

Copyrights and Creativity: Evidence from Italian Opera in the Napoleonic Age

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This paper exploits variation in the adoption of copyrights within Italy—due to the timing of Napoléon’s military victories—to investigate the causal effects of copyrights on creativity. Baseline regressions compare changes in opera production across Italian states with and without copyrights. This analysis yields three main results. First, the adoption of copyrights led to a significant increase in the number of newly created operas. Second, copyrights raised the quality of new operas, measured both by their immediate success and by their longevity. Third, there were no benefits from copyright extensions beyond the life of the original creator.

Copyrights establish intellectual property rights in creative goods ranging from literature and science to images, film, and music. According to

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US law, “the primary purpose of copyright law is to foster the creation and dissemination of intellectual works” (Register of Copyrights 1961, 5). Yet systematic empirical evidence on the effects of copyrights on creativity continues to be scarce. Existing analyses of copyrights have exploited variation in exposure to piracy but found no significant effects on sales or on the quality of popular music (Oberholzer-Gee and Strumpf 2007; Waldfoegel 2012). Starting from low levels of existing protection, stronger copyrights have been shown to raise the price of content in literature (Li, MacGarvie, and Moser 2018) and science (Biasi and Moser 2020).¹ Analyses of book contracts further suggest that stronger copyrights increase payments to authors (MacGarvie and Moser 2015). Despite these contributions, however, existing research has been unable to identify the causal effects of copyrights on the creation of new works.

This paper exploits exogenous variation in the adoption of copyright laws—as a result of the timing of Napoléon’s military victories in Italy—to examine the 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, which adopted French laws. In 1801, the Republic adopted France’s copyright laws of 1793, granting composers exclusive rights for the duration of their lives, plus 10 years for their heirs (Legge 19 Fiorile anno IX repubblicano, Art. 1–2; Repubblica Cisalpina 1801). In 1804, France replaced its system of feudal laws and aristocratic privilege with the *code civil*, a codified system of civic laws. The code left copyrights intact where they already existed but did not introduce them in states without copyright laws. As a result, only Lombardy and Venetia offered copyrights until the 1820s (Foà 2001b, 64), while all other Italian states that came under French rule after 1804 had no copyrights, even though they shared the same exposure to French rule, as well as the same language and culture.²

The empirical analysis examines rich new data on 2,598 operas that composers created across eight Italian states between 1770 and 1900.³

¹ Li, MacGarvie, and Moser (2018) find that extensions in the length of copyrights increase the price of books by improving publishers’ ability to practice intertemporal price discrimination. For music, Scherer (2004, 195–96) compares the number of composers across countries with and those without copyrights but finds no effects of copyrights on country-level counts of composers.

² Acemoglu et al. (2011) show that German states that were more exposed to occupation by France (and thereby the *code civil*) experienced higher rates of subsequent growth. While the current analysis focuses on copyrights, we also estimate robustness checks with controls for variation in exposure to French rule.

³ We based the beginning and end of our sample on the periodization of opera: 1770 is the beginning of the *bel canto* period, characterized by a vocal technique that emphasizes beauty of sound over dramatic expression; 1900 is the final year of *verismo*, a period of realism associated with composers such as Giacomo Puccini.

These data offer a unique opportunity to examine the effects of copyrights on creativity. First, because opera is a public art form for which output is easily observed, records of new pieces are exceptionally complete. Moreover, because aficionados of operas have created unparalleled archival records on notable performances, it is possible to create alternative measures for the “quality” of operas, capturing variation in both the immediate popularity and the durability of operas. These features of opera create an exceptional measure for analyses of creativity that would be impossible to replicate in modern data.

Baseline estimates compare changes after 1801 in the number of new operas across Italian states with and those without copyrights. These estimates indicate that the adoption of basic copyright laws led to a substantial increase in the creation of new operas. Ordinary least squares (OLS) estimates show that Lombardy and Venetia created 2.2 more new operas per year after 1801 than Italian states without copyrights. Relative to a pre-1801 mean of 1.4 operas, this implies a 157% increase in the creation of new operas. These estimates are robust to a broad range of alternative specifications. Even when we exclude Milan and Venice (the cultural centers of Lombardy and Venetia, respectively), we find a 66% increase in the creation of new operas. Importantly, pre-1801 trends in the creation of new operas are comparable for Italian states with and without copyrights. Moreover, states with and those without copyrights are similar in terms of the preexisting demand for opera (measured by the number of theaters and by the number of theater seats) as well as in terms of population, GDP per capita, and urbanization.

In addition to influencing the number of new operas, copyrights may change the “quality” of creative work by encouraging composers to create pieces that are more profitable.⁴ Without copyrights, composers are paid only when they deliver the work and derive no extra benefits from future performances. Copyrights, which grant composers the right to charge theaters every time they perform a piece, strengthen composers’ incentives to create works that are more popular and durable.⁵ Historical letters and contracts between composers and theater managers document that composers used the 1801 law to extract additional pay for repeat performances. These additional payments increased composers’ wealth, allowing them to spend more time on each piece. For a later period, the poet Ezra Pound (1885–1972) explained that such freedom is critical for encouraging creativity: “The only thing one can give an artist is leisure in

⁴ Importantly, we do not judge the artistic quality of operas and instead focus on their most economically relevant traits.

⁵ Performance rights remained composers’ main source of revenue until the mid-nineteenth century (Scherer 2004, 178). Great Britain adopted performance rights in 1842, and the United States adopted them in 1870 (Scherer 2004, 180).

which to work. To give an artist leisure is actually to take part in his creation” (Pound 1980, 147). Anecdotal evidence suggests that even star composers responded to these types of financial incentives. Gioacchino Rossini (1792–1868), for example, announced that he would produce pieces that had “nothing new in them but the variations” (Beyle 1824, 200–1) when he felt that theaters in Naples paid too little for his operas.

Copyrights did in fact increase the “quality” of operas, defined by their popularity and durability. We construct three complementary measures for these economically important differences in operas. Our first measure uses a standard reference of notable performances (Loewenberg 1978) to capture differences in the immediate historical success and popularity of an opera. The second measure identifies operas that were popular and durable enough to be performed at least once at the Metropolitan Opera House in New York in the twentieth and early twenty-first centuries. The third measure investigates the most durable operas that are still available for purchase on Amazon in the 2010s. Analyses for all three measures suggest that copyrights changed the quality of operas, by encouraging composers to create more popular and durable works.

Composer-level regressions confirm the main results. Controlling for differences in the productivity of individual authors, composers created twice as many new operas when they had copyrights. Importantly, there is no evidence for a brain drain from other Italian states to Lombardy and Venetia after 1801. Instead, we find that the adoption of copyrights encouraged Italian-born émigré composers to return to Lombardy and Venetia after 1801. Even when return migrants are controlled for, however, other Italian composers who had never worked abroad produced more operas when they had copyrights. Return migrants, who were more productive than the average composer, made substantially larger contributions to the quality than to the quantity of operas.

Between 1826 and 1840, all remaining states adopted copyrights as part of Italy’s process toward unification; we find that these copyright adoptions were associated with an increase in creativity. Most, if not all, of these changes were driven by political processes leading to Italy’s unification in 1861, unrelated to the creation of new operas. Confirming the main results, Italian states produced more new operas when they had copyrights. They also produced more popular and durable works.

Copyright extensions, however, appear to have minimal effects on creativity, at best. In 1998, the “Mickey Mouse” Copyright Term Extension Act increased US copyrights from the duration of the creator’s life plus 50 years to life plus 70 years.⁶ These extensions are set to expire in 2023,

⁶ From 75 to 95 years for corporate owners. See Pub. L. No. 105-298, 112 Stat. 2827 (1998), codified as amended, 17 U.S.C. §§ 108, 203, 301–304.

setting the stage for discussions on further increases in the length of copyrights. Compared with those today, nineteenth-century extensions started from much lower levels, increasing copyrights from a base of the composer's life plus 10 years for their heirs. Even in this setting, we find that extensions were associated with a decline in creative output.

We use performance data to show that few pieces are durable enough to benefit from copyright extensions beyond the author's life. In that case, the dynamic costs of long-lived copyrights for future creativity outweigh the benefits of longer terms. Recent research on copyrights has documented these costs. For example, Nagaraj (2018) shows that copyrights discourage the reuse of images on Wikipedia. Examining the case of US science, Biasi and Moser (2020) show that copyrights discourage the creation of new science by raising the costs of accessing existing work.

Did copyrights interact with preexisting demand for entertainment? We answer this question by exploiting detailed city-level data on theaters and theater seats. These data indicate no significant differences in the level or the trend of preexisting demand between states with and those without copyrights until 1801. Instead, we find that cities with a better preexisting theater infrastructure benefitted more from copyrights.

To investigate the generalizability of our findings, a final section examines the effects of copyrights on librettos and on a broader set of musical compositions, including symphonies, operettas, and songs. Under the 1801 copyright law, opera scores and librettos received separate copyrights. Like composers, librettists benefitted from this change and were able to extract more revenue from their work. Repeating our main analyses, we find that copyrights encouraged the creation of new librettos, measured by both the count of new librettos and the share of operas that used a new libretto. We also find that the adoption of basic copyright protection encouraged the creation of new musical works, confirming the finding based on operas. Taken together, these results suggest that the adoption of copyrights encouraged creativity for larger set of creative goods beyond operas, including their literary text and other types of musical compositions.

The remainder of this paper is structured as follows. Section I summarizes the relevant historical background and outlines changes in copyright laws. Section II introduces the main data set. Section III checks the identifying assumption and presents baseline estimates and robustness checks. Section IV investigates changes in the quality of music. Section V presents composer-level regressions. Section VI examines copyright adoptions and extensions across all of Italy between 1826 and 1865. Section VII investigates interactions with preexisting infrastructure and demand. Section VIII explores the effects of copyrights on a broader set of musical compositions, and section IX concludes.

I. Historical Background

Opera was an exceptionally popular form of entertainment in eighteenth- and nineteenth-century Europe. Beyle (1824, 9), describes the scene at a performance of Rossini's *La Scala di Seta*:

[A]n 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.

Theaters were 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, 155).⁷

Composers typically took 4–8 weeks to create a new opera. During this time, they worked closely with singers and the orchestra at the commissioning theater (Valle 1823, 157; Moore 1854, 823). The Teatro Torre Argentina in Rome, for example, commissioned Gioacchino Rossini to compose *Il Barbiere di Siviglia* on December 17, 1815. Rossini stayed in Rome, and *Il Barbiere* premiered there roughly 6 weeks later, on February 5, 1816 (Panico 2002, 62). In 1819, Rossini complained, "you know very well that scarcely six weeks are allowed me to compose an opera" (Moore 1854, 823).

A. *Without Copyrights, Composers Received No Pay for Repeat Performances*

Without copyrights, composers were paid only for the initial composition of the opera and had no legal right to demand additional fees when their works were performed again after the first performance. Piracy was rampant, and *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

⁷ Sections I.F and I.G discuss the interactions between composers, *impresarios*, and librettists.

he could get one elsewhere at half the asking price. (Rosselli 1996, 74).⁸

Under these conditions, composers would “recycle some of the music in another opera and another town” (Rosselli 1996, 74).

B. Napoléon’s Military Campaign in Northern Italy

Napoléon’s military campaign brought copyright laws to 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, Napoléon defeated Sardinia’s King Vittorio Amedeo III in the battles of Cairo Montenotte, Dego, Millesimo, and Cosseria (in Liguria, a region in the northwest 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 14.⁹ 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, Great Britain, Russia, Turkey, and Sweden formed 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 (Pécout 1999, 138).

