COPYRIGHT AND CREATIVITY- EVIDENCE FROM ITALIAN OPERAS*

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

FEBRUARY 24, 2015

This paper exploits variation in the adoption of copyright laws within Italy – as a result of variation in the timing of Napoleon's military victories - to examine the effects of copyrights on creativity. To measure variation creative output, we use new 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. 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 limited. Our analysis of alternative mechanisms for this increase reveals a substantial shift in composer migration in response to copyrights. Consistent with agglomeration externalities, we also find that cities with a better pre-existing infrastructure of performance spaces benefitted more copyright laws.

JEL CODES: O3, O33, O34, K11, N3

KEYWORDS: Copyright, intellectual property, creativity, innovation, music, culture.

* We wish to thank Dave Donaldsen, Ben Depoorter, Stephan Heblich, Sarah Kaplan, Frank Mueller-Langer, François Velde, and seminar participants at Dartmouth, the IfW (Kiel), the Max Planck Institute (Munich), Northwestern University, Stanford, Toronto, and Toulouse for helpful comments. Moser also gratefully acknowledges financial support from the National Science Foundation through NSF CAREER grant 1151180.

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 Copyright Laws in 1793 and the (Napoleonic) *code civil* in 1804 in France. The code *civil* 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. Copyrights may also increase the quality of the marginal composition by relaxing composers' budget constraint, if composers have an intrinsic valuation for quality beyond the additional income that it may generate.

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 the adoption of copyrights. An alternative measure captures the creation of exceptionally durable operas that continued to be 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 copyrights.

Demographic data show that native composers accounted for the majority of additional operas in Lombardy and Venetia after 1801. Demographic data, however, also reveal a significant shift in patterns of composer migration after 1801. Until 1801, few composers premiered their first opera in a state that was different from their state of birth. After 1801, however, many composers premiered their first opera in a state that was different from their state of birth, and these migrant composers moved almost exclusively to Lombardy and Venetia.

To examine the role that differences in infrastructure and in demand for music play in determining the effects of copyrights, we collect city-level data on theaters that existed in 1800, before the adoption of copyrights. City-level analyses indicate, which had two or more theaters in 1800, produced on average 2.3 additional operas in response to the introduction of copyrights compared with cities with one or no theater.

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. Opera was entertainment and the Italian public took to it with

enthusiasm and vehemence. For example, Beyle (1824, p.9) describes the scene surrounding a performance of Rossini's *La Scala di Seta* at the new Teatro San Mosè in Venice:

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

Each theater was managed by a professional agent (*impresario*), who identified 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). Without copyright laws, composers had no right to be compensated for repeat performances of their work, either by the theater that had commissioned the work or by other theaters (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). Until Lombardy and Venetia adopted copyrights in 1801, Italian composers would also moved to France and Austria to take advantage of copyright protection in those countries. Domenico Cimarosa (1749-1801), for example, premiered most of his operas in Austria; in 1801, the year of his death Cimarosa premiered a final opera, *Artemesia*, in Venice (Scherillo 1916, p. 67).[4]

[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 Sonnambula,* one third of the flat fee that Bellini had received (Rosselli 1996, p. 75).

[4] Our data, which capture premieres in Italy, include four additional operas by Cimarosa: *L'Italiana in Londra* (Papal State 1774), and four in the Papal State (*Caio Mario* 1784, *La Giuditta,* 1785, *Il Sacrificio di Abramo*, 1786.

Vincenzo Bellini (1801-1835) 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.[5] 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.[6] 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. Under the

[5] Letter from September 4, 1834, cited in Rosselli (1996, p. 119).
[6] 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.

new law, composers now had the right to collect royalties for repeat performances of their operas (Celletti, 1959, p. 518). Copyrights were based on the first performance of an opera, and they were enforceable in Lombardy and Venetia, but not in other Italian states.[7]

Due to the timing of Napoleon's military victories, only Lombardy and Venetia adopted the French copyright law, while the rest of Italy also came under the influence of French laws *without* adopting copyrights. France had adopted copyrights in 1793 to replace the royal privileges, which had been abolished in the French Revolution of 1789. On March 21, 1804, the Parliament of France adopted the (Napoleonic) *code civil.* It left copyrights intact where they had already been established, but did not introduce copyrights to states that had not yet adopted them. As a result, Lombardy and Venetia adopted French copyright laws in 1801, after they had come under French influence, and adopted the *code civil* – maintaining copyright laws after 1804. Other Italian states which Napoleon conquered after 1801 - including the Kingdom of Sardinia (1804), Parma (1805), Tuscany (1809), the Kingdom of Naples (1812), and the Papal State (1812, Latium), - adopted the *code civil without adopting copyrights* (Treccani 2001, p. 64).[8]

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).[9] 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 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).[10]

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

[7] 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).
[8] The *code civil* was repealed in many states after the Congress of Vienna without affecting copyrights. For example Tuscany, the Papal States, and the Two Sicilies repealed the *code civil* in 1819 (*Code civil italien* 1866, pp. xxiv).
[9] 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).
[10] 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.

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 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.[11] 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*.[12]

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 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

[11] 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.

[12] 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 motivated some agents to 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.

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 Emanuele II 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 Italian 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.[13] 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).

II.A. New Operas across Eight Italian States, 1770-1900

Data on premieres cover 2,598 first performances of operas by Italian 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

[13] Italy lost Istria and Zara to Yugoslavia as a result of World War II in 1945; the 1975 Treaty of Osimo affirmed this change.

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.[14] 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 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.

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). We find that our sample includes 80 composers who are missing from the *New Grove*. We also collect information on 880 additional operas by the 705 composers in the sample from the *New Grove* and Treccani (2001).

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

[14] Loewenberg (1978) also lists the librettist, translations into other languages, and the source for the opera's plot.

