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Country Briefing: Suriname

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Economic Outlook

Suriname is the smallest nation in South America and is considered as an upper-middle-income country and among the best performing economies in South America in the past decade, until its crash in 2016. With a GDP per capita of \$5900.56 in 2017, Suriname's economy is dominated by the mining industry, with exports of oil and gold accounting for approximately 85% of exports and 27% of government revenues. Consequently, this country can be sensitive to changes in world commodity and oil prices. The worldwide drop in international commodity prices, together with the interruption of alumina mining in Suriname, reduced significantly government revenue and national income during the past few years.

The country has also suffered from challenges related to inflation. There were major episodes of exchange rate depreciation and high inflation in 1987, 1994, 1999 and most recently in 2016. In 2016 a slowing growth in emerging markets, most importantly in China, has led to sharp drops in commodity prices and shortage of the oil demand that caused the U.S. dollar exchange rate to depreciate by around 82% and the inflation rate reached 59%. As an oil-exporting country, a decrease in oil prices will lead to a deterioration of the trade balance and subsequently to a depreciation of the local currency.

Taking a look at Suriname's Balance of Payments in table 1, the latest value for the current account balance in Suriname was -\$410 million dollars as of 2019. Over the past 13 years, the value for this indicator has fluctuated between \$650.8 and -\$786.4 million dollars in 2010 and in 2015, respectively. The Balance of goods has been positive throughout the last decade with a superavit of \$407.1 million, mainly due to the exports of refined petroleum, gold and precious metals. Foreign Direct Investment inflows increased from \$161 million in 2017 to \$190 million in 2018. Suriname is viewed as a rising FDI star with gold, bauxite, oil and most recently palm oil as the main sectors that attract FDI. The main investing countries are the United States, Belgium, and the Netherlands.

Exchange Rate Regime

The current foreign exchange system includes the official market and the commercial bank cambio market. The official exchange rate is pegged to the US dollar at a rate announced by the Central Bank of Suriname (CBvS) and is used for specific transactions. Other legal private sector transactions are carried out through the commercial bank-cambio market. Information regarding this parallel is not disclosed to the public. The official market accounts for less than 20 percent of all foreign exchange transactions. Suriname's exchange rate regime can be characterized as a crawling peg. The exchange rate is not officially pegged to the U.S dollar, but it is rarely adjusted. The last noticeable, even though temporary, exchange rate movement was the depreciation of the exchange rate during June 2005. Since that date, the nominal exchange rate has been stable.

History of Currency in Suriname

Following independence in 1975, the Suriname guilder was fixed at the rate of Sf 1.785 per U.S dollar until 1980. As inflationary pressures accumulated during the 1980s and the early 1990s, the exchange rate in the parallel market diverged increasingly from the official rate. By September 1992, the parallel rate was about 13 times the official rate.

In response, the authorities introduced a multiple exchange rate system in October 1992 to support imports. The system initially included seven rates, some of which were pegged to the dollar, others were flexible. There were three fixed rates: the official rate was limited to debt service payments and imports of consumer goods; the bauxite rate for tax liabilities and local expenses of the bauxite companies, and the tourist rate for foreign exchange sold by tourists. The flexible rates included an auction rate (for imports of raw materials), a banana rate, a rice rate, and another export rate.

In 1994, the authorities reestablished a unified official exchange rate at a rate of Sf 180 per U.S dollar. In addition, a legal parallel market was introduced for commercial banks and cambios. This period was characterized by several episodes of growing spreads between the official rate and the parallel rate, which

led to large devaluations of the official rate, particularly in October 1994 and January 1999. The exchange rate has stabilized since 2002, and the authorities have moved toward unifying the exchange rate regime. In 2004, the CBvS introduced the Suriname dollar to replace the Suriname guilder at a rate of 1:1000. In 2011, the Suriname dollar (SRD) was pegged to the USD at a rate of 1 USD = 0.3.25 SRD. In November 2015, the currency was devalued, and the pegged at of 1 USD = 4.0 SRD, and in 2016 the peg was further moved to 1 USD = 7.46 SRD.