C. Lombardy and Venetia Adopted Copyrights in 1801

In 1793, France passed a copyright law to replace royal privileges, which had been abolished by the French Revolution four years before (app. B;

⁸ In 1782, Mozart wrote to his father that he felt indebted to the Baron von Riedesel, who had bought the score for *Die Entführung aus dem Serail* from him instead of acquiring a cheaper version from a copyist (Scherer 2004, 167).

⁹ France had declared war on 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.

apps. A and B are available online).¹⁰ On May 9, 1801, Legge no. 423 (Repubblica Cisalpina 1801) extended this law to Lombardy and Venetia.¹¹ The 1801 law granted exclusive 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.¹²

Because of the timing of Napoléon's military victories, only Lombardy and Venetia adopted France's copyright law. On March 21, 1804, the Parliament of France adopted the (Napoleonic) *code civil*, which was extended to all French dominions, including Lombardy and Venetia. 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 same *code civil*, but without copyrights (Foà 2001b, 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

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 5 years. The 1791 law was codified as Article 428 of the *code pénal* of 1810.

¹¹ Even though Venice and other parts of Venetia had been granted to the King of Austria in the Treaty of Luneville in 1801 and officially remained under Austrian control until the Treaty of Pressburg in 1805, copyrights and other laws of the Cisalpine Republic applied to Venetia in 1801. A description of the locations where the laws of the Cisalpine Republic apply in 1801 specifically includes Venice and territories in Venetia (in the *Raccolta di Tutte le Leggi ossia di Tutti i Proclami, Editti ed Avvisi della Repubblica Cisalpina* of 1807, reported in app. B). Also see Foà (2001a, 313) who writes that "after Milan and Venice in 1801, the other major Italian city to adopt a copyright law was Rome in 1826." To check whether other laws of the Cisalpine Republic may have influenced the creation of new operas, we examined all 414 laws, edicts, and public announcements in the Cisalpine Republic between 1797 and 1805 in the 1807 *Raccolta*. None of these laws relate to copyrights or other elements of artistic creativity. Instead, laws such as "Per la Consegna del Grano Turco" govern the delivery of corn, wheat, and other crops and define other elements of public order.

¹² Legge 19 Fiorile anno IX repubblicano, Art. 1–2 (Repubblica Cisalpina 1801). See app. B for the original text of all laws and our translations.

¹³ Tuscany, the Papal State, and the Two Sicilies repealed the *code civil* in 1819 (Code Civil Italien 1896 [1865], xxiv).

survived the 1815 Congress of Vienna, which placed Lombardy and Venetia under the rule of Kaiser Franz I of Austria.¹⁴ Foà (2001b, 62) explains:

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.

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, the Kingdom of 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 (Tuscany), the Papal State, and the Kingdom of the Two Sicilies (Two Sicilies; fig. 1).¹⁵

Operas that had premiered in either Lombardy or Venetia were protected in Lombardy and Venetia but not in other states. Censors, whose main role was to judge the content of an opera (and eliminate “blasphemous” references to religions) were the first line of defense against illegal reproductions. “Since the censors had to approve all new publications, anyone could apply directly to them to stop publication of a work” (Jensen 1989, 16). In a letter to Ricordi, Bellini describes how the Governor of Catania stopped a pirated performance of *La Sonnambula* and confiscated its score:

I see that you’re always thinking of the pirates of our *Sonnambula*: and do you believe that I sleep? I learned for a fact that the impresario in Catania named Andreaci, not being able to have the score . . . from you for a small price, had the score compiled and orchestrated . . . thereby he wanted to present it on the stage in Catania: the Governor, or Intendent of said city has been advised, and not only will he not permit it to be given, but if he is able, he will try to sequester the counterfeit score to punish the criminal for his crime. (February 18, 1832, cited in Jensen 1989, 19)

¹⁴ *Codice civile universale austriaco pel Regno Lombardo-Veneto* (Regno Lombardo-Veneto 1815). The Austrian civil legislation (*Allgemeines Bürgerliches Gesetzbuch*) reintroduced exceptions to the principle of equality but left property rights intact (Soresina 2018).

¹⁵ The Congress of Vienna also created the Duchy of Lucca. Because Lucca remained under the influence of Tuscany and was annexed by Tuscany in 1848, we treat Lucca as a part of Tuscany.



FIG. 1.—Map of Italy with borders established by the Congress of Vienna (1815); from https://www.age-of-the-sage.org/history/1848/italy_revolution.html.

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 (table A1; tables A1–A18 are available online). 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 states. 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, 353) writes about a pirated performance of Donizetti's *Roberto Devereux*, which had premiered in Naples in 1837: "A pirated version of it was sung at the Teatro Re, Milan, late in 1837 or early in 1838."

D. With Copyrights, Composers Were Paid for Repeat Performances

The 1801 law entitled composers to charge royalties for repeat performances, starting with the first repeat performance after the premiere (e.g., Jensen 1989, 8–10, 31). Systematic data on nineteenth-century authors show that payments to authors increased in response to stronger copyrights (MacGarvie and Moser 2015). Contracts between impresarios and composers document comparable improvements in composers' pay as a result of the adoption of copyright in 1801. For example, the composer Giuseppe Mosca (1772–1839) entered a contract with the impresario Francesco Benedetto Ricci of Milan's Alla Scala theater in 1802, to compose the opera *Chi Vuol Troppo Veder Diventa Cieco*. Their contract specifies, "Francesco Benedetto Ricci is obliged to pay Giuseppe Mosca the sum of 3,500 francs for the score and 250 francs for each repeat performance in the current season" (contract between Francesco Benedetto Ricci and Giuseppe Mosca, January 16, 1802, Archivio dello Stato Centrale, carte sciolte no. 6268; fig. A1, panel A; figs. A1–A6 are available online). Writing from Venice in 1803, three years after the adoption of copyrights, the composer Stefano Pavesi (1779–1850) uses a reference to the Venetian copyright law to demand additional pay from the Teatro Regio in Turin:

It is not that I disregard your offer of 3,000 francs. But it is less than the pay I could get in Venice. There, I receive a sum of 200 francs for each repeat performance of my work since 1801. (Stefano Pavesi to Giacomo Pregliasco, November 3, 1803, Archivio dello Stato Centrale, carte sciolte no. 6253; fig. A1, panel B).

Another composer, Giovanni Pacini (1796–1867), acknowledges an offer from the impresario Angelo Petracchi at the Alla Scala in Milan. In his letter to Petracchi, Pacini explicitly accepts payments for repeat performances, starting from the current season:

Acknowledging the proposal you made on behalf of Alla Scala Theater in Milan for the Carnival season of 1820, I am delighted to accept 6,000 francs for the composition and 300 francs for each repeat performance starting in the same Carnival season of 1820. (Giovanni Pacini to Angelo Petracchi, December 12,

1819, Archivio dello Stato Centrale, carte sciolte no. 6261; fig. A1, panel C).

Ubertazzi (2000, 47–48) confirms this increase in payments to composers as a consequence of the adoption of copyrights in Lombardy and Venetia:

[W]hile the Teatro Regio in Torino had started to become very famous at the beginning of the 19th century, it faced no small challenge to attract successful composers, due to the absence of a copyright law compared with La Scala in Milan and La Fenice in Venice.

E. Other Italian States Adopt Copyrights Starting in 1826

On September 28, 1826, an edict by Pope Leo XII (Editto no. 433; app. B) established exclusive rights in compositions, books, and other types of media for the duration of their creator'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 no. 1904, February 5, 1828). 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, May 22, 1840; app. B). Sardinia had emerged as a political leader in Italy's fight for independence (Pécout 1999, 158), and within weeks, all the other Italian 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 plus 10 years to life plus 30 and in the Papal State from life plus 12 years to life plus 30.¹⁶

On March 17, 1861, five states—Lombardy, Modena, Parma, Tuscany, and the Two Sicilies—joined Sardinia to form the Kingdom of Italy

¹⁶ Verdi and his publisher Ricordi used copyrights to levy hefty fees for each performance (of 400 francs, roughly 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, 179). Verdi accepted the scheme, and Ricordi enforced it through a team of field agents.

(Pécout 1999, 170). On June 25, 1865, the Kingdom's first copyright law extended copyrights from life plus 30 years to life plus 40 (Legge no. 2337; June 25, 1865; app. 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 no. 3300, November 4, 1866). On September 20, 1870, after the Breach of Porta Pia, Vittorio Emanuele II annexed the Papal State to the Kingdom of Italy (Pécout 1999, 183–89). A decree on October 9 (Regio Decreto no. 5903, October 9, 1870) extended the Kingdom's laws to the Papal State.

Now all of Italy offered copyrights for the composer's life plus 40 years.

F. Interactions between Composers, Impresarios, and Publishers

Impresarios and publishers played an important part in helping composers to extract profit from their copyrights, and both benefitted from reduced competition as a result of copyrights. Without copyrights, commissioning impresarios faced intense competition from other theaters, who did not have to pay for the commission but could copy and freely perform an opera if it turned out to be successful. With copyrights, composers and their impresarios had the right to forbid unauthorized repeat performances of their work (Art. 7 of the 1801 copyright law). Exclusive rights to a new opera improved the commissioning impresario's ability to practice intertemporal price discrimination and extract a larger share of the consumer surplus created by new operas.¹⁷ As we document in section I.D, theaters passed some of these extra profits on to composers, increasing their compensation.

Over time, prominent publishers, such as the famous Casa Ricordi (founded in 1808), also began to take a more active role in helping composers to exploit copyrights, and publishers and composers often worked together to protect their interests. Vincenzo Bellini (1801–35) “and his Milanese publisher (Ricordi) did not enjoy a warm relationship from their first association, but it developed during a joint effort to fight pirated scores and the closely related matter of unauthorized performances” (Jensen 1989, 5). Jensen (1989, 14) explains that “publishers kept tight control of all full scores and required rental fees for scores which someone wished to perform.”

¹⁷ Li, MacGarvie, and Moser (2018) show that extensions in the lengths of copyrights in nineteenth-century England enabled publishers to practice intertemporal price discrimination and charge higher prices for Romantic period literature.

Some composers would sell their rights to publishers, who were in a better position to maximize returns. Bellini, for example, offered Ricordi the rights to all the works he would write from 1835 to 1838; Ricordi offered a similar contract to Verdi (Jensen 1989, 31). Alternatively, theaters would acquire rights to rent performance materials (*spartiti*) and printing rights (*riduzioni*) from the composer at the time of the premiere and then market these rights to publishers (Jensen 1989, 8–10). In 1841, Alla Scala's impresario Merelli sold the performance rights to Verdi's first opera, *Oberto*, to Ricordi to raise the necessary capital for production. When theaters could not afford to pay the fees of Italy's favorite composers, they would turn to publishers for additional funds (Jensen 1989, 89). Such three-way agreements between the composer, the impresario, and the publisher became common after 1845, when Ricordi won a comprehensive contract with Alla Scala (Jensen 1989, 11, 19–20), but they were less common in the early 1800s, which are the focus of our analysis.

