The Correlation Between Economic Resource and Productivity in different Industries

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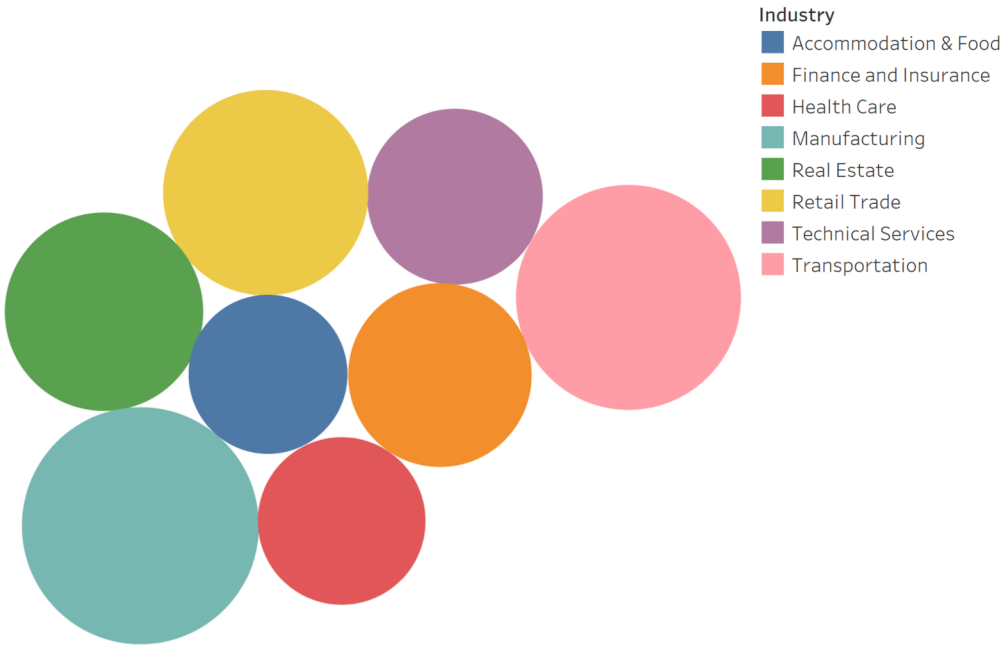


Figure1: Industry Productivity Distribution

- Representation of overall productivity divided by aggregated industries over 20 year time period
- Manufacturing and Transportation have the highest, while Health Care and Accommodation & Food have the lowest overall productivity
- Service Industries have started later to improve productivity and it is more difficult to measure

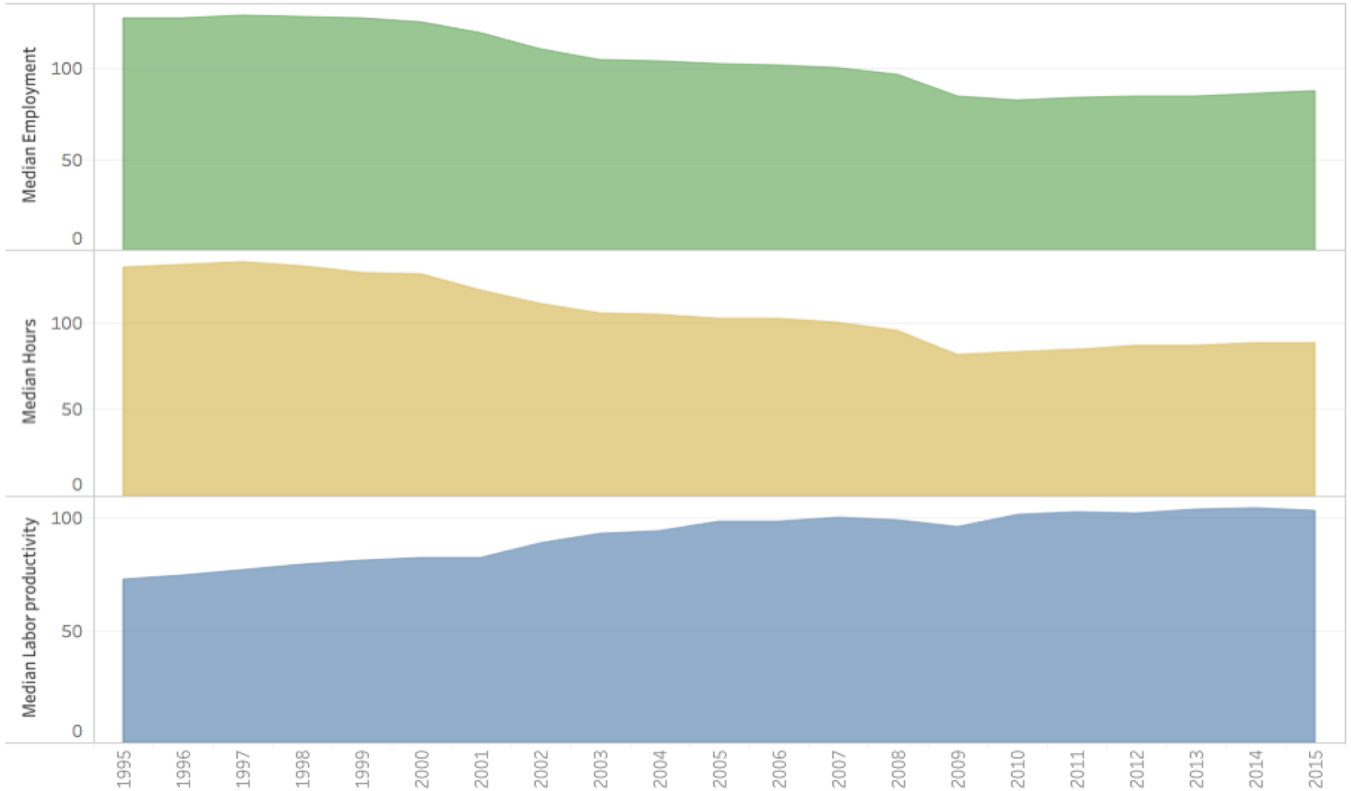


Figure2: Quantity of Economic Resources (number of employee & number of hours)

