India’s Trade with the rest of the world

Sanjay chauhan

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Introduction

This report explores India’s trade with the rest of the world from 1997 to 2021. It focuses on imports, exports, total trade, and balance of trade. Some key factors have been kept in focus during the data analysis process such as timely comparison, Trade performance with some of the biggest countries of the world, and also the performance with its neighboring countries. All the manipulations made in the raw form of the data have been made available in the given report.

Raw Data

```
df <- read.csv("exim.csv")
glimpse(df)
## Rows: 5,767
## Columns: 7
## $ Country       <chr> "AFGHANISTAN", "AFGHANISTAN", "AFGHANISTAN",
"AFGHANISTA~
## $ Export        <chr> "21.25", "12.81", "33.2", "25.86", "24.37", "60.77",
"14~
## $ Import        <chr> "10.7", "28.14", "21.06", "26.59", "17.52", "18.46",
"40~
## $ Total.Trade   <chr> "31.95", "40.95", "54.26", "52.45", "41.89",
"79.23", "1~
## $ Trade.Balance <chr> "10.55", "-15.33", "12.15", "-0.73", "6.85",
"42.31", "1~
## $ Year.start.   <int> 97, 98, 99, 2000, 2001, 2002, 2003, 2004, 2005,
2006, 20~
## $ Year.end.     <int> 98, 99, 2000, 2001, 2002, 2003, 2004, 2005, 2006,
2007, ~
```

Data cleaning process

Note- We are keeping the start year as the base year for analysis and ignoring the financial year approaches to make analysis more flexible and convenient. Hence the “End year” column is of no use for analysis purposes.

```
df <- df %>% select(-Year.end.)
```

Modification in the column names

```
names(df) <- tolower(names(df))
df <- df %>% rename(total_trade=total.trade)
df <- df %>% rename(trade_balance= trade.balance)
df <- df %>% rename(year=year.start.)
```

Rectification of datatypes. To convert the numbers from character datatypes to numeric we need to first remove "," from numbers otherwise NAs will be introduced by coercion.

```
df$export <- gsub("," , "", df$export)
df$import <- gsub(",","",df$import)
df$total_trade <- gsub(",","",df$total_trade)
df$trade_balance <- gsub(",","",df$trade_balance)
```

Datatypes rectification-

```
df$export <- as.numeric(df$export)
df$import <- as.numeric(df$import)
df$total_trade <- as.numeric(df$total_trade)
df$trade_balance <- as.numeric(df$trade_balance)
```

Now, we shall take notice of NAs and empty cells if there any

```
df %>% map(~sum(is.na(.)))
## $country
## [1] 0
##
## $export
## [1] 8
##
## $import
## [1] 532
##
## $total_trade
## [1] 566
##
## $trade_balance
## [1] 566
##
## $year
## [1] 0
```

Now let's see those NAs in dataframe

```
df %>% filter(!complete.cases(.)) %>% head(10)
##         country export import total_trade trade_balance year
## 1       ALBANIA   0.91     NA          NA            NA   99
## 2  AMERI SAMOA   0.06   0.06          NA            NA   97
## 3  AMERI SAMOA   0.59     NA          NA            NA   99
## 4  AMERI SAMOA   0.71     NA          NA            NA 2000
## 5  AMERI SAMOA   0.19     NA          NA            NA 2001
## 6       ANDORRA   0.02     NA          NA            NA   99
## 7       ANDORRA   0.09     NA          NA            NA 2000
## 8       ANDORRA   0.27     NA          NA            NA 2001
## 9       ANDORRA   0.09     NA          NA            NA 2005
```

```
## 10     ANDORRA   4.75     NA          NA            NA 2017
```

If we look at the data with empty rows we find that majority of them are either small island nations or part of other territories and they are not contributing any significant value and in the absence of alternatives we shall drop NAs to avoid chaos in the analysis phase.

```
df <- df %>% drop_na()
dim(df)
## [1] 5201    6
```

Switching country names from upper case to proper case

```
df$country <- str_to_title(df$country)
head(df)
##       country export import total_trade trade_balance year
## 1 Afghanistan  21.25  10.70       31.95         10.55   97
## 2 Afghanistan  12.81  28.14       40.95        -15.33   98
## 3 Afghanistan  33.20  21.06       54.26         12.15   99
## 4 Afghanistan  25.86  26.59       52.45         -0.73 2000
## 5 Afghanistan  24.37  17.52       41.89          6.85 2001
## 6 Afghanistan  60.77  18.46       79.23         42.31 2002
```

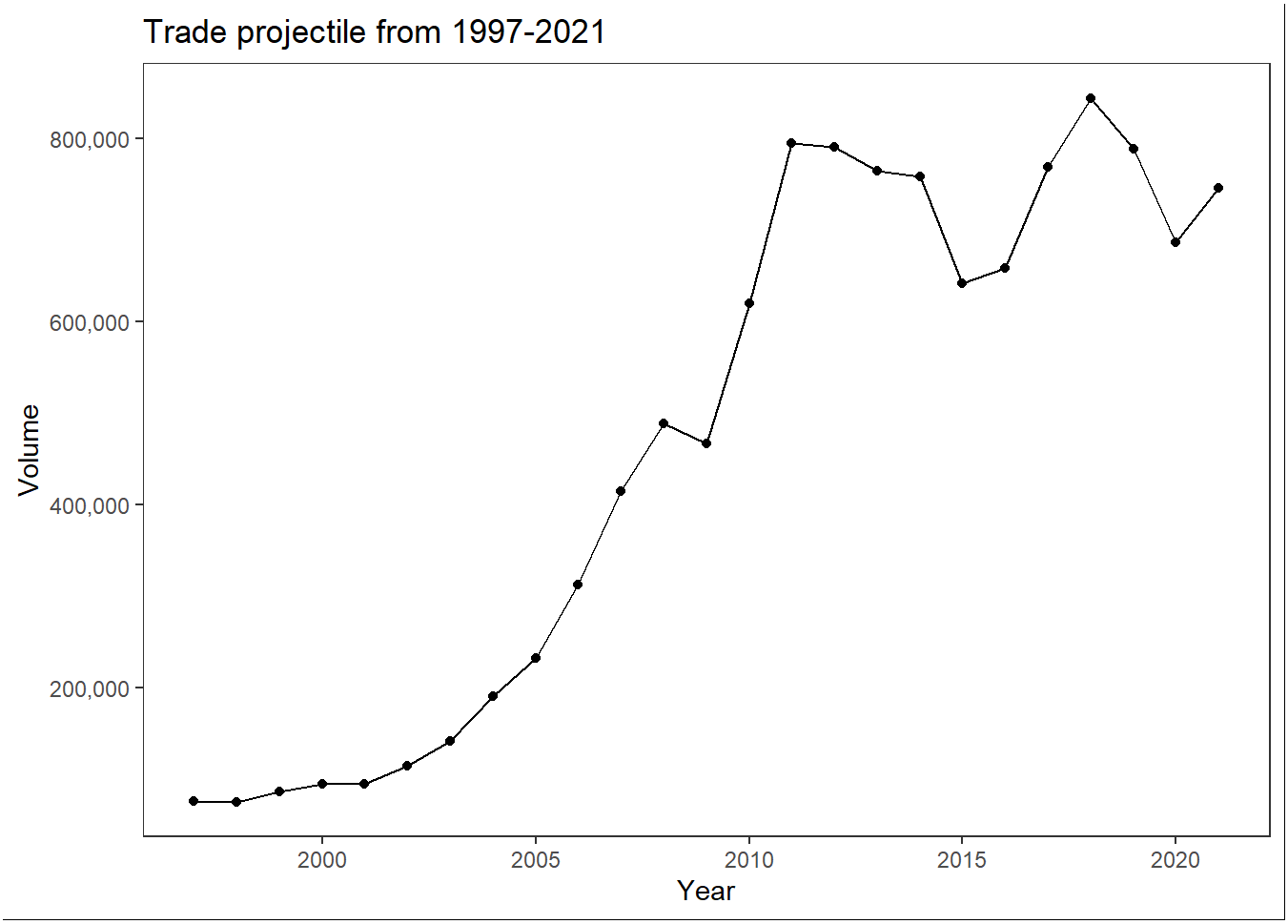
Modification in some inconsistent attributes

```
df$year[df$year==97] <- 1997
df$year[df$year==98] <- 1998
df$year[df$year==99] <- 1999
df$country[df$country=="China P Rp"]<- "China"
df$country[df$country=="U S A"]<-"USA"
df$country[df$country=="U Arab Emts"]<- "UAE"
df$country[df$country=="Sri Lanka Dsr"] <- "Sri Lanka"
df$country[df$country=="Bangladesh Pr"] <- "Bangladesh"
df$country[df$country=="Pakistan Ir"] <- "Pakistan"
```

