

Comparing the Efficiency of Gender Policy in Canada and the United States by the Female Employment Rate

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Abstract: Companies in society began to focus more on gender problems and provide more privileges for women by creating policies that recruit more female employees. The efficiency of this policy differs in various fields in different countries despite almost every company utilizing this policy. By looking at the data about the changes in the number of women employees and women employees-to-all employees ratio from the 20th century to now, this research paper compares the rate of female employment changes in two countries, Canada and the United States. To indicate which country, Canada or the United States, is more efficient about the policy based on different fields, this paper used linear regressions to observe the slopes of female employment changes from 1987 to 2021 in business, health, government, trade, transportation, and manufacturing fields. This paper also identifies which area has more efficiency in using policy inside each Canada and the United States.

Keywords: gender, policy, female employment rate, linear regression, Canada, United States

1. Introduction

Society began to pay more attention to gender equality from the twentieth century to now gradually [1]. Governments worldwide aimed to create an equal gender atmosphere by formulating policies and opening organizations. Women didn't have suffrage or the right to participate in politics until 1920 [2]. Women's rights were assumed as human rights in 1993 in Vienna, and women's freedom was promoted in 1995 in Beijing [3]. Women began to get educational equality in 2005 [4]. The United Nations Educational, Scientific and Cultural Organization proclaimed to decrease the differences in gender equality in secondary and elementary schools in 2005 and reach equal educational rights in 2015. Last year, the White House announced to build White House Gender Policy Council (Council), which created twelve policies, such as encouraging equality of gender in leadership positions, to benefit women [5].

Looking at gender equality in workplaces, women's speed to get into high positions increases [6]. Before 1980, there was no female in the top 1,000 jobs. However, after this, women got promoted more quickly than men. Previous research analyzed the data from 2001 to 2011 and compared the number of women and men who got into high positions in the top ten high positions in Fortune [7]. It proved that women got promoted into top executive positions faster than men and gained more advantages over the years they stayed in the organization.

Furthermore, 27% of women took leadership positions in Fortune in 2011 [8]. Companies changed their ways of hiring people and began to care about diversity. This made me wonder whether companies' focus on diversity increased the number of women being hired and which fields and countries used the most efficient gender policy.

In this work, I look at the data from different fields of work from the 20th century to now in both the United States and Canada. I will import all these data into python and use linear regression models to compare the slope for each field in each country. By ranking the hill from the greatest to the smallest, I can get a result about which area is the most efficient in gender policy in the United States, which field is the most efficient in Canada, and whether the United States or Canada will have more efficiency in a specific area. This result can give people an idea about what fields and which country companies should pay more attention to add more diversity.

Comparing the female employment ratio totally, the United States has more efficiency than Canada, but the U.S. and Canada lead in different fields at different times. Inside the United States, the business field from 1965 to 1989 had the most efficiency in policy, and the information field from 1983 to 2022 had the least efficiency. Inside Canada, the management field from 1987 to 1998 was the most efficient, and the manufacturing field from 1987 to 1993 was the least efficient.

2. Main Body

The data used in this paper are from Federal Reserve Economic Data and Statistics Canada, which provided the ratio of women employees to all employees in different areas in America and Canada. The data for all fields in the U.S. was recorded in months, and the data for all lots in Canada was recorded in years. Therefore, the final number I gained in each field of Canada should be divided by 12 to compare with the last number of U.S.

Linear Regression is the model in this paper. I use the equation $y = ax + b$. In the United States, x represents the number of months since the first month in the data. X is 0 for the first month, and x is 1 for the second month. Y represents the percentage of women employees. In Canada, x means how many years there have been since 1987. X is 0 for 1987, and x is 1 for 1988. Y is the percentage of women employees. The first slope will be "Slope 1", the second slope will be "Slope 2", and so on.

By mathematical equation,

$$\text{Slope (a)} = (y-b)/x$$

Comparing the ratio of women employees to all employees in U.S. and Canada in Total:

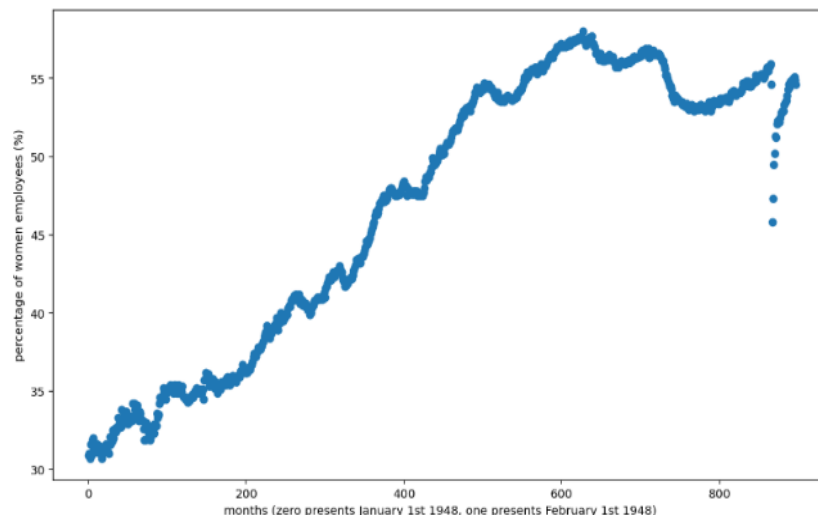


Figure 1: The left figure. Change of percentage of women employees in Total between January 1st, 1948, to October 1st, 2022, in the United States [9].