- Area Charts to visualize the trend regarding number of employment, number of hours worked on products, and labor productivity
- While both the number of employees, as well as the hours worked decrease, labor productivity increases
- Due to automation and development in technology, less labor is needed for more productivity

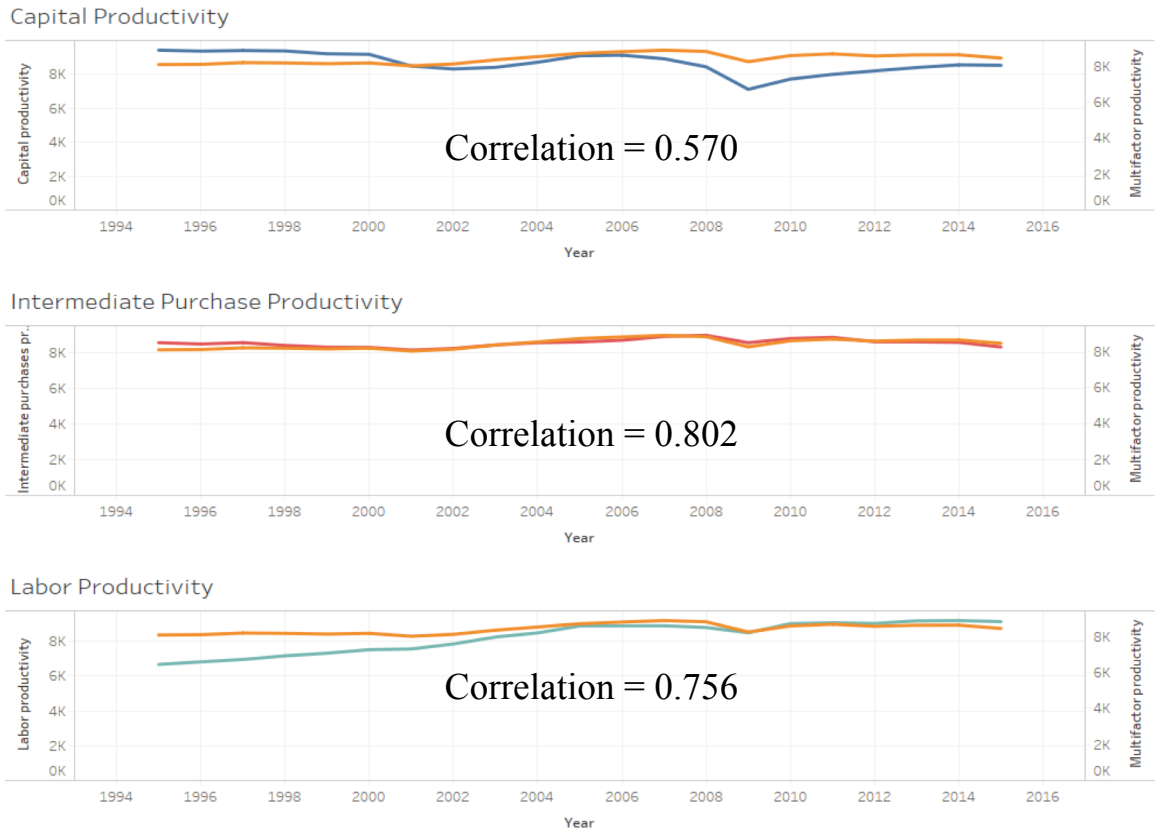


Figure3: Components of Multifactor Productivity

- Correlation of absolute productivity of capital, intermediate purchases, and labor with multifactor productivity
- All elements have a positive correlation with Multifactor Productivity but Intermediate Purchase Productivity has the most significant
- The best leverage for companies to increase productivity is labor and intermediate purchases

