COPYRIGHT AND CREATIVITY- EVIDENCE FROM ITALIAN OPERAS*

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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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The primary "purpose of copyright is to create incentives for creative effort."[1] To achieve this goal, copyrights create temporary monopolies in creative output, ranging from literature, music, and movies to web content and computer software. Yet, due to major data constraints and the paucity of experimental variation in copyright laws, systematic empirical evidence continues to be scarce. An empirical analysis of historical book prices indicates that extensions in the lengths of copyrights can raise the price of copyrighted content (Li et al. 2014), and may increase payments to authors (MacGarvie and Moser 2014). Analyses of piracy in popular music, however, indicate no significant effects of copyright violations on sales or the quality of recorded music (Oberholzer-Gee and Strumpf 2007, Waldfogel 2011), and historical comparisons of counts of composers across countries with and without copyrights yield no conclusive evidence for the effects of copyrights (Scherer 2004, pp. 195-196).

This paper extends the available evidence by exploiting variation in the adoption of copyright laws – as a result of Napoleon's military campaign in Northern Italy- to examine the effects of a copyright law on the quantity and quality of creative output. Lombardy and Venetia adopted copyright laws in 1801, after they fell under French rule. Due to the timing of their annexation Lombardy and Venetia remained the only states within Italy to offer copyrights until 1826, while six other Italian states continued to offer no copyrights.[2] To measure variation in creative output in response to copyright laws we have collected a new data set of 2,598 operas that premiered across eight Italian states between 1770 (the beginning of the Italian *bel canto* period) and 1900 (the end of the *verismo* period and the Italian *ottocento*).

Comparisons of new operas per state and year reveal substantial increase in the number of new operas in states with copyrights after 1801. Baseline estimates indicate that Lombardy and Venetia produced 2.12 additional operas per year compared with other Italian states after 1801. Relative to an average of 1.41 operas per state and year before 1801, this implies a 150 percent increase.

[1] *Sony Corp. of America v. Universal City Studios*, 464 U.S. 417, 104 S. Ct. 774, 78 L. Ed. 2d 574 (1984). In this paper, we adopt Feinstein's (2013, p. 8) definition of 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."

[2] Lombardy and Venetia were annexed by France between the adoption of the French Copyright Law in 1793 and the (Napoleonic) *code civile* in 1804. The code *civile* left copyrights intact where they had been established but did not introduce copyrights in states that had not yet adopted them. As a result, Lombardy and Venetia were the only Italian states that were exposed both to the Napoleonic code and copyrights.

Was this increase in output driven by low or high quality creative work? If copyright increases the profitability of creative output independently of quality, the adoption of copyright laws can reduce the average quality of creative output by raising low-quality output above the threshold of profitability. If copyrights, however, disproportionately raise the profitability of high-quality work, they can increase the average quality of creative output. Copyrights in music (as well as theaters and other types of works with repeat performances) grant composers the rights to payments for repeated performances of their work. Intuitively, this increases the profitability of high quality work, which tends to me more popular and durable.

An exceptional wealth of historical records on operas allows us to examine the effects of copyrights on the quality of creative output. The first measure captures historically popular operas, which enter records of notable opera performances in Alfred Loewenberg's (1943, 1978) *Annals of Opera (1597-1940).* Loewenberg includes performances for 245 of all 2,598 operas in our data (nearly 10 percent). Estimates of these data imply a 4.6-fold increase in the creation of historically popular operas in response to copyrights. An alternative measure captures the creation of exceptionally durable operas that continued to 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.

How did the creation of copyrights increase the quantity and quality of creative output? Biographic data indicate that immigrants accounted for the large majority of additional operas in Lombardy and Venetia after 1801, even though output by native composers increased as well. 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 helped to increase creative output in states with copyrights relative to other states in part by attracting immigrants from states without copyright.

We also examine the effects of copyright adoptions in other Italian states, which adopted copyrights between 1826 and 1840, as Italy's states moved towards unification. OLS regressions indicate that the adoption of copyrights was associated with an increase in production in this broader sample of Italian states; state-year pairs with copyrights produced 2.68 additional operas per year compared with state-year pairs without copyrights. Relative to 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.

A final test examines the effects of copyright *extensions*. Lombardy and Venetia, for example, increased their length of copyright protection from *life+10* (the duration of the authors life plus 10 years for heirs) to *life+30* in 1840 and *life+40* in 1865. By 1870 all eight Italian states had extended the length of their copyrights to *life+40*. In contrast to the effects of copyright adoptions, the data reveal no clear effects of copyright extensions on the number and the quality of operas.

The remainder of this paper is structured as follows. Section I presents a brief history of changes in copyrights. Section II describes the data on operas output (premieres), quality measures, and demographic data on composers. Section III presents baseline estimates, which evaluate the effects of the adoption of copyrights in Lombardy and Venetia in 1801. Section IV examines changes in output across all of Italy, and section V concludes.

I. A Brief History of Italian Opera and Copyrights

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

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

Public demand for opera proved so large that by the end of the 17th 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, and had no rights to be compensated for future performances (Scherer 2008, p. 5).

In the absence of copyright protection, piracy was rampant. Mozart, for example, wrote to his father in 1782 that he felt indebted to the Baron von Riedesel who had bought the score for *Die Entführung aus dem Serail* directly from him when he could have obtained a cheaper version from a copyist (Scherer 2004, p. 167). Without copyrights, impresarios or publishers might

> "…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 point out that he could get one elsewhere at half the asking price" (Rosselli 1996, p.74).[3]

Instead of relying on repeat sales of their works, composers in Italy would hope to "recycle some of the music in another opera and another town" (Rosselli 1996, p. 74), or move to Paris to take advantage of French copyrights. Vincenzo Bellini (1801-1835), for example, praised the French copyright system, which allowed composers to collect royalties from a large number of provincial towns where the opera circulated after the initial production.[4] In Italy, Bellini had unsuccessfully sought performance fees from smaller theaters but, faced with competition from pirated copies, was unable to extract much revenue (Scherer 2004, p. 179).

I.A. Napoleon's Military Campaign 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.[5] 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

[3] Payments for printing rights remained modest compared with payments for performance right. For example, the Milanese publisher Ricordi paid Bellini 4,000 Austrian lire (3,489 francs) for *La somnambula*, one third of the flat fee that Bellini had received (Rosselli 1996, p. 75).
[4] Letter from September 4, 1834, cited in Rosselli 1996, p. 119.
[5] 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.

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. Under the new law, composers now had the right to collect royalties for repeat performances of their operas (Celletti, 1959, p. 518).[6]

Due to the timing of Napoleon's military victories, only Lombardy and Venetia adopted the French copyright law, while the rest of Italy came under the influence of French laws, culture, and other aspects of Napoleon's influence *without* copyrights.[7] On March 21, 1804, the Parliament of France adopted the (Napoleonic) *code civile.* It left copyrights intact where they had already been established, but did not introduce copyrights to states that had not yet adopted them. The *code civile* was extended to territories that Napoleon conquered after 1801 (Treccani 2001, p. 647), including the Kingdom of Sardinia (1804), Parma (1805), Tuscany (1809), the Kingdom of Naples (1812), and the Papal State (1812, Latium).

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).[8] It also created a system of state borders within Italy that remained intact until Italy's unification: the Kingdom of Lombardy and Venetia, the Kingdom of Sardinia (which, for simplicity, we will call

[6] Although the French and Austrian laws included so-called performance rights, not all other copyright laws did. Britain's law was amended to cover performances in 1842, and the US law in 1870 (Scherer 2002, p. 178).
[7] France had adopted copyrights in 1793 to replace the royal privileges, which had been abolished after the French Revolution in 1789.
[8] In 1815, the Congress of Vienna placed Lombardy and Venetia under the rule of Austria's Kaiser Franz I (1768-1835) to form the Crown Land of the Kingdom of Lombardy–Venetia (Regno Lombardo-Veneto).

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).[9]

Lombardy and Venetia remained the only states to offer copyrights in Italy for 25 years (Figure 1). Copyrights from Lombardy were enforceable in Venetia, and copyrights from Venetia were enforceable in Lombardy. In other Italian states, however, theaters could perform works that had been copyrights in Lombardy and Venetia without additional payments to composers.

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

On September 28, 1826, an edict of Pope Leo XII (Editto n. 433, Stato Pontificio) established exclusive rights in compositions, books, and other intellectual goods for the duration of their creators' life plus 12 years. Only two years later, in 1828, a decree of Francesco I (1777-1830), King of the Two Sicilies, created copyrights for the duration of the composer's live 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.