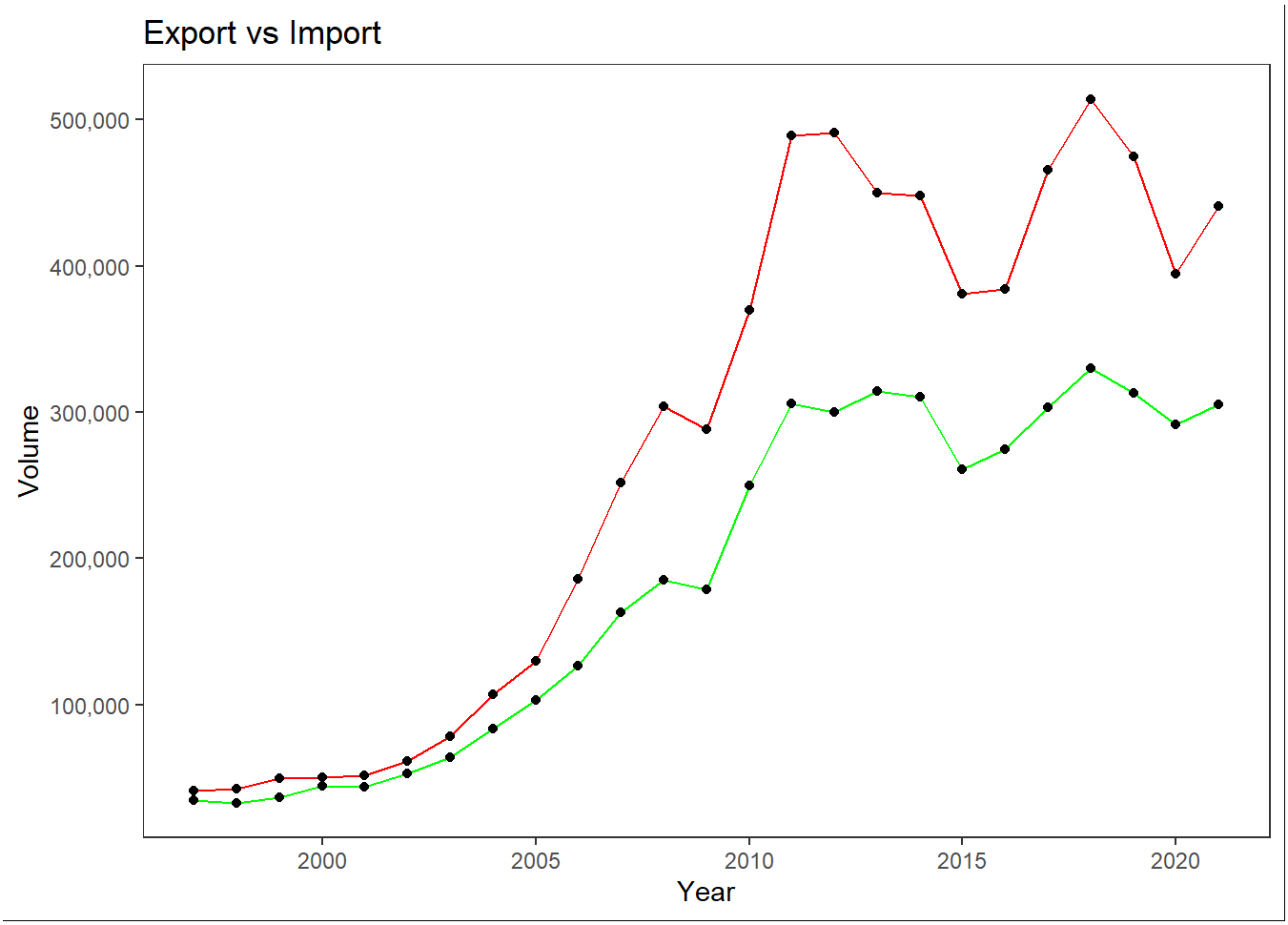
Now data seems reliable, consistent and clean enough to proceed for analysis phase.