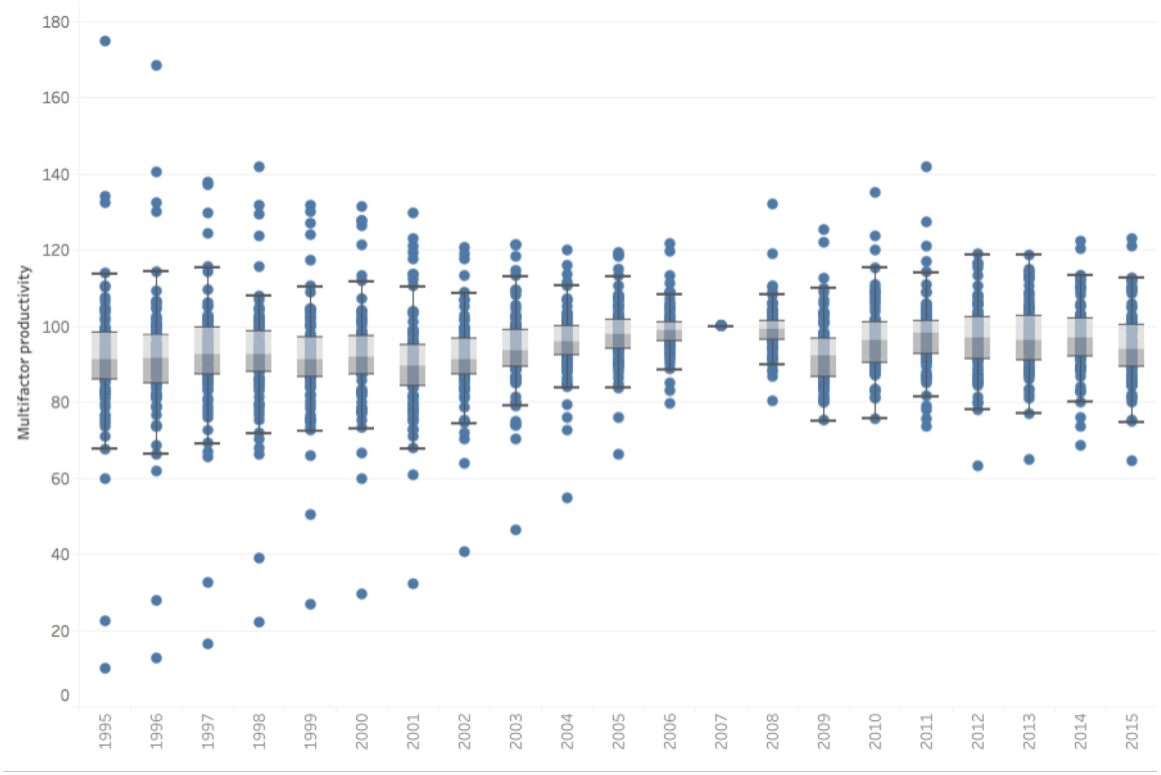


Figure4: Difference in Productivity among Industries

- Distribution of Multifactor Productivity for each year
- The standard deviation of productivity among industries decreases over time
- Procedural and technical standards have been transferred between one industry to another (especially manufacture to service)

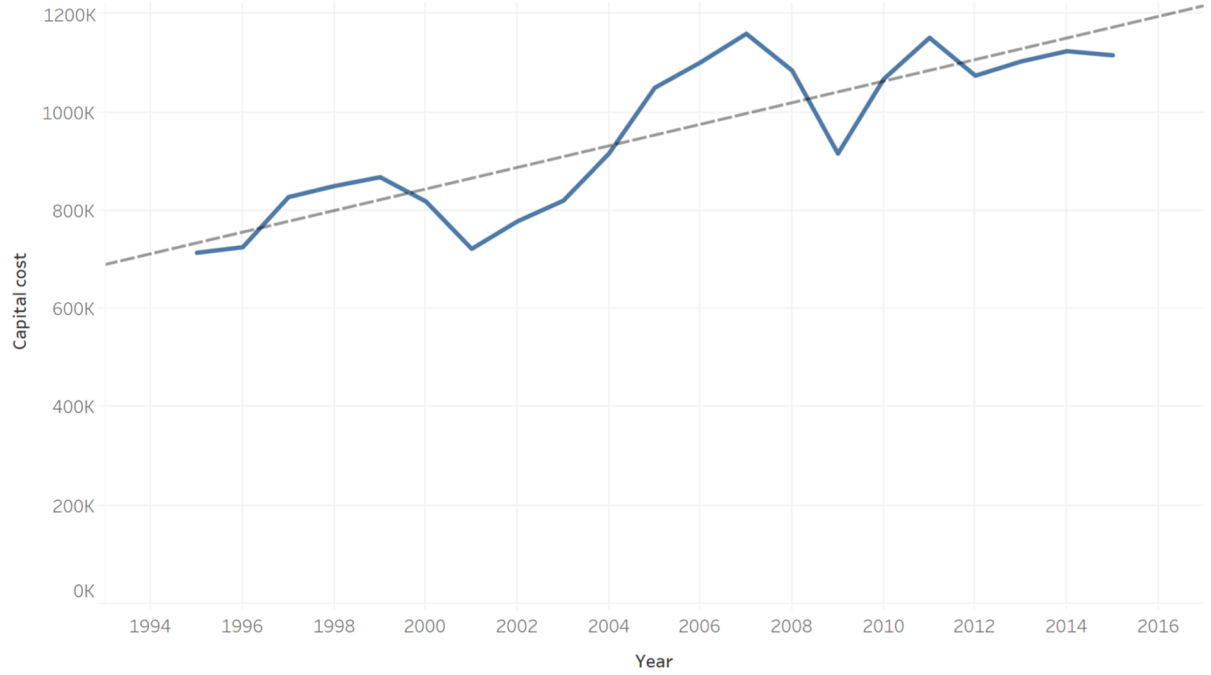


Figure5: Investments in Technology

- Illustration of of overall capital costs in terms of equipment, (IT-) Infrastructure, and machineries
- The investments increase over the inspected time period of 20 years as the trend line shows
- It is of paramount importance for companies to invest in technological equipment

