

What is the effect of change in oil price on the value of Kazakhstani currency KZT in terms of USD?

Dauren Tursynbek

Abstract

This document contains the results of investigation on the effect of change in Crude Oil price on the value of Kazakhstani currency in terms of USD. Relevance of the investigation is justified by the facts that Kazakhstan's economy quite largely depends on oil product exports. Therefore, decrease in oil price may have huge negative impact on economy of Kazakhstan which can be seen in loss of the value of Kazakhstani Tenge, or simply devaluation.

1 Introduction

1.1 Relevance of the investigation

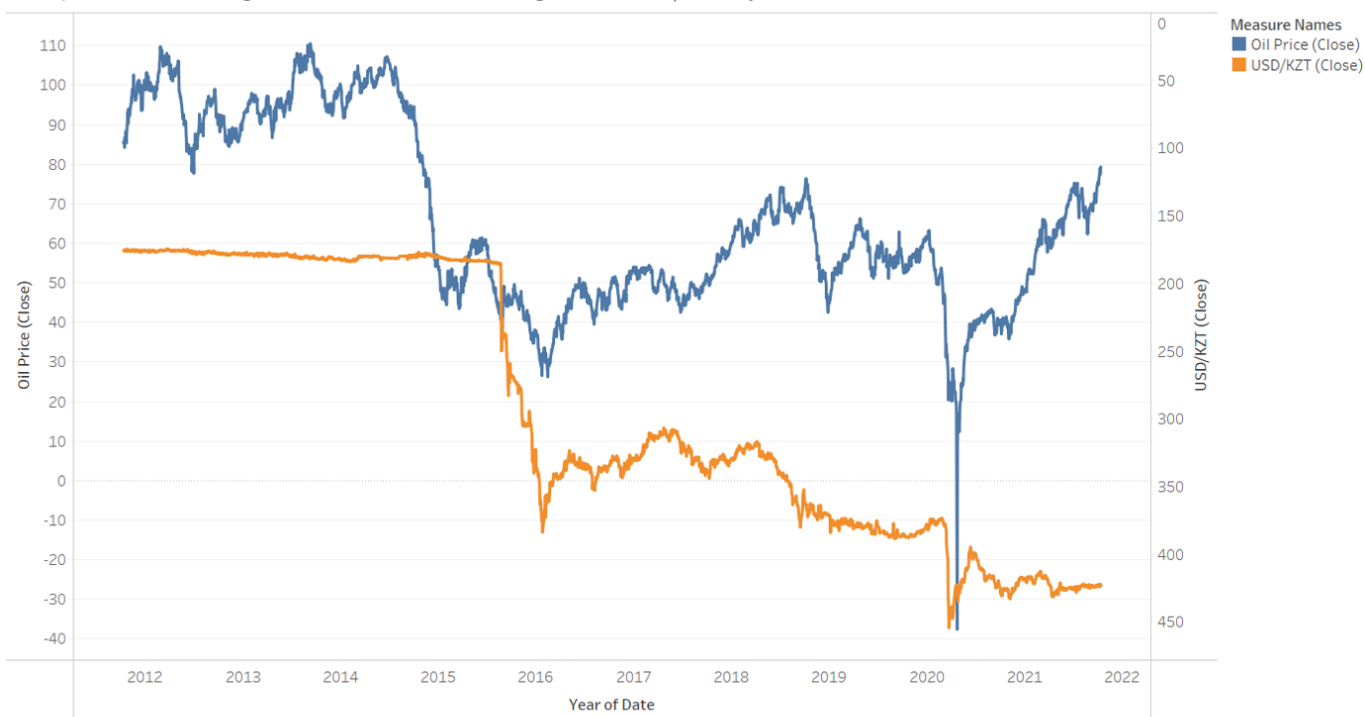
According to Daniel Workman (World's Top Exports), Kazakhstan is the 9th exporter of Crude Oil in the world, and according to World Bank, hydrocarbon output constituted 21 percent of GDP and about 70 percent of exports in 2020. Such level of dependence of economy on oil product exports may be quite risky, especially in the long-term because natural oil reserves are limited. Oil market is controllable by manipulating supply by oil producer countries. However, other questions arise when it comes to supply cut or boost. For example, who is gonna reduce the volume production, or, to what level must the volume of production changed. Oil market also depends on future expectations because oil production is a complicated process which needs time and millions of dollars of investment. Comparing change in oil price and change in exchange rate is a good method of measuring to what extent oil price might have impact on Kazakhstan's economy because the value of currency depends on the economic situation in a country. Since hydrocarbon output constitutes one fifth of GDP and about 70 percent of exports of Kazakhstan, it is reasonable to predict that there exists high positive correlation between oil price and value of KZT. USD is chosen for its stability and reliability, and therefore is a good currency to compare with.