Performance rights remained composers' main source of revenues until the 1850s:

[I]t 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 *Rigoletto*. (Scherer 2004, 178)

G. Collaborations between Composers and Librettists

In the eighteenth and nineteenth centuries, “the writing of opera libretti was a precarious business. An impresario would employ one or more ‘poets,’ sometimes on a contracted basis with a salary, but often on a more casual basis” (Black 1984, 4). While successful librettists such as Felice Romani (1777–1841) became paid staff of a theater, “most librettists were theatrical hangers-on, amateurs or professionals” (Black 1984, 5).¹⁸ More

¹⁸ Many successful librettists were full-time professionals. Felice Romani (1778–1865), e.g., was hired as a “*poeta di teatro*” at least once in 1824 by the impresario Glossop at Alla Scala in Milan (Roccatagliati 1996, 116). Gaetano Rossi (1774–1855) was first hired as *poeta di teatro* at La Fenice Theater in Venice and then became director of the Philharmonic Theater of Verona (Audino 2001, 348–49). Andrea Leone Trottola (died in 1831) was the official poet of the royal theaters in Naples and a librettist for the impresario Domenico Barbaia (1777–1841) when he joined the San Carlo theater in Naples (Black 1996, 772–73). This is in sharp contrast to Venetian opera between 1636 and 1670, when most librettists were “amateurs” (Glixon and Glixon 2006, 110–11). Some were nobles, but many had day jobs, frequently as attorneys. The librettist Niccolò Minato (1627–98), e.g., explained “you should know that I am not a poet by profession. My attentions [sic] lie in the courts; to serve who may command me, I have robbed myself of some hours of sleep to give you this drama.”

typically, the life of nineteenth-century librettists was a “history of dignified misery, improvable only if they could steadily work with a successful composer” (Bianconi and Pestelli 1987, 259). Nineteenth-century composers began to give librettists specific guidance about changes in the text (Bianconi and Pestelli 1987, 264–65). By the 1830s, an increasing number of composers chose their own librettist, further shifting balance of power in favor of composers (Bianconi and Pestelli 1987, 269).¹⁹

Importantly, the 1801 law granted separate copyrights for the score and the libretto (Art. 1; app. B; Giulini 2001, 260). Unlike composers—who received additional payments for performance rights—librettists continued to receive only lump-sum payments from the theater (Roccatagliati 1996, 117). Copyrights, however, improved librettists’ ability to derive additional income from the sale of physical copies of their work (Giulini 2001, 261). Like composers, librettists also began to rely on publishers to profit more from copyrights. In 1812, for example, Luigi Romanelli (1751–1839) signed an exclusive contract with Ricordi to publish the libretto of *Tancredi*, which had premiered at Alla Scala a few weeks earlier. Ricordi paid Romanelli 1,000 Milanese lira for the first 100 printed copies and 50 Milanese lira for each additional copy (fig. A1, panel D).

II. Data

Our data comprise 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 of its premiere, and three alternative measures of quality, defined by popularity and durability.²⁰ These data cover Lombardy and Venetia as well as six other Italian states that did not adopt copyrights in 1801: the Kingdom of Sardinia, the Duchy of Modena, the Duchy of Parma, the Grand Duchy of Tuscany, the Papal State, and the Kingdom of Two Sicilies. 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 no. 423; Repubblica Cisalpina 1801). The original text of these laws and our translations are available in appendix B.

¹⁹ The contemporary American composer John Adams (2008, 221–22) explains that the composer is necessarily the dominant partner in the creation of an opera: “In making an opera the librettist invariably feels cheated or disrespected. But the composer is responsible for so much more than the librettist. The music is what determines the ultimate form and feel of the piece.” Adams also explains why such collaborations are difficult: “Artistic collaboration is never easy. On occasion it has occurred to me that, next to double murder-suicide, it might be the most painful thing two people can do together.”

²⁰ 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, and Zara; these regions had been part of the Austro-Hungarian Empire and became part of Italy in the Treaty of Rapallo in 1920. Italy lost Istria and Zara to Yugoslavia as a result of World War II in 1945; the 1975 Treaty of Osimo affirmed this change.

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* (Grove 2001), 1770 is the beginning of the *bel canto* period. Italian for beautiful singing, *bel canto* denotes a vocal technique that emphasizes beauty of sound over dramatic expression. *Bel canto* composers include Gioacchino Rossini (1792–1868), Vincenzo Bellini (1801–35), and Gaetano Donizetti (1797–1848). Our sample ends in 1900, the final year of the Italian *verisimo* period. Derived from the Italian *vero* (“true”), the *verisimo* is the period of artistic realism, exemplified by Giacomo Puccini (1858–1924).

A. *New Operas across Eight Italian States, 1770–1900*

To collect data on the creation of new operas, we have searched five standard reference books for operas by Italian-born composers. Carlo Dassori's (1903) *Opere e Operisti: Dizionario Lirico* includes 1,353 operas, by 544 Italian-born composers, that premiered between 1770 and 1900. Extending these data, Loewenberg's (1978) *Annals of Opera* includes 254 operas by 90 Italian-born composers between 1770 and 1900. A third reference book, Corrado Ambiveri's (1998) *Operisti Minori dell'Ottocento Italiano* adds “minor” operas that were performed by city orchestras; Ambiveri lists 71 premieres by 45 Italian-born composers between 1770 and 1900.²¹ Among these three 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.

To complement these data, we have also searched the *New Grove Dictionary of Music and Musicians* (Grove 2001) and Treccani's (2001) *Enciclopedia Italiana di scienze, lettere ed arti* for works by Italian-born composers; this search adds another 880 operas by the 705 Italian-born composers in our data. As an additional data check, we compared a complete list of 89 composers whose last names begin with B or D and who are listed in Dassori (1903), Loewenberg (1978), or Ambiveri (1998) with a list of all entries for B and D in the *New Grove*. This comparison reveals that our sample includes 80 composers who are missing from the *New Grove*, while the *New Grove* includes no operas that are not included in the first three sources, suggesting that the sum of the first three sources is more comprehensive.

B. *Measures for the Popularity and Durability of Operas*

Three complementary measures capture variation in the popularity and durability of operas. First, to quantify differences in the immediate,

²¹ Ambiveri includes composers born between 1792 (the year when Rossini was born) and 1900 (the end of the *verisimo* period).

historical popularity of operas, we use records of notable performances in Loewenberg's (1978) *Annals of Opera*. According to *Opera Today* (Kaufman 2005), "This volume has long been regarded as the definitive work on the subject. . . . [I]t is a magnificent piece of work, and belongs on the bookshelf of every researcher in the operatic field." Loewenberg records notable premieres and repeat performances between 1597 and 1940. He includes 254 of the 2,598 operas in our data (9.7%).

Our second measure uses performance records for the Metropolitan Opera House (Met) in New York to identify operas that were popular and durable enough to be performed throughout the twentieth century. Moser (2012) uses performances at the Met between 1900 and 1950 to document shifts in ethnic preferences in response to World Wars I and II. We extend data in Moser (2012) to include performances between 1900 and 2014. In our data, 182 of the 2,598 operas (7%) were performed at least once at the Met between 1900 and 2014. We also collect data on performances at a broader set of venues, such as Alla Scala in Milan (1947–2018), the Opéra National de Paris (1900–2018), the Wiener Staatsoper (1955–2018), and the Teatro Colón in Buenos Aires (1908–2018).

A third measure identifies the most durable operas in our sample, on the basis of their availability as complete recordings on Amazon (www.amazon.com) as of 2014. To collect these data, we have searched Amazon for complete recordings of 2,598 operas, using the name of the composer and the name of the opera as the search variables. 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 one. By comparison, a search for Domenico Cimarosa's *Penelope* yields no results, and we record the Amazon dummy to equal zero. A total of 156 operas created between 1770 and 1900 (6% of the 2,598 operas in our data) were still for sale on Amazon in 2014.

C. *Estimating the Expected Length of Copyrights Using the 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 estimating their remaining years of life (table A2). Years of birth and death are available for all 705 composers from Dassori (1903), Ambiveri (1998), and the *New Grove* (Grove 2001). The oldest composer in our data was Giovanni Paisiello (1741–1816); the youngest was Stefano Donaudy (1879–1925). The longest-lived composer was Vincenzo Mela (1803–97), and the shortest-lived was Nicola Manfroce (1791–1813).

On average, Italian-born composers lived to be 59.7 years (with a median of 55 years),²² and they were 33.6 years old at the time of the premiere (with a median of 32 years). Composers of exceptionally popular or durable operas were slightly older, with an average of 35.9 years (median of 36) for operas in Loewenberg (1978) and 35.6 years (median of 34) for operas on Amazon.²³

III. Effects on the Number of New Operas

To examine whether copyrights helped to encourage creativity, we exploit exogenous variation in the adoption of copyrights as a result of the timing of Napoléon's military victories in Italy. This approach allows us to control for unobservable factors, such as shifting aesthetics, or changes in interactions between composers, librettists, and impresarios, which may have encouraged the creation of operas across Italy, independently of copyrights.

A. Identification Strategy

Summary statistics indicate that composers in Lombardy and Venetia created significantly more operas than composers in other states after 1801. 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 afterward.

To systematically compare changes in the creation of new operas in states with and those without copyrights, we estimate OLS difference-in-differences regressions,

$$\text{Opera}_{it} = \beta \text{Lombardy \& Venetia}_i \times \text{Post-1801}_t + \varphi_i + \delta_t + \varepsilon_{it}, \quad (1)$$

where the dependent variable, Opera_{it} , counts newly created operas in state i in year t . The variable $\text{Lombardy \& Venetia}_i$ is an indicator for the two states that adopted copyrights in 1801, and Post-1801_t equals one for years after 1800. State fixed effects φ_i control for variation in output across states that is constant over time, for example, as a result of time-invariant

²² This is slightly below the average for European composers with birth years between 1650 and 1849, which was 64.5 years (Scherer 2004, 8).

²³ These age distributions are also confirmed by information on composers of Italian operas that were performed at the Met in New York between 1900 and 2014. In those data, the average composer was 36.2 years old at the time of the premiere (with a standard deviation of 13.5).

TABLE 1
NEW OPERAS PER STATE AND YEAR ACROSS EIGHT STATES WITHIN ITALY, 1781–1820

	Lombardy and Venetia	Other States
All Operas ($N = 677$)		
1781–1820	3.063	1.717
1781–1800	1.575	1.350
1801–20	4.550	2.083
Historically Popular Operas in Loewenberg (1978; $N = 62$)		
1781–1820	.363	.121
1781–1800	.125	.083
1801–20	.600	.158
Operas Performed at the Met, 1900–2014 ($N = 55$)		
1781–1820	.363	.108
1781–1800	.100	.067
1801–20	.625	.150
Durable Operas on Amazon ($N = 42$)		
1781–1820	.225	.088
1781–1800	.025	.025
1801–20	.425	.150

NOTE.—Lombardy and Venetia adopted copyright laws in 1801. “Other states” are Sardinia, Modena and Reggio, Parma and Piacenza, Tuscany, the Papal State, and Sicily. “Historically popular operas” are 62 operas created between 1781 and 1820 and listed in Loewenberg’s (1978) *Annals of Opera*, a compendium of notable performances between 1597 and 1940. “Operas performed at the Met” are 55 operas that were performed at the Metropolitan Opera House in New York at least once between 1900 and 2014. “Durable operas” are 42 operas created between 1781 and 1820 that were available for sale on Amazon in March 2014.

cultural differences or as a result of preexisting differences in the infrastructure to perform operas. Year fixed effects δ_i control for variation in output over time that is common across all Italian states. Standard errors ε_{it} are clustered at the state-year level.²⁴ Robustness checks estimate standard errors, collapsing years for the pre- and postcopyright periods (table A3, implementing Bertrand et al. 2004, 14).

Under the assumption that—without copyrights—changes in the creation of new operas after 1801 would have been comparable in Lombardy and Venetia and other Italian states, the coefficient β estimates the causal effect of copyrights on the creation of new operas.

²⁴ Even though our results are robust to clustering at both the state and state-year levels, our preferred specification includes fixed effects for states and for years, with clustering at the level of states and years. Abadie et al. (2017) show that there may be harm in clustering at a level that is too aggregate. 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 2018). Subclustering the wild-bootstrap estimate is not appropriate for difference-in-differences estimates because clusters (states) switch from control to treatment (MacKinnon and Webb 2018).

B. Tests of the Identification Assumption

To investigate the identification assumption, we perform a series of tests. First, we compare the time series of new operas for states with and those without copyrights until 1801. These comparisons reveal no differences in output trends between the two sets of states before the adoption of copyrights (fig. 2). Until 1801, composers in both states with and those without copyrights created around 1.5 new operas per state and year. Afterward, output increased steadily for states with copyrights, from four in 1801 to seven in 1805, but stayed stable in states without copyrights, at slightly more than two new operas per state and year.