Analysis & Visualization

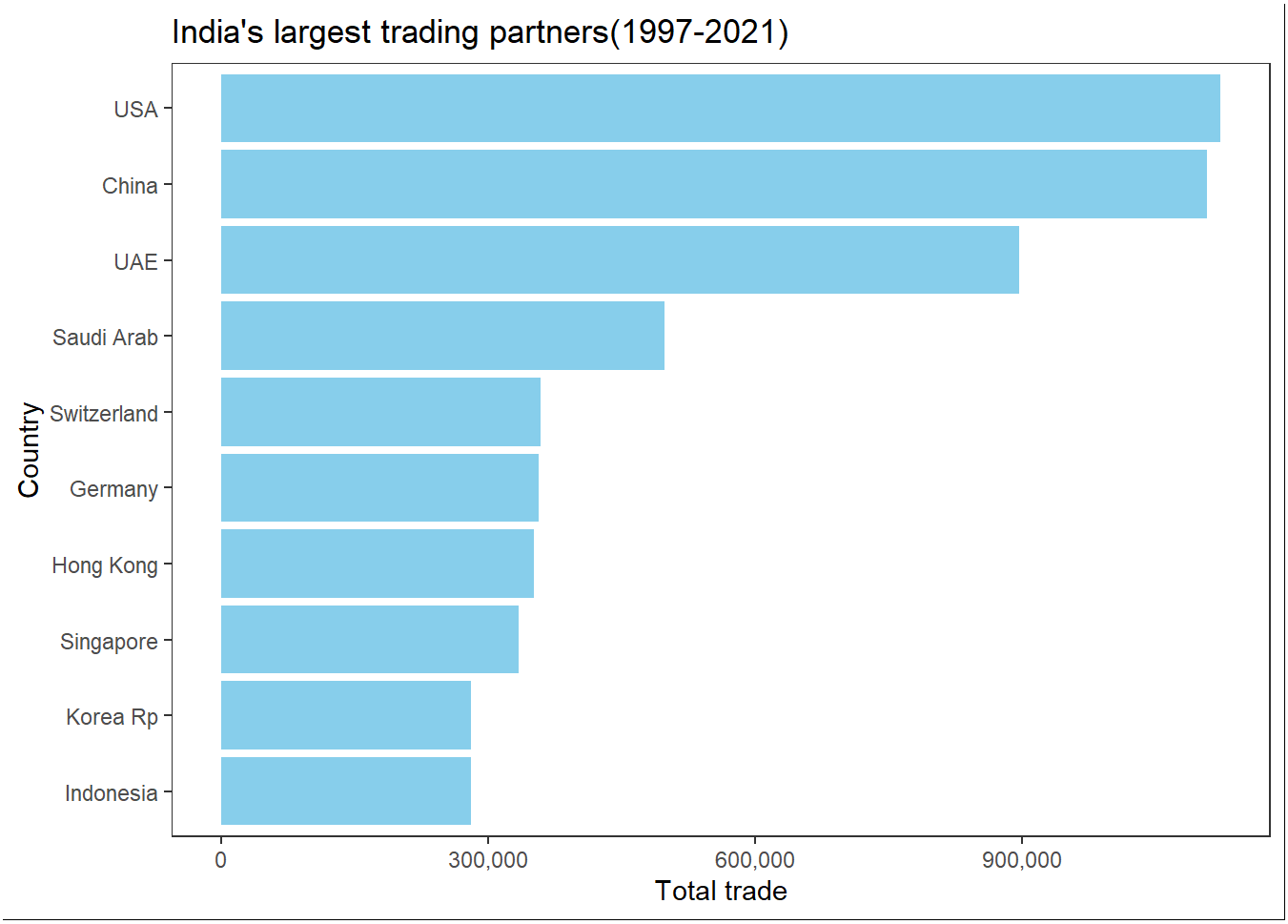
Projection of the volume of trade(1997-2021)