Interest Rate Parity

To assess if there is an arbitrage opportunity by investing in Suriname and United States, we used the interest rates as of November 2019 in both countries, that were 8.90% and 1.75%, respectively and the fixed exchange rate of 7.43SRD/USD. By exchanging \$10,000 into Surinamese dollars, investing them in a Surinamese bank and exchanging it for dollars again in a year, we can lock in an opportunity of \$715. However, we do not have access to the forward exchange rates, so the strategy would need to use the future spot rate. It is important to mention that even though the exchange rate is fixed, by using the spot rate we are not protected from eventual changes in exchange rates due to potential economic crises, as we will further discuss. So, there is an opportunity to profit as the interest rate parity does not hold, but it is not riskless, because of the impossibility of entering the forward market.

The analysis from this point forward will consider the values from 2004 onwards, when the currency officially changed from the Surinamese guilder to the Surinamese dollar. It is important to note that we can only perform the analysis using the official exchange rate, which is the only one we have access to data.

Price Levels and Real Exchange Rates:

Figures 3 to 5 picture the evolution of the prices in Suriname and the United States. The levels of yearly inflation were remarkably higher in Suriname, reaching an average of 11.42% in the period between 2004 and 2019, as opposed to 2.08% in the US. Overall, the high increase in prices implied that the internal purchasing power of the Surinamese dollar decreased by 78.71%, or, in other words, what a Surinamese consumer could buy with 100 SRD in 2004 is what he/she could buy with 469.67 SRD in 2018.

This evolution of prices naturally implies that the amount of Surinamese dollars needed to purchase the same basket of goods that one USD can buy increased over time. Figure 6 confirms this view, plotting the Purchasing Power Parity (PPP) of the Surinamese dollar relative to the USD. The PPP more than tripled from 2004 to 2018.

Knowing that the exchange rates remained pegged to the US dollar during most periods, it is no surprise that Absolute PPP did not hold, as the PPP kept increasing over time. Figure 7 shows the evolution of the real exchange rate, which takes into consideration both the PPP and the nominal exchange rate. Indeed, what drives the changes in the real exchange rate are the changes in the PPP, except for the few periods that the nominal exchange rate sharply increased.

The Surinamese dollar has always been undervalued in this time period, however, with the rise of the PPP, the undervaluation decreased until 2010. From 2010 to 2015, the PPP did not present major changes, so the real exchange rate remained at stable levels of around 60%. In 2016, when Suriname's economy collapsed, despite the high increase in home prices, the Real Exchange rate fell, because of the great increase in the nominal exchange rate. In 2018, the Real Exchange rate presented a value of 40.20%, meaning it was 59.80% undervalued relative to the dollar.

Figure 8 plots Suriname's GDP per capita values adjusted for the PPP. Given the values are presented in US dollars, and the Surinamese dollar is undervalued, the PPP adjusted GDP becomes higher. In other words, the GDP per capita, unadjusted for PPP, presents a worse picture of Suriname's overall economy than the actual one, when compared to the US prices.

The analysis of relative PPP is simplified by the fact that the exchange rates remain constant at most times. Given the prices increased more in Suriname, and the exchange has not changed, then the relative PPP did not hold. Plus, in the periods of exceptional depreciation of the currency, the actual depreciation levels were higher than the levels of inflation (relative to the US' inflation), so in those periods the relative PPP did not hold as well.

Predicting the exchange rate development

Should we expect a Surinamese dollar exchange rate appreciation, knowing that it is currently undervalued? The answer is no. Looking into the historical data, it is possible to see that when Suriname's economy was faring well (2004 - 2014, when the commodities market was on the rise), the currency did not appreciate, despite its undervaluation. However, in times of economic upheaval, such as in the year of 2016, the nominal exchange rate increased sharply, depreciating the Surinamese dollar. So, it should be expected that the exchange rate will remain constant in times of good economic health, and increase in times of crisis.

So, how should we predict the development of the exchange rate? The real exchange rate is only a good predictor for floating and inflation targeting currency systems. The fixed nature of this exchange rate surely indicates that it does not follow a random walk pattern. The common models used to predict exchange rate development will not work with this currency, so we need to follow a different approach to predict it.

The approach we adopted was one that would forecast the exchange rate development by predicting the future economic outlook of the country. Knowing that the changes in the rate should only occur in times of crisis, we can predict whether the economy will likely enter a depression and subsequently indicate if the rate should depreciate or not.

