$. After knowing the

proportion of each type of stationarity value, the next step is to do a stationarity test with a root-root test approach.

Table 2. Root Test

	t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic	-4.709484	0.0006
Test critical values:		
1% level	-3.639407	
5% level	-2.951125	
10% level	-2.614300	

*MacKinnon (1996) one-sided p-values.

The data is said to be stationary if the absolute augmented dickey-fuller (ADF) > MacKinnon absolute value. With stationarity at the 1st difference level, we can prove the ADF value of 4.709484 > 2.951125. So, it can be concluded that the value of the difference (d) in this study is 1.

After finding the value of d, then the correlogram test is then carried out using the 1st difference. Based on the correlogram test (figure 2), the autocorrelation plot (ACF), and the partial autocorrelation plot (PACF), it can be seen that the two images have cut off (decrease) from the first line.

- a. If the cut-off is on ACF and PACF then the first probability is $p = 1$ and $q = 0$ and the second possibility is $p = 0$ and $q = 1$
- b. When combined with d, the possible ARIMA values (p, d, f) are ARIMA (1,1,0) or AR (1) and ARIMA (0,1,1) or MA (1)

Based on the correlogram analysis, the data is said to be stationary if the probability value of Q-statistics is > from the critical value, namely 1%, 5%, and 10%. So the data in the study above is also stationary at the 1st difference level.

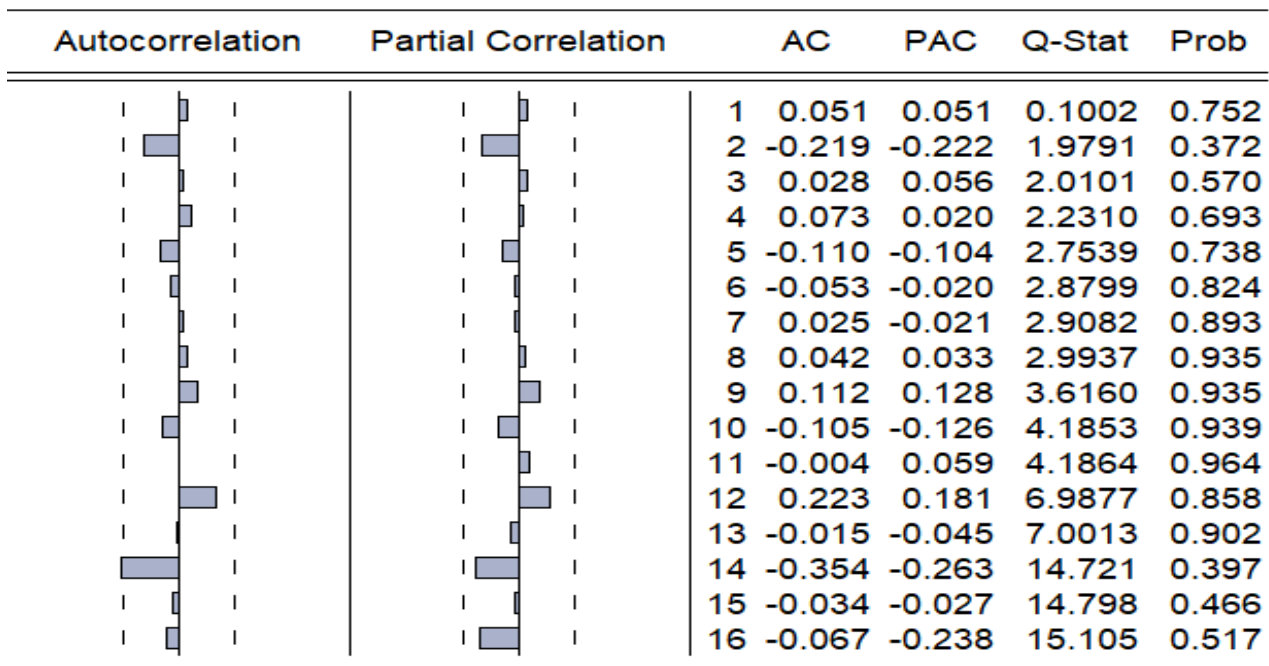


Figure 2. Correlogram test

Parameter Estimation Model

AR estimation model: $Remitt = \beta_0 + \beta_1 Remitt-1 + \beta_2 Remitt-2 + \dots + \beta_p Remitt-p + \epsilon_t$