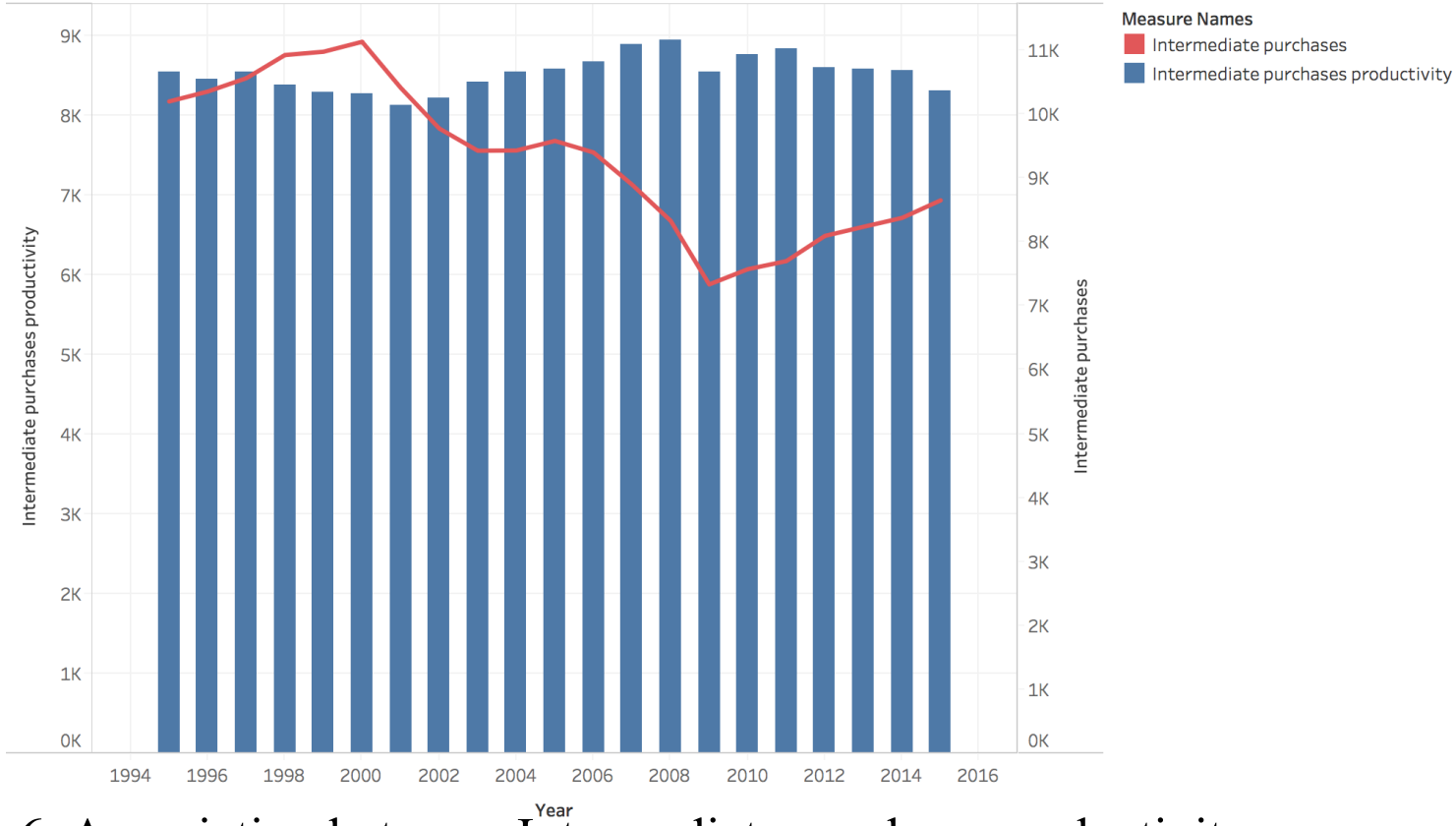


Figure6: Association between Intermediate purchase productivity and intermediate purchase

- The bar chart is about intermediate purchases productivity and the lines is regarding the change of intermediate purchases.
- Intermediate purchases have a negative relation with intermediate purchases.
- Companies are supposed to increase their intermediate purchases productivity to spend less money on intermediate purchases.