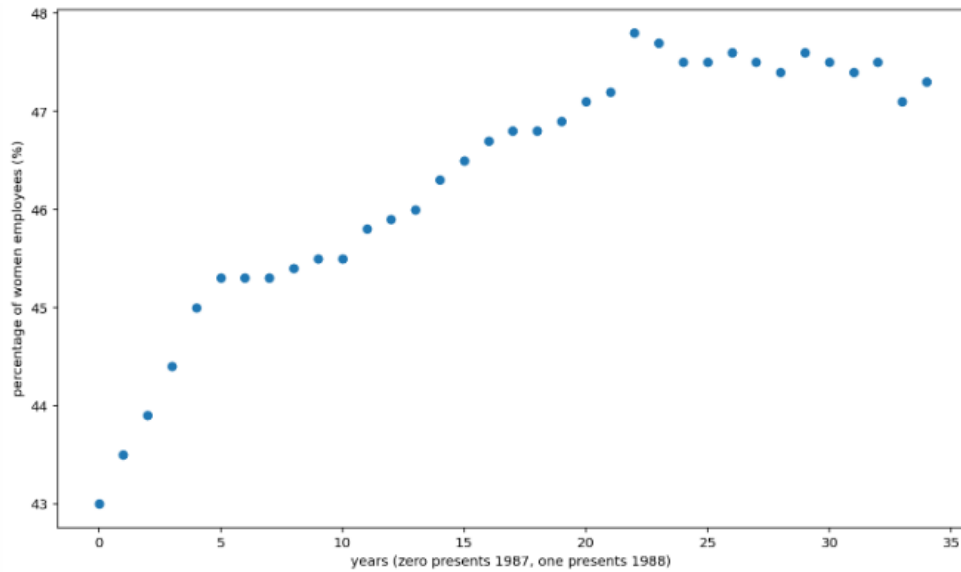


Figure 2: The correct figure. Change of percentage of women employees in Total between 1987 to 2021 in Canada [10].

Figure 1 shows that the ratio of female employment to full employment is increasing. By using a linear regression model, Slope 1 is 0.0312.

As Figure 2 shows, the graph of female employee ratio in Total is increasing. Slope 2 is 0.115, which the linear regression model calculates. Because the data for Canada is recorded by years, the hill I should use to compare with the United States is $0.115/12=0.0096$.

By comparing Slope 1 and Slope 2, the United States's coefficient is 0.0312, and Canada's is 0.0096.

Comparing the ratio of women employees to all employees in the U.S and Canada in Business:

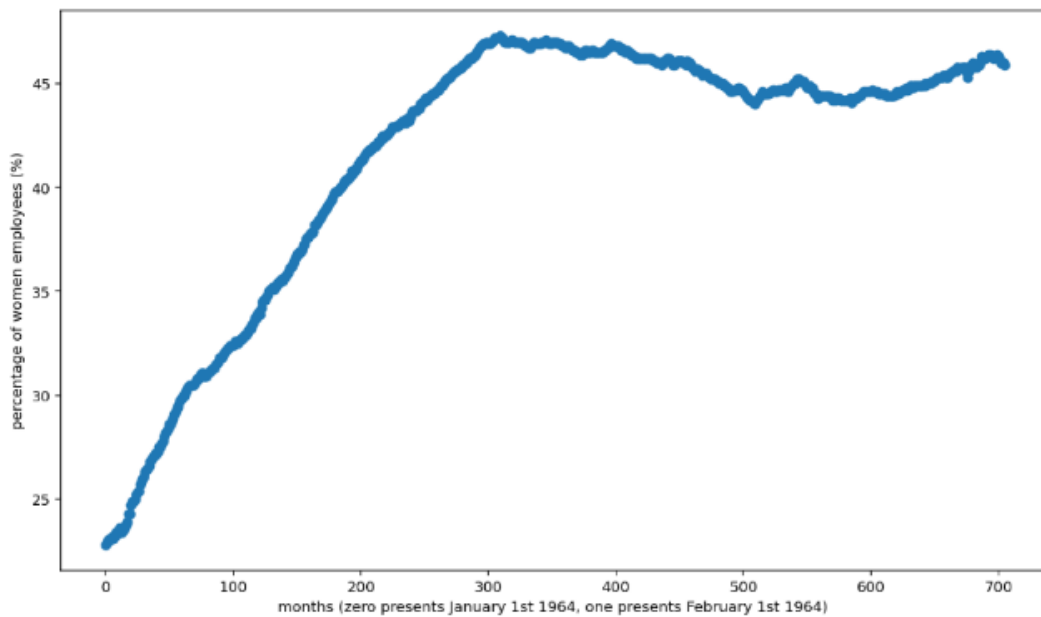


Figure 3: The left figure. Change of percentage of women employees in Business between January 1st, 1964, to October 1st, 2022, in the United States [11].

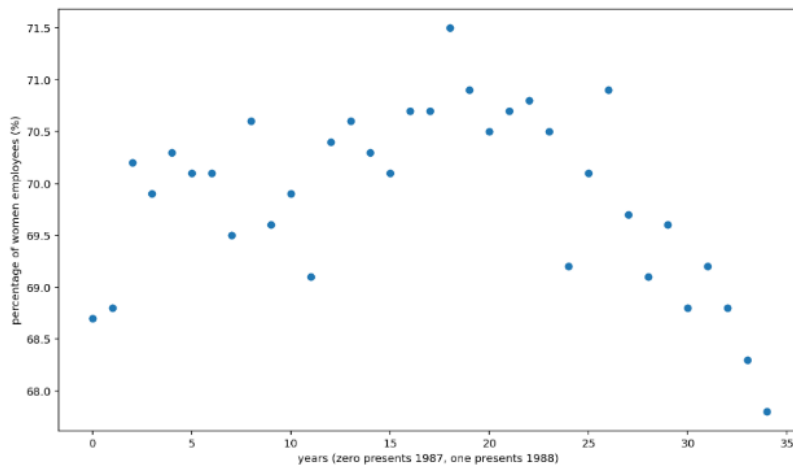


Figure 4: The correct figure. Change of percentage of women employees in Business between 1987 to 2021 in Canada [10].

Based on Figure 3, the percentage of women employees increased from 1964 to 1989 and 2008 to 2022 and decreased from 1989 to 2008. Therefore, I divide this graph into three parts, 1964 to 1989, 1989 to 2008, and 2008 to 2022. By using the linear regression model, Slope 3 for the "1964 to 1989" period is 0.0798, Slope 4 for the "1989 to 2008" period is -0.0116, and Slope 5 for the "2008 to 2021" period is 0.011.

According to Figure 4, the proportion of female employment to the whole job increased from 1987 to 2008 and decreased from 2008 to 2021. I divide this graph into two parts, 1987 to 2008 and 2008 to 2021, and use a linear regression model to calculate the slopes. Slope 6 of the "1987 to 2008" period is -0.0204, and Slope 7 of the "2008 to 2021" period is -0.2066. To change the units into the month, I divide the slopes by 12, $-0.0204/12 = -0.0017$ and $-0.2066/12 = -0.0172$.