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 it was available for sale as a complete recording in 2008 from Arthaus Musik and in 2012 from 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 to equal 0. To measure the quality of complete operas, rather than specific arias, we restrict the Amazon measure to operas that were 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.[15] *Opera Today* (January 24, 2005) praises Loewenberg (1978)

> This volume has long been regarded as the definitive work on the subject…it is a magnificent piece of work, and belongs on the bookshelf of every researcher in the operatic field….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

[15] The Metropolitan data expands data in Moser (2012), which cover 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. To expand the data, we have added performances between 1950 and 2014. These data cover 7 additional operas by 5 composers, which were performed 23 times; 25 operas in Moser (2012) were performed another 82 times between 1950 and 2014. 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).

may instead represent a bias by *Opera Today* in 2005).[16] 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 the Met played between 1900 and 2012 are missing from Loewenberg (1978): Amilcare Ponchielli's *Gioconda* (1876) and 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 operas include 13 by Giovanni Pacini (1796-1867), 9 by Luigi Ricci (1805-1859), 5 each by Enrico Petrella (1813-1877), Ferdinando Paer (1771-1839), and Francesco Morlacchi (1784-1841), and 4 each by Pietro Generali (1773-1832), Pietro Mascagni (1863-1945) and Amilcare Ponchielli (1834-1886). All operas that the Met played between 1900 and 2014 were 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 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 shortest-lived 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

[16] 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.

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).[17]

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 birth places, as well as years of birth and death for all 795 composers from Dassori (1903) Ambiveri (1998) and the *New Grove Dictionary of Music and Musicians* (2001).

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.

[17] 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 *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.

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),[18] and 1795 to 1796 when Giuseppe Farinelli (1769-1836) produced three new operas in Venice (Venetia).[19] 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:

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

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 starting in 1801. Under the assumption that changes in opera output would have been comparable for Lombardy and Venetia and other Italian states in the absence of copyright protection, the coefficient β estimates the effect of copyright protection on opera 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 as a result of 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 the demand for operas due to the rise of Italian nationalism. The error term ε_{it} is estimated with a t-

[18] *Giannina and Bernardone*, *Giunio Bruto*, *Il Convito* by Cimarosa and *Angelica e Medoro* by Andreozzi. All four operas were notable performances in Loewenberg (1978).
[19] *L'indolente*, *Duello per un compimento*, and *Terza Lettera in* 1795 and *I Giouchi d'Agrigento*, *Idomeneo*, and *Cid nelle Spagne* in 1796. Among them *L'Indolente, I Giouchi d'Agrigento,* and *Cid nelle Spagne* entered the *Annals.*

wild bootstrap (Cameron, Gelbach, and Miller 2008) to allow for correlation in the error terms within states.[20]

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 β_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-

[20] For difference-in-differences estimators, Bertrand et al (2004) show that clustering at the state level may yield inconsistent estimates for standard errors, and that bootstrap standard errors over-reject if the number of states is small. The t-wild bootstrap procedure allows for correlation within states and provides consistent estimates for standard errors with a small number of states. The wild cluster bootstrap generalizes the wild bootstrap for heteroskesdastic standard errors without clustering. The bootstrap-t procedure provides asymptotic refinement.

trend for each state indicate a differential increase by 2.16 additional operas (Table 2, column 4, significant at 1 percent).

III.C. Effects on the Quality of Compositions

Beyond the effects on the number of new works, the creation of copyrights may also have influenced the quality of new operas by creating property rights in compositions. Most importantly, the creation of copyrights may have increased the quality of the marginal composition if it helped to increase composers' revenue from composition, and if composers preferred to create high quality works. Biographical sources indicate that many musicians depended on income for operas as a source of income. Giaocchino Rossini, for examples, was born into a family of poor musicians and had no prior wealth.

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

Rossini letters suggest that he adjusted the nature of his compositions in response to payments that he received from theaters. For example, he responded to the *impresari* that he encountered in Naples:

> "And, as for those good gentlemen, the *impressarj* (sic), who pretend to pay me handsomely, by giving me for sixteen or eighteen pieces, for the first characters, the same as they gave my predecessors for four, or six pieces at the most, I know a way of being even with them. In every fresh opera, I will serve up three or four of these pieces, which shall have nothing new in them but the variations." (Beyle 1824, pp. 200-01)

Rossini letters also suggest that he had clear ideas of quality:

> "The theatres are filled with performers, who have learned music from some poor provincial professor. This mode of singing violin concertos, and variations without end, tends to destroy, not only the talent of the singer, but also to vitiate the taste of the public" (Beyle 1824, pp. 199).

Rossini and moved to Milan in 1811 when he was 19 years old. Between 1811 and his death in 1868, Rossini produced 5 of his 33 operas in Milan and 9 in Venetia. Historical observers

judged his operas to be of significantly higher quality than his contemporaries, who had produced a larger number of lower quality operas:

> "Paisiello saw, perhaps, some twenty or thirty principal pieces of his hundred and fifty operas meet with general favour. Rossini could easily reckon upon a hundred in his thirty operas, really different from each other" (Beyle 1824, pp. 249).

To systematically examine the effects of copyrights on the quality of new operas we repeat the baseline specifications with two alternative measures for the quality of operas. The first test examines data on historically popular operas, based on records of notable performances between 1780 and 1945 in Loewenberg's 1978 *Annals of Opera*. Between 1780 and 1821 composers created 62 new operas that became notable performances (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 (Table 3, column 2, significant at 1 percent). Regressions with a common pre-trend for Lombardy and Venetia imply an additional increase by 0.57 historically popular 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 (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 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).