Although there is no direct evidence for lobbying in Italy, the adoption of long-lived copyrights in the Two Sicilies may have been an early instance of a response to lobbying. In 1825, the records of the German Bundesversammlung include a request for copyrights by a group of well-known composers including Johann Nepomuk Hummel, Carl Maria von Weber, and Ludwig van Beethoven, who complained that publishers were "getting fat by robbing without penalty their neighbors property," and demanded the right to collect fees for "operas and opera-like works" (Scherer 2002, pp. 176-8). Even though we have not found any comparable evidence for lobbying for the Two Sicilies, they had produced many successful composers, including Domenico Cimarosa (1749-1801), and our data indicate that opera output had begun to increase *before* the Two Sicilies adopted copyrights, (from 2 new operas in 1795, 3 in 1800, 2 in

[9] The Congress of Vienna also created the Duchy of Lucca, which remained under the influence of Tuscany and was annexed by Tuscany in 1848. There were no opera productions in Lucca and we treat it as a part of Tuscany.

1805, and 2 in 1810, increasing to new operas 15 in 1827, the year the Two Sicilies began to offer copyrights.

The need for copyright protection increased with the appearance of music publishers in the 1810s. Publishers depended primarily on adapting vocal scores from new areas for amateur musicians, and also often ran a copying business on the side (Rosselli 1996, p. 74).

I.D. Sardinia's bilateral treaty with Austria in 1840 and Italy's Unification in 1861

In the following decades, 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' 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.[10] This agreement introduced copyrights in Sardinia, Tuscany, Modena, and Parma and extended copyrights in Lombardy and Venetia from *life+10* to *life+30* and in the Papal State from *life+12* to *life+30*.[11]

On April 27, 1859, 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). The French and Sardinian Army

[10] 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.

[11] With his publisher and agent Ricordi, Verdi began to exploit this shift towards stronger copyrights to levy hefty fees for each performance (of 400 Francs, equivalent to three months' earning for a building craftsman). This led impresarios ignore Verdi's copyrights and lobby for a repeal of Sardinia's copyright laws. In an exchange of letters in the 1850s, Ricordi explained to his client: "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." (Ricordi to Verdi on 1850, cited in Scherer 2002, pp. 179). Ricordi proposed to Verdi that they negotiate with each theater separately, according to their willingness to pay. Verdi accepted the scheme and Ricordi enforced it by employing a team of field agents.

defeated Austria at Magenta (June 4, 1859), Solferino (June 24, 1859), and San Martino (June 25, 1859). In the Villafranca Armistice (July 11, 1859) Austria conceded Lombardy to France, and France granted Lombardy to Sardinia.

On March 17, 1861, when five states - Lombardy, Modena, Parma, Tuscany, and the Two Sicilies – joined Sardinia to form the Kingdom of Italy (Pecout 1999, p. 170). On June 25, 1865, the 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 Peace of Vienna (August 24, 1866), the Kingdom of Lombardy-Venetia dissolved into the Kingdom of Italy, and a decree of Italy's King Vittorio Emmanuele 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. 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.[12] 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 laws we collect data on legal changes from Franchi (1902) and examine the original texts of Italian laws (e.g., Legge 9 May 1801, n. 423 Repubblica Cisalpina).

[12] 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.A. New Operas across Eight Italian States, 1770-1900

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.[13] 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.

Among the three standard reference works, Loewenberg (1978) is the most restrictive; 133 of 1,353 operas in Dassori (1903), and none of 71 operas in Ambiveri (1998), and are included in Loewenberg (1978).

To further check the quality of our sample, we compare 89 composers in our sample whose last names begin with B or D with entries for B and D in the *New Grove Dictionary of Music and Musicians* (2001). This comparison indicates that our sample includes 80 additional

[13] 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.

composers. We also 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.

II.D. Quality: Historically Popular and Durable Operas

Our first measure of 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 the 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).

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. More specifically, we search for CDs and DVDs for the title of each of the 2,598 operas and its composers' first and last name. The indicator variable *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 recording 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.

To check for bias in these alternative measures of quality, we compare them with each other, as well as with records of all Italian operas the Metropolitan opera in New York performed between 1900 and 2014.[14] *Opera Today* (January 24, 2005) praises Loewenberg (1978)

[14] The Metropolitan data expands data in Moser (2012) on 25 operas by 9 Italian composers that the Metropolitan performed between 1900 and 1950; these 25 operas were performed a total of 128 times until 1950. We extend the data to include 7 additional operas by 5 composers that the Metropolitan performed between 1950 and 2014; these operas were performed 23 times, and the original 25 were performed another 82 times. They include *Il Barbiere di Siviglia* by Gioacchino Rossini (1816), *Olivo e Pasquale* by Gaetano Donizetti (1827), *L'Elisir d'Amore* by Gaetano Donizetti (1829), *La Sonnambula* by Vincenzo Bellini (1831), *Lucia di Lammermoor* by Gaetano Donizetti (1835), *Rigoletto* by Giuseppe Verdi (1851), *Il Trovatore* by Giuseppe Verdi (1853), *La Traviata* by Giuseppe Verdi (1853), *Un Ballo in Maschera* by Giuseppe Verdi (1859), *Otello* by Giuseppe Verdi (1887), *La Cavalleria Rusticana* by Pietro Mascagni (1890), *Pagliacci* by Ruggero Leoncavallo (1892), *Falstaff* by Giuseppe Verdi (1893), *Manon Lescaut* by Giacomo Puccini (1893), *La Bohème* by Giacomo Puccini (1896), *Iris* by Pietro Mascagni (1898), and *Tosca* by Giacomo Puccini (1900).

> 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….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*.

Data checks confirm that operas by Donizetti and Mercadante may be under-represented, whereas works by Pacini are more likely to be included in Loewenberg than other sources (and may instead represent a bias by the authors of *Opera Today*).[15] 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 (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.C. Demographic Data, Life Tables, and Measures of Migration

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

[15] 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.

2,598 operas that premiered between 1770 and 1900. The oldest composer in our data is Giovanni Paisiello (1741-1816), while the youngest is Stefano Donaudy (1879-1925). The longest-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 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).[16]

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 on composers' average age at death because they are conditional on survival until 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 composer in age bracket [a, a+4], the expected remaining years of life are the average remaining years of life across all composers in the same age bracket and time interval [t, t+4]. This implies that a composer of average age at the time of the premiere (33.56, roughly 34 years) would 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 years + 0.8 * 29.23 years (Appendix Table A1).

To examine changes in the patterns of migration, we also collected information on composers' places 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).

[16] 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.

III. Changes in Creative Output after 1801

Summary statistics on the 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 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 before 1801 (Figure 2). In a typical year between 1780 and 1800, composers produced two operas per state and year in states with and without copyrights. The only exceptions are 1793, when Domenico Cimarosa (1749-1801) and Gaetano Andreozzi (1755-1826) premiered three and one new opera, respectively, in Milan (Lombardy) and Venice (Venetia),[17] and 1795 to 1796 when Giuseppe Farinelli (1769-1836) produced three new operas in Venice (Venetia).[18] After 1801 opera output increased steadily from 4 in 1801 to 7 in 1806 while output in other Italian states remained stable around 2 new operas per year.

III.A. Baseline Estimates

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

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

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

[17] *Giannina and Bernardone*, *Giunio Bruto*, *Il Convito* by Cimarosa and *Angelica e Medoro* by Andreozzi. All four operas entered Loewenberg's Annals (1978).

[18] *L'indolente*, *Duello per un compimento*, and *Terza Lettera in* 1795 and *I Giouchi d'Agrigento*, *Idomeneo*, and *Cid nelle Spagne* in 1796. Among these six operas, three entered Loewenberg's Annals: *L'Indolente, I Giouchi d'Agrigento, and Cid nelle Spagne.*

starting in 1801. Under the assumption that, in the absence of copyright laws, changes in opera output would have been comparable for Italian states with and without copyright laws, the coefficient β for the interaction term estimates the effect of copyright laws on output. 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 cultural differences or pre-existing differences in the infrastructure to perform operas. Year fixed effects δ_t control for variation in output over 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, ε_{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 2, 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 2, 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 $ß_r$ separately for each year, allowing it to be different from zero before the adoption of copyrights in 1801.

$$opera_{it}=\beta_0 + \beta_r\, Lombardy\ \&Venetia_i \times year_r + \varphi_i + \delta_r + \varepsilon_{it} \qquad (2)$$

where the variable $year_r$ represents an indicator variable for each year between 1791 and 1821, and 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 2, 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 2, column 4, significant at 1 percent).

III.C. Controlling for Quality

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 3, 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 3, 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 3, 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 3, column 4, significant at 5 percent).

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 produced 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 3, 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 3, 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 3, column 7, significant at 5 percent), and regressions with state specific linear pre-trends imply an increase by 0.30 additional operas (Table 3, column 8, significant at 5 percent).