As previously mentioned, Suriname's economy is highly dependent on the production of oil and gold, and that the overall wealth of the country is highly exposed to the changes in prices of these two commodities. The drop in oil prices and the deceleration of the gold value led to Suriname's economic plunge in 2016. So, to predict the economic development of the country, we have forecasted the future values of gold and crude oil.

The predictions are made for the next month, using an Autoregressive Integrated Moving Average (ARIMA) model. Through a back testing, we show that this model better predicts future oil and gold spot prices than do futures prices. The predictions indicate that the gold and crude oil will respectively reach a price of \$1513.04 and \$25.23 the next month (to be precise, on April 16, 2020). These represent a decrease of the gold and crude oil values of 3.11% and 53.81%, respectively, relative to the spot prices in January 16, 2020.

Indeed, Suriname's economic outlook does not look prominent. The decrease in the expected value of these commodities, especially of crude oil, comes from the economic impact that the coronavirus brought to the world. As these are times of crisis, it is reasonable to assume that the volatility levels of gold and crude oil prices will be similar to the periods of 2007, 2008 and 2009. Assuming a normal distribution, the prices of gold and crude oil may fall below \$1332.07 and \$18.03, respectively, with a probability of 2.28%.

So, the scenario indicates that it is likely that the currency will, in the near future, highly depreciate. It is close to impossible to predict the exact moment the depreciation will happen, and to which extent. However, if we assume that the currency will depreciate at the same proportion level as it did to the fall in crude oil prices in 2016, then it can reach a whopping exchange rate increase of 95.40%.

To conclude, an investment in Suriname today can't be met without high levels of risk. The economy should face hardships from the shocks that will likely occur in the commodity markets. To make matters worse, the country is at the brink of a political crisis, with the current President being sentenced to 20 years of imprisonment, with elections coming in May 2020. These factors contribute to an increased pressure to devalue the Surinamese dollar.

Methodology:

Price levels and real exchange rates:

The data for the consumer price indexes for Suriname and the United States were extracted from the World Bank database, with the year 2010 equaling a price level of 100. The inflation rates for year t and country i are computed as follows:

$$Inflation_t = \frac{CPI_{i,t}}{CPI_{i,t-1}}$$

From the World Bank database, the '*PPP conversion factor (GDP) to market exchange rate ratio*' is extracted for Suriname. This variable already adjusts the PPP by dividing it with the exchange rate. In other words, these values represent the Real Exchange rate. To get the actual PPP, we multiply this variable by the nominal exchange rate.

With the values of the PPP rate computed, the GDP per capita adjusted for the PPP can be calculated. We multiply Suriname's GDP per capita (which is already in dollars, so it considers the nominal exchange rate) by the PPP rate, and get the adjusted GDP per capita.

Forecast of gold and crude oil prices:

The daily spot and futures prices of gold and crude oil were extracted from Thomson Reuters, for the period between January 1, 1986 and March 16, 2020. Figures 9 and 10 show the development of these prices from 2004 onwards (2004 being the year that the Surinamese dollar replaced the Surinamese guilder).

Figures 11 and 12 present the distributions of the monthly percentage change of the crude oil and gold in respect to the dollar, respectively, for the period starting in January 2004 and ending in March 2020. Table 2 shows the average, standard deviation, skewness and kurtosis for the monthly changes on crude oil, gold and the Surinamese exchange rate. Table 3 shows the same statistics for crude oil and gold, but only focusing on the period of the 2008 financial crisis (years 2007, 2008 and 2009). Comparing the two tables, it is possible to see that the volatilities are higher, as expected from an upheaval period. At the time of the writing of this report, there is an ongoing economic crisis, which no one knows the extents to which it will affect global markets. Hence, we believe that the distributions of prices that fits better to this moment, and that will most closely resemble upcoming risk levels and price changes, are the ones from the financial crisis of 2008. To compute the probabilities downfall of these two commodities, the standard deviations of that same period of crisis will be used.

The ARIMA model

The inspiration to use the Autoregressive Integrated Moving Average model came from the works of Guha and Bandyopadhyay, 2016, when they used this model to predict gold prices. The code used to build the model was constructed of the code in this [GitHub link](#). A brief overview of how this model works is provided in this section.

