



Using Macroeconomic Indicators to Explore the Continent of Africa

Teaching Principles of Macroeconomics typically involves discussing data. Using data can move a classroom beyond the normal chalk-and-talk presentation of material. But data can also be a tool to expand students' perspectives on the world outside their campus. In this paper we provide a guideline for a Principles of Macroeconomics project that applies basic macroeconomic data in a novel way by focusing on the continent of Africa. In small groups, students research an African country and develop a written document explaining the link between the country's economic variables and the standard of living of its people. Students conclude their analysis by predicting the future economic direction of their country. We provide variations for this project and offer suggestions for how to implement it in both on ground and online modalities.

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1. Introduction

College students have more access to global news and events than at any time in history. Yet many college students have very little exposure to the world beyond their borders. Furthermore, media reports about the lack of geographic acumen support the belief that American college students are not aware of what is going on in the greater world (Camera, 2015; Blankenship, 2022).

We teach at a community college and a four-year college where students are drawn primarily from the respective local areas, and our students conform to the mold of uninformed college students, living in a bubble. As educators, we know that students will be part of a global economy, and as such, we bear some responsibility to expand students' perspectives on the world and to prepare them for what they will face when they graduate (Tichnor-Wagner, 2016).

To this end, we developed a project for a Principles of Macroeconomics course focused on Africa. In small groups, students choose one African country, use provided websites to collect macroeconomic data, and develop a written document explaining the link between the economic variables and the standard of living of people in that country. They conclude their analysis by predicting the future economic direction of their chosen country. Upon completion of the project, students share their findings with the class. This paper explains the project and how we have implemented it in multiple class modalities.

2. Literature Review

The question of what should be taught in a macroeconomics course has been widely discussed. Some of the discussions center on policy (Taylor, 2000), but others reference current events (Kennedy, 2006; Blinder, 2010; Shiller, 2010; Gaertner, Griesbach, & Jung, 2013). Still others focus on modelling (Solis-Garcia, 2018). However, teaching macroeconomics also involves introducing students to data. Macroeconomics courses at the principles level are replete with references to data and creative educators have provided ways to teach macro with that data (Zhuang, 2012; Wuthisatian & Thanetsunthorn, 2019; Underwood, 2020; Wolfe, 2020). Using data to teach is made easier in part by the resources from the St. Louis Fed's Federal Reserve Economic Data (FRED) website (Mendez-Carbajo, Taylor, & Bayles, 2017; Bayles, 2018; Mendez-Carbajo, 2020).

Of course, textbooks present data and publisher tools include PowerPoint slides containing that data. But as Zhuang (2012) notes that textbooks, while valuable for presenting basic information, are limited due to the publication cycle. Data found there is always behind current events. Therefore, it is incumbent upon instructors to augment the data students see to keep it up to date.

Using data can help students get out of their seats, so to speak. Rather than watching slides or graphs of numbers on a screen, allowing students to collect and analyze data provides a tool for instructors to go beyond the chalk-and-talk model so prevalent in the economics discipline (Becker, Becker, & Watts, 2006; Picault, 2019). The data-related papers noted above provide interesting ways to use data in the classroom, but they are focused solely on the United States. That is understandable as U.S. data is widely available and reliable. However, collecting data can also help students learn about what is happening in the world. Abdalla (1993) presents a writing activity for students in an international economics course focusing on trade data, but this is an assignment for an advanced economics class. The project presented in the current paper seeks to fill a hole in the literature by showing how students in Principles courses can collect data with which they are just becoming familiar while pushing them to think beyond their borders by exploring countries on the continent of Africa.

3. The Project Basics

Typically, in a Principles of Macroeconomics course, the definitions and examples of macroeconomic variables are taught in the context of students' home countries. Once the basics are learned, however, students should be able to apply them in any setting. To expand their understanding of not only these variables but to also broaden their international awareness, this project introduces them to various countries in Africa.

This project is designed for students in a Principles of Macroeconomics class, although it could be assigned to advanced high school students or upper-level students as a concept refresher. This project can be assigned to students in a face-to-face setting or an online environment. Through their work, students will collect and analyze macroeconomic variables, utilizing critical thinking skills to make connections between these data and the present and future living standards in a particular African country.

The project seeks to accomplish the following learning objectives:

1. Describe and define the economic concepts of gross domestic product, economic growth, unemployment, and inflation.
2. Learn how to collect relevant data from reputable internet sources.
3. Explain how unique domestic resources impact gross domestic product and economic growth.
4. Explain the impact of unemployment and inflation on economic growth.
5. Describe the standard of living and economic well-being in a specific African country using macroeconomic variables.

Regardless of the delivery modality of the course, resident or online, the final product is a report on a particular African country. This project can be incorporated in a variety of ways, with many extensions depending on available time, class modality, and the level of class.

