COPYRIGHTS AND CREATIVITY—EVIDENCE FROM ITALIAN OPERAS

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The purpose of copyrights is to encourage creativity, but there is little systematic evidence on their effects. This paper exploits variation in the adoption of copyrights, due to the timing of Napoléon’s military victories in Italy, to investigate the causal effects of copyrights on creativity. Using data on operas across states with and without copyrights, we find that basic levels of copyright protection increased creative output, measured by the number of new operas. Copyrights also improved quality, measured by the immediate success and durability of new operas. By comparison, the effects of extensions in copyright length are limited, at best. (JEL K11, O3, O33, O34, N3)

Copyrights, which create intellectual property in music, news, literature, film, and other types of media, are intended to encourage creativity.1 With the growing importance of media and digitization, copyrights have become a critical tool for encouraging economically valuable innovations, yet economic analyses of copyrights continue to be rare. Existing analyses have exploited variation in exposure to copyright piracy, but found no significant effects on sales or on the quality of pop music (Oberholzer-Gee and Strumpf 2007, Waldfogel 2012). Recent studies of online content in investigative reporting (Cagé, Hervé, and Viaud 2017) suggest that copyrights may change the reuse of content.2 Analyses of price data show that — starting from low levels of existing protection — stronger copyrights raise price (Li et al. 2017, Biasi and Moser 2016).3 Data on book contracts suggests that copyrights can also increase payments to authors (MacGarvie and Moser 2014). Despite these contributions, however, existing work has been unable to identify effects on creativity, even though this is the primary goal of copyright laws.

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2 See for example, Sony Corp. of America v. Universal City Studios, 464 U.S. 417, 104 S. Ct. 774, 78 L. Ed. 2d 574 (1984).
3 Li et al. (2017) show that extensions in the length of copyright terms increase the price of books by improving publishers to practice intertemporal price discrimination. For music, Scherer (2004, pp. 195-196) compares of the number of composers across countries with and without copyrights, but finds no effects of copyrights on country-level counts of composers.
This paper exploits plausibly exogenous variation in the adoption of copyright laws – as a result of the timing of Napoléon’s military victories in Italy – to investigate the causal effects of copyrights on creativity. In 1796, Napoléon began his Italian campaign by invading the Kingdom of Sardinia at Ceva. Although he was unable to subdue Sardinia at the time, two other states, Lombardy and Venetia, were annexed and formed the Cisalpine Republic. The Cisalpine Republic (which covered Lombardy and large parts of Venetia) adopted French laws, including copyrights. In 1801, the Republic adopted France’s copyright laws of 1793, granting composers exclusive rights for the duration of their lives, plus ten years for their heirs (Legge 19 Fiorile anno IX repubblicano, Art.1-2). In 1804, France’s parliament adopted the code civil, a codified system of civic laws that replaced the traditional system of feudal laws and aristocratic privilege. The code civil left copyrights intact where they already existed, but did not introduce copyrights to states without such laws. As a result, only Lombardy and Venetia adopted the French copyright law (Foà 2001, p. 64), even though all of Italy spoke the same language, shared a similar culture, and was exposed to French influence, including Napoléon’s army and the code civil.4

Our analysis exploits a rich dataset on 2,598 newly-created operas across eight Italian states between 1770 and 1900.5 Baseline specifications compare changes in the number of new operas per year after 1801 across eight Italian states with and without copyright laws. OLS estimates indicate that two states with copyright laws (Lombardy and Venetia) created 2.1 additional new operas per year after 1801 compared with other Italian states without copyright laws. Relative to a pre-1801 mean of 1.4 operas per state and year across Italy, this implies a 1.5-fold increase for states with copyrights. Importantly, pre-1801 time trends in the creation of new opera are comparable for states with and without copyrights. States with and without copyrights are also similar in terms of the pre-existing demand for opera (measured by the number of theaters and by the number of seats), as well as in terms of population, GDP per capita, and rates of urbanization.

Copyrights can also influence quality of creative output because high-quality work takes additional effort, and copyrights reward such efforts. When Rossini felt that theaters in Naples paid too little for his work, he created pieces that had “nothing new in them but the variations” (Beyle 1824, pp. 200-01). The 1801 law included performance rights, which allowed composers like Rossini to charge theaters fees for repeated performances of their work, increasing incentives to create better work.6 In addition, copyrights may raise artistic quality through wealth effects, by allowing composers who have an intrinsic preference for quality to devote more time to high-quality work. Giuseppe Verdi, for

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4 Acemoglu, Cantoni, Johnson, and Robinson (2011) discuss the broader set of reforms that were associated with the code civil, and show that German states that were more exposed to these reforms experienced higher rates of subsequent growth.
5 We chose the beginning and end periods of our sample based on musicologists’ periodization of opera: 1770 is the beginning of the bel canto period of classical music. The term bel canto means beautiful singing and denotes a vocal technique that emphasizes beauty of sound rather than dramatic expression. 1900 is the final year of the Italian verismo. Coming from the Italian root “vero”, verismo was a period or realism, associated with composers such as Giacomo Puccini.
example, used income from performance fees and sheet music to stop working like a “galley slave” (Scherer 2001, pp. 179-180) and created fewer but better operas.

Detailed data on historical operas allow us to construct several alternative measures for quality. First, we examine variation in the immediate success and the historical popularity of operas based on Alfred Loewenberg’s *Annals of Opera* (1978), the standard reference work on notable performances. Difference-in-differences estimates imply a 4.6-fold increase in the creation of popular operas. Corresponding estimates for average quality imply a 1.4-fold increase in the share of high-quality operas. We also measure variation in the durability of operas, based on their availability on Amazon today. These estimates show that copyrights also encouraged the creation of more durable operas.

We then extend the analysis to examine the effects of copyrights across the remaining states of Italy. All remaining states adopted copyright laws between 1826 and 1840 as part of Italy’s political process towards unification. OLS estimates of these changes indicate that the adoption of copyrights was associated with a 2.3-fold increase in the creation of new operas. States with copyrights also produced more historically popular and more durable operas.

If basic levels of copyright protection encourage creativity, do extensions in existing copyright lengths create similar effects? In the United States, the contentious 1998 “Mickey Mouse” US Copyright Term Extension Act increased copyright terms from life+50 to life+70.\(^7\) These extensions are set to expire in 2023, and discussions about further extensions are likely to resume.

Our research suggests that the benefits of extending copyrights beyond the life of the original creator are minimal at best. First, we examine performance data to check whether operas are performed beyond the composer’s life. These data show that even historically popular operas were rarely played after the first five years. Then it is not surprising that, when Lombardy and Venetia increased copyright lengths to life + 30 and life + 40, there was no clear increase in the level or the quality of output, even though both states had responded strongly to the adoption of basic copyright laws. Moreover, OLS regressions for the entire sample of all Italian states show that extensions to life + 40 (still much shorter than modern copyright lengths) were associated with a decline in output, even though extensions to life + 30 are associated with a small increase. These results complement recent research, which has found that copyrights can reduce the re-use of creative content (Nagaraj 2017 for images of baseball cards), and discourage follow-on innovation in science (Biasi and Moser 2016). When copyrights are extremely long-lived, the dynamic costs of reducing follow-on innovation appear to outweigh the positive incentive effects of intellectual property rights on creativity.

Recent work on superstar patentees has shown that lower tax rates can help to attract superstar inventors to countries (Akegiti, Baslandze, and Stantcheva 2016) and US states with more favorable

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terms (Moretti and Wilson 2016). We examine whether copyrights create similar effects, by attracting exceptionally creative individuals to states that offer copyrights. Complementing results on inventors, we find that composers who had moved to Lombardy and Venetia created more new operas after 1801 compared with composers who had moved to other states. Importantly, however, there is no evidence of a brain drain towards Lombardy and Venetia from other states within Italy after 1801, and there is no decline in the number of new operas, or in the number of active composers in the control group of other Italian states. Instead, the adoption of copyright laws appears to have stemmed the outflow of Italian composers to other European countries with copyright laws.

We also examine the effects of copyrights on stayers, who were subject to both positive and negative productivity shocks. Applying theoretical predictions about agglomeration externalities (e.g., Marshall 1920, Ciccone and Hall 1999, Kline and Moretti 2014) to our setting suggests that the arrival of productive movers may have raised the productivity of natives, for example, by creating opportunities for knowledge spillovers. Moser, Voena, and Waldinger (2014) document such effects for German Jewish émigré scientists, whose arrival in the United States increased native rates of invention. Recent work on immigrant mathematicians (Borjas and Doran 2012), however, suggests that competition with immigrants can have reduce the productivity of natives when outlets for their work are capacity constrained. Composer-level regressions show such negative effects, albeit for a small sample of stayers.

A final section investigates interactions between pre-existing demand and copyrights laws. Although data on key economic variables such as GDP and population are extremely scarce for pre-unification Italy, there is excellent city-level data on theaters and theater seats, which we can use as proxies for variation in demand. These data indicate no significant differences in the growth paths of demand for states with and without copyrights before 1801. City-level regressions, however, suggest important interactions between pre-existing differences in demand and the effects of copyright laws. Cities that had two or more theaters before the adoption of copyrights experienced a substantially larger increase in the number and in the quality of operas.

The remainder of this paper is structured as followed. Section 1 summarizes the relevant historical background and outlines changes in copyright laws. Section 2 introduces the main data set. Section 3 checks the identifying assumption and presents baseline estimates and robustness checks for the effects of copyrights on the number of new works. Section 4 examines effects on quality. Section 5 investigates the effects of copyright adoptions and extensions across all of Italy until 1900. Section 6 presents composer-level analyses for movers and stayers. Section 7 investigates interactions with pre-existing infrastructure and demand, and Section 8 concludes.

1. Historical Background

Until the 17th century, opera had been “distinctly aristocratic, a bonne bouche for cultivated cognoscenti” (Apthorp 1901, p. 26). In 1637, however, with Francesco Manelli’s L’Andromeda, the
Teatro San Cassiano in Venice became the first commercial public theater to perform opera for a paying audience (Celletti 1959, p. 516).

“…with it, the Opera was for the first time brought face to face with the great public. Thenceforth, the people, together with but quite as much as crowned heads and affluent nobles – were to be the arbiters of its destiny” (Apthorp 1901, p. 26).

Demand was so great that, by the end of the 17th century, ten theaters performed opera in Venice alone. Beyle (1824, p. 9) describes the scene at a performance of Rossini’s La Scala di Seta in Venice:

“…an immense concourse of people, assembled from every quarter of Venice, and even from the Terra Firma…who, during the greater part of the afternoon, had besieged the doors; who had been forced to wait whole hours in the passages, and at last to endure the ‘tug of war’ at the opening of the doors.”

Each theater was managed by a professional agent (impresario), who identified a promising story, procured a libretto, and then hired a composer to create a score (Valle 1823, p. 155; Scherer 2008, p. 5).