The ARIMA combines three methods: Autoregression, Moving Average and Integration. For the Autoregression, it can use several time lags to compute the coefficients for these autoregressions, so that we can use them to predict the value of the next period. The logic for the Moving Average is that we can forecast future prices as an average of past prices. Similar to the autoregressions, we can compute the averages using different lag periods. The Integrated method is a method that enables an adjustment to the data such that it can become stationary (i.e., the data having constant mean and constant volatility over time), which enables for better predictions.

The model can have different parametrizations on the following:

P – the order (number of lags)

D – the degree of differencing

Q – the order of moving average

In our model, we found that what worked best with the data we had was $P = 1$, $D = 1$ and $Q = 0$.

Now, deviating from these technical concerns, what really matters is if the model performs well or not. So, using the data from 1986 until end of 2009 to train the model, we then predict the monthly prices for oil and gold from 2010 onwards. Figures 13 and 14 plot the predictions versus the actual spot prices for these two commodities. The root mean squared errors for these were significantly better than the ones from using the futures prices as the forecast of future spot prices, as can be seen in the table 4.

Using the predictions to calculate the risk of gold and crude oil

So, having predicted the values for the next month and knowing the volatility levels, we can now calculate the risk level of the actual value falling below 2 standard deviations (assuming a normal distribution).

With standard deviations of the crisis period being 12% and 6%, we can get the conditional volatility by multiplying them with the latest spot values (\$29.98 and \$1502.23), being 3,90 and 90,13 (for oil and gold, respectively). So, with the predicted values for these two, from the ARIMA model, which were \$25.23 and \$1513.04, we can now assume a normal distribution to understand which values are at the lower tail, 2 standard deviations from the mean. These are \$18.03 for crude oil and \$1332.77 for gold.