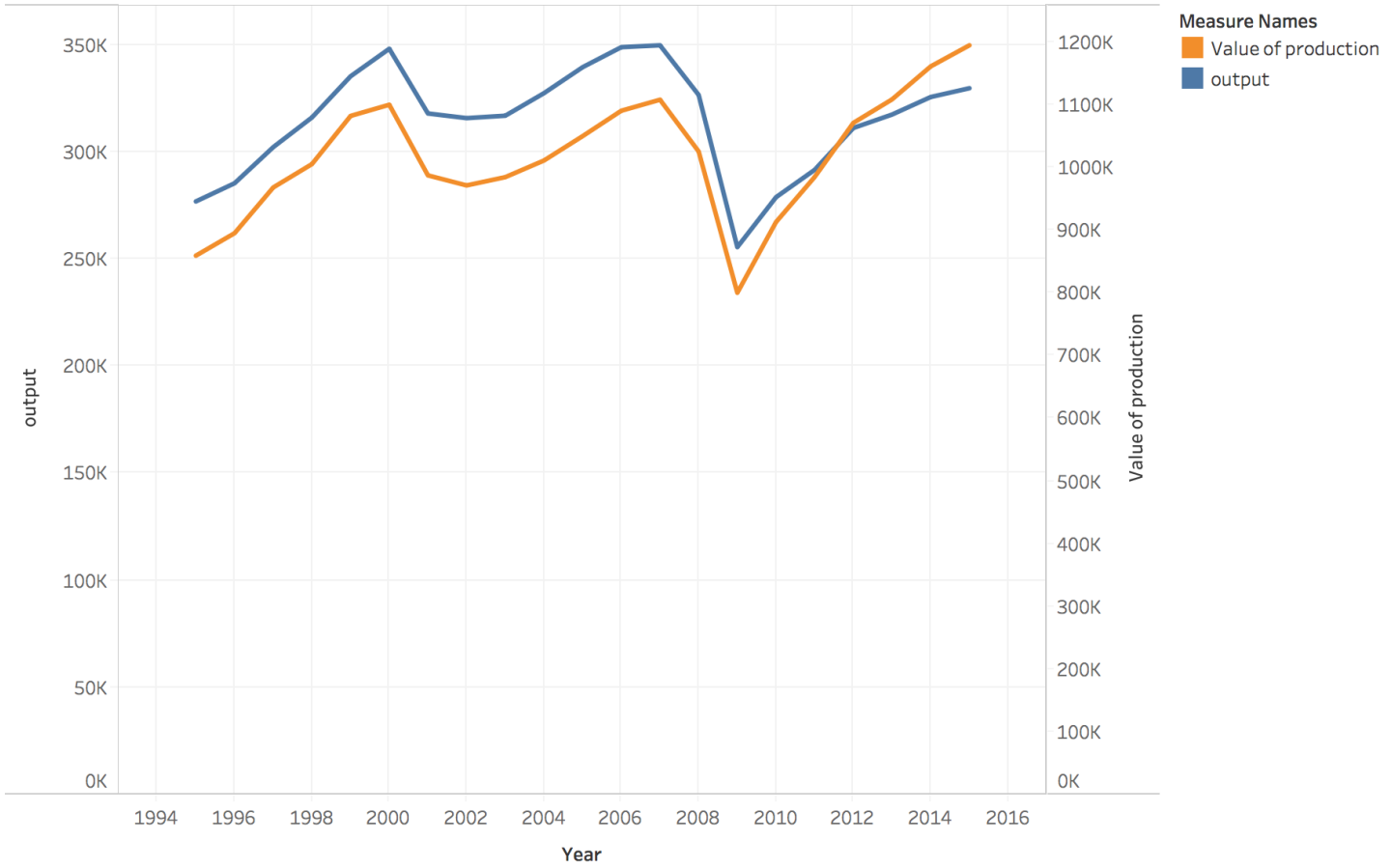


Figure7: Line chart for output and value of production

- The line chart represents the trend of output and value of production from 1994-2016.
- Output and value of production have strong positive correlation. Since 2012, the growth rate of value of production exceed that of output.
- When the value of production rises, industries can also increase their output.

