Political Influence On Covid Vaccination Distribution

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Abstract

The COVID-19 pandemic revealed significant disparities in vaccine distribution globally, shaped predominantly by political and economic factors. This report explores these disparities by analyzing the timing of vaccine deployment relative to the GDP of various countries, revealing how geopolitical influence and economic power impacted vaccine access. Wealthier and geopolitically influential nations, such as the United States and the United Kingdom, often secured earlier vaccine supplies, while other economically strong nations, including Japan and Australia, faced unexpected delays.

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1 Introduction

The COVID-19 pandemic highlighted critical inequalities in global healthcare access, particularly in the timely distribution of vaccines. Driven by political dynamics and economic strength, vaccine availability varied widely among countries. This analysis investigates the extent to which political influence and economic status shaped the global vaccine rollout.

2 Analysis

To effectively analyse vaccination disparities, accurate data regarding vaccine administration dates for each country was essential. Due to inconsistencies in official WHO records, rigorous cross-validation using reliable online sources was conducted to ensure the accuracy of the first vaccination dates used in this analysis.

2.1 Initial Observations

An initial visualization of vaccine rollout timelines highlights substantial variation in the dates when countries began their vaccination efforts. Figure 1 illustrates the distribution clearly, and Figure 2 provides a detailed monthly breakdown, setting the stage for deeper exploration of political and economic influences.