2 Results

2.1 Dataset

Dataset used in this investigation contains volume and price of oil from 10th October 2011 to 8th October 2021. The other dataset contains volume and value of KZT in terms of USD in the same time interval. Data is shown graphically in Figure 1. Visually one can observe the trend: as the oil price decreases, so decreases the value of KZT.

Comparison of Change in Oil Price and Exchange Rate USD/KZT by Time



The trends of Oil Price (Close) and USD/KZT (Close) for Date Day. Color shows details about Oil Price (Close) and USD/KZT (Close). The view is filtered on sum of Close and Date Day. The sum of Close filter keeps non-Null values only. The Date Day filter keeps non-Null values only.

Figure 1: Oil price and exchange rate by time.

The graph shows that between 2014 and 2015 price of oil fell rapidly from about 105 USD per barrel to 45 USD barrel, which is more than 50% of decline. Later, by the end of 2015, value of KZT fell down, and therefore USD became more expensive by about 100%. The other huge decline in oil price occurred in April 2020, when demand for oil disappeared because of Covid pandemic. It was a short term decline because demand, actually, was not hit that much. The main reason was speculation, or loss of confidence in the future of oil and oil related industries.

One can also observe that in 2020, value of KZT fell down right after oil price, but not in 2015. One should notice that till the end of 2016 value of KZT in terms of USD remained unchanged, or more precisely, fixed. The reason for this is that the National Bank of Kazakhshtan implemented a fixed exchange rate system, which was canceled in August 2015 due to huge imbalance in economy.