States with and those 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 3.2 million people per state, compared with 3.0 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). GDP per capita was 1,450 million USD in Lombardy and Venetia, and 1,386 million in other Italian states. This evidence is consistent the findings of Daniele and Malanima (2007, 2011), who show that,

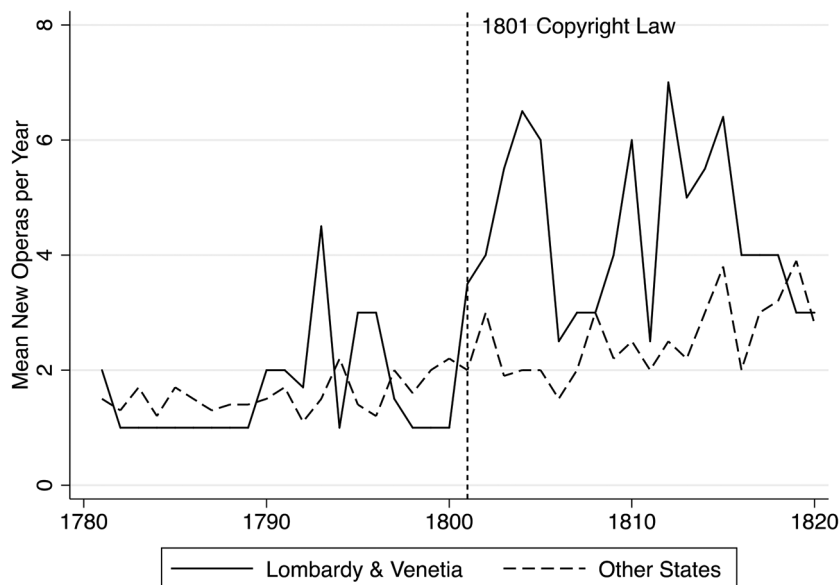


FIG. 2.—New operas per state and year in Italy, 1781–1820. Data include 677 operas created in state i and year t between 1781 and 1820. Lombardy and Venetia adopted copyright laws in 1801. The control group “other states” includes six remaining Italian states without copyrights: Sardinia, Modena and Reggio, Parma and Piacenza, Tuscany, the Papal State, and Sicily.

TABLE 2
 PRECOPYRIGHT CHARACTERISTICS: LOMBARDY AND VENETIA COMPARED
 WITH OTHER ITALIAN STATES

	Lombardy and Venetia (1)	Other States (2)	Difference (3)
A. Population, Urbanization, and GDP in 1800			
Population (in millions)	3.18	2.98	.199 (.101)
Cities with >5,000 people	15.50	16.00	-.500 (.972)
Urbanization rate	17.50	16.90	.599 (.632)
GDP per capita (million USD)	1,450	1,386	64.000 (50.903)
B. Proxies for the Demand for New Operas			
Theaters	4.67	5.50	-.833 (2.941)
Theaters performing opera	2.00	1.67	.333 (1.217)
Theater seats	4,710.00	3,711.00	999.00 (2,240.918)
Composers	1.00	1.17	-.167 (.304)
Librettos	4.50	3.83	.667 (3.355)
Librettists	4.00	3.50	.500 (2.972)
Theaters/city	1.22	.88	.347 (.382)
Theaters performing opera/city	.44	.31	.132 (.240)
Theater seats/city	1,046.67	695.81	350.854 (432.890)

NOTE.—Lombardy and Venetia adopted copyrights in 1801. “Other states” are Sardinia, Modena and Reggio, Parma and Piacenza, Tuscany, the Papal State, and Sicily. Data in panel A on population, cities with >5,000 inhabitants, and urbanization rate (population in cities/population elsewhere) are drawn from Malanima (2015). Data on GDP per capita are in 1990 USD (purchasing power parity) and are drawn from Felloni (1959, 78), Romani (1982), and Ostuni (1992). Column 3 reports a *t*-test for the equality of means between Lombardy and Venetia and other states.

at the time of Italy’s unification in 1861, states were comparable in terms of GDP and urbanization.

Next, we check whether states with and those without copyrights were comparable in terms of their preexisting infrastructure, as proxies for demand (table 2, panel B). Between 1781 and 1800, Lombardy and Venetia had 2.0 theaters per state and year, compared with 1.7 for other states. With a *p*-value of .793, 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 1781 and 1800, Lombardy and Venetia had a total of 4,710 theater seats per state and year, compared with 3,711 for other states (p -value of .671).

We also compare counts of active opera composers, as a proxy for differences in preexisting supply. With 1.0 active composers, on average, per state and year in Lombardy and Venetia between 1781 and 1800, compared with 1.2 in other states, this difference is not statistically significant (p -value of .603).

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 possibility, we examine changes in the count of composers who had created at least one opera in one of the control states and moved to a state with copyrights 1801 (table A4). These data show that migration within Italy cannot explain the differential change in creativity. Only two composers moved within Italy before 1801 (table A4, panel A). After 1801, 16 composers moved within the control group of other Italian states, but none of them moved to Lombardy or Venetia (table A4, panel B).

Instead, data on composer migration suggest that the adoption of copyrights encouraged Italian-born émigré composers to return home. After 1801, 30 Italian-born composers who had previously created operas in France returned to Italy to compose in Lombardy, and another 25 moved to Venetia. Similarly, 14 Italian-born composers who had composed operas in Austria returned to Italy to compose in Lombardy, and another nine returned to Venetia. Flows of return migration had been substantially smaller before 1801. Only five Italian-born composers returned from France to Italy to compose in Lombardy before 1801, and four moved to Venetia; 11 Italian-born composers returned from Austria to Italy to compose in Venetia after 1801, and six returned to Venetia. Moreover, the historical records reveal no differences in migration patterns to Lombardy and Venetia for noncomposers, compared to the other Italian states (Romani 1955 [1977]).

Finally, we check whether Lombardy and Venetia had a higher preexisting stock of librettos or librettists before copyrights. Librettists complement the work of the composer in an important way, by providing the text of the opera. A higher preexisting stock of potential collaborators may have encouraged opera creation even without copyrights. A comparison of means, however, shows that the pre-1801 stock of librettists was similar across states with and those without copyrights. Before copyrights, Lombardy and Venetia had 4.0 librettists per state and year, slightly more than the 3.5 librettists per state and year in other Italian states. A p -value of .871 fails to reject the null hypothesis of equality in means. Similarly, Lombardy and Venetia had 4.5 librettos—for operas, operettas, and oratorios—per state and year before 1801, compared with 3.5 librettos per state and year

in other Italian states. A p -value of .849 fails to reject the null hypothesis of equality in means.

In sum, comparisons of observables yield no evidence against the identification assumption. There are no differences in time trends of creative output between states with and those without copyrights before the adoption of copyrights, and the two sets of states shared similar characteristics. There is also no evidence of a decline in the number of active composers or the share of movers for control states after 1801, and there is no evidence of higher preexisting numbers of potential collaborators (librettists) in states with copyrights.

C. Baseline Estimates and Time-Varying Effects

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, col. 1; significant at 1%). 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, col. 2; significant at 1%). We also estimate quasi-maximum likelihood (QML) Poisson regressions to address the count data characteristics of the opera data. Average treatment effects of these regressions imply an increase by 1.1 additional operas per year (table 3, col. 5; significant at 1%).

TABLE 3
EFFECTS OF COPYRIGHTS ON THE CREATION OF NEW OPERAS (Dependent Variable:
Operas Created per State and Year, 1781–1820)

	OLS				Poisson
	(1)	(2)	(3)	(4)	(5)
L&V × Post	2.201 (.404)	2.147 (.422)	2.263 (.472)	2.430 (.470)	1.287 (.313)
L&V		.320 (.238)			
State fixed effects	Yes	No	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes	Yes
Linear pretrend for L&V	No	No	Yes	No	No
State-specific linear pretrend	No	No	No	Yes	No
Pre-1801 mean	1.406	1.406	1.406	1.406	1.406
Observations (state-year pairs)	320	320	320	320	320
R^2	.800	.726	.800	.819	

NOTE.—The indicator variable L&V equals one for Lombardy and Venetia, which adopted copyrights in 1801; the indicator Post equals one for years after 1800. The pre-1801 mean reports the average number of new operas created per state and year until 1800. State fixed effects control for variation in the creation of new operas that is constant over time. Year fixed effects control for variation in opera output over time that is shared across states. Columns 1–4 are estimated using OLS; col. 5 reports the average treatment effect of a QML Poisson regression with conditional fixed effects. Standard errors clustered at the state-year level are in parentheses.

Comparisons of the raw data in figure 2 indicate no significant differences in pretrends of creativity across states with and without copyrights. To examine whether states with copyrights had begun to create more operas before copyrights, we estimate β separately for each year, allowing the coefficient to be different from zero before the adoption of copyrights in 1801:

$$\text{Opera}_{it} = \Sigma \beta_r \text{Lombardy \& Venetia}_i \times \text{Year}_r + \varphi_i + \delta_t + \varepsilon_{it}, \quad (2)$$

where the variable 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 opera output before 1801 is not statistically different between Lombardy and Venetia and the other Italian states (fig. 3). The annual coefficients between 1791 and 1800 are close to zero and not statistically significant; they increase to one additional opera in 1801 and remain positive and statistically significant in all years except 1806, 1808, and 1811 until 1820.

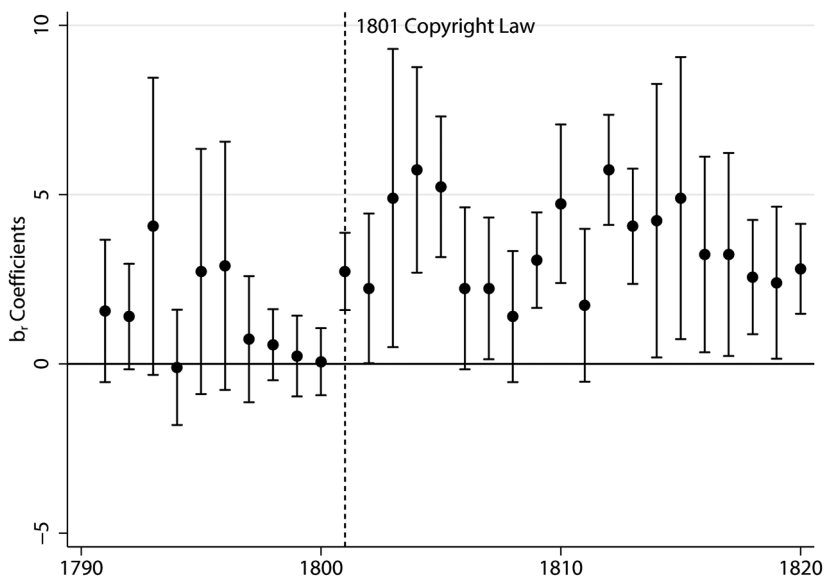


FIG. 3.—Time-varying estimates for effects of copyrights on new operas created per state and year: 95% confidence intervals for β_r coefficients in the OLS regression $\text{opera}_{it} = \Sigma \beta_r \text{Lombardy \& Venetia}_i \times \text{year}_r + \varphi_i + \delta_t + \varepsilon_{it}$, where the dependent variable counts new operas in state i and year t . The variable year_r indicates years between 1791 and 1820; years between 1781 and 1790 are the excluded period; φ_i are state fixed effects, and δ_t are year fixed effects.

D. Controls for Pretrends and Excluding Major Cities

Regressions with alternative controls for differential pretrends confirm the main results. Estimates with a common linear pretrend 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, col. 3; significant at 1%). Specifications that allow for a separate linear pretrend for each state indicate a differential increase by 2.4 additional operas (table 3, col. 4; significant at 1%).

