**ESG Framework**

We analyzed data sets across the following categories with some of these example datasets

* Environmental  
  + Natural Resources – Forest Acreage
  + Pollution – CO2 Emissions
  + Energy – Fossil Fuel %
  + Wildlife Protection – Threatened Species
* Social
  + Human Rights - Child Labor
  + Health – Child Mortality
  + Education – Access to Primary Education
  + Exclusion – Gender Equality
* Governance
  + Political – Property Ownership
  + Legal – Prison Population
  + Corruption – Rule of Law

**Potentially Useful Charts based on World Bank data in case they are useful**

A screenshot of a map

Description automatically generated

Over 80% of people in the world have access to Electricity

A screenshot of a cell phone

Description automatically generated

Worldwide, over 90% of Young Women Complete Primary Education

**Environmental Data Example:** **Global CO2 Emissions**

![A screenshot of a cell phone

Description automatically generated]()

* As you would expect higher Emissions correlates with GDP and industrialization
* China and the US dominate CO2 Emissions

**Environmental Data Example: Global CO2 Emissions**

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* Elephants in the Room: China CO2 output is almost double the next highest producer
* With Long Tails: Emissions for high producers 46x greater than lesser producers

**Environmental Data Example: CO2 Emissions for China vs US**

A close up of a map

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* While US CO2 Emissions are still among the highest in the world levels are DECREASING
* China CO2 output outpaced the US in 2005 and are still INCREASING

A fair scoring system should reward positive behavior and penalize negative behavior.

**Constructing our own ESG Score Methodology**

1. Identify representative factors across Environmental, Social, and Governance datasets
2. Assess the Quality and Scope of Data Coverage for the identified factors
3. Create a Normalized Scoring System based on 5 a tier ranking of A through F
4. Apply the score calculation with frequency (driven by data availability)
5. Score each Country based on Relative Performance
6. Weight Country Scores by Population to create a Global Aggregate measure

**Results**

**A screenshot of a cell phone

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**A close up of a mans face

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* Improvements in the India score drove the 0.16 increase in the Environmental 2011
* Environmental and Social scores are largely graded a C by our scoring system
* Governance measures have largely moved downward in recent years
* According to our metric the world has made progress since the Credit Crisis of 2008

**Post-Mortem and Next Steps**

This was a very educational but challenging exercise:

* David and Matt were correct – we spent over 80% of our time reviewing and cleaning data. Depth of coverage and quality varies dramatically.
* Far more vetting and statistical analysis needs to be done on the available metrics to identify those sufficient coverage and unique descriptive power
* Distributions were typically skewed. We believe Clustering analysis could improve the scoring system to ensure that Countries are not unfairly bucketed
* The methodology would benefit by adjusting Scores to Reward/Penalize based on Trend
* Be realistic about time and skills. With only a finite amount of time to complete the project and should have been more realistic about the time to perform tasks.
* We should have spent more time on upfront planning and delegation instead of rushing into implementation. While more fun and satisfying, it was not the most way to achieve our goals.

**Appendix: Using the World Bank Data API**

List the Hundreds of Available Databases

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Perform Global Searches for Individual Series

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Retrieve a Pandas DataFrame A screenshot of a cell phone

Description automatically generated

JSON Data Package

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**Appendix: Data Sources**

* Data
  + MSCI ESG Government Ratings: <https://www.msci.com/documents/10199/e092c439-34e1-4055-8491-86fb0799c38f>
  + BP Statistical Review of World Energy: <https://www.bp.com/en/global/corporate/energy-economics/statistical-review-of-world-energy.html>
  + Doing Business Data Catalogue: <https://datacatalog.worldbank.org/dataset/doing-business>
  + Quandl World Bank Governance Indicators: <https://www.quandl.com/data/WWGI-World-Bank-Worldwide-Governance-Indicators/documentation>
  + Our World in Data Renewable Energy: <https://ourworldindata.org/renewable-energy>
  + Atlas of Sustainable World Bank Development Goals 2018 <https://books.google.com/books?id=89RdDwAAQBAJ&pg=PT107&lpg=PT107&dq=EG.ELC.ACCS.RU.ZS&source=bl&ots=2qTVZRuBd0&sig=ACfU3U1mM2ExRtOJXWZ4N5yhoMjdglRMdg&hl=en&sa=X&ved=2ahUKEwjr7NqUnb7kAhVBwlkKHUMpBAAQ6AEwB3oECAgQAQ#v=onepage&q=EG.ELC.ACCS.RU.ZS&f=false>
* Technology
  + World Bank API: <https://wbdata.readthedocs.io/en/latest/fetcher.html>
  + Plotly: <https://plot.ly/python/bubble-charts/>
  + Stack Overflow: <http://www.stackoverflow.com>

**Questions?**

RANDOM NOTES (NOT FOR INCLUSION JUST FOR THOUGHTS OR COMMENTARY)

Our group wanted to explore ways to use data to make the world a better place.

Our project was about creating a framework to analyze country behavior across different dimensions not just investing – that would be a next step.

We all want to make the world a better place, **or at least not subsidize those who are making it worse.**

We all have causes that are important to us:

[Natalie Holloway murdered in Aruba] [Organ Harvesting in China] [Health impact of Chernobyl]

That is what ESG Scoring is about: Creating a standard framework for measuring performance on specific Issues, broken down by Environmental, Social, and Governance factors.

Look how fortunate we all are in this room. Here we are in New York City, one of the great cities of the world, at one of the top universities on the planet, having the opportunity to learn new skills that we are interested in and that will help us be more successful.

It is easy to take all this for granted.

For example, I feel very passionate about human rights and about people being able to live free from fear.

We all watch the news and see people boycotting different Companies and Countries on the basis of their performance on various topics.

You may feel strongly about the environment and the effects of Climate Change and want to do what you can to promote these beliefs through your investment choices.