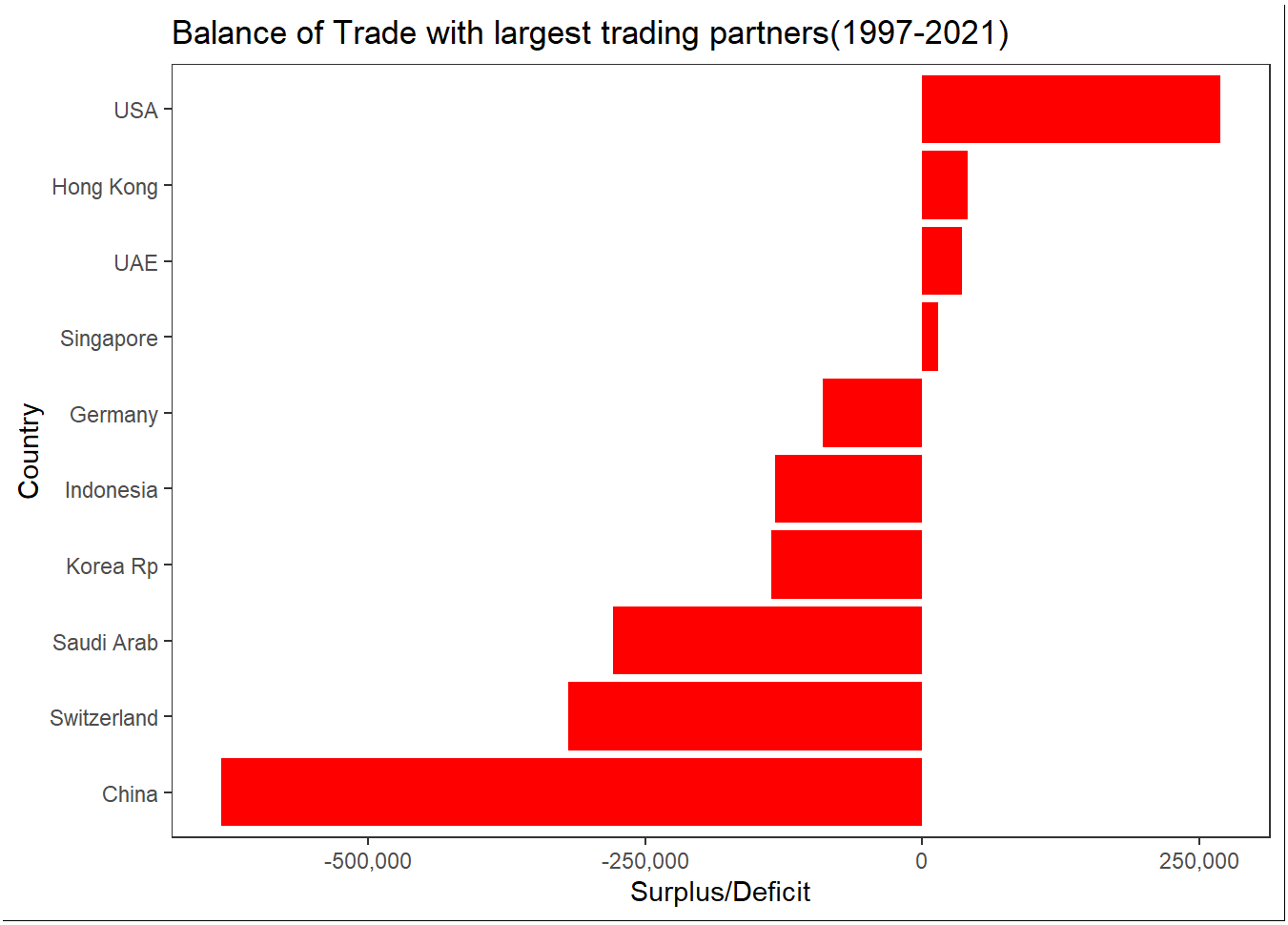
Export and Import comparison



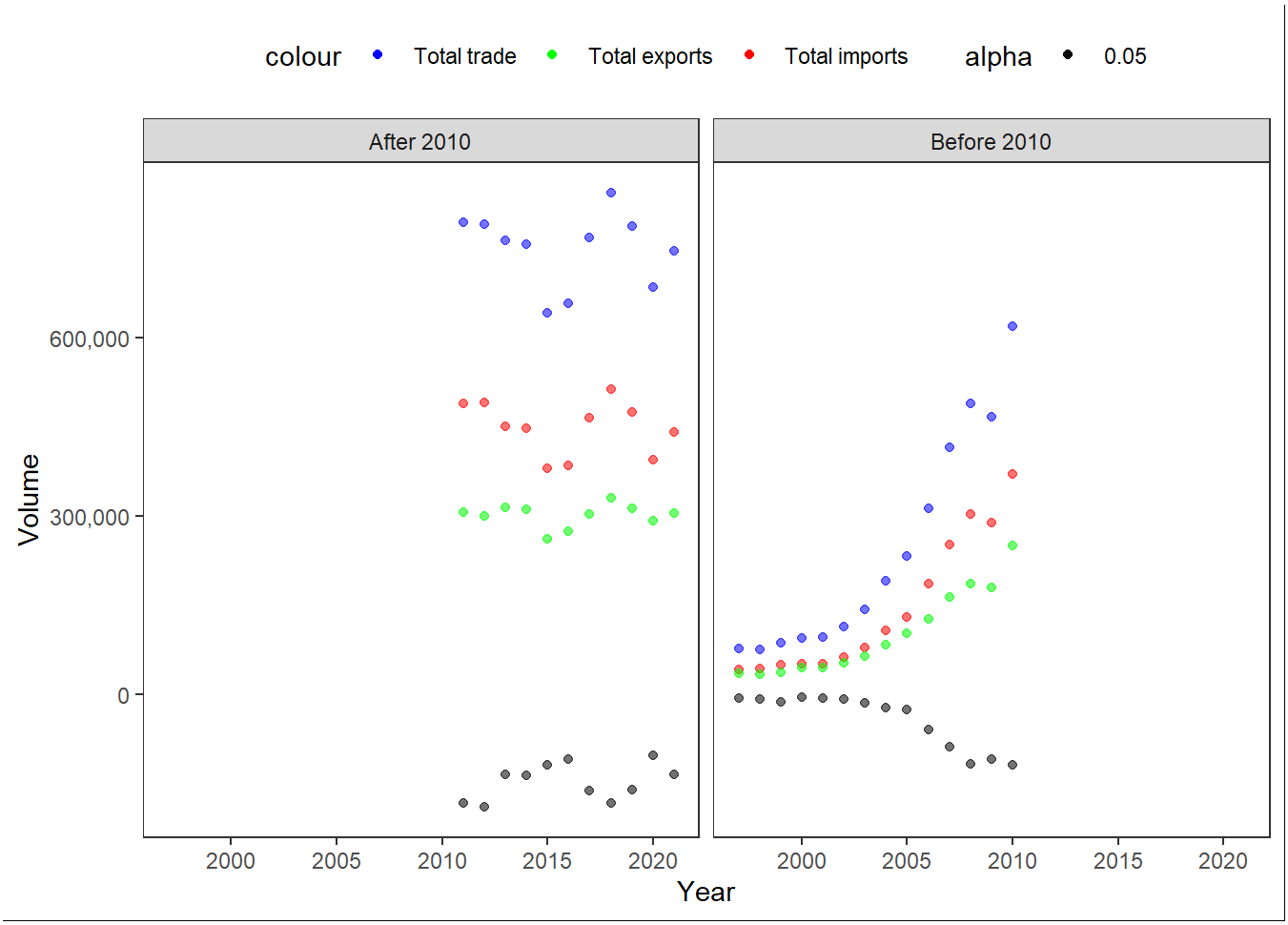
Largest trading partner of India from 1997-2021