Table 3. Autoregressive Model (AR)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	2.71E+08	2.23E+08	1.211462	0.2346
AR(1)	0.063105	0.663591	0.095096	0.9248
SIGMASQ	7.24E+17	9.86E+16	7.342853	0.0000
R-squared	0.003351	Mean dependent var		2.75E+08
Adjusted R-squared	-0.058940	S.D. dependent var		8.65E+08
S.E. of regression	8.90E+08	Akaike info criterion		44.13257
Sum squared resid	2.53E+19	Schwarz criterion		44.26588
Log-likelihood	-769.3199	Hannan-Quinn criteria.		44.17859
F-statistic	0.053793	Durbin-Watson stat		1.758034
Prob(F-statistic)	0.947714			

MA estimation model: $Remitt = \beta_0 + \beta_1 Remitt-1 + \beta_2 Remitt-2 + \dots + \beta_p Remitt-p + \epsilon_t$

Table 4. Moving Average Model (MA)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	2.66E+08	2.02E+08	1.313323	0.1984
MA(1)	0.137507	0.454161	0.302772	0.7640
SIGMASQ	7.21E+17	1.01E+17	7.126101	0.0000
R-squared	0.007689	Mean dependent var		2.75E+08
Adjusted R-squared	-0.054330	S.D. dependent var		8.65E+08
S.E. of regression	8.88E+08	Akaike info criterion		44.12864
Sum squared resid	2.52E+19	Schwarz criterion		44.26195
Log-likelihood	-769.2511	Hannan-Quinn criteria.		44.17466
F-statistic	0.123984	Durbin-Watson stat		1.846169
Prob(F-statistic)	0.883816			

Diagnostic Test

This value will be compared, to whether AR or MA is good for forecasting. The criteria for the selected model are: (1) the value of Adj r square must be greater; (2) the value of Sum square

resid must be smaller; (3) the value of the Akaike info criterion must be smaller; (4) the value of the Schwarz criterion must be smaller.

Table 5. Model Selection Criteria

Criteria	AR (p)	MA (q)
Adj r square	-0.058940	-0.054330
Sum square resid	2.53E+19	2.52E+19
Akaike info criterion	44.13257	44.12864
Schwarz criterion	44.26588	44.26195

Based on the estimation and diagnosis tests above, it can be concluded that the ARIMA model (0,1,1) is a suitable model to be used in this study. The next step is forecasting. By using remittance data from the previous 30 years, the forecasting results can be seen in figure 3 and table 6 below.

