The influence of abolition of the “professor’s privilege” in Norway

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1.Introduction

1.1 Context

This article takes Norway as the background. In 2003, Norway launched a new policy, which abolished the "professor's privilege," before 2003, university researchers enjoyed full rights to new business ventures and intellectual property they created.

1.2 Research Question

After Norway issued a new policy in 2003, will the shift in rights from researcher to university lead to a decline in the innovation rate of university researchers? After the reform, will university researchers reduce the number of their patent applications?

2.Data Summary

2.1 Data Description

Our analyzes primarily consider difference-in-differences regressions, divide the sample into the early stage and the late stage, call the inside of the university a treated group, call the group of staff outside the university a control group, and compare the entrepreneurship of the treated group and the control group situation, and patent rates.

From Figure 1, we can see that before the bill is proposed, the probability of researchers starting a firm is 0.667%, and after the bill is proposed, the probability of researchers starting a firm is 0.224%. Before the bill was proposed and after the bill was proposed, that is, the % of end of privilege and after the comparison, we can find that the probability of university researchers starting a firm is dropping rapidly. These data can show that the entrepreneurship of Norwegian researchers is declining sharply.

From Figure 2, 0.94% of university researchers applied for patents in 2001, and the rate of university patent applications reached its peak in 2002. In 2003, Norway abolished the privilege of professors. In 2005, 0.48% of university researchers applied for patents, per capita The patent filing rate fell by 49%. Since the number of researchers in Norway grew relatively rapidly during 1995-2010, the per-worker measure shows that the university patenting rate dropped sharply after the reform.

Figure 1

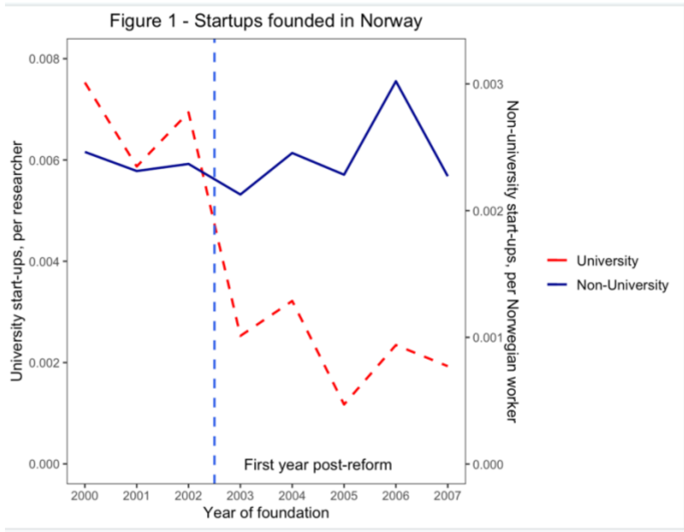


Figure 2

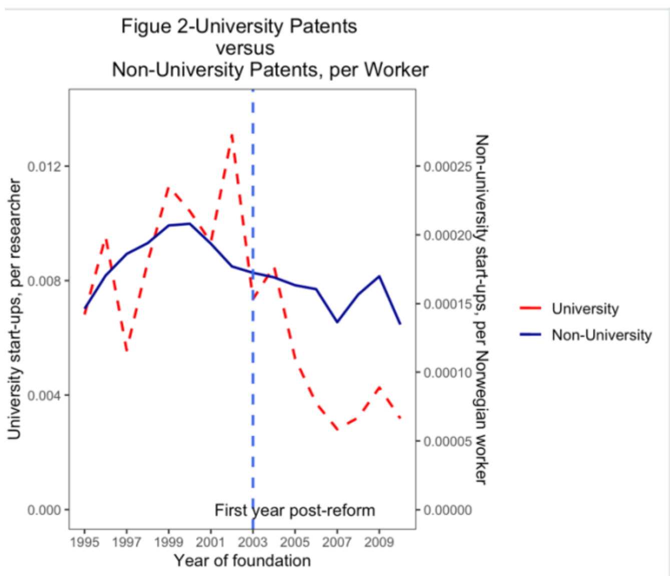
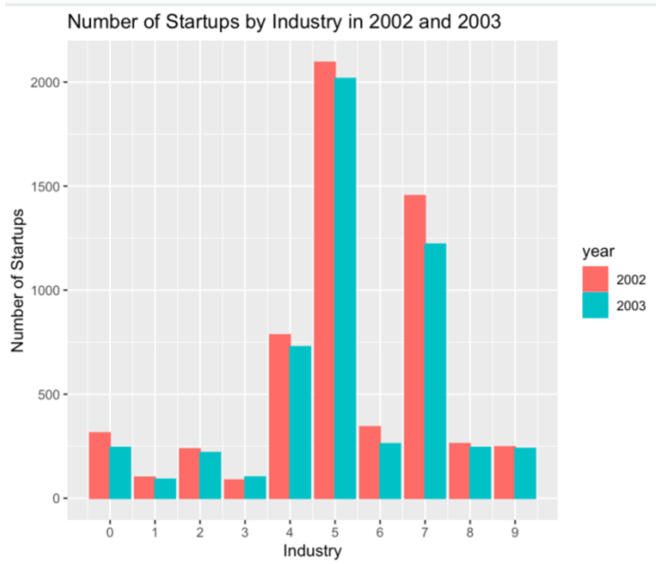


Figure 3



From Figure 3, we can see that the number of startups of 7 dropped by the most 7 in 2003, representing the real-estate industry, which shows that the number of startups opened by university researchers in the real estate industry is most affected by the end of privilege, followed by The industries represented by 0, 4, 5, and 6 are Other services, Wholesale and retail trade, transportation and storage, accommodation and food service activities, Information and communication, Financial and insurance activities.