A quick note on data sources is in order before we get into the project's specifics. One of the learning objectives is for students to learn how to collect data, but as the project is directed at principles-level students, we do not want the data collection to be a point of frustration. This may be the first time they have been asked to find economic data or data of any kind on their own. Therefore, we provide a list of data sources from which students are instructed to find their data. These include:

- a. Global Edge <https://globaledge.msu.edu/global-insights/by/country>
- b. CIA Factbook <https://www.cia.gov/the-world-factbook/>
- c. Trading Economics <https://tradingeconomics.com/>
- d. Gap Minder <https://www.gapminder.org/>
- e. A to Z theWorld Database <https://www.atoztheworld.com/?c=97uZTzgEpD> (accessible to students through most college libraries)
- f. Numbeo Cost of Living Calculator <https://www.numbeo.com/cost-of-living/>

g. Oanda Online Currency Converter <https://www.oanda.com/currency-converter/en/?from=EUR&to=USD&amount=1>

While students still must do some investigation, we know these sources will provide the data required. Sticking to these sites will prevent them from being overwhelmed by the volume of data available online.

As most students will have very little familiarity with Africa, it may be necessary to provide a primer for them. We have identified a few resources and videos that can be shared with students when the project is introduced. These are presented in Appendix A.

In preparation for the project, students need to be introduced to the variables of interest as noted in learning objective 1. They should understand what each variable measures and have a rudimentary understanding of the relationship between these variables. In the next sections, we describe the project as implemented in both a face-to-face and online modality. We follow the description with possible variations on the project. Appendix B provides an example of exemplary student work.

4. Face-to-face modality

Students are charged with forming small groups (2-4 students depending on class size) to create a written report focused on one African country.¹ In this version of the face-to-face approach, work on the project is completed in class.² This project unfolds over multiple class periods with out-of-class work completed to prepare students for what is expected of them in class, in effect flipping the classroom. This is referenced in the description below. Information about relevant exercises can be found in Appendix C. Class periods (50 minutes) in the unit are divided into 2 parts: the first 15-20 minutes will be time for discussion and questions on the theory, and the last 30-35 minutes will be time to organize and work in small groups. This project unfolds over a few class periods.

Day 1: The instructor introduces the project and provides a brief review of the information to be found on the various websites provided. Students are divided into small groups and choose a country on the African continent to research. Students begin a collaboration document using Canvas (or any LMS) or Google Doc to write a brief introduction of the country including:

- Geographic description, with climate information
- Information about culture and religion
- Pictures including a map and country flag
- Description of natural, labor, and capital resources
- Primary imports, exports, and major economic activities

¹ If you do not want groups researching the same country, tell students that countries will be determined on a first-come, first-served basis, or use some random choice mechanism if more than one group wants to research the same country. Having groups research different countries benefits the instructor as well. Grading can get a little dull if every group reports on the same country.

² Another variation of the face-to-face approach is to have students complete the assignment as an out-of-class project. In this case, there is some initial prep work in terms of helping students understand how to utilize the data sources. From here they need to follow the prompting of the instructions to complete the assignment.

Day 2: Before attending class, students complete assignments on the definition and components of GDP, as well as become familiar with the formulas for calculating real GDP, growth rate, and GDP per capita. The first portion of the class will be used to answer questions and review the basic theory of GDP that students were assigned. In their small groups, using the provided websites, as well as other resources they may find for their chosen country, students will research and document:

- Real GDP (amount in US dollars)
- Growth rate of real GDP
- Real GDP per capita
- GDP composition percentages (C + I + G + NX)

Day 3: In their small groups, students will continue their report with a focus on analyzing the links between the economic information in their introduction (Day 1) and the different components of GDP. Specifically, they will:

- Compare and contrast the GDP composition percentages of their country to the averages of the United States.
- Identify links between GDP and the country's natural, labor, and capital resources.
- Discuss imports, exports, and major economic activities in the context of GDP.

Day 4: Before attending class, students complete assignments on the concepts of economic growth using the production possibilities frontier. The first portion of the class will be used to answer questions and review the basic theory of economic growth. Students will research and document the following statistics:

- Population size
- Percent of the population in poverty³

Combining the above numbers with their data on GDP growth rate and GDP per capita, students will continue writing their collaborative report defining the standard of living in their country. By the end of class, they will:

- Explain the relationship between real GDP per capita and population size
- Discuss the role of poverty in economic growth
- Compare the pace of economic growth in their country to the investment component of GDP

Day 5: Before attending class, students will complete assignments on the definitions of unemployment and traditional unemployment calculations. The first portion of the class will be used to answer questions and review the basic theory and calculations of unemployment.

³ This is determined as the percentage of the population below the poverty line. According to the CIA World Factbook: "National estimates of the percentage of the population falling below the poverty line are based on surveys of sub-groups, with the results weighted by the number of people in each group. Definitions of poverty vary considerably among nations. For example, rich nations generally employ more generous standards of poverty than poor nations." (<https://www.cia.gov/the-world-factbook/field/population-below-poverty-line/>)

Students will research and document the following statistics:

- Unemployment rate
- Median age
- Size of the labor force

Combining the above numbers with their previous research, students will continue writing their collaborative report, where they will:

- Explain the link between the unemployment rate and GDP
- Discuss the size of the labor force and median age in relation to economic growth
- Explore connections between the labor force and the major economic activities of the country

Day 6: Before attending class, students complete assignments on the definition of inflation and the traditional CPI and inflation calculations. The first portion of the class is used to answer questions and review the basic theory and calculations of inflation. Students will then research and document:

- Inflation rate
- Median income (amount in US dollars)
- Current prices of: (in US dollars – use exchange rate calculator)
 - gasoline
 - milk
 - loaf of bread
 - pair of jeans
 - average rent for a one bedroom apartment (outside of the city center)
 - movie ticket

Combining the above numbers with their previous research, students will continue writing their collaborative report with analysis to:

- Describe the connection between inflation and economic growth
- Discuss the role of price, income, and inflation in the standard of living

Day 7: In their small groups, students will finalize their collaborative report by providing an economic summary of their country in which they:

- Demonstrate the ability to interpret key macroeconomic statistics
- Provide insight into both the economic well-being and potential growth of their country
- Discuss the impact of economic freedom. Find the Economic Freedom of the World (Fraser, 2021) ranking for your country. How do you think this affects the standard of living of people in your country? LINK: <https://www.fraserinstitute.org/studies/economic->

[freedom](#) - note, be sure to use the Economic Freedom of the World information.