IV. Changes in Migration

In addition to encouraging existing composers to produce more operas, the adoption of copyrights may have also increased output by encouraging migration to Lombardy and Venetia. Data on the birth states of composers indicate that opera output increased for natives and immigrants in Lombardy and Venetia after 1801, and that it increased significantly more for immigrants compared with other states. Between 1780 and 1800, natives composed 1.60 new operas per state and year in Lombardy and Venetia, while immigrants composed 0.29 new operas per state and year (Figure 4, Panel A). Beginning in 1801, opera output by natives experienced a 2.8-fold increase to 4.48 new operas per state and year, and output by immigrants experienced a 7.4-fold increase to 2.14 new operas.

By comparison, other states experienced a substantially smaller increase in output for both natives and immigrants, without a significant differential increase for immigrants. Between 1780 and 1800 natives composed 1.62 operas per state per year in other states, and immigrants composed 0.10 new operas per state and year (Figure 4, Panel B). Beginning in 1801, output by

natives experienced a 1.6-fold increase to 2.51 new operas, and output by immigrants experienced a 1.7-fold increase to 0.29 new operas.

Composer-level data also show that the number of active composers increased substantially more in Lombardy and Venetia, with a differential increase for immigrants. Between 1780 and 1800, a total of 34 natives and 6 immigrants composed operas in Lombardy and Venetia. Beginning in 1801, the number of native composers increased 1.4-fold to 46, while the number of immigrant increased 5.0-fold to 30 (Figure 5, Panel A). New immigrants to Lombardy and Venetia included Domenico Cimarosa (1749-1801), Saverio Mercadante (1795-1870), and Giovanni Pacini (1796-1867).

By comparison, other states experienced a much smaller differential increase in counts of immigrant composers. Between 1780 and 1800, a total of 35 natives and 2 immigrants were active opera composers (Figure 5, Panel B). After 1800, the number of composers stayed relatively flat (with 37 native composer, a 1.1-fold increase) and 4 immigrant composers (a 2.0-fold increase).

Biographical data on individual composers confirm that patterns of migration became significantly more targeted towards Lombardy and Venetia after 1801. Until 1801, many Italian composers moved to Austria and France to take advantage of copyrights. Domenico Cimarosa (1749-1801), for example, premiered most of his operas in Austria until 1801, when he premiered his final opera, *Artemesia*, in Venice (Scherillo 1916, p. 67).[19]

After Lombardy and Venetia adopted copyrights in 1801 Italian composers began to move to Lombardy and Venetia instead of France or Austria. Vincenzo Pucitta (1778-1861), for example, was born in Civitavecchia (50 miles northern than Rome in Papal State) in 1778. He moved to Milan in 1801 and premiered *Il Fuoruscito* in 1801, *Il Puntiglio* in 1802, and *La Finta Pazza* in 1804. In addition to his work in Milan, Puccitta premiered *Zerinda e Lindoro* in 1803 in Venice. Overall, 12 of 19 Puccitta's 19 new operas between 1801 and 1826 (when the Papal State adopted copyrights) premiered in Lombardy and Venetia.

Comparisons between composers' place of birth and the location of their *first* opera confirm the shift in composer migration (Table 4). Between 1780 and 1800, most Italian composers created their first opera in their state of birth. Between 1780 and 1800, 15 composers

[19] Our data include five operas by Chimarosa, including one in the Papal State (*L'Italiana in Londra*, 1774), four in Tuscany (*Caio Mario*, 1784, *La Giuditta*, 1785, *Il sacrificio di Abramo*, 1786, and *Artemisia* in Venice in 1801.

premiered their first opera in a state that was different from their state of birth (Table 4, Panel A). For example, six Sicilian composers premiered their first opera in Lombardy between 1780 and 1800, and two composers from the Papal State composed their first opera in Venice, Venetia.[20] Between 1801 and 1821, 57 composers premiered their first opera in a state that was different from their state of birth. Among these 57 composers, 43 composers premiered their first opera in Lombardy and Venetia, and only 12 premiered their first opera in another state (Table 4, Panel B).

Other composers moved to Lombardy and Venetia soon after they had composed a first opera in another Italian state. Saverio Mercadante (1795-1870), who was born in Altamura in the North of the Two Sicilies in 1795, premiered his first opera, *L'Apoteosi di Ercole*, in 1819 in Naples. Mercadante then moved to Lombardy and Venetia where he premiered in Milan *Elisa and Claudio* in 1820, and *Il Posto Abbandonato* in 1821, and in Venice *Andronico* in 1821 (De Napoli 1952, p.75). Vincenzo Bellini (born in Catania, Two Sicilies in 1801) also 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).

V. Changes in Output for all of Italy, 1770-1900

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 5). For example, composers in Sardinia produced 3,4 premieres per year after the adoption of copyrights (1840-1864) compared with 2.4 before (1828-1839) (Table 7).

I.A. OLS regressions, 1770-1900

OLS regressions for the full sample estimate

$$opera_{it}=\beta_0 + \beta_r\, copyright_{it} + \varphi_i + \delta_r + \varepsilon_{it} \qquad (3)$$

where the variable $copyright_{it}$ 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

[20] Five composers from Sicily moved to Venice: Giuseppe Farinelli (1769-1836), Giuseppe Nicolini (1762-1842), Giovanni Paisiello (1740-1816), Silvestro Palma (1754-1834), and Raffaele Orgitano (1757-1831), and two moved to the Papal State: Giuseppe Palione (1781-1845) and Vincenzo Pucitta (1778-1861).

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 6, 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 6, column 3, significant at 1 percent).

V.B. Quality: Historically Popular and Durable Operas

Summary statistics indicate that composers in state-time pairs with 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 6, 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 6, column 5, significant at 5 percent).

Composers in states with 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 6, 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 6, column 7, significant at 1 percent).

I.C. Copyright Extensions

Performance data from Loewenberg's (1978) *Annals of Opera* suggest that only a small minority of exceptionally long-lived operas did benefit from copyright extensions. Figure 6 plots performances per year for the first 100 years for 165 historically popular operas in Loewenberg (1978) that premiered between 1780 and 1800 (before the adoption of copyrights in Lombardy and Venetia).[21] Overall, these 165 operas were performed 1,687 times, or 10.22 times per opera, including 7.46 times within the first 40 years (the expected length of copyrights under *life+10*) and 2.76 times afterwards.[22] Less than one third of operas (49 of 165 operas, 29.70 percent) were performed at least once after the end of initial copyright term under *life + 10* (39.23 years, Figure 6).[23] 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. Another 39 operas (23.64 percent) stood to gain from an extension beyond *life + 30*. These operas were performed 2.65 times on average between 59.23 and 69.23 years after their premiere (the expected length of copyrights under *life+30* and *life+40*, respectively). Thirty-two operas of 165 operas (19.39 percent) were performed after the expected end of copyright terms under *life+40*.

Data on new operas per state and year suggest no increase in creative output in response to these extensions. Lombardy and Venetia, for example, produced 5.59 new operas per state and year between 1801 and 1839, under a regime of *life+10* (Figure 7). After the length of copyrights increased to *life+30* in 1840, opera output stayed nearly unchanged at 5.64 new operas per state and year between 1840 and 1864. After a further increase in copyright length to *life+40*, the number of new operas per state and year declined by 9.57 percent to 5.11 between 1865 and 1900.

[21] 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).
[22] 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). 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.
[23] 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).

I.D. Improvements in Infrastructure

Another channel by which the creation of copyrights may have encouraged the production of operas is through 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 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 8, 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 8, 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 state 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 8, Panel B).

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.

These results suggest that offering some basic level of copyright protection can increase both the quantity and quality of 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 37.40 percent of operas are only performed in the year of their premiere, and 47.42 percent of operas are performed only within the first five years. This suggests that extensions in the length of copyright beyond the duration of the author's life (and possibly beyond the first five years) create a negligible increase in income for the average author. Instead, copyright extensions only benefit the authors of exceptionally long-lived works. To the extent that these works are difficult to identify *ex ante,* copyright extensions are unlikely to encourage rational investments in creative work by the average author. They may, however, encourage investments by authors who are overly optimistic about their ability to create an exceptionally long-lived piece.

Comparisons of composers' places of birth and the places of premieres further indicate that the creation of copyrights encouraged composers to move to Lombardy and Venetia after 1801. Even though native composers also began to produce more operas after 1801, immigrants produced the majority of additional operas in Lombardy and Venetia after 1801, and accounted for a disproportionate share of high quality operas. When other Italian states begun to offer copyrights starting in 1826, there was no comparable shift in migration. These results suggest that the creation of copyrights may disproportionately benefit states that offer intellectual property rights while other states (and in particular culturally related neighbors) offer no protection. In the case of Italy, the adoption of copyrights in Lombardy and Venetia appears to have stopped a "brain drain" of composer to Austria and France.