Composers typically took four to eight weeks to create a new opera (Valle 1823, p. 157). The Teatro Torre Argentina in Rome commissioned Gioacchino Rossini (1792-1868) to compose Il Barbiere di Siviglia on December 17, 1815, and Il Barbiere premiered in Rome roughly six weeks later, on February 5, 1816 (Panico 2002, p. 62). In 1819, Rossini complained: “…you know very well that scarcely six weeks are allowed me to compose an opera” (Moore 1854, p. 823).

Before the adoption of copyright laws, composers had no recourse to demand payments for repeat performances (Scherer 2008, p. 5), and piracy was rampant.® Impresarios would

“…either steal an authentic score (as a rule by bribing a copyist) or pirate it by getting a minor composer to work up a new orchestral setting from the printed vocal score […]. An impresario who wanted to give a recent opera would commonly try to knock down the cost of hiring the authentic score by pointing out that he could get one elsewhere at half the asking price” (Rosselli 1996, p. 74).

Without payments for repeat performances of their work, composers would “recycle some of the music in another opera and another town” (Rosselli 1996, p. 74), suggesting that the absence of copyright protection may have diminished novelty.

1.1. Napoléon’s Military Campaign in Northern Italy

Variation in the success of Napoléon’s military campaign brought copyright laws to some parts of Northern Italy in 1801. After taking command of the French “Army of Italy” on March 11, 1796, Napoléon invaded the Kingdom of Sardinia at Ceva on April 11, 1796. Between April 12 and 14,

® In 1782, Mozart wrote to his father that he felt indebted to the Baron von Riedesel because Riedesel had bought the score for Die Entführung aus dem Serail from him instead of acquiring a cheaper version from a copyist (Scherer 2004 p. 167).
Napoléon defeated Sardinia’s King Vittorio Amedeo III in the battles of Cairo Montenotte, Dego, Millesimo, and Cossèria (in Liguria, a region in the North-West of Italy), and in a decisive victory on April 19, 1796 near the town of Mondovì (in Piedmont, about 50 miles from Turin). As a result of these victories, Sardinia granted Nice and Savoy to France under the Treaty of Paris on May 15, 1796. In his campaign against Austria, Napoléon conquered Verona on April 25, 1797, Venice on May 12, 1797, and Milan on May 14. On June 29, 1797 Napoléon decreed the creation of the Cisalpine Republic (Repubblica Cisalpina) with Milan as the capital. On August 5, Napoléon defeated the Austrian Army at Castiglione, forcing Kaiser Franz to retreat. Austria acknowledged the Cisalpine Republic in the Treaty of Campoformio on October 18, 1797, in exchange for what remained of the Venetian Republic.

To curb Napoléon’s grasp on Europe, Piedmont, Austria, England, Russia, Turkey, and Sweden from the Second Coalition against France on March 12, 1799. Austria was defeated in the battle of Marengo (June 14, 1800) and Napoléon invaded Venetia on June 20, 1800. Venetia officially became part of the French empire with the Peace of Pressburg on December 26, 1805 (Pecout 1999, p. 138).

1.2. Lombardy and Venetia Became the Only States to Adopt Copyright Laws in 1801

In 1793, France had passed a copyright law to replace royal privileges, which had been abolished in the French Revolution four years before (Appendix B). On May 9, 1801, Legge n. 423 (Repubblica Cisalpina, 19 florile IX articles 2 and 7) extended this law to the French-controlled territories of Lombardy and Venetia. The 1801 law granted performance rights to composers for as long as they lived, plus another 10 years for their heirs:

“The authors of any type of writing, composers, painters, and designers who make paintings or drawing, will benefit for the entire duration of their lives from the exclusive right of selling, allowing to sell, and distributing their works in the Cisalpine Territory, and of ceding their property to others (in its entirety or in parts). Their heirs, or assignees, will have the same right for the duration of ten years after the death of the authors.” (Legge 19 Fiorile anno IX repubblicano, Art.1-2).

Now composers were entitled to royalties for repeat performances of operas that had premiered in Lombardy or Venetia, starting from the premiere (Celletti 1959, p. 518). Operas that had premiered either in Lombardy or in Venetia were protected both in Lombardy and Venetia, but not in other states.

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9 France had declared war with Austria on April 20, 1792, after Austria joined the first coalition against France, which had formed between Great Britain, Prussia, Spain, Holland, and the Kingdom of Sardinia on April 6, 1792.
10 The 1793 law created exclusive publication rights for the duration of the composer’s life plus 10 years, whereas a 1791 French law, which abolished censorship in the performing arts, had created exclusive performance rights for life plus five years. The 1791 law was codified as Article 428 of the code pénal of 1810.
11 See Appendix B for the original Italian or French text of all relevant laws and our translations.
12 Even though the 1801 law also included reproduction rights, performance rights remained composers’ main sources of revenues until the 1850s: “…it took the combination of copyright protection, Italians’ love of opera, and the love of money shared by Ricordi and Verdi to carry the reduction enterprise to its height of sophistication...In 1851, Verdi was paid the unprecedented sum of 14,000 francs (£550) for the publication rights, not including performance rental royalties, to
Performance data (which we describe in more detail below) indicate that enforcement was effective. No opera that had premiered in Lombardy or Venetia after the adoption of copyrights in 1801 was performed by another theater in Lombardy and Venetia after 1801 (Appendix Table A1). But operas that had premiered in Lombardy and Venetia before 1801 (and were therefore not protected under the 1801 law) continued to be performed frequently in the same state. Similarly, operas that premiered in other states after 1801 (and were therefore not protected by the laws of Lombardy and Venetia) continued to be performed in other states, including Lombardy and Venetia. For example, Weinstock (1963, p. 353, writes about Donizetti’s *Roberto Devereux*, which had premiered in Naples in 1937: “A pirated version of it was sung at the Teatro Re, Milan, late in 1837 or early in 1838.”

Due to the timing of Napoléon’s military victories, only Lombardy and Venetia adopted French copyright law, while the rest of Italy came under the influence of French laws and institutions *without* adopting copyrights until 1826. Foà (2001, p. 62) writes:

“In Italy, the first acknowledgment of ‘the most sacred and precious of all properties’ occurred with the Law of 19 Fiorile anno IX (May 9, 1801) of the Cisalpine Republic; it was followed by the Edict September 23, 1826 for Papal State, the Decree February 5, 1828 for the Kingdom of Two Sicilies, the Decree December 22, 1840 of Maria Luigia for the Duchy of Parma, Piacenza, and Guastalla.”

On March 21, 1804, the Parliament of France adopted the (Napoléonic) *code civil*. The *code* was agnostic about copyrights; it did not introduce them to states without copyright laws and left them in place for states where copyrights existed already. As a result, Lombardy and Venetia kept their copyright laws while other Italian states that came under French rule after 1804, adopted the *code civil* without copyrights (Foà 2001, p. 64): Sardinia (under French influence in 1804), Parma (1805), Tuscany (1809), Naples (1812), and the Papal State (1812).13

Lombardy and Venetia’s copyright laws also survived the 1815 Congress of Vienna, which placed Lombardy and Venetia under the rule of Kaiser Franz I of Austria.14 The borders drawn by the Congress of Vienna remained intact until Italy’s unification in 1861. We use them to distinguish eight states within Italy: the Kingdom of Lombardy and Venetia, the Kingdom of Sardinia (for simplicity, Sardinia), the Duchy of Parma and Piacenza (Parma), the Duchy of Modena and Reggio (Modena), the Grand Duchy of Tuscany, the Papal State, and the Kingdom of the Two Sicilies.15

### 1.3. Other Italian States Adopt Copyrights Starting in 1826

*Rigoletto*” Unlike Italy and France, Britain’s law did not include performance rights until the 1842 Copyright Act. The United States added performance rights in 1870 (Scherer 2004, p. 178).

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13 Tuscany, the Papal States, and the Two Sicilies repealed the *code civil* in 1819 (*Code civil italien* 1866, pp. xxiv).

14 *Codice civile universale austriaco pel Regno Lombardo-Veneto*, 1815, Regno Lombardo-Veneto.

15 The Congress of Vienna also created the Duchy of Lucca, which remained under the influence of Tuscany and was annexed by Tuscany in 1848. We therefore count Lucca with Tuscany, but there were no operas in Lucca.
On September 28, 1826, an edict by Pope Leo XII (Editto n. 433, Stato Pontificio, Appendix B) established exclusive rights in compositions, books, and other types of media for the duration of the composer or author’s life, plus 12 years for heirs. In 1828, a decree of Francesco I (1777-1830), King of the Two Sicilies, created copyrights for the duration of the composer’s life plus 30 years (Regio decreto 5 February 1828, n. 1904, Regno delle Due Sicilie). These were the longest copyright terms in all of Italy. Four other states – Sardinia, Modena, Parma, and Tuscany – continued to offer no protection. Without rules of reciprocity, copyrights from the Two Sicilies were enforceable only in the Two Sicilies, and copyrights from the Papal State were limited to the Papal State.

On June 26, 1840, Sardinia entered into a bilateral copyright treaty with Austria. This treaty granted copyrights for the duration of the composer’s life plus 30 years for heirs (Convenzione Austro-Sarda 22 May 1840, Regno di Sardegna). Sardinia had emerged as a political leader in Italy’s fight for independence (Pecout 1999, p. 158), and within weeks, all other Italians states (with the exception of the Two Sicilies) joined Sardinia’s treaty with Austria. This process introduced copyrights to Tuscany, Modena, and Parma, and extended the length of existing copyright terms in Lombardy and Venetia from life+10 to life+30 and in the Papal State from life+12 to life+30.16

On March 17, 1861, five states – Lombardy, Modena, Parma, Tuscany, and the Two Sicilies – joined Sardinia to form the Kingdom of Italy (Pecout 1999, p. 170). On June 25, 1865, the Kingdom’s first copyright law extended copyrights from life plus 30 to life plus 40 years (Legge 25 June 1865, n.2337, It, Appendix B). On June 29, 1866, the Kingdom declared war on Austria, beginning the Third War of Independence. With the Peace of Vienna (August 24, 1866), the Kingdom of Lombardy-Venetia dissolved into the Kingdom of Italy, and a decree of King Vittorio Emanuele II extended the Kingdom’s laws to Venetia (Regio Decreto 4 November 1866, n.3300, It.). On September 20, 1870, after the Breach of Porta Pia, Vittorio Emanuele II annexed the Papal State to the Kingdom of Italy (Pecout 1999, pp. 183-189). A decree on October 9 (Regio Decreto 9 October 1870, n.5903, It.) extended the Kingdom’s laws to the Papal State. Now all of Italy offered copyrights for life plus 40 years.

2. Data

The main data set for this analysis comprises 2,598 new operas by 705 Italian-born composers between 1770 and 1900, including the title of each opera, the name of its composer, the year and location for its premiere, and two alternative measures for quality.17 These data cover 8 Italian states

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16 Verdi and his publisher Ricordi used copyrights to levy hefty fees for each performance (of 400 Francs, equivalent to three months’ earnings for a building craftsman). In an 1850 letter to Verdi, Ricordi proposes price discrimination: “It is more advantageous to provide access to these scores for all theaters, adapting the price to their special means, because I obtain much more from many small theaters at the price of 300 or 250 Lire, than from ten or twelve at the price of a thousand” (cited in Scherer 2004, pp. 179). Verdi accepted the scheme and Ricordi enforced it through a team of field agents.

