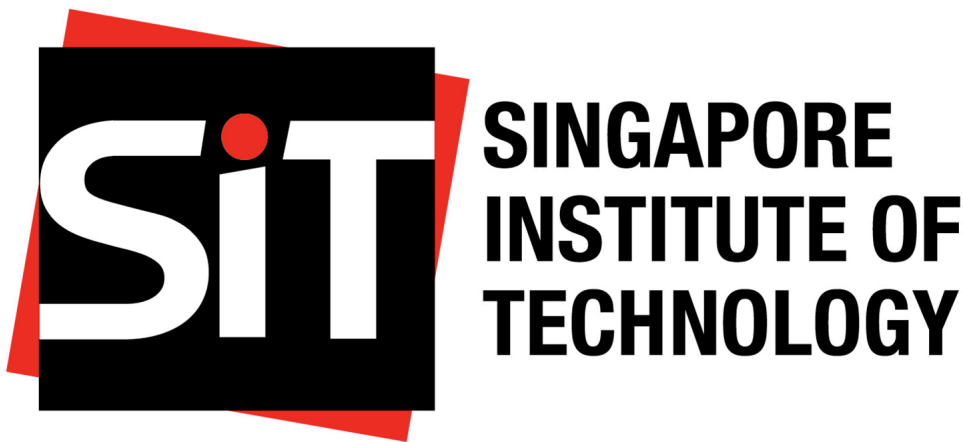


Worldwide Overproduction of Cars

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INTRODUCTION

CrudeOilPeak¹, a website that tracks global oil production and consumption as well as its impact on the economy, states that over the past decade, global car production has surged by 52%, predominantly driven by China’s growth. In contrast, oil supplies have only increased by 16%². This disparity highlights a significant challenge: the demand for cars is outpacing the available oil supply. To further illustrate this issue, they have created a visualization that compares the growth in car production by country/region against the growth in global liquid supplies (Figure 1). We found the visualization to be severely lacking and messy, and believe that it can be improved to be more visually appealing and easier to digest.