More generally, the results of this paper suggest that narrowly defined intellectual property – in the form of copyrights - can encourage creativity and innovation, whereas more broadly defined intellectual property rights patent rights appear to discourage innovation. Empirical analyses of 19th century innovations indicate that countries without patent laws as innovative as countries with patent laws (Moser 2002, 2005). Moreover, the sum of the historical evidence suggests that policies that weaken patents encourage innovation (Moser 2013, Moser and Voena 2012), while policies that strengthen patents appear to discourage innovation (Lampe and Moser 2012, 2014). In contrast to these findings, the results of the current analysis indicates that copyrights can be an effective policy mechanism to encourage creativity.

Intuitively, the narrow scope of copyrights, which protects an individual expression of a work, prevents a key problem with the patent system. When patent rights are broad and their boundaries are poorly defined, innovators are at risk of unintentionally infringing on existing intellectual property, and patent examiners may issue overlapping patents for the same invention. These characteristics of patent laws – which have been in place since the inception of patents – increase litigation risks and discourage innovation. The comparison of patents and copyrights suggests that intellectual property policies that reduce the breadth of patents (for example by disallowing patents for abstract ideas) can encourage innovation.

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

	LOMBARDY & VENETIA	OTHER STATES
	All operas (N=473)	
1780-1821	3.061	1.736
1780-1800	1.547	1.358
1801-1821	4.476	2.095
	Historically popular operas Loewenberg's (1978) *Annals of Opera* 1770-1940 (N=62)	
1780-1821	0.378	0.126
1780-1800	0.125	0.083
1801-1821	0.619	0.167
	Long-lived operas Available for sale on *Amazon* in 2014 (N=42)	
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 – 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***	2.069***	2.091***	2.165***	1.045***
	(0.402)	(0.421)	(0.404)	(0.397)	(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 3 – 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) *Annals of Operas* (1770-1940)				Long-lived operas (5-8) Available on *Amazon* in 2014			
Lombardy & Venetia * post1801	0.418***	0.411***	0.568**	0.371**	0.307**	0.302**	0.308**	0.302**
	(0.152)	(0.152)	(0.251)	(0.156)	(0.130)	(0.130)	(0.129)	(0.132)
Lombardy & Venetia		0.041				0.000		
		(0.067)				(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 4 – MATRIX OF MIGRATION WITHIN ITALY:
COMPOSERS BY STATE OF BIRTH AND LOCATION OF PREMIERE FOR THEIR FIRST OPERA

PANEL A: 1780-1800

Composed in: / Born in:	Sardinia	Modena	Parma	Tuscany	Lombardy	Venetia	Rome	Sicily
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: / Born in:	Sardinia	Modena	Parma	Tuscany	Lombardy	Venetia	Rome	Sicily
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 5 – MEAN NUMBER OF NEW OPERAS PER STATE AND YEAR IN ITALY, 1770-1900

ITALIAN STATES:	WITH COPYRIGHT	WITHOUT COPYRIGHT
	All operas (N=2,598)	
1770-1900	7.374	2.212
	Historically popular operas Loewenberg's (1978) *Annals of Opera* 1770-1940 (N=254)	
1770-1900	0.733	0.404
	Long-lived operas Available for sale on *Amazon* in 2014 (N=155)	
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 6 – 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 *Annals of Operas* (1770-1945)		Operas on *Amazon* 2014	
Copyright	2.683***	2.533***	0.952***	0.188*	0.193**	0.327***	0.372***
	(0.436)	(0.439)	(0.149)	(0.098)	(0.095)	(0.111)	(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 7 – 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	1865-1869	1870-1900
Sardinia	no copyright 0.82 operas	no copyright 1.52 operas	no copyright 0.50 operas	no copyright 2.42 operas	life+30y 3.44 operas	life+40y 2.80 operas	life+40y 4.10 operas
Modena	no copyright 0.09 operas	no copyright 0.20 operas	no copyright 0.10 operas	no copyright 0.33 operas	life+30y 0.52 operas	life+40y 0.00 operas	life+40y 0.48 operas
Parma	no copyright 0.64 operas	no copyright 0.64 operas	no copyright 0.00 operas	no copyright 0.42 operas	life+30y 0.56 operas	life+40y 0.60 operas	life+40y 0.48 operas
Tuscany	no copyright 0.36 operas	no copyright 0.92 operas	no copyright 3.00 operas	no copyright 2.50 operas	life+30y 2.44 operas	life+40y 0.24 operas	life+40y 0.27 operas
Lombardy	no copyright 0.36 operas	life+10y 5.08 operas	life+10y 5.50 operas	life+10y 6.25 operas	life+30y 5.52 operas	life+40y 5.20 operas	life+40y 5.03 operas
Venetia	no copyright 1.73 operas	life+10y 3.44 operas	life+10y 2.50 operas	life+10y 2.92 operas	life+30y 2.52 operas	life+40y 3.20 operas	life+40y 3.61 operas
Papal State	no copyright 0.64 operas	no copyright 3.44 operas	life+12y 2.50 operas	life+12y 2.92 operas	life+30y 2.64 operas	life+30y 2.80 operas	life+40y 4.10 operas
Sicilies	no copyright 2.64 operas	no copyright 4.60 operas	no copyright 15.50 operas	life+30 17.00 operas	life+30y 9.84 operas	life+40y 4.80 operas	life+40y 4.58 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 *opera*s 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 8 – 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	

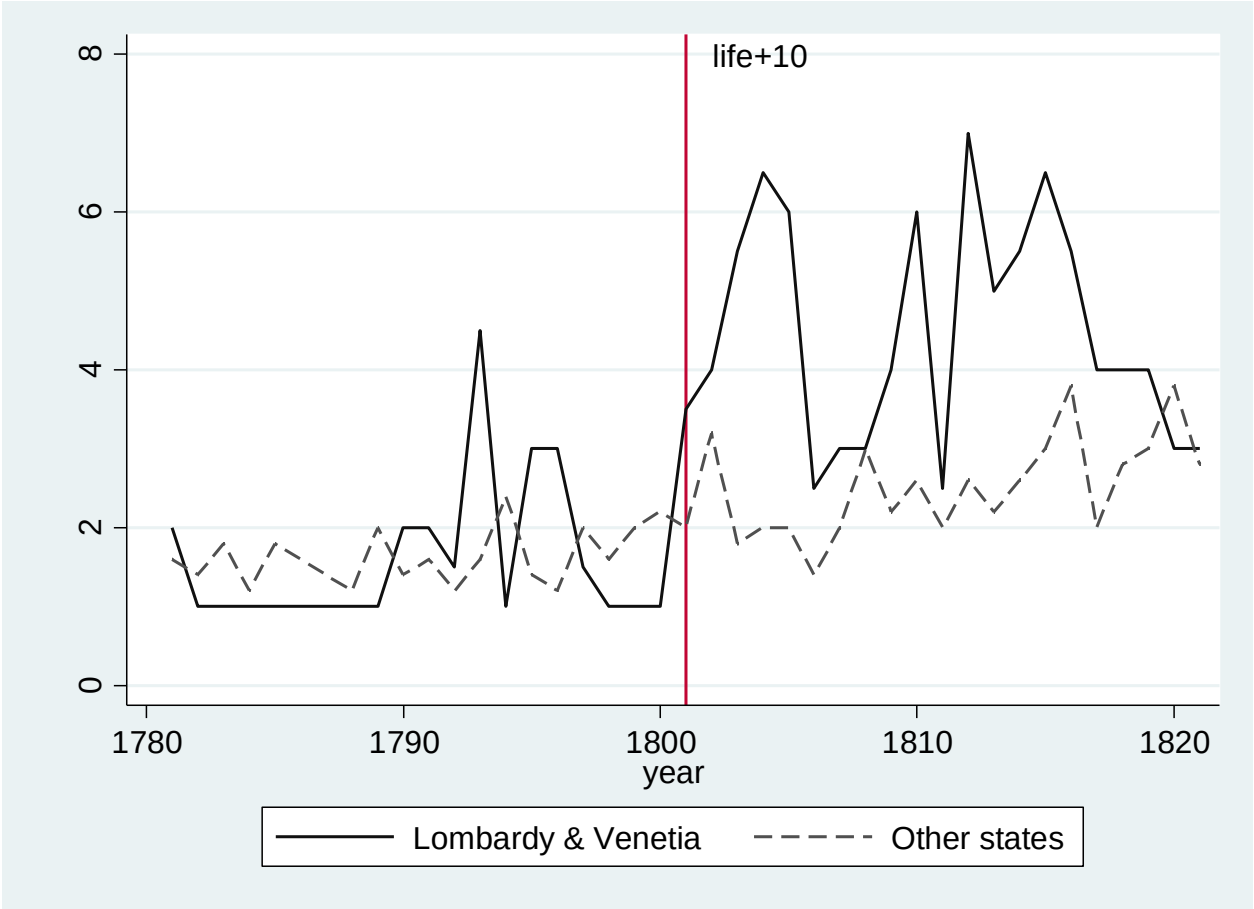
Notes: 100 seats is a standard lower bound for a theater that has enough capacity to host an opera (e.g. Antolini 2000, p.132). Data on theaters>100 seats are from Antolini (2000). Information on theaters that performed at least 1 opera are drawn from Loewenberg (1978, premieres and other performances),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