17 We use the term Italy as defined by the country’s borders in 1900. Compared with Italy’s borders today, this definition excludes Trentino, Alto Adige, Eastern Friuli, Venezia and Giulia, Istria, Zara; these regions had been part of the Austro-
with and without copyright laws. To measure variation in copyright laws across these states, we collect information from Franchi (1902) and examine the original texts of the Italian laws (e.g., Legge 9 May 1801, n. 423 Repubblica Cisalpina). A detailed description of these laws, including the original text and our translations, is available in Appendix B.

Composers typically took four to eight weeks to complete a new opera, and they worked closely with the theater (Valle 1823, p. 157 and Moore 1854, p. 823). Therefore, the location of the premiere is a good proxy for the location where the composer created a new opera.

We chose the beginning and end years for our analysis to match musicologists’ periodization of opera. According to the New Grove Dictionary of Music and Musicians (2001), 1770 is the beginning of the bel canto period of classical music. The term bel canto means beautiful singing and denotes a vocal technique that emphasizes beauty of sound over dramatic expression. Bel canto composers include Gioacchino Rossini (1792-1868), Vincenzo Bellini (1801-1835), and Gaetano Donizetti (1797-1848). The end year of our sample is 1900, the final year of the Italian verismo. Derived from the Italian root “vero”, the verismo was a period or realism, exemplified by Giacomo Puccini (1858-1924).

2.1. New Operas across Eight Italian States, 1770-1900

To collect data on the creation of new operas, we search five standard reference books for opera premieres by Italian-born composers. Carlo Dassori’s Opere e Operisti. Dizionario Lirico (1903) includes 1,353 new operas by 544 Italian-born composers that premiered between 1770 and 1900. We extend these data to include information from Loewenberg’s (1978) Annals of Opera. Loewenberg focuses on notable performances and lists 254 new operas created by 90 Italian-born composers between 1770 and 1900. A third reference book, Corrado Ambiveri’s (1998) Opere e Operisti Minori dell’Ottocento Italiano adds information on “minor” operas that were performed by city orchestras; Ambiveri lists 71 premieres by 45 Italian-born composers between 1770 and 1900.

Among these major reference works, Loewenberg (1978) is the most restrictive: 133 of 1,353 operas in Dassori (1903) and none of 71 operas in Ambiveri (1998) are included in Loewenberg. We also search the New Grove Dictionary of Music and Musicians (2001) and Treccani’s Enciclopedia Italiana di scienze, lettere ed arti (2001) for additional works by the 705 composers in our data; this process adds information on another 880 operas. As an additional data check we compare a complete list of 89 composers whose last names begin with B or D in our sample with a list of all entries for B and D in the New Grove Dictionary of Music and Musicians (2001). This comparison shows that our sample includes 80 composers who are missing from the New Grove.
2.2. Alternative Measures for Quality: Historical Popularity and Durability

Our first measure of quality exploits records of notable performances in Loewenberg (1978) *Annals of Opera*. According to *Opera Today* (January 24, 2005) “(t)his volume has long been regarded as the definitive work on the subject…it is a magnificent piece of work, and belongs on the bookshelf of every researcher in the operatic field…” Loewenberg records notable performances of operas between 1597 and 1940. We extract information on 254 operas by Italian composers between 1770 and 1900.21

To measure variation in the artistic durability of newly created operas, we search Amazon.com for operas that were still available for sale as complete recordings in 2014.22 In practice, this means that we search Amazon for each of the 705 composers’ names along with the title of each of the 2,598 operas, and record the Amazon variable to equal one if the opera is still available as a complete recording in 2014. For example, a search for Giuseppe Verdi’s *La Traviata* shows that it was available as a complete recording in 2008 from Arthaus Musik and in 2012 from Virgin Classics; we therefore record the Amazon dummy for *La Traviata* to equal 1. By comparison, a search for Domenico Cimarosa’s *Penelope* yields no results and we record the Amazon dummy to equal 0.

To check our quality measures, we compare them with each other, as well as with an alternative outside measure: operas that the New York’s Metropolitan opera performed between 1900 and 2014. These checks, reported in Appendix C confirm the high quality of the data.23

2.3. Life Expectancies of Composers

Demographic data on composers’ years of birth and death allow us to estimate the expected length of copyrights, by calculating composers’ age in the year of the premiere, and estimate their remaining years of life (Appendix Table A2). Information on years of birth and death are available for all 705 composers from Dassori (1903), Ambiveri (1998), and the *New Grove Dictionary of Music and Musicians* (2001). The oldest composer in our data is Giovanni Paisiello (1741-1816), and the youngest is Stefano Donaudy (1879-1925). The longest-lived composer was Vincenzo Mela (1803-1897), and the shortest-lived was Nicola Manfroce (1791-1813). The average composer lived to be 59.7 years (with a median of 55 years),24 and was 33.6 years old at the time of the premiere (with a median of 32 years).

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21 Among the 254 operas listed in Loewenberg (1978), the median opera was performed 8 times until 1940 (with an average of 2.7 performances and a standard deviation of 4.7).
23 Data in Moser (2012) include 25 operas by 9 Italian that were performed at the Metropolitan between 1900 and 1950. For the current analysis, we have expanded these data to include performances between 1950 and 2014.
24 By comparison, the European average for composers was 64.5 between 1650 and 1849 (Scherer 2004, p. 8, median of 66).
Composers of high-quality operas were slightly older, with an average of 35.9 years for operas in Loewenberg (1978, with a median of 36) and 35.6 years for operas on Amazon (with a median of 34).25

3. Effects on Quantity

To examine whether the adoption of copyright laws encouraged creativity, we compare changes in the creation of new operas in Lombardy and Venetia after 1801 with changes in other Italian states without copyright laws. Both sets of states shared a common language and similar culture, and both were exposed to the French occupation and other political factors. Due to the idiosyncratic outcomes of individual battles, however, only Lombardy and Venetia adopted the French copyright law.

Summary statistics suggest a significant increase in creativity in response to copyrights. Until 1801, composers in Lombardy and Venetia created 1.6 new operas per state and year (Table 1). After 1801, composers in Lombardy and Venetia produced nearly three times as many new operas, with 4.6 new operas per state and year. By comparison, creative output increased much less in other states, from 1.4 new operas per state and year until 1801, to 2.1 afterwards.

To examine these changes systematically we estimate OLS difference-in-differences regressions:

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\text{opera}_{it} = \beta \text{ Lombardy } & \text{ Venetia}_i \times \text{ post } 1801_t + \phi_i + \delta_t + \varepsilon_{it} \quad (1)
\]

where the dependent variable, \(\text{opera}_{it}\), counts newly-created operas in state \(i\) in year \(t\). The variable \(\text{Lombardy } & \text{ Venetia}_i\) is an indicator for the two states that adopted copyrights in 1801, and \(\text{post}_t\), equals 1 for years after 1800. State fixed effects \(\phi_i\) control for variation in output across states that is constant over time, for example as a result of time-invariant cultural differences or as a result of pre-existing differences in the infrastructure to perform operas. Year fixed effects \(\delta_t\) control for variation in output over time that is common across states. Standard errors \(\varepsilon_{it}\) are estimated as robust, which, in this regression, is equivalent to clustering at the state-year level.26 Robustness checks estimate standard errors with clustering at the state level, collapsing years for the pre- and post-copyright period (Appendix Tables A3 and A4, implementing Bertrand et al. 2004, p.14).

The coefficient \(\beta\) estimates the causal effect of copyrights on creativity under the assumption that, without the adoption of copyrights, changes in the creation of new operas would have been comparable across states with and without copyrights.

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25 These age distributions are also confirmed by information on composers of Italian opera that were performed at the Metropolitan opera house in New York played between 1900 and 2014. In that year, the average composer was 36.2 years old at the time of the premiere (with a standard deviation of 13.5).

26 With only eight states, the number of clusters would be too small to cluster standard errors at the state level (Cameron et al. 2008). Moreover, because only two of eight states are treated, we cannot estimate the t-wild bootstrap (MacKinnon and Webb 2016). Sub-clustering the wild bootstrap estimate is not appropriate for difference-in-differences estimates because clusters (states) switch from control to treatment (MacKinnon and Webb 2016).
3.1. Tests of the Identifying Assumption

We perform a series of tests of the identification assumption. First, we compare the time series of new operas for states with and without copyrights until 1801. These comparisons reveal no differences in output trends between the two sets of states before the adoption of copyrights (Figure 2). Until 1801, composers in states with and without copyrights both created 2 new operas per state and year. Afterwards, output increased steadily for states with copyrights, from 4 in 1801 to 7 in 1806, but stayed stable in states without copyrights, at slightly more than 2 new operas per state and year.

States with and without copyrights were also comparable in population, urbanization, and GDP per capita. In 1800, the last year before the adoption of copyright laws, Lombardy and Venetia had a population of 3.1 million people per state compared with 2.9 million for other Italian states. Rates of urbanization were also comparable, with 15.5 cities above 5,000 people in Lombardy and Venetia compared with 15.8 in other states (Table 2, Panel A).

Next, we check whether states with and without copyrights were comparable in terms of their pre-existing infrastructure, as well as proxies for demand (Table 2, Panel B). Between 1780 and 1800, Lombardy and Venetia had 2.1 theaters per state and year, compared with 1.9 for other states. (With a p-value of 0.658, an equality of means test fails to reject the hypothesis that the two values are identical.) The two sets of states were also comparable in the total number of theater seats, which we use to proxy the demand for entertainment. Between 1780 and 1801, Lombardy and Venetia had a total of 4,730 theater seats per state and year, compared with 4,284 for other states (p-value 0.631).

We also compare counts of active opera composers, as a proxy for differences in pre-existing supply. With 0.5 active composers per state and year in Lombardy and Venetia between 1780 and 1800, compared with 0.6 in other states, this difference is not statistically significant (p-value 0.532).

A related threat to our identification strategy is that composers may have moved from control states to states with copyrights after 1801. To investigate this issue, we construct composer-level data on the number of individuals who had composed at least one opera in one of the six control, and moved to states with copyrights 1801 (Appendix Table A5). These data indicate that only two composers moved within Italy before 1801 (Appendix Table A5, Panel A). After 1801, 16 composers moved within the control group of other Italian states, but not to Lombardy and Venetia (Appendix Table A5, Panel B).

