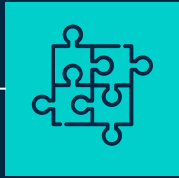


The background is a dark blue gradient. It is decorated with various geometric elements: small squares in teal, orange, and pink, and thin white vertical lines of varying lengths. These elements are scattered across the slide, creating a modern, minimalist aesthetic.

# China **LOANS** to Africa

By Jatin Sethi

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## PROBLEM

What issue we tackled and why it's important



02

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Our Data, Methodology, and Final Results



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PROBLEM

01

# UNDERSTANDING THE PROBLEM

China has loaned heavily to African countries over the past 20 years for the Transportation, Agriculture, Education, Health, Water and Resources sectors. What particular KPIs are influencing these countries' GDP with high amount of debt? Are the Chinese loans truly helping these countries?

# CHINA LOAN SECTORS

DATE

REASON

DESCRIPTION

Transportation

2001

Highest  
Potential

For multiple developing African countries, road infrastructure is key.

Education

2005

Good  
Potential

Education can open up doors to new jobs.

Health

2000

Low Potential

Keeping average life expectancy high is necessary.

Agriculture

2003

Good  
Potential

Food produce will be in high demand.

# EDA & Model Evaluation

02

# METHODOLOGY

Experimenting and trying to understand how world bank collects data

World Bank API

Step 1

Step 2

EDA

Generating unique visualizations to understand loans for highly indebted countries

Choosing model and key indicator to determine model performance

Model Evaluation

Step 3

Step 4

Model Conclusion/  
Key Takeaways  
Deciding what the model tells us and the effect of China loans



# DATA

## Input Variables

- AG.LND.ARBL.ZS: Arable Land
- EG.CFT.ACCS.ZS: Access to clean foods and technology for cooking
- EG.IMP.CON5.ZS: Energy imports, net (% of energy use)
- EN.ATM.PM25.MC.M3: PM2.5 air pollution (mean annual exposure)
- EN.ATM.PM25.MC.ZS: PM2.5 air pollution (populations exposed to exceed WHO levels)
- EP.PMP.DESL.CD: Pump price for Diesel Fuel
- EP.PMP.SGAS.CDL Pump price for Gasoline
- ER.H2O.FWTL.ZS: Annual freshwater withdrawals
- ER.H2O.INTR.PC: Renewable internal freshwater resources per capita
- IS.SHP.GCNW.XQ: Liner shipping connectivity index
- LP.LPI.OVRL.XQ: Logistics performance index
- SE.XPD.TOTL.GD.ZS: Government expenditure on education
- SH.XPD.CHEX.GD.ZS: Current health expenditure
- SH.XPD.CHEX.PC.CD: Current health expenditure per capita
- SH.XPD.EHEX.PP.CD: External health expenditure per capita
- SH.XPD.PVTD.CH.ZS: Domestic private health expenditure
- SI.POV.MDIM: Multidimensional poverty headcount ratio
- SL.UEM.NEET.ZS: Share of youth not in education
- SP.DYN.IMRT.MA.IN: Mortality rate, infant, male
- SP.DYN.LE00.IN: Life expectancy at birth, total
- SP.DYN.TFRT.IN: Fertility rate, total
- TM.VAL.ICTG.ZS.UN: ICT good imports