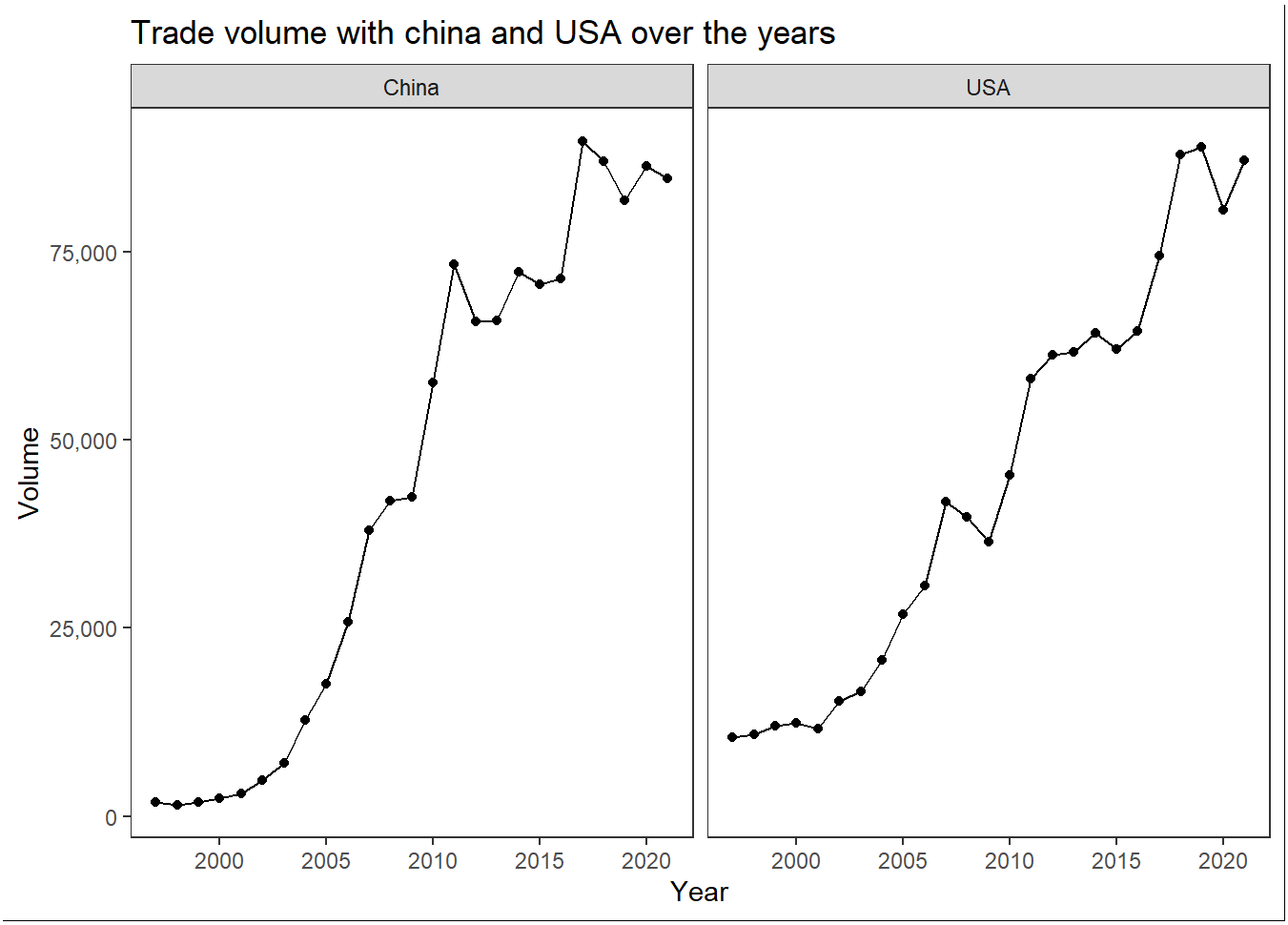
Balance of Trade

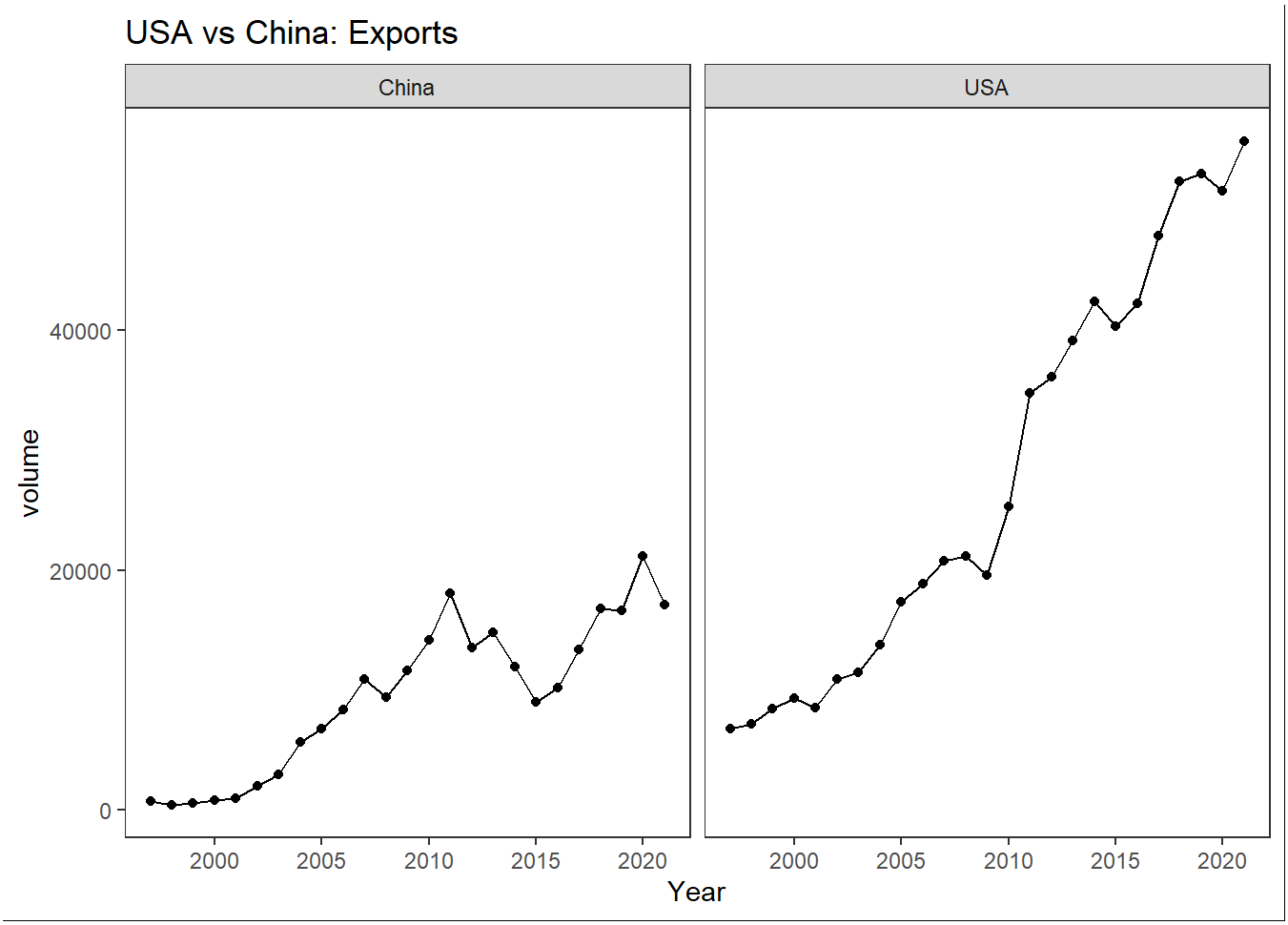


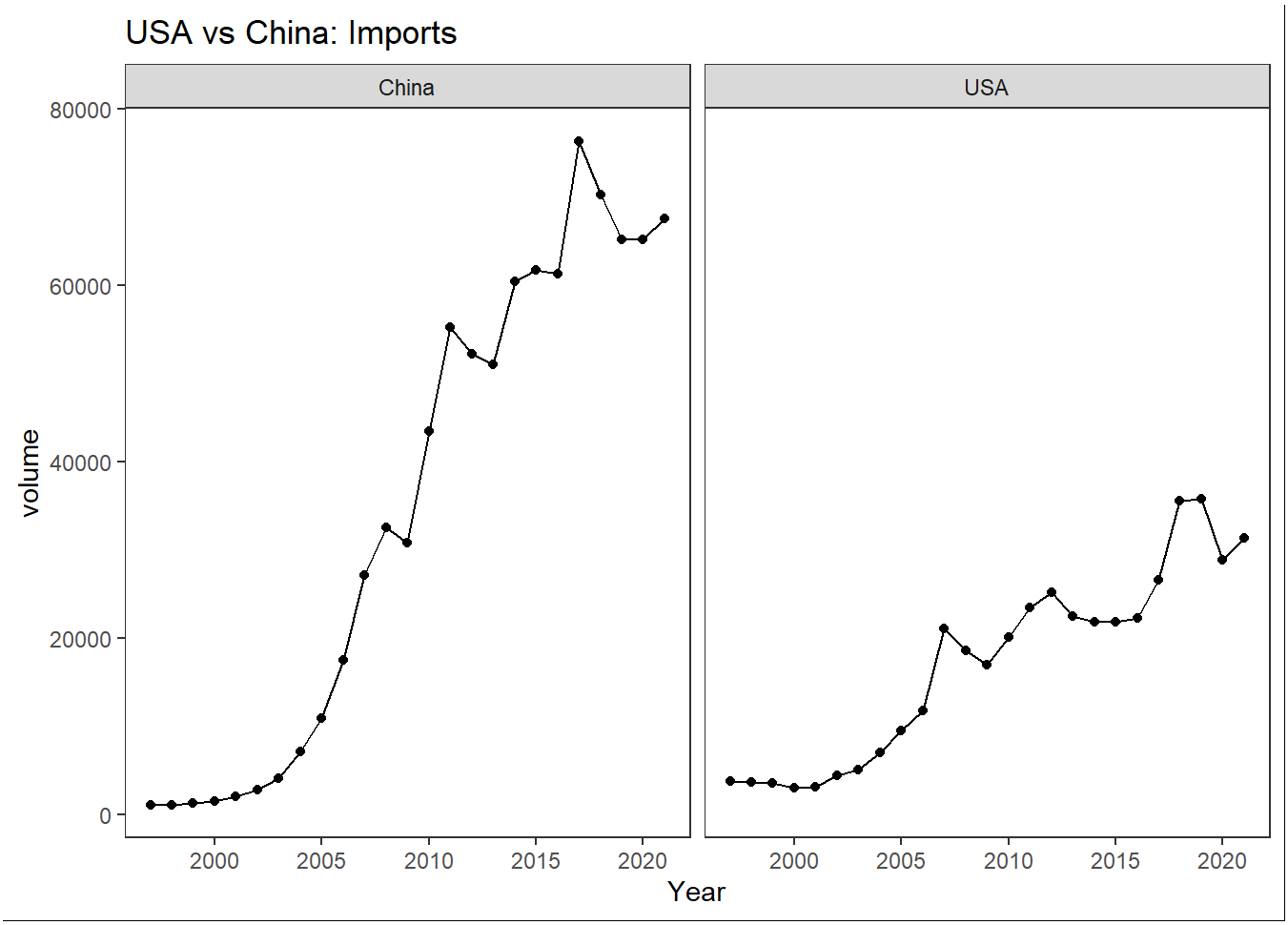
Before and after 2010: A comparison