Appendix

Table 1: Suriname Balance of Payments

	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015*	2016*	2017*	2018*	2019*
A. Current Account	220.6	324.5	324.7	111.3	650.8	431.3	162.4	-196.0	-416.4	-786.4	-160.5	60.9	-118.0	-410.6
1. Balance on Goods	271.9	314.2	336.8	11.1	686.2	967.8	706.7	242.5	133.0	-375.9	186.7	672.0	547.1	407.1
Exports	1,174.5	1,359.0	1,743.5	1,401.8	2,084.1	2,646.9	2,700.2	2,416.2	2,145.3	1,652.3	1,438.7	2,034.5	2,129.1	2,210.4
Imports	-902.6	-1,044.8	-1,406.7	-1,390.7	-1,397.9	-1,679.1	-1,993.5	-2,173.7	-2,012.3	-2,028.2	-1,252.0	-1,362.5	-1,582.0	-1,803.3
2. Balance on Services	-32.7	-64.5	-123.0	1.4	-17.7	-361.7	-424.6	-373.8	-550.2	-462.6	-282.6	-316.7	-380.3	-494.4
Credit	236.6	253.4	284.2	286.7	241.4	200.8	175.3	178.5	210.7	204.2	186.5	160.6	172.1	163.1
Transportation	24.6	20.4	19.0	19.0	31.0	21.5	28.3	30.5	37.5	39.4	32.9	40.5	42.4	39.5
Other	212.0	233.1	265.2	267.7	210.4	179.4	147.0	148.0	173.2	164.7	153.6	120.1	129.7	123.5
Debit	-269.3	-317.9	-407.2	-285.3	-259.1	-562.5	-599.9	-552.3	-760.9	-666.8	-469.1	-477.3	-552.4	-657.4
Transportation	-63.1	-65.6	-90.0	-63.1	-73.4	-101.8	-96.1	-98.1	-89.0	-80.1	-43.5	-53.2	-67.6	-54.1
Other	-206.2	-252.3	-317.2	-222.2	-185.7	-460.7	-503.8	-454.2	-671.8	-586.6	-425.6	-424.1	-484.8	-603.3
3. Balance on Income	-54.5	-2.6	20.4	4.8	-104.3	-262.1	-192.5	-131.2	-70.3	-13.3	-166.4	-394.0	-387.5	-413.1
Credit	25.0	43.6	42.2	29.8	26.1	16.2	27.1	21.6	21.6	14.5	20.6	27.5	35.5	21.1
Debit	-79.5	-46.2	-21.8	-25.0	-130.4	-278.3	-219.6	-158.4	-92.0	-27.8	-187.0	-421.5	-422.9	-434.2
4. Balance on Current Transfers	35.9	77.4	90.5	94.0	86.5	87.3	72.8	66.6	71.2	65.3	101.8	99.7	102.7	89.7
Credit	73.5	139.8	141.0	147.2	141.8	159.4	145.5	153.2	151.4	139.4	161.5	155.4	160.8	144.4
Debit	-37.6	-62.4	-50.5	-53.2	-55.3	-72.1	-72.8	-86.6	-80.2	-74.1	-59.7	-55.7	-58.0	-54.7
B. Capital Account	19.3	8.1	31.9	87.4	53.9	35.0	-7.0	0.1	-0.4	1.3	19.4	0.0	-0.4	-2.9
Credit	19.3	8.1	31.9	87.9	53.9	35.0	0.8	0.1	0.1	1.3	19.4	0.0	0.2	0.6
Debit	0.0	0.0	0.0	-0.5	0.0	0.0	-7.8	0.0	-0.6	-0.1	0.0	0.0	-0.7	-3.5
Total, Groups A plus B	239.9	332.6	356.6	198.7	704.7	466.3	155.4	-195.9	-416.8	-785.2	-141.1	60.9	-118.4	-413.5
C. Financial Account, excluding Group E	-255.5	-366.3	-48.2	-141.2	-501.6	-84.9	487.2	430.1	696.9	769.7	482.5	112.6	298.2	775.0
1. Direct investment	-163.4	-246.7	-231.4	-93.4	-247.7	72.9	172.8	187.6	164.1	266.7	300.0	98.2	119.2	7.2
Abroad	0.0	0.0	0.0	0.0	0.0	3.1	-0.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0
In reporting economy	-163.4	-246.7	-231.4	-93.4	-247.7	69.8	173.7	187.6	164.1	266.7	300.0	98.2	119.2	7.2
2. Portfolio investment assets	0.0	0.0	-15.2	-9.9	-2.3	5.5	-5.8	-1.2	0.6	-9.5	-42.1	-26.6	-58.5	8.2
Equity securities	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-0.1	0.1	0.0	-0.1	-6.1	-0.0	-0.6
Debt securities	0.0	0.0	-15.2	-9.9	-2.3	5.5	-5.8	-1.1	0.5	-9.5	-42.1	-20.5	-58.5	8.8
3. Portfolio investment liabilities	-0.3	-1.3	-1.7	-0.9	-9.7	0.0	0.0	0.0	0.0	0.0	550.0	0.0	0.0	108.3
Equity securities	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Debt securities	-0.3	-1.3	-1.7	-0.9	-9.7	0.0	0.0	0.0	0.0	0.0	550.0	0.0	0.0	108.3
4. Other investment assets	-88.6	-37.2	193.5	-148.9	-289.2	-483.2	258.7	35.7	55.9	78.0	-221.3	-14.3	-103.5	500.9
Monetary authorities	-30.6	-5.1	-12.9	-15.5	0.7	-57.9	74.4	2.0	24.1	-5.7	-65.2	89.0	-31.3	31.8
Banks	-64.7	-109.9	36.9	-137.0	-11.3	-77.4	-96.6	-96.0	31.7	20.1	-11.6	-55.7	-15.9	379.9
Other sectors	6.7	77.8	169.4	3.6	-278.5	-347.9	280.9	129.8	0.2	63.6	-144.5	-47.5	-56.3	89.2
5. Other investment liabilities	-3.2	-81.2	6.6	111.9	47.3	319.9	61.4	208.0	476.3	434.4	-104.1	55.3	341.0	150.3
Monetary authorities	0.8	-0.3	-0.4	126.3	-2.7	-0.8	1.0	0.0	0.0	161.0	81.5	0.2	-7.7	-13.6
General government ⁽¹⁾⁽²⁾	-28.8	-98.1	12.2	-5.9	66.4	120.7	103.4	164.9	79.7	74.0	110.7	133.6	46.4	151.9
Banks	25.0	21.1	-2.3	-5.0	2.9	-1.5	4.9	21.0	19.8	-2.7	-0.1	6.9	-4.7	12.9
Other sectors	-0.1	-3.9	-2.9	-3.5	-19.4	201.4	-47.8	22.0	376.8	202.1	-296.2	-85.5	307.0	-0.9
Total, Groups A through C	-15.6	-33.7	308.4	57.4	203.1	381.4	642.5	234.3	280.1	-15.5	341.4	173.5	179.8	361.5
D. Net Errors and Omissions	79.5	179.8	-100.0	-18.9	-168.1	-257.3	-462.4	-383.0	-430.3	-250.3	-262.0	-151.8	-31.9	-316.7
E. Financing items	-63.9	-146.1	-208.4	-38.5	-35.0	-124.1	-180.1	148.8	150.2	265.8	-79.4	-21.7	-147.9	-44.8
Reserve assets ⁽²⁾⁽³⁾	-63.9	-146.1	-208.4	-38.5	-35.0	-124.1	-180.1	148.8	150.2	265.8	-79.4	-21.7	-147.9	-44.8
Memorandum item														
Valuation changes ⁽³⁾⁽⁴⁾	-8.7	-19.9	9.1	-16.0	1.2	-1.9	-11.3	80.9	3.5	29.1	28.7	-21.7	-8.4	-22.0