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



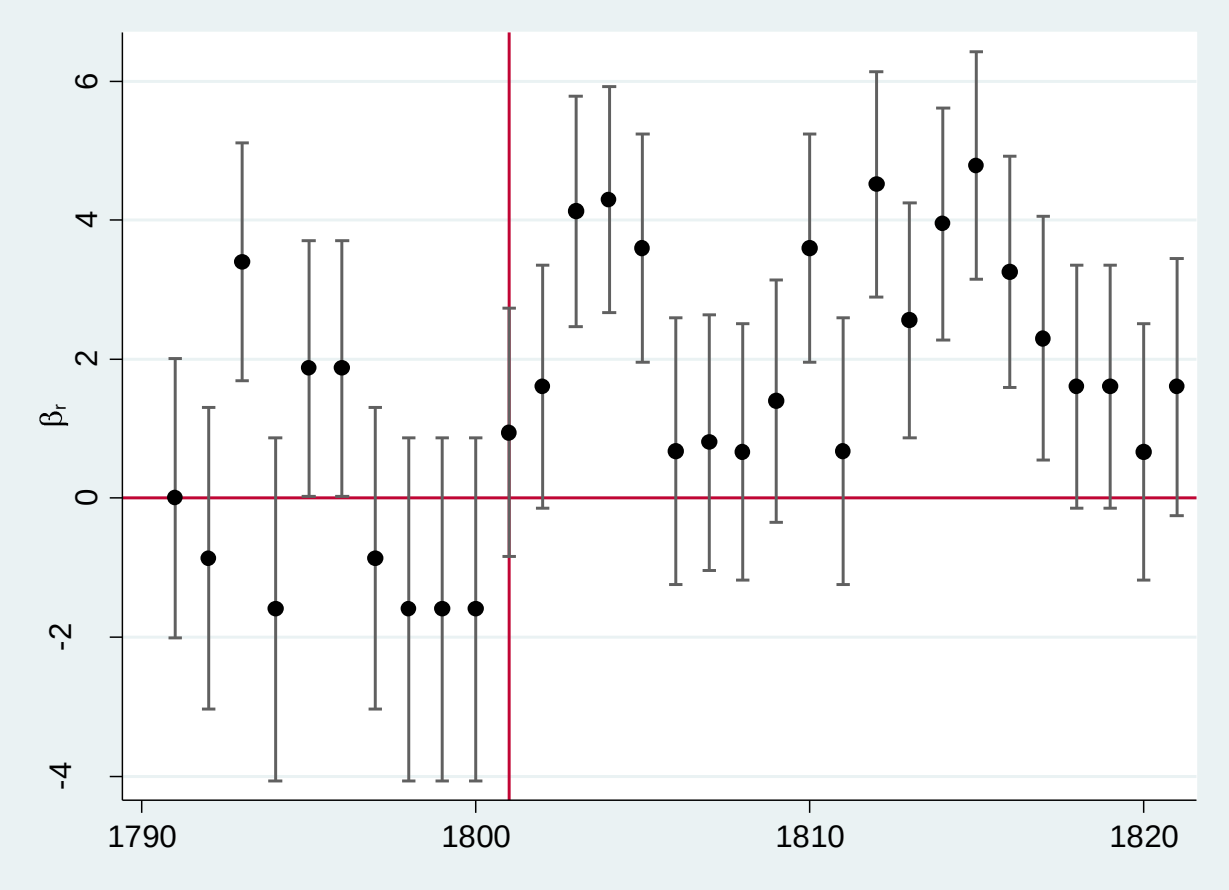
Notes: Lombardy and Venetia adopted copyrights in 1801, as part of a broader packet of French laws, after they had fallen under French rule. Shapefile for Italy is from the Italian National Institute for Statistics (ISTAT, accessed October 3, 2014, http://www.istat.it/it/archivio/104317#confini). We use Italy's borders in 1900 to define the country of Italy and the borders drawn by the Congress of Vienna in 1815 to draw state borders within Italy.

FIGURE 2 – 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.

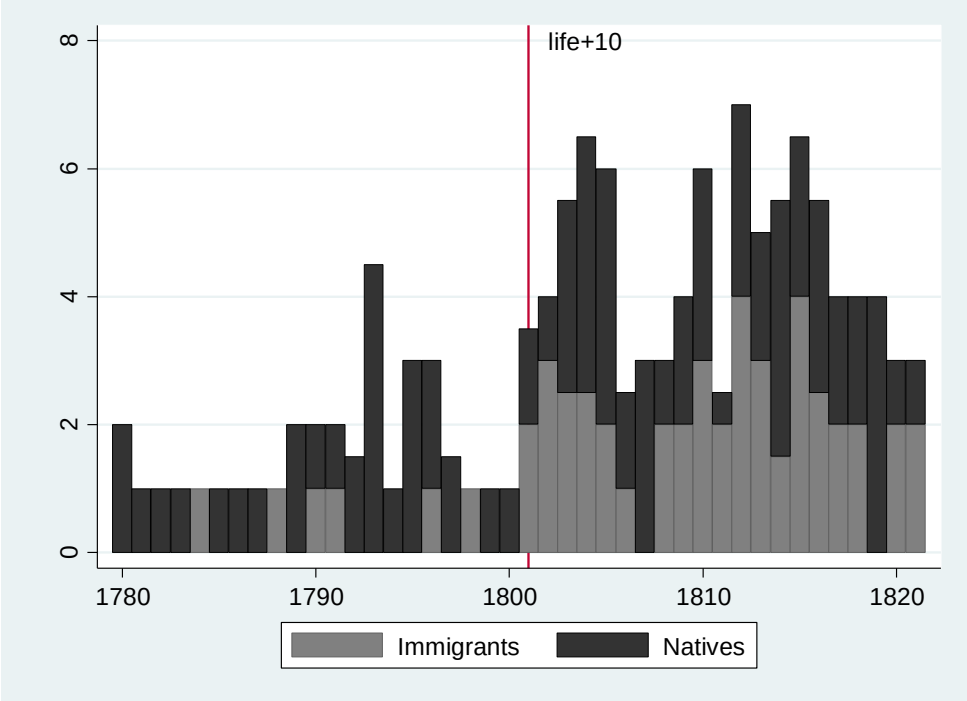
FIGURE 3 – OLS ANNUAL ESTIMATES FOR EFFECTS OF COPYRIGHT LAWS ON CREATION OF NEW OPERAS PER STATE AND YEAR



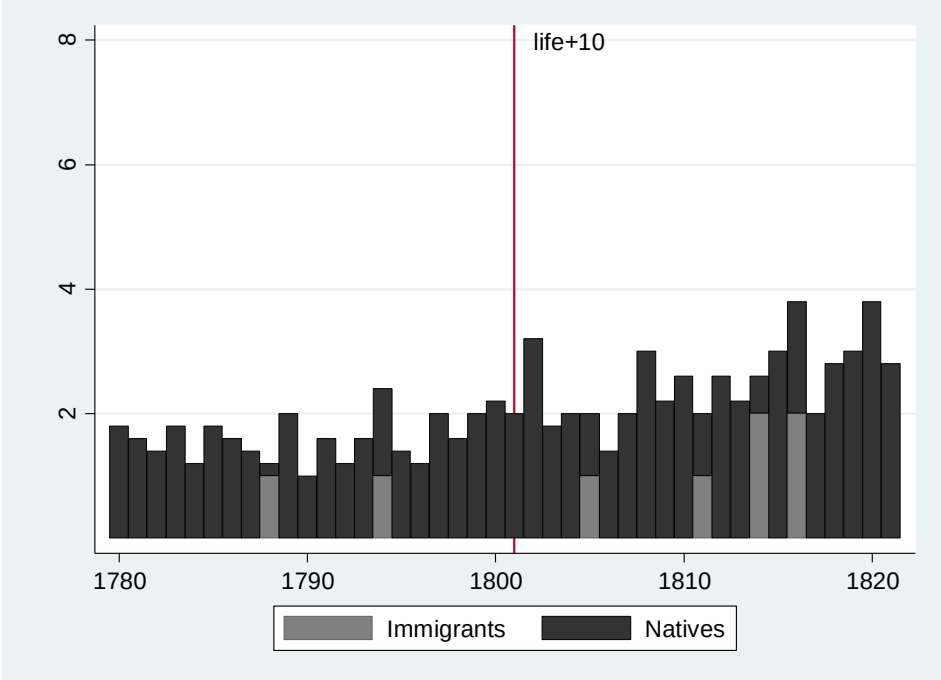
Notes: 95% confidence interval for β_r in $opera_{it}=\beta_0 + \beta_r\ Lombardy\ \&Venetia_i \times year_r + \varphi_i + \delta_r + \varepsilon_{it}$ where the dependent variable counts the number of new operas premiered per state and year. The variable *Lom&Ven* equals 1 for Lombardy and Venetia, which adopted copyright laws in 1801. The variable $year_r$ indicates individual years between 1791 and 1821; years between 1780 and 1790 are the excluded period. State fixed effects φ_i control for variation in opera production across states that is constant over time. Year fixed effects δ_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 4 – NEW OPERAS PER STATE PER YEAR, IMMIGRANTS VS NATIVES, 1780-1821