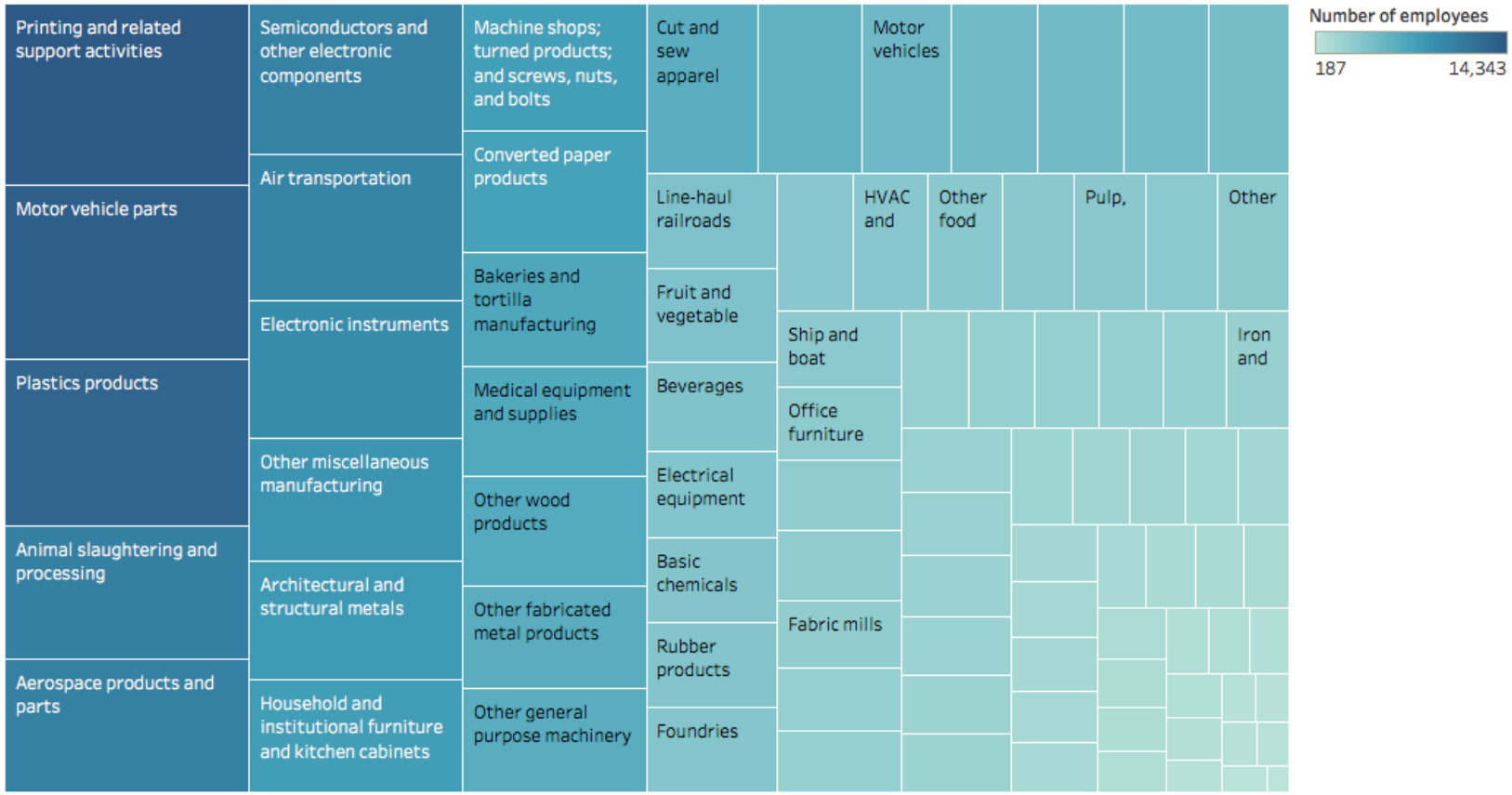
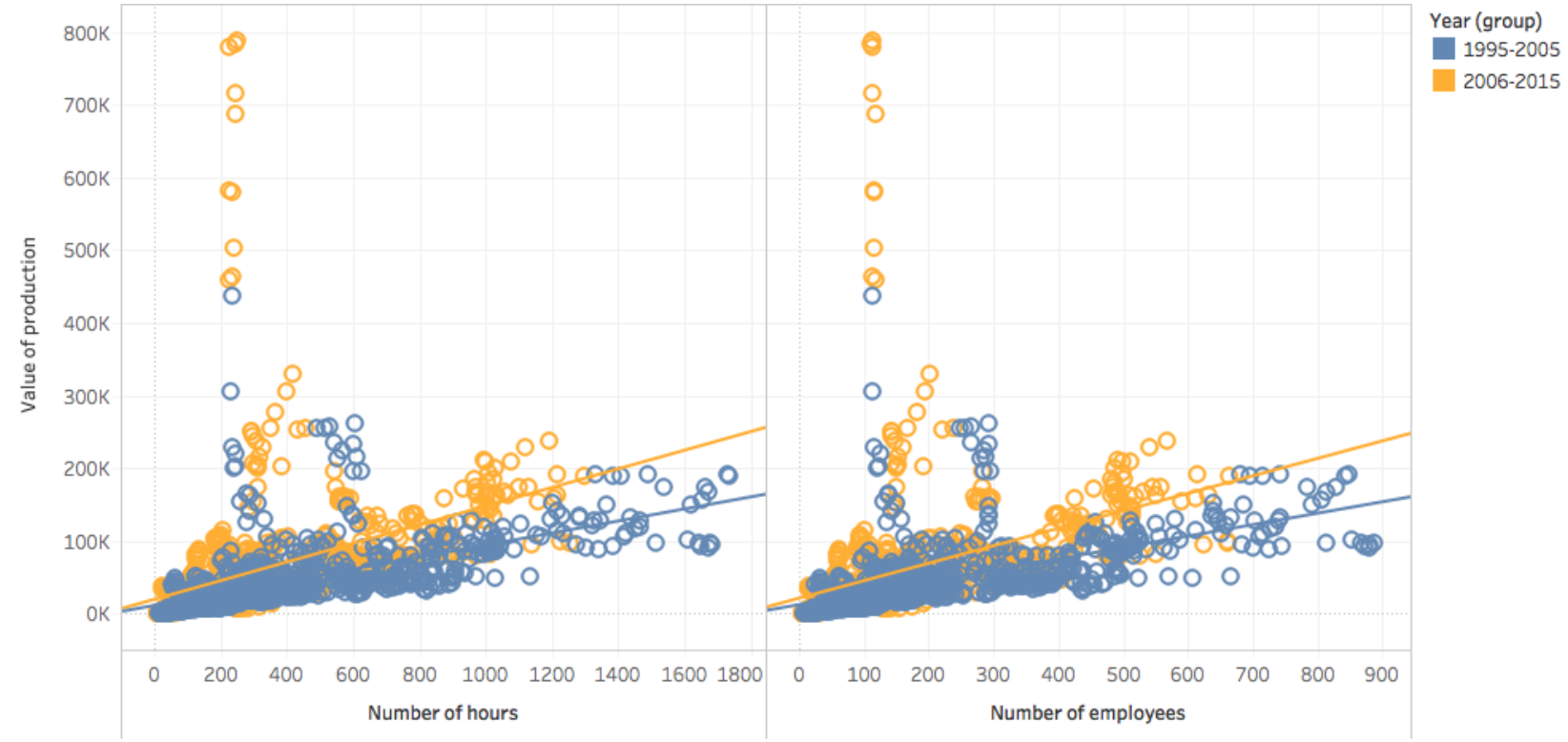


Figure8: Heat map of employee number for each industry

- The color and size above illustrates sum of number of employees for each industry.
- Industry with large employee are manufacturing industries like printing and related activities, motor vehicle and plastics product industry.
- Business with large number of employees should focus more on increasing labor productivity.



Number of hours and Number of employees vs. Value of production. Color shows details about Year (group). The view is filtered on Year (group), which keeps 1995-2005 and 2006-2015.

Figure 9: Statistical Model, Linear Regression

- Illustration of the linear regression for value of production with number of hours and number of employees as explanatory variables.
- Value of production increases more rapidly during 2006-2015 than that during 1995-2005.
- With the development of technology, the labor productivity increases in recent years.