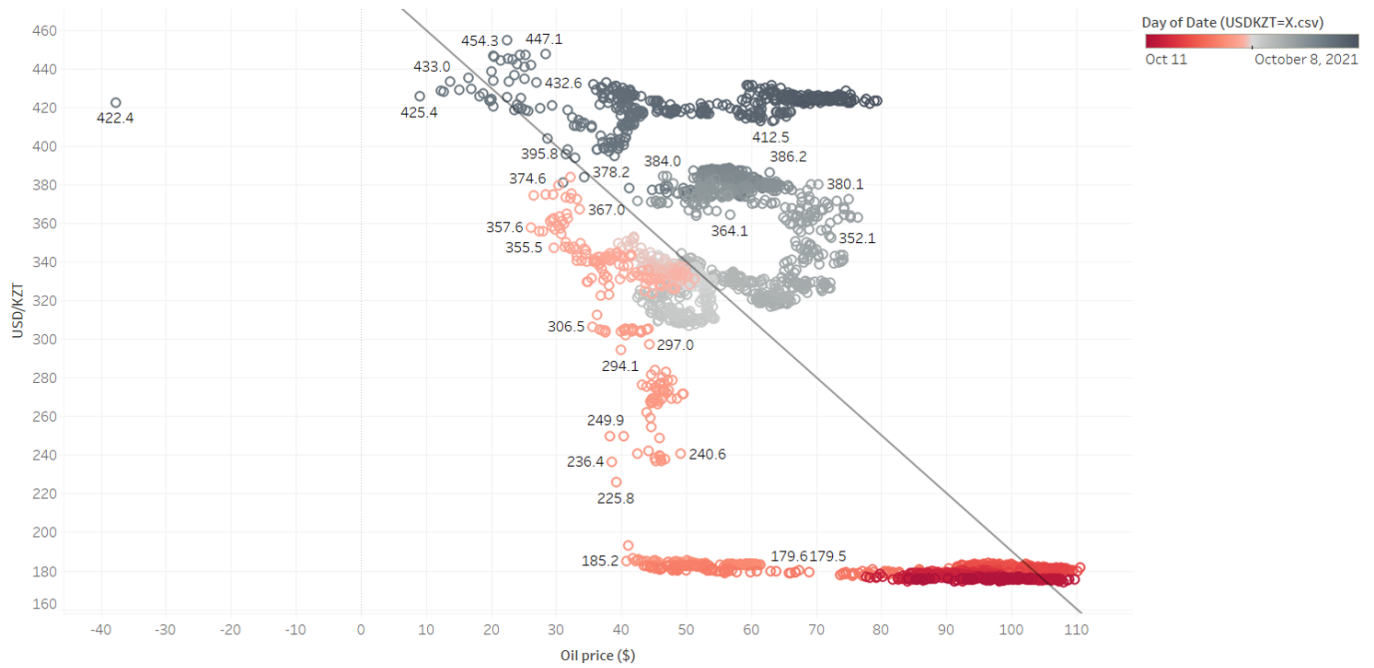
2.2 Trend

Let's see how the trend line looks like. Scatter plot in Figure 2 shows the trend line going downwards. It means that there is a direct proportionality between oil price and real value of KZT. Note that increase in USD/KZT axis means that USD is becoming more expensive, so KZT is losing its value. As already mentioned USD is one of the most stable and reliable currencies. Therefore, increase in USD definitely means weakening of KZT.

Let's see what happens if we consider only the last four years. It is clear from the scatter plot that decrease in oil price leads to devaluation of the Kazakhstani Tenge. Moreover, the USD/KZT exchange rate fluctuates strongly when the oil price is less than 40\$ per barrel. It can be explained by the fact that people expect KZT to fall down further. Therefore, people start to buy dollars and that's why KZT loses its value more and more.

One can also observe that after a decline in oil price the exchange rate does not come back to its previous point. It means that falling oil price is a factor that has the most impact on economy of Kazakhstan. Every time oil price fall down, economy of Kazakhstan shrinks and can not rehabilitate in short-term.

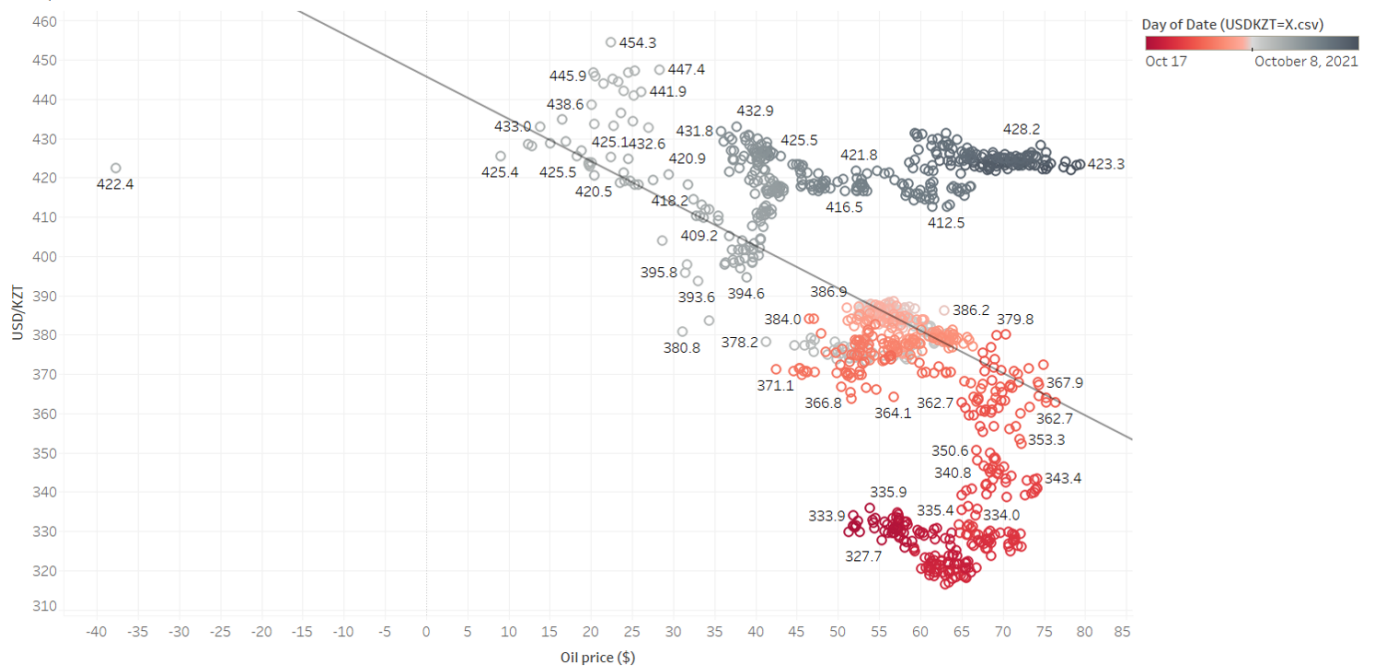
USD/KZT vs. Oil price



Close/Last vs. Close. Color shows details about Date (USDKZT=X.csv) Day. The data is filtered on Date (USDKZT=X.csv), which ranges from 10/10/2011 to 08/10/2021.

