

# Linux & GitHub

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  - 2. GitHub**
  - 3. Research & Predictions**
  - 4. Data**
  - 5. Explorative Analysis**
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  - 8. Takeaway Questions**
-



# 1. Context

# 1: Context

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- UN Comtrade Global Trade dataset
  - 2014-2025
  - 200+ Countries
  - Merchandise/Goods Trade
  - Imports & Exports by year



**UN Comtrade Database**

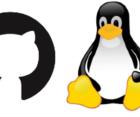
- Most reputable source for trade analysis, used by researchers and policymakers





## 2. GitHub

# 2: GitHub



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GitHub was used to ensure our analysis was collaborative, transparent, and reproducible.

## Why GitHub?

- Easy version control and collaboration
  - Codespaces allow everyone to work on the project simultaneously without overwriting each other
- Complete project history visible at a glance
  - Able to restore and backup work easily
- GitHub Desktop removes the need to memorise commands
- Built in LLM assistant (co-pilot) for troubleshooting
- Community of 100M users (larger than any competitor)
  - Plenty of public datasets and forum discussions

Contributors 3



ggmax-gif Shun Him Daniel Fung



harrymcdiarmid1



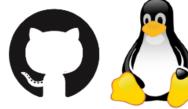
alicemcm



## Key Git commands used:

- git push
- git pull
- git commit

# 2: GitHub



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**Data-Science** Public

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main · 1 Branch · 0 Tags

Go to file Add file Code

harrymcclarmid1 Presentation Slides ed520dc · now 15 Commits

Data Science in Economics.pdf Presentation Slides now

README.md Update README.md 6 hours ago

Tariffline\_2\_3\_2026\_22\_15\_30.csv Tariffline data 4 days ago

cleantradedata.csv Clean data set 5 hours ago

trade data analysis.xlsx Add files via upload 2 days ago

trade\_analysis\_commands.sh Add Linux commands for trade data analysis 2 days ago

tradedata.csv Update and rename TradeData\_1\_30\_2026\_11\_38\_56.csv to ... 2 days ago

README

**Data Science in Economics: Global Trade Analysis**

BEE2041 Group Project | University of Exeter

LINUX GITHUB

**Project Overview**

Analysing a decade of global merchandise trade (2014–2024) using Linux command-line tools and GitHub collaboration. This project demonstrates how to efficiently clean and analyse large datasets using AWK, grep, and other Unix utilities. We used the [UN Comtrade Database](#) covering 200+ countries to explore international trade patterns.

**Research Questions**

- How have global trade patterns evolved from 2014 to 2024?
- What was COVID-19's impact on international trade?
- Which countries experienced the most significant growth?

**Command-Line Tools**

Linux tools were used to clean and analyse the data efficiently:

**About**

BEE2041 Group project

Readme Activity 0 stars 0 watching 0 forks Report repository

**Releases**

No releases published Create a new release

**Packages**

No packages published Publish your first package

**Contributors**

harrymcclarmid1 gmax-gif Shun Him Daniel Fung alicemcm

**Languages**

Shell 100.0%



## 3. Research & Predictions

# 3: Research Questions & Predictions

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## 1. How have global trade patterns changed from 2014 to 2024?

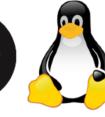
- Higher volume (+30% from 2024 vs 2014) with trade being more concentrated among the wealthier countries.

## 2. What was COVID-19's impact on global trade?

- Sharp decline (15-20% drop from 2019 levels) with recovery after 2021.

## 3. Which countries trade grew the most over the decade?

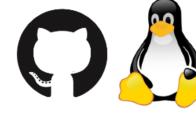
- China, Vietnam, USA, India, Germany. Mixture of established trading powerhouses and strong emerging economies.