PREVIOUS VISUALIZATION

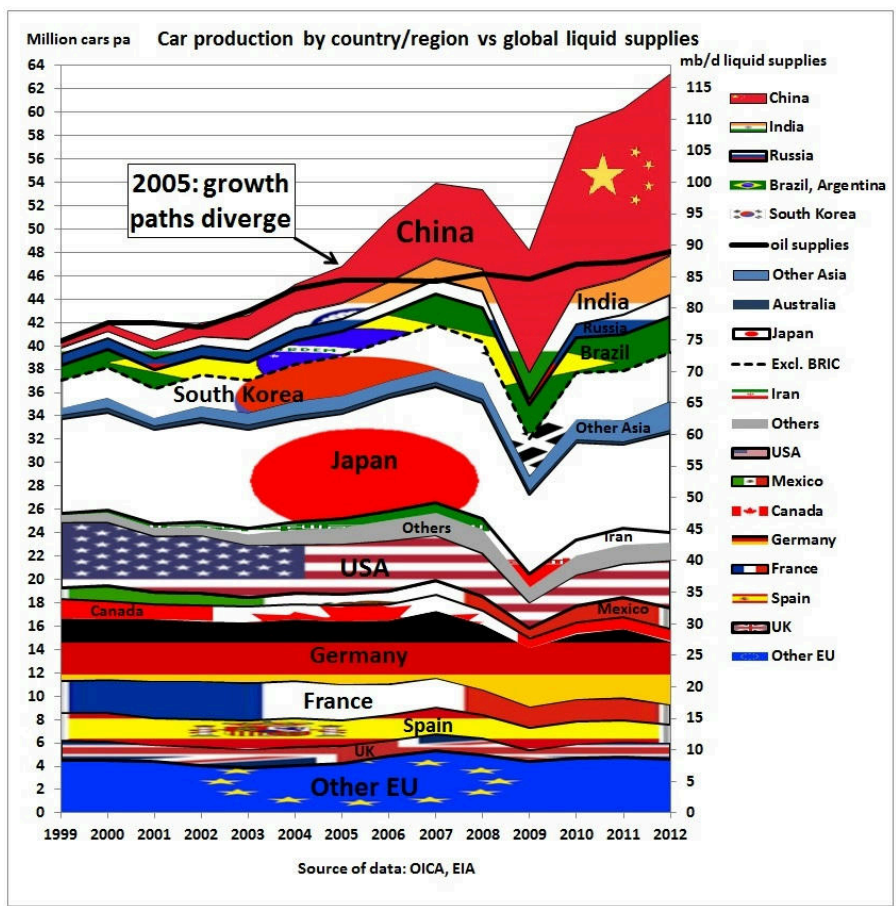


Figure 1: Car production by country/region vs global liquid supplies

STRENGTHS

1. High amount of information shown on the graph. Users can pinpoint and gather data specific to each country.
2. Area filling with country flags make it possible to identity country in question without referencing the plot legends.
3. Data clearly shows the point in which car and oil production diverges.

SUGGESTED IMPROVEMENTS

To better allow the purpose of the graph to be intuitive to the reader, we propose to limit the amount of information in the graph to only those that are important to the point we are driving across. For the purpose of the article, we have identified 3 main points the author is trying to illustrate.

1. There is a divergence between car production and oil production starting from year 2005.

¹<https://crudeoilpeak.info>
²<https://crudeoilpeak.info/world-car-production-grows-3-times-faster-than-global-oil-supplies>

2. There is a sharp increase in car production in BRIC countries in the years following 2005.
3. The main comparison made was between BRIC and non-BRIC countries.

To make it more intuitive for the reader, we propose splitting the main visualization into 2 different visualization. The first visualization will remain in the same format as the original graph, but with countries limited to reduce visual cluttering. For the second point, a % change in car production on a yearly basis for both groups will be plotted. This will be used to illustrate the rate of change in car production between both group better than a stacked area graph.

1. *Too much visual clutter* can make it difficult to interpret the data. Stick to a consistent color scheme and remove unnecessary elements.
2. *Do not add flags to the graph* it adds significant amount of visual clutter due to the sheer number of countries
3. *The growth paths divergence* can be better emphasized, more contrasting colors can be chosen. Current graph uses black on black.
4. *Aggregate data* The data illustrated are too fine-grained. A significant number of countries in the graph does not increase the amount of information gained from the illustration due to its negligible magnitude.
5. *Color Scheme* Better color scheme can be chosen to fit the users natural bias. (i.e. Red for RBIC, Blue for Non-BRIC countries)

IMPLEMENTATION

Data

- Car production data by country/region were obtained from the International Organization of Motor Vehicle Manufacturers (OICA) for the year 2023³.
- Similarly, the oil production data were obtained from the U.S. Energy Information Administration⁴. However, the data was not bundled together initially, so we had to manually combine and summarize the data from the different sources.

Software

We used the Quarto publication framework and the R programming language, along with the following third-party packages:

- *readxl* for data import
- *tidyverse* for data transformation, including *ggplot2* for visualization based on the grammar of graphics
- *knitr* for dynamic document generation

FURTHER SUGGESTIONS FOR INTERACTIVITY

Because our visualization was intended for a poster, we did not implement any interactive features, including the infotip. However, if the data are visualized in an HTML document, interactive features can be achieved using the R packages such as *plotly*. In that case, we recommend that the a tooltip that shows the actual label values on a mouse over event, offering additional if necessary by the user.

³<https://www.oica.net/category/production-statistics/>
⁴<https://www.eia.gov/international/data/world#/?>

CONCLUSION

We successfully implemented all suggested improvements for the non-interactive visualization. The users can clearly see the divergence in production between Oil and Cars. The second graph fully supports this idea intuitively as the % change in Car production is always higher than % Change in Oil production. (i.e. the line drawn is always above.)