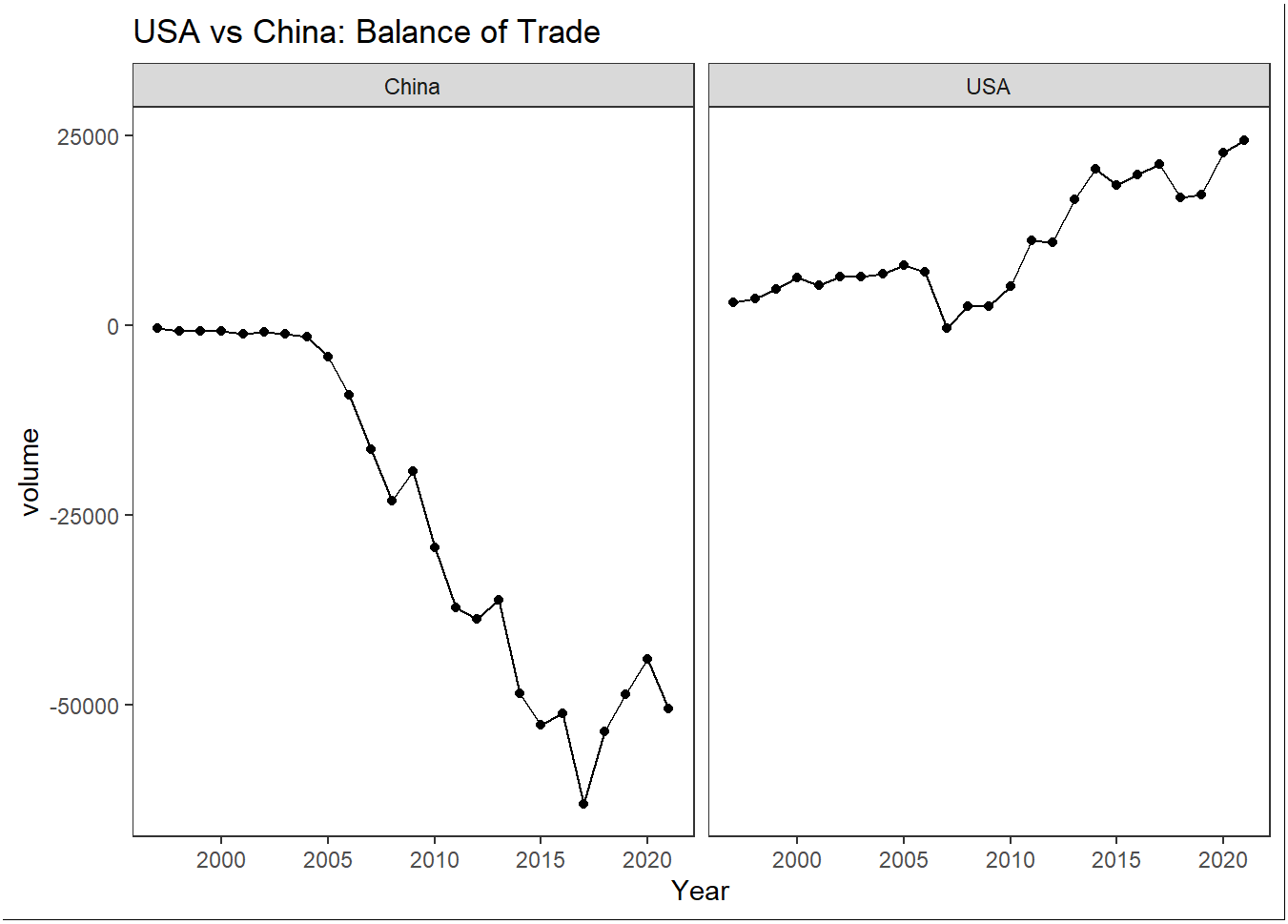


India's Trade with the USA and China-

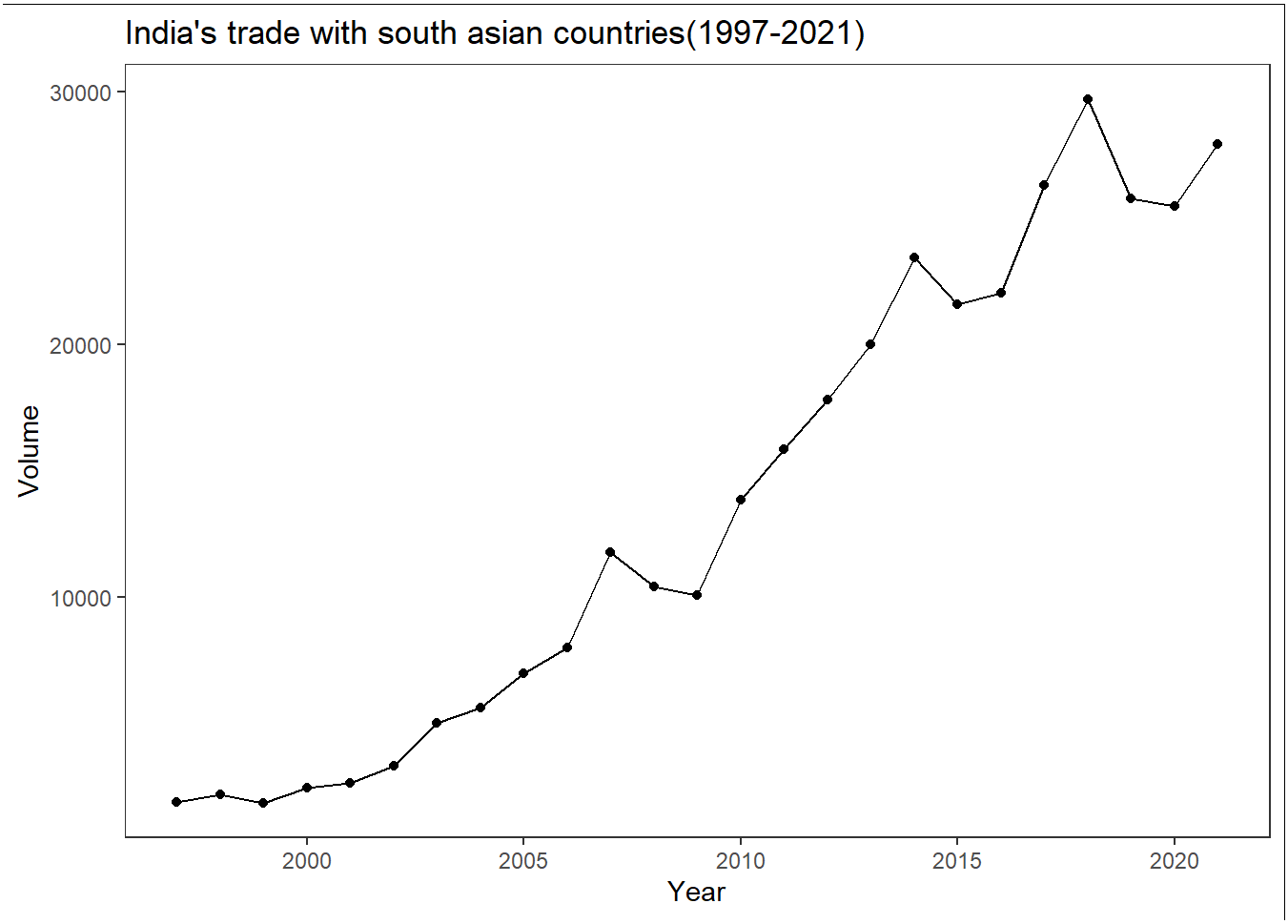

Trade volume with china and USA over the years
China
USA
Volume