## 4. Data

## 4.1: Data - Exploration

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1. `head -5 tradedata.csv`
  2. `wc -l tradedata.csv`
  3. `head -1 tradedata.csv | awk -F',' '{print NF}'`
  4. `tail -n +2 tradedata.csv | cut -d',' -f4 | sort -u`
  5. `tail -n +2 tradedata.csv | cut -d',' -f4 | sort | uniq -c`
  6. `tail -n +2 tradedata.csv | cut -d',' -f9 | sort -u | wc -l`
-

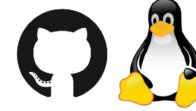
# 4.1: Data - Exploration



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```
harry@DESKTOP-NBN7GRH:/mnt/c/Users/harry/Downloads$ head -5 tradedata.csv
typeCode,freqCode,refPeriodId,refYear,refMonth,period,reporterCode,reporterISO,reporterDesc,flowCode,flowDesc,partnerCode,partnerISO,partnerDesc,partner2Code,partner2ISO,partner2Desc,classificationCode,classificationSearchCode,isOriginalClassification,cmdCode,cmdDesc,aggrLevel,isLeaf,customsCode,customsDesc,mosCode,motCode,motDesc,qtyUnitCode,qtyUnitAbbr,qty,isQtyEstimated,altQtyUnitCode,altQtyUnitAbbr,altQty,isAltQtyEstimated,netWgt,isNetWgtEstimated,grossWgt,isGrossWgtEstimated,cifvalue,fobvalue,primaryValue,legacyEstimationFlag,isReported,isAggregate
"C","A","20140101","2014","52","2014","4","AFG","Afghanistan","M","Import","0","W00","World","0","W00","H2","HS","true","TOTAL","All Commodities","0","false","C00","TOTAL CPC","0","0","TOTAL MOT","-1","N/A","","false","false","false","7697178170","","7697178170","0","true","false",
"C","A","20140101","2014","52","2014","4","AFG","Afghanistan","X","Export","0","W00","World","0","W00","H2","HS","true","TOTAL","All Commodities","0","false","C00","TOTAL CPC","0","0","TOTAL MOT","-1","N/A","","false","false","false","570534007","570534007","0","true","false",
"C","A","20140101","2014","52","2014","4","ALB","Albania","M","Import","0","W00","World","0","W00","H4","HS","true","TOTAL","All Commodities","0","false","C00","TOTAL CPC","0","0","TOTAL MOT","-1","N/A","","false","false","false","5229972238","5229972238","0","true","false",
"C","A","20140101","2014","52","2014","8","ALB","Albania","X","Export","0","W00","World","0","W00","H4","HS","true","TOTAL","All Commodities","0","false","C00","TOTAL CPC","0","0","TOTAL MOT","-1","N/A","","false","false","false","2430723644","2430723644","0","true","false",
harry@DESKTOP-NBN7GRH:/mnt/c/Users/harry/Downloads$ wc -l tradedata.csv
3702 tradedata.csv
harry@DESKTOP-NBN7GRH:/mnt/c/Users/harry/Downloads$ head -1 tradedata.csv | awk -F',' '[print NF]'
47
harry@DESKTOP-NBN7GRH:/mnt/c/Users/harry/Downloads$ tail -n +2 tradedata.csv | cut -d',' -f4 | sort -u
"2014"
"2015"
"2016"
"2017"
"2018"
"2019"
"2020"
"2021"
"2022"
"2023"
"2024"
"2025"
harry@DESKTOP-NBN7GRH:/mnt/c/Users/harry/Downloads$ tail -n +2 tradedata.csv | cut -d',' -f4 | sort | uniq -c
 342 "2014"
 346 "2015"
 353 "2016"
 360 "2017"
 356 "2018"
 344 "2019"
 338 "2020"
 338 "2021"
 332 "2022"
 326 "2023"
 264 "2024"
   2 "2025"
harry@DESKTOP-NBN7GRH:/mnt/c/Users/harry/Downloads$ tail -n +2 tradedata.csv | cut -d',' -f9 | sort -u | wc -l
```

## 4.2: Data - Cleaning



Variable Name	Description
refYear	Year of Trade
reporterDesc	Country Name
flowDesc	Import/Export direction
primaryValue	Trade value (USD)

