

# COPYRIGHT AND CREATIVITY- EVIDENCE FROM ITALIAN OPERAS<sup>\*</sup>

MICHELA GIORCELLI, STANFORD, AND  
PETRA MOSER, STANFORD AND NBER

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This paper exploits variation in the adoption of copyright laws within Italy – as a result of Napoleon’s military campaign - to examine the effects of copyrights on creativity. To measure variation in the quantity and quality of creative output, we have collected detailed data on 2,598 operas that premiered across eight states within Italy between 1770 and 1900. These data indicate that the adoption of copyrights led to a significant increase in the number of new operas premiered per state and year. Moreover, we find that the number of high-quality operas also increased – measured both by their contemporary popularity and by the longevity of operas. By comparison, evidence for a significant effect of copyright extensions is substantially more limited. Data on composers’ places of birth indicate that the adoption of copyrights triggered a shift in patterns of composers’ migration, and helped attract a large number of new composers to states that offered copyrights.

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Copyrights create temporary monopolies in creative content, ranging from literature and news, to movies, music, and computer software. The primary “purpose of copyright is to create incentives for creative effort.”<sup>1</sup> Yet there is very little empirical evidence to date to prove that copyrights can in fact encourage creativity and contemporary copyright laws are the subject of intense debate. In the United States and Europe, copyright laws create exclusive rights for the duration of the author’s life and 70 years after the author’s death. In China copyright laws offers nominal protection for 50 years after the initial publication, but enforcement is so weak that the effective length of copyright protection is close to zero.

This paper exploits variation in the adoption of copyright laws – as a result of Napoleon’s military campaign in Northern Italy- to examine the effects of the introduction of a copyright system on the quantity and quality of creative output. Specifically, we exploit the fact that the Italian states of Lombardy and Venetia adopted copyright laws in 1801, after they fell under French rule, while other states in Italy continued to offer no copyright protection. To measure variation in creative output we collect information on 2,598 new operas that premiered within the year 1900 borders of Italy between 1770 (the beginning of the Italian *bel canto* period) and 1900 (the end of the *verismo* period and the Italian *ottocento*).

Comparisons of changes in the number of new operas per state and year after 1801 in Lombardy and Venetia indicate that composers responded to the introduction of copyrights by increasing their production of new operas. Baseline regressions imply that Lombardy and Venetia produced 2.12 additional operas per year after 1801, compared with other Italian states that did not adopt copyrights. Relative to a mean of 1.41 operas per state and year across eight Italian states between 1780 and 1801, this implies a 150 percent increase in the number of new operas.

How did the adoption of a copyright system influence the quality of music? If copyright increases the profitability of compositions independently of their quality, the adoption of

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<sup>1</sup> *Sony Corp. of America v. Universal City Studios*, 464 U.S. 417, 104 S. Ct. 774, 78 L. Ed. 2d 574 (1984). Universal and Disney claimed that Sony’s introduction of the Betamax VCR had violated the Copyright Revision Act (17 U.S.C.A. § 101 et seq. [1976]) by allowing home viewers to record television shows. The Supreme Court overturned a decision of the Ninth Circuit court, arguing that although contributory infringement of a copyright could occur, manufacturing and marketing of the Betamax did not constitute contributory infringement because not all uses of the Betamax infringed on copyrights. Creativity can be broadly defined as “the use of imagination or original ideas to create something” (Oxford English Dictionary 2010, p. 233). Feinstein (2013, p. 8) defines creativity as “connecting, combining or relating two or more elements that have not previously been connected, combined or related. Specifically, individuals create new elements in the field by combining two previously created strings that have not previously been combined.”

copyright laws may reduce the average quality of new works by raising the profitability of lower quality works that would not have been worth producing without copyrights. If copyrights, however, disproportionately increase the profitability of higher quality works (for example because they are more long-lived), then the adoption of copyright laws may increase the average quality of new compositions.

An exceptional wealth of historical records on operas allows us to examine these effects. Operas that were popular in their day are captured through records of notable opera performances in Europe and the United States up to 1940 in Loewenberg's (1978) *Annals of Opera*. This source lists notable performances for nearly 10 percent of the operas in our data (245 of all 2,598 operas). Estimates of these data imply a 4.6-fold increase in the creation of notable performances in response to the introduction of copyrights in 1801. An alternative measure for quality captures the creation of durable operas that were available as full-length recordings on Amazon in 2014. Estimates for these data indicate a 10-fold increase in the creation of durable operas in response to the adoption of copyrights.

After the initial adoption of copyrights in 1801, other Italian states adopted and extended copyrights as part of Italy's progress towards national unification. After Lombardy and Venetia adopted copyrights in 1801, all six remaining states adopted their own copyright laws between 1826 and 1840. Most of these changes were a reflection of Italy's process of unification. In 1840, for example, the King of Sardinia, who had emerged as a political leader in the struggle for independence from Austria and Italy, entered a bilateral treaty with Austria and began to offer copyrights. Within weeks, three other states – Tuscany, Modena and Reggio, Parma and Piacenza – also joined the treaty. By 1900, all Italian states had adopted copyright laws that offered protection for the length of the composers' life plus 40 years.

OLS regressions, which compare operas per state and year for states with and without copyrights, indicate that states with copyrights produced 2.68 additional operas per year. Compared with a mean of 2.21 new operas per state and years, this implies a 121 percent increase. Equivalent regressions for historically popular operas imply a 47 percent increase, and regressions for exceptionally durable operas imply an 80 percent increase. By comparison, there is no conclusive evidence that copyright extensions increase the quantity or quality of creative output.

How did the creation of copyrights increase the quantity and quality of creative output? Comparisons across the location of opera premieres and the composers' state of birth reveal a significant change in the pattern of composer migration after 1801, with a large shift in composer migration towards Lombardy and Venetia. These results suggest that copyrights may have helped to increase creative output in states with copyrights relative to other states in part by attracting immigrants from states without copyright. Our current research investigates the aggregate effects of such movements on the quantity and quality of music.

The remainder of this paper is structured as follows. Section I presents a brief history of Italian opera and changes in copyright policies between 1770 and 1900. Section II describes the data on new operas (premieres), measures for differences in the popularity and durability of operas, as well as demographic data on composers, and patterns of composer migration. Section III presents difference-in-differences analyses and robustness checks. Section IV examines the mechanisms by which the creation of copyrights may encourage creativity, and section V concludes.

## I. A BRIEF HISTORY OF ITALIAN OPERA AND COPYRIGHTS

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

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

Public demand for opera proved so large that by the end of the 17<sup>th</sup> century, ten theaters performed operas in Venice. Each theater was managed by a professional agent (*impresario*), who identified an interesting story, procured a libretto, and then hired a composer to create a score (Valli 1823, p. 155; Scherer 2008, p. 5), typically within a couple of months (Valli 1823, p. 157). For example, the Teatro Torre Argentina in Rome commissioned Gioacchino Rossini (1792-1868) to compose *Il Barbiere di Siviglia* on 17 December 1815. *Il Barbiere* premiered in Rome roughly six weeks later, on February 5, 1816 (Panico 2002, p. 62). Composer transferred all performance rights to the theater that had commissioned the opera, effectively allowing the

theater to perform the opera as long as it was profitable, without further compensation (Scherer 2008, p. 5).

### *I.A. Napoleon's Military Victories in Northern Italy*

After taking command of the French "Army of Italy" on March 11, 1796, Napoleon invaded the Kingdom of Sardinia at Ceva on April 11, 1796. Between April 12 and 14, Napoleon defeated Sardinia's King Vittorio Amedeo III in the battles of Cairo Montenotte, Dego, Millesimo, and Cosseria (in Liguria a region in the North-West of Italy), and in a decisive victory on April 19, 1796 near the town of Mondovì (in Piedmont, about 50 miles from Turin). As a result of these victories, Sardinia granted Nice and Savoy to France under the Treaty of Paris on May 15, 1796. In his campaign against Austria, Napoleon conquered Verona on April 25, 1797, Venice on May 12, 1797, and Milan on May 14.<sup>2</sup> On June 29, 1797 Napoleon decreed the creation of the Cisalpine Republic (Repubblica Cisalpina) with Milan as the capital of the new state. On August 5, Napoleon defeated the Austrian Army at Castiglione, forcing Kaiser Franz to retreat. Austria acknowledged the Cisalpine Republic in the Treaty of Campoformio on 18 October 1797, in exchange for what remained of the Venetian Republic.

To curb Napoleon's grasp on Europe, Piedmont, Austria, England, Russia, Turkey, and Sweden united against France in the Second Coalition on March 12, 1799. Austria was defeated in the battle of Marengo (June 14, 1800) and Napoleon invaded Venetia on June 20, 1800. Venetia was then annexed to the Cisalpine Republic and officially became part of the French empire with the Peace of Pressburg on December 26, 1805 (Pecout 1999, pp. 138-14).

### *I.B. Lombardy and Venetia become the only states to adopt copyright laws in 1801*

On May 9, 1801, Legge n. 423 (Repubblica Cisalpina) extended France's copyright law of 1793 to Lombardy and Venetia. This law granted authors and composers exclusive rights to their works for the duration of their lives plus an additional 10 years for their heirs. It allowed composers to collect royalties for repeat performances instead of transferring the performance

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<sup>2</sup> France had declared war with Austria on April 20, 1792, after Austria joined the first coalition against France, which had formed between Great Britain, Prussia, Spain, Holland, and the Kingdom of Sardinia on April 6, 1792.

rights – without rights to additional payments – to a single theater (Celletti, 1959, p. 518). Copyrights issued in Lombardy were enforceable in Venetia and vice versa.<sup>3</sup>

Due to the timing of Napoleon's military victories, only Lombardy and Venetia adopted the French copyright law of 1793, while states that Napoleon conquered after 1804 adopted French laws *without* copyrights. On March 21, 1804, the Parliament of France adopted the (Napoleonic) *code civile*. The new code which left copyrights intact where they had been established, but did not introduce them in states without copyrights. It was extended to territories that Napoleon took to the Kingdom of Piedmont (1804, excluding the island of Sardinia), Parma and Piacenza (1805), Tuscany and Kingdom of Naples (1809), and Latium (1812, Treccani 2001, p. 647). As a result Lombardy and Venetia were the only states within Italy that had come under French influence *including the adoption of copyright laws*.

The stipulations of the Congress of Vienna in 1815, placed Lombardy and Venetia under Austro-Hungarian Empire's rule but left the 1793 French copyright law intact (*Codice civile universale austriaco pel Regno Lombardo-Veneto*, 1815, Regno Lombardo-Veneto).

### *I.C. The Papal State and the Two Sicilies adopt copyrights in 1826 and 1828*

Lombardy and Venetia were the only states to offer copyrights until 1826, when an edict of Pope Leo XII (Editto 28 September 1826, n. 433, Stato Pontificio) established exclusive rights in compositions, books, and other intellectual good for the duration of their creator's life plus 12 years.<sup>4</sup> Only two years later, in 1828, a decree of Franz I created copyrights for the duration of the composer's life plus 30 years for heirs, the longest terms of protection in all of Italy (Regio decreto 5 February 1828, n. 1904, Regno delle Due Sicilie). Four other states - Sardinia, Modena, Parma, and Tuscany - continued to offer no protection. Without rules of reciprocity, copyrights from the Two Sicilies were only enforced in the Two Sicilies, and copyrights from the Papal State were limited to the Papal State.