"1987 to 1989", "1989 to 2008:", and "2008 to 2021" are the periods U.S. and Canada both have data on. From 1987 to 1989, Slope 3 of the U.S. is 0.0798, and Slope 6 of Canada is -0.0017. From 1989 to 2008, Slope 4 of the U.S. is -0.0116, and Slope 6 of Canada is -0.0017. From 2008 to 2021, Slope 5 of the U.S. is 0.011, and Slope 7 of Canada is -0.0172.

Comparing the ratio of women employees to all employees in U.S and Canada in Health:

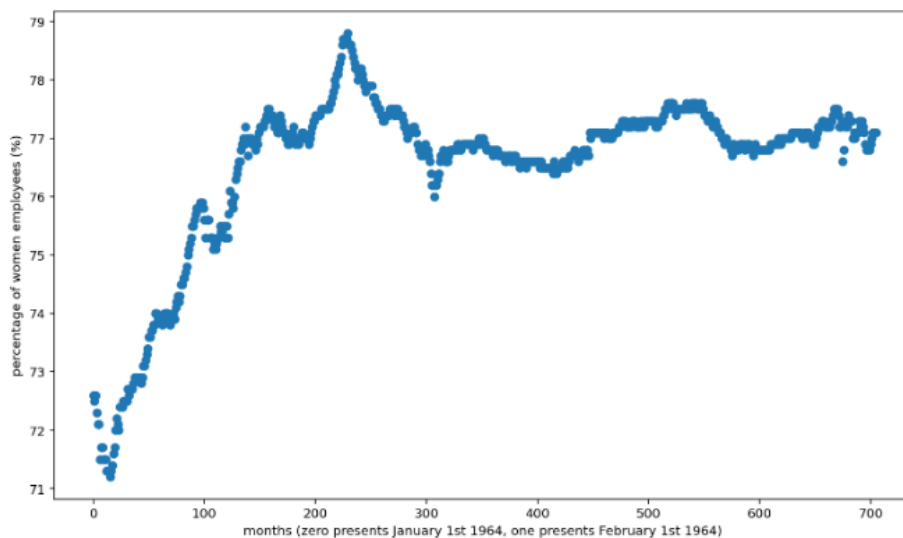


Figure 5: The left figure. Change of percentage of women employees in Health between January 1st, 1964, to October 1st, 2022, in the United States [12].

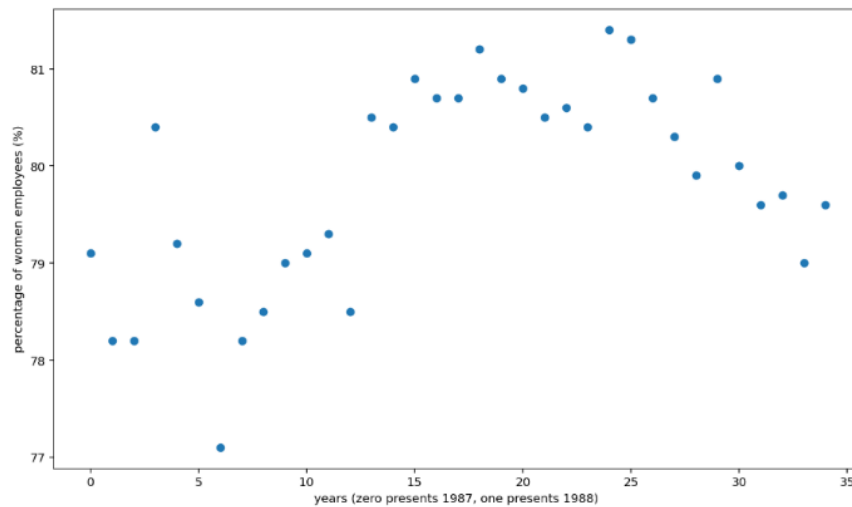


Figure 6: The correct figure. The percentage of women employees in Health changed between 1987 to 2021 in Canada [10].

Figure 5 shows that the female employment ratio to total employment increased from 1964 to 1983 and stopped growing from 1983 to 2022. I divide this graph into two parts, from 1964 to 1983 and 1983 to 2022. By applying the linear regression model, Slope 8 for the "1964 to 1983" period is 0.0297, and Slope 9 for the "1983 to 2022" period is -0.0002 .

Based on Figure 6, the graph increased from 1987 to 2011 and decreased from 2011 to 2021. Slope 10 for the "1987 to 2011" period is 0.1238, and Slope 11 for the "2011 to 2021" period is -0.1939 . Because the data for Canada is recorded by years, the slopes I should use to compare with the United States are $0.1238/12 = 0.0103$ and $-0.1939/12 = -0.0162$.

I picked the periods U.S. and Canada both have data on, "1987 to 2011" and "2011 to 2021". From 1987 to 2021, Slope 9 of the U.S. is -0.0002 , and Slope 10 of Canada is 0.0103. From 2011 to 2021, Slope 9 of the U.S. is -0.0002 , and Slope 11 of Canada is -0.0162 .

Comparing the ratio of women employees to all employees of the U.S and Canada in Government:

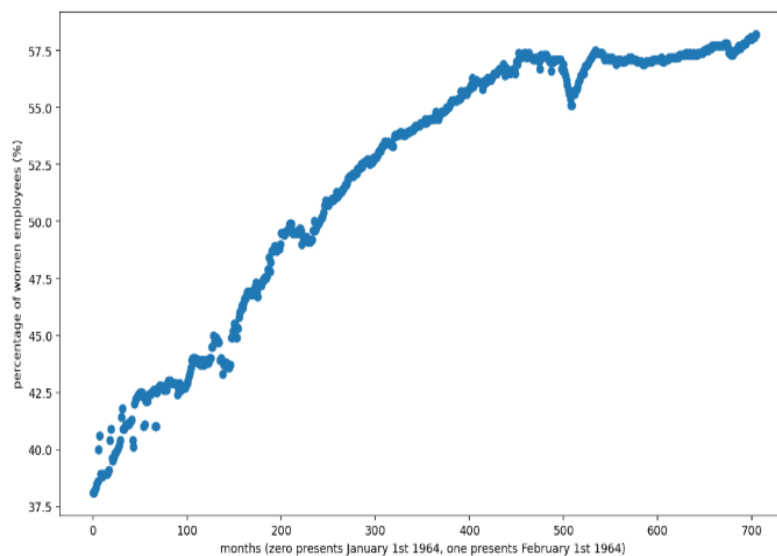


Figure 7: The left figure. Change of percentage of women employees in Government between January 1st, 1964, to October 1st, 2022, in the United States [13].