Instead, data on composer migration suggest that the adoption of copyrights stemmed the outflow of Italian composers to other European states with copyrights. Until 1801, prolific composers such as Domenico Cimarosa and Giovanni Paisiello, moved to France to take advantage of French copyright laws. After 1801, 30 Italian-born composers who had previously created operas in France

27 Vincenzo Bellini (1801-1835), praised the French law for allowing composers to collect royalties from provincial towns (Letter from September 4, 1834, cited in Rosselli, 1996, p. 119). In Italy’s Two Sicilies, Bellini had unsuccessfully sought performance fees from provincial theaters but, faced with competition from pirated copies of his own work, was unable to extract much revenue (Scherer 2004, p. 179).
returned to Italy to compose in Lombardy, and another 25 moved to Venetia (Appendix Table A5, Panel B). Similarly, 14 Italian-born composers who had composed operas in Austria returned to Italy to compose in Lombardy, and another 9 returned to Venetia.\textsuperscript{28} Flows of return migration had been substantially smaller before 1801. Only 5 Italian-born composers returned from France to Italy to compose in Lombardy before 1801, and 4 moved to Venetia; 11 Italian-born composers returned from Austria to Italy to compose in Venetia after 1801 and 6 returned to Venetia.

In sum, comparisons of observables yield no evidence against the identification assumption. There are no differences in time trends of creativity for states with without copyrights before 1801, and the two sets of states shared similar characteristics. There is also no evidence for a decline in the number of active composers or in the share of movers for control states after 1801.

3.2. Baseline Estimates, Time-Varying Effects, and Controls for Pre-Trends

OLS estimates of equation (1) indicate that states with copyrights created 2.2 additional operas per state and year after 1800 compared with other Italian states (Table 3, column 1, significant at 1 percent). Relative to an average of 1.4 new operas per state and year across Italy until 1800, this implies a 2.6-fold increase. Excluding state fixed effects leaves the estimate at 2.1 (Table 3, column 2, significant at 1 percent). We also estimate quasi-maximum likelihood (QML) Poisson regressions as an alternative to address the count data characteristics of the opera data. Average treatment effects of this regression indicate 1.1 additional operas per year (Table 3, column 5, significant at 1 percent).

Comparisons of the raw data in Figure 2 indicate no significant differences in pre-trends of creativity across states with and without copyrights. As an additional test to examine whether states with copyrights had begun to create more operas before copyrights, we estimate $\beta$ separately for each year, allowing the coefficient to be different from zero before the adoption of copyrights in 1801:

$$\text{opera}_{it} = \sum \beta_r \times \text{Lombardy & Venetia}_r \times \text{year}_r + \varphi_i + \delta_t + \varepsilon_{it}$$

where the variable $\text{year}_r$ represents an indicator variable for each year between 1791 and 1820. Years between 1781 and 1790 are the excluded category. Estimates of annual coefficients indicate that the observed increase in opera production cannot be explained by differential pre-trends (Figure 3). Annual coefficients are close to zero and not statistically significant for 9 of 12 years until 1801; they increase to 4 additional operas in 1803-1805, and remain positive and statistically significant for 11 of 20 years between 1801 and 1820.

\textsuperscript{28} Nine Italian-born composers who had worked in France returned to other Italian states, and five Italian-born composers returned to other states from Austria.
Regressions with alternative controls for differential pre-trends confirm the main results. Estimates with a common linear pre-trend for Lombardy and Venetia indicate that the two states that adopted copyrights in 1801 produced 2.3 additional operas per year after 1801 (Table 3, column 3, significant at 1 percent). Specifications that allow for a separate linear pre-trend for each state indicate a differential increase by 2.4 additional operas (Table 3, column 4, significant at 1 percent). We also estimate a de-trended version of equation (1) by estimating a linear pre-trend for Lombardy and Venetia and subtracting the estimated pre-trend from the dependent variable opera$_{it}$. De-trended estimates confirm the main estimates, with 2.2 additional operas for states with copyrights after 1801 (Appendix Table A6, column 1, significant at 1 percent).

3.3. Constructing a Synthetic Lombardy and Venetia with Copyrights

As an additional test, we construct a synthetic Lombardy without copyright laws from data for other states that are most similar to Lombardy. Abadie and Gardeazabal (2012) estimate a Mahalanobis matching estimator to create a synthetic Basque region without terrorism from the characteristics of other Spanish regions to evaluate the effects of terrorism on GDP growth over time. Abadie, Diamond and Hainmueller (2012) extend the earlier paper to create a synthetic control for California to examine the effects of a large-scale tobacco control program that California implemented in 1988.

We apply these methods to match the characteristics of the real Lombardy as closely as possible through a weighted average of the characteristics of other Italian states with similar characteristics, but without copyright laws. Let $J$ be the number of available control states without copyright laws and let $W$ be a $(J \times 1)$ vector of non-negative weights $(w_1, w_2, ..., w_J)'$ that sum to one. The scalar $w_j$ represents the weight that state $j$ is given in constructing the synthetic Lombardy. Let $X_1$ be a $(K \times 2)$ vector of the number of theater seats in Lombardy (as a measure of demand), and the number of active composers (as measure of supply) in Lombardy, and let $X_0$ be a $(K \times J)$ matrix of the values for these same variables in the set of possible controls. Let the $(K \times K)$ matrix $V$ be the inverse sample variance-covariance matrix of the matching variables. This is the weighing matrix of the Mahalanobis matching estimator (Rubin 1977, Rosenbaum and Rubin 1983). The vector of weights $W^*$ minimizes $(X_1-WX_0)'V(X_1-WX_0)$. Each country can be used as a match twice, allowing one replacement.\textsuperscript{29}

Figure 4 shows the estimated time path of new opera creation for a counterfactual Lombardy without copyrights. With 2.3 new operas per year, counterfactual output without copyrights, would have been only half the output of the real Lombardy. Matching estimates for Venetia confirm that a counterfactual Venetia without copyrights would have produced fewer operas (66 percent, Appendix Figure A2).

\textsuperscript{29} Allowing one replacement produces higher quality matches by increasing the number of possible matches.
4. EFFECTS ON QUALITY

Beyond increasing the number of new operas, copyrights may also increase quality if at least some composers respond to financial incentives. Most straightforwardly, the right to charge for repeat performances (so-called performance rights established by the 1801 law) raised the expected revenue from creating better operas. Biographical evidence indicates that at least some composers responded to financial rewards. Gioachino Rossini, for example, explained that he purposefully produced lower quality and less innovative pieces if he thought that a theater had underpaid him.

“And, as for those good gentlemen, the impressarj (sic), who pretend to pay me handsomely, by giving me for sixteen or eighteen pieces, …I know a way of being even with them. In every fresh opera, I will serve up three or four of these pieces, which shall have nothing new in them but the variations” (Beyle 1824, pp. 200-01).

Copyrights may also have raised quality through wealth effects. If composers prefer high-quality work, and if they use operas as a source of income, copyrights may raise average quality by allowing composers to spend more of their time creating high-quality work. Giuseppe Verdi is a case in point. Under Sardinia’s 1840 copyright law, Verdi earned substantial income from performance fees and the sale of scores. This freed him from the need to work like a “galley slave” (Scherer 2001, pp. 179-180), and produce fewer, but better operas.30

Data on payments to composers are scarce, but existing research on payments to authors suggest that stronger copyrights raised payments to authors (MacGarvie and Moser 2014).31 Composer biographies further show that many of them were the children of musicians and depended on opera as a source of income. Rossini, for example, was born into a family of poor musicians.

“His mother…was a seconda donna of very passable talents. They went from town to town, and from company to company; the husband playing in the orchestra, and his wife singing on the stage. Poverty was of course the companion of their wanderings; and their son Rossini, covered with glory, and with a name that resounded from one end of Europe to the other…had not, before his arrival two years ago at Vienna, for his whole capital, a sum equal to the annual pay of an actress on the stage of Paris or Lisbon” (Beyle 1824, p.2).32

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30 In the 1840s, Verdi composed 14 operas; in the 1850s he composed 7 operas, including Rigoletto (1851), La Traviata (1853), and Simon Bocanegra (1857). In the 1870s, 1880s, and 1890s Verdi produced one major opera each decade: Aida (1871), Otello (1887), and Falstaff (1893).

31 Data on payments to composers are more likely to be available for stars like Rossini, who received the staggering sum of 1,000 French francs per opera (Moore 1854, p. 823). By comparison, a hectoliter (roughly 25 US gallons) of wheat cost 1.3 francs in 1825 (Dramé et al. 1991). Payments for publication (printing) rights to scores remained modest until the mid-19th century. Ricordi paid Bellini 4,000 Austrian lire (3,489 francs) for the rights to reprint La Sonnambula (1831) - only one third of the flat fee that Bellini had received for performance rights (Rosselli 1996, p. 75).

32 Rossini’s letters also suggest that he preferred composing high-quality pieces, whether his customers liked it or not. “The theatres are filled with performers, who have learned music from some poor provincial professor. This mode of singing violin concertos, and variations without end, tends to destroy, not only the talent of the singer, but also to vitiate the taste of the public” (Beyle 1824, pp. 199).
Information on parents’ occupations is available for 493 of the 705 Italian-born composers. These data suggest that Rossini’s background was fairly typical: 210 fathers (43 percent) were musicians, 141 fathers (29 percent) were composers, and 9 fathers were chapel masters.\textsuperscript{33}

4.1. Estimates for Popular and Durable Operas

To systematically examine the effects of copyrights on the quality of new operas, we repeat the baseline specifications with two alternative measures for quality. The first measure captures historically popular operas, based on records of notable performances between 1781 and 1820 in Loewenberg’s (1978) \textit{Annals of Opera}. Summary statistics indicate that composers began to produce significantly more historically popular operas after the introduction of copyrights in 1801. Between 1781 and 1800, composers in Lombardy and Venetia created 0.1 new operas per year that entered Loewenberg (1978). After 1801 composers in Lombardy and Venetia created 0.6 historically popular operas per state and year (a 4.6-fold increase). By comparison, the number of new historically popular operas increased much less in other states, from 0.1 per year until 1801 to 0.2 afterwards (a 100-percent increase).

Re-estimating equation (1) for historically popular operas shows that composers created 0.4 additional popular operas per state and year after 1801 in Lombardy and Venetia compared with other states (Table 4, column 1, significant at 1 percent). Relative to an average of 0.1 new operas per year before 1801, this implies a 5.6-fold increase. Excluding state fixed effects leaves the estimate at 0.4 (Table 4, column 2, significant at 1 percent).

Results are robust to alternative specifications for pre-trends. Regressions with a pre-trend for Lombardy and Venetia imply an additional increase by 0.5 historically popular operas (Appendix Table A7, column 1, significant at 1 percent). Regressions with a separate pre-trend for each Italian state imply an increase by 0.4 (Appendix Table A7, column 2, significant at 1 percent). Alternative estimates with a de-trended dependent variable confirm an increase by 0.4 historically popular operas (Appendix Table A7, column 4, significant at 1 percent).