The adoption of long-lived copyrights in the Kingdom of the Two Sicilies may have been one of the earliest instances of a change in copyrights in response to lobbying. The Two Sicilies had produced many successful composers, such as Domenico Cimarosa (1749-1801) and

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<sup>3</sup> The resolution of the Vienna Congress of 1815 united Lombardy and Venetia under the rule of Austria's Kaiser Franz I to form the (crown land of the) Kingdom of Lombardy-Venetia (Regno Lombardo-Veneto). Lombardy was annexed by Italy in 1859, and the Kingdom of Lombardy-Venetia dissolved into the Kingdom of Italy in 1866.

<sup>4</sup> The Papal State covered Rome, Latium, Umbria, Marche, and Eastern Emilia-Romagna.

Gaetano Andreozzi (1755-1826). Our data on opera premieres (Figure 2) indicate that the rate of opera creation had begun to increase *before* the Sicilies adopted copyrights, from 2 new operas in 1795, 3 in 1800, 2 in 1805, and 2 in 1810, increasing to new operas 12 in 1827, the year the Sicilies began to offer copyrights.

#### *I.D. Sardinia's bilateral treaty with Austria extends the copyrights to life + 30 in 1840*

In the following decades, the Kingdom of Sardinia (which had managed to preserve its independence from 1720 until the Peace of Paris on May 15, 1796) emerged as a leader in Italy's fight for independence (Pecout 1999, p. 158). On June 26 1840, Sardinia entered a bilateral copyright treaty with Austria, which granted exclusive rights for the duration of a composer's life plus 30 year after the composer's death (Convenzione Austro-Sarda 22 May 1840, Regno di Sardegna). Within weeks, all other Italian states except the Two Sicilies joined the agreement, creating a unified copyright system that covered nearly all of Italy.<sup>5</sup> This agreement introduced copyrights to the Kingdom of Sardinia, the Grand Duchy of Tuscany, the Duchy of Modena and the Duchy of Parma the agreement resulted in the introduction of copyrights. It also extended the length of copyrights for Lombardy and Venetia by 20 years (from *life + 10* to *life + 30* Table 6) and by 18 years for the Papal State (from *life + 12* to *life + 30*).

#### *I.E. The 1861 Unification extends Sardinia's copyright laws to five other states within Italy*

On April 27, 1859, the Kingdom of Sardinia began its military efforts to unify Italy, with the Second Italian War of Independence War against Austria (Pecout 1999, p. 167). On July 21, 1858 French Emperor Napoleon III and Camillo Benso, Conte di Cavour, the prime minister of the Kingdom of Sardinia, formed an alliance against Austria in the secret Plombières Agreement. France promised to support Sardinia against Austria if attacked, in return for control over Nice and Savoy. Cavour then provoked Austria with a series of military maneuvers close to the Austrian border. Austria responded by issuing an ultimatum on April 23, 1859, asking for the complete demobilization of the Sardinian Army. When Sardinia failed to respond Austria declared war against Sardinia on April 27, 1859 (Pecout 1999, pp. 166-172).

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<sup>5</sup> Decreto 22 December 1840, n.240, Ducato di Parma e Piacenza; Notificazione 19 December 1840, n.431, Ducato di Modena e Reggio; Notificazione 17 December 1840, n.432, Gran Ducato di Toscana; Notificazione 20 November 1840, Stato Pontificio.

On March 17, 1861, when five states - Lombardy, Modena and Reggio, Parma and Piacenza, Tuscany, and the Two Sicilies – joined Sardinia to form the Kingdom of Italy (Pecout 1999, p. 170). On June 25, 1865, the first copyright law of the Kingdom of Italy increased copyright terms from life plus 30 to life plus 40 years (Legge 25 June 1865, n.2337, It.). On June 29, 1866, the Kingdom of Italy declared war on Austria (beginning the Third War of Independence). Italy lost the battle of Custoza on June 24, 1866, but won a decisive victory against Austria at Lissa on July 20, 1866. With the conclusion of the war in the peace of Vienna (August 24, 1866), Venetia became part of the Kingdom of Italy. A decree of Italy's King Vittorio Emanuele extended the laws of the Kingdom of Italy to Venetia (Regio Decreto 4 November 1866, n.3300, It.).

On September 20, 1870, after the Breach of Porta Pia, Vittorio Emanuele II also annexed the Papal State to the Kingdom of Italy (Pecout 1999, pp. 183-189). A decree on October 9, (Regio Decreto 9 October 1870, n.5903, It.) extended all Italian laws to the Papal State. From then on, composers enjoyed copyrights for the duration of their lives plus 40 years for their heirs across all of Italy.

## II. DATA

Data for this analysis include information on copyright length and on premieres of operas in eight states within the year 1900 borders of Italy.

### *II.A. State borders and copyright laws*

Compared with Italy's borders today, this definition excludes Trentino, Alto Adige, Eastern Friuli, Venezia Giulia, Istria, Zara; these regions had been part of the Austro-Hungarian Empire and became part of Italy in the Treaty of Rapallo in 1920.<sup>6</sup> States borders within Italy are defined by the stipulations of the Congress of Vienna and the Italian Restoration in 1815. These borders remained essentially unchanged until Italy's unification in 1861. To measure variation in copyright we collect data on legal changes from Franchi (1902), and examine the original texts of the laws to extract changes in the length of copyright for compositions (e.g., Legge 9 May 1801, n. 423 Repubblica Cisalpina).

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<sup>6</sup> Italy lost Istria and Zara to Yugoslavia as a result of World War II in 1945; the 1975 Treaty of Osimo affirmed this change.



## *II.B. New operas that premiered in Italy between 1770 and 1900*

Data on premieres cover 2,598 first performances of Italian operas between 1770 and 1900. For all 2,598 operas, our data include the title of each opera, the name of its composer, the year of the premiere, and the theater, city, and state in which the opera was first performed. The beginning year of our sample, 1770, was the first year of the Italian *bel canto* (1770-1830), which included Gioacchino Rossini (1792-1868), Vincenzo Bellini (1801-1835), and Gaetano Donizetti (1797-1848). It was followed by the period of *grand opera* (1830-1880) with Giuseppe Verdi (1813-1901) and Richard Wagner (1813-1883), and the *verismo* (1880-1900) with Pietro Mascagni (1863-1945), Ruggero Leoncavallo (1857-1919) and Giacomo Puccini (1858-1924). The end year, 1900, was the last year of the *verismo* and the end of the Italian *ottocento* (*New Grove Dictionary of Music and Musicians* 2001).

Information on 1,718 premieres by 705 composers is drawn from three standard references: the *Annals of Operas* (Loewenberg 1978), *Opere e Operisti. Dizionario Lirico* (Dassori 1903) and *Operisti Minori nell'Ottocento Italiano* (Ambiveri 1998). For 254 premieres of Italian operas by 90 composers between 1770 and 1900, Loewenberg's (1978) *Annals of Opera* include the title and the name of the composer, the year and location of the premiere, as well as the year and location of other performances of the same opera.<sup>7</sup> Dassori's (1903) *Opere e Operisti. Dizionario Lirico* lists the title, composer, year, and location of opera premieres between 1541 and 1902 for 3,628 composers and 15,406 operas between 1541 and 1902, including 1,353 premieres by 544 composers between 1770 and 1900. Ambiveri's (1998) *Operisti Minori nell'Ottocento Italiano* lists premieres by Italian composers with birth years between 1792 (the birth year of Gioacchino Rossini) and 1900, whose operas were performed by city orchestras. Ambiveri (1978) lists 71 premieres by 45 composers between 1770 and 1900. To collect data on additional operas, we search the *New Grove Dictionary of Music and Musicians* (2001) and Treccani (2001) for other operas by these 705 composers. This search yields data on years and locations of first performances for another 880 operas by the 705 composers in our data.

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<sup>7</sup> Loewenberg (1978) includes premieres and performance data until 1949, as well as information on the librettist, the origins of the opera's plot and translations into other languages.

To check the data, we compare 89 composers in our sample whose last name begins with B or D against all entry for B and D in the *New Grove Dictionary of Music and Musicians* (2001). This comparison indicates that our data set is complete and includes 80 additional composers, compared with the *New Grove Dictionary*. Among the three standard reference works, Loewenberg (1978) is the most restrictive reference work. None of the 71 premieres in Ambiveri (1998), and 133 of 1,353 premiers in Dassori (1903) are included in Loewenberg (1978).

### *II.C. Historically popular operas: Loewenberg's (1978) Annals of Opera*

An alternative measure for variation in quality exploits records of notable performances in Loewenberg's (1978) *Annals of Opera*. Loewenberg records opera performances between 1770 and 1940; 254 of the 2,598 operas in our sample entered the *Annals*. Among 254 operas listed in Loewenberg (1978), the median opera was performed 8 times until 1940 (with an average of 2.72 performances and a standard deviation of 4.74).

Figure 2 shows performances per year for the first 100 years for 165 operas that premiered between 1780 and 1800 (before the adoption of copyrights in Lombardy and Venetia).<sup>8</sup> Overall, these 165 operas were performed 1,687 times, or 10.22 times per opera. Roughly one third of all operas (29.72 percent) were performed only once, and half of all operas (49.31 percent) were performed only within the first 5 years after their premiere. More than one third of total performances (633 performances, or 37.50 percent) occur in the year of the premiere.

On average, operas that premiered between 1780 and 1800 were performed 4.28 times within the first 40 years, and 2.76 times after the first 40 years. Forty years from the premiere marks the end of the expected term of copyrights under *life + 10*, which is 39.23 years (based on life table calculations that we present below).<sup>9</sup>

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<sup>8</sup> Counts of performances for new operas that premiered in Lombardy and Venetia between 1780 and 1800 (before copyrights) are comparable with performances for operas that premiered in other states (Appendix Figure A1).

<sup>9</sup> Forty-nine of 165 operas (29.72 percent) were performed at least once after the expected year of death for the average composer in our data set, which (based on life table calculations below) was 29.23 years after the premiere of the average Italian opera between 1770 and 1900. These 49 operas were performed 5.99 times on average in the first 40 years after their premiere, and 2.86 times afterwards. Forty-two of 165 operas that premiered between 1780 and 1800 were performed at least once after the actual (rather than expected) death of their composer (25.45 percent); these operas were performed 4.71 times on average before and 2.74 times after the death of their composer.