- Offer an economic growth projection for the next five years

Day 8: Using a visual device of their choice, students will share the highlights of their collaboration reports with the class. Depending on the size of the class and the number of groups, students should spend 5-8 minutes highlighting the economic variables and resources that have the greatest impact on economic growth in their chosen country.

5. Online modality

This project can also be assigned in an online setting. Groups can be formed by asking students to choose their own or they can be assigned by the instructor. Assigning groups may be more expedient as students do not have the opportunity to meet each other in online classes. Once the groups are formed, collaboration documents are assigned by the instructor. Specific instructions are given to students including the website sources. Each group chooses an African country for the focus of their project.

The instructions for the online version of this project follow those of the face-to-face class. The instructions below are slightly more formulaic so that groups can collaborate and complete the task without needing to be in constant communication with the instructor. This is particularly important if your online course is asynchronous. Rather than in-class days to work on the project, we provide due dates for each part. In the case of a shorter online term, such as an eight-week session, grouping the parts and setting a due date may be necessary. One option would be to have parts 1-2 due one week, parts 3-5 due another week, and parts 6-7 due closer to the final week of the course. The final presentation could occur in a video format or it could be forgone.

The instructions for an online version of the project are provided below; however, for brevity, we only include variations from the in-class material. Each "Part" relates to the corresponding "Day" from the face-to-face modality above.

PART 1: This is the same as the in-class version.

PART 2: Complete the table below for the most recent year available. (You may find that it is challenging to find consistent data. Please identify the year and source of each data point. You may address discrepancies in your analysis.)

Africa Project Required Data				
Real GDP (\$ amount)		Unemployment rate		Inflation rate
Real GDP growth rate		Median age		Median income
Real GDP per capita		Size of the labor force		Current prices:
GDP Composition				gasoline (1 gallon)
(C + I + G + NX)				milk (1 gallon)
Population size				loaf of bread
Population in poverty				pair of jeans
				movie ticket
				rent (1 bd outside of city)

PART 3: This is the same as the in-class version.

PART 4: This is the same as the in-class version.

PART 5: This is the same as the in-class version.

PART 6: This is the same as the in-class version.

PART 7: When foregoing the economic presentation, students should research three current events/news stories in their country.

- Include a reference for each story
- Provide a brief summary of each event
- Explain how these events may be impacting the economy or more specifically standard of living

Conclude with an analysis of the country in which students finalize their collaborative report by providing an economic summary of their country in which they:

- Demonstrate the ability to interpret key macroeconomic statistics
- Provide insight into both the economic well-being and potential growth of their country
- Discuss the impact of economic freedom. Find the Economic Freedom of the World ranking for your country. How do you think this affects the standard of living of people in your country? LINK: <https://www.fraserinstitute.org/studies/economic-freedom> - note, be sure to use the Economic Freedom of the World information.
- Offer an economic growth projection for the next five years.

6. Project Variations

Many variations can be made to this project. Here we provide some suggestions.

- Instead of students collecting just one year of macroeconomic data (such as the most recent year available), information on the past three-five years could be collected to develop a more robust picture of each economy.
- Add additional data collection and analysis questions. For example, have students collect data on interest rates, public debt, current account balance, energy consumption, communication, and transportation numbers.
- Adding a day to the project, the instructor could introduce some of the overall impacts of colonization during the first part of the class and then give students time to research specific impacts on their countries.
- When discussing economic growth, students could specifically research the current role of China, or other major investors, in their country, with specific regard to infrastructure investment and technological progress.
- A focus on the challenges of climate change faced by each country could be explored. It should be noted that the African continent as a whole is one of the most vulnerable to climate impacts while contributing only about 3% to global greenhouse gas emissions. Each country in Africa will be impacted differently.
- Students could conduct additional research on news reports/current events in a major city of their country. Stories could relate to the economy or they could reflect daily life in that country.

7. Observations

We have implemented this project in a variety of ways and found it to be an effective tool to improve the students' understanding of the relevance of macroeconomic data and the world outside their campus. Students specifically noted that they enjoyed working with their classmates. They expressed how interesting and varied the African economy and culture are and that learning about a part of the world they knew nothing about allowed them to develop a "more educated perspective on economics outside the United States".

This project has advantages for the instructor. Because of the way the assignment is broken down, grading can be conducted on a rolling basis. This allows students to receive feedback before completing the next part or parts. This also keeps the grading burden manageable as instructors do not have to grade the entire project at once. If the writing is completed in class, this is a way for instructors to ensure that students are not relying on A.I. to do the work for them. In the online setting, this project helps to meet the requirements of student-teacher interaction.