Copyrights also raised the \textit{average quality} of operas, measured by the share of high-quality operas among all new operas in state $i$ and year $t$. OLS regressions indicate an additional 10.4 percent increase in the share of historically popular operas per state and year after 1801 for Lombardy and Venetia (Table 4, column 3, significant at 5 percent). Compared with 5.5 in 100 operas until 1800, this implies a 1.9-fold increase in average quality. Moreover, copyrights increased the \textit{number of repeat performances} for each new opera (Appendix Table A6). Operas that composers wrote with copyright protection in Lombardy and Venetia were performed one additional time on average until 1821 (0.933, Appendix Table A6, significant at 5 percent), which implies a 165 percent increase compared with an

\textsuperscript{33} We collected these data from the \textit{New Grove} (2001) and Treccani (2001). Among 24 composers with information on the mother’s occupation, 8 mothers were spinners, 6 nobles, and 2 singers.
average of 1.54 repeat performances until 1801. Operas with copyrights were also more likely to be a “hit,” with 9.6 additional performances in the same year (Appendix Table A7, column 4, significant at 1 percent), which implies a 3.75-fold increase compared with the pre-copyright average of 2.69 repeat performances in the year of the premiere.

An alternative measure for quality identifies operas that were especially durable through operas that continued to be available on Amazon in 2014. Summary statistics indicate that composers from Lombardy and Venetia produced significantly more durable operas after the introduction of copyrights in 1801. Between 1781 and 1800, composers in Lombardy and Venetia premiered 0.03 durable operas per state and year. Between 1801 and 1820, they produced 0.4 per year (14.3 times more, Table 1). By comparison, composers from other parts of Italy created 0.03 durable operas per year until 1800 and 0.2 afterwards (5 times more).

Regressions with durable operas as an outcome variable indicate that composers in Lombardy and Venetia created 0.3 additional durable operas per year after 1801 compared with other Italian states (Table 4, column 5, significant at 5 percent). Relative to an average of 0.03 durable operas per year before 1801, this implies a 10.3-fold increase. Excluding state fixed effects leaves the estimate at 0.3 (Table 4, column 6, significant at 5 percent). Regressions with a pre-trend for Lombardy and Venetia indicate an increase by 0.3 durable operas (Appendix Table A7, column 4, significant at 5 percent), and regressions with state-specific linear pre-trends imply an increase by 0.3 durable operas (Appendix Table A7, column 5, significant at 5 percent). Alternative estimates with a de-trended dependent variable confirm an increase by 0.3 durable operas (Appendix Table A8, column 6, significant at 5 percent).

Estimates for changes in the average quality of new operas indicate a 1.4-fold increase in the share of durable operas in response to the adoption of copyright laws. OLS estimates imply that the share of durable operas among all new operas increased by an additional 6.9 percent per state and year after 1801 in Lombardy and Venetia (Table 4, column 3), compared with a pre-1801 share of historically popular operas of 5.1 percent.34

5. COPYRIGHT ADOPTIONS AND EXTENSIONS ACROSS ITALY

A complementary set of tests examines the effects of copyright adoptions across Italy between 1826 and 1840. During this time, many Italian states adopted copyrights as part of a political process of

34 Anecdotal evidence from composers’ biographies points to agglomeration externalities (Marshall 1890), as an additional source of quality improvements over time. A 19-year old Rossini appeared on the scene in 1811, 10 years after the adoption of copyrights. In 1824, Beyle (p. 249) recognizes that Rossini’s work was more original “Paisiello saw, perhaps, some twenty or thirty principal pieces of his hundred and fifty operas meet with general favour. Rossini could easily reckon upon a hundred in his thirty operas, really different from each other” (Beyle 1824, pp. 249). Another prominent latecomer is Vincenzo Bellini. Born in Catania (Two Sicilies) in 1801, Bellini moved to Milan in 1827, and premiered most of his operas there (Weinstock 1971, p.134), including Il Pirata (1826), La Sonnambula (1831) and La Norma (1831).
unification. For example, states that were politically close to Sardinia, adopted copyright terms of life+30 when they co-signed Sardinia’s Bilateral Treaty with Austria in 1840 (Ubertazzi 2000, p. 50). Evidence for lobbying is rare. In the only incidence when lobbying influenced a law, in Sicily in the 1820s, it was authors but not composers who lobbied for protection (Pomba et al. 1986, p. 86).35

Summary statistics show that composers in states with copyrights produced more new operas (Appendix Table A9). OLS regressions estimate

\[ \text{opera}_{it} = \beta \text{copyright}_{it} + \phi_i + \delta_t + \epsilon_{it} \] (3)

where the variable \( \text{copyright}_{it} \) equals 1 if state \( i \) offers copyrights in year \( t \), and all other variables are as defined above. OLS estimates indicate that composers created an additional 2.7 new operas per state and year in states with copyrights (Table 5, column 1, significant at 1 percent). Relative to a mean of 1.2 new operas per year in states without copyrights, this implies a 2.3-fold increase. Regressions with state-specific linear pre-trends suggest that composers in states with copyrights produce 2.5 additional new operas per year compared with states without copyrights (Table 5, column 2, significant at 1 percent).

States with copyrights also produced more high-quality operas, with 0.6 historically popular operas per year in states with copyrights, compared with 0.2 in other states. OLS estimates indicate that composers in states with copyrights produced 0.2 more new operas per year (Table 5, column 4, significant at 10 percent). Relative to a mean of 0.1 premieres per year without copyrights, this implies a 2.6-fold increase in the creation of new historically popular operas. Composers in states with copyrights also produced more durable operas (0.5 per year) compared with composers in states without copyrights (0.2 per year). OLS estimates imply that composers in states with copyrights produced 0.3 additional durable operas per year (Table 5, column 6, significant at 1 percent). Relative to an average of 0.1 durable operas per year in states without copyrights, this implies a 4-fold increase.

5.1. Copyright Extensions

We also examine how copyright extensions, which are the topic of copyright policies today, affect the quantity and quality of creative work. Lombardy and Venetia first extended their copyright terms from life+10 to life+30 in 1840, when they were under Austrian rule to comply with the Bilateral Treaty between Austria and Sardinia (Ubertazzi 2000, p. 50). In 1865, Lombardy and Venetia (along with five other states) extended their copyrights again, from life+30 to life+40, after these states unified

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35 Carlo Mele (1792-1841) and Pasquale Stanislao Mancini (1817-1888) had lobbied for protection. Mancini later argued that the Two Sicilies’ decision not to join the Bilateral Treaty between Sardinia and Austria contributed to its cultural decline in the 1840s and 1850s (Pomba et al. 1986, p.87). In Germany, parliament (Bundesversammlung) received a request for copyrights in 1825 by composers including Johann Nepomuk Hummel, Carl Maria von Weber, and Ludwig van Beethoven, who complained that publishers were “getting fat by robbing without penalty their neighbors’ property,” and demanded the right to collect fees for “operas and opera-like works” (Scherer 2002, pp.176-8).
to form the New Kingdom of Italy. In 1870, the Papal State, as the final independent state, extended its copyrights to \( \text{life}+40 \) as it was annexed by Italy (Ubertazzi 2000, p. 81)

Intuitively, extensions in copyright length should only affect pieces that are still played after the original terms expire. To examine how long pieces continue to be played, we use data on notable performances in Loewenberg (1978). These data estimate an upper bound on durability because they only include popular works. Even in this subsample of popular works, however, few pieces are performed after the first 20 years (Figure 5). This suggests already that only a small fraction of operas stand to gain from extensions in copyright length beyond the composer’s life lives.

To estimate the expected length of copyrights, we use data on years of birth and death, which are available for all 705 composers, to construct demographic life tables for Italian-born composers of operas between 1770 and 1900 (Appendix Table A2). Life table estimates imply that a composer who was of the average age at the time of the premiere (33.6 years) could expect to live another 29.3 years. For a copyright term of \( \text{life} + 10 \), this implies an expected length of 39.3 years.

Less than one third of operas (27 of 173 in Loewenberg) were still performed after 39 years.\(^{36}\) Another 24 operas (13.9 percent) were still performed after 59 years, the expected term under \( \text{life} + 30 \). Only 20 operas (11.6 percent) still played after 69 years, the expected term under \( \text{life}+40 \).

Next, we examine changes in opera output for Lombardy and Venetia, when the two states extended the length of their copyrights. In stark contrast to the effects of basic copyrights, there is no evidence for a positive effect of copyright extensions. Under the initial copyright lengths of \( \text{life} + 10 \), composers in Lombardy and Venetia created 5.59 new operas per state and year (Figure 6). After copyrights increased to \( \text{life}+30 \) in 1840, output stayed unchanged at 5.60 new operas per state and year. After a further extension to \( \text{life}+40 \) in 1865, output declined to 5.1 new operas per state and year.

We also estimate OLS regressions for copyright extensions across Italy:

\[
\text{opera}_{it} = \beta_1 \text{adopt}_{it} + \beta_2 \text{extend30}_{it} + \beta_3 \text{extend40}_{it} + \varphi_i + \delta_t + \varepsilon_{it} \tag{4}
\]

where the dependent variable counts new operas per state \( i \) in year \( t \) between 1770 and 1900. The variable \( \text{adopt}_{it} \) indicates state-year pairs after state \( i \) has adopted copyrights and before it extends its copyrights to \( \text{life} + 30 \).\(^{37}\) The variable \( \text{extend30}_{it} \) equals 1 after a state \( i \) has extended its copyrights to \( \text{life} + 30 \) and before it extends copyrights \( \text{life} + 40 \). Finally, the variable \( \text{extend40}_{it} \) indicates state-year pairs after state \( i \) has extended its copyrights from \( \text{life} + 30 \) to \( \text{life} + 40 \). The difference between \( \beta_1 \) and \( \beta_2 \)

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\(^{36}\) The number of repeat performances is similar for new operas between 1781 and 1800 that premiered in Lombardy and Venetia and other states (Appendix Figure A3). On average 165 operas in Loewenberg’s Annals were performed 10 times, including 7.5 times within the first 40 years (the expected length of copyrights under \( \text{life} + 10 \)) and 2.8 times afterwards.\(^{37}\) Lombardy and Venetia adopt copyrights for \( \text{life} + 10 \) in 1801. The Papal State adopt copyrights with \( \text{life} + 12 \) in 1826, and the Sicilies adopt copyright laws with \( \text{life} + 30 \) in 1828. Sardinia, Modena, Parma, and Tuscany adopt their own copyright laws with \( \text{life} + 30 \) in 1840. See Appendix Table A8 for a complete list of all copyright adoptions and extensions.
estimates the effect of extending existing copyrights to \( \text{life} + 30 \). The difference between \( \beta_2 \) and \( \beta_3 \) estimates the effects of further extending copyrights from \( \text{life} + 30 \) to \( \text{life} + 40 \).

OLS estimates of \( \beta_1 \) confirm that the adoption of copyrights was associated with a marked increase in creativity, with 3.2 additional new operas per state and year (Table 6, column 1, significant at 1 percent). Relative to a mean of 1.2 new operas per state and year for states without copyrights, this implies a 3.7-fold increase.

