TITLE: Case Study on the Italian Opera in the Napoleonic Age: Examine the Effects of Copyrights on Creativity

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INTRODUCTION

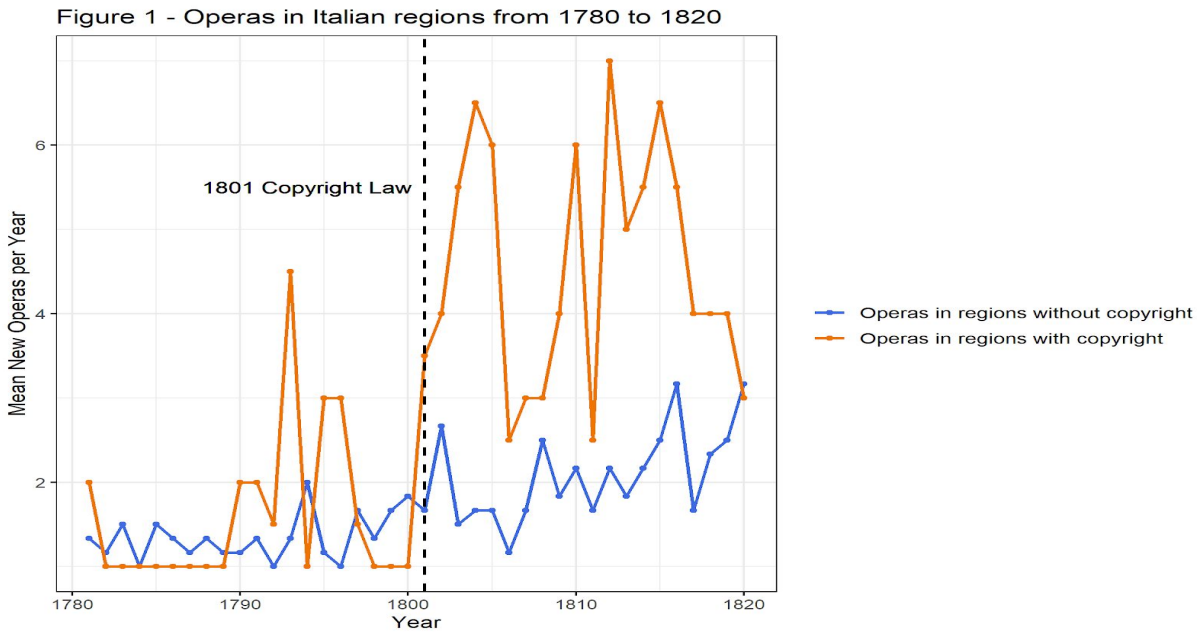
Copyright establishes intellectual property in creative goods, and it captures the economic value of the work which can foster the creation. It is important to figure out the causal effect of copyright and creativity; however, it is difficult to investigate it in the modern data. That is because it is hard to identify whether the determining reason for a public policy has come from the extensive lobbyings. For instance, the 1998 Sonny Bono Copyright Term Extension Act extended the copyright of the Mickey Mouse to 2023. The Act was established mostly because Mickey Mouse is approaching the expiration of its copyright; hence the company paid a lot of effort on lobbying for an extension. If the implementation of a policy is related to lobbying, it does not imply the causality. To avoid this problem, this report exploits exogenous variation in the adoption of copyright laws which are Napoléon's military victories in Italy to test the effect of copyright on creativity. In 1801, Lombardy and Venetia adopted France's copyright laws of 1793 which guarantee composers lifelong exclusive rights and 10 years of copyright to their heirs. Before that, the composers had no protection of their operas which meant they could not have the right to sell their work, and they were not paid for the repeat performance of their own operas. Until 1820, Lombardy and Venetia were the only states that offered copyright protection in Italy.