## Output Variable

- NY.GDP.MKTP.PP.CD: GDP

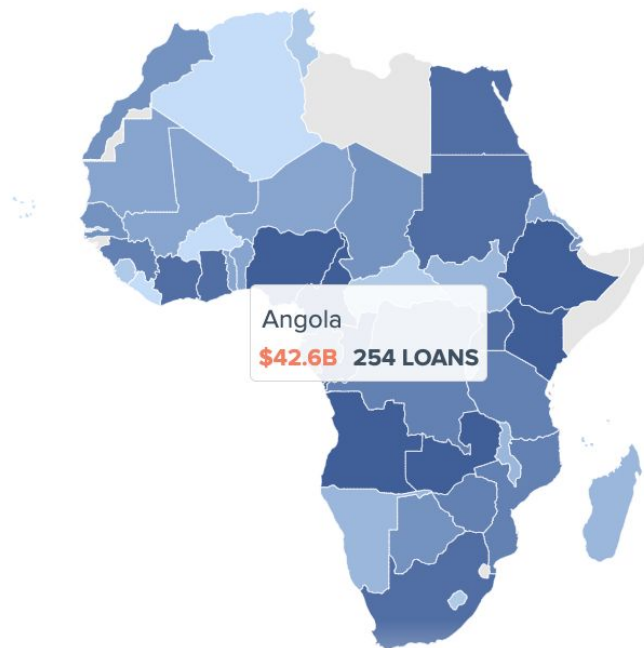


# DATA SOURCES

- China Africa Research Initiative (John Hopkins)
- World Bank

# DATA FOCUS

All Loans for ...