Extensions in copyrights, however, were followed by a decline in creativity. States that extended existing copyrights to \( \text{life} + 30 \) created 2.1 fewer operas per state and year afterwards (\( \hat{\beta}_2 - \hat{\beta}_1 = 1.07 - 3.19 = -2.12 \), Table 6, columns 1). A Wald-test rejects the hypothesis that \( \beta_2 - \beta_1 = 0 \) with a \( p \)-value of 0.000). Estimates for \( \beta_2 \) indicate no significant effects for further extensions from \( \text{life} + 30 \) to \( \text{life} + 40 \).\(^{38}\)

Regressions for high-quality operas confirm these results, albeit for a smaller number of observations. Estimates of \( \beta_1 \) indicate that states which adopted copyrights experienced an increase in high-quality output, with 0.3 additional popular operas per year (Table 6, column 3 significant at 1 percent). Relative to a mean of 0.1 in states without copyrights, this implies a 4-fold increase. Estimates for copyright extensions are negative, though not statistically significant. Estimates of \( \beta_2 \) indicate that copyright extensions were not associated with an increase in the number of popular operas (\( \hat{\beta}_3 - \hat{\beta}_1 = 0.24 - 0.30 = -0.06 \), with a \( p \)-value of 0.582). Estimates of \( \beta_2 \) imply that further extensions to \( \text{life} + 40 \) were associated with 0.28 fewer operas per year (\( \hat{\beta}_3 - \hat{\beta}_2 = -0.032 - 0.245 = -0.28 \), with a \( p \)-value of 0.259).

Estimates for durable operas confirm these results (Table 6, column 4). States that had adopted basic copyright laws created 0.40 additional durable operas per state and year. States that had extended their copyrights to \( \text{life} + 30 \) produced 0.24 fewer durable operas per state and year (\( \hat{\beta}_2 - \hat{\beta}_1 = 0.162 - 0.403 = -0.24 \), with a \( p \)-value of 0.02). Further extensions from \( \text{life} + 30 \) to \( \text{life} + 40 \) produced no additional operas, fewer operas per state and year (\( \hat{\beta}_3 - \hat{\beta}_2 = 0.109 - 0.162 = -0.05 \), with a \( p \)-value of 0.453).

6. **Movers and Stayers**

Recent work on superstar patentees has shown that variation in tax rates helps to attract superstar inventors to countries (Akcigit, Baslandze, and Stantcheva 2016) and US states with more favorable tax rates (Moretti and Wilson 2016). In principle, copyrights could play a similar role, by attracting productive composers to states with better copyright protection.

If copyrights triggered a brain drain to Lombardy and Venetia from other Italian states, these flows would threaten the validity of our baseline estimates. In section 3.1, we examine this issue by tracing composers’ movements within Italy. This analysis reveals no evidence that composers who had been active in other Italian states moved to Lombardy and Venetia after 1801. Instead, the adoption of

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\(^{38}\) The difference between \( \hat{\beta}_3 \) and \( \hat{\beta}_2 \) is 1.3, but a Wald test fails to reject \( \hat{\beta}_3 - \hat{\beta}_2 = 0 \) with a \( p \)-value of 0.407.
copyrights stemmed the outflow of Italian-born composers to other European states that offered copyrights, and appears to have motivated Italian-born composers to return to Italy.

To examine changes in composer migration in our sample of Italian-born composers, we first separate movers from stayers. Movers are composers who created at least one opera in a state that is different from the state where they composed their first opera. Stayers are composers who only compose in the state where they premiered their first opera.\(^{39}\)

6.1. Movers

Did opera output by movers increase more in Lombardy and Venetia after 1801 compared with other states? Composer-level analyses indicate that the number of new operas by movers increased significantly more in states with copyrights after 1800 compared with other states.\(^{40}\) In Lombardy and Venetia, movers created 1.2 new operas per state and year until 1800 and 4.0 afterwards (Appendix Figure 4, Panel A). In states without copyrights, output by movers increased as well, but at a lower rate, from 1.1 to 1.7 (Appendix Figure 4, Panel B).\(^{41}\) To evaluate these changes with a full set of controls, we re-estimate equation (1) for movers.

OLS estimates confirm that movers created an additional 2.2 operas per state and year after 1800 in Lombardy and Venetia compared with other states (Table 7, column 1, significant at 1 percent). Relative to an average of 1.1 operas by movers per state and year across Italy until 1800, this implies a 3.0-fold increase. Results are robust to the inclusion of a linear pre-trend for Lombardy and Venetia as well as to the inclusion of a separate linear pre-trend for each state (Table 7, columns 2 and 3, significant at 1 percent). Thus, opera output by movers increased more in Lombardy and Venetia after 1801 than in other states, confirming recent work on superstar inventors.

6.2. Operas by Stayers

---

\(^{39}\) Results are robust to an alternative distinction between “native-born” and “immigrant” composers based on the composer’s state of birth. The large majority of stayers were also natives to the state where they premiered their first opera, and there are no significant changes over time. Until 1801, 90 percent of stayers in Lombardy and Venetia were born in the state where they premiered their first opera. After 1801, 88 percent of stayers in Lombardy and Venetia were also natives. In other states, 85 percent of stayers were natives until 1801, and 89 percent of stayers were natives after 1801.

\(^{40}\) For symmetry, we treat any composer who did not premiere his first opera in the state of the premiere as an immigrant. This means that composers from Lombardy are treated as movers in Venetia, and vice versa. None of the 14 movers to Venetia until 1800 premiered their first opera in Lombardy, however, and none of the 20 movers to Lombardy premiered their first opera in Venetia. After 1801, 3 of 21 movers to Venetia had previously been active in Lombardy, and 1 of 21 movers to Lombardy had previously been active in Venetia.

\(^{41}\) The share of movers among all active composers increased in states with copyrights and stayed stable in other states. Until 1800, 9 of 48 composers who created at least one opera in Lombardy and Venetia were movers (18.75 percent, Appendix Figure A4, Panel A). With copyrights, Lombardy and Venetia’s share of movers increased to 131 in 149 (87.92 percent). In control states the share of movers increased slightly, from 25.68 percent to 26.36 percent (Appendix Figure A4, Panel B).
How did the adoption of copyright laws affect composers who never moved after they composed their first opera? In principle, these “stayers” should be exposed to both positive and negative shocks as a result of copyrights. We have shown that copyrights encouraged the creation of more and better operas. Historical evidence also suggests that the adoption of copyrights may have helped to attract prolific composers from other states to Lombardy and Venetia. For example, Beyle (1824, pp. xxv-xxvi) mentions two productive immigrants, the German Simon Mayer and the Austrian Ferdinand Pär. “Mayer, a German, who finished his education in Italy, and has resided for a number of years at Bergamo, has written some fifty operas between 1795 and 1820.” Applying theoretical predictions about agglomeration externalities (e.g., Marshall 1920, Ciccone and Hall 1999, Kline and Moretti 2014) suggests that the arrival of productive movers, such as Mayer and Pär may have improved the productivity of stayers, for example, by creating opportunities for knowledge spillovers from immigrants to natives. Moser, Voena, and Waldinger (2014) document such effects for German Jewish émigré scientists, whose arrival in the United States increased patenting rates by native US inventors.

But competition with immigrants may also have reduced the productivity of stayers by increasing competition for performance opportunities that were limited in the short run. Borjas and Doran (2012) find that native US mathematicians who had to compete with Russian immigrants for journal space published less after the collapse of the Soviet Union. Similar to native US mathematicians, stayers in Lombardy and Venetia had to compete with movers for opportunities to perform. In the short run, these opportunities may have been constrained by the existing infrastructure for theaters and by demand.

Although there is a small number of stayers in our data, summary statistics suggest that competition with immigrants reduced the productivity of stayers. In Lombardy and Venetia, the count of new operas by stayers per state and year declined from 2.6 until 1800 to 1.5 afterwards (Appendix Figure 4, Panel A). At the same time, output by stayers in other states remained constant, with 1.88 new operas by stayers per state and year until 1800 and 1.89 afterwards (Appendix Figure 4, Panel B).

OLS estimates confirm the relative decline in output by stayers in states with copyrights. Estimates of equation (1) for operas by stayers indicate a decline by 1.6 operas per state in Lombardy and Venetia after 1800 compared with other states (Table 7, column 5, significant at 10 percent). With controls for pre-trends these estimates are, however, not significant (Table 7, columns 6 and 7, with p-values of 0.35 and 0.74, respectively). QML Poisson estimates nevertheless confirm the decline in output with 0.49 fewer operas per state and year after 1800 (Table 7, column 8, significant at 1 percent).

7. Interactions between Copyrights and Demand

A final test exploits variation within states to examine how copyrights interact with pre-existing differences in infrastructure and demand. As a first test, we check whether both Lombardy and Venetia experienced a clear increase in output after they had adopted copyrights. In Lombardy, the number of new operas increased by a factor of three; in Venetia output more than doubled.
Within Lombardy, however, the increase in opera creation was stronger in Milan compared with Mantua, Brescia, and Bergamo (Appendix Figure 6, Panel A). City-level data for Venetia also indicate some geographic concentration, albeit at a smaller scale. Between 1781 and 1800, composers in Venice created 14 new operas, while composers in Vicenza and Verona produced 9 and 2 operas each. After 1801, 47 of 62 operas premiered in Venice. Another 10 operas premiered in Verona, 2 in Padova, and 3 in Vicenza.

One notable characteristic of Milan was its sheer size, with a population of 124,000 in 1800 (Malanima 2015, p. 4). By comparison, Brescia (the next largest city) had 38,000 people, Bergamo had 36,000, and Mantua 25,000. City size in turn is correlated with the density of skilled performers and with the demand for shows. Both these factors increase the payoffs from creating more and better music, which, theoretically, should amplify the effects of adopting copyrights. To proxy for city-level variation in demand and in the infrastructure to perform, we examine historical data on theaters that were large enough to perform operas. Antonini (2000, p. 23) records such data for theaters that had staged at least one opera by 1800, and explains that theaters needed around 100 seats to play operas.

Until 1801, these data indicate comparable trends for Lombardy and Venetia and the rest of Italy (Appendix Figure A7). In 1770, 9 cities in Lombardy and Venetia had on average 0.3 theaters that were large enough to stage operas, and 16 cities in other Italian states had on average 0.3 such theaters. After 1800, the greatest expansion in theater construction occurred with the unification of 1861, which increased demand for opera across Italy (Morelli 2012).

To systematically examine interactions between copyrights and pre-existing differences in theater infrastructure and demand, we estimate differential effects for cities with two or more theaters in 1800. Only Venice (Venetia) and Florence (Tuscany) had three theaters in 1800 that were large enough to stage operas. Another four cities had two theaters in 1800: Milan (Lombardy), Naples (Two Sicilies), Turin (Sardinia), and Ferrara (Papal State, Appendix Figure A5, Panel A).