III.D. Correlations for All of Italy, 1770-1900

We also examine changes in output for other Italian state between 1770 and 1900, as these states adopted copyrights after 1825 during the political process towards a unified Italy. Consistent with the results of our main analysis, summary statistics indicate an increase in output after states adopted copyrights. For example, composers in Sardinia produced 3,4 premieres per year after the adoption of copyrights (1840-1864, Appendix Table A4) compared with 2.4 before (1828-1839). 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 new operas per year in states with copyrights compared with composers in states without copyrights (Table 4, 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 4, 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 4, column 3, significant at 1 percent).

Summary statistics also 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 4, 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 4, 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 4, 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 4, column 7, significant at 1 percent).

In sum, these changes indicate that copyright adoptions were associated with an increase in the quantity and quality of creative output, even though later copyright adoptions were less likely to be exogenous than the change in 1801.

III.E. Copyright Extensions

Contemporary policy debates center on extensions of existing copyrights, rather than their adoption. Empirical analyses of such extensions are challenged by potential selection problems because works that are off copyright under modern terms (of roughly 100 years of protection) have to be extremely durable to continue to be economically important.

To measure variation in durability for operas, we first examine data on the timing of performances for operas that premiered before the adoption of copyrights in 1800. For a data set of 165 operas, these data indicate that even historically popular operas were unlikely to be performed after the first 20 years, well before the expiration of their first copyright term.[21] On average, 165 historically popular operas were performed 10 times per opera, including 7.5 times within the first 40 years (the expected length of copyrights under *life+10*) and 2.8 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 4).[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 5). 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.

IV. MECHANISMS

[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).

How did the adoption of copyrights encourage the creation of new and higher quality operas? In this section we investigate three complementary mechanisms: increased output by native composers, changes in composer migration patterns, and agglomeration externalities.

IV.1. Increased Output by Native Composers

As a first step to examine the mechanism for the increase in output, we examine changes in creative output by *native* composers, who were born in the same state where the opera premiered. This analysis reveals a differential increase in output for native composers in Lombardy and Venetia after 1800 compared with other states. In Lombardy and Venetia, opera output by natives increased 2.8-fold from 1.60 new operas per state and year between 1780 and 1800 to 4.48 between 1801 and 1821 (Figure 6, Panel A). In other states opera output by natives increased 1.6-fold from 1.62 new operas per state and year until 1800 to 2.51 afterwards (Figure 6, Panel B).

IV.2. Composer Migration to Lombardy and Venetia after 1801

Although historical records suggest that Lombardy and Venetia was not a recipient of significant migration between 1750 and 1850 (e.g., Romani 1955, p. 27), biographical evidence for individual composers indicates that immigrant composers made significant contributions to opera output in Lombardy and Venetia after 1801.[24] For example, Saverio Mercadante and Vincenzo Bellini moved to Lombardy and Venetia soon after they had premiered their first opera. Saverio Mercadante (1795-1870) was born in Altamura in the North of the Two Sicilies, premiered his first opera, *L'Apoteosi di Ercole*, in Naples in 1819, and moved to Milan the following year. He premiered *Elisa and Claudio* there in 1820 and *Il Posto Abbandonato* in 1821, followed by *Andronico* in Venice in 1821 (De Napoli 1952, p.75). Vincenzo Bellini was born in Catania, Two Sicilies 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). Another prolific composer, Vincenzo Pucitta (1778-1861) was born in Civitavecchia (50

[24] Romani (1955, p. 27 explains that migration had no significant influence on population growth in Lombardy ("irrilevante è il suo influsso sul processo di crescita della popolazione") between 1750 and 1850. Importantly, the period of analysis for our main test (1780 to 1821) precede the construction of railways in Italy (Villari 1989, pp.134-142). The first Italian railway line (between Naples and Portici line in the Two Sicilies) was inaugurated on October 3, 1839; it was 7.64km long. The Milan-Monza line (12km) was completed in 1840. Additional lines were built in Lombardy, and Venetia (1842-1846, 94km), Sardinia (1844-1853, 152km), Parma and Modena (1845, 40km), Tuscany (1844, 136km) and Papal State (1846, 63km).

miles northern than Rome in Papal State) in 1778, and moved to Milan in 1801. He premiered *Il Fuoruscito* there in 1801, *Il Puntiglio* in 1802, and *La Finta Pazza* in 1804, and *Zerinda e Lindoro* in Venice in 1803. Of 19 new operas that Puccitta created between 1801 and 1826 (when the Papal State adopted copyrights), 12 premiered in Lombardy and Venetia.

Quantitative comparisons of changes in the creation of new operas by immigrant composers indicate that – relative to a low share of immigrants until 1800 - output by immigrants grew more in Lombardy and Venetia after 1800 compared with other states. Until 1800, immigrants composed 0.29 new operas per state and year in Lombardy and Venetia (Figure 6, Panel A). After 1800 immigrants composed 2.14 new operas per state and year, which implies a 7.4-fold increase. By comparison, immigrants composed a total of 0.10 new operas in other states (Figure 6, Panel B), and 0.30 after 1800, a three-fold increase. Nearly half of the total 94 new operas that premiered in Lombardy and Venetia between 1801 and 1821 were by immigrants (46 operas, or 48.94 percent), up from one fifth between 1780 and 1800 (6 of 30 operas). By comparison, 6 of 50 new operas that premiered in other states after 1800 were by immigrants (12.00 percent), up from 2 of 28 (7.14 percent) before.