PANEL A: LOMBARDY AND VENETIA



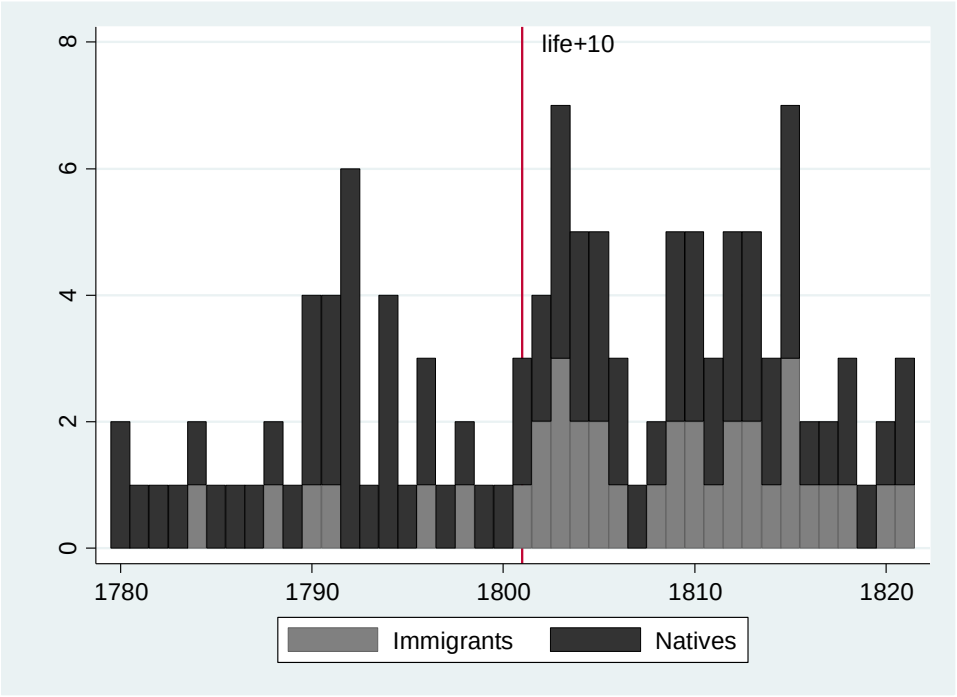
PANEL B: OTHER STATES



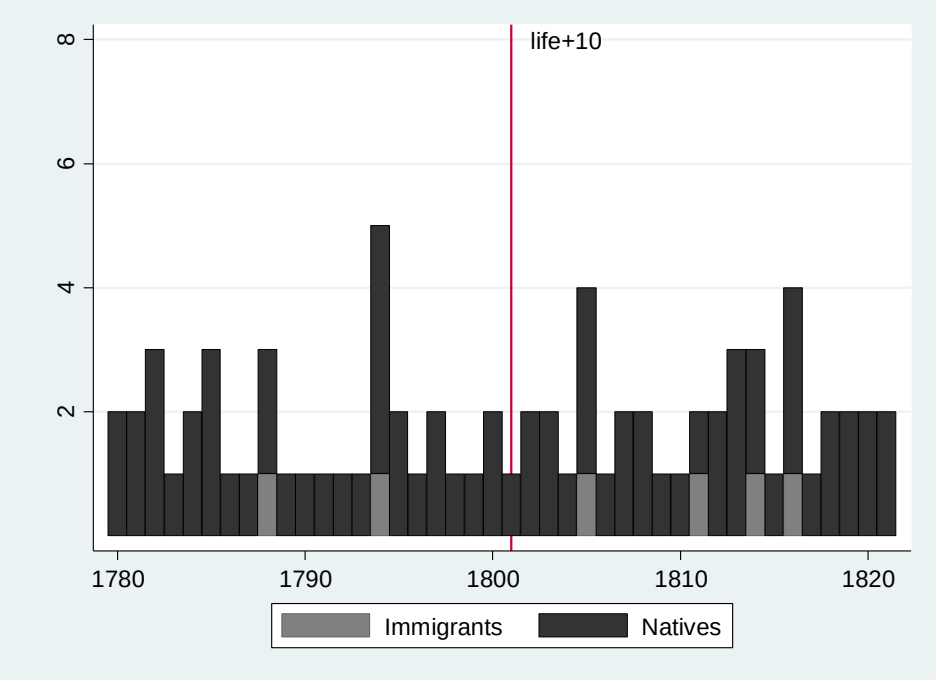
Notes: Operas by natives are defined as operas composed by a composer born in the same state as premiere state. Operas per immigrants are defined as operas composed by a composer born in a different state than premiere state. We collected data on opera premieres from Ambiveri (1998), Dassori (1903), and Loewenberg (1978).