```
tail -n +2 tradedata.csv | cut -d ',' -fX | sort -u
```



Shows bottom of file  
starting from line 2



Takes output from  
previous cmd and  
feeds to next cmd

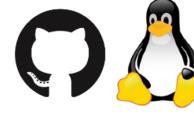


Extracts specified  
column (field X) from  
the data



Sorts alphabetically  
and shows unique  
values

## 4.2: Data - Cleaning



```
harry@DESKTOP-NBN7GRH:/mnt/c/Users/harry/Downloads$ tail -n +2 tradedata.csv | cut -d',' -f1 | sort -u
C
harry@DESKTOP-NBN7GRH:/mnt/c/Users/harry/Downloads$ tail -n +2 tradedata.csv | cut -d',' -f2 | sort -u
A
harry@DESKTOP-NBN7GRH:/mnt/c/Users/harry/Downloads$ tail -n +2 tradedata.csv | cut -d',' -f5 | sort -u
52
harry@DESKTOP-NBN7GRH:/mnt/c/Users/harry/Downloads$ tail -n +2 tradedata.csv | cut -d',' -f12 | sort -u
0
harry@DESKTOP-NBN7GRH:/mnt/c/Users/harry/Downloads$ tail -n +2 tradedata.csv | cut -d',' -f14 | sort -u
World
harry@DESKTOP-NBN7GRH:/mnt/c/Users/harry/Downloads$ tail -n +2 tradedata.csv | cut -d',' -f21 | sort -u
TOTAL
harry@DESKTOP-NBN7GRH:/mnt/c/Users/harry/Downloads$ tail -n +2 tradedata.csv | cut -d',' -f22 | sort -u
All Commodities
harry@DESKTOP-NBN7GRH:/mnt/c/Users/harry/Downloads$ tail -n +2 tradedata.csv | cut -d',' -f23 | sort -u
0
harry@DESKTOP-NBN7GRH:/mnt/c/Users/harry/Downloads$ tail -n +2 tradedata.csv | cut -d',' -f24 | sort -u
FALSE
harry@DESKTOP-NBN7GRH:/mnt/c/Users/harry/Downloads$ tail -n +2 tradedata.csv | cut -d',' -f29 | sort -u
TOTAL MOT
harry@DESKTOP-NBN7GRH:/mnt/c/Users/harry/Downloads$ tail -n +2 tradedata.csv | cut -d',' -f30 | sort -u
-1
harry@DESKTOP-NBN7GRH:/mnt/c/Users/harry/Downloads$ tail -n +2 tradedata.csv | cut -d',' -f32 | sort -u
0
harry@DESKTOP-NBN7GRH:/mnt/c/Users/harry/Downloads$ tail -n +2 tradedata.csv | cut -d',' -f38 | sort -u
0
```

## 4.2: Data - Cleaning

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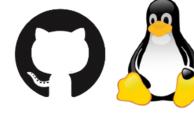


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7. `cut -d',' -f4,9,11,44 tradedata.csv > cleantradedata.csv`
8. `head -5 cleantradedata.csv`
9. `grep "," cleantradedata.csv | wc -l`

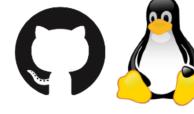
## 4.2: Data - Cleaning

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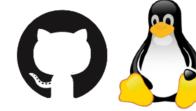
```
harry@DESKTOP-NBN7GRH:/mnt/c/Users/harry/Downloads$ cut -d',' -f4,9,11,44 tradedata.csv > cleantradedata.csv
harry@DESKTOP-NBN7GRH:/mnt/c/Users/harry/Downloads$ head -5 cleantradedata.csv
refYear,reporterDesc,flowDesc,primaryValue
2014,Afghanistan,Import,7697178170
2014,Afghanistan,Export,570534007
2014,Albania,Import,5229972238
2014,Albania,Export,2430723644
harry@DESKTOP-NBN7GRH:/mnt/c/Users/harry/Downloads$ grep ",," cleantradedata.csv | wc -l
0
```



## 5. Explorative Analysis

# 5.1: Explorative Analysis

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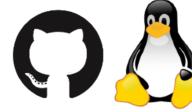


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## 1. How have global trade patterns changed from 2014 to 2024?

10. `awk -F',' '$3 ~ /Export/ && $1 ~ /2014/ {sum+=$4} END {print sum}' cleantradedata.csv`
11. `awk -F',' '$3 ~ /Export/ && $1 ~ /2024/ {sum+=$4} END {print sum}' cleantradedata.csv`
12. `awk -F',' '$3 ~ /Import/ && $1 ~ /2014/ {sum+=$4} END {print sum}' cleantradedata.csv`
13. `awk -F',' '$3 ~ /Import/ && $1 ~ /2024/ {sum+=$4} END {print sum}' cleantradedata.csv`

# 5.1: Explorative Analysis



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Processes line by line  
Sets comma as field separator  
(CSV)

Finds data containing specified trade direction in column 3

Finds data containing year in column 1

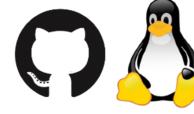
```
awk -F',' '$3 ~ /TRADEDIRECTION/ && $1 ~ /YEAR/  
{sum+=$4} END {print sum}' cleantradedata.csv
```

Adds column 4 value to total

Prints total after all rows processed

# 5.1: Explorative Analysis

---



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```
harry@DESKTOP-NBN7GRH:/mnt/c/Users/harry/Downloads$ awk -F',' '$3 ~ /Export/ && $1 ~ /2014/ {sum+=$4} END {print sum}' cleantradedata.csv
1.76371e+13
harry@DESKTOP-NBN7GRH:/mnt/c/Users/harry/Downloads$ awk -F',' '$3 ~ /Export/ && $1 ~ /2024/ {sum+=$4} END {print sum}' cleantradedata.csv
2.0711e+13
harry@DESKTOP-NBN7GRH:/mnt/c/Users/harry/Downloads$ awk -F',' '$3 ~ /Import/ && $1 ~ /2014/ {sum+=$4} END {print sum}' cleantradedata.csv
1.76182e+13
harry@DESKTOP-NBN7GRH:/mnt/c/Users/harry/Downloads$ awk -F',' '$3 ~ /Import/ && $1 ~ /2024/ {sum+=$4} END {print sum}' cleantradedata.csv
2.12474e+13
```