#### *II.D. Long-lived operas: available for sale on Amazon in 2014*

To measure variation in the artistic durability of newly created operas, we search Amazon.com for operas that were still available for sale between March 22 and March 28 2014. Specifically, we search for CDs and DVDs for the title of each of the 2,598 operas and its composers' first and last name. An indicator variable for *Amazon* equals 1 for 155 operas that were still for sale as a complete performance in 2014. For example, a search for Giuseppe Verdi's *La Traviata* shows that this opera was for sale as a complete recording in a 2008 recordings by Arthaus Musik and in a 2012 recording by Virgin Classics; we therefore record the *Amazon* dummy for *La Traviata* by Giuseppe Verdi to equal 1. By comparison, a search for Domenico Cimarosa's *Penelope* yields no results and we record the *Amazon* dummy for that opera to equal 0. To measure the quality of complete operas, rather than specific arias, we restrict the *Amazon* measure to operas that are available as complete recordings.

#### *II.E. Data check: Loewenberg (1978), Amazon (2014), and the Metropolitan 1900-2014*

To check for bias in these alternative measures of quality, we compare them with each other, as well as with records of operas that were performed at the Metropolitan opera in New York between 1900 and 2014. This measure expands Moser's (2012) data on operas that were performed at the Metropolitan between 1900 and 1950, which cover 25 operas by 9 composers that were performed a total of 128 times between 1900 and 1950. We collect additional data on performances until 2014, which include 82 performances of these 25 operas between 1950 and 2014 and 23 performances of 7 additional operas by 5 composers.

*Opera Today* (January 24, 2005) praises Loewenberg (1978)

This volume has long been regarded as the definitive work on the subject, and has been quoted in countless later works whenever a reference was required to the performance histories of individual operas. Taken as a whole, especially when one considers the state of library science when the book was first written, it is a magnificent piece of work, and belongs on the bookshelf of every researcher in the operatic field....

*Opera Today* also cautions that

The book was written at a time when the esteem for nineteenth century Italian opera was at its nadir, and, as a result, many significant Donizetti, Pacini and Mercadante works were omitted. These include *Maria Stuarda*, *Pia de'Tolomei*, *Il Reggente*, *Le Due Illustre Rivali*, and *Caterina Cornaro*.

We check for these omissions by comparing our data with other sources. These comparisons confirm that works by Donizetti and Mercadante are under-represented, whereas works by Pacini are more likely to be included in Loewenberg than other sources (and may in fact represent a bias of *Opera Today*).<sup>10</sup> Sixty operas that are still available today are missing from Loewenberg suggesting that these operas were re-discovered after 1978 (the publication year of the most recent edition of Loewenberg. Omitted records include 31 operas by Gaetano Donizetti (1797-1848), 13 by Gioacchino Rossini (1792-1868), 7 by Saverio Mercadante (1795-1870), 3 by Vincenzo Bellini (1801-1835), 2 by Domenico Cimarosa (1749-1801), 1 by Pietro Generali (1773-1832), 1 by Giovanni Pacini (1796-1867), 1 by Amilcare Ponchielli (1834-1886), and 1 by Giuseppe Verdi (1813-1901). Only two operas that were played at the Met between 1900 and 2012 are missing from Loewenberg's (1978): Amilcare Ponchielli's *Gioconda* (1876) and Gioacchino Rossini's *Otello* (1816). All 25 operas performed at the Met were available for sale on Amazon in 2014.

One hundred and fifty-nine operas for which Loewenberg's (1978) *Annals* records notable performances were missing from Amazon in 2014. These historically popular, but perhaps not extremely durable operas include 13 operas by Giovanni Pacini (1796-1867), 9 by Luigi Ricci (1805-1859), 5 by Enrico Petrella (1813-1877), Ferdinando Paer (1771-1839) and Francesco Morlacchi (1784-1841), 4 by Pietro Generali (1773-1832), Pietro Mascagni (1863-1945) and Amilcare Ponchielli (1834-1886). All operas that were played at the Met between 1900 and 2014 were still available on Amazon in 2014;

## *II.F. Demographic data, life tables, and migration patterns for composers*

The exceptional availability of records on the birth and death years of composers allows us to estimate the expected length of copyrights under a regime of *life + 10* for 705 composers of 2,598 operas that premiered between 1770 and 1900. The oldest composer in our data is Giovanni Paisiello (1741-1816); the youngest composer is Stefano Donaudy (1879-1925). The most long-lived composer was Vincenzo Mela (1803-1897, age 94), and the youngest to die was Nicola Manfroce (1791-1813, age 22). The average composer lived for 59.73 years (with a

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<sup>10</sup> Donizetti's *Maria Stuarda* (premiered in Milan in 1835) is in fact included in Loewenberg (1978, p. 1834) with performances in the cities of Modena and Reggio (in the Duchy of Modena and Reggio) in 1837.

median of 67.21 years), roughly 5 years less than the average European composer between 1650 and 1849 (64.5 years, with a median of 66 years, Scherer 2004, p. 8).

On average, 705 composers were 33.56 years old at the time of the premiere (with a median of 32 years). Composers of notable operas in Loewenberg (1978) and composers of durable operas (on Amazon 2014) were roughly two years older (35.9 years with a standard deviation of 15.13, and 35.6 with a standard deviation of 9.2, respectively).<sup>11</sup>

To estimate the remaining length of an author's life at the time of a premiere we use data on life and death years of all 705 composers to construct life tables for Italian composers. Life table estimates exceed estimates based authors' average age at death because they are conditional on survival until of 33.56, the average age of a composer at the time of the premiere. Life tables predict the expected remaining years of life  $R([a, a+4], [t, t+4])$  for a composer at age bracket  $[a, a+4]$  in intervals of five calendar years  $[t, t+4]$  between 1770 and 1900. For the median author in an age bracket  $[a, a+4]$ , the expected remaining years of life are the average remaining years of life across all authors in the same age bracket in the same time interval  $[t, t+4]$ . This implies a composer of average age at the time of the premiere (33.56, roughly 34 years) could expect to live another 29.33 years:  $R(34[1800,1804]) = 0.2 * R([30,34],[1800,1804]) + 0.8 * R([35,39],[1801,1804]) = 0.2 * 29.75 \text{ years} + 0.8 * 29.23 \text{ years}$ .

To examine changes in patterns of migration, we also collected information on composers' place of birth as well as years of birth and death for all 795 composers that premiered at least one opera within the year 1900 borders of Italy. We have collected these data from Dassori (1903) Ambiveri (1998) and the *New Grove Dictionary of Music and Musicians* (2001).

### III. CHANGES IN THE NUMBER AND QUALITY OF NEW OPERAS AFTER 1801

Summary statistics on changes in the number of new operas produced per state and year show that opera production increased significantly after Lombardy and Venetia adopted copyrights. In the 20 years before 1801, from 1780 to 1800, composers in Lombardy and

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<sup>11</sup> The average composer of an Italian opera that continued to be performed at the Met between 1900 and 2014 was 36.21 years old at the time of the premiere (with a standard deviation of 13.50 years). By comparison, data on the social background of composers, which we collect from (1998), *The New Grove Dictionary of Music and Musicians* (2001) and Treccani's (2001) *Enciclopedia Italiana di scienze, lettere ed arti* is scarce. For 493 composers we know the occupation of the father, for 21 composers, we know the occupation of both parents, and for another 3 composers we only know the occupation of the mother.

Venetia created 1.55 new operas per state and year (Table 1). In the first 20 years following the adoption of copyrights, from 1801 to 1821, they produced 4.48 new operas per state and year, a 189 percent increase. By comparison, the number of new operas per state and year increased much less in other Italian states that did not offer copyrights, with 1.36 operas per state and year until 1801 and 2.10 afterwards, a 54 percent increase.

Comparisons of the time patterns of changes in opera production indicate that the trend in output was comparable for states with and without copyrights until 1801 (Figure 2). In a typical year between 1780 and 1800, both states with and without copyrights produced two operas per state and year. The only exceptions in Lombardy and Venetia are 1793, when Domenico Cimarosa (1749-1801) and Gaetano Andreozzi (1755-1826) premiered three and one new opera, respectively, in Lombardy and Venetia,<sup>12</sup> and 1795 to 1796 when Giuseppe Farinelli (1769-1836) produced three new operas per year.<sup>13</sup> After 1801 opera output increased steadily from 4 in 1801 to 7 in 1806 while output in other Italian states remained stable around 2 operas per year.

### III.A. Difference-in-differences

To systematically examine the effect of copyright introduction on operas' production, we estimate the following difference-in-differences equation:

$$opera_{it} = \beta_0 + \beta Lombardy \& Venetia_i \times post\ 1801_t + \varphi_i + \delta_t + \varepsilon_{it} \quad (1)$$

where the dependent variable is the number of new operas premiered in state  $i$  in year  $t$ . The explanatory variable  $Lombardy \& Venetia_i$  is an indicator variable for Lombardy and Venetia, which adopted copyrights in 1801. The indicator variable  $post\ 1801_t$  equals 1 for all years starting in 1801. Under the assumption that, in the absence of the adoption of copyright laws, changes in opera output would have been comparable for Italian states with and without copyright laws, the coefficient  $\beta$  for the interaction term estimates the effect of copyright laws on output. State fixed effects  $\varphi_i$  control for variation in output across states that is constant over time, for example as a result of time-invariant cultural differences or pre-existing differences in the infrastructure to perform operas. Year fixed effects  $\delta_t$  control for variation in output over

<sup>12</sup> Including three operas by Cimarosa (*Giannina and Bernardone*, *Giunio Bruto*, *Il Convito*) and one by Andreozzi (*Angelica e Medoro*).

<sup>13</sup> All six operas are by Farinelli (*L'indolente*, *Duello per un compimento*, and *Terza Lettera in 1795*) and *I Giouchi d'Agriento*, *Idomeneo*, and *Cid nelle Spagne* in 1796).

time that is common across all states within Italy, for example as a result of an increase in national sentiment, as Italy moved towards its unification. Finally,  $\varepsilon_{it}$  is the error term.

Estimates of the baseline equation indicate that composers in Lombardy and Venetia created 2.12 additional operas per state and year after 1801, compared with other Italian states that did not adopt copyright laws (Table 3, column 1, significant at 1 percent). Relative to an average of 1.41 new operas per state and year across all Italian states before 1801, this implies a 150 percent increase. Excluding state fixed effects leaves the estimated effect at 2.07 additional new operas per year (Table 3, column 2, significant at 1 percent). We also estimate quasi-maximum likelihood Poisson regressions as an alternative to OLS. Average treatment effects of this regression indicate a smaller albeit significant increase by 1.04 additional operas per year (Table 3, column 5, significant at 1 percent).

### *III.B. Time-varying estimates and controls for pre-trends*

To investigate the timing of the increase in opera production, we estimate the difference-in-differences coefficient  $\beta_r$  separately for each year, allowing it to be different from zero before the adoption of copyrights in 1801.

$$opera_{it} = \beta_0 + \beta_r \text{Lombardy \& Venetia}_i \times year_r + \varphi_i + \delta_r + \varepsilon_{it} \quad (2)$$

where the variable  $year_r$  represents an indicator variable for each year between 1791 and 1821, years between 1780 and 1790 are the excluded category. Estimates of annual coefficients indicate that the observed increase in opera production cannot be explained by differential pre-trends (Figure 3). Annual coefficients are close to zero and not statistically significant for 9 of 12 years until 1801; they increase to 4 additional operas in 1803-1805, and remain positive and statistically significant for 11 of 22 years between 1801 and 1821.