FIGURE 5 – ACTIVE COMPOSERS PER YEAR, IMMIGRANTS VS NATIVES, 1780-1821

PANEL A: LOMBARDY AND VENETIA

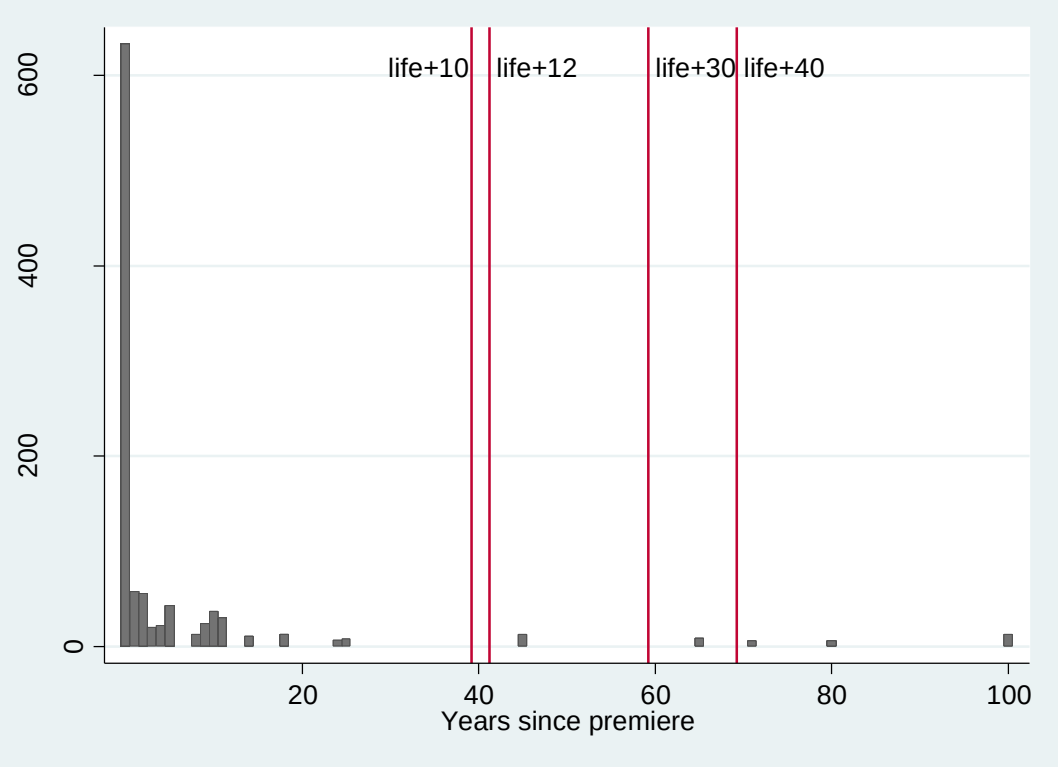


PANEL B: OTHER STATES



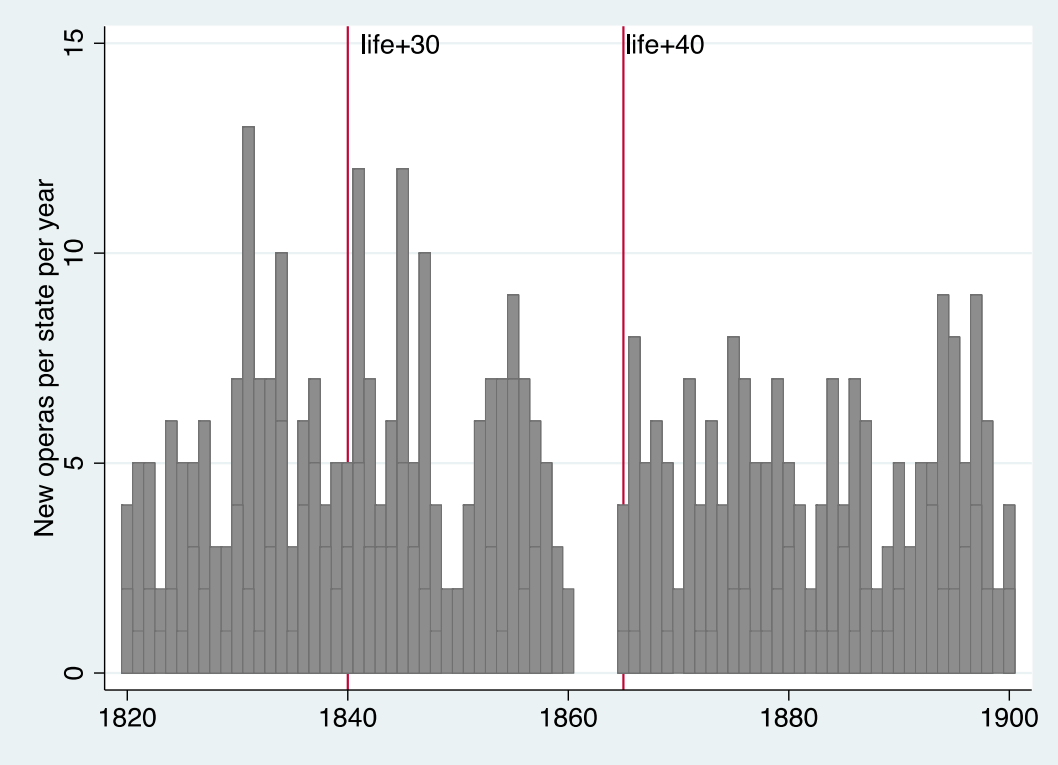
Notes: Native active composers are defined as composers who premiered at least one opera in state *i* and year *t* in the state in which they were born. We collected data on opera premieres from Ambiveri (1998), Dassori (1903), and Loewenberg (1978).

FIGURE 6 – PERFORMANCES IN THE FIRST 100 YEARS AFTER THE PREMIERE OF AN OPERA FOR ALL 8 STATES AND OPERAS THAT PREMIERED 1780-1800



Notes: Performances per year for the first 100 years since the premiere for 165 operas that premiered across Italy between 1780 and 1800 (from Loewenberg 1978). Performances to the left of the vertical line would be on copyright under a regime of *life + 10*, which Lombardy and Venetia began to offer in 1801. The expected length of copyright under *life + 10* equals 39.23 years: 10 years plus the expected remaining years of life for a composer in the year of the premiere for 705 composers and 2,598 opera that premiered between 1770 and 1900 (29.23 years). See Appendix Table A1 for life table calculations of remaining years of life. Expected lengths of copyright for *life+12* (41.29 years), *life+30* (49.23 years), and *life+40* (59.23 years), are calculated in the same way as *life + 10*.

FIGURE 7 – NEW OPERAS PREMIERED PER STATE AND YEAR
IN LOMBARDY AND VENETIA, 1820-1900



Notes: Data include 580 new operas that premiered between 1820 and 1900 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

TABLE 1A – LIFE TABLE FOR 5-YEAR TIME INTERVALS SURROUNDING 1800,
FOR 705 COMPOSERS WHO CREATED AT LEAST 1 NEW OPERAS IN ITALY, 1770-1890

	AGE BRACKET [a; a+4]			
TIME PERIOD [t; t+4]	25-29	30-34	35-39	40-44
1795-1799	29.79	29.45	28.83	28.21
1800-1804	29.91	29.75	29.23	28.94
1805-1809	30.23	29.93	29.53	29.10

Notes: We use this life table to calculate the expected remaining years of life in 1800 of an Italian composer who is 34 years old. 34 years is the average age of a composer at the time of a premiere for 2,598 operas that premiered in Italy between 1770 and 1900. The life table shows the expected years of life R([a; a+4], [t;t+4]) for composers in the age bracket [a, a+4] in intervals of five calendar years [t, t+4] between 1795 and 1809. It is based on biographic data for 705 composers who created at least 1 new opera in Italy between 1770 and 1900. We collected opera data from from Loewenberg (1978), Dassori (1903), and Ambiveri (1998), and biographic data for composers from Dassori (1903) Ambiveri (1998) and the *New Grove Dictionary of Music and Musicians* (2001).

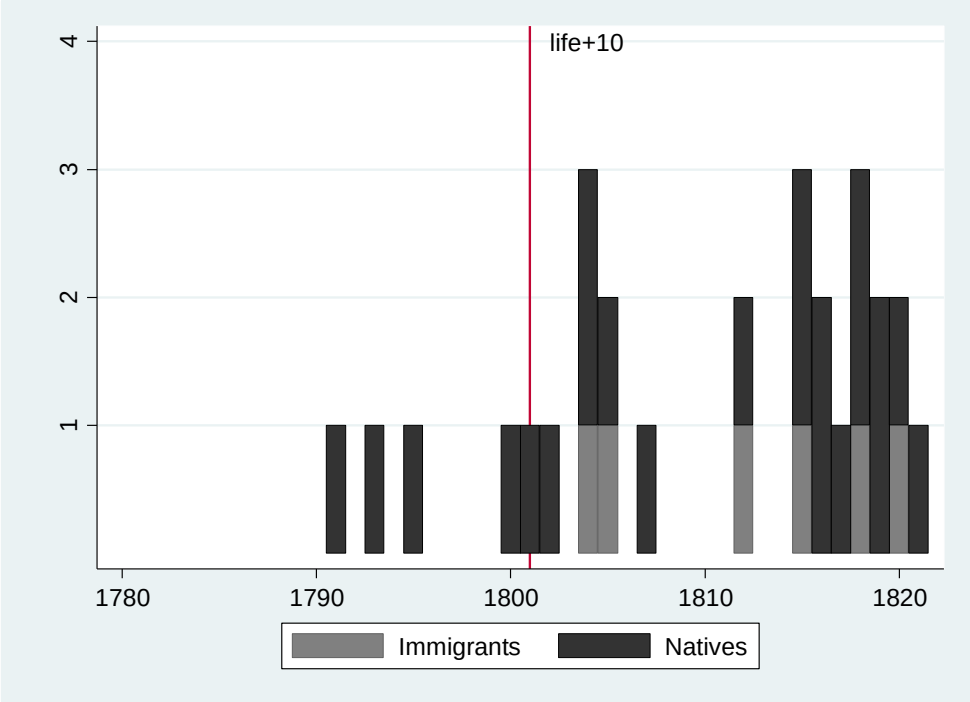
TABLE A2 - NEW OPERAS PER STATE AND YEAR, NATIVES VS IMMIGRANTS, 1780-1821

	LOMBARDY & VENETIA			OTHER STATES		
	All Operas (N=478)					
	All	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
	Historically popular operas: Loewenberg's (1978) *Annals of Opera* 1770-1940 (N=62)					
	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
	Long-lived operas: Available for sale on *Amazon* in 2014 (N=42)					
	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	0.006
1801-1821	0.452	0.290	0.136	0.031	0.023	0.014

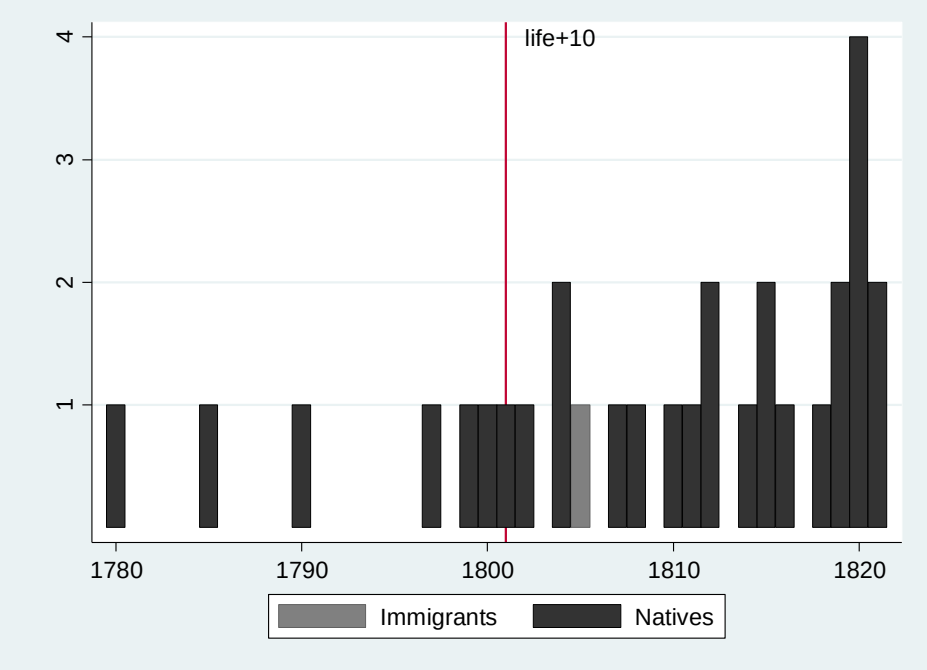
Notes: Data include 473 new operas that premiered between 1780 and 1821 within the borders of Italy in 1900. *Natives* if the mean of operas per state per year if the composer was born in the state in which opera was premiered. *Immigrants* if the mean of operas per state per year if the composer was 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.