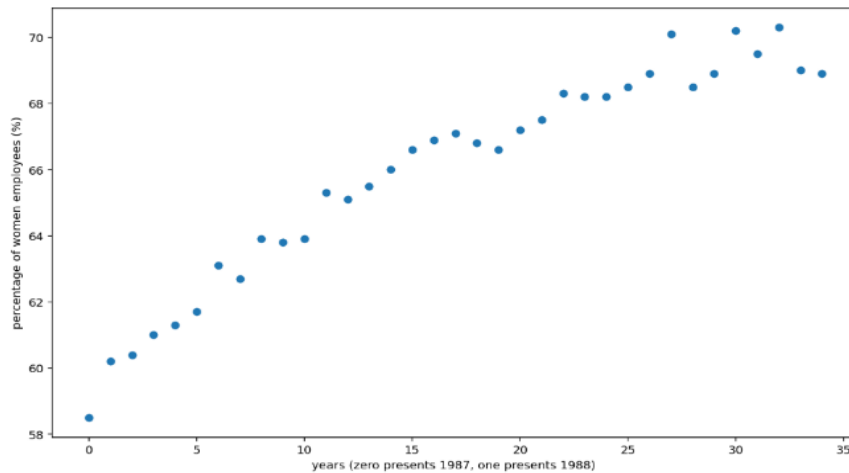


Figure 8: The correct figure. Change of percentage of women employees in Government between 1987 to 2021 in Canada [10].

Figure 7 shows that the percentage of women in Government is increasing, and Slope 12 is 0.027 by the linear regression model.

Figure 8 shows that the ratio of female employment to full employment is increasing. By using a linear regression model, Slope 13 is 0.302. Because the data for Canada is recorded by years. The slope I should use to compare with the United States is $0.302/12 = 0.0252$.

By comparing the coefficients of these two countries' graphs, the United States's Slope 12 is 0.027, and Canada's Slope 13 is 0.0252.

Comparing the ratio of women employees to all employees in U.S and Canada in Trade and Transportation:

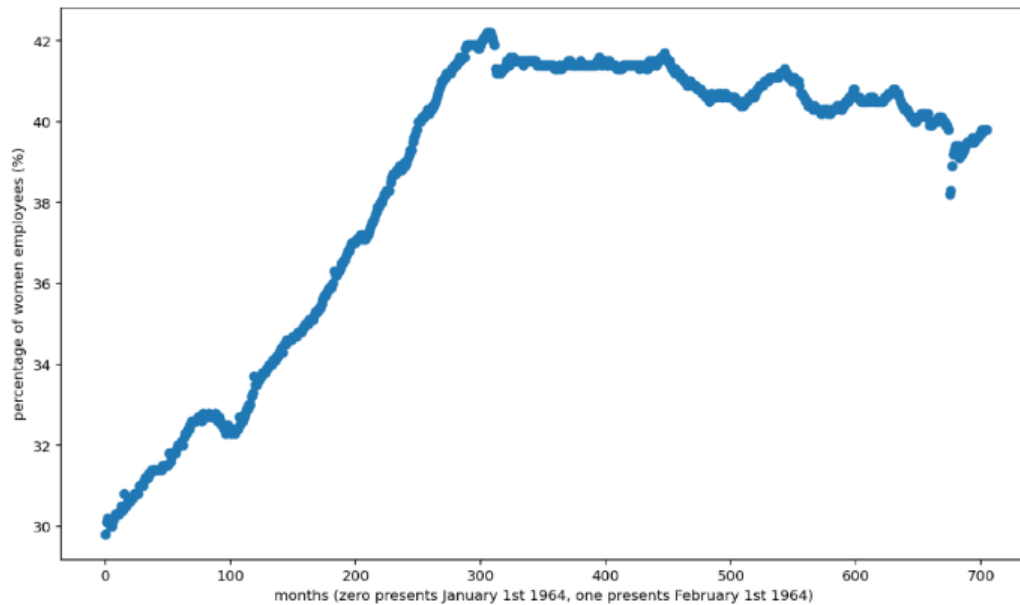


Figure 9: The left figure. Change of percentage of women employees in Trade and Transportation between January 1st, 1964, to October 1st, 2022, in the United States [14].

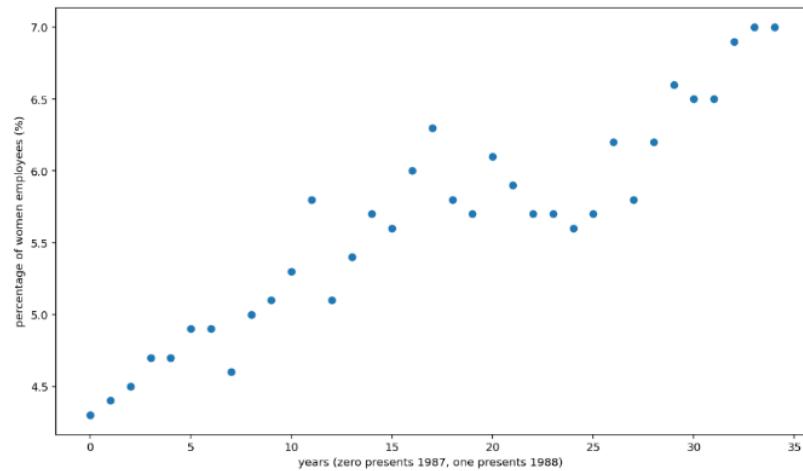


Figure 10: The correct figure. Change of percentage of women employees in Trade and Transportation between 1987 to 2021 in Canada [10].

According to Figure 9, the female employment ratio to full employment increased from 1964 to 1989 and decreased from 1989 to 2022. Using the linear regression model, Slope 14 for the "1964 to 1989" period is 0.0409, and Slope 15 for the "1989 to 2022" period is -0.0049 .

The ratio of females to full employment is increasing based on Figure 10. Slope 16 is 0.0678 (by years), which is $0.0678/12 = 0.0057$ (by months).

Slope 14 for the U.S. is 0.0409, and Slope 16 for Canada is 0.0057 from 1987 to 1989. From 1989 to 202, Slope 15 for the U.S. is -0.0049 , and Slope 16 for Canada is 0.0057.