Figure 2: Oil price vs. USD/KZT in the last 10 years

USD/KZT vs. Oil price



Close/Last vs. Close. Color shows details about Date (USDKZT=X.csv) Day. The data is filtered on Date (USDKZT=X.csv), which ranges from 17/10/2017 to 08/10/2021.

Figure 3: Oil price vs. USD/KZT in the last 4 years

2.3 Correlation

```
B [16]: #print Pearson's correlation
oil["Open"].corr(kzt["Open"])
```

```
Out[16]: 0.5854965391724819
```

Figure 4: Pearson's correlation between oil price and USD/KZT

As you can see Pearson's correlation between oil price and USD/KZT exchange rate is equal to about 0.59. This is actually not a strong correlation coefficient. In order to be strong the coefficient must

be bigger than 0.8. However, we are talking about exchange rate, for which even small changes are crucial. Therefore, 0.59 is enough to say that oil price has quite big impact on USD/KZT exchange rate.

3 Other Economic Indicators

It is also good to look at other economic indicators, such as Annual GDP Growth, Investment, Inflation, and Budget Deficit. These economic indicators together describe the economic situation in a country.

3.1 GDP Growth Annual

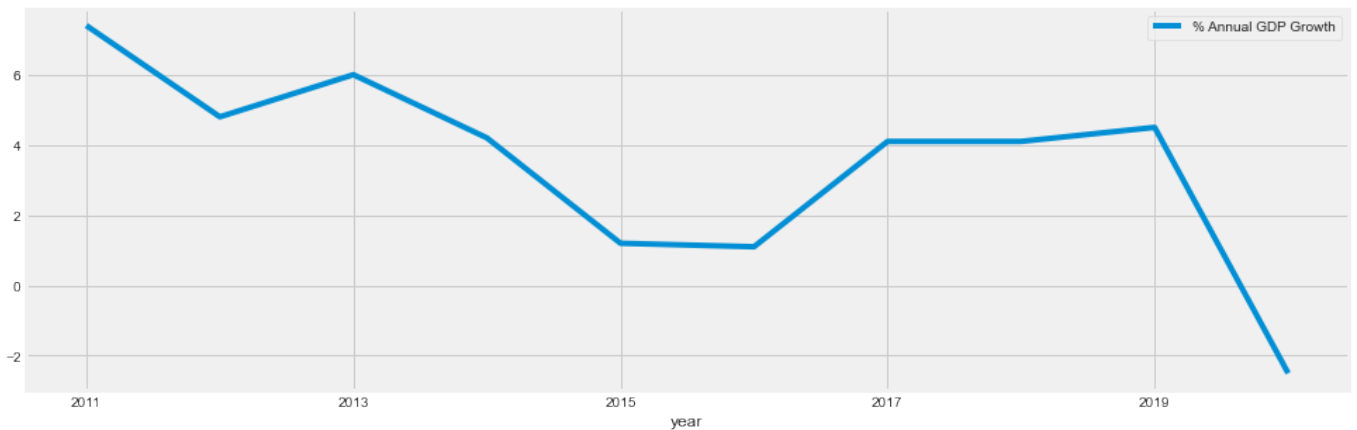


Figure 5: Annual % GDP Growth

As oil price falls, economic activity shrinks too since less number of investor put their money in oil industry, price for other goods goes up, and therefore less people can afford more expensive goods. We observe in Figure 5 that GDP Growth rate becomes slower between 2013 and 2015, and after 2019, which correspond to time interval with lower oil price.