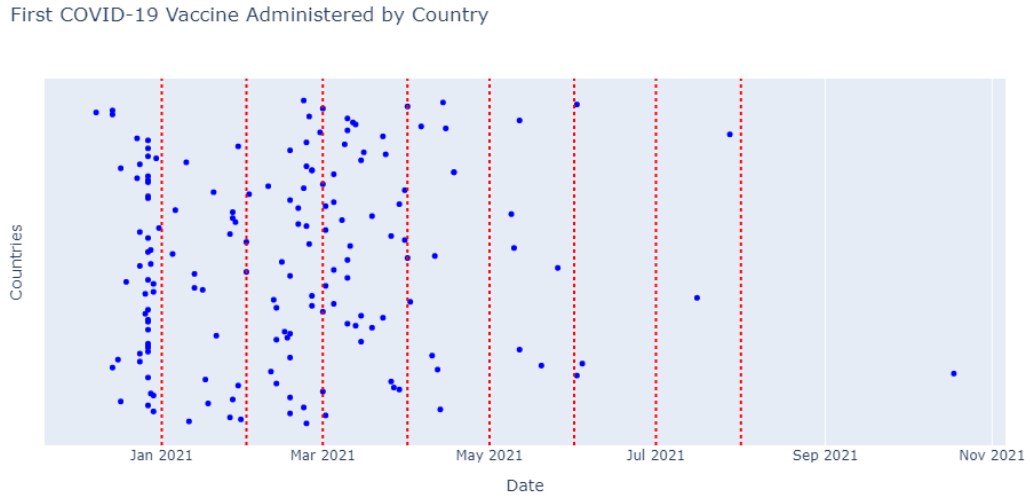

Figure 1: First COVID-19 Vaccine Administered by Country

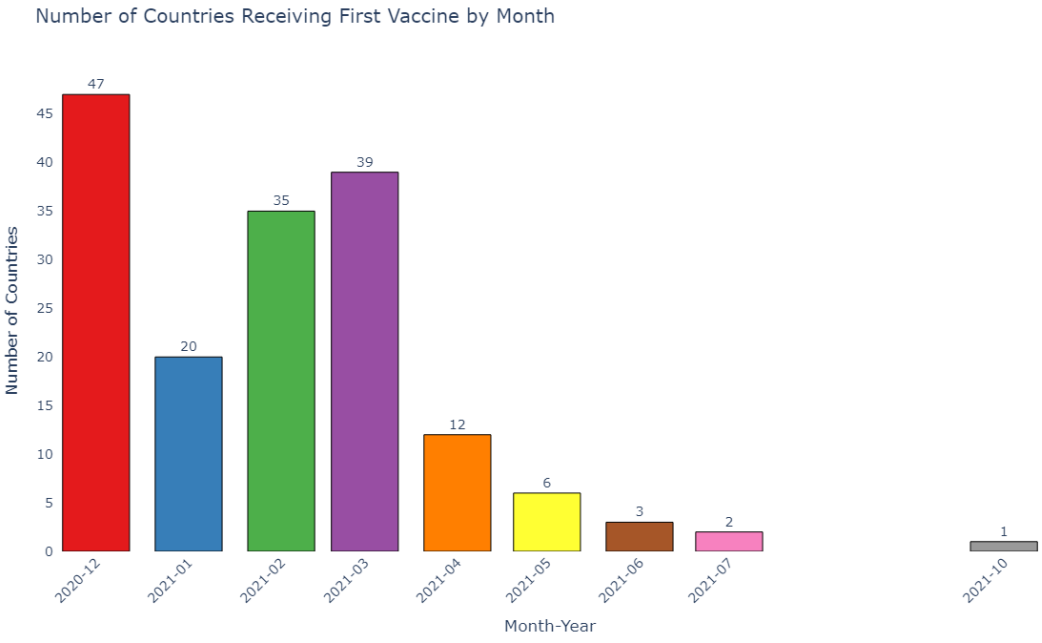

Figure 2: Vaccine Rollout Graph

Below is an explanation of Vaccine Rollout Graph (Figure 2):

Initial Surge (December 2020):

- **47 countries** received their first COVID-19 vaccine in December 2020, marking the largest number for any month.
- This surge primarily consisted of wealthier nations with higher GDP or strong political ties to vaccine-producing countries. These nations likely secured vaccine supplies early due to their financial resources and political influence.

Sharp Decline (January 2021):

- A significant drop is noted, with only **20 countries** initiating their vaccination campaigns in January 2021.
- This decline likely stems from vaccine shortages, as the majority of available vaccines were already secured by wealthier countries in December.

Recovery and Peak (February-March 2021):

- Vaccine distribution picked up again, with **35 countries** in February and **39 countries** in March 2021.
- Increased global production, the establishment of COVAX (global vaccine distribution initiative), and bilateral vaccine deals likely contributed to this rise.

Steady Decline (April 2021 onwards):

- Post-March 2021, there's a notable decline in the number of countries initiating vaccinations each month, dropping to **12 countries** in April and even fewer thereafter.
- By this time, most countries had already begun vaccination, and remaining nations faced logistical, financial, or political constraints that delayed vaccine rollout significantly.

Late Vaccinations (after June 2021):

- A very few countries (only **6 countries** from May to October 2021) administered their first vaccines late into 2021, highlighting significant disparities in vaccine distribution, likely related to political isolation, economic challenges, or infrastructural issues.

GDP and Vaccine Administration Relationship:

The graph indicates a pattern where countries with higher GDPs administered vaccines earlier (December 2020 and early 2021). Conversely, countries with lower GDPs, typically with limited political influence or resources, initiated vaccinations much later. Conclusion: The bar graph clearly reflects global inequities in COVID-19 vaccine distribution, heavily influenced by political power, economic strength, and strategic relationships. Wealthier, politically influential countries dominated early vaccine supplies, resulting in significant delays and disparities for poorer nations.

2.2 Vaccination Timings vs GDP

The GDP of each country was initially anticipated to be a significant determinant of vaccination timelines. To investigate this hypothesis, Figure 3 and a correlational analysis depicted in Figure 4 examine the relationship between a country's GDP and its timing for administering the first COVID-19 vaccine.