Source: Central Bank of Suriname
February 28, 2020.

Fig. 1: Suriname GDP per capita

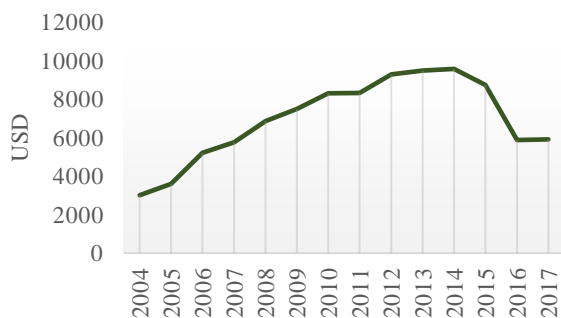
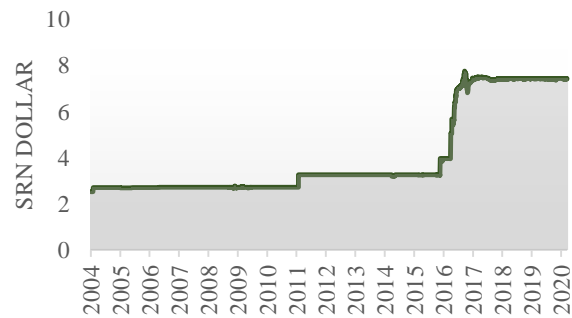


Fig. 2: Suriname dollar to USD



Price Levels indicators

Fig 3: CPI (2010 = 100)