## 5.2: Explorative Analysis

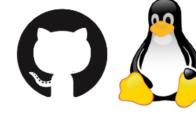
---



### 1. How have global trade patterns changed from 2014 to 2024? (Trade concentration)

```
14. for year in 2014 2024; do
    echo "$year Imports"
    tr -d "" < cleantradedata.csv | \
    awk -F',' -v y="$year" '$1==y && $3=="Import" {t+=$4; c[$2]+=$4} END {for(x in c) print c[x]"|"x"|"t}' | \
    sort -t'| -k1 -rn | head -10 | \
    awk -F'|' '{printf "%2d. %-20s %.2f%%\n", NR, $2, ($1/$3)*100}'
    echo ""
done
```

## 5.2: Explorative Analysis



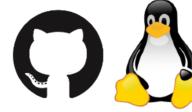
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```
harry@DESKTOP-NBN7GRH:/mnt/c/Users/harry/Downloads$ for year in 2014 2024; do
orts"
    tr -d>      echo "$year Imports"
>      tr -d '' < cleantradedata.csv | \
>      awk -F',' -v y="$year" '$1==y && $3=="Import" {t+=$4; c[$2]+=$4} END {for(x in c) print c[x]"|"x"|"t}' | \
>      sort -t'|' -k1 -rn | head -10 | \
>      awk -F'|' '{printf "%2d. %-20s %.2f%\n", NR, $2, ($1/$3)*100}'
>      echo ""
> done
2014 Imports
1. USA          13.68%
2. China        11.12%
3. Germany      6.90%
4. Japan         4.61%
5. United Kingdom 3.94%
6. France        3.75%
7. Rep. of Korea 2.98%
8. Netherlands   2.88%
9. Italy          2.69%
10. Canada       2.63%

2024 Imports
1. USA          15.80%
2. China        12.17%
3. Germany      6.48%
4. United Kingdom 3.81%
5. France        3.59%
6. Japan          3.50%
7. India          3.28%
8. Rep. of Korea 2.97%
9. Mexico         2.95%
10. Netherlands   2.92%
```

## 5.3: Explorative Analysis

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### 2. What was COVID-19's impact on global trade?