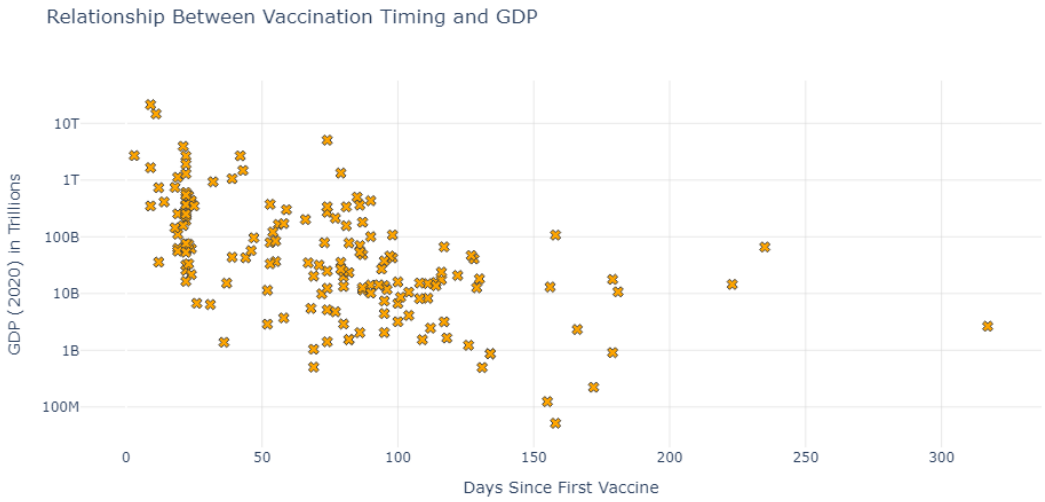

Figure 3: Vaccination Timings vs GDP

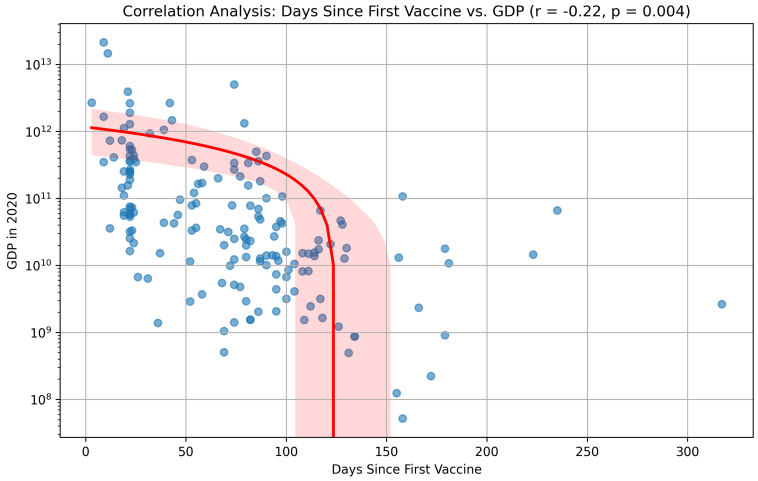

Figure 4: Correlation Analysis

From the Correlation Analysis graph (Figure 4), the correlation coefficient r = -0.22 and p-value p = 0.004 suggest the following:

Correlation Coefficient (r= -0.22)

- The negative value indicates an inverse relationship between GDP and the number of days since the first vaccine was administered.

- In simpler terms, countries with higher GDPs tended to receive vaccines earlier (fewer days since first vaccine), whereas lower GDP countries received them later.
- However, r=0.22 is a weak correlation, meaning GDP only explains a small portion of the variation in vaccine rollout timing.

P-Value (p= 0.004)

- Since p is less than 0.05, the result is statistically significant—meaning there is a low probability that this correlation occurred by random chance.
- In practical terms, while the correlation is weak, it's unlikely to be purely coincidental.

Interpretation: There is a **statistically significant but weak** negative correlation between GDP and vaccine rollout speed. While GDP played a role, other factors (e.g., political influence, vaccine diplomacy, regional logistics) likely had a stronger impact on vaccine distribution timing.

2.3 Earliest Vaccine Administering Countries

Countries initiating vaccination earliest were typically characterized by substantial geopolitical influence or strong economic capabilities. This section highlights how these nations leveraged their resources and diplomatic power to secure early vaccine access, underscoring the critical role of political strength.