IMPROVED VISUALIZATION

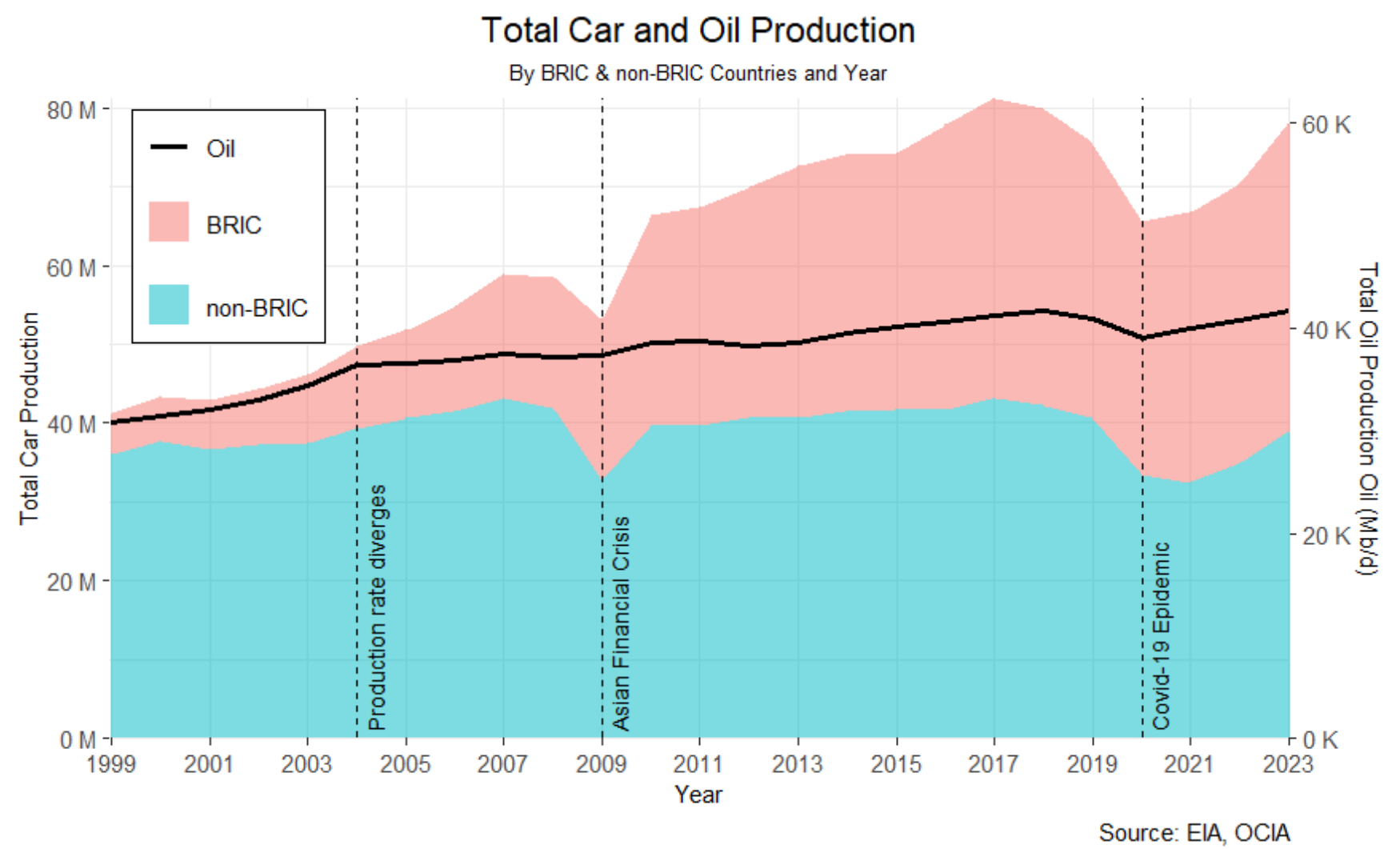


Figure 2: Revised visualization of car production by country/region vs global liquid supplies.