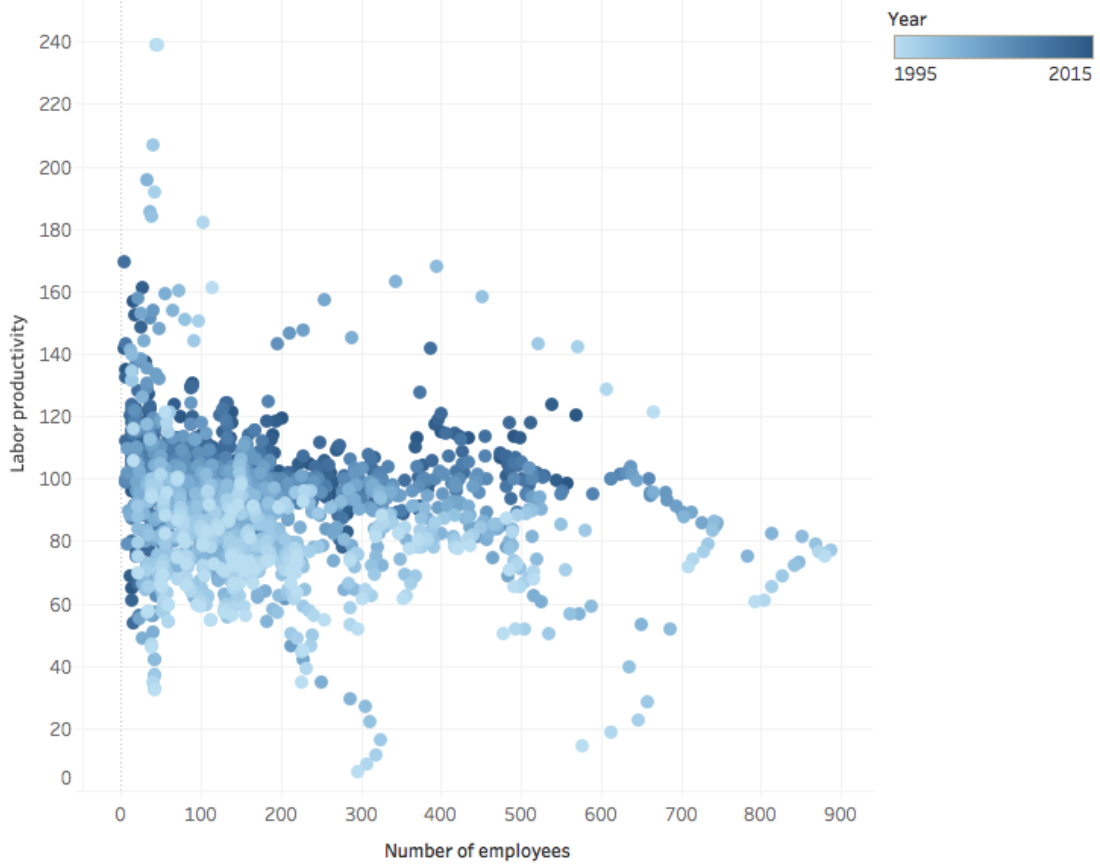


Figure 10: Number of employees and labor productivity

- The colored dot on the scatterplot represents the number of employees and labor productivity of different industries in a certain year in 1995 - 2015.
- The labor productivity grows over time, but the range of employee number remains the same.
- The growth model which relies heavily on increasing the number of workers involved in production is no longer useful.