- **Russia and China** rapidly initiated COVID-19 vaccination due to their independent development of domestic vaccines, specifically Russia's Sputnik V and China's Sinopharm and Sinovac vaccines. Their early administration reflected strategic interests and vaccine diplomacy goals. [Source: Link] [Source: Link]
- **United Kingdom** was among the earliest due to swift approval and rollout of the Pfizer-BioNTech vaccine, facilitated by strong economic capabilities and early procurement agreements.[Source: Link]
- **United States and Canada** secured early vaccine supplies by heavily investing in vaccine development and manufacturing, reflecting their high GDP and strategic global influence. [Source: Link] [Source: Link]
- **United Arab Emirates, Saudi Arabia, and Bahrain** had early access due to proactive agreements, robust healthcare infrastructures, and strategic international relationships, enabling early procurement and administration. [Source: Link] [Source: Link] [Source: Link]
- **Israel** achieved rapid vaccine acquisition through aggressive procurement deals and leveraging their advanced healthcare system and logistical infrastructure. [Source: Link]
- **Switzerland,** with a high GDP and strong healthcare system, secured vaccines promptly, emphasizing economic resources as a critical factor in early vaccine rollout. [Source: Link]

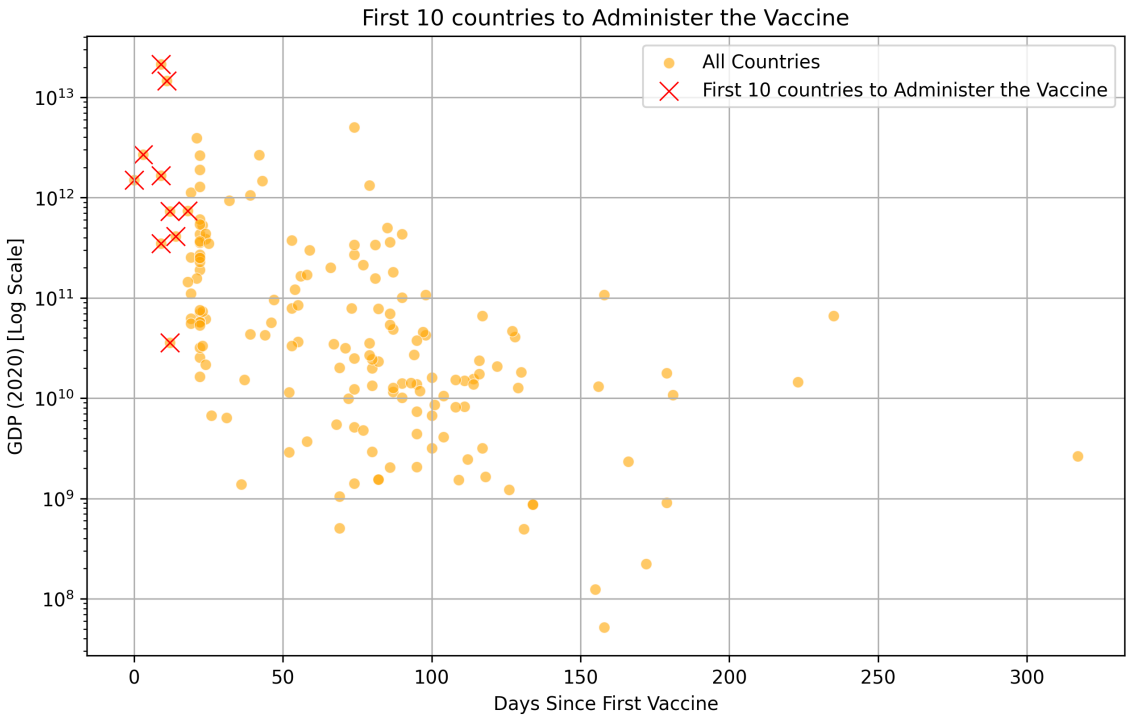

Figure 5: First 10 Countries to Administer the Vaccine

	Country	Date	Days_Since_First_Vaccine	GDP_2020
0	Russia	2020-12-05	0	1.493076e+12
1	United Kingdom	2020-12-08	3	2.696778e+12
2	Canada	2020-12-14	9	1.655685e+12
3	United States	2020-12-14	9	2.135410e+13
4	United Arab Emirates	2020-12-14	9	3.494730e+11
5	China	2020-12-16	11	1.468774e+13
6	Saudi Arabia	2020-12-17	12	7.342712e+11
7	Bahrain	2020-12-17	12	3.583763e+10
8	Israel	2020-12-19	14	4.117286e+11
9	Switzerland	2020-12-23	18	7.419994e+11

Figure 6: List of the First 10 Countries to Administer the Vaccine

2.4 High GDP - Late Access Countries

Interestingly, several economically strong nations experienced delays in vaccine rollout, defying expectations. This section examines the political, regulatory, and logistical barriers faced by these high-GDP countries, providing insight into the complexities of global vaccine distribution.