In addition, we use a detrended version of equation (1) by estimating a linear pretrend for Lombardy and Venetia and subtracting the estimated pretrend from the dependent variable $opera_{it}$. Detrended estimates confirm the main estimates, with 2.2 additional operas for states with copyrights after 1801 (table A5, col. 1; significant at 1%).

Milan and Venice were the commercial and cultural centers of Lombardy and Venetia, respectively. Is it possible that our results are driven by these two major cities?²⁵ To investigate this issue, we perform additional robustness checks that exclude Milan and Venice from the regressions. All of the main specifications are robust to dropping Milan, Venice, or both (table A6). These findings indicate that copyrights encouraged the creation of new operas, even outside the major city centers.

E. Controls for Exposure to French Rule

We also examine whether exposure to French rule, rather than the adoption of copyrights, triggered the observed increase in creative output. All Italian states had come under French rule by 1812, but the length of their exposure varied, according to the timing of their occupation (Foà 2001b, 64). Acemoglu et al. (2011) use variation in institutional reforms created by the French Revolution to estimate the effects of exposure to revolutionary ideas on economic growth in Germany.

To test for the influence of French rule, we estimate the following equation:

²⁵ In his study of Giuseppe Verdi's (1813–1901) relationship with the publishing house Ricordi, Jensen (1989, 3) explains that "Napoleon's campaigns brought a large part of Italy together with Milan as the headquarters. Italy's intellectuals and artists flowed into this center, and even after Napoleon's vision of Italy collapsed and it fragmented once again, Milan remained a magnet for Italy's best human resources, becoming a rich and important province under Austrian rule." City-level data for Venetia also indicate some geographic concentration, albeit at a smaller scale.

Venetia also had a preexisting tradition of spoken comedies (*commedia dell'arte*), and theaters that performed *commedia dell'arte* in the seventeenth century became a natural performance venue for public opera (Glixon and Glixon 2006, 3). We examine interaction between such copyrights and preexisting infrastructure in more detail in sec. VII.

$$\begin{aligned} \text{Opera}_{it} = & \beta \text{Lombardy \& Venetia}_i \times \text{Post-1801}_t \\ & + \gamma \text{Length of French Presence}_{it} + \varphi_i + \delta_t + \varepsilon_{it}, \end{aligned} \quad (3)$$

where Length of French Presence_{it} measures the length of exposure (in years) to French presence in state *i* in year *t* and all other variables are as defined in equation (1).

Controlling for French rule leaves the main estimates unchanged, with 2.16 additional new operas per state and year in states with copyrights, compared with 2.20 in the main specifications (table A7).

F. Constructing a Synthetic Lombardy and Venetia with Copyrights

As an additional test, we construct a synthetic Lombardy without copyrights from data for other states that are most similar to Lombardy.²⁶ 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.²⁷

Figure 4 shows the estimated time path of new-opera creation for a counterfactual Lombardy without copyrights. With 1.3 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%; fig. A2).

IV. Popular and Durable Operas

Beyond simply increasing output, intellectual property may also affect quality, by rewarding creative people for producing works that are more

²⁶ Abadie and Gardeazabal (2003) 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.

²⁷ Specifically, let *J* be the number of available control states without copyright laws, and let *W* be a (*J* × 1) vector of nonnegative 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* × 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* × *J*) matrix of the values for these same variables in the set of possible controls. Let the (*K* × *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.

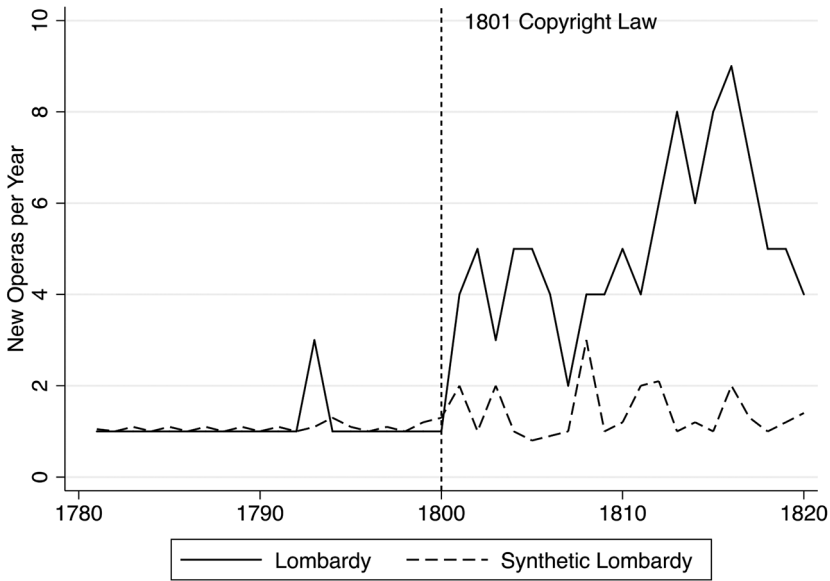


FIG. 4.—New operas created per state and year in a synthetic Lombardy without copyrights. The solid line plots the observed number of operas per year in Lombardy. The dashed line plots operas per year for a counterfactual (synthetic) Lombardy without copyrights, using propensity-score matching (as in Abadie and Gardeazabal 2003).

popular and more durable. The analysis in this section focuses on these two economically important aspects of an opera, without trying to judge its artistic quality. Specifically, copyrights may strengthen composers' incentives to create more popular and durable work, by enabling them to draw revenue from repeat performances. In section I.D, we showed that composers used the 1801 copyright law successfully to demand additional pay for repeat performances. In addition, copyrights may affect quality through wealth effects, by enabling cash-strapped composers to spend more time developing each piece. Giuseppe Verdi, for example, used income from performance fees and scores under Sardinia's copyright law of 1840 to devote time to increasingly complex operas and stop working like a "galley slave" (Scherer 2001, 179–80).²⁸

²⁸ Verdi mentions his "anni di galera" in a letter to his Milanese friend Clarina Maffei on May 12, 1858 (Gossett 2009, 237). In the 1840s, Verdi composed 14 operas; in the 1850s he composed seven operas, including *Rigoletto* (1851), *La Traviata* (1853), and *Simon Boccanegra* (1857). In the 1870s, 1880s, and 1890s, Verdi produced only one opera each decade: *Aida* (1871), *Otello* (1887), and *Falstaff* (1893). Whether these later works are of higher quality is a subject of debate (Gossett 2009), and recent research has highlighted the originality of Verdi's early works, before *Luisa Miller* (1849).

Financial incentives were particularly important at a time when many Italian composers came from families of poor musicians and depended on opera as a source of income. Rossini's parents were itinerant 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. (Beyle 1824, 2).²⁹

Data on composers' families indicate that Rossini's background was fairly typical. Among 493 composers whose fathers' occupations are listed in the *New Grove* (Grove 2001) or in Treccani (2001), 210 fathers (43%) were musicians, 141 (29%) were composers, and nine were chapel masters.

Anecdotal evidence suggests that even successful composers lowered the quality of their work when they thought that they were underpaid. Rossini, for example, wrote angrily,

And, as for those good gentlemen, the *impresarij* [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, 200–1).

To investigate systematically whether and how copyrights may have affected "quality," we examine three alternative measures to capture differences in the popularity and durability of operas.

Our first measure indicates that composers produced more popular operas when they had copyrights. Between 1781 and 1800, composers in Lombardy and Venetia created 0.1 new operas per year that entered Loewenberg's (1978) compendium of notable performances. After 1801, composers in Lombardy and Venetia created 0.6 popular operas per state and year (a 5.8-fold increase). By comparison, the number of new popular operas increased much less in other states, from 0.1 per year until 1801 to 0.2 afterward (a 100% increase; table 1). Reestimating 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,

²⁹ Rossini's letters suggest that he cared deeply about quality and thought that the public was a poor judge of it. "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, 199).

compared with other states (table 4, col. 1; significant at 1%). Relative to an average of 0.1 new operas per year before 1801, this implies a 5.3-fold increase. These results are robust to alternative specifications, including controls for state- or treatment-specific pretrends (tables A8, A9).

Copyrights also raised the share of popular operas among all new operas in state i and year t . OLS regressions indicate a 10.4 percentage point increase in the share of historically popular operas per state and year after 1801 for Lombardy and Venetia (table 4, col. 2; significant at 5%). Compared with 5.5 in 100 operas until 1800, this implies a 2.9-fold increase in average quality.

A complementary measure for historical popularity counts the number of repeat performances. This analysis indicates that operas created in states with copyrights had more repeat performances in the years after the premiere than operas composed in states without copyrights and were also more likely to be “hits” in the premiere year (table A10).

Next, we examine whether copyrights increased the number and the share of operas that were both durable and popular enough to be performed at the Met in New York between 1900 and 2014. Summary statistics indicate a 6.3-fold increase in the number of Met operas in states with

TABLE 4
EFFECTS OF COPYRIGHTS ON THE QUALITY OF NEW OPERAS, 1781–1820

	HISTORICALLY POPULAR OPERAS IN LOEWENBERG (1978)		OPERAS PERFORMED AT THE MET 1900–2014		DURABLE OPERAS ON AMAZON IN 2014	
	Count (1)	Share (2)	Count (3)	Share (4)	Count (5)	Share (6)
L&V \times Post	.407 (.152)	.104 (.047)	.448 (.144)	.102 (.044)	.280 (.129)	.069 (.032)
State fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Pre-1801 mean	.094	.055	.075	.041	.025	.016
Observations (state-year pairs)	320	320	320	320	320	320
R^2	.342	.245	.371	.274	.360	.297

NOTE.—The dependent variable measures the count or share of historically popular operas (cols. 1–2), Met operas (cols. 3–4), or durable operas (cols. 5–6). For example, col. 2 measures the number of new operas that were historically popular (appearing in Loewenberg 1978) divided by the total number of new operas in state i and year t . Column 4 reports same share for operas that were performed at the Metropolitan Opera House in New York at least once between 1900 and 2014. Column 6 reports the share for durable operas that were still available as a complete recording on Amazon in 2014. The indicator L&V equals one for Lombardy and Venetia, which adopted copyright laws in 1801. The indicator Post equals one for years after 1800. The pre-1801 mean reports the average number or share of high-quality operas per state and year before 1801. State fixed effects control for variation in the creation of new operas that is constant over time. Year fixed effects control for variation in opera creation over time that is shared across states. Standard errors clustered at the state-year level are in parentheses.

copyrights after 1801, nearly three times the 2.2-fold increase for other Italian states (table 1). Reestimating equation (1) for Met operas indicates that composers in Lombardy and Venetia produced 0.45 additional Met operas after 1801 (table 4, col. 3; significant at 1%). Relative to an average of 0.075 Met operas per state and year, this implies a 7.0-fold increase. The share of Met operas also increased by 10.2% with copyrights (table 4, col. 4; significant at 1%). These results are robust to excluding state fixed effects, controlling for a pretrend for Lombardy and Venetia, controlling for a pretrend for each Italian state (table A8, Panel B), and detrending the dependent variable (table A9, col. 3).³⁰

Finally, we show that copyrights increased the number and the share of the most durable operas, measured by their availability on Amazon in the 2010s. 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 (17 times as many; table 1). By comparison, composers from other parts of Italy created 0.03 durable operas per year until 1800 and 0.2 afterward (6 times as many). 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, col. 5; significant at 5%). Estimates are robust to controlling for a separate pretrend for states with copyrights, state-specific linear pretrends (table A8, panel C, cols. 4 and 5), or detrending the dependent variable (table A9, col. 5). The share of durable operas among all new operas increased by 6.9 percentage points per state and year after 1801 in Lombardy and Venetia (table 4, col. 6; significant at 5%), compared with a pre-1801 share of historically popular operas of 1.6%.