75,000
50,000
25,000
0
2000
2005
2010
2015
2020
Year

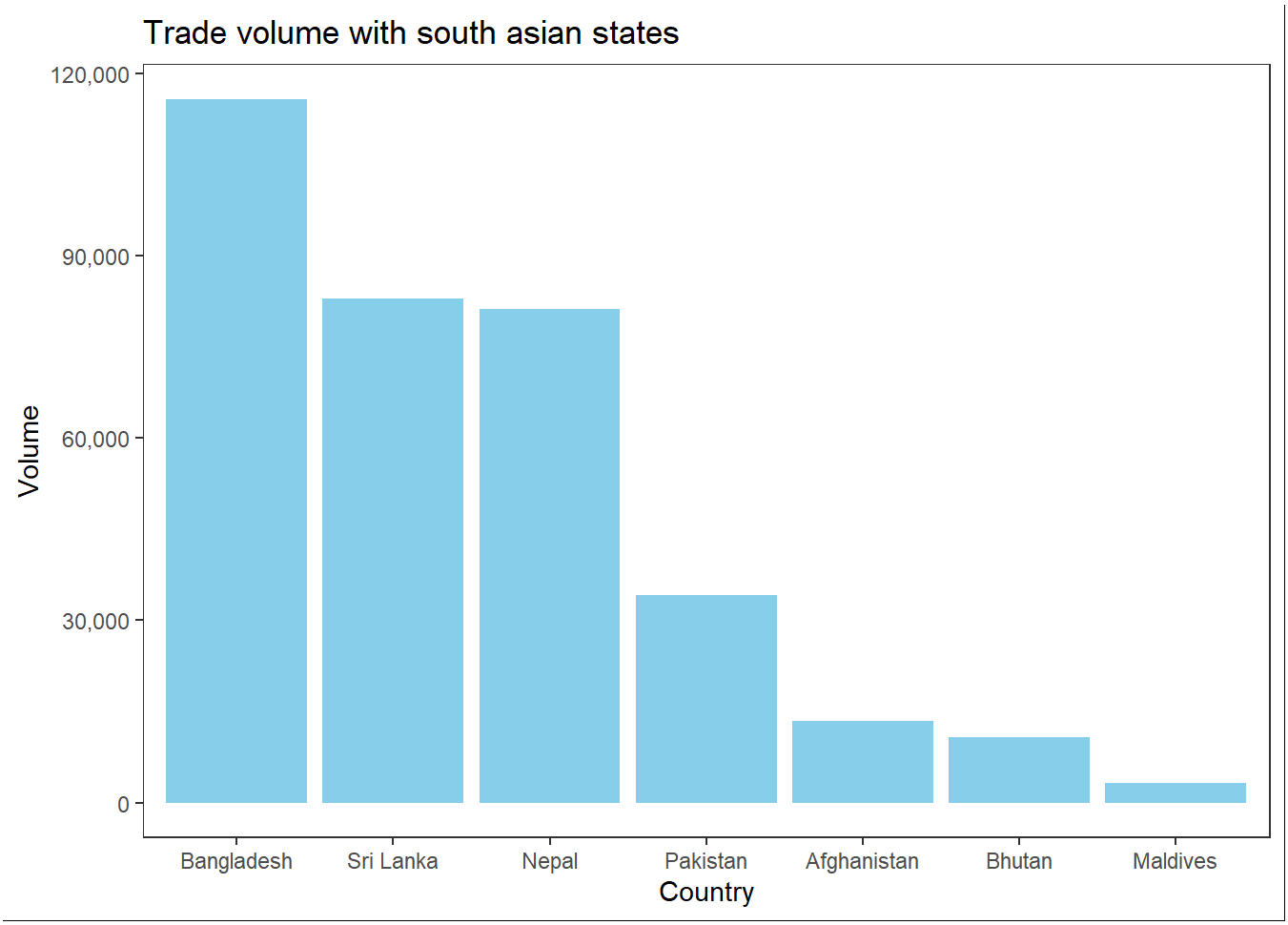

USA vs China: Exports
China
USA
40000
20000
0
volume
2000
2005
2010
2015
2020
Year