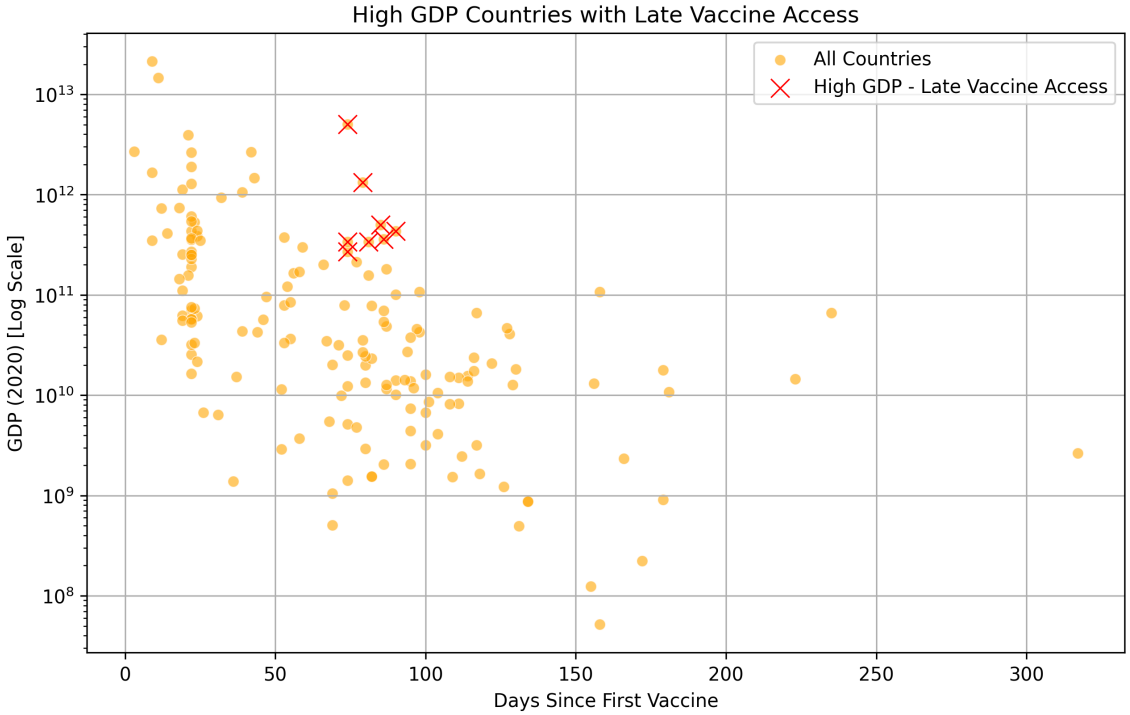

Figure 7: High GDP Late Access Countries

	Country	Date	Days_Since_First_Vaccine	GDP_2020
0	Australia	2021-02-22	79	1.328414e+12
1	Colombia	2021-02-17	74	2.703483e+11
2	Japan	2021-02-17	74	5.055587e+12
3	Malaysia	2021-02-24	81	3.374562e+11
4	Nigeria	2021-03-05	90	4.321989e+11
5	Philippines	2021-03-01	86	3.617511e+11
6	South Africa	2021-02-17	74	3.379747e+11
7	Thailand	2021-02-28	85	5.004619e+11

Figure 8: List of High GDP Late Access Countries

1. **Australia:**
   - **Cautious Approach:** Australia delayed vaccinations to observe outcomes in other countries and address vaccine hesitancy. [Source: Link]
2. **Colombia:**
   - **Global Supply Inequities:** As a lower-middle-income country, Colombia faced delays due to vaccine nationalism and limited access to doses.
3. **Japan:**
   - **Vaccination Infrastructure:** Limited qualified personnel and infrastructure slowed mass vaccination efforts. [Source: Link]

- **Regulatory Approval Delays:** Japan required domestic clinical trials for COVID-19 vaccines, leading to later approvals compared to other nations.
- **Importation Challenges:** Obstacles such as production halts and export approvals limited vaccine imports.