OLS regressions interact Lombardy & Venetia * post with an indicator for cities that had two or more theaters in 1800. These estimates show that cities with two or more theaters created 2.1 additional operas per year in response to the adoption of copyright laws (Table 8, column 1, significant at 1 percent). Relative to a pre-1801 mean of 0.3 new operas per city and year, this implies a 7-fold increase. Controlling for a separate linear pre-trend for cities with two or more theaters increases the estimate to 2.2 (Table 8, column 2, significant at 1 percent), which implies a 7.3-fold increase.

Cities with two or more theaters before 1801 also experienced a larger increase in high-quality operas after they had adopted copyrights. Cities with two or more theaters in 1800 created 0.3 additional popular operas per year with copyrights (Table 8, column 3, significant at 5 percent). Controlling for a separate linear pre-trend for cities with two or more theaters leaves this estimate nearly unchanged at 0.3 (Table 8, column 4, significant at 5 percent). Cities with two or more theaters also created 0.4 additional durable operas per year after 1800 (Table 8, column 5, significant at 10 percent).
Alternative specifications with the number of seats further confirm these results (Appendix Table A10). For example, cities with 1,000 or more seats in 1800 produced 1.8 additional after 1800 (Appendix Table A10, column 1, significant at 1 percent).

8. Conclusions

This paper has exploited the adoption of copyright laws across eight states within Italy – as a result of variation in the timing of Napoléon’s military victories – to examine the effects of copyrights on creativity. Comparing changes in the creation of new operas across states with and without copyrights we find that the adoption of basic copyright laws led to a 1.5-fold increase in the creation of new operas. Moreover, states also produced also better operas with copyrights – measured both by their contemporary popularity and by their durability. These results suggest that laws which provide basic levels of copyright protection can raise both the level and the quality of creative work.

Importantly, however, we find no evidence for positive effects of copyright extensions. Data on repeat performances of opera show that only a small number of exceptionally durable works are still valuable after the initial terms of copyrights expire (in our data after 39 years). While copyright adoptions are consistently associated with improvements in both levels and in quality, copyright extensions are associated with no significant benefits. These findings carry important implications for recent extensions in copyright terms, and they suggest that further extensions of copyright terms will harm, rather than encourage creativity.

Our results also have implications for intellectual property rights more generally, and in particular for patents. Intuitively, the narrow scope of copyrights avoids major problems with the current patent system. Overly broad patents fuel litigation by raising the risk that inventors unintentionally infringe on existing patents. Recent decisions of US courts have rejected attempts to assert broad patents, effectively narrowing the scope of patents. Narrowly-defined patents are more similar to copyrights, and our findings suggest that such changes can encourage innovation.

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References:


Li, Xing, Megan MacGarvie, and Petra Moser. 2014. ‘Dead Poets’ Property - How Does Copyright Influence Price?”, *SSNR Working Paper*. 


<table>
<thead>
<tr>
<th></th>
<th>Lombardy &amp; Venetia</th>
<th>Other States</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>All operas (N=677)</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1781-1820</td>
<td>3.063</td>
<td>1.717</td>
</tr>
<tr>
<td>1781-1800</td>
<td>1.575</td>
<td>1.350</td>
</tr>
<tr>
<td>1801-1820</td>
<td>4.550</td>
<td>2.083</td>
</tr>
<tr>
<td><strong>Historically popular operas</strong></td>
<td>Annals of Opera (N=62)</td>
<td></td>
</tr>
<tr>
<td>1781-1820</td>
<td>0.363</td>
<td>0.121</td>
</tr>
<tr>
<td>1781-1800</td>
<td>0.125</td>
<td>0.083</td>
</tr>
<tr>
<td>1801-1820</td>
<td>0.600</td>
<td>0.158</td>
</tr>
<tr>
<td><strong>Long-lived operas</strong></td>
<td>Available on Amazon in 2014 (N=42)</td>
<td></td>
</tr>
<tr>
<td>1781-1820</td>
<td>0.225</td>
<td>0.088</td>
</tr>
<tr>
<td>1781-1800</td>
<td>0.025</td>
<td>0.025</td>
</tr>
<tr>
<td>1801-1820</td>
<td>0.425</td>
<td>0.150</td>
</tr>
</tbody>
</table>

*Notes: Lombardy & Venetia* adopted copyright laws after 1801, when they first came under French rule. *Other States* include Sardinia, Modena and Reggio, Parma and Piacenza, Tuscany, Papal States and Sicily. *Historically popular operas* include 62 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 42 operas created between 1781 and 1820 and were for sale on Amazon in March 2014. Data include 677 new operas created between 1781 and 1820 across eight Italian states within the year 1900 borders of Italy.
## Table 2 – Comparison of Observable Characteristics for Lombardy & Venetia Before Copyrights with the Control States

<table>
<thead>
<tr>
<th></th>
<th>Lombardy and Venetia</th>
<th>Other States</th>
<th>Difference</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Panel A: Population, Urbanization, and GDP in 1800</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Population (in millions)</td>
<td>3.179</td>
<td>2.980</td>
<td></td>
</tr>
<tr>
<td>Cities with &gt; 5,000 people</td>
<td>15.500</td>
<td>15.800</td>
<td></td>
</tr>
<tr>
<td>Urbanization rate</td>
<td>17.500</td>
<td>16.900</td>
<td></td>
</tr>
<tr>
<td>GDP per capita</td>
<td>1,450.000</td>
<td>1,386.000</td>
<td></td>
</tr>
<tr>
<td><strong>Panel B: Pre-Existing Infrastructure and Demand for Opera</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Theaters</td>
<td>5.556</td>
<td>5.550</td>
<td>-0.056</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>(1.248)</td>
</tr>
<tr>
<td>Theaters performing opera</td>
<td>2.111</td>
<td>1.875</td>
<td>-0.236</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>(0.526)</td>
</tr>
<tr>
<td>Theater seats</td>
<td>4,730.111</td>
<td>4,284.250</td>
<td>-445.861</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>(917.827)</td>
</tr>
<tr>
<td>Composers</td>
<td>0.545</td>
<td>0.643</td>
<td>0.974</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>(0.628)</td>
</tr>
<tr>
<td>Theaters/city</td>
<td>1.222</td>
<td>0.875</td>
<td>-0.347</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>(0.382)</td>
</tr>
<tr>
<td>Theaters performing opera/city</td>
<td>0.444</td>
<td>0.313</td>
<td>-0.132</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>(0.240)</td>
</tr>
<tr>
<td>Theater seats/city</td>
<td>1,046.667</td>
<td>695.813</td>
<td>-350.854</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>(432.890)</td>
</tr>
</tbody>
</table>

*Notes: Lombardy & Venetia* adopted copyright laws in 1801, after they had fallen under Napoleonic rule. *Other States* include Sardinia, Modena and Reggio, Parma and Piacenza, Tuscany, Papal States and Sicily. In Panel A, 1800 *Population, Number of cities with > 5,000 inhabitants* and *Urbanization rate* – computed as the ratio between population living in cities and population living in countryside – are in authors’ calculation from estimates of Malanima (2015); *GDP per capita in 1800* is in 1990 PPP USD and is from authors’ calculation of estimates of Romani (1982), Felloni (1959) and Ostuni (1992); and *Extension* is authors’ calculation from Ciccarelli and Fenoaltea (2010). In Panel B, columns 1 and 2 report the mean of the opera market characteristics variables for Lombardy & Venetia and Other States. Column 3 reports the results of a *t*-test for mean equality between Lombardy & Venetia and Other States in 1800.
between 1781 and 1820 across eight Italian states within the year 1900 borders of Italy. The dependent variable is new operas created per state and year measures the number of new operas in state \( i \) and year \( t \) between 1781 and 1820. The indicator variable \( \text{Lombardy \& Venetia} \) equals 1 for Lombardy and Venetia, which adopted copyright laws in 1801, and 0 for other states. The indicator variable \( \text{Post} \) equals 1 for years after 1800. Pre-1801 mean reports the average number of new operas per state and year until 1800. **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.

### Table 3 – OLS and QML Poisson Regressions

<table>
<thead>
<tr>
<th></th>
<th>Column (1)</th>
<th>Column (2)</th>
<th>Column (3)</th>
<th>Column (4)</th>
<th>Column (5)</th>
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</thead>
<tbody>
<tr>
<td>R-squared</td>
<td>0.72</td>
<td>0.80</td>
<td>0.80</td>
<td>0.819</td>
<td>0.800</td>
</tr>
<tr>
<td>N (year-state pair)</td>
<td>320</td>
<td>320</td>
<td>320</td>
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<td>Pre-1801 mean</td>
<td>0.320</td>
<td>0.406</td>
<td>0.406</td>
<td>0.490</td>
<td>0.406</td>
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<tr>
<td>Linear pre-trend for Lombardy &amp; Venetia</td>
<td>No</td>
<td>No</td>
<td>Yes</td>
<td>No</td>
<td>No</td>
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<tr>
<td>State fixed effects</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>Yes</td>
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<tr>
<td>Year fixed effects</td>
<td>No</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Linear pre-trend</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
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<tr>
<td>State fixed effects</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
</tbody>
</table>

**Robust standard errors in parentheses**

* \( p < 0.1 \)
** \( p < 0.05 \)
*** \( p < 0.01 \)
Historically popular operas

<table>
<thead>
<tr>
<th>Number (1-4)</th>
<th>Share (3-4)</th>
<th>Number (5-6)</th>
<th>Share (7-8)</th>
</tr>
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<tbody>
<tr>
<td>Annals of Operas</td>
<td>Lombardy &amp; Venetia</td>
<td>Lombardy &amp; Venetia</td>
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<tr>
<td>Long-lived operas</td>
<td>0.041</td>
<td>0.014</td>
<td>0.014</td>
</tr>
<tr>
<td></td>
<td>(0.067)</td>
<td>(0.035)</td>
<td>(0.035)</td>
</tr>
<tr>
<td>Historically popular operas</td>
<td>0.094</td>
<td>0.094</td>
<td>0.094</td>
</tr>
<tr>
<td></td>
<td>(0.152)</td>
<td>(0.152)</td>
<td>(0.152)</td>
</tr>
</tbody>
</table>

Notes: The dependent variables are new operas per state and year. The results measure new operas created in state $i$ and year $t$ between 1781 and 1820. Robust standard errors in parentheses. **p<0.01, *p<0.05, *p<0.1.
### Table 5 – All of Italy, 1770-1900, Dependent Variable is New Operas per State and Year

<table>
<thead>
<tr>
<th></th>
<th>(1) OLS</th>
<th>(2) Poisson ATE</th>
<th>(3) Historically popular Annals of Operas</th>
<th>(4) Long-lived operas Amazon</th>
</tr>
</thead>
<tbody>
<tr>
<td>Copyright</td>
<td>2.683*** (0.436)</td>
<td>0.952*** (0.149)</td>
<td>0.188* (0.098)</td>
<td>0.327*** (0.111)</td>
</tr>
<tr>
<td>State FE</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Year FE</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Pre-copyright mean</td>
<td>1.173</td>
<td>1.173</td>
<td>0.123</td>
<td>0.105</td>
</tr>
<tr>
<td>Observations</td>
<td>1,048</td>
<td>1,048</td>
<td>1,048</td>
<td>1,048</td>
</tr>
<tr>
<td>R-squared</td>
<td>0.706</td>
<td>0.370</td>
<td>0.350</td>
<td>0.345</td>
</tr>
</tbody>
</table>

Robust standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1

Notes: The dependent variable *new operas per state and year* measures new operas created in city $i$ and year $t$ between 1770 and 1900. Column 3 reports results for *historically popular operas* in Loewenberg’s (1978) *Annals of Operas*. Column 4 for *long-lived operas* that were still for sale on Amazon in 2014. Copyright is an indicator variable that equals 1 if state $i$ offers copyright protection in that year. Pre-copyright mean reports the mean of the dependent variable for year-state pairs without copyrights. Specification (3) estimates the average treatment effect (ATE) of the conditional fixed effects quasi-maximum likelihood Poisson regression. Data include 2,598 new operas premiered between 1770 and 1900 across eight Italian states within the year 1900 borders of Italy.