3.2 Investment

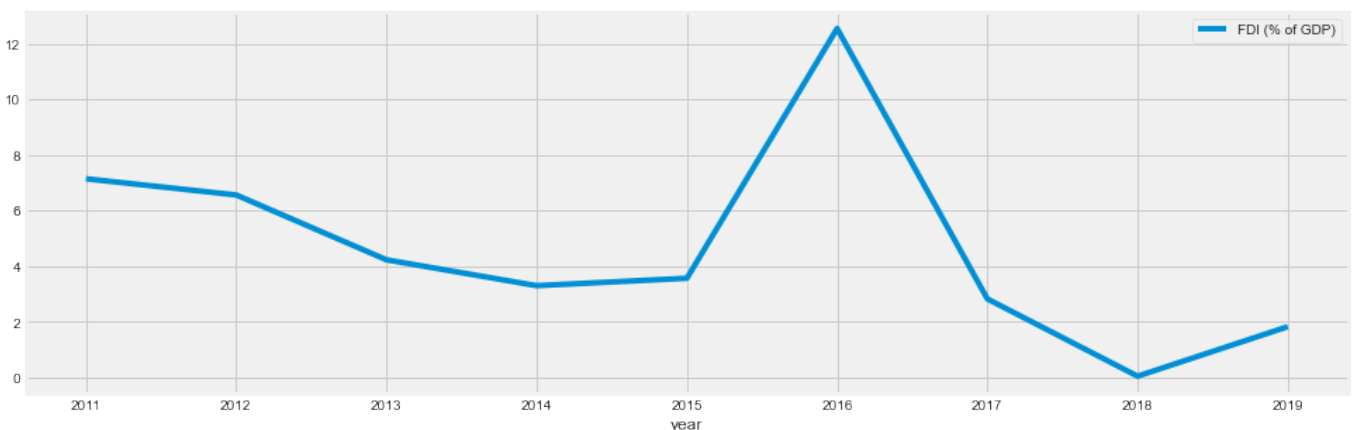


Figure 6: Foreign Direct Investment (% of GDP)

Less investors may put their money in oil if oil market collapses. However, oil is one of the most necessary commodities, and therefore demand for oil is price-inelastic which means that oil price does not affect much on the size of demand. In addition, Kazakhstan sells its natural resources really cheap which attracts many investors.

3.3 Inflation

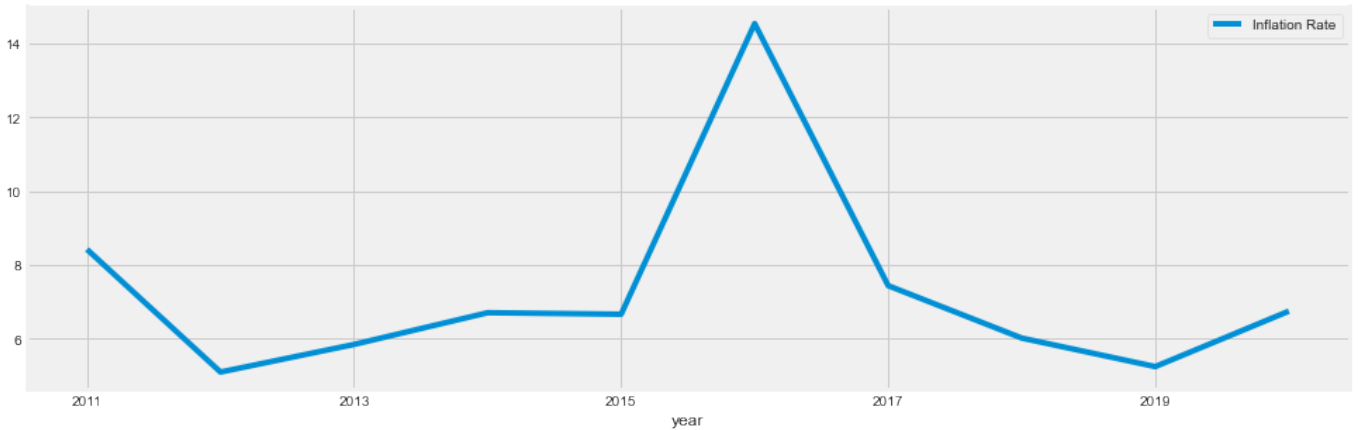


Figure 7: Inflation Rate

Inflation rate was mostly between 5-9% since 2011. However, notice that until 2015 Kazakhstan's National Bank used fixed exchange rate system. So, it was possible that the real value of KZT was less than its fixed value. After imposing free floating exchange rate, KZT lost its half value. Of course, after such a huge devaluation of currency, the country's economy must expect high inflation rate.