4. **Malaysia:**
   - **Supply Shortages:** Global vaccine shortages, exacerbated by high-income countries hoarding doses, led to initial slow rollouts. [Source: Link]
   - **Distribution Inequities:** Unequal distribution across states caused delays in certain regions. [Source: Link]
5. **Nigeria:**
   - **Global Supply Inequities:** As a lower-middle-income country, Nigeria faced delays due to vaccine nationalism and limited access to doses. [Source: Link]
6. **Philippines:**
   - **Negotiation Challenges:** Delays in securing agreements with manufacturers, including a missed opportunity with Pfizer. [Source: Link]
   - **Supply Limitations:** Global shortages and competition hindered timely vaccine acquisition.
7. **South Africa:**
   - **Global Supply Inequities:** Similar to Nigeria, South Africa faced delays due to vaccine nationalism and limited access to doses.
8. **Thailand:**
   - **Supply Chain Issues:** Delays in vaccine production and delivery affected the rollout. [Source: Link]
   - **Apology for Delays:** The National Vaccine Institute acknowledged slow deployment. [Source: Link]

2.5 Low GDP - Early Receiver Countries

Contrary to expectations based solely on GDP, certain low-income countries gained early vaccine access. This section explains how diplomatic relations, geopolitical interests, and strategic positioning enabled these countries to obtain vaccines earlier than their economic circumstances alone would predict.

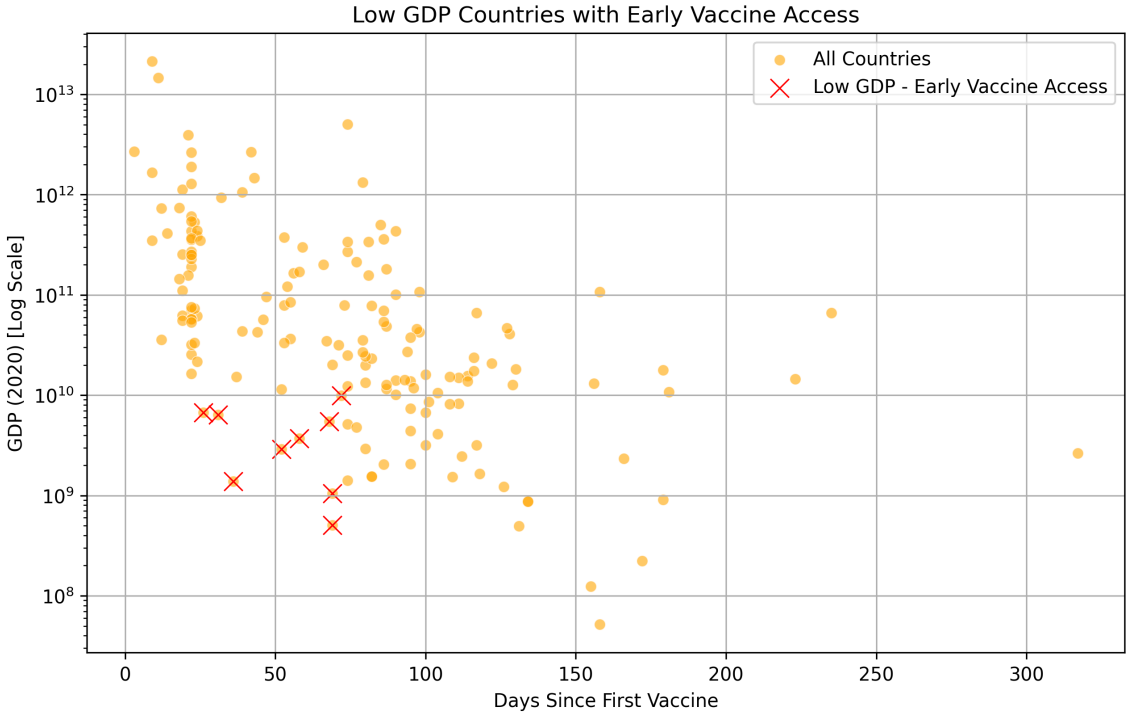

Figure 9: Low GDP Early Access Countries

	Country	Date	Days_Since_First_Vaccine	GDP_2020
0	Andorra	2021-01-26	52	2.891001e+09
1	Dominica	2021-02-12	69	5.042148e+08
2	Equatorial Guinea	2021-02-15	72	9.893816e+09
3	Grenada	2021-02-12	69	1.043411e+09
4	Guyana	2021-02-11	68	5.471257e+09
5	Liechtenstein	2021-01-05	31	6.405870e+09
6	Maldives	2021-02-01	58	3.712605e+09
7	Monaco	2020-12-31	26	6.730736e+09
8	Seychelles	2021-01-10	36	1.382552e+09