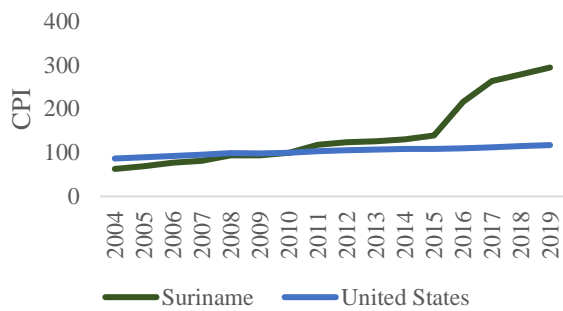


Fig 4: Suriname Inflation Rate

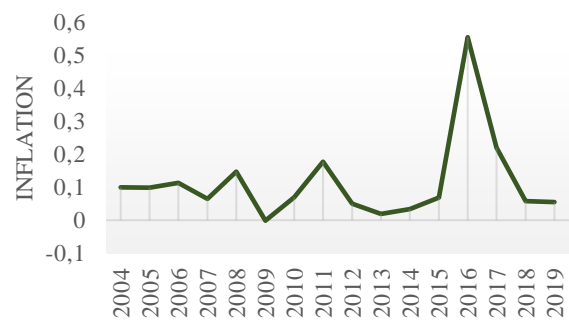


Fig 5: United States Inflation Rate

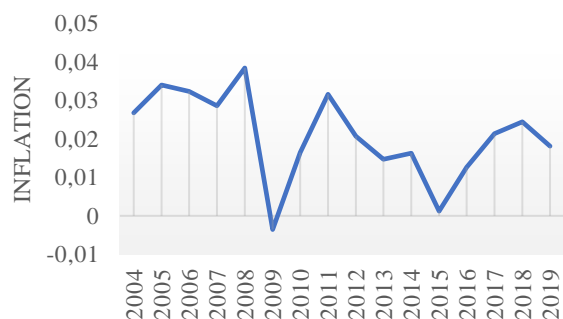


Fig 6: PPP: P Suriname / P US

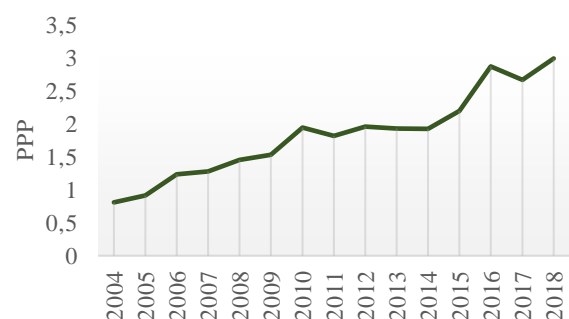


Fig 7: Real Exchange Rate

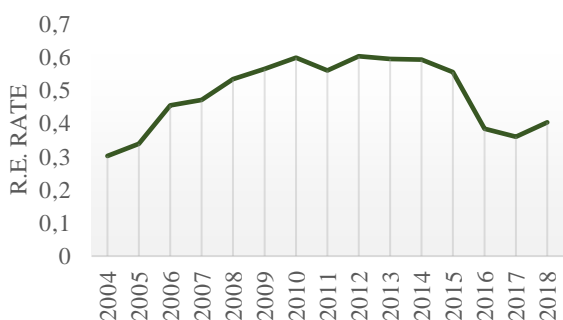
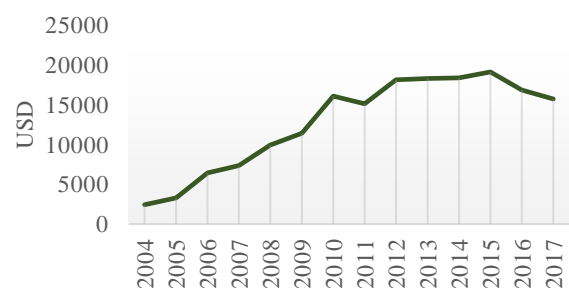


Fig 8: Suriname GDP per Capita (PPP Adjusted)



Forecast of Exchange Rate (Using Crude Oil and Gold Prices)

Fig. 9: USD/Oil

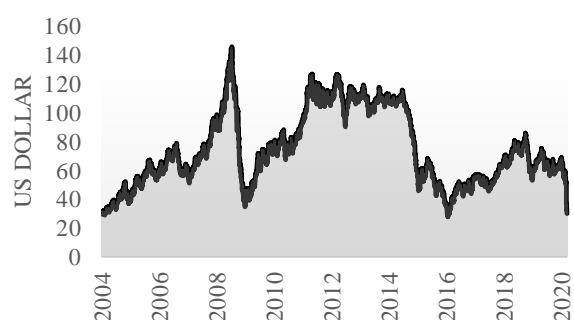
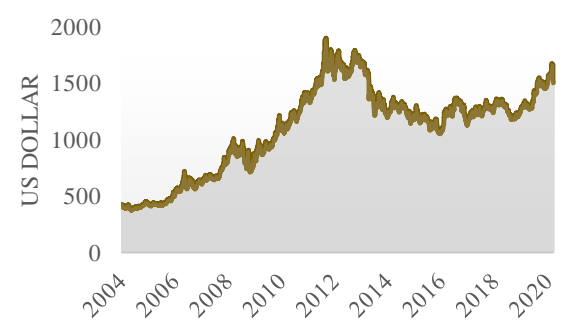