Of course, no project is without its drawbacks. One practical concern is that regardless of the size of the course or the number of students in a group, grading still requires time. Unless you have a stable of reliable TAs, this is unavoidable. However, we have found that the time constraint is not prohibitive in classes we teach, which are as large as 50 students.

There are the normal worries about group work as well. We have received a few complaints from students that group members aren't pulling their weight. This is not as prevalent an issue as we feared, although there is likely an underreporting problem. Furthermore, because students will most likely be assigned a particular component of the project which will be cobbled together for the final submission, writing styles may clash. To alleviate this, we suggest that groups select an editor for their submission to ensure consistency of voice in their writing.

Other issues are more of a concern. In particular, data on some African countries is not up to date and of dubious quality. This should be addressed with students going into the project so they are aware that finding up-to-date data might be difficult. By providing students with the websites for data we help to overcome this problem.

Another significant concern is that this project, when conducted in class, takes up valuable in-person instructional time. This can be addressed by using a flipped classroom approach where students understand that learning is done outside of class in preparation for application in class. Another option is decreasing the in-class time allotted for working on the project. With the ease of use of collaborative documents, the project can be completed as an out-of-class assignment.

Finally, this project is intended to help students think about the greater world. The persistent calls for economics to be more inclusive can be answered in part by showing students that economics exists outside the textbook and the classroom. We hope that this project provides instructors with a place to start.

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APPENDIX A: Resources to Introduce Students to Africa.

YouTube videos that can introduce students to the continent of Africa:

101 Facts about Africa, YouTube, <https://youtu.be/dwAuXNytack>

Every Country in Africa: What You Need to Know, YouTube

Part 1 <https://youtu.be/DpliSgyldMk>,

Part 2 <https://youtu.be/y8CHIAKGhO8>

Here are ALL 54 Countries of Africa, YouTube, https://youtu.be/_On_SC5v88Q

Top 10 Wonders of the African World, YouTube, <https://youtu.be/u9SVLthDLHg>

Other resources:

African history through the lens of economics: <https://voxeu.org/article/african-history-through-lens-economics>

APPENDIX B: Example of a Submission.

Sudan: Overview and Introduction

Day 1 / Part 1

Sudan is a country located in northeastern Africa, bordered by the Red Sea, Egypt, and Eritrea. Most of Sudan is an arid desert, so the climate tends to be hot and dry (Central Intelligence Agency, n.d.). Central and southern regions of Sudan have a rainy season, which occurs from March to October each year. The desiccated desert is mainly in northern Sudan, where there is little to no rainfall. (World Bank Group, 2021). The general landscape is a flat plain with no distinctive features distinguishing it from other deserts, and most of the land is used for agricultural purposes. Sudan's primary water source is the Nile River, which travels 6,650 kilometers across several other African countries (Central Intelligence Agency, n.d.).

The major ethnic group in Sudan is Sudanese Arab. There are two official languages of Sudan: Arabic and English. The main religion in Sudan is Sunni Muslim, though there is a small population of Christians as well. A large female population is dominant in rural areas due to males seeking work in urban areas. Since the middle twentieth century, there has been a decline in fertility, a drop in mortality, and an increase in life expectancy. Sudan has a relatively low literacy rate of barely over 60%. This this number is even lower for women. This inhibits exponential economic growth, as Sudan lacks sufficient school enrollment, infrastructure, and overall education quality. Northern Sudan is sparsely populated, while central and southern Sudan have more dense, urban populations. About one-third of the population is urbanized. This urbanization has allowed nearly 99% of drinking water sources to be improved in urban areas, along with a 72.1% improvement in sanitation facility access (Central Intelligence Agency, n.d.).



Flag of Sudan (Central Intelligence Agency, n.d.)



Map of Sudan including major cities and border countries (Central Intelligence Agency, n.d.)



Map of Sudan, showing relative location on the African continent (Central Intelligence Agency, n.d.)



Image of a Sudanese Desert (Central Intelligence Agency, n.d.)

Sudan's natural resources mainly consist of agricultural products. Sugarcane, milk, and groundnuts are among the top agricultural items that Sudan supplies, along with sesame seeds and bananas. (International Trade Administration, 2022). A major, nonagricultural natural resource in Sudan is oil, which was first discovered in southern Sudan in 1978 (Michigan State University, n.d.). Its main industries are cotton ginning, textiles, and oil, especially because the Greater Nile Oil Pipeline (GNOP) runs through it (Michigan State University, n.d.). The GNOP spans across all of Sudan and ends at Port Sudan, which is on the Red Sea (U.S. Agency for International Development, 2001). The largest source of hydroelectricity in Africa, the Merowe Dam, is found in Sudan (Michigan State University, n.d.). Sudan also produces 80% of the world's acacia gum, which is an important resource used in food additives, paint, and cosmetics (International Trade Administration, 2022). In terms of labor resources, the labor force of Sudan is 12.921 million, and its population is approximately 49.198 million. Of those employed, it is estimated that 80% work in agriculture, 7% in industry, and 13% in services. Sudan's unemployment rate is 19.81%, and a 2009 study estimated that 46.5% of the population lives under the poverty line (Central Intelligence Agency, n.d.).