Figure 10: List of Low GDP Early Access Countries

Given their low GDP, the early vaccine access for these countries can primarily be explained by the following factors:

1. **Political Connections and Diplomatic Relations:**
   - **Dominica, Grenada, and Guyana:**
     These Caribbean nations received early vaccine shipments as part of diplomatic outreach efforts, primarily by India, through its vaccine diplomacy program ("Vaccine Maitri"). India sent doses of the AstraZeneca vaccine (Covishield) to strengthen political ties and goodwill in the region. [Source: Link]
   - **Maldives and Seychelles:**
     Similar to Caribbean nations, the Maldives and Seychelles benefited from India's

vaccine diplomacy. Both are strategically located island nations, significant for India's geopolitical interests in the Indian Ocean. They received early doses as part of India's diplomatic engagement in the region. [Source: Link] [Source: Link]

2. **Geographical and Political Proximity to Wealthier Nations:**
   - **Andorra:**
     A small European country, landlocked between Spain and France, received its vaccine supplies early primarily due to direct support from neighboring European countries and the EU's broader vaccine distribution efforts.
   - **Liechtenstein:**
     Located in the heart of Europe, Liechtenstein closely cooperates economically and politically with Switzerland and the EU. This proximity allowed it quick and efficient access to vaccines through agreements and partnerships.
   - **Monaco:**
     Located on the French Riviera, Monaco received early vaccine access through its strong diplomatic relationship and economic integration with France, ensuring priority access. [Source: Link]
3. **Resource-rich or Economically Strategic Position:**
   - **Equatorial Guinea:**
     While having relatively low GDP, Equatorial Guinea is resource-rich, primarily in oil, attracting interest and relationships with wealthier nations or corporations. Vaccine access here may have been facilitated through such strategic economic partnerships or diplomacy. [Source: Link]
4. **Tourism-dependent Economies:**
   - **Seychelles, Maldives, and Caribbean nations (Dominica, Grenada):**
     These countries heavily depend on tourism as a primary economic activity. Early vaccination was prioritized to safely reopen borders to international visitors and rejuvenate their economically critical tourism sectors. [Source: Link]

These factors outweighed GDP as a determinant for vaccine allocation in these specific low-GDP countries, thus explaining their early receipt of COVID-19 vaccines.

2.6 Outliers

A few countries significantly deviated from established trends, labeled as outliers in vaccine distribution timelines. This section identifies and examines the unique political, social, and infrastructural factors that influenced their atypical vaccine rollout timings, providing insights into exceptional circumstances impacting global vaccine accessibility.