V. Composer-Level Regressions

State-level regressions have shown that Lombardy and Venetia produced more and better operas after they adopted copyrights, compared with Italian states that did not offer copyrights. Successful composers like Rossini, however, may have produced more and better operas regardless of copyrights. In this section, we repeat the analysis at the composer level, controlling for individual productivity differences through composer fixed effects.

³⁰ Additional robustness tests in table A11 examine performances at Alla Scala in Milan, the Opéra National de Paris, the Wiener Staatsoper, and the Teatro Colón in Buenos Aires in the twentieth century. These tests confirm that operas created by composers with copyright protection were more likely to be extremely durable, measured by repeat performances at any of these theaters.

A. *Baseline Estimates*

To estimate the effect of copyrights at the composer level, we estimate

$$\text{Opera}_{cit} = \beta \text{Lombardy \& Venetia}_i \times \text{Post-1801}_t + \lambda_c + \varphi_i + \delta_t + \varepsilon_{cit}, \quad (4)$$

where the dependent variable, Opera_{cit} , is the number of new operas that composer c creates in state i and year t . Composer fixed effects λ_c control for differences in baseline levels of productivity across composers. All other variables are defined in equation (1).

Composer-level regressions confirm that opera output increased in response to copyrights. Composers in Lombardy and Venetia created 1.5 additional new opera per state and year after 1801, compared with composers in other Italian states (table 5, row A, col. 1; significant at 1%). Relative to a pre-1801 mean of 1.2 operas per composer, state, and year, this implies that composers produced approximately twice as many operas when they had copyrights. QML Poisson estimates confirm these results

TABLE 5
COMPOSER-LEVEL REGRESSIONS (Dependent Variable: New Operas per State and Year by Composer, 1781–1820)

	ALL OPERAS	HISTORICALLY POPULAR OPERAS IN LOEWENBERG (1978)		OPERAS PERFORMED AT THE MET, 1900–2014		DURABLE OPERAS ON AMAZON IN 2014	
		Count (1)	Count (2)	Share (3)	Count (4)	Share (5)	Count (6)
L&V × Post:							
A. All composers	1.451 (.411)	.838 (.204)	.276 (.074)	.653 (.196)	.223 (.074)	.563 (.235)	.192 (.069)
B. Excluding top 10%	1.703 (.496)	.793 (.240)	.201 (.072)	.596 (.218)	.144 (.073)	.429 (.169)	.145 (.090)
C. Excluding top 20%:	1.317 (.757)	.399 (.285)	.132 (.131)	.278 (.273)	.066 (.119)	.387 (.241)	.181 (.109)
Composer fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes
State fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Pre-1801 mean	1.194	.056	.048	.046	.037	.048	.031

NOTE.—The dependent variable measures the count or share of all operas (col. 1), historically popular operas (cols. 2–3), Met operas (cols. 4–5), or durable operas (cols. 6–7). For instance, col. 3 measures the number of new operas that were historically popular (based on notable performances in Loewenberg’s *Annals of Opera*) divided by the total number of new operas in state i and year t . Column 5 reports same share for operas that were performed at the Metropolitan Opera House in New York at least once between 1900 and 2014. Column 7 report the share for durable operas that were still available as complete recordings on Amazon in 2014. The indicator L&V equals one for Lombardy and Venetia, the two states that adopted copyrights in 1801. The indicator Post equals one for years after 1800. The pre-1801 mean reports the average number of new operas created per composer and year until 1800. Row A includes all the composers; rows B and C exclude, respectively, composers in the top 10% and 20% of opera output. Standard errors clustered at the state-year level are in parentheses.

(table A12, col. 1; significant at 1%). Composers in states with copyrights also created an additional 0.8 popular operas per state and year (table 5, row A, col. 2; significant at 1%), as well as 0.7 additional Met operas (table 5, row A, col. 4; significant at 1%) and 0.6 additional durable operas (table 5, row A, col. 6; significant at 5%). To check whether our results might be driven by a small number of exceptionally prolific composers, we repeat the analyses excluding composers in the top 10% and 20% of opera output. The results further corroborate our findings from the full sample (table 5, rows B and C).

B. Return Migrants from Austria and France

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 (Moretti and Wilson 2017) with more favorable tax rates. In principle, copyrights could play a similar role, by attracting productive composers to states with better copyrights. 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 III.A, we examined 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.

We do, however, find that the adoption of copyrights encouraged Italian-born émigrés to return to Italy and compose in Lombardy and Venetia (fig. 5). Until 1801, 1.25 Italian composers per year moved from France and Austria to Lombardy and Venetia. After 1801, return migration increased almost threefold, to 4.75 composers per year. Return migration peaked in 1804, when eight Italian composers returned; after that, return migration remained above the precopyright levels until 1820.³¹

To estimate the contribution of these return migrants to the creation of new operas, we reestimate equation (4) with an additional interaction for Return Migrants \times L&V \times Post (where "L&V" is "Lombardy & Venetia" and "Post" is "Post-1801"). This analysis shows that return migrants made a substantially larger contribution to the quality than to the quantity of new operas. In these regressions the estimate for L&V \times post remains large and significant, at 1.1 additional new operas per composer, state, and year (table A14, panel A, col. 1; significant at 1%). Compared with a precopyright

³¹ Competition with prolific return migrants may have also discouraged composers in other Italian states from moving to Lombardy and Venetia after 1801. Even though the returns from writing an opera improved with copyrights, competition with return migrants and other composers lowered the probability of earning a commission, thereby reducing the expected returns to migration.



FIG. 5.—Return migration from France and Austria to Lombardy and Venetia. Returning composers are Italian composers who composed in other parts of Europe that offered copyrights (specifically, France and Austria) and who moved to Lombardy and Venetia before and after these two states adopted copyrights in 1801.

average of 1.2 new operas per composer, state, and year, this implies a 92% increase in the number of new operas by other, nonmigrant composers. By comparison, the estimate for Return Migrants \times L&V \times Post is smaller (at 0.846; table A14, panel A, col. 1; significant at 5%).

By comparison, return migrants contributed significantly to the increase in high-quality operas (table A14, panels B–D, cols. 1–2). Comparisons of output before 1801 show that composers who had worked abroad and returned to Italy after 1801 were more productive than the average Italian composer. Return migrants produced 1.4 operas per year before 1801, compared with 1.2 operas for the average composer (table A13). Return migrants also created more popular and more durable operas, with 0.074 popular or durable operas before 1801, compared with 0.056 popular and 0.046 durable operas for the average composer.

A complementary set of regressions examines the effects of copyrights on stayers, who worked only in the state where they composed their first opera. Because they were exceptionally immobile, these composers may have been particularly hard hit by increased competition with return migrants. Conversely, they may have benefitted from knowledge spillovers and other types of positive agglomeration externalities (Marshall 1920;

Ciccone and Hall 1996; Kline and Moretti 2014).³² Consistent with negative competition effects on the most immobile composers, OLS estimates are negative but imprecisely estimated because of the small number of stayers (table A14, col. 3). Regressions for popular and durable operas yield similar results (table A14, panels B–D, cols. 3–4).

VI. Copyright Adoptions and Extensions across All of Italy

In this section, we exploit a broader set of changes in copyrights laws across all of Italy to investigate the effects of copyright adoptions across states and to compare the benefits of copyright extensions starting from different levels of existing rights.

A. Copyright Adoption in Other States, 1826–40

Between 1826 and 1840, all the remaining states within Italy adopted copyrights as part of a political process toward unification. Many, if not all, of these changes were exogenous to artistic creativity. For example, states that were politically close to Sardinia adopted copyrights for life plus 30 years when they cosigned Sardinia's Bilateral Treaty with Austria in 1840 (Ubertazzi 2000, 50). With the exception of Sicily, there is little evidence of lobbying. In Sicily, authors (but not composers) lobbied unsuccessfully for copyrights in the 1820s (Pomba, Vieuxseux, and Tenca 1986, 86).³³

This broader set of changes enable us to explore the effects of adopting copyright laws in an environment where other states already offer such laws, similar to today. Summary statistics after 1826 confirm that the introduction of copyrights also encouraged creative work in this setting. After adopting copyrights, Italian states produced 2.72 new operas per state and year, compared with 1.43 before (table A15). To examine these changes in output more systematically, we estimate

$$\text{Opera}_{it} = \beta \text{Copyright}_{it} + \varphi_i + \delta_t + \varepsilon_{it}, \quad (5)$$

³² Moser, Voena, and Waldinger (2014) document the benefits of such spillovers on US invention in chemistry after the arrival of German Jewish émigré scientists in the United States.

³³ Carlo Mele (1792–1841) and Pasquale Stanislao Mancini (1817–88) 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, Vieuxseux, and Tenca 1986, 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 2004, 176–78).

TABLE 6
ALL OF ITALY, 1770–1900 (Dependent Variable: New Operas per State and Year)

	ALL OPERAS		HISTORICALLY POPULAR OPERAS IN LOEWENBERG (1978)	OPERAS PERFORMED AT THE MET, 1900–2014	DURABLE OPERAS ON AMAZON IN 2014
	OLS (1)	Poisson (2)	OLS (3)	OLS (4)	OLS (5)
Copyright	2.579 (.438)	.571 (.092)	.188 (.098)	.396 (.113)	.327 (.111)
State fixed effects	Yes	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes	Yes
Precopyright mean	1.474	1.474	.123	.123	.105
Observations (state-year pairs)	1,048	1,048	1,048	1,048	1,048
R^2	.709		.370	.353	.350

NOTE.—“Copyright” is an indicator that equals one if state i offers copyrights in year t . The precopyright mean reports the mean of the dependent variable for state-year pairs without copyrights. Column 2 presents average treatment effects from a QML Poisson model with conditional fixed effects. Standard errors clustered at the state-year level are in parentheses.

where the variable Copyright_{it} equals one if state i offers copyrights in year t and all other variables are as defined above. OLS estimates indicate that composers created an additional 2.6 new operas per state and year in states with copyrights (table 6, col. 1; significant at 1%). Relative to a mean of 1.5 new operas per year in states without copyrights, this implies a 2.7-fold increase.³⁴

In addition to increasing the number of new operas, the adoption of copyrights also changed the quality of operas—even when surrounding states already offered copyrights as well. OLS estimates indicate that composers in states with copyrights produced 0.2 more historically popular new operas per year (table 6, col. 3; significant at 10%). Relative to a mean of 0.1 premieres per year without copyrights, this implies a 2.5-fold increase. States with copyrights also created 0.4 additional new operas that continued to be played at the Met in the twentieth and twenty-first centuries (table 6, col. 4; significant at 1%), implying a 6.3-fold increase. States with copyrights also produced more durable operas (0.5 per year) compared to 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 6, col. 5; significant at 1%). Relative to an average of

³⁴ We also estimate pre-post regression for Sardinia, Modena, Parma, and Tuscany, which adopted copyright for life plus 30 years in 1840, when they joined the Bilateral Treaty with Austria, using as time windows 25, 20, 15, and 10 years before and after 1840. The results, reported in table A15, indicate an increase of 2.9 operas per state and year after 1840.

0.1 durable operas per year in states without copyrights, this implies a 4.1-fold increase.

B. Extensions in the Length of Copyright

We also examine the effects of copyright extensions on the number and quality of nineteenth-century operas. In recent years, such extensions have been a subject of intense debate surrounding the 1998 US Copyright Term Extension Act and the 2018 Music Modernization Act. Compared with extensions today, which lengthen copyrights from preexisting levels of life plus 50 years or more, historical extensions started from much lower levels of preexisting protection, at life plus 10 years, and may therefore have been more economically meaningful.³⁵

Similar to copyright adoptions, most of these changes were a result of broader, politically motivated changes, independent of lobbying by composers. Lombardy and Venetia first extended their terms from life plus 10 years to life plus 30 in 1840, when they were under Austrian rule, and Austria signed a Bilateral Treaty with Sardinia (Ubertazzi 2000, 50). A second extension in 1865, from life plus 30 to life plus 40, was a result of the unification of Lombardy, Venetia, and five other states into the new Kingdom of Italy. In 1870, the last remaining independent part of Italy, the Papal State, extended its copyrights to life plus 40 when it was annexed to Italy (Ubertazzi 2000, 81).