Data from biographies also indicate that composers became significantly more likely to move to Lombardy and Venetia to premiere their *first* opera. Between 1780 and 1800, only 15 composers premiered their first opera in a state that was different from their state of birth (Table 5, 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 Venetia. After 1800, migration increased significantly, but *only towards Lombardy and Venetia*. Between 1801 and 1821, 57 composers premiered their first opera in a state that was different from their state of birth; 43 of these composers – more than 75 percent – moved to Lombardy and Venetia (Table 5 Panel B). For example, Vincenzo Migliorucci (1788-1863) was born in Rome and moved to Milan where he premiered his first opera, *Paolo and Virginia* in 1813. Between 1813 and 1818 Migliorucci premiered three additional operas in Milan and one in Venice.[25]

[25] In fact, Lombardy and Venetia appear to have attracted important composers from outside of Italy after 1801. For example, Beyle (1824, pp. xxv-xxvi) explains: "After Cimarosa, and before the appearance of Rossini, two names present themselves, Mayer and Paer. Mayer, a German, who finished his education in Italy, and has resided for a number of years at Bergamo, has written some fifty operas be tween 1795 and 1820." Because our analysis focuses on Italian composers, their compositions are excluded from the empirical tests.

As a result of entry and migration, the number of active composers per state and year increased from 1.75 in Lombardy and Venetia between 1770 and 1800 to 8.15 per state and year between 1801 and 1821 (Appendix Figure A4). Native composers also continued to account for the majority of composers in Lombardy and Venetia, even though the share of immigrants more than doubled from 6 in 40 (15.00 percent) before 1800 to 39 in 76 (39.47 percent) after 1800 (Appendix Figure A4, Panel A). By comparison, the share of immigrants in other states remained flat, with 2 of 35 active composers between 1780 and 1800 (5.71 percent, Appendix Figure A4, Panel B), and 4 of 41 between 1801 and 1821 (9.76 percent).

Migration data also show that Lombardy received a larger number of new composers after 1801, even though a significant number of new composers moved to Venetia as well (Table 4). These patterns of geographic concentration are consistent with Marshallian (1890) agglomeration externalities, which may have interacted with the effects of copyrights..

IV.3. Differential Effects within Lombardy and Venetia

To examine geographic variation in the effects of copyrights within Lombardy and Venetia, we first examine city-level data on new operas per year separately for Lombardy and Venetia. These data indicate that both states experienced a significant increase in output after 1800. In Lombardy, new operas per year increased from 1.06 per year between 1780 and 1800 to 3.56 between 1801 and 1821 (Figure 7, Panel A). In Venetia, new operas per year increased from 0.84 before 1801 to 1.87 afterwards (Figure 7, Panel B).

City level data also show that, within Lombardy, the increase in output after 1800 was concentrated in Milan. Between 1780 and 1801, composers in Milan premiered roughly one new opera per year.[26] After 1800, output in Milan increased to four new operas in 1803 and three in 1804. At the same time, composers outside of Milan produce only one new opera, Francesco Gnecco (1769-1811)'s *Il Geloso Corretto* in Mantua in 1804. Between 1805 and 1809, composers in Milan premiered two new operas per year, then three in 1810, two in 1811, and four in 1812. In 1818, Milan's output reached another peak with five new operas. At the same time, composers premiered a total of four new operas in Mantua between 1801 and 1821, one in Bergamo, and one in Brescia. City-level data for Venetia yield some evidence of geographic concentration, albeit at a smaller scale. Between 1781 and 1801, 14 of 24 new operas within

[26] The only exception to this pattern is 1795, when two operas were premiered in Milan, and one in Mantua.

Venetia premiered in Venice. After 1801, 47 of 62 operas premiered in Venice, 2 in Padova, 3 in Vicenza, and 10 in Verona.

One outstanding characteristic of Milan was its sheer size, with a population of 134,058 people in 1800 (Malanima 2005, p.4). By comparison, the next largest city, Brescia had a population of 38,000; Bergamo had 36,000, and Mantua 25,000 people. Population size in turn is correlated with the number of people who can afford to pay for entertainment, along with other factors that increase demand for operas. Composers' payoffs from creating a new opera also depend on the supply of inputs and complementary factor, such as the availability of singers, instrumentalists, and theaters that are large enough to perform operas.

According to Antonini (2000, p. 132), the minimum efficient size for a theater to perform an opera was roughly 100 seats. We use Antonini's (2000) data on the stock of such theaters in 1800 to proxy for variation in pre-existing infrastructure and demand for opera. Two Italian cities had three theaters in 1800 that were large enough to perform opera: Venice and Florence (Figure 8, Panel A). Three theaters in Venice offered a joint seating capacity of 2,521 (Figure 8, Panel B): Teatro Moise (founded in 1640, 800 seats), Teatro Malibran (founded in 1678, 721 seats), and La Fenice (founded in 1774, 1,000 seats). Another four cities had two theaters in 1800 that were large enough to perform operas: Milan, Naples, Turin, and Ferrara. With 2,030 seats at La Scala (founded in 1778) and another 1,500 seats at Teatro Carcano (founded in 1797) Milan had the largest number of seats for any Italian city (Figure 8, Panel B). At the other end of the spectrum, Brescia had the smallest seating capacity among Italian cities with at least one theater in 1800; Brescia's Teatro Comunale (founded in 1739) could seat 99 people.

There is a break in the distribution of seating capacities (Figure 8, Panel B) between Verona, with 1,200 seats and Florence with 2,177 seats; this loosely corresponds to a break in the distribution of theaters, between cities with one and two or more theaters (Figure 8, Panel A). Verona had one theater, the Teatro Filarmonico (founded in 1732, 1,200 seats). Ferrara is the city with the next largest seating capacity with 292 seats at the Teatro Estense (founded in 1476), and 900 seats at the Teatro Comunale (founded in 1798). Ferrara and 5 other cities with seating capacities above 1,000 had 2 or more theaters. Verona and other 10 cities (Ancona, Bologna, Padova, Mantua, Vicenza, Bergamo, Rome, Messina, Genoa, Brescia) had at least one theater in 1800; four of these theaters (Verona, Ancona, Bologna, and Padua) had more than 500 seats.