The primary imports in Sudan are raw sugar, wheat, and packaged medicines. These resources mainly come from China and India, with approximately \$9.788 billion being spent on imports in 2021. Sudan's primary exports are gold, crude petroleum, groundnuts, and live animals, with the majority of their exports going to the United Arab Emirates and China (Central Intelligence Agency, n.d.). In 2021, Sudan exported about \$5.916 billion worth of goods and services (Central Intelligence Agency, n.d.).

Military and political turmoil in the country has hurt overall economic activity, limiting GDP growth and causing an economic contraction (International Trade Administration, 2022). Sudan's two major economic activities are agriculture and extractive industries, however, distribution chain issues, lack of credit, scarcity of inputs, and outdated production methods create many market challenges for Sudan, which inhibit economic growth (International Trade Administration, 2022).

Day 2 / Part 2 (Note: This is the data table from the online modality)

Africa Project Required Data					
Real GDP (\$ amount) Global Edge	\$197,622,822,616 (2022)	Unemployment rate Global Edge	18.73% (2022)	Inflation rate Global Edge	138.808% (2022)
Real GDP growth rate Global Edge	-0.953% (2022)	Median age CIA World Factbook	18.3 years	Mean Income per day (Could not find median income) Our World in Data	\$4.56 per day (2014)
Real GDP per capita Global Edge	\$4216 (2022)	Size of the labor force Global Edge	13,501,917 (2022)	Current Prices: Gasoline (1 gallon) Numbeo	\$5.20 (2023)
GDP Composition (C + I + G + NX) CIA World Factbook	Consumption: 77.3% (2017) Investment: 19% (2017) Government: 5.8% (2017) Net Exports: Exports: 9.7% Imports: -11.8% (2017)			Milk (1 gallon) Numbeo	\$5.76 (2023)
Population size CIA World Factbook	49,197,555 (2023)			Loaf of bread Numbeo	\$0.88 (2023)
Population in poverty CIA World Factbook	46.5% (2009)			Pair of jeans Numbeo	\$17.38 (2023)
				Movie ticket Numbeo	\$3.00 (2023)
				Rent (1 bd outside of city) Numbeo	\$227.14 (2023)

Day 3 / Part 3

In 2022, the real GDP in Sudan was about \$197.6 billion, with an annual growth rate of about -0.953% (Michigan State University, n.d.). The most recent data about GDP composition in Sudan was from 2017. In 2017, 77.3% of GDP came from consumption spending, 19% came from investment, 5.8% came from government spending, and -2.1% came from net exports (Central Intelligence Agency, n.d.). Compared to the average GDP composition of the United States, there was more consumption spending and investment in Sudan than in the U.S. However, the U.S. government spends significantly more than the government of Sudan. On average, 20% of the U.S. GDP comes from government spending while only 5.8% of Sudan's GDP came from government spending in 2017. Though the government in Sudan barely exists due to recent military and political turmoil (International Rescue Committee, 2023), it makes sense that government spending is relatively low. Sudan has fewer net exports than the U.S., suggesting that they either import less or export more than the U.S.

Sudan's main natural resources are agricultural products. Some of these agricultural resources include groundnuts, sugarcane, milk, sesame seeds, and bananas (International Trade Administration, 2022). While agriculture may be a booming industry in Sudan, agricultural production alone is not enough to have a significant impact on GDP. Relying on agriculture alone may be hindering Sudan from significantly increasing its GDP. Another major factor that may be limiting GDP growth is Sudan's economic resource supply. In 2022, Sudan had a labor force of about 13.5 million people while their population was about 49 million (Central Intelligence Agency, n.d.). Only about a quarter of the population was in the labor force. The median age in Sudan is 18.3 years (Central Intelligence Agency, n.d.), so it has a relatively young population. This may limit the size of the labor force and thus limit GDP growth. With fewer labor resources, there are fewer resources available for production. A majority of the labor force (80%) works in agriculture, further showing how Sudan relies heavily on the agricultural industry.

Sudan mainly imports sugar, wheat, and medicines (International Trade Administration, 2022). Sudan mainly exports precious metals, crude petroleum, and live animals. Precious metals, such as gold and silver, as well as oil are important resources that many other countries need and want. Sudan's net exports only accounted for about -2.1% of GDP. While total exports accounted for about 9.7% of GDP, the number of net exports is still negative. This means that Sudan must have needed more resources from other countries than other countries needed from them. In context, Sudan must have needed more sugar, wheat, and medicines while other countries didn't quite need that much oil, metals, and animals. Another factor here is that oil is a main export of Sudan. Many other countries export oil, and Sudan is not one of those top countries. Sudan is exporting oil, but there are multiple other countries to get oil from. Increased competition decreases prices and decreased prices for oil leads to less revenue from oil exports, and thus leads to a smaller GDP in Sudan.

Day 4 / Part 4

Real GDP per capita is relatively low compared to population size. In 2022, the Real GDP per capita was \$4,216 (Michigan State University, n.d.), and in 2023, the population size was about 49.2 million (Central Intelligence Agency, n.d.). The small population is most likely caused by the millions of citizens who have fled the country due to recent military and political turmoil (International Rescue Committee, 2023). Because the population is small and the real GDP is low and decreasing, real GDP per capita is also low. People cannot work and contribute to the economy of a country if they are fleeing and being displaced from Sudan.