Regressions with alternative controls for differential pre-trends confirm the main results. Estimates with a common linear pre-trend for Lombardy and Venetia indicate that the two states that adopted copyrights in 1801 produced 2.09 additional operas per year after 1801 (Table 3, column 3, significant at 1 percent). Alternative specifications that allow for a separate linear pre-trend for each state indicate a differential increase by 2.16 additional operas (Table 3, column 4, significant at 1 percent).

### *III.C. Controlling for the quality of new operas: Historical popularity*

To examine the effects of copyrights on the quality of new operas we examine data on historically popular operas, based on records of notable performances in Loewenberg's 1978 *Annals of Opera*. Between 1780 and 1821 composers created 62 new operas that entered Loewenberg (1978; Table 1).

Summary statistics indicate that composers from Lombardy and Venetia began to produce significantly more high-quality operas after the introduction of copyrights in 1801. Before the adoption of copyrights, between 1780 and 1800, composers in Lombardy and Venetia premiered 0.125 operas per year that entered Loewenberg's *Annals*. After the adoption of copyrights, they created 0.619 per year (395 percent more). By comparison, composers from other parts of Italy premiered 0.083 historically popular operas from 1780 to 1800 and 0.167 from 1801 to 1821 (100 percent more).

Re-estimating the baseline equation (1) with historically popular operas as an outcome variable indicates that composers created 0.42 additional popular operas per year after 1801 compared with composers in other Italian states that did not offer copyrights (Table 4, column 1, significant at 1 percent). Relative to an average of 0.09 premieres per year before 1801, this implies a 455 percent increase. Excluding state fixed effects leaves the estimate at 0.41 additional historically popular operas (Table 4, column 2, significant at 1 percent). Regressions with a common pre-trend for Lombardy and Venetia imply an increase by 0.57 additional operas (Table 4, column 3, significant at 5 percent). Regressions that allow for a separate pre-trend for each state imply an increase by 0.37 additional operas (Table 4, column 4, significant at 5 percent).

### *III.D. Controlling for the quality of new operas: Durability*

An alternative measure for quality identifies operas that were especially durable, through operas that were still available for sale on Amazon in 2014. Between 1780 and 1821 composers created 42 that were available on Amazon in 2014 (Table 1).

Summary statistics indicate that composers from Lombardy and Venetia began to produce significantly more durable operas after the introduction of copyrights in 1801. Between 1780 and 1800, composers in Lombardy and Venetia premiered 0.15 operas per year that continued to be for sale on Amazon in 2014. Between 1801 and 1821, they produced 0.45 per



year (200 percent more, Table 1). By comparison, composers from other parts of Italy premiered 0.025 durable operas per year from 1780 to 1800 and 0.031 from 1801 to 1821 (24 percent more).

Regressions with durable operas as an outcome variable indicate that composers in Lombardy and Venetia created 0.31 additional operas per year after the adoption of copyrights compared with other Italian states that did not adopt copyrights (Table 4, column 5, significant at 5 percent). Compared with an average of 0.03 premieres per year before 1801, this implies a 10.33 fold increase. Excluding state fixed effects leaves the estimate at 0.30 additional durable operas per year (Table 4, column 6, significant at 5 percent). Regressions with a common pre-trend for Lombardy and Venetia linear pre-trend indicate an increase by 0.31 durable operas (Table 4, column 7, significant at 5 percent), and regressions with state specific linear pre-trends imply an increase by 0.30 additional operas (Table 4, column 8, significant at 5 percent).

#### IV. COMPARISONS ACROSS ALL STATES WITH AND WITHOUT COPYRIGHTS

After 1801, other Italian states adopted copyrights as part of Italy's process towards unification. Summary statistics indicate that composers produced more operas after their governments had adopted copyright laws (Table 2). For example, composers in Sardinia produced 34.4 premieres per decade after the adoption of copyrights (1840-1864) compared with 24.2 before (1828-1839) (Table 6).

##### IV.A. OLS regressions, 1770-1900

OLS regressions for the full sample estimate

$$opera_{it} = \beta_0 + \beta_r \text{copyright}_{it} + \varphi_i + \delta_r + \varepsilon_{it} \quad (3)$$

where the variable  $\text{copyright}_{it}$  equals 1 if state  $i$  offers copyrights in year  $t$ , and all other variables are as defined above. Estimates of this regression indicate that composers produced 2.68 more new operas per year in states with copyrights compared with composers in states without copyrights (Table 5, column 1, significant at 1 percent). Compared with a mean of 2.21 new operas in per year in states without copyrights, this implies a 121 percent increase. Regressions with state specific linear pre-trends indicate that composers in states with copyrights produce 2.53 additional new operas per year compared with states without copyrights (Table 5, column 2,

significant at 1 percent). Average treatment effect (ATE) of an QML Poisson regression indicate that composers in states with copyright protection produce 0.95 additional premieres compared to states without copyrights (Table 5, column 3, significant at 1 percent).

#### *IV.B. Quality: historically popular operas*

Summary statistics indicate that composers in state-time pairs without copyright produced more historically popular operas than composers in states without copyrights. Composers in states with copyrights produced 0.73 historically popular operas per year (measured by entries in Loewenberg's 1978 *Annals of Opera*), whereas composers in states without copyrights produced only 0.40.

OLS regressions with controls for variation across states and over time indicate that composers in states with copyrights produced 0.19 more new operas per year than composers in states without copyrights (Table 5, column 4, significant at 10 percent). Relative to a mean of 0.40 premieres per year without copyrights, this implies a 48 percent increase. Regressions with state specific linear pre-trends indicate that states with copyrights produced 0.19 additional new operas per year compared with states without copyrights (Table 5, column 5, significant at 5 percent).

#### *IV.C. Quality: durable operas*

Composers in states without copyrights also produced more durable operas that were still for sale on Amazon in 2014 (0.82 per year, 101 percent more) than composers in states without copyrights (0.419 per year). OLS regressions indicate that composers in states with copyrights produced 0.33 additional durable operas per year compared with other Italian states without copyright laws (Table 5, column 6, significant at 1 percent). Relative to an average of 0.41 new operas per year in states without copyright protection, this implies an 80 percent increase. Regressions with state specific linear pre-trend indicate that composers in states with copyrights produced 0.37 additional new operas per year (Table 5, column 7, significant at 1 percent).

### V. MECHANISM

#### *V.A. Changes in Composer Migration*

Comparisons between composers' place of birth and the location of premieres reveal a significant shift in the spatial pattern of composer migration in response after 1801. Between 1780 and 1800, most Italian composers premiered their operas in the state where they were born (Table 7, Panel A). Among 140 composers that created at least one opera in Italy between 1780 and 1800, 15 composers premiered their first opera in a state that was different from their state of birth. For example, Domenico Cimarosa (1749-1801) and five other composers were born in the Kingdom of the Two Sicilies, and premiered their operas in Lombardy between 1780 and 1800.<sup>14</sup> Two composers who were born in the Papal State premiered their first opera in Venetia.<sup>15</sup>

By comparison, many composers began to move to Lombardy and Venetia after 1801, when these states began to offer copyrights. Between 1801 and 1821, 43 composers who were born outside of Lombardy premiered an opera in that state (Table 7, Panel B). For example, Saverio Mercadante, born in Altamura (in the Northern parts of the Kingdom of the Two Sicilies) in 1795, premiered his first opera, *L'Apoteosi di Ercole*, in Naples (in the Kingdom of the Two Sicilies, 233 km North-West of Altamura in 1819). In 1819, Mercadante moved to Milan, where he performed *Elisa e Claudio* in 1820, and *Il Posto Abbandonato* in the same year. In 1821, he premiered *Andronico* in Venice, 272 km East of Milan. Similarly, Vincenzo Bellini, was born in Catania, in the Southern island of Sicily in 1801, moved to Milan in 1827, and premiered most of his operas there (Weinstock 1971, p. 134), including *Il Pirata* (1826), *La Sonnambula* (1831) and *La Norma* (1831) in our data. Another 13 composers born outside of Venetia premiered an opera in Venetia. By comparison, a total of 5 "foreign-born" composers premiered an opera across all 6 states without copyrights between 1801 and 1825.

### *V.B. Changes in Infrastructure*

Another channel by which the creation of copyrights may have encouraged the production of operas is by increasing the stock of theaters, to build performance spaces for a growing number of operas. These effects, however, may occur with a delay after the increase in opera premieres. It may also be muted by the fact that copyrights strengthened the negotiating

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<sup>14</sup> Cimarosa was one of the most prolific Italian composers of the period, with a total of 70 operas. Only 10 of his works, however, were ever performed within Italy, and most of his compositions premiered in Austria (Scherillo 1916, p. 67). The other five composers born in the Sicilies were Giuseppe Farinelli (1769-1836), Giuseppe Nicolini (1762-1842), Giovanni Paisiello (1740-1816), Silvestro Palma (1754-1834), and Raffaele Orgitano (1757-1831).

<sup>15</sup> Giuseppe Palione (1781-1845) and Vincenzo Pucitta (1778-1861).

power of composers relative to theaters (by granting composers property rights in repeated performances), which may have made opera production less, rather than more profitable for theaters. To examine the effects of copyrights on the construction of new theaters we collect theater data from Antolini (2000). A capacity of 100 seats is a standard lower bound for a theater that is large enough to host an opera (e.g., Antolini 2000, p.132). To examine changes in the number of theaters that actively performed operas, we use data from theaters that performed at least 1 opera are drawn from Loewenberg (1978, premieres and other performances), Dassori (1903, premieres), and Ambiveri (1998, premieres).

These data indicate that Lombardy and Venetia started from a slightly higher level of available performance space compared with the rest of Italy. For 1780 to 1800, Antolini (2000) reports 13 theaters with more than 100 seats in Lombardy and Venetia (6.5 per state) compared with 5.00 theaters per state in the rest of Italy (Table 9, Panel A). Among these theaters, three theaters in Lombardy had performed at least one opera, La Scala in Milan, La Fenice in Venice, and Teatro Comunale in Verona. At the state level, this means that 1.50 theaters per state performed at least one opera in our sample in Lombardy and Venetia between 1780 and 1800, and 1.00 performed at least one opera in other states (Table 9, Panel A).

Consistent with the idea that copyrights may have reduced the profitability of performing operas for theaters (while increasing it for authors), the number of theaters increases at a lower rate for Lombardy and Venetia after 1800, compared with other states. After 1800, the number of theaters per states increased to 8.00 in Lombardy and Venetia from 1801 to 1821 (an increase of 23 percent), while the number of theaters in other states increased to 6.50 (by 30 percent). Lombardy and Venetia added three theaters between 1801 and 1821 (the Teatro Comunale in Mantua, Vicenza, and Brescia), increasing the number of active theaters per state by 100 percent to 3.00. At the same time, other Italian states added three theaters (Teatro Comunale in Reggio, Palermo, and Teatro La Pergola in Florence), increasing the number of active theaters per state by 50 percent to 1.50 theaters.