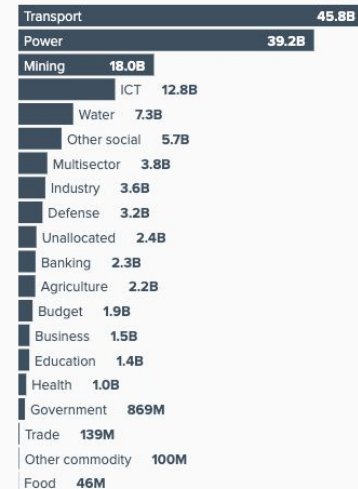


## AFRICA

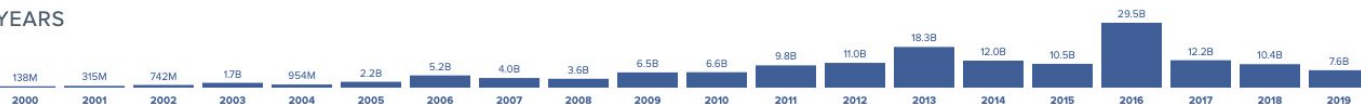
> Amount Committed Number of Loans

**\$153B** **1143**

### SECTORS



YEARS



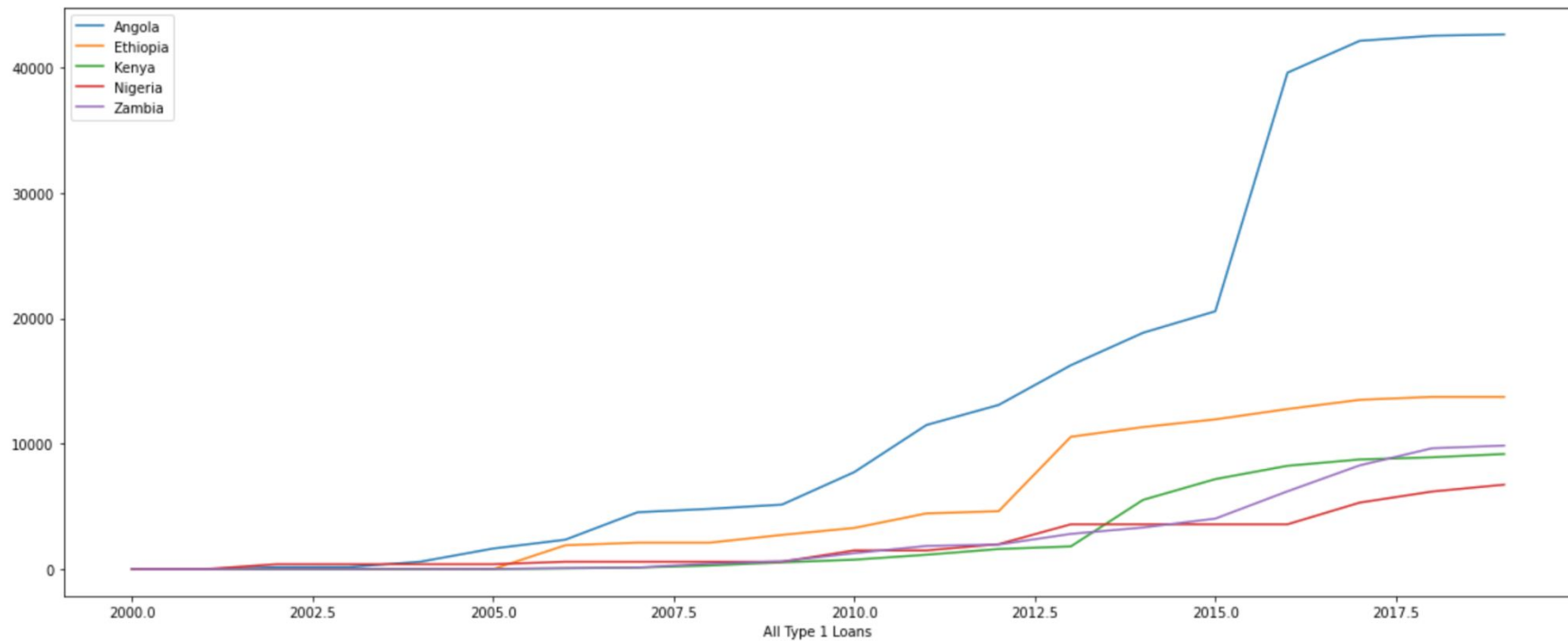
See More Data

# THE STORY

- The top nations that have received the most money from China are a good representation of the impact these loans can have on a country's development.
- Therefore, we're going to be using these countries for our analysis from this point on, specifically Angola.

# THE STORY

Total Incurred Debt

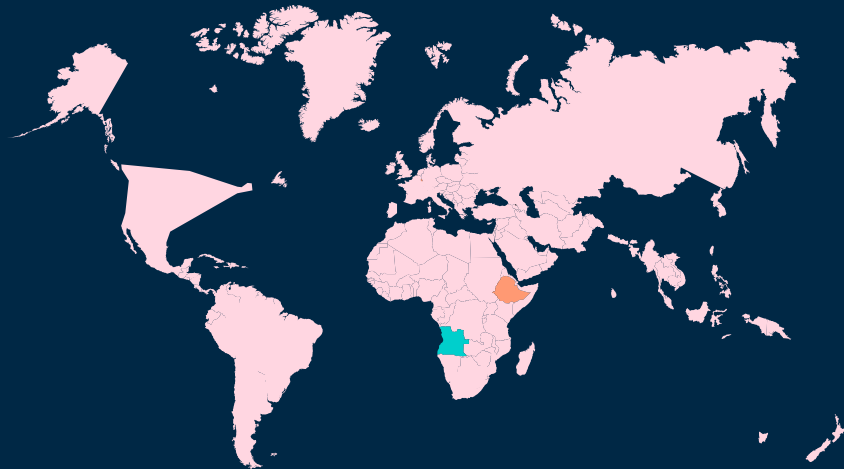


# WHY ANGOLA IS INTERESTING TO US?

- Out of the \$153 billion that China has poured into Africa, ~30% of that has gone to Angola
- Angola was one of the first nations to receive funding and that puts them in an interesting spot for our analysis
- The loans to Angola have plateaued over the past 5 years while the funding from China has not slowed down.