The most recent measurement of Sudan's population in poverty is from 2009. In 2009, 46.5% of the population was living in poverty (Central Intelligence Agency, n.d.). This is almost

half of the population. This number isn't very useful in assessing the standard of living of the people of Sudan today, however, it shows that the situation hasn't improved that much over the years. With a low GDP per capita in 2022, a significant amount of Sudan's population must be living in poverty even today. The standard of living in Sudan is poor. Fourteen years ago, nearly half of the population was in poverty, and now the GDP per capita is a little over \$4,000. That number is low compared to other countries, such as the United States, with much higher standards of living.

Real GDP growth in Sudan was -0.953% in 2022 (Michigan State University, n.d.). The investment component of Sudan's GDP in 2017 was 19% (Central Intelligence Agency, n.d.). The current negative growth rate and the high amount of investment spending from the past speak primarily to the quality of investments. In 2017, Sudan spent a greater percentage of their GDP on investment than the U.S. However, five years later, their GDP growth was negative. Sudan must have invested in resources that were not as productive as they had hoped, for the significant amount of investment spending in the past did not cause a significant amount of economic growth over a longer time period.

Day 5 / Part 5

In 2019, Sudan's real GDP was \$178.7 billion. Its GDP fell to \$172.2 billion in 2020 and continued to decrease in 2021 to \$168.98 billion (Central Intelligence Agency, n.d.). Unsurprisingly, Sudan's unemployment rate had an inverse relationship with GDP growth. The unemployment rate increased each year while GDP fell. The unemployment rate was 17.65% in 2019, 19.65% in 2020, and 19.81% in 2021 (Central Intelligence Agency, n.d.). Unemployment rates rise when less goods are being produced and fewer services are being provided. When these factors decrease, GDP decreases. Therefore, they have an inverse relationship; as unemployment goes up, GDP goes down.

The labor force in Sudan is estimated to be about 13.5 million people, with an overall population of approximately 49.197 million. The median age in Sudan is 18.3 years. This number varies slightly among men and women. The median age of men is 18.1 years, while the median age of women is 18.5 years (Central Intelligence Agency, n.d.). Because the median age is about 18 years, the population is very young. This is a major factor as to why the labor force is so small. 50% of the population may be too young to begin working.

Another factor of Sudan's small labor force is their ongoing war. Since April, more than four million people have been displaced, including 880,000 people who have fled the country. Because of the war, an influx of the population has joined the military, which takes away from the labor force. Also, about 3.3 million people have been displaced from their homes in Sudan and are living in safe camps. This also affects the labor force, as these people are not working. Their main focus is on keeping themselves and their families safe from violence (International Rescue Committee, 2023). As the war continues, the labor force will continue to shrink, which will inhibit economic growth.

With a smaller labor force, economic growth is limited. A large majority of the population does not work, so most of the country does not contribute to GDP or economic activity in general. If the demand for any product were to go up, it would be hard for supply to catch up because the labor force is so small. This limits even minimal economic growth from happening within the country.

In Sudan, 80% of the labor force works in agriculture. Sudan's major economic activities are exporting gold, crude petroleum, groundnuts, and live animals (Central Intelligence Agency, n.d.). It makes sense that Sudan primarily exports natural resources because the majority of the labor force works in that field. Sudan's major imports are packaged medicines and jewelry (Central Intelligence Agency, n.d.). These items do not fall under the agricultural sector, so it is

obvious that Sudan's primary focus is not on producing these items. Because the labor force is agriculture-focused, Sudan relies on other countries for items that are industry or service-based.

Day 6 / Part 6

The inflation rate in 2022 was 138.808%. The real GDP per capita in 2022 was \$4,216 (Michigan State University, n.d.). With inflation skyrocketing and real GDP per capita plummeting, it is putting Sudan in a state of stagflation. The high inflation rate results in people spending less money because the value of the currency has decreased. People may be unable to buy as much as they could before and may not be spending as much with the high inflation rates. With higher prices, the production of goods and services decreases, causing GDP per capita to decrease in turn.

The mean income per day in Sudan was \$4.56 in 2014 (University of Oxford, n.d.). Though this number is from 2014, GDP per capita is still low with high inflation. Thus, it can be assumed that Sudan is not in a much better place than they were in 2014, and this number can be used as a reference. The prices of goods and services in comparison to the mean income per day are astronomical. A few examples of prices include \$5.20 for a gallon of gasoline, \$5.76 for a gallon of milk, and \$227.14 for one month's rent (Numbeo, 2023). The high inflation rate causes the prices of goods and services to rise. However, income does not change as fast as inflation. Based on the numbers from 2014, a person would have to work 50 days to pay a month's rent today. That does not include paying other bills such as food, clothing, and transportation. The high inflation rate and low amount of income do not complement each other in a way that promotes economic growth. Overall, Sudan suffers from a low real GDP per capita, high inflation rate, low income, low economic freedom, a small labor force, high unemployment, and political turmoil. The people of Sudan are focused on surviving and getting by rather than flourishing economically.