The empirical analysis examines the data on 657 operas that composers created across eight Italian states (Lombardy, Venetia, Sardinia, Modena and Reggio, Parma and Piacenza, Tuscany, Papal States, and Sicily) from 1781 to1820. The dataset collected by Professor Petra Moser and Professor Michela Giorcelli. It includes the title of the operas, composers' names, and an indicator variable for operas appears in "Annals of Opera" which is a prestigious publication, as well as the indicator variable for whether the opera was available on Amazon for purchase in 2014 and so on and so for. In this way, we could have a chance to measure the "quality" of the operas by capturing the popularity and durability. The empirical analysis is based on the

difference-in-differences regression with parallel assumption held by comparing the changes after 1801 in the number of the new operas between the state with and without copyrights. We hypothesize that the copyright adoption in Italy encourages the creation of the new operas in total as well as the number of the popular operas.

EMPIRICAL EVIDENCE AND DISCUSSION

FIGURE 1. NEW OPERAS PER STATE AND YEAR IN ITALY, 1781-1820



Notes: Date include 657 new operas created in state i and year t between 1781 and 1820. Lombardy & venetia adopted copyright law in 1801. Other states include Sardinia, Modena and Reggio, Parma and Piacenza, Tuscany, Papal States, and Sicily.

For the empirical analysis, we use difference-in-differences regression to test whether the adoption of the copyright encourages the creativity of the production of new operas. To use this strategy, we first test whether the parallel assumption holds before the treatment effect occurred. Figure 1 is the new operas per state and year between 1781 to 1820. From Figure 1, we could see that before the Copyright law implemented in 1801, the average number of operas for Lombardy and Venetia had a similar trend to the other six states. Through the graph, there exist some noises on the curve due to the limited sample size but overall speaking, and the parallel assumption holds and in this way, we could apply the difference-in-differences in this situation. The difference-in-differences regression works in a way that compares whether the treated group and the control group have similar trends after the treatment took place. If their trends are not similar, then treatment has an effect on the treated group but not on the control group by eliminating the effect of other factors like population, education, GDP per capita, the number of the theater and

etc. In this way, by capturing the change in two groups, we could get the effect of the treatment. Through Figure 1, we observe that after 1801, Lombardy and Venetia created significantly more operas than composers in other states. This may imply that our hypothesis that the adoption of the copyright law encourages creativity is correct.

TABLE 1. NEW OPERAS PER STATE AND YEAR ACROSS EIGHT STATES WITHIN ITALY, 1781-1800

Years	Venetia and Lombardy	Other States
All Operas (total number of data = 657)		
1781-1820	3.06	1.72
1781-1800	1.57	1.35
1801-1820	4.55	2.08
Historically popular operas Annals of Opera (total number of data = 58)		
1781-1820	0.362	0.121
1781-1800	0.125	0.083
1801-1820	0.6	0.158
Long-lived operas Available on Amazon in 2014 (total number of data = 39)		
1781-1820	0.225	0.088
1781-1800	0.025	0.025
1801-1820	0.425	0.15

Notes: Historically popular operas include 58 operas created between 1781 and 1820 and are listed in Loewenberg's (1978) Annals of Opera, a compendium of notable performances between 1597 and 1940. Long-lived operas include 39 operas created between 1781 and 1820 and were for sale on Amazon in 2014.

According to Table 1, we could find that for all operas created between 1781 and 1800, Venetia and Lombardy created 1.57 new operas per state, and per year and for other states, they produced 1.37 new operas per state and per year which has no significant difference. However, for the period between 1801 and 1820, Venetia and Lombardy created 4.5 new operas per state and per year, which is almost 2.2 times larger than the other state's new operas created. There exist significant differences after the copyright is implemented. As for the more popular and

high-quality operas, Venetia and Lombardy increased much more than other states, and in total, there were 74 operas defined as popular from 1781 to 1820. For the historically popular operas, the change in the increase of the number of operas per state and year are 0.474 and 0.075 separately compared to the treated group and control group before and after the copyright implemented. As for the long-lived operas, the change in the new operas created is 0.4 and 0.125 separately for Venetia and Lombardy and other states before and after 1801. This may imply that the adoption of copyright law encourages creativity in high-quality work. Among all the situations in Table 1, the increase in the treated group is significantly larger than the control group.