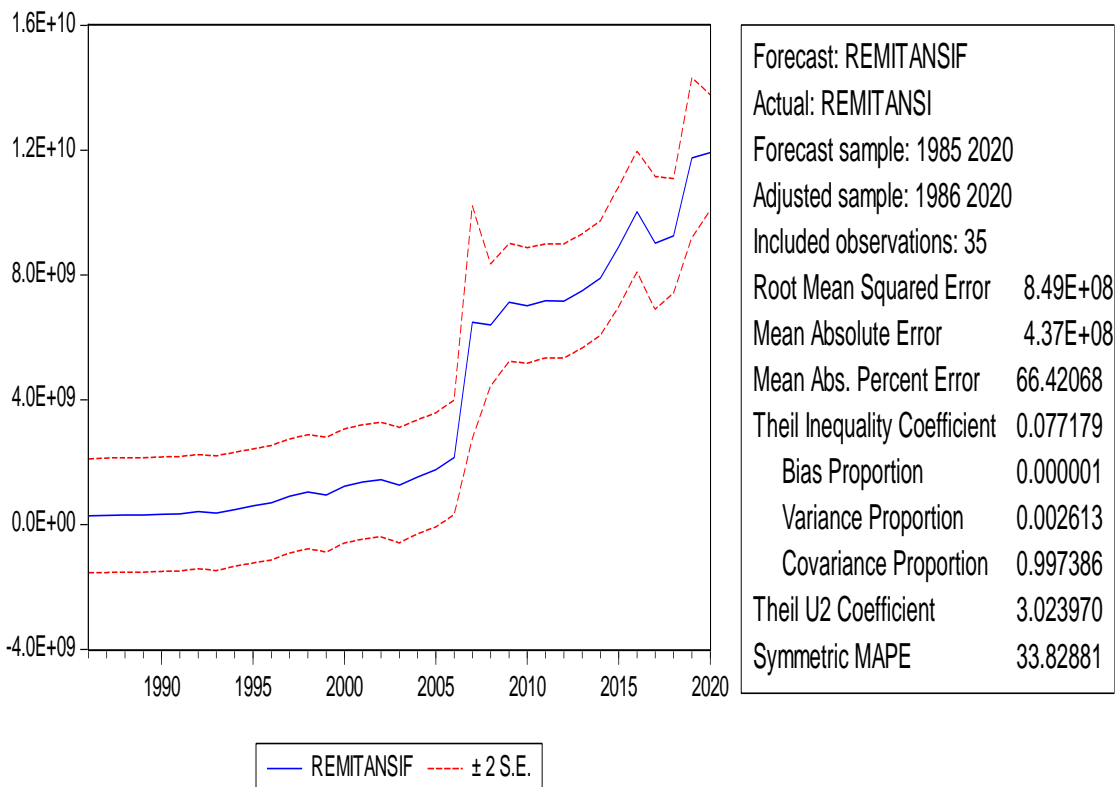


Figure 3. Forecasting Graph

Table 6. Forecasting Results for 2021-2025

Tahun	Person (%)
2020	22,95
2021	20,68
2022	23,01
2023	20,73
2024	20.76
2025	20,78

The value of remittances today is influenced by the number of remittances by Indonesian workers in previous years. Based on the results of forecasting using the ARIMA model approach (0,1,1) it shows that the remittance value for the years 2021-2025 is still relatively low when compared to the value in the year before the pandemic. This result is in line with the World Bank's (2020) prediction which says that the value of remittances will fall due to the pandemic.

However, if analyzed, the results of the test turned out to give a positive picture. Where 2022 itself is estimated to reach around \$9,844 billion or an increase of 2.23% from 2021. Sayeh & Chami (2020) explained that remittances are likely to increase after the devastating pandemic shocks in the first few years, due to improving economic access, then remittances will return to normal. This statement is supported by De et al., (2019); Takenaka, Villafuerte, Gaspar, & Narayanan (2020); Bisong, Ahairwe, & Njoroge (2020).

The increase in remittance value cannot be separated from government policies that have adapted to the pandemic so that they can think about and take appropriate steps to increase their remittances again. Access for migrant workers abroad and immigrants who enter the country is fully optimal if it is following the health protocols implemented by the government (Ministry of Health, 2020). We can see another policy in one of the state-owned financial institutions (BUMN) which continues to evaluate to provide easy service to immigrants in conducting transactions.

Based on a report by Dina Mirayanti (2021) at Kontan.co.id, the growth in the volume of remittance transactions for 2022 is likely to increase due to innovations made by financial institutions in COVID-19. One of these innovations is to change customer transaction patterns in the face of restrictions so that customers tend to combine several transactions that are usually carried out into one delivery. This can be seen from the average remittance value of Indonesian migrant workers has increased.

This result is also consistent with the evidence for forecasting the value of Indonesian remittances for the years 2023-2025. Even though there was a decrease from 2022 due to policy adaptation, the value of remittances for the next 3 years continued to increase even though it was not too big, namely 20.73%, 20.76%, and 20.78%. This value is at least able to maintain the stability of the value of Indonesian remittances. The strengthening of remittances during COVID-19 was not only experienced by Indonesia itself, but also in Latin America and the Caribbean, which increased by 6.5%, South Asia by 5.2%, and the Middle East by 2.3% (World Bank, 2021).

4. Conclusions

Based on the explanation above, the researcher can draw a common thread that the value of Indonesian remittances for the next 5 years (2021-2025) has decreased compared to before the covid-19 pandemic. However, based on forecasting results, remittances have shown a fairly stable value, especially in 2023-2025 which continues to increase although not too big. At least this value proves that the remittance value has been able to maintain its stability. These results, of course, only provide an overview that requires government performance. He still has to continue to evaluate policies and issue brilliant innovations so that the value of Indonesian remittances for the next few years continues to show a significant increase. So with a stable remittance value, the country's foreign exchange will tend to rise, increasing employment opportunities and reducing unemployment so that welfare is relatively easy to achieve.

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