Day 7 / Part 7 (Note: this is from the online modality, including an analysis of news articles)

In the article "Fears of all-out ethnic war rise in Sudan's Darfur," published by Al Jazeera, residents, experts, and aid groups fear that the next major conflict in Sudan's civil war will result in "all-out ethnic violence." In the past week, the Joint Protection Forces (JPF), a group of non-arab armed men, have deployed reinforcements to a village outside the capital of North Darfur. For context, Darfur is a region in the western part of Sudan. The JPF, a neutral body, is there to protect the community from a possible attack by the Rapid Support Forces (RSF). The RSF, composed of mostly Arab tribes, has not put forth a statement on whether or not they will attack the community. However, two weeks ago the RSF killed 1,300 civilians inside an internally displaced persons camp in the Darfur region, targeting the non-Arab Masalit people. The community in North Darfur is fearful that they will attack, and they have good reason to believe they will (Nashed & Ahmed, 2023).

With the war going on in Darfur, the residents are fearing for their lives. Some may be fleeing or sheltering in safe places in internally displaced persons camps. If people flee, not only will the country lose key labor resources, but there will also be fewer people in the country to demand goods and services. With fewer labor resources, the supply of goods and services will decrease. With fewer people demanding goods and services, demand will decrease. Both of these situations decrease GDP. If people shelter in safe places, there may be an increase in demand for necessities, such as food and water. However, displaced people most likely will not have the funds to buy such supplies. The ethnic targeting has decreased the standard of living in Darfur as its residents fear the next events in the war. Masalit citizens fear for their lives because the RSF is targeting their people. People aren't participating in economic activity when they are afraid to leave their homes or shelter. This event has primarily caused economic turmoil in the country.

In other recent events, according to AP News, "over half of Sudan's population needs humanitarian aid after nearly 7 months of war." This aid is needed after Sudan's military and a powerful paramilitary, the RSF, destroyed parts of the country. There are roughly 25 million people who need assistance. The United Nations (UN) has plans to provide aid for about 12 million people in Sudan, which is just under half of all of those who need it. However, the UN is having a difficult time funding its humanitarian response in Sudan (Lederer, 2023).

The standard of living in Sudan is currently poor. Over half of Sudan's population needs humanitarian aid. A large amount of money is going towards the war effort and funding the armed forces. People cannot work when they are displaced from their homes and fleeing from violence. Without a steady income, they are unable to buy the necessities and support themselves and their families. People are living in poverty, and with the negative real GDP growth rate, there is not enough money coming into the economy to aid in this humanitarian crisis. The country needs outside economic help to pull it out of its financial crisis. People are frightened for their lives day in and day out. They are not focusing on wealth or the state of the economy; they are simply trying to survive. However, surviving becomes harder and harder as inflation soars and prices rise to levels that people can't afford.

In the past few months, there has been a steep rise in the number of Sudanese refugees fleeing from the violence. An article published by CNN discusses the number of people who have left Sudan. As of June 2023, about 2.8 million people have fled Sudan. Some have left the continent as a whole, and others have moved to neighboring countries. Of those who fled to neighboring countries, most people have fled to Egypt and Chad. Many of the refugees do not have passports, leaving many refugees stranded in the neighboring countries. They are not able to leave these countries and go to other parts of the world without a passport. Some of the passports were destroyed by the US Embassy after the war started, and some people simply do not have them (Formanek, 2023).

As mentioned before, people fleeing Sudan not only decrease labor resources but also decrease the number of people who demand goods and services. Both of these factors lead to a decrease in GDP. The passport issues hinder many of the refugees from fleeing to farther places. The countries neighboring Sudan may become overpopulated if too many refugees go there. This has economic implications for these countries as well as Sudan. Sudan is losing its labor resources to these other countries, and these other countries may face resource strain from the increased population sizes. Despite some fleeing to neighboring countries, the passport issues may prevent some citizens from leaving Sudan. They are stuck in the violence and conflict, moving from place to place within the borders of Sudan. Many cannot escape poverty and struggle to survive, so they are not contributing to economic growth. Sudan cannot grow economically if it does not have the labor resources, demand, and supply that is necessary to thrive.

Sudan's real GDP has consistently decreased over the last three years. In 2022, its real GDP growth rate was -0.953% (Michigan State University, n.d.). Sudan also reported negative real GDP growth rates for the years 2021 and 2020 (Central Intelligence Agency, n.d.). Along with negative real GDP growth rates, Sudan has also had an increase in unemployment. Since 2019, unemployment has steadily increased, with 19.81% of the labor force being unemployed in 2021 (Central Intelligence Agency, n.d.). This outcome is unsurprising because GDP and unemployment have an inverse relationship. When GDP falls, fewer goods and services are being produced. This affects unemployment. When fewer goods and services are being produced, less labor is needed. As GDP decreases, unemployment will increase.

Because of Sudan's steady decrease in real GDP, its production is also decreasing. In 2021, Sudan's industrial production growth rate was -0.7% (Central Intelligence Agency, n.d.). Their limited production causes Sudan to rely heavily on imports. In 2021, Sudan imported \$9.788 billion worth of goods and exported only \$5.916 billion (Central Intelligence Agency,

n.d.). When imports are greater than exports, real GDP will fall. Limited production, reduced resource availability, and political conflict are some of the many causes of Sudan's low real GDP.