Comparing the ratio of women employees to all employees in the U.S and Canada in Manufacturing:

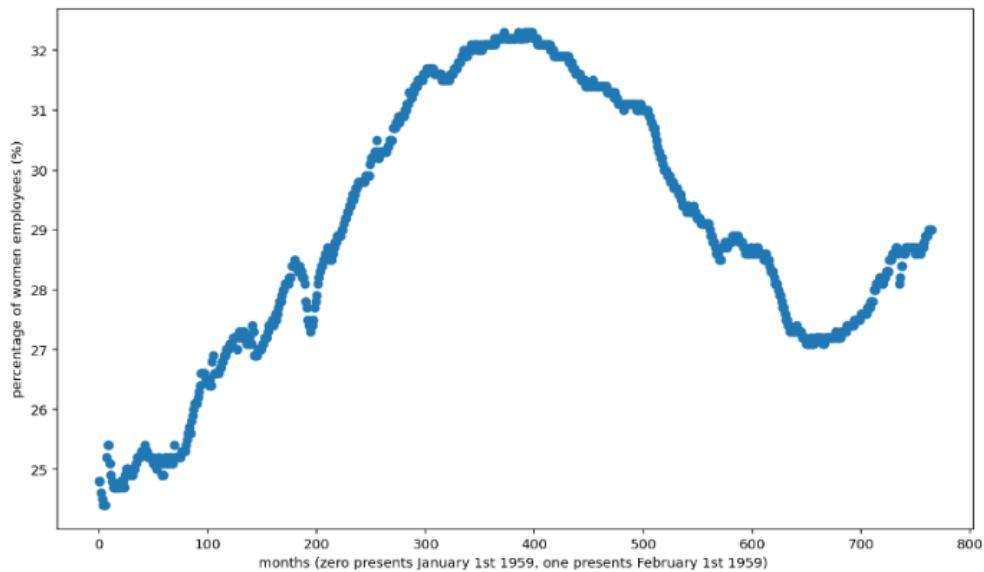


Figure 11: The left figure. Change of percentage of women employees in Manufacturing between January 1st, 1959, to October 1st, 2022, in the United States [15].

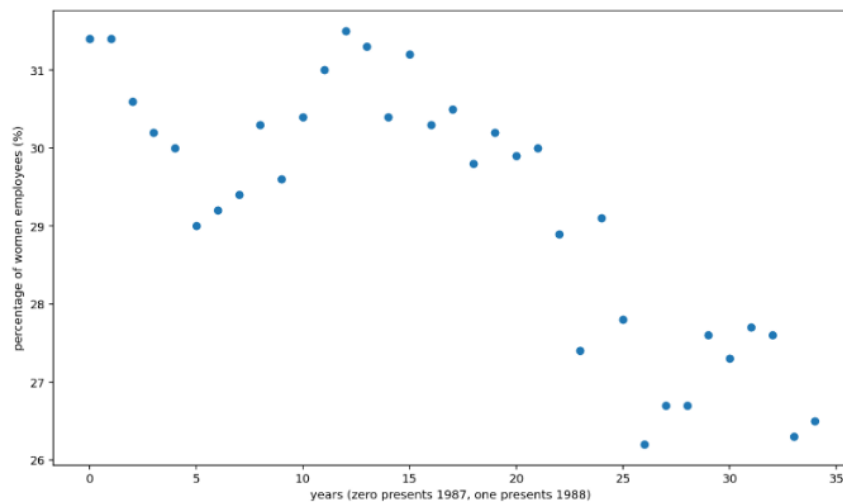


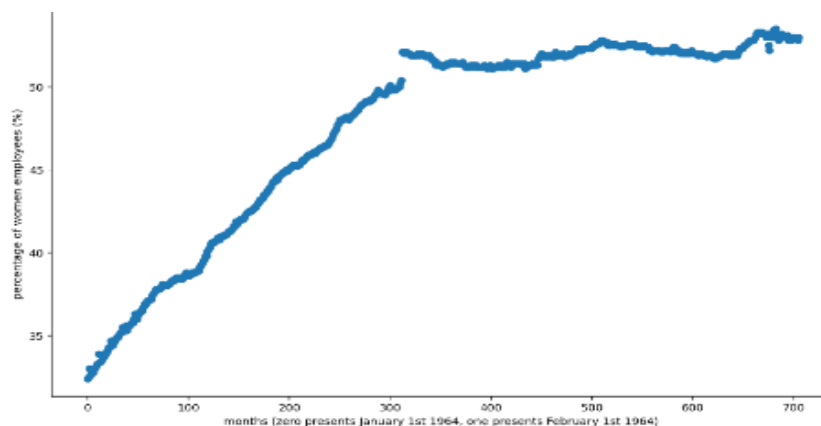
Figure 12: The correct figure. Change of percentage of women employees in Manufacturing between 1987 to 2021 in Canada [10].

As Figure 11 shows, the female employment ratio to total employment increased from 1959 to 1991, from 2014 to 2022, and decreased from 1991 to 2014. Therefore, there are three parts, "1959 to 1991", "1991 to 2014", and "2014 to 2022". By applying the linear regression model, Slope 17 for the "1959 to 1991" period is 0.0229, Slope 18 for the "1991 to 2014" period is -0.0202, and Slope 19 for the "2014 to 2022" period is 0.0208.

The proportion of female employment to the whole job increased from 1993 to 2000 and decreased from 1987 to 1993 and from 2000 to 2021, according to Figure 12. Therefore, I divide this graph into three parts, 1987 to 1993, 1993 to 2000, and 2000 to 2021. Slope 20 for the "1987 to 1993" period is -0.4743, Slope 21 for the "1993 to 2000" period is 0.3643, and Slope 22 for the "2000 to 2021" is -0.2367. Because the data for Canada is recorded by years, the slopes I should use to compare with the United States are $-0.4743/12 = -0.0395$, $0.3643/12 = 0.0304$, and $-0.2367/12 = -0.0197$.

I pick the periods "1987 to 1991", "1991 to 1993", "1993 to 2000", "2000 to 2014", and "2014 to 2021", where U.S. and Canada both have data. From 1987 to 1991, Slope 17 is 0.0229, and Slope 20 is -0.0395. From 1991 to 1993, Slope 18 is -0.0202, and Slope 20 is -0.0395. From 1993 to 2000, Slope 18 is -0.0202, and Slope 21 is 0.0304. From 2000 to 2014, Slope 18 is -0.0202, and Slope 22 is -0.0197. From 2014 to 2021, Slope 19 is 0.0208, and Slope 22 is -0.0197.

