Worldwide Overproduction of Cars

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Introduction

CrudeOilPeak[1], 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 outpacing the available oil supply.

To further illustrate this issue, a visualization was created to compare 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 cluttered, and believe that it can be improved to be more visually appealing and easier to comprehend.

Original Visualization

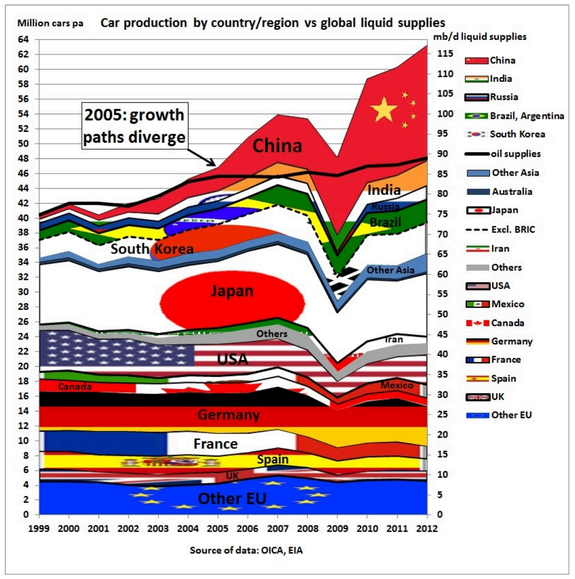

Figure 1: Car production by country/region vs global liquid supplies

Strengths

1. **Article Title**: The article title is impactful and states the main point of the visualization.
2. **Annotation**: The annotation provides context and explains the significance of the black line.
3. **Divergence**: The data clearly shows the point where car and oil production diverge.

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

Suggested Improvements

1. **Reduce visual clutter**: Stick to a consistent color scheme and remove unnecessary elements.
2. **Remove flags**: Flags add significant visual clutter due to the sheer number of countries.
3. **Emphasize divergence**: Use more contrasting colors to highlight divergence. The current graph uses black on black.
4. **Aggregate data**: The data illustrated are too fine-grained. A significant number of countries in the graph do not increase the amount of information gained due to their negligible magnitude.
5. **Color Scheme**: Choose a better color scheme to fit the user's natural bias (e.g., Red for BRIC, Blue for non-BRIC countries).
6. **Multiple y-axis**: The graph currently has two y-axis, which can be confusing for the average reader to understand.

To make the graph more intuitive, we propose simplifying it to highlight key points. The article focuses on three main points:

1. Accurately defining the point of **divergence** between the car production in BRIC countries and oil production in 2004.
2. **Sharp increase** in car production in BRIC countries after 2004.
3. Comparison between **BRIC** and **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 2023[3].
- Similarly, the oil production data were obtained from the U.S. Energy Information Administration[4]. However, since the data was not bundled together initially, the data had to be manually combined and summarized from various sources.

Software

Quarto publication framework and the R programming language was used, 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

As the visualization was intended for a poster, no interactive features were implemented, including the infotip. However, if the data is visualized in a HTML document, interactive features can be achieved using R packages such as `plotly`. In that case, we recommend implementing a tooltip that shows the actual label values on a mouse over event, offering additional info, if necessary, for the user.

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

Improved Visualization

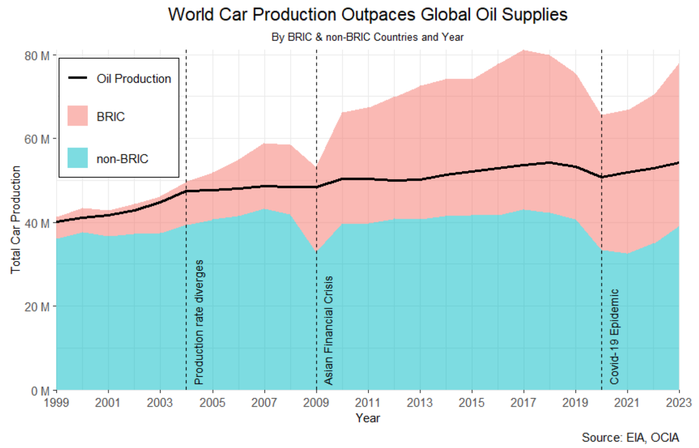

Figure 2: Revised visualization of world car production outpaces global oil supplies

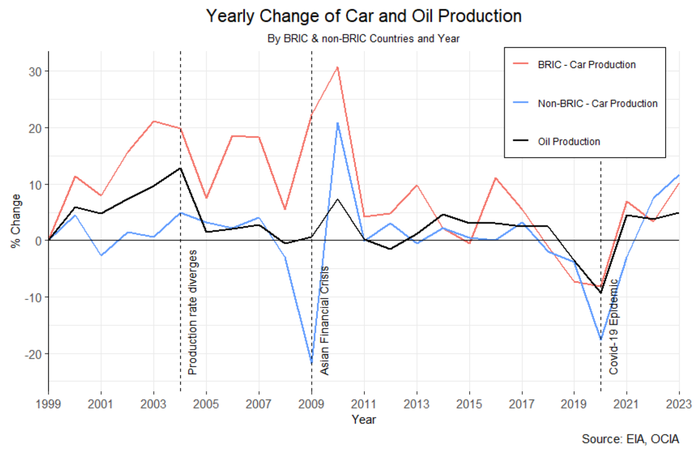

Figure 3: Revised visualization of yearly change of car and oil production

Conclusion

We successfully implemented all suggested improvements for the non-interactive visualization in (Figure 2). The new graph accurately highlights the point of divergence between car production in BRIC countries and oil production in 2004, supporting the main notion that the surging demand for cars as compared to oil production is mainly caused by BRIC countries. The second graph in (Figure 3) further reinforces this idea intuitively, as the yearly percentage change in car production in BRIC countries is predominately higher than the change in oil production as well as non-BRIC countries (i.e. the red line drawn is almost always above the rest).