To test whether cities with a better pre-existing infrastructure benefitted more from copyrights, we interact the variable *L&V * post* with an indicator variable for cities that had two or more theaters in 1800. Estimates with year and city fixed effects indicate that these cities produced 2.32 additional operas per year after 1800 (Table 6, column 1, significant at 1 percent) compared with cities that had only one or no theater. Relative to an average of 0.25 new operas per city and year until 1800, this implies a 9.20-fold increase. Controlling for a linear pre-trend for cities with two or more theaters increases the estimate to 2.43 additional operas per city and year after 1800 (Table 6, column 2, significant at 1 percent), which implies a 9.60-fold increase. Estimates for historically popular operas imply that cities with a better pre-existing infrastructure premiered 0.78 additional historically popular operas per year in response to the adoption of copyrights (Table 6, column 3, significant at 1 percent). Relative to an average of 0.022 historically popular operas until 1800, this implies a 35-fold increase. Controlling for a separate separate linear pre-trend for cites with 2 or more theaters increases the estimate to 0.80 (Table 6, column 4, significant at 1 percent). Estimates for durable operas indicate that cities with two or more theaters premiered 0.48 additional durable operas per year in response to the adoption of copyrights (Figure 6, column 5, significant at 1 percent). Relative to an average of 0.004 new durable operas per city and year until 1800 this implies a 120-fold increase. Controlling for a linear pre-trend slightly increases the estimate to 0.50 (Figure 6, column 6, significant at 1 percent).

Theater data also indicate that the most significant improvements in infrastructure occurred after the unification of Italy in 1861. The number of theaters that were large enough to produce operas (having at least 100 seats, Antonini 2000, p. 132) increased from 8.13 between 1840 and 1865 to 8.88 between 1865 and 1869 and 35.40 between 1870 and 1900 (nearly a 3-fold increase, Table 7). By comparison, the growth in theaters after 1801 was relatively modest. The number of active theaters with more than 100 seats per state and year increased from 3.75 between 1770 and 1899 to 6.50 between 1801 and 1825. Comparisons of the stock of theaters with utilization data indicate that the stock of theaters was not a binding constraint for the average state: 1.13 per state and year produced at least one opera between 1770 and 1800, and 2.88 between 1870 and 1900 (1.55-fold increase, Table 7).

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 2003, 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.

REFERENCES

Bandi ed Ordini da osservarsi nel Granducato di Toscana, n. CIII, Firenze, 1840.

Code civil italien, promulgué le 25 juin 1865, mis en vigueur le 1er janvier 1866. A. Pedone, January 1, 1896

Collezione delle leggi e dei decreti reali del Regno delle Due Sicilie, n.154, Napoli, 1828.

Collezione generale delle leggi costituzioni editti proclami,e cc. per gli Stati Estensi, Tomo XXII, Modena, 1842.

Intorno alla garanzia della proprietà scientifico letterario artistico nei domini della Santa Sede. Leggi declaratorie e sentenze, Roma, 1860.

Raccolta generale delle leggi per gli Stati di Parma, Piacenza e Guastalla, n.151, Parma, 1840.

Raccolta degli atti del governo di Sua Maestà il Re di Sardegna, n.301, Torino, 1840.

Raccolta degli atti dei governi di Milano e Venezia e delle disposizioni generali emanate dalle diverse autorità in oggetti si amministrativi che giudiziali, n.64, Milano, 1847.

Raccolta delle leggi, proclami, ordini ed avvisi pubblicati in Milano dal giorno 13 pratile anno VIII, n.144, Milano, 1801.

Raccolta ufficiale delle leggi e decreti del Regno d'Italia, Stamperia Reale, n.162, Torino, 1865.
Antolini, Bianca M. 2000. *Editoria musicale, 1750-1930.* Edizioni ETS. Pisa.
Apthorp, William F. 1901. *The opera, past and present and historical sketch*. New York NY: Scribner.
Ambiveri, Corrado. 1998. *Opere e Operisti Minori dell'Ottocento Italiano.* Gremese Editore. Milano.
Bertrand, Marianne, Ester Duflo, and Sendhil Mullainathan. 2004. "How Much Should We Trust Differences-In-Differences Estimates?" *The Quarterly Journal of Economics*, 119(1): 249-275.
Beyle, Marie Henrie. 1824. *The Life of Rossini.* London: Printed for T. Hookham, Old Bond Street, by J. and C. Adlard, 23, Bartholomew Close.
Cameron, A. Colin, Gelbach, Jonah B. and Miller, Douglas L. (2008). "Bootstrap-Based Improvements for Inference with Clustered Errors." *The Review of Economics and Statistics*, 90(3): 414–427.
Celletti, Rodolfo, ed. 1959. *Impresario.* Enciclopedia dello spettacolo, VI, casa editrice Le Maschere, Firenze – Roma.
Conley, G. Timothy, and Christopher R. Taber. 2011. "Inference with "Difference in Differences" with a Small Number of Policy Changes." *The Review of Economics and Statistics*, 93(1):113-125.
Dassori, Carlo. 1903. *Opere e Operisti. DizionarioLirico (1541-1902)*, Tipografia editrice R. Istituto Sordomuti, Genoa.
De Napoli, Giuseppe, ed. 1952. *La triade melodrammatica altamurana: Giacomo Tritto, Vincenzo Lavigna, Saverio Mercadante.* Industrie grafiche Rosio & Fabe. Milano.
Franchi, Luigi, ed. 1902. *Leggi e convenzioni su diritti di autore. Raccolta generale delle leggi italiane e straniere e di tutti i trattati e le convenzioni esistenti fra l'Italia e altri stati*, Società italiana degli autori, Ulrico Hoepli. Milano.
Graziani, Antonio, ed. 1958. *La politica commerciale del Regno delle Due Sicilie dal 1838 al 1858.* Atti della Accademia Pontaniana. Giannini Editore. Napoli.
Grove, George, ed. 2001. *The New Grove Dictionary of Music and Musicians*, Oxford University Press. Oxford.
Istituto Dell'enciclopedia Italiana Treccani, *Enciclopedia Italiana di scienze, lettere ed arti*, Milano, 2001.
Kaufman, Tom. "Loewenberg: Annals of Opera, 1597-1940." *Opera Today,* January 5, 2005.
Loewenberg, Alfred. 1978. *Annals of Operas (1597-1940).* Oxford University Press. Alfred Loewenberg: Annals of Opera, 1597-1940, 3rd edition rev. and corrected. First published 1943; revised 1955.
Lampe, Ryan, and Petra Moser. 2012. "Patent Pools: Licensing Strategies in the Absence of Regulation." *The Journal of Economic History*, Volume 71(2): 363-382.
Lampe, Ryan, and Petra Moser. 2014. "Patent Pool and Innovation in Substitute Technologies – Evidence from the U.S. Sewing Machine Industry." *RAND Journal of Economics*, Volume 44(4): 757-778
Li, Xing, Megan MacGarvie, and Petra Moser. 2013. "Dead Poets' Property - How Does Copyright Influence Price?", *SSNR Working Paper.*