To systematically compare the changes in the new operas creation in the state with and without copyrights, we use the difference-in-differences regression in the following form:

$$y_{ct} = \alpha_t + \gamma_c + \beta_0 Post_t + \beta_1 Treat_c + \beta_2 Post_t \times Treat_c + \varepsilon_{ct}$$

In the equation, α_t denotes as the time fixed effect and γ_c denotes as the state fixed effect. The variable $Post_t$ is an indicator for year after 1800 and the variable $Treat_c$ is an indicator for states that applied the copyright which are Venetia and Lombardy in this report.

TABLE 2. DIFFERENCE-IN-DIFFERENCES REGRESSION,
DEPENDENT VARIABLE IS NEW OPERAS PER STATE AND YEAR, 1781--1820

	(1)	(2)	(3)
Treated X post-1801	2.517 ***	0.517 ***	2.517 ***
	(0.368)	(0.135)	(0.430)
Post-1801			0.958 ***
			(0.215)
Treated			0.292
			(0.304)
Year FE	yes	yes	no
State FE	yes	yes	no
Sample	Known	Known & popular	Known
N	320	320	320
R^2	0.580	0.332	0.334

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

Notes: The dependent variable new operas per state and year measures the number of new operas in state i and year t between 1781 and 1820. The indicator variable Lombardy & Venetia equals 1 for Lombardy and Venetia, which adopted copyright laws in 1801. The indicator variable post equals 1 for years after 1800. For the sample row, known means run the regression for all operas with a known composer(either first name or the last name of the composer exist) and a known title. Popular means either two of the definitions fulfilled. i) Historically popular operas that appear in Annals of Opera. ii) Durable operas that were available for purchase on Amazon in 2014.

From Table 2, difference-in-differences regression of equation (1) indicates that the states with copyright created 2.517 additional new operas per year and state after 1801, and that is the treatment effect. The standard error is 0.368, and the p-value is smaller than 0.01 so that the estimate is statistically significant. The standard error tells how accurate the mean of any given sample from the whole dataset compared to the true mean. So the better estimate has a smaller standard error which indicates that the means are more contract which results in a more accurate estimate of the true mean.

In equation (2), the regression only tests the data on the popular operas, which are long-lived and famous. Through the table, the treatment effect is that the states with copyright created 0.517 additional new operas per year and states after 1801 with the standard error is 0.135 and p-value smaller than 0.01. Because the R-square is 3% which is relatively low, so the estimate is statistically significant, and the coefficient is plausible.

Equation (3) is the regression same as (1) but without the fixed effect. The state fixed effects control for variance in opera output that is constant over time and the year fixed effects to control for variation over time that is shared across states. By using the fixed effect, it allows us to identify causal effects with units and to see how much each observation differs from the average of that state or year. By involving fixed effects, it is also helpful to handle some of the unobserved confounders such as GDP per capita, education level and so on and so for. Although the treatment effect is almost the same in (1) and (3), (1) with fixed effect has smaller standard error than (3) which indicates a better estimate by eliminating potential omitted variable bias in some senses.

CONCLUSION

This report uses exogenous variation in the adoption of copyright to examine whether the copyright encourages creativity in operas. By using the difference-in-differences empirical analysis to compare the changes in the creation of new operas with and without copyrights, we confirm our hypothesis that the copyright adoption in Italy encourages the creation of the new operas, as well as the operas with higher quality which defined as more popular and durable. Those findings may have important implications for future debate in the existence of the copyrights. It is crucial to figure out the causal effect of the copyright and creatively to help to make better decisions in the public policy domain.

Work Cited

Moser, Petra., & Giorcelli, Michela. (2020, October 16). Copyrights and Creativity: Evidence from Italian Opera in the Napoleonic Age. *Journal of Political Economy, 2020, vol. 128, no. 11 by The University of Chicago.*