# ANALYSIS

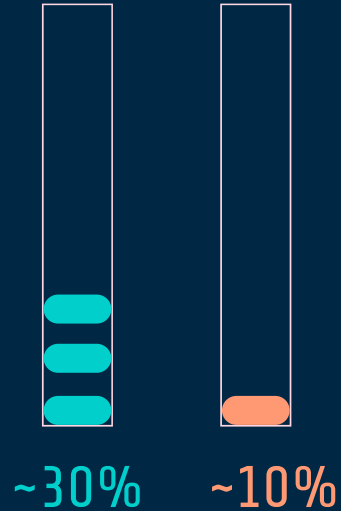
## Chinese Loans Map



Angola

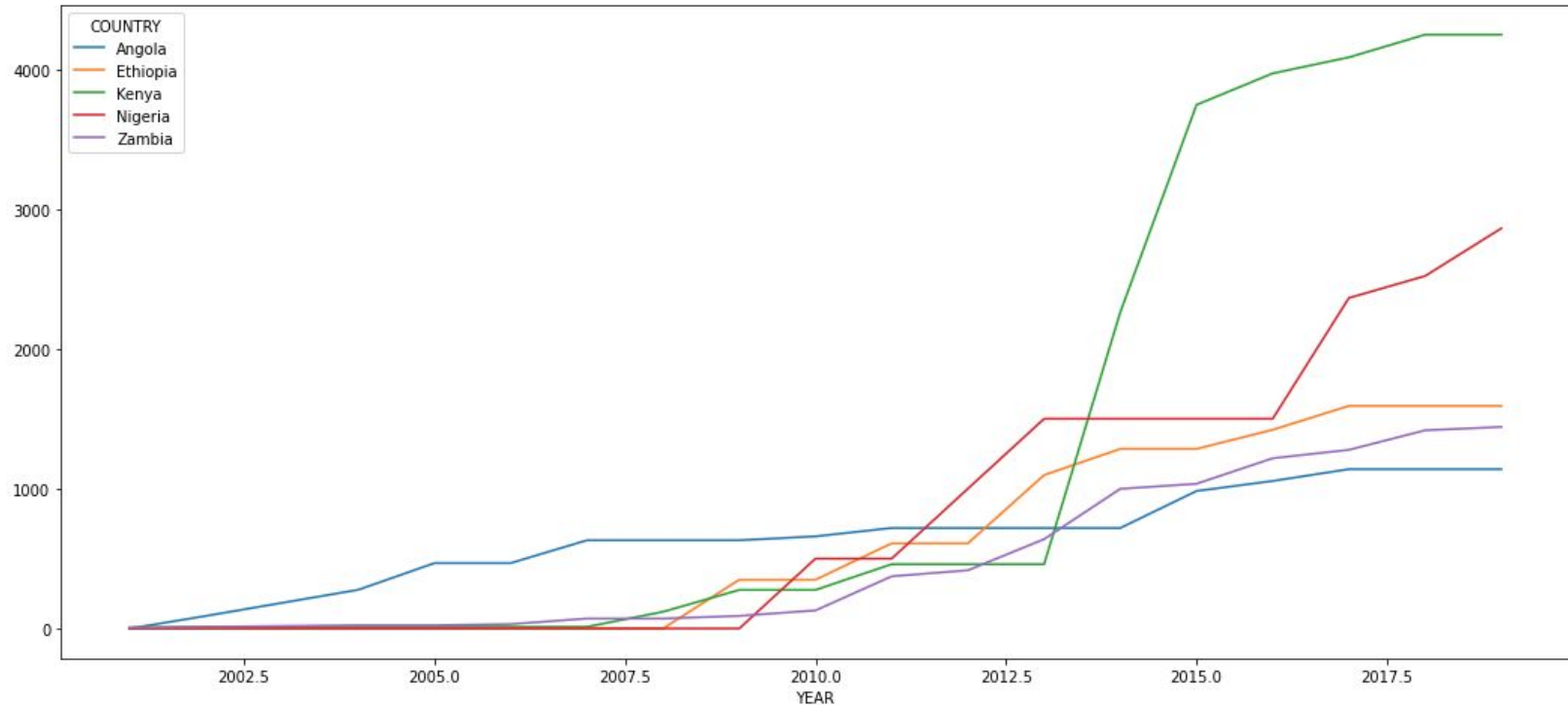
Ethiopia

## Total Type 1 Loans



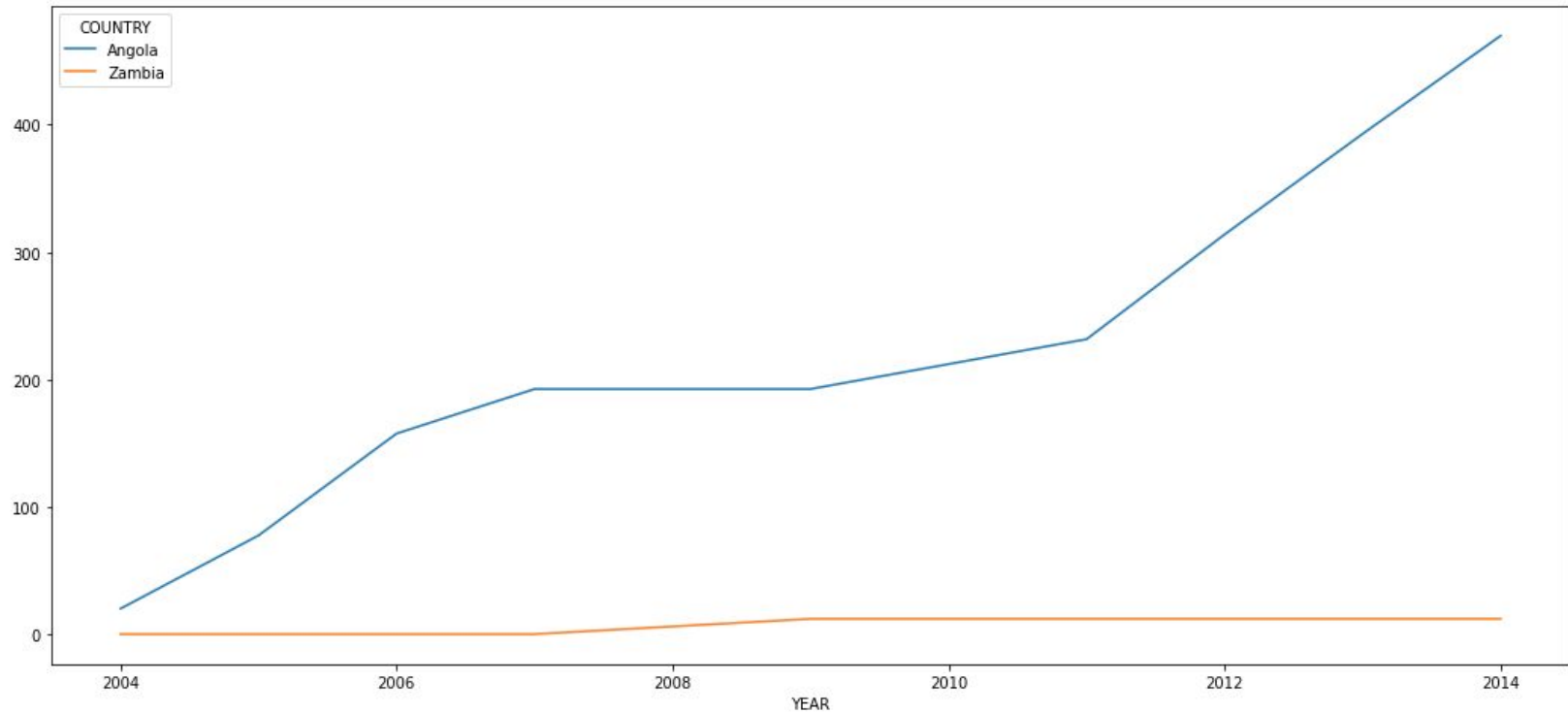
# LOANS IN TRANSPORTATION

Incurred Debt in the Transportation sector



# LOANS IN AGRICULTURE

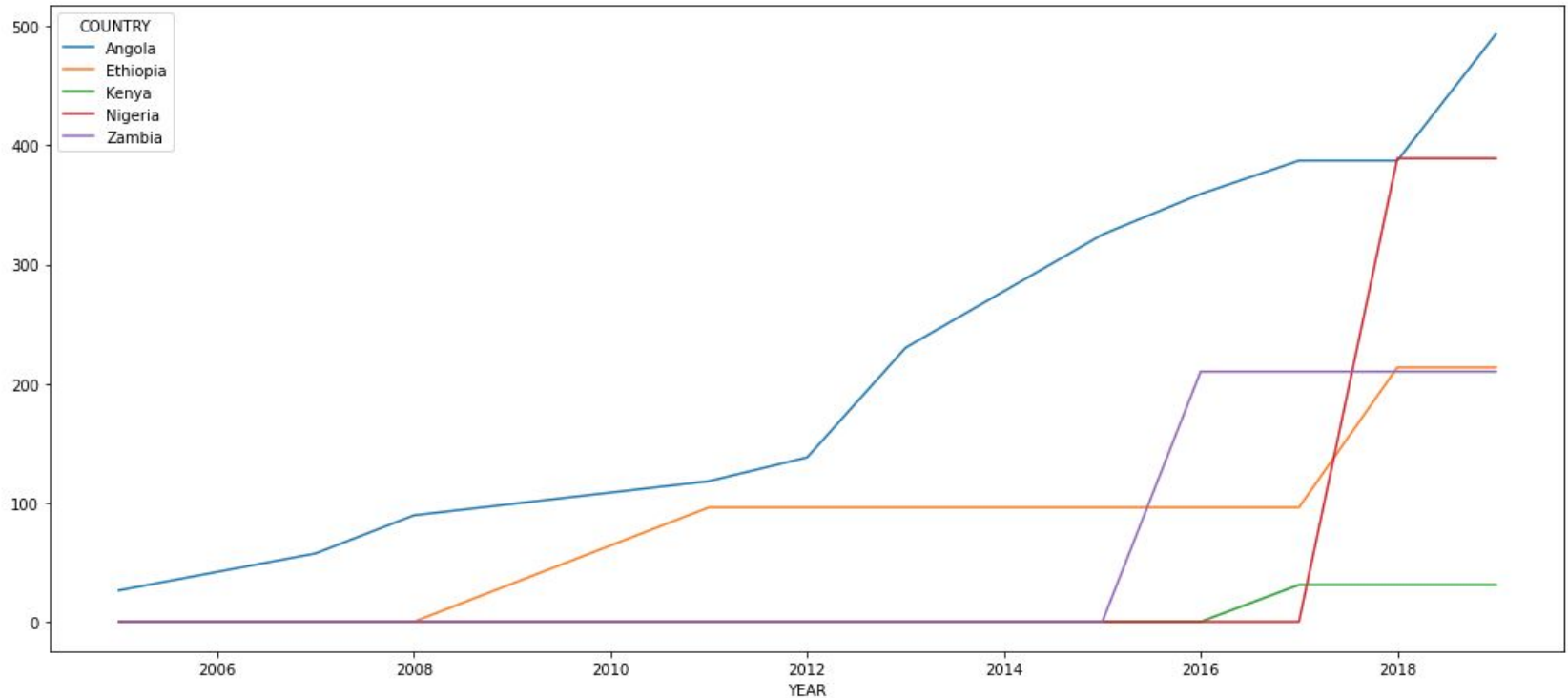
Incurred Debt in the Agriculture sector





# LOANS IN WATER

Incurred Debt in the Water sector



# IMPACT OF SPECIFIC SECTOR LOANS ON DEVELOPMENT METRICS OF ANGOLA

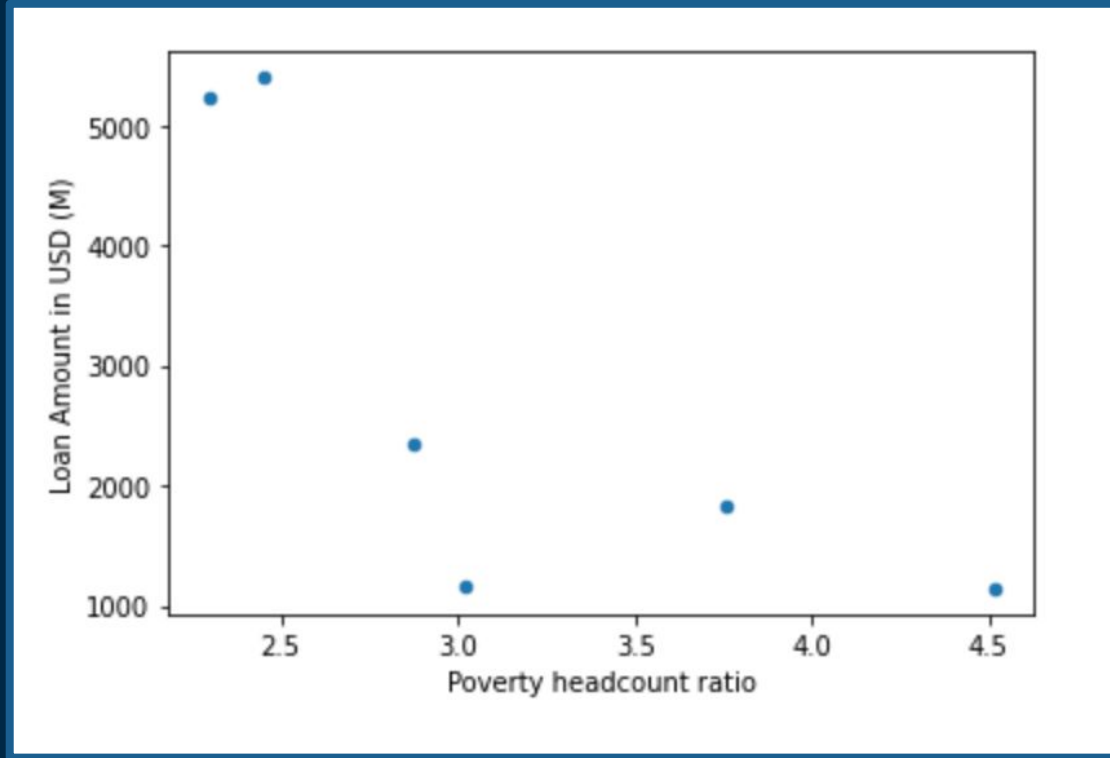
- Agricultural Loans: Over the past 20 years, these amount to a total of \$5 billion. The metrics that show the impact of loans in this sector are