MacGarvie, Megan, and Petra Moser, ed. 2013. *"*Copyright and the Profitability of Authorship*"* Forthcoming in Avi Goldfarb, Shane Greenstone, and Catherine Tucker. *The Economics of Digitization: An Agenda*.

Marshall, Alfred. 1890. *Principles of Economics*. Macmillan, London.

Mortimer, Julie H. 2006. "Price Discrimination, Copyright Law, and Technological Innovation: Evidence from the Introduction of DVDs." *The Quarterly Journal of Economics*, 122 (3): 1307-1350.

Moser, Petra. 2003. "Determinants of Innovation – Evidence from 19th Century World Fairs." *NBER Working Paper*.

Moser, Petra. 2005. "How Do Patent Laws Influence Innovation? Evidence from Nineteenth-Century World Fairs." *The American Economic Review,* Volume 95(4): 1214- 1236.

Moser, Petra. 2012. "Taste-Based Discrimination. Evidence from a Shift in Ethnic Preferences after WWI." *Explorations in Economic History*, Volume 49(2): 167-188.

Moser, Petra. 2013. "Patents and Innovation – Evidence from Economic History." *Journal of Economic Perspectives*, Volume 27(1): 23-44.

Moser, Petra, and Alessandra Voena. 2012. "Compulsory Licensing: Evidence from the Trading with the Enemy Act", *The American Economic Review*, 102(1): 396-427.

Oberholzer, Felix, and Koleman Strumpf. 2007. "The Effect of File Sharing on Record Sales: An Empirical Analysis." *Journal of Political Economy*, 115 (1): 1-42.

Panico, Paolo. 2002. *Verdi Businessman*, Gruppo Editoriale Atman. Pray (Biella).

Pecout, Gilles. 1999. *Il lungo Risorgimento: la nascita dell'Italia contemporanea (1770-1922).* Pearson Paravia Bruno Mondadori.

Reimers, Imke. 2013. "I Got You Babe: Welfare Effects of the Sonny Bono Copyright Extension." *Working Paper*.

Romani, Mario. 1977. "Il movimento demografico in Lombardia dal 1750 al 185*0*" in *Aspetti e problemi dell'economia lombarda nei secoli XVIII e XIX,* Milano.

Rosselli, John. *The Life of Bellini.* Cambridge University Press, 1996.

Scherer, Friedrich. M. 2004. *Quarter Notes and Bank Notes: The Economics of Music Composition in the 18th and 19th Centuries.* Princeton University Press.

Scherer, Friedrich. M. 2001. "The Evolution of Free-Lance Music Composition, 1650-1900." *Journal of Cultural Economics*, 11: 307-319.

Scherer, Friedrich. M. 2008. "The Emergence of Musical Copyright in Europe from 1709 to 1850." *Review of Economic Research on Copyright Issue,* 12: 3-18.

Valle, Giovanni. 1823. *Cenni teorico pratici sulle aziende teatrali*. Soc. Tip. dei classici italiani. Milano.

Villari, Lucio. 1989. "Nove minuti che fecero una storia - 1839-1989: I centocinquantanni delle Ferrovie Italiane". *Voci della rotaia.* 8(9): 112-169.

Varian,Hal. R. 2005. "Copying and Copyright." *The Journal of Economic Perspectives*, 19 (2): 121-138.

Waldfogel, Joel. 2011. "Bye, bye, Miss American Pie. The Supply of New Recorded Music Since Napster." *NBER Working Paper 16882.*

Waldfogel, Joel. 2011. "Copyright protection, technological change, and the quality of new products: evidence from recorded music since NAPSTER." *NBER Working Paper 17503.*

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)			Poisson ATE (5)
L&V *post1800	2.124***	2.069***	2.091***	2.165***	1.045***
	(0.392)	(0.401)	(0.388)	(0.399)	(0.146)
L&V		0.311			
		(0.241)			
Year FE	Yes	Yes	Yes	Yes	Yes
State FE	Yes	No	Yes	Yes	Yes
Linear pre-trend for L&V	No	No	Yes	No	No
State-specific linear pre-trend	No	No	No	Yes	No
Pre-1801 mean	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	

Wild cluster bootstrap-t 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 *post1800* equals 1 for years after 1800. *Pre-1801 mean* reports the average count of new operas per state and year before 1801. 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 (ATE) of the conditional fixed effects quasi-maximum likelihood Poisson regression. Standard errors are estimated using a wild cluster bootstrap-t procedure (Cameron, Gelbach, and Miller 2008) to allow for correlation in the error terms within states with a small number of states.