Fig. 10: USD/Gold



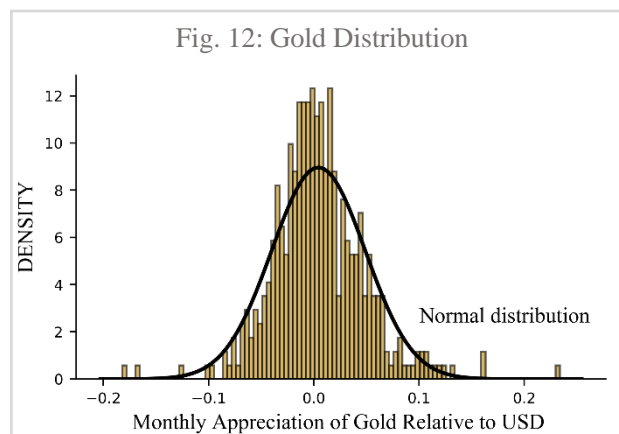
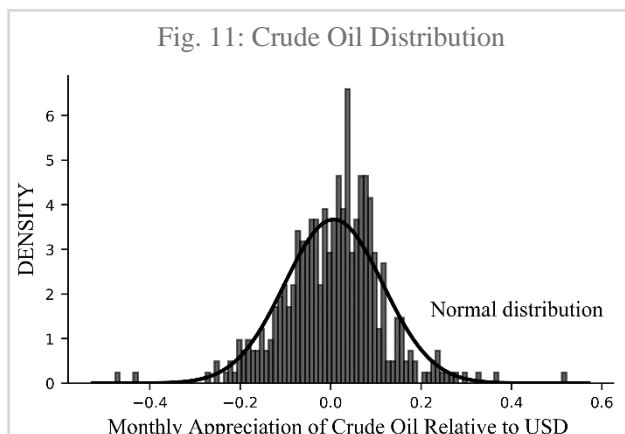


Table 2: Descriptive Statistics: 2004 - 2020

% Monthly Change	Average	Standard Deviation	Skewness	Excess Kurtosis
SRN/USD	0.01	0.04	8.05	77.23
Oil	0.01	0.10	-0.60	2.07
Gold	0.01	0.05	-0.09	1.78

Table 3: Descriptive Statistics: 2007 - 2009

% Monthly Change	Average	Standard Deviation	Skewness	Excess Kurtosis
SRN/USD	0.00	0.00	7.45	4.07
Oil	0.01	0.12	-0.58	-0.31
Gold	0.02	0.06	-0.68	2.15

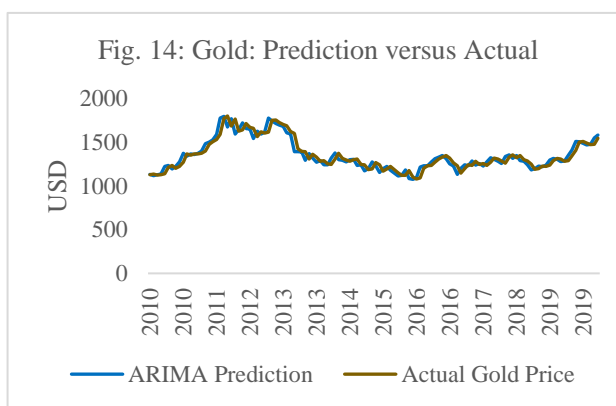
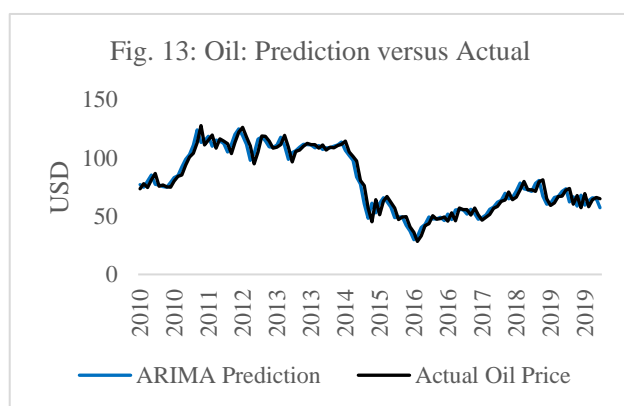


Table 4: Performance of ARIMA vs Futures

Commodity	Model	Root Mean Squared Error
Oil	ARIMA (1,1,0)	6.12
	Futures	11.56
Gold	ARIMA (1,1,0)	59
	Futures	73.36

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