### Table 6 – Extensions of Copyright Length, 1770-1900

<table>
<thead>
<tr>
<th></th>
<th>(1) OLS</th>
<th>(2) Poisson ATE</th>
<th>(3) Historically popular Annals of Operas</th>
<th>(4) Long-lived operas Amazon</th>
</tr>
</thead>
<tbody>
<tr>
<td>Copyright Adoption</td>
<td>3.188*** (0.515)</td>
<td>1.078*** (0.129)</td>
<td>0.303*** (0.103)</td>
<td>0.403*** (0.122)</td>
</tr>
<tr>
<td>Extension beyond <em>life+10</em></td>
<td>1.074*** (0.381)</td>
<td>-0.021 (0.180)</td>
<td>0.245*** (0.075)</td>
<td>0.162** (0.066)</td>
</tr>
<tr>
<td>Extension beyond <em>life+30</em></td>
<td>-0.265 (0.753)</td>
<td>-0.266 (0.250)</td>
<td>-0.032 (0.249)</td>
<td>0.109** (0.053)</td>
</tr>
<tr>
<td>State FE</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Year FE</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Pre-copyright mean</td>
<td>1.173</td>
<td>1.173</td>
<td>0.123</td>
<td>0.105</td>
</tr>
<tr>
<td>Observations</td>
<td>1,048</td>
<td>1,048</td>
<td>1,048</td>
<td>1,048</td>
</tr>
<tr>
<td>R-squared</td>
<td>0.710</td>
<td>0.378</td>
<td>0.354</td>
<td>0.345</td>
</tr>
</tbody>
</table>

Robust standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1

Notes: The dependent variable *new operas per state and year* measures new operas created in city $i$ and year $t$ between 1770 and 1900. Column 3 reports results for *historically popular operas* in Loewenberg’s (1978) *Annals of Operas*. Column 4 for *long-lived operas* that were still for sale on Amazon in 2014. Copyright Adoption is an indicator variable that equals 1 if state $i$ offers copyright protection in that year. Extension beyond *life+10/30* is an indicator variable that equals 1 if state $i$ extends copyright length beyond the life of composer plus 10/30 years for heirs. Pre-copyright mean reports the mean of the dependent variable for year-state pairs without copyrights. Specification (3) estimates the average treatment effect (ATE) of the conditional fixed effects quasi-maximum likelihood Poisson regression. Data include 2,598 new operas premiered between 1770 and 1900 across eight Italian states within the year 1900 borders of Italy.
<table>
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<tr>
<th>Columns</th>
<th>Notes: The dependent variable new operas per state and year measures the number of new operas in state i and year t.</th>
<th>OLS (1-3)</th>
<th>ATLE (8)</th>
<th>Poisson log likelihood (5-7)</th>
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<td>(1)</td>
<td>Lombardy &amp; Venetia post 0.468*** 2.034*** 1.924*** 2.354**</td>
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Notes: The dependent variable new operas per state and year for movers and stayers measures the number of new operas created between 1781 and 1820 across eight Italian states within the year 1900 borders of Italy. Likelihood Poisson regression with conditional fixed effects. Data include 677 new operas created between 1781 and 1820. Table 7-OLS and QML Poisson regressions.

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Notes: The dependent variable new operas per state and year for movers and stayers measures the number of new operas created between 1781 and 1820 across eight Italian states within the year 1900 borders of Italy. Likelihood Poisson regression with conditional fixed effects. Data include 677 new operas created between 1781 and 1820. Table 7-OLS and QML Poisson regressions.

Columns (1-4) estimate regressions for new operas by movers (composers who had premiered their first opera in another Italian state). Columns (5-8) report results for stayers (composers who premiered their first opera in the same state where they lived). The variable Lombardy & Venetia equals 1 for Lombardy and Venetia, the two Italian states that adopted copyrights in 1801. The variable post equals 1 for years after 1800. The pre-1801 mean reports the average number of new operas per state and year until 1800. State fixed effects control for variation in opera production at the level of states that is constant over time. Year fixed effects control for variation over time that is shared across states. Columns (1-4) report OLS estimates. Columns (5-8) report average treatment effect (ATE) of a quasi-maximum likelihood Poisson regression with conditional fixed effects. Data include 677 new operas created between 1781 and 1820 across eight Italian states within the year 1900 borders of Italy.
Data include 677 new operas created between 1781 and 1820 across eight Italian states within the year 1900 borders of Italy. The dependent variable in 1801, pre-1810 mean report the average number new operas created per city and year until 1800. The variable Lombardy & Venetia equals 1 for cities in Lombardy and Venetia, the two Italian states of more theaters before 1801. The variable historic operas equals 1 for operas first performed in 1800. The variable Venetia equals 2 for cities in Venetia, which adopted copyright laws in 1801. The variable post equals 1 for years after 1801. The variable 2 theaters equals 1 for cities that had two or more theaters before 1801. The indicator variable post equals 1 for years after 1800. The indicator variable historic operas equals 1 for operas first performed in 1800. The indicator variable Lombardy & Venetia equals 1 for Lombardy and Venetia, the two Italian states that adopted copyrights in 1801. The indicator variable 2 theaters equals 1 for cities with two or more theaters before 1801. The dependent variable new operas per year and city measures the number of new operas in city i and year t between 1781 and 1820 (columns 1-2). Columns (3-4) report results for long-lived operas in Lomwendt’s Annals of Operas. Columns (5-6) report results for historically popular operas in Lomwendt’s Annals of Operas. The dependent variable new operas per city and year measures the number of new operas in city i and year t between 1781 and 1820.

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Notes: The dependent variable new operas per year and city measures the number of new operas in city i and year t between 1781 and 1820. Columns (1-2) report results for historically popular operas in Lomwendt’s Annals of Operas. Columns (3-4) report results for long-lived operas in Lomwendt’s Annals of Operas. The dependent variable new operas per year and city measures the number of new operas in city i and year t between 1781 and 1820. The variable Lombardy & Venetia equals 1 for Lombardy and Venetia, the two Italian states that adopted copyrights in 1801. The indicator variable post equals 1 for years after 1800. The indicator variable 2 theaters equals 1 for cities with two or more theaters before 1801. The dependent variable new operas per year and city measures the number of new operas in city i and year t between 1781 and 1820. The variable Lombardy & Venetia equals 1 for Lombardy and Venetia, the two Italian states that adopted copyrights in 1801. The indicator variable post equals 1 for years after 1800. The indicator variable 2 theaters equals 1 for cities that had two or more theaters before 1801. The dependent variable new operas per year and city measures the number of new operas in city i and year t between 1781 and 1820. The variable Lombardy & Venetia equals 1 for Lombardy and Venetia, the two Italian states that adopted copyrights in 1801. The indicator variable post equals 1 for years after 1801. The indicator variable 2 theaters equals 1 for cities with two or more theaters before 1801. The dependent variable new operas per year and city measures the number of new operas in city i and year t between 1781 and 1820. The variable Lombardy & Venetia equals 1 for Lombardy and Venetia, the two Italian states that adopted copyrights in 1801. The indicator variable post equals 1 for years after 1800. The indicator variable 2 theaters equals 1 for cities with two or more theaters before 1801. The dependent variable new operas per year and city measures the number of new operas in city i and year t between 1781 and 1820. The variable Lombardy & Venetia equals 1 for Lombardy and Venetia, the two Italian states that adopted copyrights in 1801. The indicator variable post equals 1 for years after 1800. The indicator variable 2 theaters equals 1 for cities with two or more theaters before 1801. The dependent variable new operas per year and city measures the number of new operas in city i and year t between 1781 and 1820.
Notes: The grey area covers Lombardy and Venetia, which adopted copyrights in 1801 after they had fallen under French rule. We use Italy’s borders in 1900 to define the country of Italy and the borders drawn by the Congress of Vienna in 1815 to draw state borders within Italy. Shapefiles for Italy from the Italian National Institute for Statistics.
Notes: Data include 677 new operas created in state $i$ and year $t$ between 1781 and 1820. Lombardy & Venetia adopted copyright laws in 1801, after they had fallen under Napoleonic rule. Other States include Sardinia, Modena and Reggio, Parma and Piacenza, Tuscany, Papal States and Sicily.
Notes: 95% confidence intervals for $\beta_i$'s coefficients in the OLS regression $\text{opera}_{it} = \sum \beta_r \text{Lombardy & Venetia}_i \times \text{year}_r + \varphi_i + \delta_t + \epsilon_{it}$ where the dependent variable counts new operas in state $i$ and year $t$. The variable $\text{year}_r$ indicates years between 1791 and 1820; years between 1781 and 1790 are the excluded period. $\varphi_i$ are state fixed effects and $\delta_t$ are year fixed effects.
Notes: The solid line for *Lombardy* plots the observed number of operas per year in Lombardy. The interrupted line for the *Synthetic Lombardy* plots operas per year for a counterfactual (synthetic) Lombardy *without copyrights*, using propensity score matching (as in Abadie and Gardazabal 2003).
Notes: Performances per year for the first 100 years since the premiere for 165 operas that premiered across Italy between 1781 and 1800 and entered Loewenberg’s (1978) *Annals of Operas*. Performances to the left of the vertical line would be on copyright under a regime of life + 10, which Lombardy and Venetia began to offer in 1801. The expected length of copyright under life + 10 equals 39.23 years: 10 years plus the expected remaining years of a composer of the average age at the time of the premiere (See Appendix Table A1 for life table calculations)
Figure 6 – New Operas Premiered per State and Year in Lombardy and Venetia, 1820-1900

Notes: Lombardy & Venetia adopted copyright laws in 1801, after they had fallen under Napoleonic rule. The vertical lines correspond to the bilateral treaty between Kingdom of Sardinia and Austria of 1840 that extended copyright length from life+10 to life+30, and to the Italian copyright law of 1865 that extended copyright length from life+30 to life+40. Data include 580 new operas that premiered between 1781 and 1820 across eight Italian states within the year 1900 borders of Italy.