In sum, these data indicate relatively modest improvements in the theater infrastructure for Lombardy and Venetia after 1801, compared with other Italian states. Extending the theater data to the full sample indicate that the most significant improvements in infrastructure occurred half a century later, as the demand for operas increased with the unification of Italy in 1861 (Table 9, Panel B).

### *V.C. No significant effects of copyright extensions*

Data on performances per year (which we are able to collect from Loewenberg (1978)) indicate that the incentive effects of copyright extensions are likely to be small, because the large majority of performances occur within the first five years (Figure 2). Only 49 of 165 operas (29.70 percent) in the pre-copyright sample of premieres between 1770 and 1900 were performed at least once after the end of initial copyright term under *life + 10* (39.23 years).<sup>16</sup> On average these operas were performed 43 times between the end of the copyright term under *life + 10* and the end of the copyright term under *life + 30*, which Lombardy & Venetia offered between 1840 and 1864. This implies that the copyright extension granted composers property rights for an additional 43 performances of 6 operas that were 40 years or older at the time of the performance. Data on the creation of new operas per year indicate no significant increase in the creation of new operas in response to this extension (Figure 5)

Another 39 operas in the pre (23.64 percent) stood to gain from an extension beyond *life + 30*. These operas were performed 2.65 times on average between 59.23 years after their premiere (the expected end of copyright terms under *life + 30*) and before 69.23 years, the expected end of copyright terms under *life of 40*, which all Italian states began to offer in 1865. Thirty-two operas of 165 operas (19.39 percent) were performed after the expected end of copyright terms under *life + 40*.

## VI. CONCLUSIONS

This paper has exploited the introduction of copyright laws in parts of Northern Italy in 1801 as a result of Napoleon's military campaign to examine the effects of copyright laws on creativity. New data on operas that were premiered across eight Italian states between 1780 and 1821 – 20 years before and after the introduction of copyright laws – indicate that opera output increased in response to the introduction of copyrights. Data on high-quality operas (measured through variation in their historical popularity and longevity) further suggest that the introduction of copyright laws increased the average quality of new operas.

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<sup>16</sup> Forty-nine operas in the pre-copyright sample (29.70 percent) were performed after *life + 12* (offered by the Papal State between 1826 and 1840).

These results suggest that offering some basic level of copyright protection can increase both the quantity and quality of copyrights for intellectual works that create revenue through repeat performances. Intuitively, copyrights of any reasonable length increase composers' incentives to produce high-quality works (which tend to be repeated more frequently) by allowing them to appropriate a portion of the revenues from repeat performances.

Interestingly, these effects appear to be limited to the first introduction of copyright laws, and there is no clear evidence of extending copyrights beyond the duration of the composers' life. This is also consistent with data on repeat performances, which indicate that the large majority of works yields no additional revenues after the first period of 20 years.

Comparisons of composers' places of birth and the places of premieres further indicate that the creation of copyrights in a subset of states – while other states offered no protection – encouraged composers to migrate to states that offered protection. In future work we will investigate the effects of this migration on the quantity and quality of creative works.

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TABLE 1 – MEAN NUMBER OF NEW OPERAS PER STATE AND YEAR IN ITALY, 1780-1821

	LOMBARDY & VENETIA	OTHER STATES
<u>All operas (N=473)</u>		
1780-1821	3.061	1.736
1780-1800	1.547	1.358
1801-1821	4.476	2.095
<u>Historically popular operas</u> <u>Loewenberg's (1978) <i>Annals of Opera</i> 1770-1940 (N=62)</u>		
1780-1821	0.378	0.126
1780-1800	0.125	0.083
1801-1821	0.619	0.167
<u>Long-lived operas</u> <u>Available for sale on <i>Amazon</i> in 2014 (N=42)</u>		
1780-1821	0.243	0.089
1780-1800	0.151	0.025
1801-1821	0.452	0.031

*Notes:* Data include 473 new operas that premiered between 1780 and 1821 within the borders of Italy in 1900. *Lombardy & Venetia* adopted copyright laws in 1801, after they had fallen under Napoleonic rule. *Other States* includes Sardinia, Modena and Reggio, Parma and Piacenza, Tuscany, Papal States and Sicily. *Historically popular operas* include 62 operas that premiered between 1780 and 1821 and were listed in Loewenberg's (1978) compendium of notable performances between 1597 and 1940 in the *Annals of Opera*. *Long-lived operas* includes 42 operas that premiered between 1780 and 1821 and were for sale on Amazon in March 2014.

TABLE 2 – MEAN NUMBER OF NEW OPERAS PER STATE AND YEAR IN ITALY, 1770-1900

ITALIAN STATES:	WITH COPYRIGHT	WITHOUT COPYRIGHT
<u>All operas (N=2,598)</u>		
1770-1900	7.374	2.212
<u>Historically popular operas</u> <u>Loewenberg's (1978) <i>Annals of Opera</i> 1770-1940 (N=254)</u>		
1770-1900	0.733	0.404
<u>Long-lived operas</u> <u>Available for sale on <i>Amazon</i> in 2014 (N=155)</u>		
1770-1900	0.823	0.409

*Notes:* Data include 2,598 new operas that premiered between 1770 and 1900 within the borders of Italy in 1900. *Historically popular operas* include 254 operas that premiered between 1780 and 1821 and were listed in Loewenberg's (1978) compendium of notable performances between 1597 and 1940 in the *Annals of Opera*. *Long-lived operas* includes 155 operas that premiered between 1770 and 1900 and were for sale on Amazon in March 2014.

TABLE 3 – OLS AND QML POISSON REGRESSIONS, DEPENDENT VARIABLE IS NEW OPERAS PER YEAR AND STATE, 1780-1821

	(1)	(2)	(3)	(4)	(5)
	OLS (1-4)				QML Poisson (5)
Lombardy & Venetia *post1801	2.124*** (0.402)	2.069*** (0.421)	2.091*** (0.404)	2.165*** (0.397)	1.045*** (0.146)
Lombardy & Venetia		0.311 (0.241)			
Year FE	Yes	Yes	Yes	Yes	Yes
State FE	Yes	No	Yes	Yes	Yes
Linear pre-trend for Lombardy & Venetia	No	No	Yes	No	No
State-specific linear pre-trend	No	No	No	Yes	No
Pre-1801 mean operas per year	1.413	1.413	1.413	1.413	1.413
N (year-state pair)	336	336	336	336	336
R-squared	0.796	0.718	0.798	0.798	

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

*Notes:* The dependent variable *new operas per year and state* measures the number of new operas that were premiered in state *i* and year *t* between 1780 and 1821. State borders are defined by the year 1900 borders of Italy. The indicator variable *Lombardy & Venetia* equals 1 for Lombardy and Venetia, which adopted copyright laws in 1801, after they had fallen under Napoleonic rule. The indicator variable *post1801* equals 1 for years after 1801. *Mean operas* reports the mean of the dependent variable – count of new operas per year and state – for year-state pairs. State fixed effects control for variation in opera production that is constant over time. Year fixed effects controls for variation over time that is shared across states. Data include 328 new operas that premiered between 1790 and 1821 within the year 1900 borders of Italy. Columns (1) to (4) are OLS; column (5) reports the average treatment effect of the conditional fixed effects quasi-maximum likelihood Poisson regression.

TABLE 4 – OLS: HISTORICALLY POPULAR AND LONG-LIVED NEW OPERAS PREMIERED PER YEAR AND STATE, 1780-1821

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Historically popular operas (1-4) <i>Annals of Operas</i> (1770-1940)				Long-lived operas (5-8) Available on <i>Amazon</i> in 2014			
Lombardy & Venetia * post1801	0.418*** (0.152)	0.411*** (0.152)	0.568** (0.251)	0.371** (0.156)	0.307** (0.130)	0.302** (0.130)	0.308** (0.129)	0.302** (0.132)
Lombardy & Venetia		0.041 (0.067)				0.000 (0.028)		
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
State FE	Yes	No	Yes	Yes	Yes	No	Yes	Yes
Linear pre-trend for N. Italy	No	No	Yes	No	No	No	Yes	No
State-specific linear pre-trend	No	No	No	Yes	No	No	No	Yes
Pre-1801 mean operas per year and state	0.094	0.094	0.094	0.094	0.025	0.025	0.025	0.025
N (year-state pair)	336	336	336	336	336	336	336	336
R-squared	0.341	0.299	0.351	0.343	0.358	0.302	0.367	0.358
Robust standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1								

*Notes:* The dependent variable *new operas per year and state* measures the number of new operas that were premiered in state *i* and year *t* between 1780 and 1821. State borders are defined by the year 1900 borders of Italy. The indicator variable *Lombardy & Venetia* equals 1 for Lombardy and Venetia, which adopted copyright laws in 1801, after they had fallen under French rule. The indicator variable *post1801* equals 1 for years after 1801. *Mean operas* reports the mean of the dependent variable – count of new operas per year and state – for year-state pairs. State fixed effects control for variation in opera production that is constant over time. Year fixed effects controls for variation over time that is shared across states. Data include 328 new operas that premiered between 1790 and 1821 within the year 1900 borders of Italy. Columns (1)-(4) estimate OLS regressions for 62 new operas premiered between 1780 and 1821 that entered Loewenberg’s (1978) *Annals of Operas*, a compendium of notable performances; columns (6)-(10) estimate OLS regressions for 42 new operas still premiered between 1780 and 1821 that were for sale on Amazon on March 2014.

TABLE 5 – OLS AND QML POISSON,  
DEPENDENT VARIABLE IS NEW OPERAS PER YEAR AND STATE, 1770-1900

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	OLS (1-2)		Poisson(3)	Operas in <i>Annals of Operas</i> (1770-1945)		Operas on <i>Amazon</i> 2014	
Copyright	2.683*** (0.436)	2.533*** (0.439)	0.952*** (0.149)	0.188* (0.098)	0.193** (0.095)	0.327*** (0.111)	0.372*** (0.107)
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
State FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
State-specific linear pre-trend	No	Yes	No	No	Yes	No	Yes
Pre-copyright mean opera per state and year	2.212	2.212	2.212	0.404	0.404	0.409	0.409
Observations	1,048	1,048	1,048	1,048	1,048	1,048	1,048
R-squared	0.706	0.709		0.709	0.259	0.370	0.160

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

*Notes:* The dependent variable *new operas per year and state* is the count of new operas premiered between 1770 and 1900 in theaters within the 1900 borders of Italy for a year-state pair. *Copyright* is an indicator variable that equals 1 if state offers copyright protection in that year. *Mean operas* reports the mean of the dependent variable – count of new operas per year and state – for year-state pairs *without* copyrights. Specifications (1)-(2) estimate OLS regressions; specification (3) estimates the average treatment effects (ATE) of a conditional fixed effects Poisson regression. Data include 2,598 new operas premiered between 1770 and 1900 in theaters within the 1900 borders of Italy.