2.2 Data Analyze

We set the professor as the treated group and other Norwegians (or other Norwegian PhDs) as a control group. We found that the probability of opening a start-up company per capita in the treated group was 0.6938% in 2002 and 0.2527% in 2003, compared with In the control group, we found that the probability of opening a start-up company per capita in the treated group dropped by 64%. From Table 2, we can find that the patent application rate per capita of the Treated group was 1.3% in 2002, and dropped to 0.74% in 2003, which is consistent with figure 2. For our control group, in 2002, the per capita patent application rate was 0.0177%, and in 2003, the per capita patent application rate was 0.01723%. We can see that the per capita patent application rate of the control group has hardly changed.

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Table 1 Start-up

Year	Control	Treated
2002	0.002368720	0.006938885

2003	0.002127227	0.002526993

Table 2 Patents

Year	Control	Treated
2002	0.0001769696	0.013077129
2003	0.0001723467	0.007351252

Table 3 is the data we get from science_yearly_nace, and Table 1 is the data from aggregate_startups. The reason why the data in these two tables are different is that when we calculate the number of people in the Treated group, we use the sample in science_yearly_nace as 0 The data, that is, researchers in the university, and when we calculate the control group, we use the data of sample=2, which is to calculate the full-time employed not working at a university, and we use the sample as 1 data, that is Those who work in the university but are not researchers are filtered out, so when we calculate the number of controls, Table 3 has fewer people than Table 1, and Table 3 has fewer people.

Table 3 Start-up from science_yearly_nace (2b)

Year	Control	Treated
2002	0.002361583	0.007538417
2003	0.00212588	0.003286525

Then, we want to do the t-test to analyze whether the change between 2002 and 2003 is statistically significant, we use the variable called the percentage of change. Firstly, we assume that the treated group started the number of start-ups before and after the reform There is no change, we found that the p-value is 0.008647, which is smaller than 0.05, so we can show that the treated group has a significant change in the number of start-ups before and after the reform. Then we conducted a t-test on the patent application rate of the researchers in the university before and after the reform. We found that the p-value was 0.8103, which is bigger than 0.05. From the t-test, the treated group was before and after the reform. There is no change in the patent application rate, but according to Figure 2 above, the application rate of university researchers before and after the reform has changed, so we will do a regression next.

From the table 6 we observe that before the reform, the university professors founded significantly 53.865 more startups than all the other workers. The regression shows that the treatment effect is 44.256 less startups per 100,000 university workers in 90% significant level. However, we can find that the control group for other workers with at least a PhD degree doesn’t have any significant evidence to support the estimated treatment effect. Therefore, from this regression, we could only get the conclusion that the startups in untreated group decreases 28,269 from 2002 to 2003.

Table 6

	(1)	(2)
Treated X post-2003	-44.256 *	-15.419
	(24.227)	(16.014)
Post-2003	0.568	-28.269 **
	(17.131)	(11.324)
Treated	53.865 ***	-7.858
	(19.153)	(12.661)
Year FE	no	no
Control group	All workers	With PhD
N	160	160
R^2	0.069	0.804

*** $p < 0.01$; ** $p < 0.05$; * $p < 0.1$.

3. Methodology

In this paper, we cannot simply examine changes in the outcome variable before and after the reform, without control. The reason is that we do not know that in the process of using the before-and-after changes in the results before and after the reform as the difference to test, there will be no other irrelevant variables, and irrelevant variables may have an impact on our experimental results, thus bringing inaccurate conclusions.

Explain and give an example to illustrate the potential problems with this approach:

In medicine, we compare a group of patients before and after treatment and then want to study the effect of acupuncture and moxibustion, but in this process, we ignore the influence of other factors besides the research factors, such as the outcome of the disease, research The subject's diet, exercise, and other treatment methods, etc., but whether to control these factors and how to control them, there is no clear explanation in this example. For example, before acupuncture and moxibustion treatment, there was not enough time to observe the research subjects, so it was impossible to objectively evaluate the disease and health status of the research subjects before acupuncture and moxibustion. Therefore, it is difficult to consider that the study is comparable before and after acupuncture treatment, and it is impossible to determine that the changes in the research indicators are caused by the research factors (acupuncture). So in this example, we need to set up a control experiment.

How to use the control group to solve this problem: Because we can find another group of patients, this group of people is the same as our treated group in terms of diet, exercise, and other treatment methods, so that other factors other than the research factors can be used Take control. We assume that the mean of difference-in-differences in 2002 and 2003 is the same, specifically, we assume that the trend of the treatment group and control group must be the same before the policy, and after the policy, the trend of the treatment group and control group must be the different.

4.Conclusion

From the analysis of t-test and Regression, I found that due to policy changes, the number of new patents invented by the treated group, and the number of starts startups have also dropped a lot .However, the control group for other workers doesn’t have any significant evidence to support the estimated treatment effect from the regression. Therefore, we couldn’t get the conclusion that the many Researchers' ability to innovate has declined, due to policy changes, since we need more evidence.