We exploit these changes to investigate the effects of copyright extensions. In contrast to the adoption of basic copyrights, there is no evidence that extensions in copyrights terms—beyond the death of the composer—have encouraged creativity. Under the initial copyright length of life plus 10 years, composers in Lombardy and Venetia created 5.59 new operas per state and year (fig. 6). After copyrights increased to life plus 30 in 1840, output stayed unchanged, at 5.60 new operas per state and year. After a further extension to life plus 40 in 1865, output declined to 5.1 new operas per state and year.

³⁵ The 1998 Copyright Term Extension Act extended copyrights for privately owned works from the life of the author plus 50 years to the life of the author plus 70 years and those for works of corporate ownership from 75 to 120 years from creation or 95 years after publication (whichever comes earlier). Notably, opera is very different from Mickey Mouse and other fictional characters, whose commercial value to the original owner depends on their use in other types of products, extending from comic books to consumer products, such as t-shirts, mugs, and even theme parks. With such products, copyrights alone are insufficient as a means of protection. Instead, creators need a “convergence of intellectual property rights,” including copyrights, trademarks, and claims of unfair competition (Helfand 1992). In contrast, opera scores, which are the subject of our paper, typically are used “as is,” so that they do not need the same type of protection.

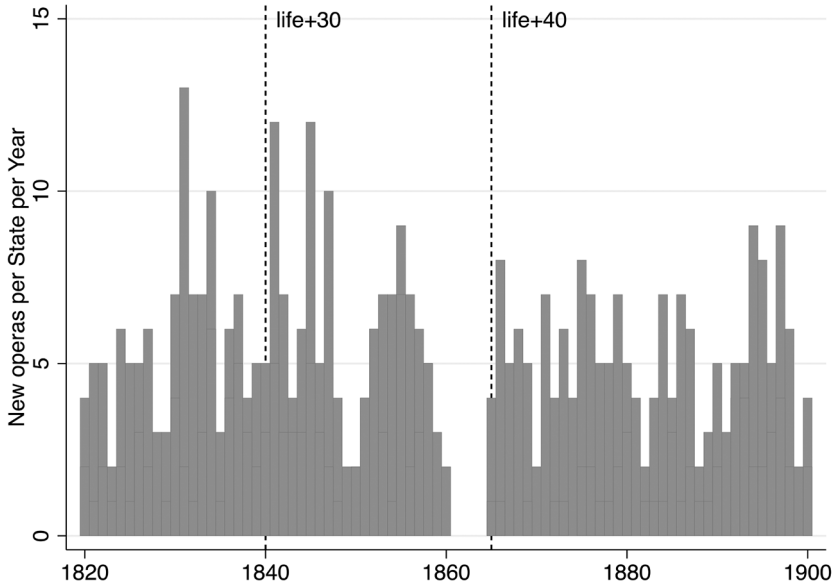


FIG. 6.—New operas created per state and year in Lombardy and Venetia, 1820–1900. Lombardy and Venetia adopted copyright laws in 1801, after they had fallen under Napoleonic rule. The vertical lines correspond to the bilateral treaty between the Kingdom of Sardinia and Austria of 1840 that extended copyright length from life plus 10 years to life plus 30 and to the Italian copyright law of 1865 that extended copyright length from life plus 30 to life plus 40. Data include 580 new operas that premiered between 1781 and 1820 across eight Italian states within the year-1900 borders of Italy.

We also estimate OLS regressions for copyright extensions across Italy:

$$\text{Opera}_{it} = \beta_1 \text{Adopt}_{it} + \beta_2 \text{Extend30}_{it} + \beta_3 \text{Extend40}_{it} + \varepsilon_{it}, \quad (6)$$

where the dependent variable counts new operas per state i in year t between 1770 and 1900. The variable Adopt_{it} indicates state-year pairs after state i has adopted copyrights and before any further extensions.³⁶ The variable Extend30_{it} equals one after a state i has extended its copyrights from life plus 10/12 to life plus 30 and before it extends copyrights life plus 40.³⁷ Finally, the variable Extend40_{it} indicates state-year pairs after state i has extended its copyrights from life plus 30 to life plus 40. The

³⁶ Lombardy and Venetia adopted copyrights for life plus 10 years in 1801. The Papal State adopted copyrights with life plus 12 in 1826, and the Sicilies adopted copyright laws with life plus 30 in 1828. Sardinia, Modena, Parma, and Tuscany adopted their own copyright laws with life plus 30 in 1840 (table A15).

³⁷ Sardinia, Modena, Parma, and Tuscany adopted copyrights in 1840, with a length of life plus 30 years. To reflect this change, the variable adopt_{it} in eq. (6) equals one after 1840 for these four states, while extend30_{it} equals zero, since they never extended their copyright lengths to life plus 30.

TABLE 7
EFFECTS OF EXTENSIONS IN THE LENGTH OF COPYRIGHTS, 1770–1900
(Dependent Variable: New Operas per State and Year)

	ALL OPERAS		HISTORICALLY POPULAR OPERAS IN LOEWENBERG (1978)	OPERAS PERFORMED AT THE MET, 1900–2014	DURABLE OPERAS ON AMAZON IN 2014
	OLS (1)	Poisson (2)	OLS (3)	OLS (4)	OLS (5)
Adopt	3.259 (.246)	2.789 (.230)	.466 (.064)	.474 (.071)	.405 (.070)
Extend30	1.138 (.433)	.707 (.271)	–.125 (.077)	–.227 (.084)	–.168 (.083)
Extend40	–.467 (.296)	–.366 (.225)	–.189 (.073)	–.393 (.072)	–.352 (.071)
Precopyright mean Observations	1.474	1.474	.123	.123	.105
(state-year pairs)	1,048	1,048	1,048	1,048	1,048
R^2	.414		.179	.127	.105

NOTE.—The indicator Adopt equals one if state i has adopted basic copyrights in year t but not extended lengths to life plus 30 years. The indicator Extend30 equals one after state i has extended its copyrights to life plus 30 and before it extends copyrights to life plus 40. The indicator Extend40 represent state-year pairs after state i has extended copyrights to life plus 40. The precopyright mean reports the mean of the dependent variable for state-year pairs without copyrights. Column 2 presents average treatment effects from a QML Poisson model with conditional fixed effects. Standard errors clustered at the state-year level are in parentheses.

difference between β_1 and β_2 estimates the effect of extending existing copyrights to life plus 30. The difference between β_2 and β_3 estimates the effects of further extending copyrights from life plus 30 to life plus 40.³⁸

OLS estimates of β_1 confirm that the adoption of copyrights was associated with an increase in output, with 3.3 additional new operas per state and year (table 7, col. 1; significant at 1%). Relative to a mean of 1.5 operas per year for states without copyrights, this implies a 3.2-fold increase. Extensions in copyright lengths, however, were followed by a decline in output. States that extended existing copyrights to life plus 30 created 2.1 fewer operas per year afterward ($\hat{\beta}_2 - \hat{\beta}_1 = 1.14 - 3.23 = -2.09$, with a p -value of .001; table 7, col. 1). Estimates for β_3 indicate no positive effects for further extensions from life plus 30 to life plus 40.

³⁸ The identifying assumption for β_2 and β_3 is that states with and those without copyright extensions would have experienced a comparable change in opera creation per year had there been no copyright extension. This assumption would be violated if composers who were exceptionally productive lobbied successfully for extensions in their state. As we explain above, we have found no evidence for successful lobbying by composers. Instead, nearly all changes in Italian copyrights during this time resulted from Italy's process toward unification.

Regressions for popular operas confirm these results. Estimates of β_1 indicate that states that adopted copyrights produced 0.5 additional popular operas per year (table 7, col. 3; significant at 1%). Relative to a mean of 0.1 in states without copyrights, this implies a sixfold increase. Estimates for copyright extensions are not statistically significant and negative. Estimates of β_2 indicate that copyright extensions were not associated with an increase in the number of popular operas ($\hat{\beta}_2 - \hat{\beta}_1 = -0.13 - 0.47 = -0.6$, with a p -value of .000). Estimates of β_2 imply that further extensions to life plus 40 were associated with 0.1 fewer popular operas per year ($\hat{\beta}_3 - \hat{\beta}_2 = -0.19 - (-0.13) = -0.06$, with a p -value of .254; table 7, col. 3). States that had adopted basic copyrights also created 0.5 additional Met operas per state and year (table 7, col. 4), while states that had extended their copyrights to life plus 30 produced 0.70 fewer Met operas per year ($\hat{\beta}_2 - \hat{\beta}_1 = -0.23 - 0.47 = -0.7$, with a p -value of .000). States that further extended the length of copyrights from life plus 30 to life plus 40 produced fewer operas per year ($\hat{\beta}_3 - \hat{\beta}_2 = -0.39 - (-0.13) = -0.26$, with a p -value of .001).

Results for durable operas that were available on Amazon in the 2010s confirm the direction of these estimates (table 7, col. 5). States that had adopted basic copyright laws created 0.40 additional durable operas per state and year. States that had extended copyrights to life plus 30 produced 0.24 fewer durable operas per year ($\hat{\beta}_2 - \hat{\beta}_1 = 0.17 - 0.40 = -0.23$, with a p -value of 0.000). Further extensions from life plus 30 to life plus 40 produced 0.2 fewer operas per year ($\hat{\beta}_3 - \hat{\beta}_2 = -0.352 - (-0.168) = -0.18$, with a p -value of .001).

While estimates for all of Italy are less well identified than our preferred specifications, they have economically important implications for copyright extensions. At the very least, our evidence suggests that extensions in the length of copyright terms—even starting from relatively short existing terms—did little to encourage creativity. Intuitively, extensions in copyrights affect only cultural goods that are durable enough to be consumed after the original terms expire. But even the most popular operas in our data were rarely performed after the first 20 years (fig. 7).

Using biographical data to calculate the expected lengths of copyrights under a rule of life plus 10, we show that less than one-third of the most popular operas would have benefitted from extensions beyond life plus 10. To estimate the expected length of copyrights under life plus 10, life plus 20, and life plus 30, 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 (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 life plus 10, this implies an expected length of 39.3 years. Less than one-third of operas (27 of 173 in Loewenberg) were

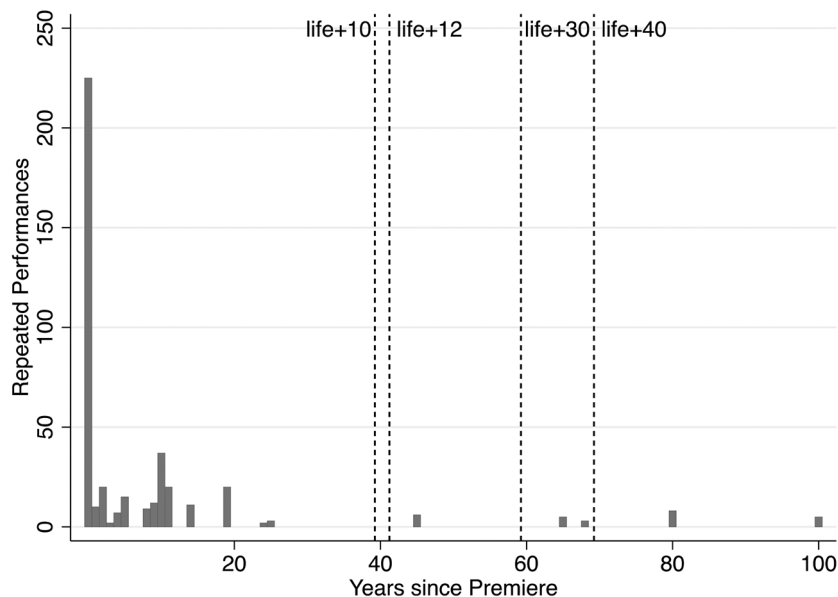


FIG. 7.—Performances per year for the first 100 years after the premiere for 165 operas that premiered across Italy between 1781 and 1820 and entered Loewenberg's (1978) *Annals of Operas*. Performances to the left of the vertical line would be on copyright under a regime of life plus 10 years, which Lombardy and Venetia began to offer in 1801. The expected length of copyright under life plus 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 table A1 for life-table calculations).

still performed after 39 years. In the full sample of all 677 operas created between 1781 and 1820, this implies that only 4% of operas were still performed after their copyrights under life plus 10 would have expired.³⁹ Another 24 operas (13.9%) were still performed after 59 years, the expected term under life plus 30. Only 20 operas (11.6%) still played after 69 years, the expected term under life plus 40.