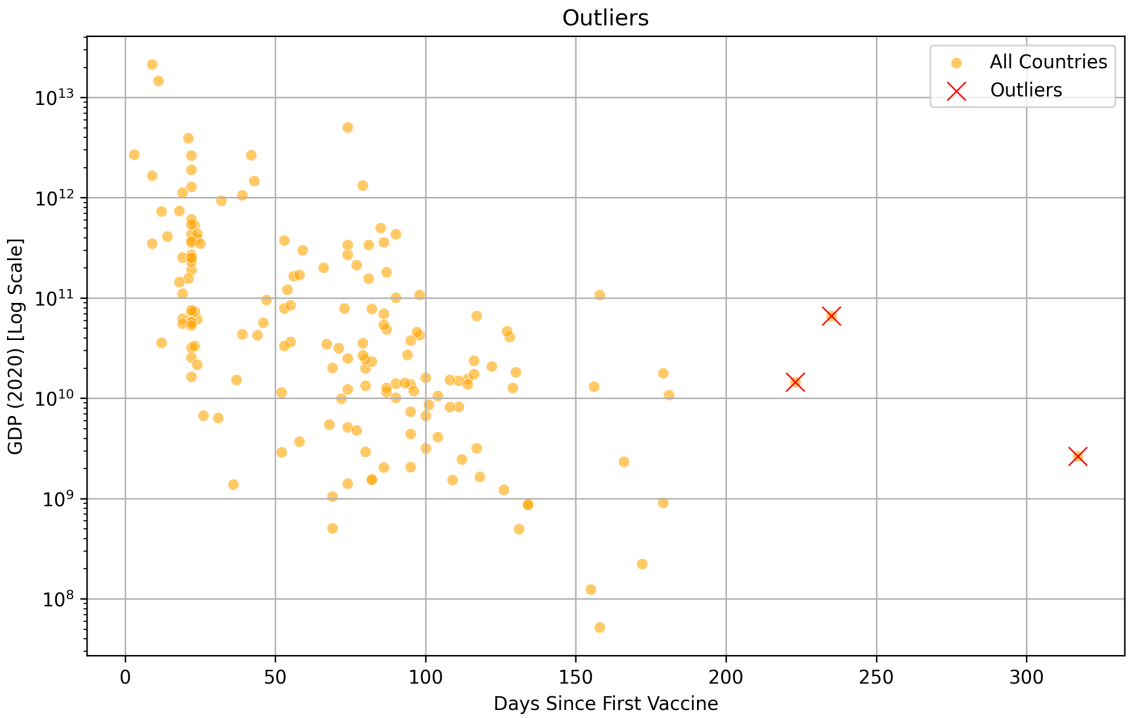

Figure 11: Outliers

	Country	Date	Days_Since_First_Vaccine	GDP_2020
0	Burundi	2021-10-18	317	2.649680e+09
1	Haiti	2021-07-16	223	1.450822e+10
2	Tanzania	2021-07-28	235	6.606874e+10

Figure 12: List of Outliers

1. **Burundi**
   - **Political Vaccine Hesitancy:** Initially rejected COVID-19 vaccines due to governmental skepticism, significantly delaying their vaccine rollout. [Source: Link]
2. **Haiti**
   - **Political Instability:** The assassination of Haiti's president in July 2021 disrupted governance and delayed vaccine distribution. [Source: Link]
   - **Healthcare and Infrastructure Crisis:** Fragile healthcare systems and natural disasters (earthquakes) further delayed the vaccination process. [Source: Link]
3. **Tanzania**
   - **Leadership Denial of COVID-19:** The assassination of Haiti's president in July 2021 disrupted governance and delayed vaccine distribution. [Source: Link]
   - **Delayed International Cooperation:** Vaccine acquisition was delayed due to initial rejection of international aid and limited engagement in global health initiatives. [Source: Link]

2.7 Conclusion

The analysis clearly demonstrates that political and economic factors significantly influenced the disparities in COVID-19 vaccine rollout across countries. Wealthier nations, characterized by higher GDP and stronger international political ties, received and administered vaccines notably earlier, dominating vaccine access during the critical initial months (especially December 2020). Consequently, vaccine distribution in lower-income countries was significantly delayed, primarily due to shortages resulting from vaccine hoarding by richer nations. The weak correlation between GDP and vaccine rollout timing suggests that while wealthier nations generally had earlier access to COVID-19 vaccines, economic strength alone did not fully determine the speed of rollout. These disparities reflect broader political and systemic inequalities in global health infrastructures. This highlights the need for fairer international policies to ensure equitable and timely vaccine distribution in future global health crises.

2.8 Future Work

Future research could build upon this analysis by conducting comparative case studies focusing on countries with similar GDP levels but notably different vaccination rollout speeds. Such studies would help identify additional critical factors beyond economic resources, potentially including healthcare infrastructure, governance quality, and logistical preparedness. Furthermore, investigating the role of vaccine diplomacy during the COVID-19 pandemic could provide deeper insights into how international relations and vaccine donations influenced global vaccine distribution. Understanding these diplomatic dynamics would be instrumental in shaping fairer and more effective international strategies for managing vaccine distribution in future global health emergencies.