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			
L&V * post1800	0.418***	0.411***	0.568**	0.371**	0.307**	0.302**	0.308**	0.302**
	(0.147)	(0.155)	(0.248)	(0.158)	(0.126)	(0.127)	(0.129)	(0.132)
L&V		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 L&V	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	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

Wild cluster bootstrap-t 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 *post1800* equals 1 for years after 1800. *Pre-1801 mean* is the mean number of new operas per state and year before 1801. 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. Standard errors are estimated using a wild cluster bootstrap-t procedure (Cameron, Gelbach, and Miller 2008) to allow for correlation in the error terms within states with a small number of states.

TABLE 4 – 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 ATE(3)	Historically popular operas (4-5) *Annals of Operas* (1770-1945)		Long-lived operas (6-7) Available on *Amazon* in 2014	
Copyright	2.683***	2.533***	0.952***	0.188*	0.193**	0.327***	0.372***
	(0.433)	(0.434)	(0.147)	(0.097)	(0.093)	(0.112)	(0.109)
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	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

Wild cluster bootstrap-t 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. *Pre-copyright mean* 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 effect (ATE) of the conditional fixed effects quasi-maximum likelihood Poisson regression. Data include 2,598 new operas premiered between 1770 and 1900 in theaters within the 1900 borders of Italy. Standard errors are estimated using a wild cluster bootstrap-t procedure (Cameron, Gelbach, and Miller 2008) to allow for correlation in the error terms within states with a small number of states.

TABLE 5 – MIGRATION: COUNTS OF COMPOSERS BY STATE OF BIRTH AND LOCATION OF THEIR FIRST OPERA

PANEL A: 1780-1800

First opera 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

First opera 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).

TABLE 6 – CITY-LEVEL REGRESSIONS WITH INTERACTIONS FOR THEATER INFRASTRUCTURE IN 1800
DEPENDENT VARIABLE IS NEW OPERAS PER YEAR AND CITY, 1780-1821

	(1)	(2)	(3)	(4)	(5)	(6)
	All Operas (1-2)		Historically popular *Annals of Operas* (1770-1945) (3-4)		Long-lived operas *Amazon* 2014 (5-6)	
L&V * post1800 * 2 or more theaters	2.316***	2.429***	0.776***	0.803***	0.481**	0.497**
	(0.321)	(0.321)	(0.247)	(0.251)	(0.242)	(0.245)
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
City FE	Yes	Yes	Yes	Yes	Yes	Yes
Linear pre-trend for L&V	No	Yes	No	Yes	No	Yes
Pre-1801 mean	0.253	0.253	0.022	0.022	0.004	0.004
N (year-city pair)	1,050	1,050	844	844	838	838
R-squared	0.594	0.597	0.310	0.313	0.258	0.261
City-level clustered standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1						

Notes: The dependent variable *new operas per year and city* measures the number of new operas that were premiered in city *i* and year *t* between 1780 and 1821. The indicator variable *L&V* equals 1 for cities in Lombardy and Venetia, which adopted copyright laws in 1801, after they had fallen under Napoleonic rule. The indicator variable *post1800* equals 1 for years after 1800. The variable *2 theaters* is a dummy that equals 1 if city *i* had two or more theaters in 1800, before copyright law was approved in Lombardy and Venetia. *Pre-1801 mean* is the mean number of new operas per city and year before 1801. Data include 328 new operas that premiered between 1790 and 1821 within the year 1900 borders of Italy. Columns (1) to (2) include all operas; columns (3-4) only operas listed in Loewenberg's *Annals of Operas* (1770-1940) and columns (5-6) only operas available for sale on *Amazon* in 2014.