VII. Interactions between Copyrights and Demand

In this section, we exploit variation in theater infrastructure and the pre-existing demand for operas within states to examine interactions between copyrights and demand. State-level analyses indicate that both Lombardy and Venetia experienced a clear increase in output after they had adopted

³⁹ The number of repeat performances is similar for new operas that premiered between 1781 and 1820 in Lombardy and Venetia and other states (fig. A3). On average, 165 operas in Loewenberg's (1978) *Annals* were performed 10 times, including 7.5 times within the first 40 years (the expected length of copyrights under life plus 10) and 2.8 times afterward.

copyrights. In Lombardy, the number of new operas increased by a factor of 3; in Venetia output more than doubled. Within Lombardy, however, opera output increased substantially more in Milan than in Mantua, Brescia, and Bergamo. One notable characteristic of Milan was its sheer size, with a population of 124,000 in 1800 (Malanima 2015, 4). By comparison, Brescia (the next-largest city) had 38,000 people, Bergamo 36,000, and Mantua 25,000. City size, in turn, is correlated with the density of skilled performers and 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, we examine detailed historical city-level data on the theaters and theater seats. Antolini (2000, 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, trends in theater construction were comparable in Lombardy and Venetia and the rest of Italy (fig. A5). In 1770, nine cities in Lombardy and Venetia had, on average, 0.3 theaters that were large enough to perform operas, and 16 cities in other Italian states had, on average, 0.3 such theaters. By far the greatest expansion in theater construction occurred with the unification of 1861, which increased demand for opera across Italy (Morelli 2012). 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), while all the other cities had one (fig. A6A).

To systematically examine interactions between copyrights and preexisting differences in demand, we separately estimate the effects of copyrights for cities with one or more than one theater in 1800. These regressions show that cities with more preexisting demand and a better infrastructure benefitted more from the adoption of copyright laws. Cities with one theater produced 0.27 additional new operas per year after 1801 with copyrights. Relative to a pre-1801 mean of 0.22 new operas per year for cities with one theater, this implies a 122% increase in opera output in response to copyrights. Cities with two or more theaters produced 1.89 additional new operas per year after 1801. Relative to a pre-1801 mean of 1.04 new operas per city and year for cities with two or more theaters, this implies a 182% increase, which is substantially larger than the increase for cities with just one preexisting theater. Regressions with controls for quality show that cities with more theaters also experienced a larger increase in high-quality operas after they had adopted copyrights (table 8, cols. 3–8).

Analogous regressions with theater seats confirm that copyrights with a larger preexisting demand for entertainment benefitted more from copyrights. Cities with fewer than 1,000 theater seats before 1800 produced

TABLE 8
CITY-LEVEL REGRESSIONS WITH INTERACTIONS FOR PREEXISTING INFRASTRUCTURE
(Dependent Variable: New Operas per City and Year, 1781–1820)

	ALL OPERAS		HISTORICALLY POPULAR OPERAS IN LOEWENBERG (1978)		OPERAS PERFORMED AT THE MET, 1900–2014		DURABLE OPERAS ON AMAZON IN 2014	
	One Theater (1)	>1 Theaters (2)	One Theater (3)	>1 Theaters (4)	One Theater (5)	>1 Theaters (6)	One Theater (7)	>1 Theaters (8)
	L&V × Post	.269 (.062)	1.893 (.294)	.071 (.026)	.962 (.140)	.080 (.024)	.449 (.102)	.064 (.024)
City fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Pre-1801 mean	.215	1.036	.018	.079	.015	.057	.012	.057
Observations (city-year pairs)	680	280	680	280	680	280	680	280
R ²	.457	.824	.124	.601	.149	.546	.143	.505

NOTE.—The indicator L&V equals one for cities in Lombardy and Venetia, which adopted copyright laws in 1801. The indicator variable Post equals one for years after 1800. Columns 1, 3, 5, and 7 refer to cities with one theater before 1801. Columns 2, 4, 6, and 8 refer to cities with two or more theaters before 1801. The pre-1801 mean reports the count of new operas created per city and year until 1800. Standard errors clustered at the city-year level are in parentheses.

0.3 additional operas after 1800 (table A16, col. 1; significant at 1%). Cities with more than 1,000 theater seats before 1800 produced 1.3 additional operas after 1801 (table A16, col. 2; significant at 1%).

VIII. Other Musical Compositions and Librettos

Operas are the focus of our analysis because they provide exceptionally rich empirical measures for the quantity and quality of creativity. To complement the analysis of operas, this final section presents results for librettos as well as for a broader set of musical compositions, including symphonies, operettas, and songs. All tests confirm our main findings that the adoption of basic copyrights encouraged the creation of new works.

A. Librettos

Librettos, the text that complements the score of an opera, were literary compositions with separate copyrights, under Article 1 of the 1801 copyright law (app. B). Although many librettists were “amateurs” (Black 1984, 5), they came to expect some type of financial recognition for their efforts,

and the sale of physical copies of the libretto became an important source of revenue to its authors (sec. I.F).

If copyrights helped to increase these revenues for librettists, the 1801 law may have encouraged the creation of new librettos, similar to musical scores.⁴⁰ OLS estimates indicate that the adoption of copyrights led to a substantial increase in the creation of librettos. Lombardy and Venetia produced an additional 2.6 new librettos per state per year after 1801, compared with other Italian states (table A17, col. 1; significant at 1%). Relative to a pre-1801 mean of 3.0 new librettos per state and year, this implies an 87% increase.⁴¹

We also investigate whether copyrights increased the share of operas using new librettos. Since the late seventeenth century, a custom of “recycling” existing librettos had developed (Glixon and Glixon 2006, 117). Our analysis shows that the adoption of copyrights was associated with a shift toward using new librettos. Until 1801, only 16.5% of new operas used a new libretto. After Lombardy and Venetia adopted copyrights in 1801, the share of operas that used a new libretto increased by 53 percentage points in Lombardy and Venetia, compared with other states (table A17, col. 3; significant at 1%). These results suggest that the adoption of copyrights encouraged the creation of new librettos above and beyond the effects on scores.

B. Other Musical Compositions

In this final section, we examine whether our results on operas generalize to a broader set of musical compositions. We start by examining data from *Opening Night! Opera & Oratorio Premieres*, a crowd-sourced database of more than 42,000 musical compositions, maintained by Stanford University.⁴² While our main data include only operas, *Opening Night!* covers a broader range of compositions, including operettas, oratorios, and serenades. *Opening Night!* includes 5,949 premieres of such works in Italy between 1770 and 1900. Estimating equation (1) with this broader set of

⁴⁰ To measure changes in the creation of new librettos, we first collect the names of all 648 librettists who were active in Italy between 1770 and 1900 from Dassori (1903) and Treccani (2001). We then use the *New Grove* (Grove 2001) to collect all 1,091 librettos that they created in Italy between 1770 and 1900 and reestimate the main specifications with librettos as the outcome variable.

⁴¹ In principle, this increase in the number of new librettos may have increased the returns to writing the score, as a complement to the libretto. While we cannot estimate cross-price elasticities with our data, historical evidence on the collaboration between librettists and composers in sec. I.F indicates that scores were more important than librettos for the success of an opera. As a result, some of the observed effect of copyrights on librettos may have been driven by the increase in the production of scores, whereas the opposite effect was probably quite small.

⁴² We accessed these data at <http://operadata.stanford.edu> on September 20, 2018.

compositions, but excluding operas, confirms that the adoption of copyright laws encouraged the creation of new works. After the adoption of copyrights in 1801, output in Lombardy and Venetia increased by an additional 1.2 works per state and year, compared with other Italian states (table A18, col. 1; significant at 1%).

A complementary set of tests examines the effects of copyrights on the creation of new symphonies and songs, using information on scores from the International Music Score Library Project (IMSLP, also known as the Petrucci Music Library),⁴³ which covers the entire history of symphonies and songs. In 2018, the IMSLP covered 139,837 works by 17,003 composers, including 2,398 symphonies and nearly 5,600 songs that premiered in Italy between 1770 and 1900.⁴⁴

This analysis confirms the positive link between the adoption of basic copyrights and an increase in creative output. With copyrights, composers in Lombardy and Venetia created an additional 3.4 symphonies and 5.9 additional songs per state and year (table A18, cols. 3 and 5, respectively; significant at 1%). Taken together, our analyses of *Opening Night!* and the IMSLP suggest that the adoption of basic copyrights encouraged the creation of new music—beyond opera.

IX. Conclusions

This paper has used exogenous variation in the adoption of basic copyrights—as a result of the timing of Napoléon’s military victories in Italy—to investigate the effects of copyrights on creativity. Comparing changes in the creation of new operas across Italian states with and those without copyrights, we show that the adoption of basic copyrights encouraged the creation of new work. Moreover, we find that copyrights changed the quality of creative output by encouraging composers to produce more popular and durable works. These results generalize to a broader set of musical compositions and to librettos, as the literary component to the score of operas. On the basis of these findings, we conclude that the adoption of basic levels of copyright protection—not exceeding the lifetime of the composer—can help to raise both the quantity and the quality of new creative works.

Importantly, we find that extensions in the length of copyright beyond the composer’s life did not encourage creativity. Performance data reveal that few operas were played after the first 20 years, which suggests that only the most durable creative goods stand to gain from copyright extensions. Analyses of payments to nineteenth-century authors have shown

⁴³ We accessed these data at <https://imslp.org> on November 4, 2018.

⁴⁴ This count excludes 127 folk songs and other anonymous pieces (1.59% of the total data) in the IMSLP for which the author or the year of the composition are unknown.

that copyright extensions disproportionately benefitted a small number of superstars, such as Sir Walter Scott (MacGarvie and Moser 2015). Similarly, extensions in nineteenth-century Italy—beyond the life of the original composers—may have disproportionately benefitted the heirs of superstar composers, such as Gioacchino Rossini, without encouraging creative work. Thus, copyrights may have helped to turn the music into what Krueger (2019, 1) called a “superstar, winner-take-all affair . . . where a small number of top performers did fabulously well, while almost everyone else struggled to make ends meet.”

Moreover, copyrights engender a critical trade-off between the benefits of increasing pay for creative work today and the costs of restricting access for future generations. These dynamic costs of copyrights are especially damaging for fields in which new creativity depends on access to existing work. An analysis of US science has shown that copyright policies that reduce access costs can encourage the creation of new follow-on science by encouraging broad-based participation (Biasi and Moser 2018). Despite recent advances, more systematic theoretical and empirical research is needed to improve our understanding of these trade-offs and how copyrights, more generally, shape creativity and innovation.

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