TABLE 6 – LENGTH OF COPYRIGHT AND COUNTS OF NEW OPERAS CREATED PER STATE AND DECADE, 1770-1900

	1770-1800	1801-1825	1826-1827	1828-1839	1840-1864	1865-1969	1870-1900
Sardinia	no copyright 8.2 operas	no copyright 15.2 operas	no copyright 5 operas	no copyright 24.2 operas	life+30y 34.4 operas	life+40y 28 operas	life+40y 41 operas
Modena	no copyright 0.9 operas	no copyright 2 operas	no copyright 1 operas	no copyright 3.3 operas	life+30y 5.2 operas	life+40y 0 operas	life+40y 4.8 operas
Parma	no copyright 6.4 operas	no copyright 6.4 operas	no copyright 0.0 operas	no copyright 4.2 operas	life+30y 5.6 operas	life+40y 6 operas	life+40y 4.8 operas
Tuscany	no copyright 3.6 operas	no copyright 9.2 operas	no copyright 30.0 operas	no copyright 25.0 operas	life+30y 24.4 operas	life+40y 24 operas	life+40y 27.4 operas
Lombardy	no copyright 3.6 operas	life+10y 50.8 operas	life+10y 55 operas	life+10y 62.5 operas	life+30y 55.2 operas	life+40y 58 operas	life+40y 50.3 operas
Venetia	no copyright 17.3 operas	life+10y 34.4 operas	life+10y 25.0 operas	life+10y 29.2 operas	life+30y 25.2 operas	life+40y 32 operas	life+40y 36.1 operas
Papal State	no copyright 6.4 operas	no copyright 34.4 operas	life+12y 25 operas	life+12y 29.2 operas	life+30y 26.4 operas	life+30y 28 operas	life+40y 41.0 operas
Sicilies	no copyright 26.4 operas	no copyright 46 operas	no copyright 155 operas	life+30 170 operas	life+30y 98.4 operas	life+40y 48.0 operas	life+40y 45.8 operas

Notes: Copyrights for *life +10* (30, 40) create exclusive rights in an opera for the duration of a composer's life plus 10 (30, 40) years. The variable *operas* counts the number of opera premieres per decade in state *i*. For example 5 composers created a total of 9 operas in Sardinia in 11 years between 1770 and 1800, which is equivalent to 8.2 operas per decade. Data include 2,598 operas first performed between 1770 and 1900, collected from Ambiveri (1998), Dassori (1903), and Loewenberg (1978).

TABLE 7 – COUNTS OF COMPOSERS BY STATE OF BIRTH AND FIRST PERFORMANCE  
 PANEL A: 1780-1800

Composed in:	Sardinia	Modena	Parma	Tuscany	Lombardy	Venetia	Rome	Sicily
Born in:								
Sardinia	0	0	0	0	0	0	0	0
Modena	1	0	0	0	0	0	2	0
Parma	0	0	0	1	0	0	0	0
Tuscany	0	0	0	0	0	0	0	0
Lombardy	0	0	0	0	0	0	0	0
Venetia	0	0	0	0	0	0	0	0
Rome	0	0	0	0	0	2	0	3
Sicily	0	0	0	0	6	0	0	0

PANEL B: 1801-1821

Composed in:	Sardinia	Modena	Parma	Tuscany	Lombardy	Venetia	Rome	Sicily
Born in:								
Sardinia	0	0	0	0	11	2	1	0
Modena	0	0	1	0	0	0	0	0
Parma	0	0	0	0	3	0	1	0
Tuscany	0	0	0	0	3	0	2	0
Lombardy	0	0	0	0	8	0	0	0
Venetia	0	0	0	0	1	0	0	0
Rome	0	0	0	0	15	8	0	0
Sicily	0	0	0	0	10	3	0	0

*Notes:* This table records the count of composers by the composer's state of *birth* and by the state in which the *opera* was first performed. Values on the diagonal report operas that were first performed in their composer's state of birth. Data include locations of 473 premieres for 473 new operas that premiered within the year 1900 borders of Italy between 1770 and 1821; we collected these data from handbooks of Italian operas (Ambiveri 1998, Dassori 1903, and Loewenberg 1978. Data on composers' states of birth are drawn from these handbooks, and the *New Grove Dictionary of Music and Musicians* (2001) and Treccani (2001). (2001).



TABLE 8 - MEAN NUMBER OF NEW OPERAS PER STATE AND YEAR IN ITALY BY NATIVES AND IMMIGRANTS, 1780-1821

	LOMBARDY & VENETIA			OTHER STATES		
	All	<u>All Operas (N=478)</u> Natives Immigrants		All	Natives	Immigrants
1780-1821	3.061	2.514	1.619	1.736	1.589	0.128
1780-1800	1.547	1.317	0.304	1.358	1.113	0.329
1801-1821	4.476	2.795	2.813	2.095	1.742	0.487
<u>Historically popular operas: Loewenberg's (1978) <i>Annals of Opera</i> 1770-1940 (N=62)</u>						
	All	Natives	Immigrants	All	Natives	Immigrants
1780-1821	0.378	0.206	0.151	0.126	0.097	0.048
1780-1800	0.125	0.107	0.023	0.083	0.074	0.012
1801-1821	0.619	0.393	0.296	0.167	0.152	0.016
<u>Long-lived operas: Available for sale on <i>Amazon</i> in 2014 (N=42)</u>						
	All	Natives	Immigrants	All	Natives	Immigrants
1780-1821	0.243	0.205	0.057	0.089	0.058	0.043
1780-1800	0.151	0.125	0.070	0.025	0.021	0.060
1801-1821	0.452	0.290	0.136	0.031	0.023	0.014

*Notes:* Data include 473 new operas that premiered between 1780 and 1821 within the borders of Italy in 1900. *Natives* if the mean of operas per state per year if the composer was born in the state in which opera was premiered. *Immigrants* if the mean of operas per state per year if the composer was born in a different state from the one in which opera was premiered. *Lombardy & Venetia* adopted copyright laws in 1801, after they had fallen under Napoleonic rule. *Other States* includes Sardinia, Modena and Reggio, Parma and Piacenza, Tuscany, Papal States and Sicily. *Historically popular operas* include 62 operas that premiered between 1780 and 1821 and were listed in Loewenberg's (1978) compendium of notable performances between 1597 and 1940 in the *Annals of Opera*. *Long-lived operas* includes 42 operas that premiered between 1780 and 1821 and were for sale on Amazon in March 2014.

TABLE 9 – THEATERS PER STATE AND YEAR

PANEL A: 1780-1821

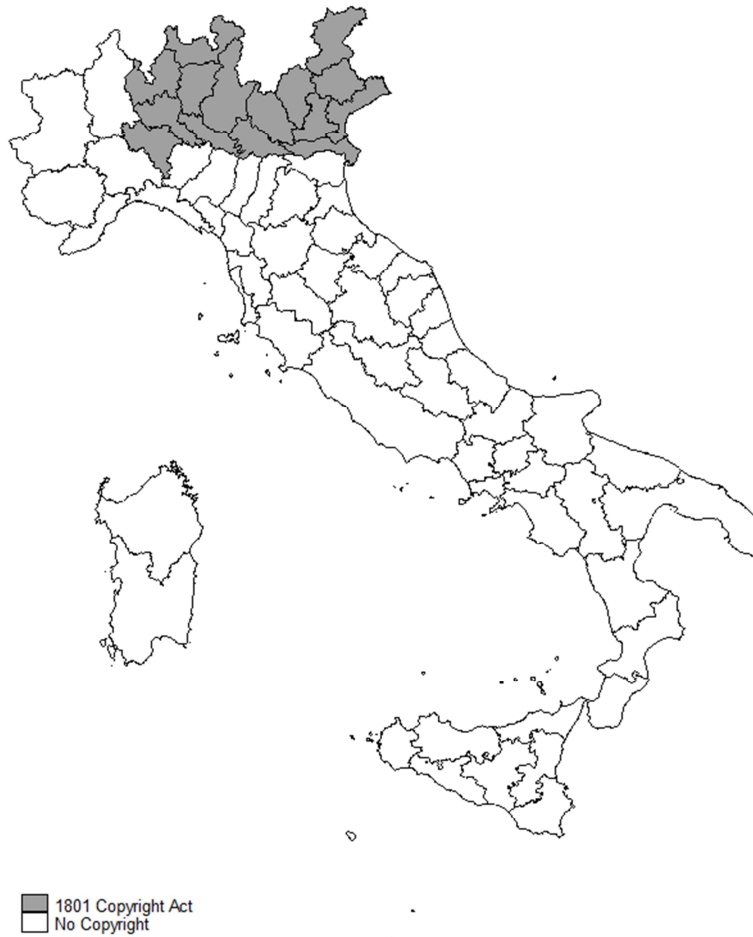
	THEATERS WITH >100 SEATS		THEATERS THAT PERFORMED ≥1 OPERA	
	LOMBARDY & VENETIA	OTHER STATES	LOMBARDY & VENETIA	OTHER STATES
1780-1800	6.50	5.00	1.50	1.00
1801-1821	8.00	6.50	3.00	1.50

PANEL B: 1770-1900

	THEATERS WITH >100 SEATS		THEATERS THAT PERFORMED ≥1 OPERA	
	COPYRIGHT	NO COPYRIGHT	COPYRIGHT	NO COPYRIGHT
1770-1800	-	3.75		1.13
1801-1825	6.50	5.00	3.00	1.50
1826-1827	6.67	8.20	3.00	1.60
1828-1839	11.75	4.00	2.00	1.50
1840-1864	8.13	-	2.38	
1865-1869	8.88	-	2.50	
1870-1900	35.40	-	2.88	