In addition to decreased production of goods and services, Sudan has also experienced a large amount of inflation. In 2021, the inflation rate was 382.82%, which is extremely high. It dropped to 138.8% in 2022. In previous years, inflation has consistently been over 50% (Central Intelligence Agency, n.d.). Because of Sudan's ongoing high inflation levels, price levels have risen. The real GDP per capita was \$4216 in 2022. This is relatively low compared to the high level of inflation. As the prices of goods have gone up and income has remained low, it has become harder and harder for the people of Sudan to afford basic needs. The decrease in real GDP and increase in inflation have put Sudan in a period of stagflation. People are unable to buy as much as they did before, which will inhibit further GDP growth. In 2009, 46.5% of the population was living in poverty. Given the low real GDP per capita in 2022, this percentage has likely not decreased too much. With a significant percentage of the population living in poverty, a low GDP per capita, negative GDP growth, and high inflation, the standard of living in Sudan remains low.

In 2021, the Economic Freedom of the World Index for Sudan was 3.98 out of 10 ranking Sudan 162nd out of all countries in terms of economic freedom (Fraser Institute, 2021). Sudan ranks among the least economically free and most repressed countries in the world. This has a significant impact on the standard of living in the country. Less economic freedom limits economic growth and contributes to effects such as a negative GDP growth rate, a low GDP per capita, and a large portion of the population in poverty. Given that Sudan has had much military and political turmoil, it does not have many strong institutions let alone institutions that enhance economic freedom. Without strong institutions and economic freedom, economic growth in Sudan has been greatly hindered. The government of Sudan cannot build infrastructure or protect private property rights if it's being overthrown. People cannot pull themselves out of poverty if they do not have economic freedom and the ability to do so. Because of this, the standard of living continues to be low, for factors that promote economic growth don't readily exist in Sudan.

As of 2022, Sudan was in a recession. In 2022, the Real GDP growth rate was -0.953%. While recessions don't usually last long and the economy is typically able to adjust back to its equilibrium point, the outlook for Sudan's economy over the next five years does not appear to be too promising. Sudan is suffering from stagflation where there is a decrease in GDP but a large increase in the price level. The inflation rate was 138.8% in 2022. For Sudan to come out of their economic downturn, the government must intervene, or it must wait for the economy to adjust on its own. Neither of these possibilities seems likely to happen within the next five years. With the ongoing civil and political conflict, the government is in turmoil. It most likely will not have the capability to use fiscal policy to increase aggregate demand and bring the country out of its recession. Wars also have the potential to create a supply shock in an economy. With this war destroying much of the infrastructure of the country, input prices most likely will not fall to bring short-run aggregate supply back to equilibrium. Input prices will most likely continue to rise until the war is over, and they will remain high as the country rebuilds. Both of these possibilities considered, it is unlikely that there will be a drastic increase in real GDP within the next five years. Real GDP may continue to decrease or increase only slightly within the next five years unless a major peace agreement is reached soon to allow Sudan to rebuild itself.

Unemployment does not have a very hopeful outlook either. With the ongoing war, citizens continue to be displaced from their homes, increasing the number of unemployed people. Unemployment may not change dramatically though. Logically speaking, people are fleeing Sudan, so its population is getting smaller. A smaller population means there is a smaller labor force. This decrease changes the proportion of unemployed workers relative to the labor force. If the size of the labor force is changing and the number of unemployed people

is changing, unemployment may not show a drastic change if this pattern continues over the next five years.

The only promising economic situation for Sudan is inflation. As of January 2023, the inflation rate had fallen to 83.6% (Trading Economics, n.d.). This is about 50% below the average inflation rate of 2022. While still high, the problem of inflation seems to be improving. As long as there are no mass destruction events, natural disasters, or pandemics, the inflation rate shouldn't increase dramatically over the next five years. As the war continues, the country will slowly adjust to living during a war. As the country adjusts, the economy will also gradually adjust and prices will slowly begin to decrease. At the end of five years, the economy may have adjusted enough to make it into a significant expansionary period. However, as long as the conflict and turmoil continue in Sudan, the economy cannot thrive and flourish. People will be stuck in poverty and the country will have minimal resources to build itself back up again.

APPENDIX C: Pre-class Assignments

These assignments come from Carlos Asarta and Roger Butters (2022) *Connect Master Principles of Economics*. Similar assignments from other textbooks can be substituted.

Videos & Algorithmic Assignment on GDP: Gross Domestic Product, The Expenditures Approach - Personal Consumption and Government Expenditures, The Expenditures Approach - Gross Investment, The Expenditures Approach - Gross vs. Net Investment, The Expenditures Approach - Net Exports, Real GDP, and Real GDP Per Capita

Videos & Algorithmic Assignment on Economic Growth: A Historical Approach to Economic Growth, Economic Growth and the Production Possibilities Frontier, and Measuring Economic Growth Using Real GDP

Videos & Algorithmic Assignment on Unemployment: The Labor Force, Unemployment - Cyclical, Frictional, and Structural, The Unemployment Rate, Unemployment - the Natural Rate,

Videos & Algorithmic Assignment on Inflation: The Inflation Rate, The Consumer Price Index (What Goes In), Calculating the Consumer Price Index, Measuring Inflation Using the Consumer Price Index, Nominal and Real Income

These assignments come from Carlos Asarta and Roger Butters (2022) *Connect Master Principles of Economics*. Similar assignments from other textbooks can be substituted.

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