The ratio of women employees to all employees in Leisure and Hospitality, Construction, and Information in the United States:



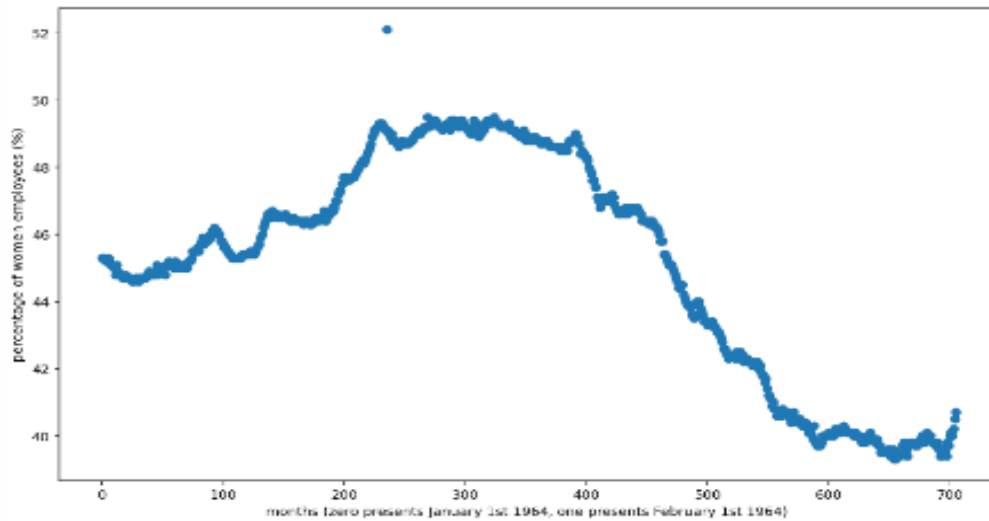


Figure 13: The left figure. Change of percentage of women employees in Leisure and Hospitality between January 1st, 1964, to October 1st, 2022, in the United States [16].

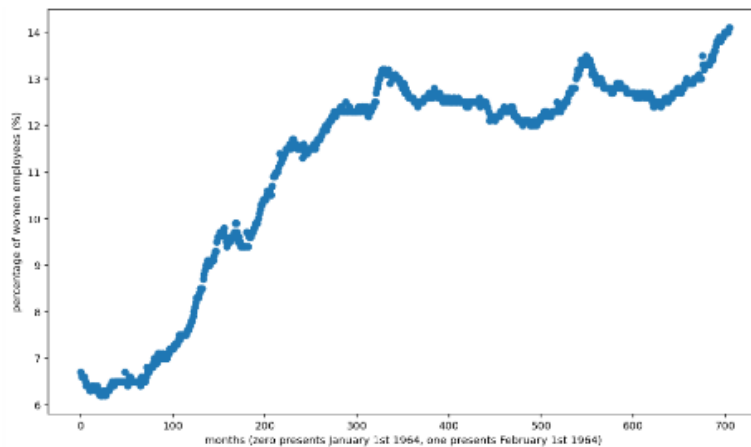


Figure 14: The middle figure. Change of percentage of women employees in Construction between January 1st, 1964, to October 1st, 2022, in the United States [17].

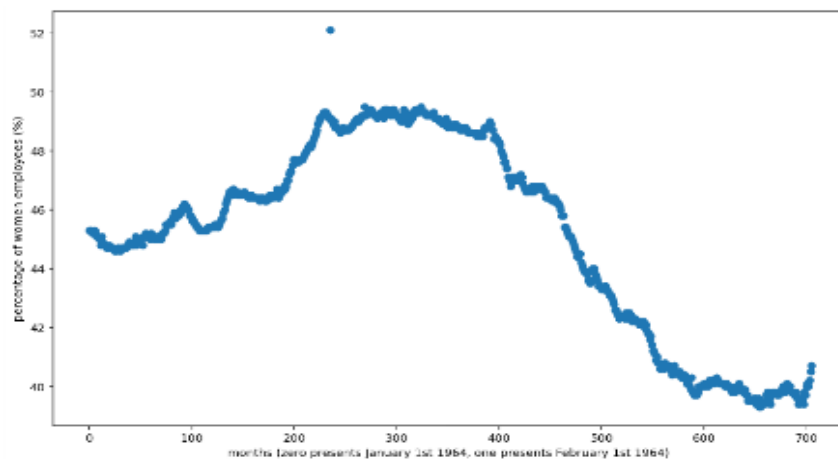


Figure 15: The correct figure. Change of percentage of women employees in Information between January 1st, 1964, to October 1st, 2022, in the United States [18].

Based on Figure 13, the ratio of women's employment in Leisure and Hospitality increased from 1964 to 1990, and the slope changed after 1990. I separate the graph into "1964 to 1990" and "1990 to 2022". Using the linear regression model, Slope 23 for the "1964 to 1990" period is 0.057, and Slope 24 for the "1990 to 2022" period is 0.0037.

Figure 14 shows that the ratio of female employment to full employment is increasing. By using a linear regression model, Slope 25 is 0.0097.

Figure 15 shows that the percentage of female employment in the whole job increased from 1964 to 1983 and decreased from 1983 to 2022. Slope 26 for the "1964 to 1983" period is 0.0164, and Slope 27 for the "1983 to 2022" period is -0.0275 by the linear regression model.

The ratio of women employees to all employees in Natural and Applied Science, Management, Art and Culture, Sales and Service, and Natural Resources and Agriculture in Canada:

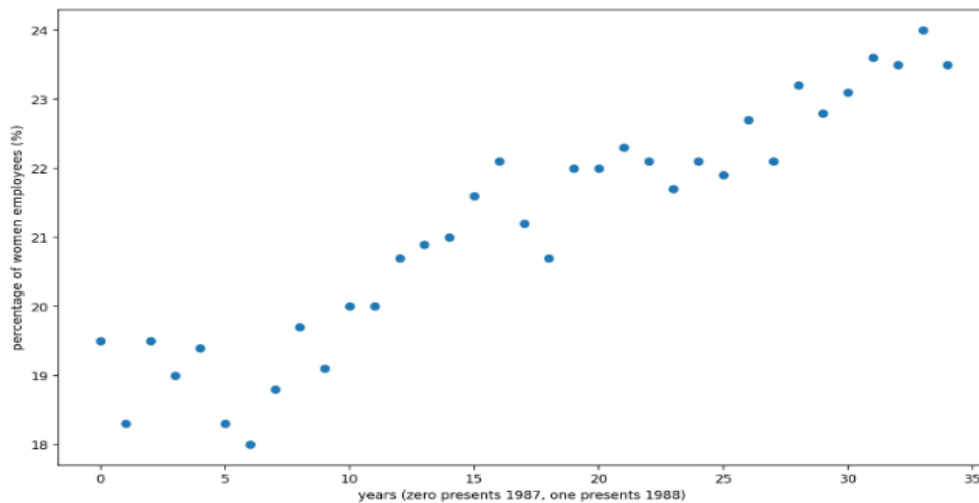


Figure 16: The left figure is on the first row. Change in the percentage of women employees in Natural and Applied Science between 1987 to 2021 in Canada [10].