3.4 Budget Deficit

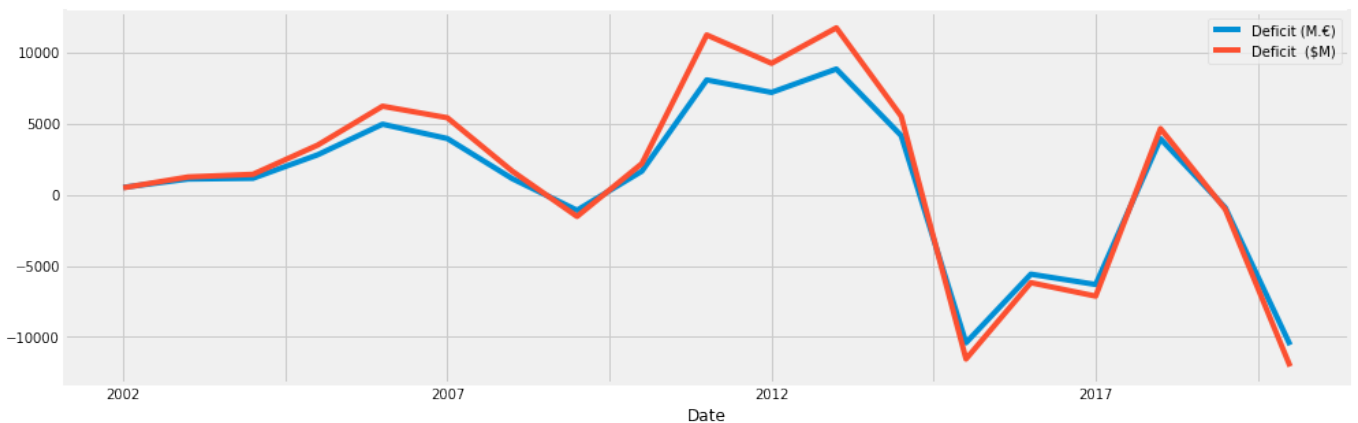


Figure 8: Budget Deficit in millions of USD and EUR

After the collapse of oil market in late 2014, Kazakhstan's government experienced huge budget deficit with amount of around 10 billions of US Dollars. It is not surprising because almost all oil companies in Kazakhstan are owned either by government, or by foreigners (foreign investors, foreign multinational companies). So, the government really struggles when there is much less profit from oil industry.

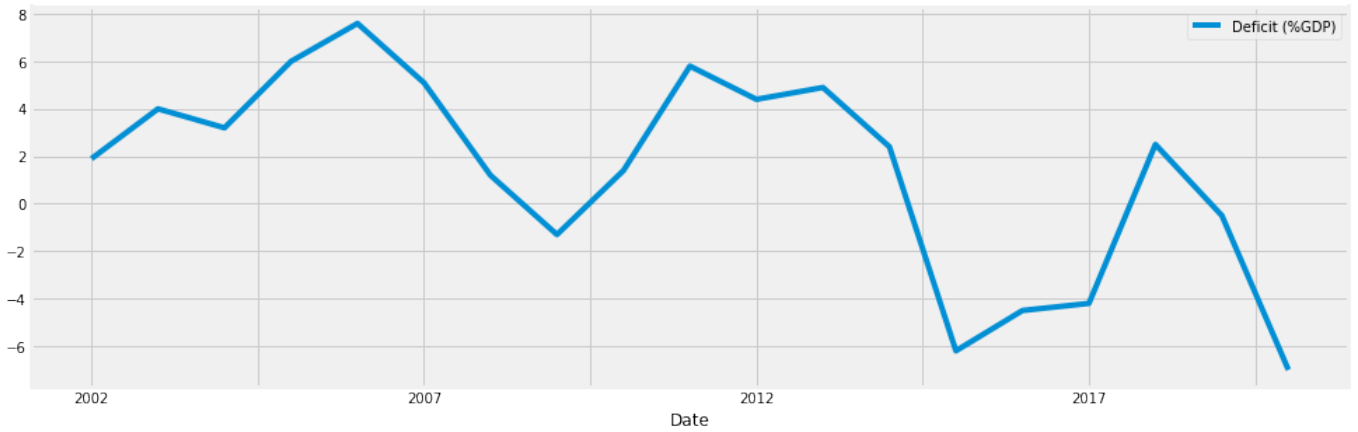


Figure 9: Budget Deficit (% of GDP)

If we look at the Budget Deficit in % of GDP, it becomes clear that fall in oil price in late 2014 led to 10% fall in Budget Deficit in terms of GDP which is a huge percentile.

4 Conclusion

The investigation shows that oil price has big impact on USD/KZT exchange rate since most of exports of Kazakhstan is oil products. Pearson's correlation calculated in the investigation justifies the statement. Despite there are many factors that affect on an economy, sometimes it is even worth investigate only one factor because of its bigger role in an economy. Oil market determines the economy of Kazakhstan. Therefore, it must expand its economy by other economic fields. For example, United Arab Emirates invest money earned from oil exports into tourism. Kazakhstan must not choose the same way, but due to geopolitical instability around oil market, it is very important for Kazakhstan to develop other economic fields such as agriculture, tourism and infrastructure.