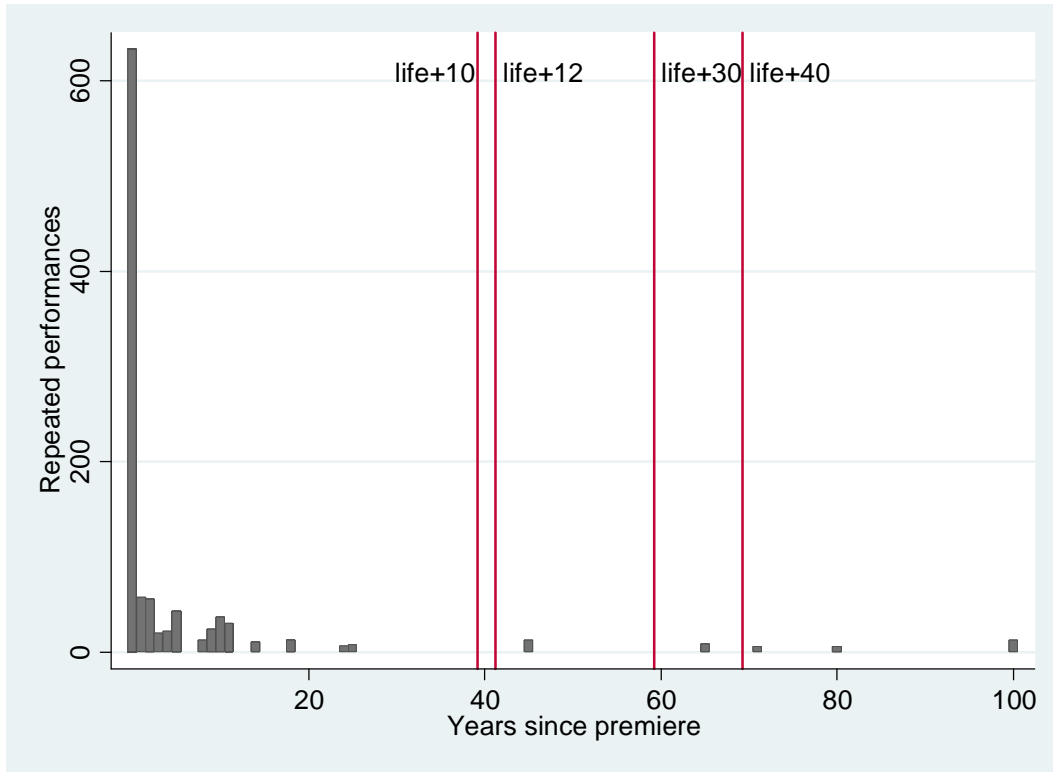
*Notes:* 100 seats is a standard lower bound for a theater that has enough capacity to host an opera (e.g. Antolini 2000, p.132). Data on theaters >100 seats are from Antolini (2000). Information on theaters that performed at least 1 opera are drawn from Loewenberg (1978, premieres and other performances), Dassori (1903, premieres), and Ambiveri (1998, premieres).

FIGURE 1 – MAP OF ITALIAN STATES THAT ADOPTED COPYRIGHT LAW IN 1801



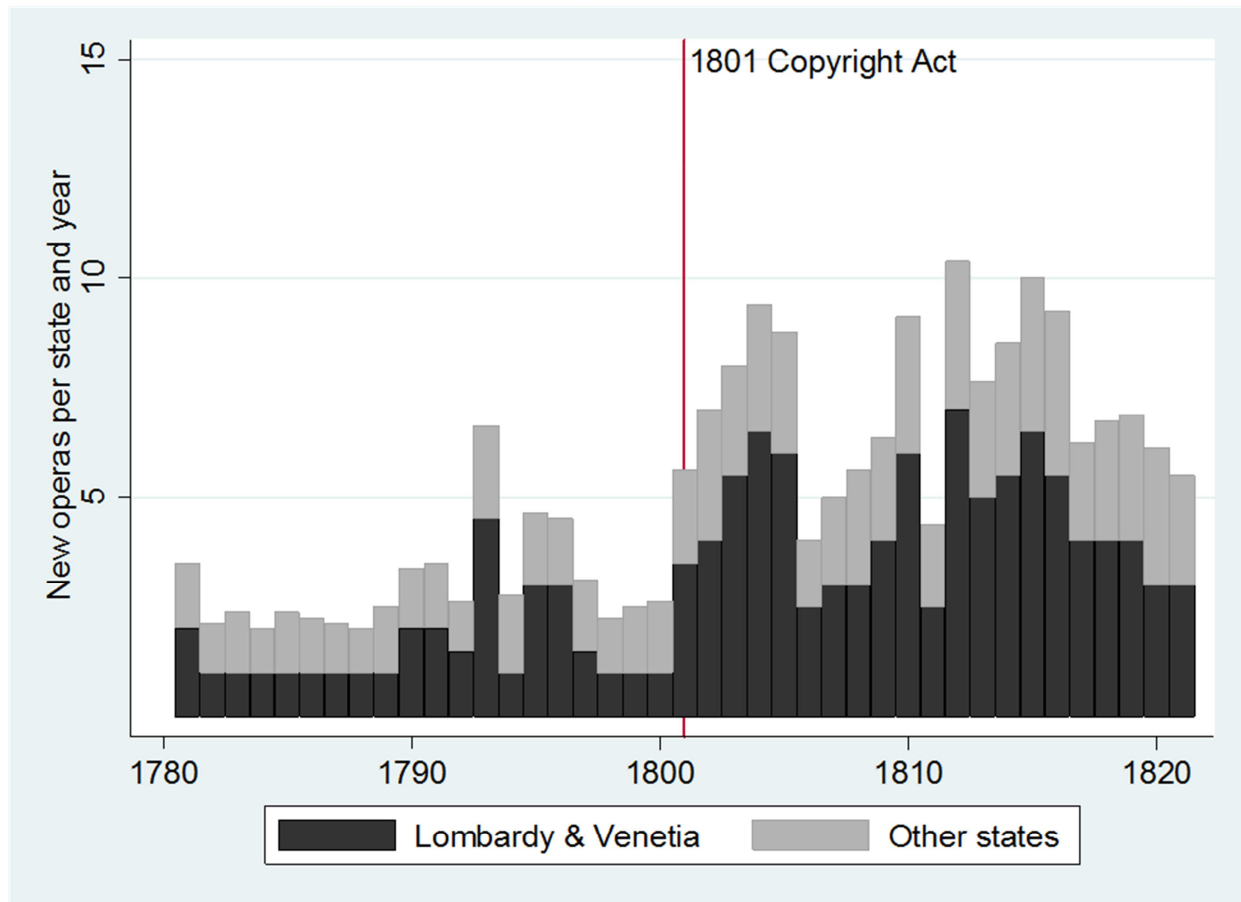
*Notes:* Lombardy and Venetia adopted copyrights in 1801, as part of a broader packet of French laws, after they had fallen under French rule. Shapefiles for Italy are from the Italian National Institute for Statistics (ISTAT, accessed October 3, 2014).

FIGURE 2 – PERFORMANCES IN THE FIRST 100 YEARS AFTER THE PREMIERE OF AN OPERA FOR ALL 8 STATES AND OPERAS THAT PREMIERED 1780-1800



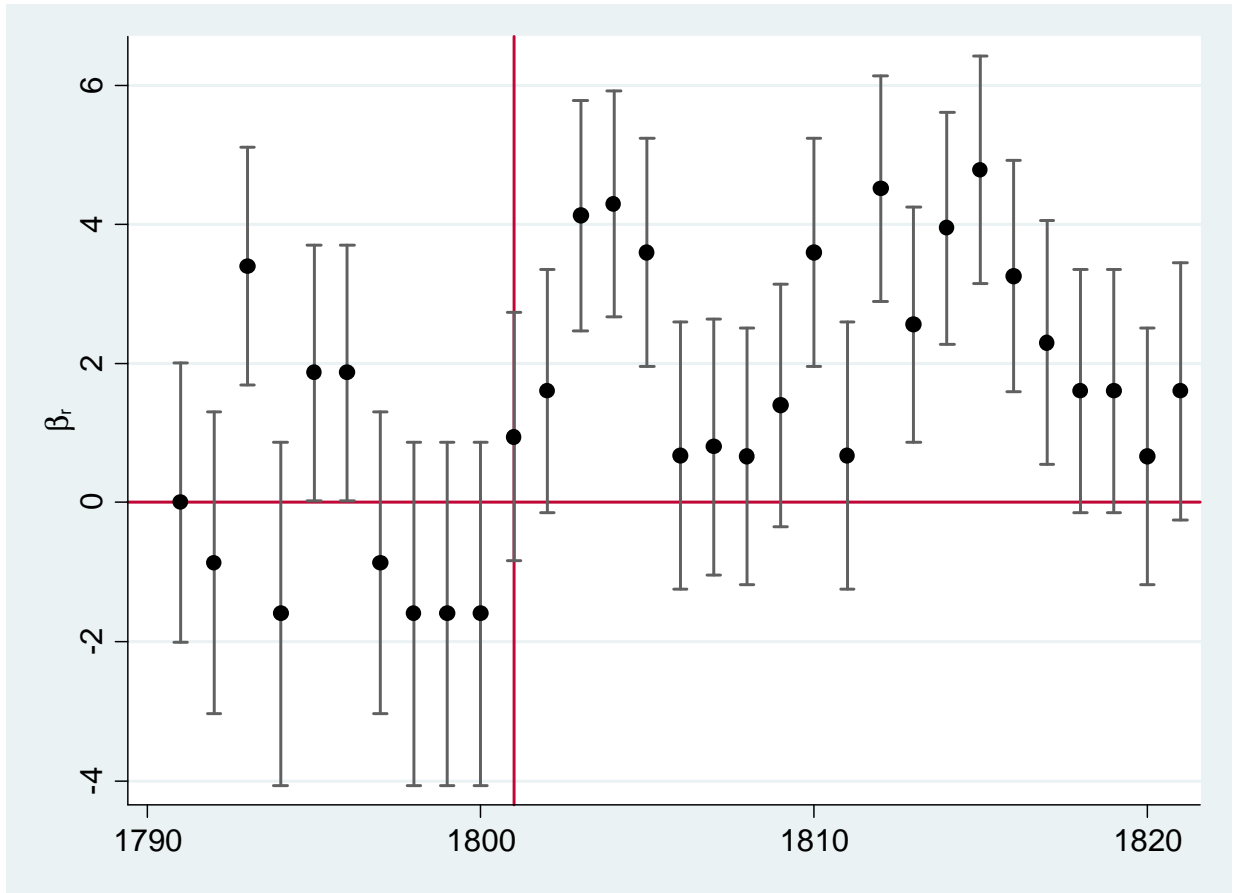
Notes: Data on 165 performances in each year for the first 100 years that had passed since the premiere of the opera for 165 operas that premiered between 1780 and 1800 in Italy (including all 8 states). Operas to the left of the vertical line would be on copyright under a copyright regime of  $life + 10$  which Lombardy and Venetia began to offer in 1801. The expected length of copyright under  $life + 10$  equals 39.23 years, which is 10 years plus the average remaining years of life in the year of the premiere for 705 composers and 2,598 opera that premiered between 1770 and 1900 (29.23 years). Vertical red lines for copyright extensions are defined accordingly:  $life+12$  (41.29 years),  $life+30$  (49.23 years) and  $life+40$  (59.23 years). We collected performance data from Loewenberg (1978).