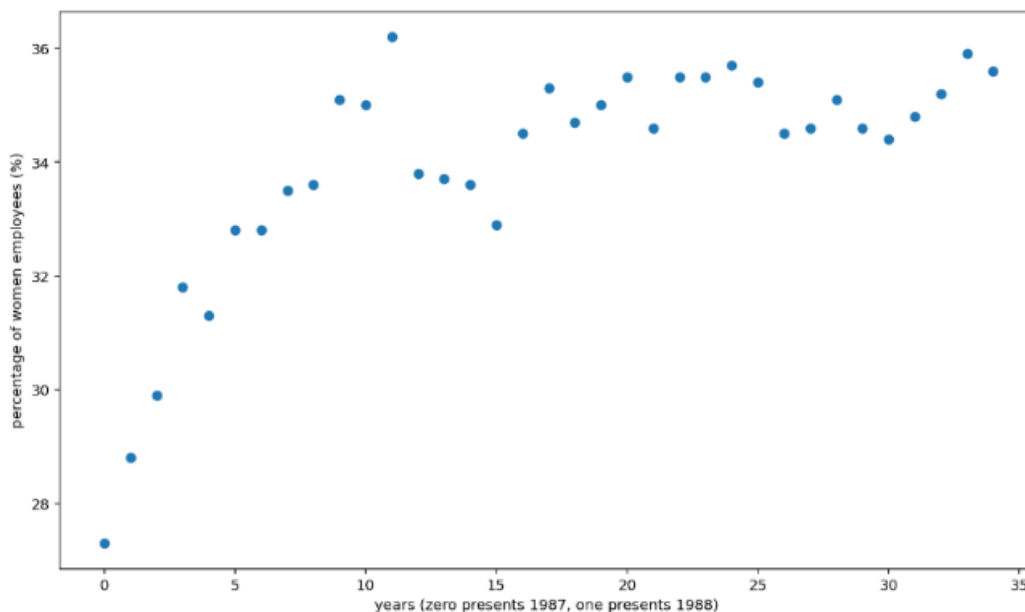


Figure 17: The correct figure on the first row. Change of percentage of women employees in Management between 1987 to 2021 in Canada [10].

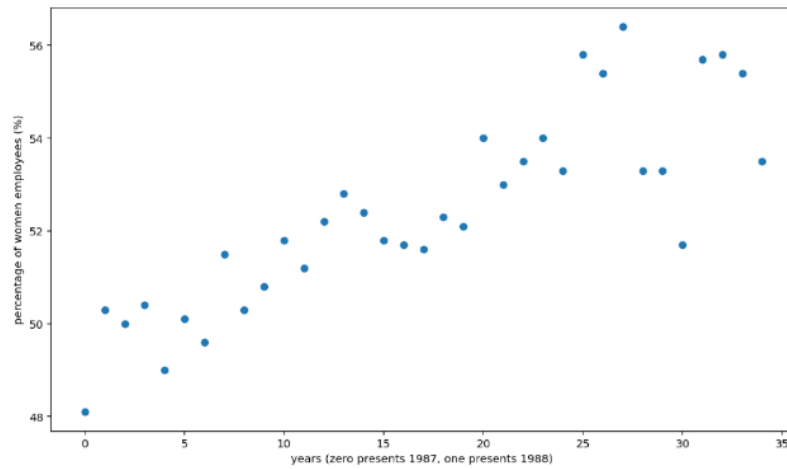


Figure 18: The left figure is on the second row. Change in the percentage of women employees in Art and Culture between 1987 to 2021 in Canada [10].

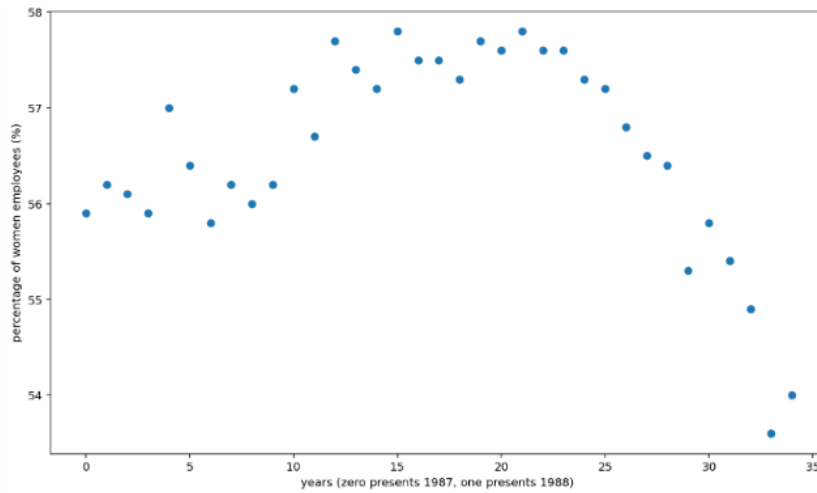


Figure 19: The correct figure on the second row. Change of percentage of women employees in Sales and Service between 1987 to 2021 in Canada [10].