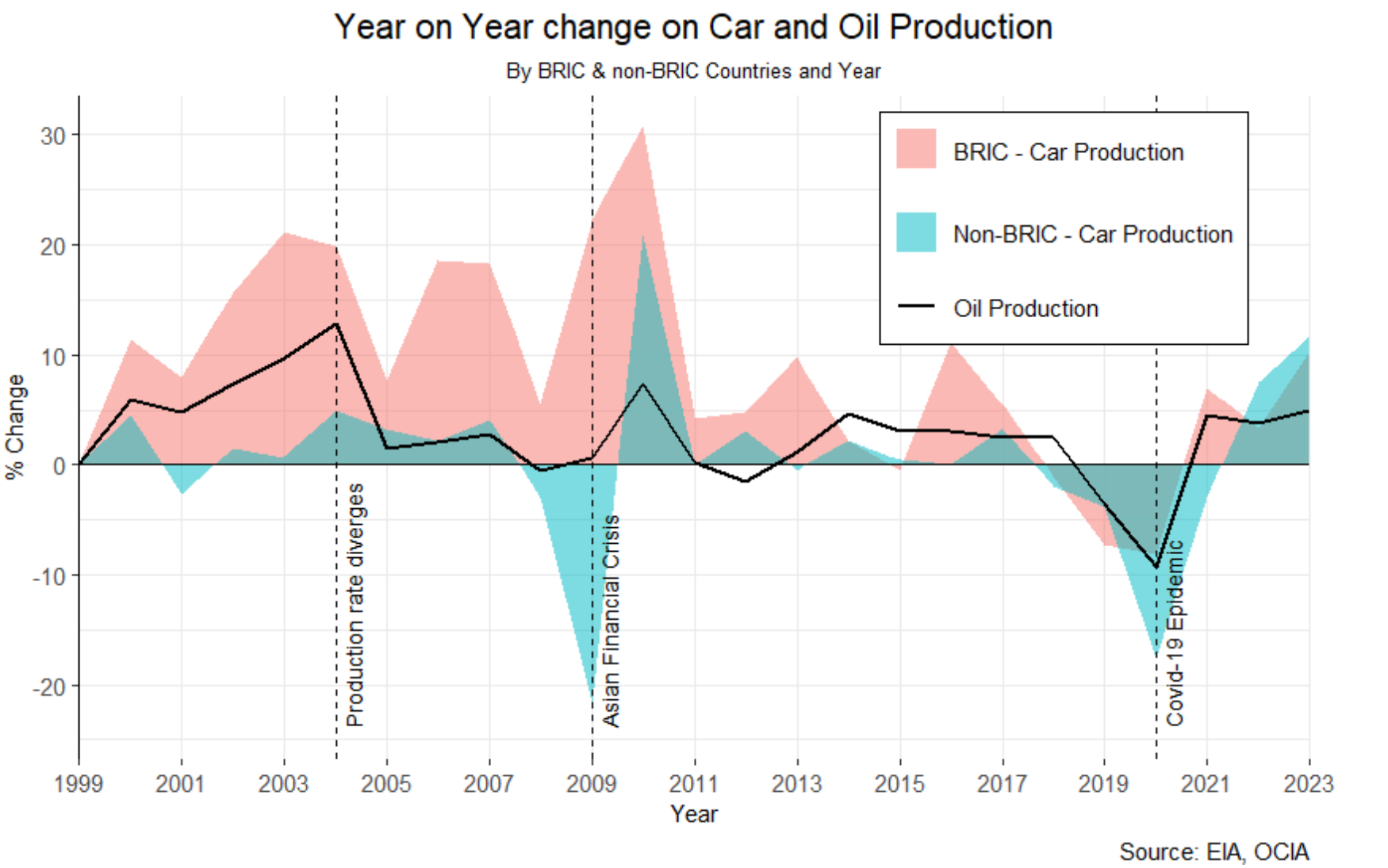


Figure 3: Revised visualization of car production by country/region vs global liquid supplies.