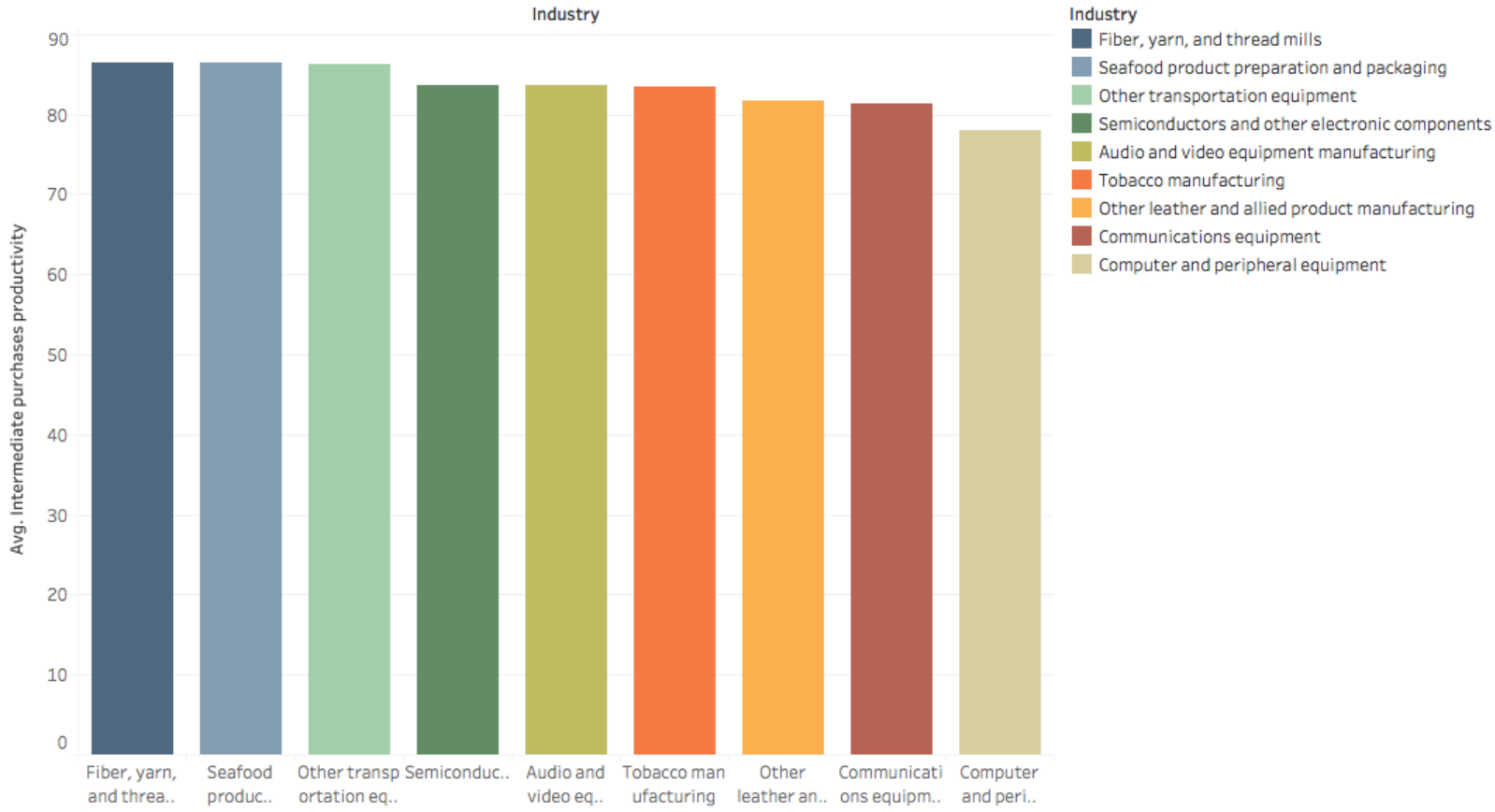


Figure 11: Top 9 industry for intermediate purchase productivity

- Bar charts for intermediate purchase productivity regarding different industries.
- Most of the top industries are traditionally manufacturing industry, while followed by electronic industry like semiconductors and computer equipment.
- Manufacturing is still the leading industry on production but there is a rise of the electronic products.

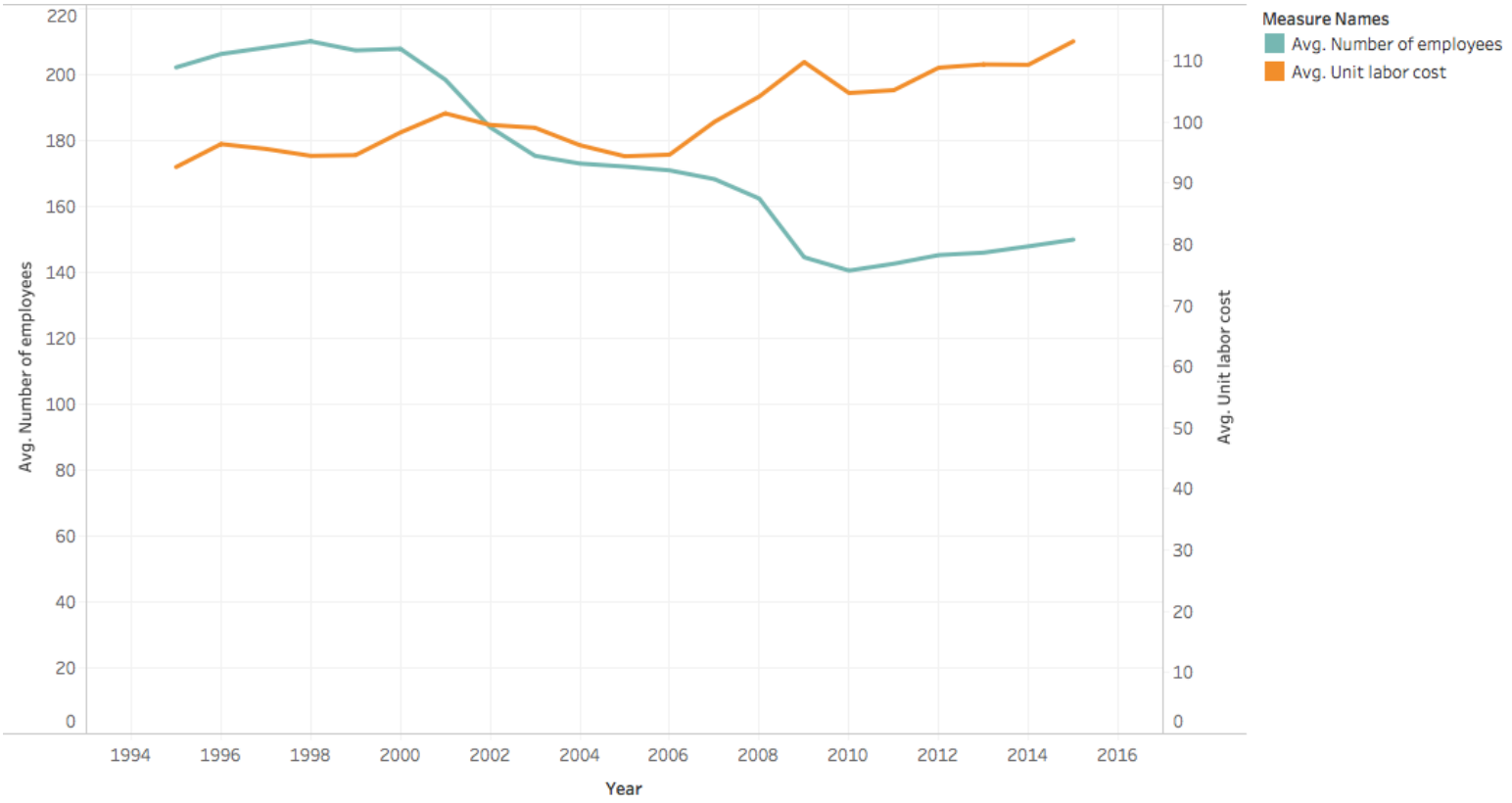


Figure 12: Correlation between number of employee and unit labor cost

- The two line chart represents the changes of number of employees and unit labor cost.
- There is a negative correlation between number of employees and unit labor cost.
- Plentiful low-cost labor is replaced by higher-cost workers.