```
15. for year in 2016 2017 2018 2019 2020 2021 2022 2023; do
    exports=$(awk -F',' -v y="$year" '$1 ~ y && $3 ~ /Export/ {sum+=$4} END {print sum}' cleantradedata.csv)
    imports=$(awk -F',' -v y="$year" '$1 ~ y && $3 ~ /Import/ {sum+=$4} END {print sum}' cleantradedata.csv)
    echo "$year - Exports: $exports, Imports: $imports"
done
```

## 5.3: Explorative Analysis

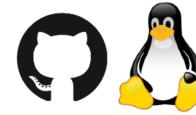
---



```
harry@DESKTOP-NBN7GRH:/mnt/c/Users/harry/Downloads$ for year in 2016 2017 2018 2019 2020 2021 2022 2023; do
rts=$((>      exports=$(awk -F',' -v y="$year" '$1 ~ y && $3 ~ /Export/ {sum+=$4} END {print sum}' cleantradedata.csv)
>      imports=$(awk -F',' -v y="$year" '$1 ~ y && $3 ~ /Import/ {sum+=$4} END {print sum}' cleantradedata.csv)
>      echo "$year - Exports: $exports, Imports: $imports"
> done
2016 - Exports: 1.49276e+13, Imports: 1.50748e+13
2017 - Exports: 1.64395e+13, Imports: 1.66962e+13
2018 - Exports: 1.80993e+13, Imports: 1.84016e+13
2019 - Exports: 1.75872e+13, Imports: 1.78977e+13
2020 - Exports: 1.62805e+13, Imports: 1.64952e+13
2021 - Exports: 2.05601e+13, Imports: 2.08645e+13
2022 - Exports: 2.24738e+13, Imports: 2.3507e+13
2023 - Exports: 2.15988e+13, Imports: 2.21178e+13
```

## 5.3: Explorative Analysis

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### 3. Which countries trade grew the most over the decade?

```
16. awk -F',' '$3 ~ /Export/ && $1 ~ /2014/ {c14[$2]+=$4} $3 ~ /Export/ && $1 ~ /2024/ {c24[$2]+=$4}  
END {for(x in c24) print x","(c24[x]-c14[x])}' cleantradedata.csv | sort -t',' -k2 -rn
```

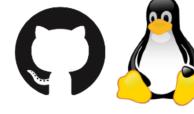
```
17. awk -F',' '$3 ~ /Import/ && $1 ~ /2014/ {c14[$2]+=$4} $3 ~ /Import/ && $1 ~ /2024/ {c24[$2]+=$4}  
END {for(x in c24) print x","(c24[x]-c14[x])}' cleantradedata.csv | sort -t',' -k2 -rn
```

# 5.3: Explorative Analysis



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```
harry@DESKTOP-NBN7GRH:/mnt/c/Users/harry/Downloads$ awk -F',' '$3 ~ /Export/ && $1 ~ /2014/ {c14[$2]+=$4} $3 ~ /Export/ && $1 ~ /2024/ {c24[$2]+=$4} END {for(x in c24) print x","(c24[x]-c14[x])}' cleantradedata.csv | sort -t',' -k2 -rn
China,123425000000
USA,44406000000
Mexico,2289200000
Poland,16585600000
Switzerland,13555000000
Germany,13247000000
Netherlands,123579000000
Italy,122885000000
Ireland,119179000000
India,116890000000
Brazil,116115000000
Rep. of Korea,110052000000
Australia,100410000000
Malaysia,95319000000
Turkey,95273000000
Indonesia,90294000000
Singapore,89363000000
Czechia,85013000000
Spain,84051000000
France,79303000000
Canada,74445000000
Thailand,73186000000
Belgium,58051000000
Morocco,5675306780
Hungary,55169000000
Austria,36710000000
Slovenia,36113583325
Peru,35408069504
Sweden,31082000000
Romania,30493109156
Slovakia,29800901120
Chile,23750344199
Norway,23656000000
Denmark,22953000000
Guyana,21240533637
Cambodia,19818482381
Uzbekistan,19735445899
Portugal,19179568381
Serbia,18194799269
Egypt,18034675393
Greece,17601777488
South Africa,17451287575
Bulgaria,17260702983
Japan,17173000000
Croatia,12218885043
```



