

## Empirical analysis

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One question that comes to mind when looking at life expectancy by countries and regions is whether geography matters. In order to investigate this, I compared life expectancies between regions. for this purpose, I aggregated the data by regions and years. the most common aggregation can be considered as mean. Therefore, I plotted the time series graph of these aggregated values by regions over time. However, the mean can be deceiving because it can be affected by outliers therefore, I also aggregated the data using the median for each region and observed that the findings are still valid.

There is an upward trend for all regions from 1960 to 2017. There is a significant difference between regions in terms of life expectancy. North America has the highest life expectancy among all regions. whereas sub-Saharan Africa has always had the lowest life expectancy.

According to Bor et al. (2013), the HIV epidemic in the 1980s led to a dip in life expectancy mainly in Africa. It is evident in the graph below that Sub-Saharan Africa was impacted indeed. The gap between Sub-Saharan Africa and other regions in terms of life expectancy increases after this HIV epidemic. The period of HIV epidemic is annotated in the graph below.

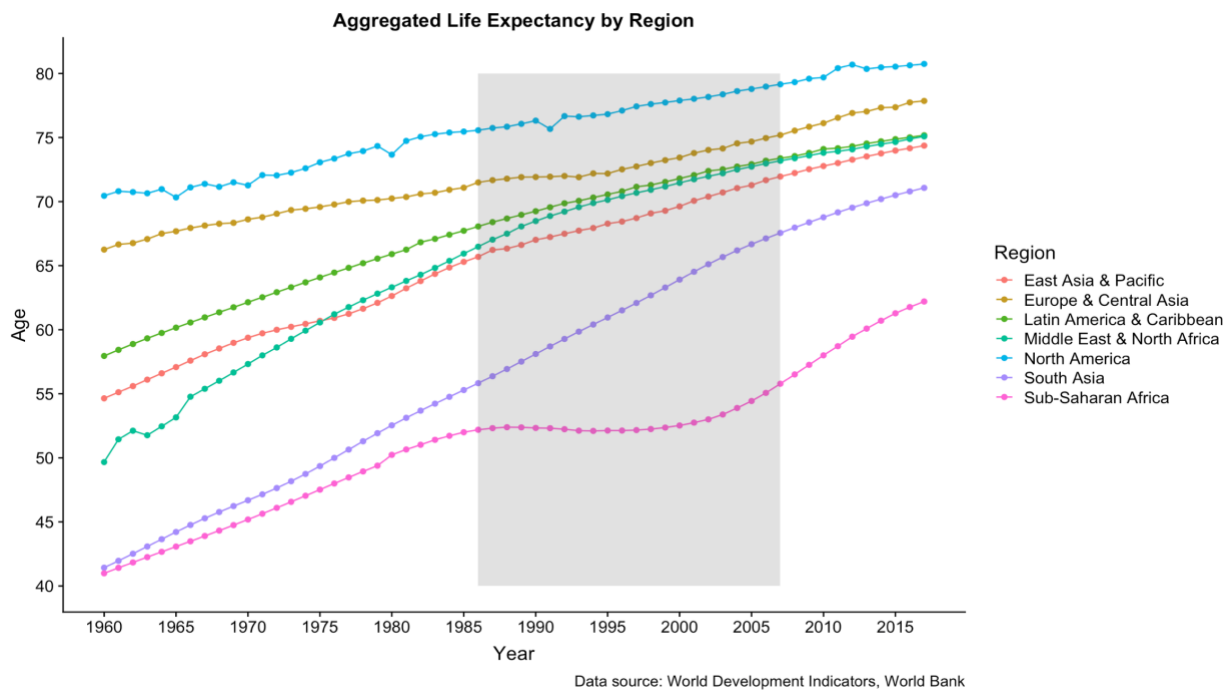


Figure 1: Mean of life expectancy by region. The annotated time window signifies the period during the HIV epidemic.

## Empirical analysis

The Standard deviation shows the variance among countries in each region, From the graph below, we can observe a surge in variance in East Asia & Pacific. This can be further investigated by pinpointing the countries causing this surge in variance if time allowed us to.

We observe another increase in variance for the Sub-Saharan Africa region, which occurs during early 80s. This can be related to the HIV epidemic and can be interpreted as HIV epidemic impacted different countries in Sub-Saharan Africa region at different levels.

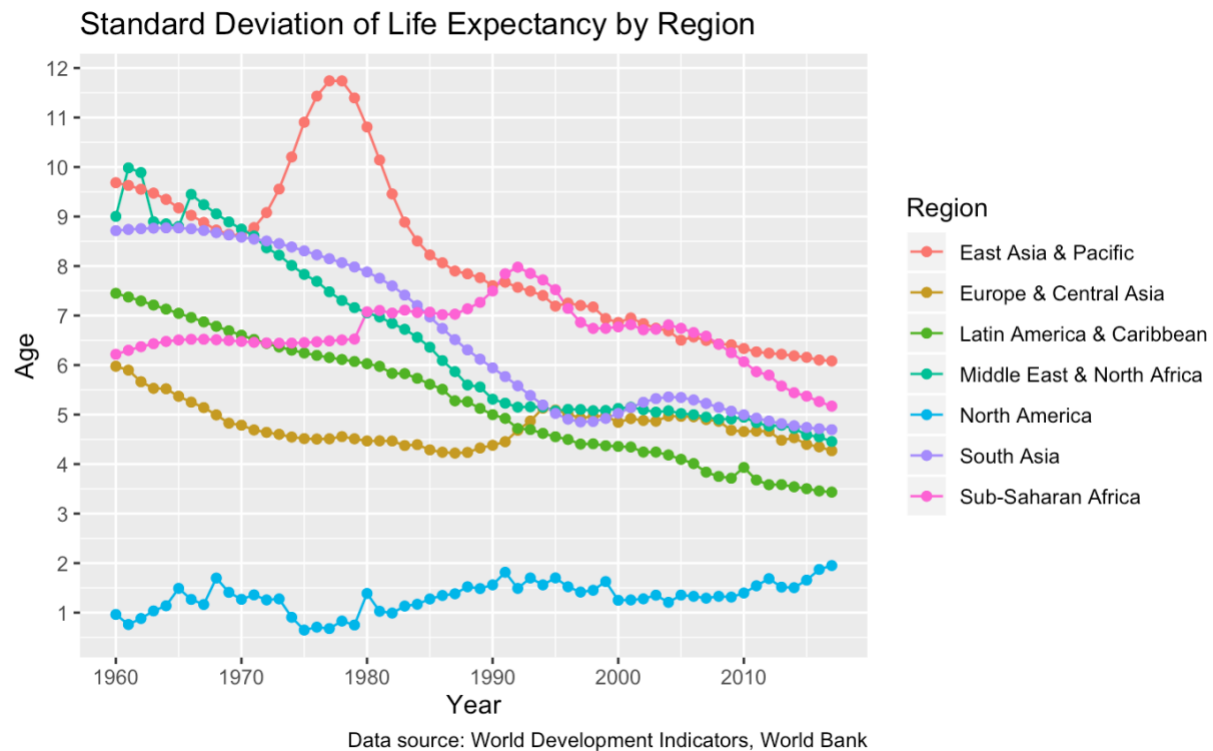


Figure 2: Standard deviation of life expectancy by region.

## References

Bor, J., Herbst, A. J., Newell, M. L., & Bärnighausen, T. (2013). Increases in adult life expectancy in rural South Africa: valuing the scale-up of HIV treatment. *Science*, 339(6122), 961-965.