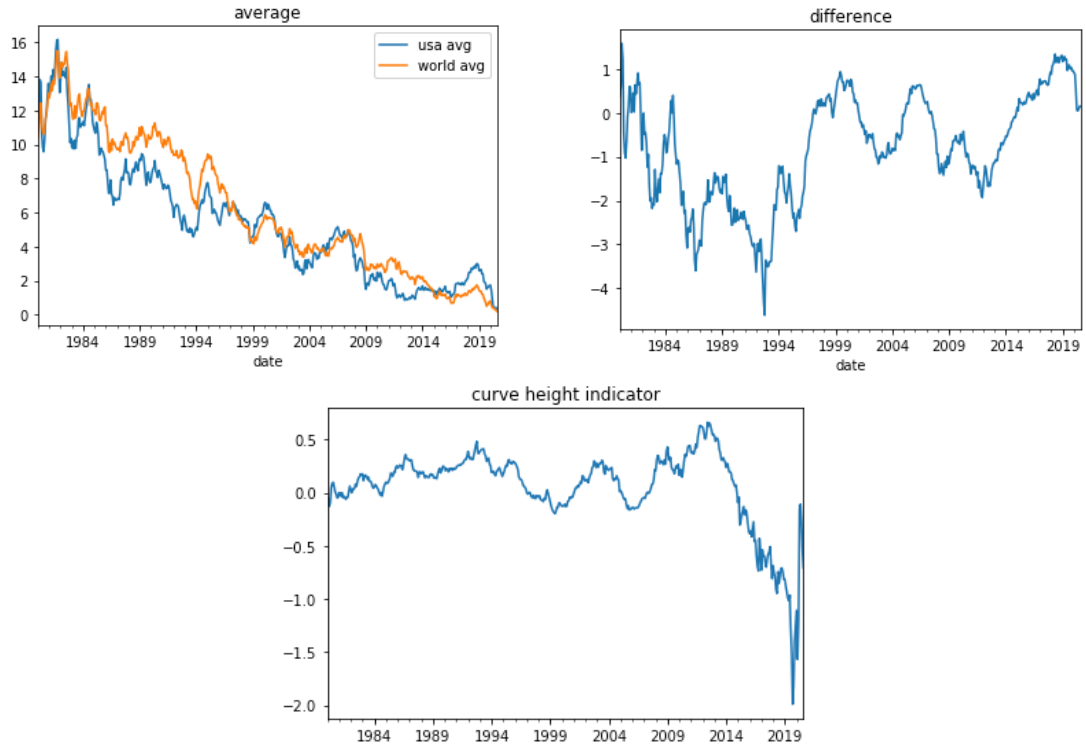
I am currently trying to build an indicator based on curve height. To make it easier, I am only working with the USA bond market. I needed a way to determine if the curve is higher than other curves so I am comparing the US short and long term average to the world average. Currently, my indicator is taking the difference between the US average and the world average to know whether the US curve is high or low. Then, I divided the difference by the world average. My thought process was that investors would be much more incentivized to buy US bonds when US bonds having a 2% average and the world average is 1% because they would be doubling their return. However, they would be less incentivized when US bonds have a 14% average and the world average is 13%.



After my check in, I realize there could be flaws in that logic. I knew from the beginning it would need to be tweaked because as is it goes below -1 and does not really go above 0.5, so even when the difference between the world average and US bond average is high, I am going long with only 0.5 percent of my money which did not make sense. However, Peter and Georgia brought up other questions such as in general, buying the US bond regardless of how big the difference is will still earn an increased yield so why would investors not want to earn more money. Additionally, this poses problems when the averages are very low (such as now). Therefore, I'll try a few more ways of calculating the indicator and see which ones work best. Other ways I will try is to just take the difference (I will have to convert it to a scale of [-1,1] so I could either clip the numbers or divide them I might try both and see what happens to the returns) and looking at how far USA averages deviate from the average.

I looked into various different lags (0, 1, 2, 3, 6, 9, 12 months) for the indicator to see which performed well and the indicator without lag worked the best. In the below graphs, the blue line is the returns from my portfolio (matplot stacked the legends on top of each other I will look into how to fix that). The returns are much lower than that of the markets. I think a reason for this could be my position does not go above 0.5 so my returns are low. I will try different ways of computing my indicator and see what happens. Additionally, Peter mentioned I should look at risk adjusted returns so I will calculate that and see what happens.

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indicator : lag =  0
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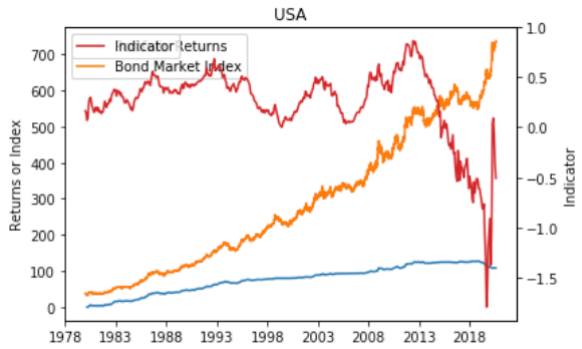


```
max:  127.21764514253576
min:  -0.6541559534686788
```

```
indicator : lag =  3
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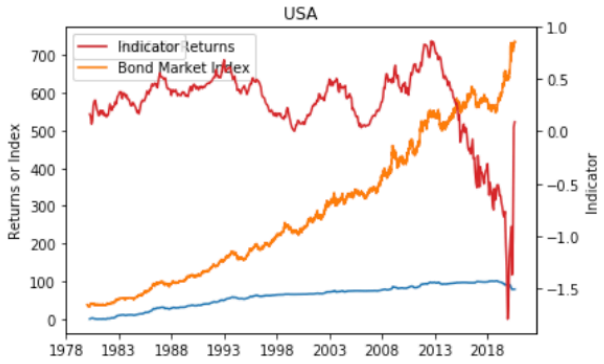


```
max:  100.9290848526629
min:  -0.642679281285325
```

Going forward I will work on the different ways of calculating the curve height indicator and see which has the best returns. I will also add more indicators and look to see ways I could combine them. A preliminary thought I had was to look at the performance of the different indicators over a previous window of time and weight the indicator by its correlation to the returns. Also, I felt my current indicator performed poorly in the last 10 years so I need to look deeper into why that is the case and choose an additional indicator that is better at explaining returns in the past 10 years. One major reason it did so bad was the rates were so low a change of 0.1 would dramatically change the value of the indicator so changing how I calculate the indicator might solve this problem.