  - 'Arable land as a % of Total Land' and
  - 'Employment rate in Agriculture as % of total employment'.
- These metrics best show the impact these loans have had on the Agricultural sector of Angola



# IMPACT OF SPECIFIC SECTOR LOANS ON DEVELOPMENT METRICS OF ANGOLA

- Transportation Loans: Over the past 20 years, these amount to a total of \$1.2 billion. The metrics that show the impact of loans in this sector is
  - 'Poverty headcount ratio'
- Better transportation leads to urbanization, higher trade and more jobs and hence this metric best shows the impact of transportation loans

# ANGOLA LOAN PERFORMANCE PART 2



# MODEL BREAKDOWN

- Train Data: Angola
- Test Data: Ethiopia
- Model: Ridge Regression
- Performance Indicators: R2 Score/Ridge Regression Model Coefficients

# RESULTS

## Model Conclusion

The top 3 features that have the most influence on the Ridge Regression model in predicting GDP are the following: AG.LND.ARBL.ZS, LP.LPI.OVRL.XQ, and SP.DYN.LE00.IN. These are Arable land (% of land area), Logistics performance index, and Life Expectancy. Here are following model evaluation scores below:

Train R2 score: 0.9977

Test R2 score is 0.8272

Our model does not overfit, which is great news and has performed to its best ability!

NEXT STEPS

03



## PROFITABILITY

### STEP 1



The particular indebted country should see if they have been profitable.

## STATUS UPDATE

### STEP 2



There should be meetings set with China to see which sectors have thrived from the loans. Plans for more funding should be decided.

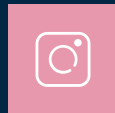
## LOAN PAYMENT

### STEP 3



Once it's time, all loans should be paid back in full back to China. This determines real social impact since it's an indication whether the economy in Africa will thrive.

# THANKS



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