## 6. Conclusion

# 6.1: Conclusion: Evolution of Trade



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## 1. How have global trade patterns changed from 2014 to 2024?

	Exports (\$B)	Imports (\$B)	Trade Balance (\$B)
2014	17,637.1	17,618.2	18.9
2024	20,711.0	21,247.4	(536.4)
% Change	17.4%	20.6%	
Predicted % Change	30%	30%	
<b>Variance</b>	<b>(12.57%)</b>	<b>(9.40%)</b>	

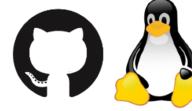
# 6.1: Conclusion: Evolution of Trade



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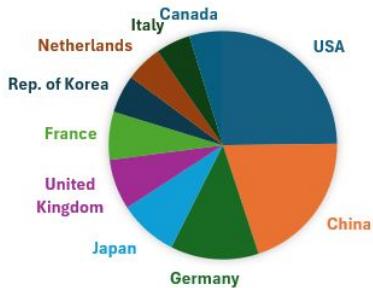
Import Concentration		Export Concentration		
2014	USA	13.68%	China	13.28%
	China	11.12%	USA	9.18%
	Germany	6.90%	Germany	8.49%
	Japan	4.61%	Japan	3.91%
	United Kingdom	3.94%	Netherlands	3.26%
	France	3.75%	Rep. of Korea	3.25%
	Rep. of Korea	2.98%	France	3.21%
	Netherlands	2.88%	Italy	3.00%
	Italy	2.69%	United Kingdom	2.90%
	Canada	2.63%	Russian Federation	2.82%
<b>Total</b>		<b>55.18%</b>	<b>Total</b>	<b>53.30%</b>
Country				
2024	USA	15.80%	China	17.27%
	China	12.17%	USA	9.96%
	Germany	6.48%	Gemany	7.87%
	United Kingdom	3.81%	Japan	3.42%
	France	3.59%	Netherlands	3.38%
	Japan	3.50%	Rep. of Korea	3.30%
	India	3.28%	Italy	3.15%
	Rep. of Korea	2.97%	France	3.12%
	Mexico	2.95%	Mexico	2.99%
	Netherlands	2.92%	Canada	2.65%
<b>Total</b>		<b>57.47%</b>	<b>Total</b>	<b>57.11%</b>

# 6.1: Conclusion: Evolution of Trade

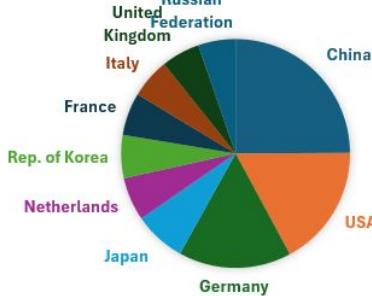


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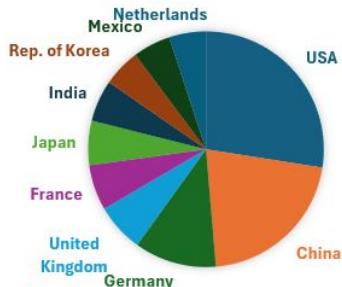
2014 IMPORT CONCENTRATION



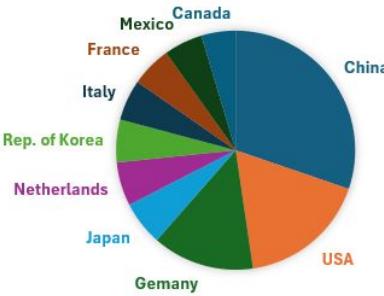
2014 EXPORT CONCENTRATION



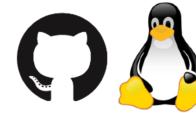
2024 IMPORT CONCENTRATION



2024 EXPORT CONCENTRATION



# 6.2: Conclusion: Impact of Covid-19



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## 2. What was COVID-19's impact on global trade?