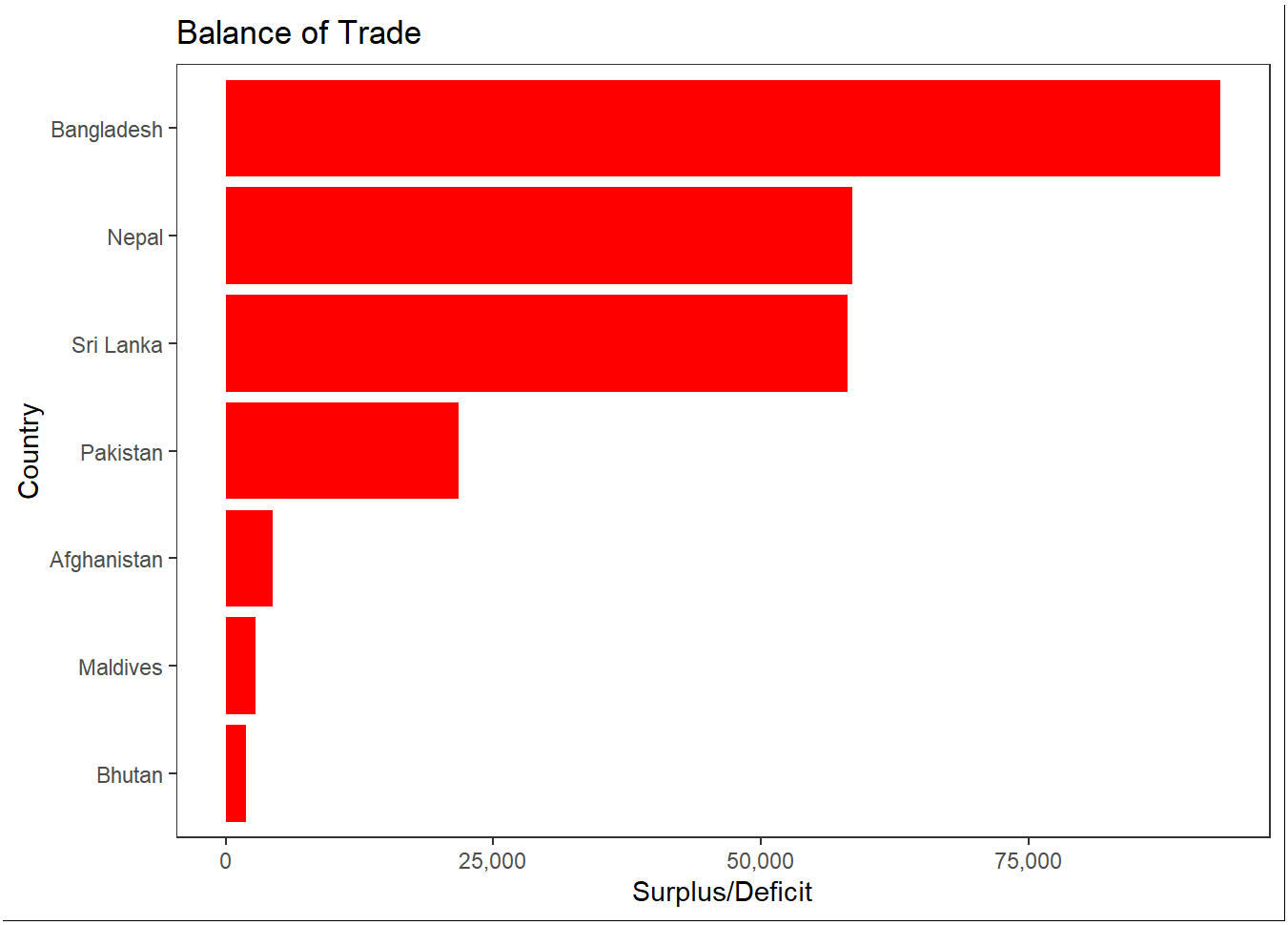

USA vs China: Imports
China
USA
80000
60000
40000
20000
0
volume
2000
2005
2010
2015
2020
Year



India’s trade with its neighboring states


India's trade with south asian countries(1997-2021)
30000
20000
10000
Volume
2000
2005
2010
2015
2020
Year


Trade volume with south asian states
120,000
90,000
60,000
30,000
0
Volume
Bangladesh
Sri Lanka
Nepal
Pakistan
Afghanistan
Bhutan
Maldives
Country



Conclusion

In this analysis, we explored India's trading relationship with the rest of the world. However, our point of focus while analysis was- - India's performance in different time phases - Trade relations with China and the US - Trade relations with its neighboring states

Before and After 2010

Looking at the performance of the country in different time phases namely before and after 2010, we see that the growth rate is commendable especially before 2010 however after that we could not maintain the same stability as before. Before 2010, the projectile looks stable and it witnessed a dip only in the year 2009 and most likely reason would be The great recession of 2008 and after that, we still see a massive growth till the year 2015. And after that year we could not maintain that stability however our trade was historically high in the financial year 2017-2018 still we witnessed a dip in the very next year. What we can conclude is that we could not maintain a steady pace in long run.

Trade relations with China and the United States

China and the US are the two biggest trading partners of India from the initial stages however we see that trade with China has gone up a few years after the initial stages and with the US its consistently high. If we focus we would see that trade with China has seen a mass growth after 2010.

Looking at the Balance of trade, we find that the country maintains a massive deficit with China hence trading with china is not as beneficial as it's with the US. The deficit with China is concerning as it's continuously getting wider. However, India maintains a consistent trading surplus with the US.

Trade relations with its neighboring states

Trading performance with south Asian countries depicts almost the same pattern as trading with the rest of the world i.e. it has seen a continuous rise and it also indicates an exponential growth after 2010. However, one key difference is that we have maintained a stable growth rate in this particular scenario which is the opposite when it comes to measuring it as a whole. In fact, after 2015 we have witnessed a massive rise till the year 2018. The other good thing is that we have a consistent trading surplus with every country in this region.