FIGURE 3 – MEAN NEW OPERAS PREMIERED PER STATE AND YEAR IN ITALY, 1780-1821



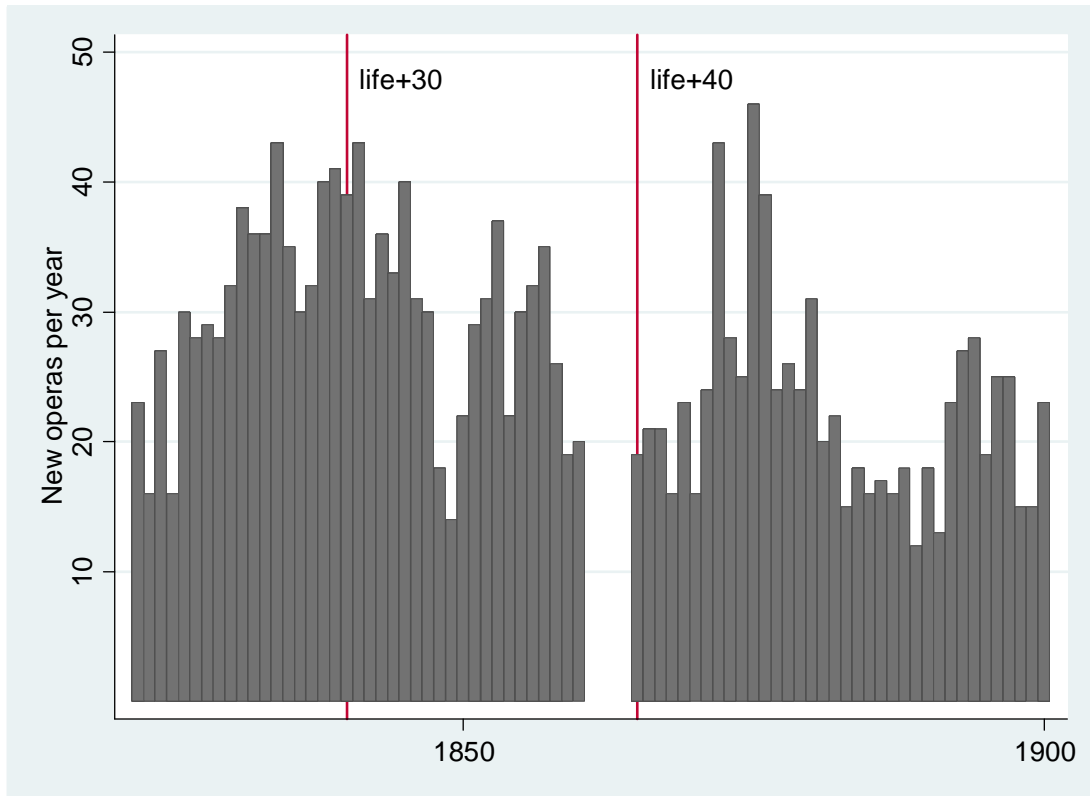
Notes: Data include 478 new operas that premiered between 1780 and 1821 within the year 1900 borders of Italy. We have collected these data from Loewenberg (1978), Dassori (1903), and Ambiveri (1998). Lombardy & Venetia adopted copyright laws as part of a broader packet of French laws in 1801, after they had fallen under French rules. *Other states* include Sardinia, Parma and Piacenza, Modena and Reggio, the Papal State, and the Two Sicilies.

FIGURE 4 – OLS ANNUAL ESTIMATES FOR EFFECTS OF COPYRIGHT LAWS ON CREATION OF NEW OPERAS PER STATE AND YEAR



Notes: 95% confidence interval for  $\beta_r$  in  $opera_{it} = \beta_0 + \beta_r Lombardy \& Venetia_i \times year_r + \varphi_i + \delta_r + \varepsilon_{it}$  where the dependent variable counts the number of new operas premiered per state and year. The variable *Lom&Ven* equals 1 for Lombardy and Venetia, which adopted copyright laws in 1801. The variable *year<sub>r</sub>* indicates individual years between 1791 and 1821; years between 1780 and 1790 are the excluded period. State fixed effects  $\varphi_i$  control for variation in opera production across states that is constant over time. Year fixed effects  $\delta_r$  controls for variation over time that is shared across states. Data include 473 new operas that premiered between 1790 and 1821 within the year 1900 borders of Italy.

FIGURE 5 – MEAN NEW OPERAS PREMIERED PER STATE AND YEAR  
IN LOMBARDY AND VENETIA, 1820-1861



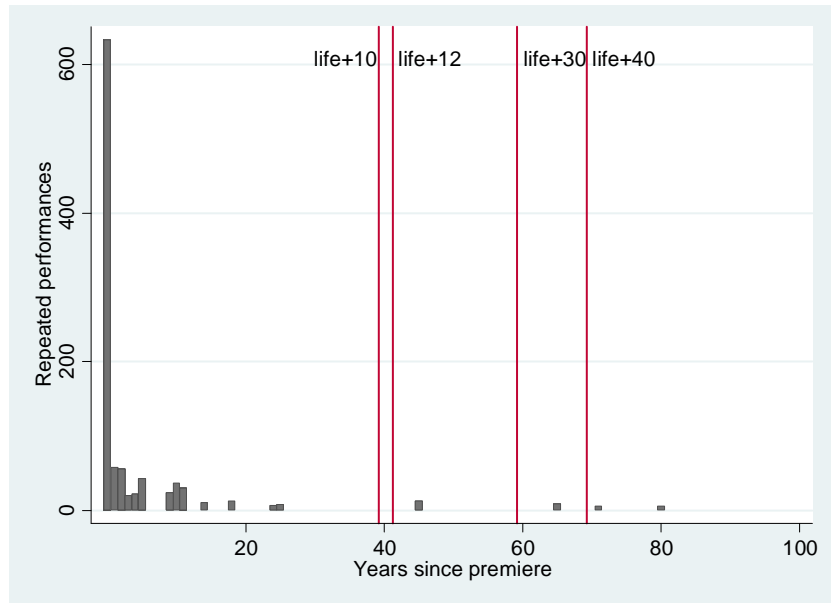
*Notes:* Data include 580 new operas that premiered between 1820 and 1861 in Lombardy and Venetia. We have collected these data from Loewenberg (1978), Dassori (1903), and Ambiveri (1998). The vertical line corresponds to the bilateral Treaty between Kingdom of Sardinia and Austria that extended copyright length from *life+10* to *life+30*, and Italian copyright law of 1865 that extended copyright length from *life+30* to *life+40*.

APPENDIX

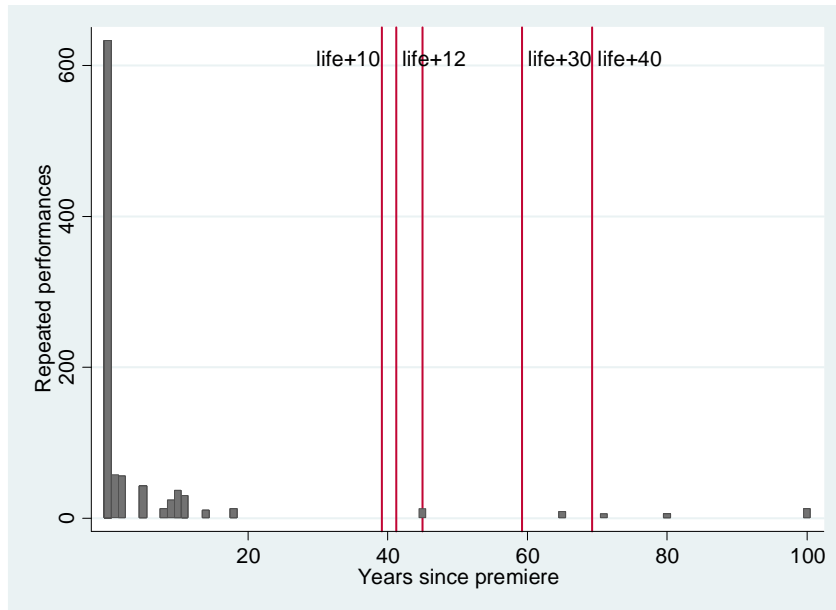
NOT FOR PUBLICATION



FIGURE A1 – PERFORMANCES IN THE FIRST 100 YEARS AFTER THE PREMIERE OF AN OPERA  
 PANEL A: LOMBARDY AND VENETIA



PANEL B: OTHER ITALIAN STATES



Notes: Data on 165 performances in each year for the first 100 years that had passed since the premiere of the opera for 165 operas that premiered between 1780 and 1800 in Lombardy and Venetia (Panel A) and in other states (Panel B). Operas to the left of the vertical line would on copyright under a copyright regime of *life + 10* which Lombardy and Venetia began to offer in 1801. The expected length of copyright under *life + 10* equals 39.23 years, which is 10 years plus the average remaining years of life in the year of the premiere for 705 composers and 2,598 opera that premiered between 1770 and 1900 (29.23 years). Vertical red lines for copyright extensions are defined accordingly:

*life+12* (41.29 years), *life+30* (49.23 years) and *life+40* (59.23 years). We collected performance data from Loewenberg (1978).

#### DATA APPENDIX: SOURCES

##### A) PREMIERES PERFORMED AT NEW YORK METROPOLITAN

The premieres still performed at New York Metropolitan in the 10's are: "Il barbiere di Siviglia (The barber of Seville)" by Gioacchino Rossini (1816), "Olivo e Pasquale (Olivo and Pasquale)" by Gaetano Donizetti (1827), "L'elisir d'amore (The elixir of love)" by Gaetano Donizetti (1829), "La sonnambula (The sleepwalker)" by Vincenzo Bellini (1831), "Lucia di Lammermoor (Lucia of Lammermoor)" by Gaetano Donizetti (1835), "Rigoletto" by Giuseppe Verdi (1851), "Il trovatore (The trobadour)" by Giuseppe Verdi (1853), "La traviata (The fallen woman)" by Giuseppe Verdi (1853), "Un ballo in maschera (A masked ball)" by Giuseppe Verdi (1859), "Otello" by Giuseppe Verdi (1887), "La cavalleria rusticana (Rustic Chivalry)" by Pietro Mascagni (1890), "Pagliacci (Clowns)" by Ruggero Leoncavallo (1892), "Falstaff" by Giuseppe Verdi (1893), "Manon Lescaut" by Giacomo Puccini (1893), "La Boheme" by Giacomo Puccini (1896), "Iris" by Pietro Mascagni (1898), "Tosca" by Giacomo Puccini (1900). The premieres, defined as belonging to the "Top 50 operas in the world" by the Guardian are: "Il barbiere di Siviglia (The barber of Sevilla)" by Gioacchino Rossini (1816), "L'elisir d'amore (The elixir of love)" by Gioacchino Rossini (1829), "La Norma" by Vincenzo Bellini (1831), "Lucia di Lammermoor" by Gaetano Donizetti (1835), "Rigoletto" by Giuseppe Verdi (1851), "La traviata" by Giuseppe Verdi (1853), "Pagliacci (Clowns)" by Ruggero Leoncavallo (1892), "Falstaff" by Giuseppe Verdi (1893), "La Boheme" by Giacomo Puccini (1896), "Tosca" by Giacomo Puccini (1900). Giuseppe Verdi composed "Otello" (1887) and "Falstaff" (1893) when he was, respectively, 74 and 80 years old.

##### B) SHAPEFILES FOR MAPS OF

The source for Italy shapefiles is the Italian National Institute for Statistics (ISTAT), accessed October 3, 2014 through: <http://www.istat.it/it/archivio/104317#confini>

The map refers to 2010 Italian regions borders. We adapted provinces borders to 1861, pre-unification states borders to 1815 and we referred to Italian borders as in 1900, following ISTAT Census data.