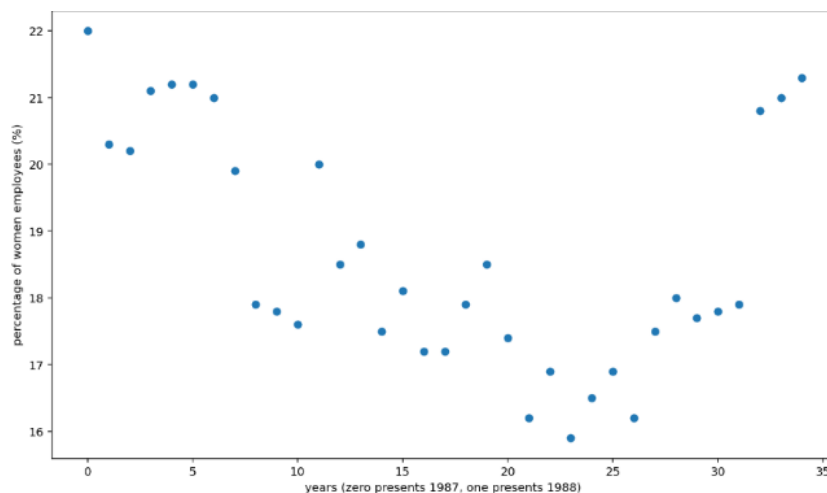


Figure 20: The figure on the third row. Change of percentage of women employees in Natural Resources and Agriculture between 1987 to 2021 in Canada [10].

According to Figure 16, the proportion of female employees in Natural and Applied Science is increasing. Using the linear regression model, Slope 28 is 0.1583 (recorded by year), which is $0.1583/12=0.0132$ (recorded by months).

Figure 17 shows that the female employment ratio to total employment increased from 1987 to 1998, and the increasing slope changed in 1998. I separate the graph into "1987 to 1998" and "1998 to 2021". By using the linear regression model, Slope 29 for the "1987 to 1998" period is 0.7192 (by years), and Slope 30 for the "1998 to 2021" period is 0.0649 (by years). The slopes by months would be $0.7192/12=0.0599$ and $0.0649/12=0.0054$.

The percentage of female employment is increasing based on Figure 18. Slope 31 is 0.1749 (recorded by year), which is $0.1749/12=0.0146$ (recorded by months).

According to Figure 19, the graph increases from 1987 to 2008 and decreases from 2008 to 2021. Therefore, I divide this graph into two parts, from 1987 to 2008 and 2008 to 2021. By applying the linear regression model, Slope 32 for the "1987 to 2008" period is 0.0956 (by years), and Slope 33 for the "2008 to 2021" period is -0.03286 (by years). The slopes by months would be $0.0956/12=0.008$ and $-0.03286/12=-0.00274$.

Figure 20 shows that the ratio of female employment to total employment decreased from 1987 to 2010 and increased from 2010 to 2021. Diving the time into three parts, 1987 to 2010 and 2010 to 2021, I gain both slopes. Slope 34 for the "1987 to 2010" period is -0.2166 (by years), and Slope 35 for the "2010 to 2021" period is 0.4982 (by years). The slopes by months would be $-0.2166/12=-0.0181$ and $0.4982/12=0.0415$.

Inside the United States, I compare the coefficient of each field to indicate which field has more efficiency. Because some areas have different coefficients on different periods, I separate a lot on their periods. Ranking the coefficients of Business from 1964 to 1989, Business from 1989 to 2008, Business from 2008 to 2022, Health from 1964 to 1983, Health from 1983 to 2022, Government from 1964 to 2022, Trade and Transportation from 1964 to 1989, Trade and Transportation from 1989 to 2022, Manufacturing from 1959 to 1991, Manufacturing from 1991 to 2014, Manufacturing from 2014 to 2022, Leisure and Hospitality from 1964 to 1990, Leisure and Hospitality from 1990 to 2022, Construction from 1964 to 2022, Information from 1964 to 1983, and Information from 1983 to 2022 from increasing to decreasing.

Inside Canada, I compared the coefficients the same way I did for the United States. I separate a field by its period. Ranking the coefficients of Business from 1987 to 2008, Business from 2008 to 2021, Health from 1987 to 2011, Health from 2011 to 2021, Government from 1987 to 2021, Trade and Transportation from 1987 to 2021, Manufacturing from 1987 to 1993, Manufacturing from 1993 to 2000, Manufacturing from 2000 to 2021, Natural and Applied Science from 1987 to 2021, Management from 1987 to 1998, Management from 1998 to 2021, Art and Culture from 1987 to 2021, Sales and Service from 1987 to 2008, Sales and Service from 2008 to 2021, Natural Resources and Agriculture from 1997 to 2010, and Natural Resources and Agriculture from 2010 to 2021.

3. Conclusion

In total, the United States has more efficiency in using gender policy compared to Canada. In the business field, the ratio of women employment increasing in the United States is higher than in Canada from 1987 to 1989 and 2008 to 2021 and lower than in Canada from 1989 to 2008. In the health field, Canada is more efficient in using policy than the U.S. from 1987 to 2011 and less efficient than the U.S. from 2011 to 2021. In the government field, the increasing ratio is higher in the U.S. than in Canada from 1987 to 2021. In the trade and transportation fields, the U.S. has more efficiency from 1987 to 1989 and less efficiency from 1989 to 2021. In manufacturing, the U.S. is more efficient in gender policy than Canada from 1987 to 1991, 1991 to 1993, and 2014 to 2021.

Canada is more efficient than the U.S. from 1993 to 2000 and 2000 to 2014.

Inside the United States, the ranking from the most efficient field in applying gender policy to the least efficient area is Business from 1964 to 1989, Leisure and Hospitality from 1964 to 1990, Trade and Transportation from 1964 to 1989, Education and Health from 1964 to 1983, Government from 1964 to 2022, Manufacturing from 1959 to 1991, Manufacturing from 2014 to 2022, Information from 1964 to 1983, Business from 2008 to 2022, Construction from 1964 to 2022, Leisure and Hospitality from 1990 to 2022, Health from 1983 to 2022, Trade and Transportation from 1989 to 2022, Business from 1989 to 2008, Manufacturing from 1991 to 2014, Information from 1983 to 2022.

Inside Canada, the ranking from the most efficient field in applying gender policy to the least efficient area is: Management from 1987 to 1998, Natural Resources and Agriculture from 2010 to 2021, Manufacturing from 1993 to 2000, Government from 1987 to 2021, Manufacturing from 2000 to 2021, Art and Culture from 1987 to 2021, Natural and Applied Science from 1987 to 2021, Health from 1987 to 2011, Sales and Service from 1987 to 2008, Trade and Transportation from 1987 to 2021, Management from 1998 to 2021, Business from 1987 to 2008, Health from 2011 to 2021, Business from 2008 to 2021, Natural Resources and Agriculture from 1987 to 2010, Sales and Service from 2008 to 2021, Manufacturing 1987 to 1993.

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