Year	Global Exports (\$B)	Global Imports (\$B)	Exports YoY Growth	Imports YoY Growth
2016	14,927.6	15,074.8		
2017	16,439.5	16,696.2	10.1%	10.8%
2018	18,099.3	18,401.6	10.1%	10.2%
<b>2019</b>	<b>17,587.2</b>	<b>17,897.7</b>	(2.8%)	(2.7%)
<b>2020</b>	<b>16,280.5</b>	<b>16,495.2</b>	(7.4%)	(7.8%)
2021	20,560.1	20,864.5	26.3%	26.5%
2022	22,473.8	23,507.0	9.3%	12.7%
2023	21,598.8	22,117.8	(3.9%)	(5.9%)



- Decline in trade growth 2019-2020 as expected. Not as sharp as the 15-20% prediction.
- Global trade decline seen in 2023 as well, suggesting unsustainable covid recovery growth.

# 6.3: Conclusion: Growth Comparison



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## 3. Which countries trade grew the most over the decade?

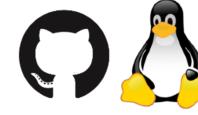
Country	Export Growth (\$B)	Country	Import Growth (\$B)
China	1,234.3	USA	946.0
USA	444.1	China	625.9
Mexico	222.1	India	238.4
Poland	165.9	Mexico	225.9
Switzerland	135.6	Poland	162.8
Germany	132.5	Germany	162.0
Netherlands	123.6	Italy	127.9
Italy	122.9	United Kingdom	114.9
Ireland	119.2	Netherlands	112.9
India	116.9	Rep. of Korea	106.2



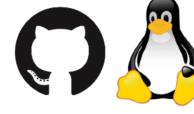
## 7. Limitations

# 7: Limitations

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- **Missing data** - Several smaller countries have very little or no data present after 2019
  - **Limited data granularity** - No product breakdown or ability to hypothesis test based on initial claims
  - **Potential unreliable reporting** - Data from corrupt states may not be accurately reported
  - **Digital trade not captured** - Goods/merchandise trade only, excludes services
  - **Absolute growth only** - Growth data not showing percentage growth
  - **Limited Analysis scope** - Dataset too large to perform analysis on every country, restricted to only top 10
  - **Outdated data** - No 2025 data available
  - **Currency conversion effects** - All values in USD not local currency, distorting true trading volumes
-



## 8. Takeaway Questions

## 8. Takeaway Questions

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**1. What key factors have made GitHub the dominant platform for developer collaboration compared to competitors?**

- User base size
- Microsoft acquisition
- Pricing

**2. How does the command-line efficiency used compare to Python/R for datasets of this size?**

- Processing speed
- Memory usage
- Scalability
- Complexity of Python vs command-line



## 8. Takeaway Questions

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**3. How does the choice of base year affect measured trade growth, e.g. comparing growth from 2014-2024 vs 2016-2024?**

- Base year effects (recession/boom)
- Use `awk` to sum trade value for each year to compare

**4. Several emerging economies (India, Vietnam, Poland) increased their trade significantly. What economic policies or structural changes drove such rapid growth?**

- Free trade agreements
- Exchange rate movements
- Infrastructure investment

## 8.2 Takeaway Questions

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**5. Which countries switched from trade surplus to deficit (or visa versa) over the decade?**

- Use `awk` to calculate trade balances (exports - imports)
- Filter for countries where the sign changed and use `sort` to sort by magnitude

**6. Theoretically every import is another countries export yet global trade balance for 2024 was -\$536.4bn. What creates this imbalance and how can it be reconciled?**

- Trade timing differences
  - Valuation methods
  - Currency conversion timing differences
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# Q&A

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