FIGURE A1 - ENTRANTS PER STATE AND YEAR, IMMIGRANTS VS NATIVES 1780-1821

PANEL A: LOMBARDY AND VENETIA



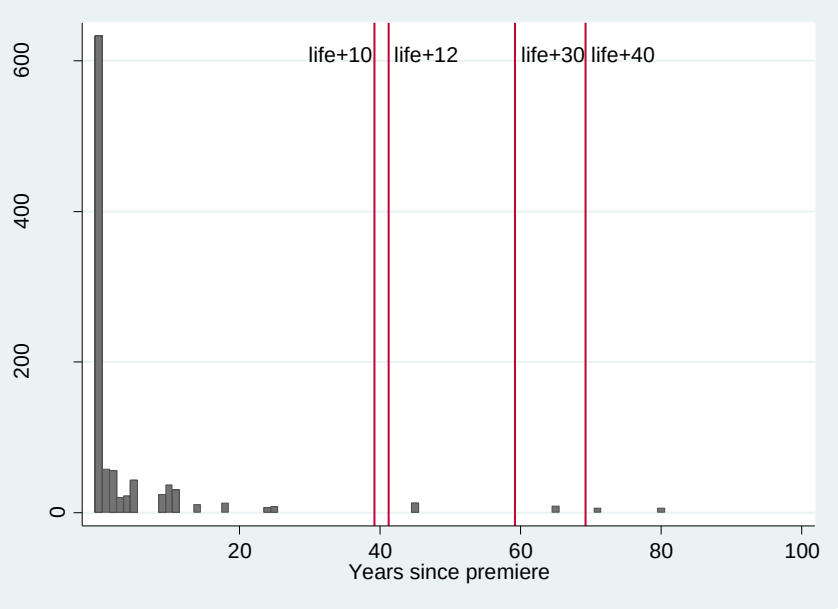
PANEL B: OTHER STATES



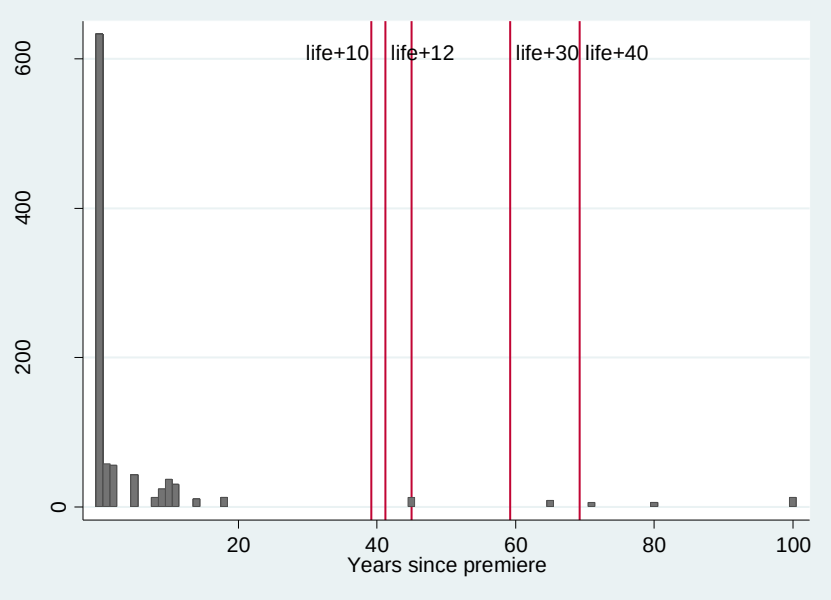
Notes: *New native composers* are defined as composers who premiered their first opera in the state in which they were born, based on records of opera premieres in Ambiveri (1998), Dassori (1903), and Loewenberg (1978), per state *i* and year *t*.

FIGURE A2 – PERFORMANCES IN THE FIRST 100 YEARS AFTER THE PREMIERE OF AN OPERA

PANEL A: LOMBARDY AND VENETIA

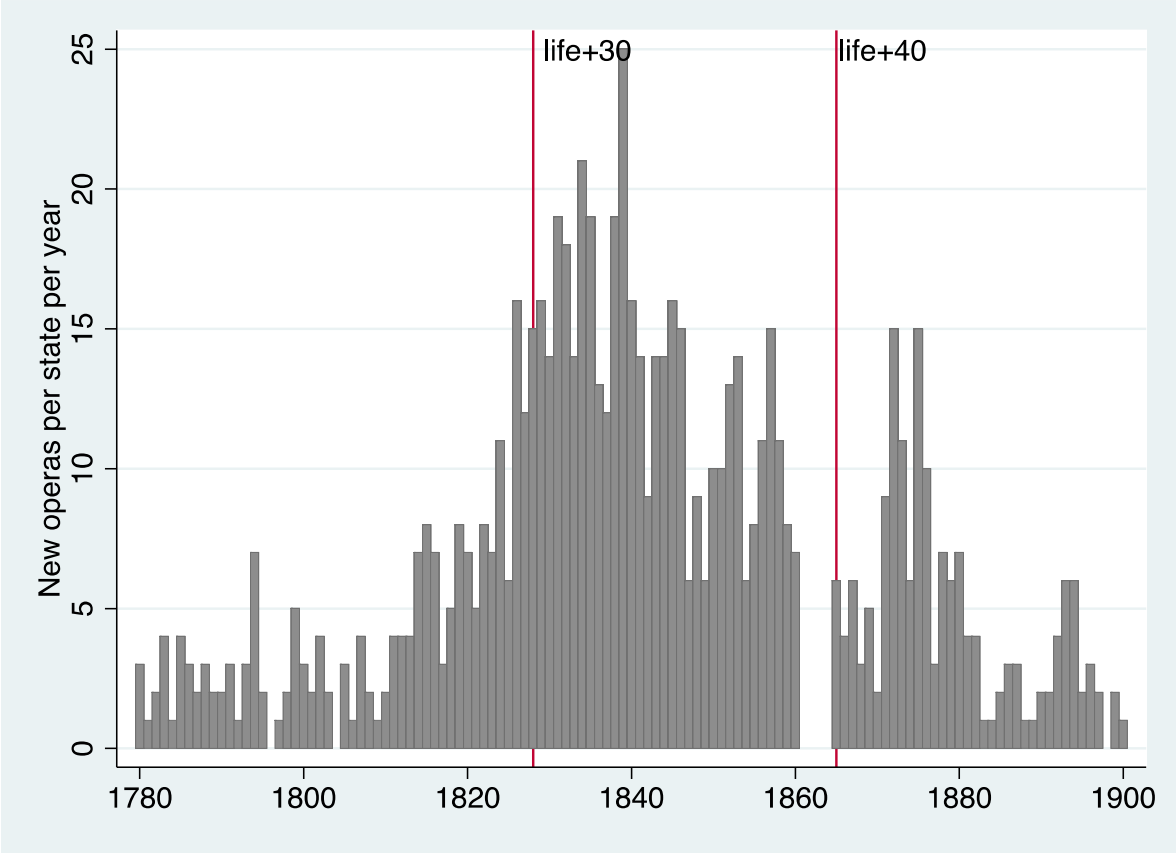


PANEL B: OTHER ITALIAN STATES



Notes: Performances per year for the first 100 years after the premiere for 165 operas that premiered between 1780 and 1800 (from Loewenberg 1978). Performances to the left of the vertical line life+10 would on copyright under a regime of *life + 10*. The expected length of copyright under *life + 10* equals 39.23 years: 10 years plus the expected remaining years of life for the average composer in the year of the premiere for 705 composers and 2,598 opera that premiered between 1770 and 1900 (29.23 years, based on life tables in Table A1). Cutoffs for copyrights under *life+12* (41.29 years), *life+30* (49.23 years), and *life+40* (59.23 years) are calculated in the same way as *life + 10*.

FIGURE A3 – NEW OPERAS PER YEAR IN TWO SICILIES,



Notes: Data include 478 new operas that premiered in Two Sicilies between 1780 and 1900 within the year 1900 borders of Italy. We have collected these data from Loewenberg (1978), Dassori (1903), and Ambiveri (1998). Two Sicilies adopted copyright laws in 1828 for a length of *life+30* that was extended to *life+40* after Italy Unification in 1865.