TABLE 7 – THEATERS PER STATE AND YEAR, 1770-1900

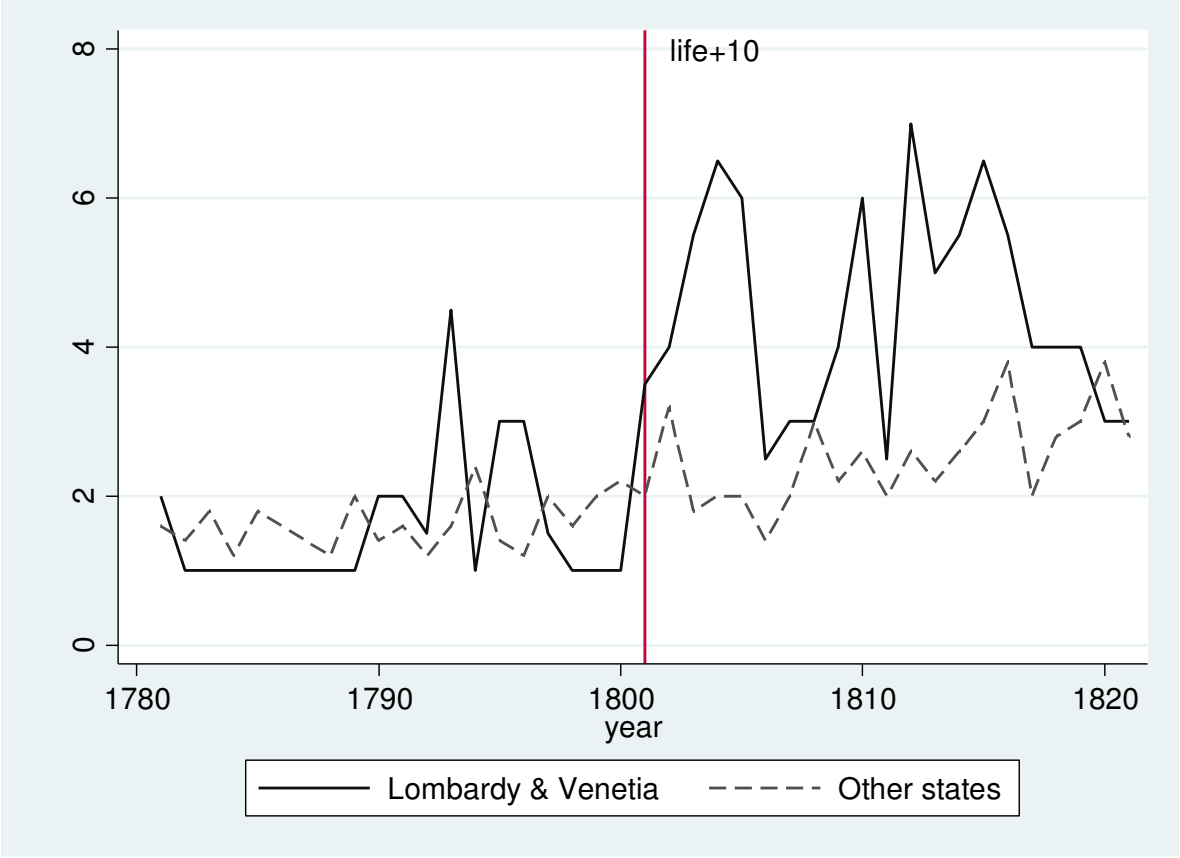
	THEATERS WITH >100 SEATS		THEATERS THAT PERFORMED ≥1 OPERA	
States	W COPYRIGHT	W/O COPYRIGHT	W COPYRIGHT	W/O COPYRIGHT
1770-1800	-	3.75		1.13
1801-1825	6.50	5.00	3.00	1.50
1826-1827	6.67	8.20	3.00	1.60
1828-1839	11.75	4.00	2.00	1.50
1840-1864	8.13	-	2.38	
1865-1869	8.88	-	2.50	
1870-1900	35.40	-	2.88	

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 is 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

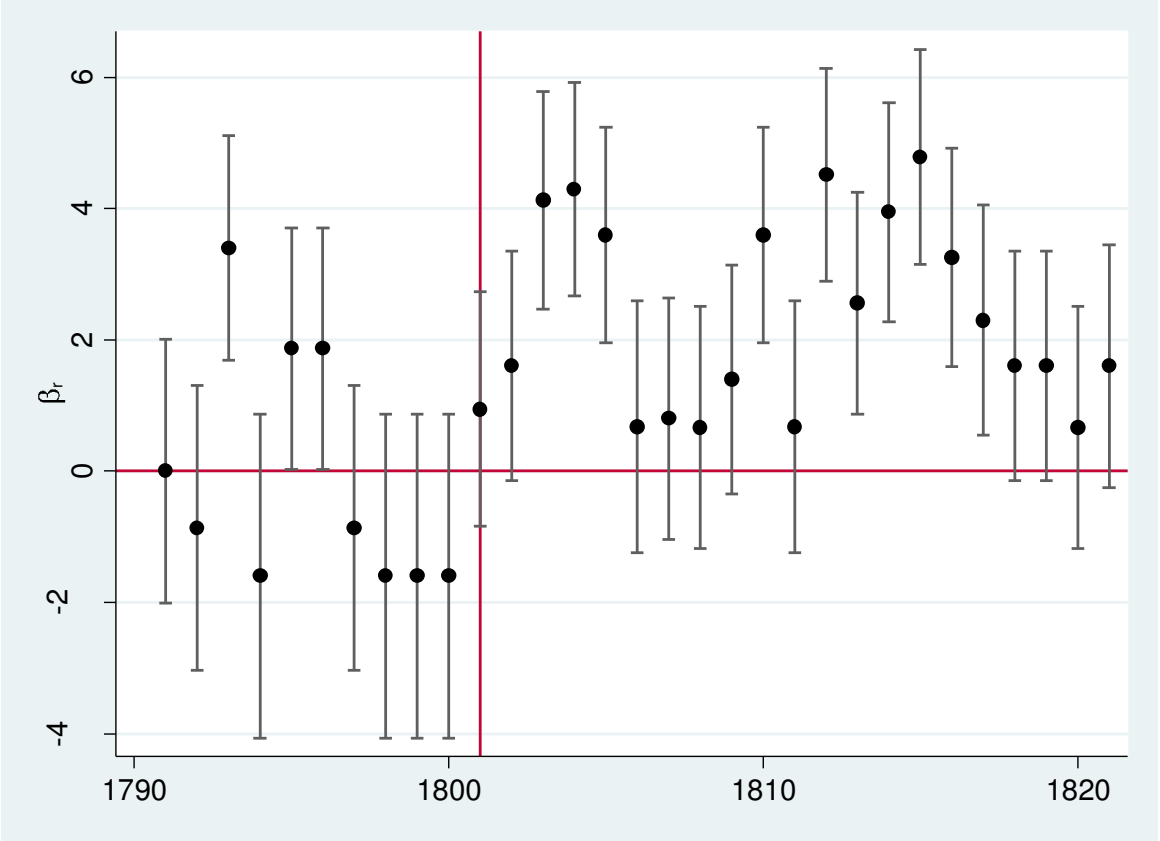
Notes: Lombardy and Venetia adopted copyrights in 1801, as part of a broader packet of French laws, after they had fallen under French rule. Shapefile for Italy is from the Italian National Institute for Statistics (ISTAT, accessed October 3, 2014, http://www.istat.it/it/archivio/104317#confini). We 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 PER STATE AND YEAR IN ITALY, 1780-1821



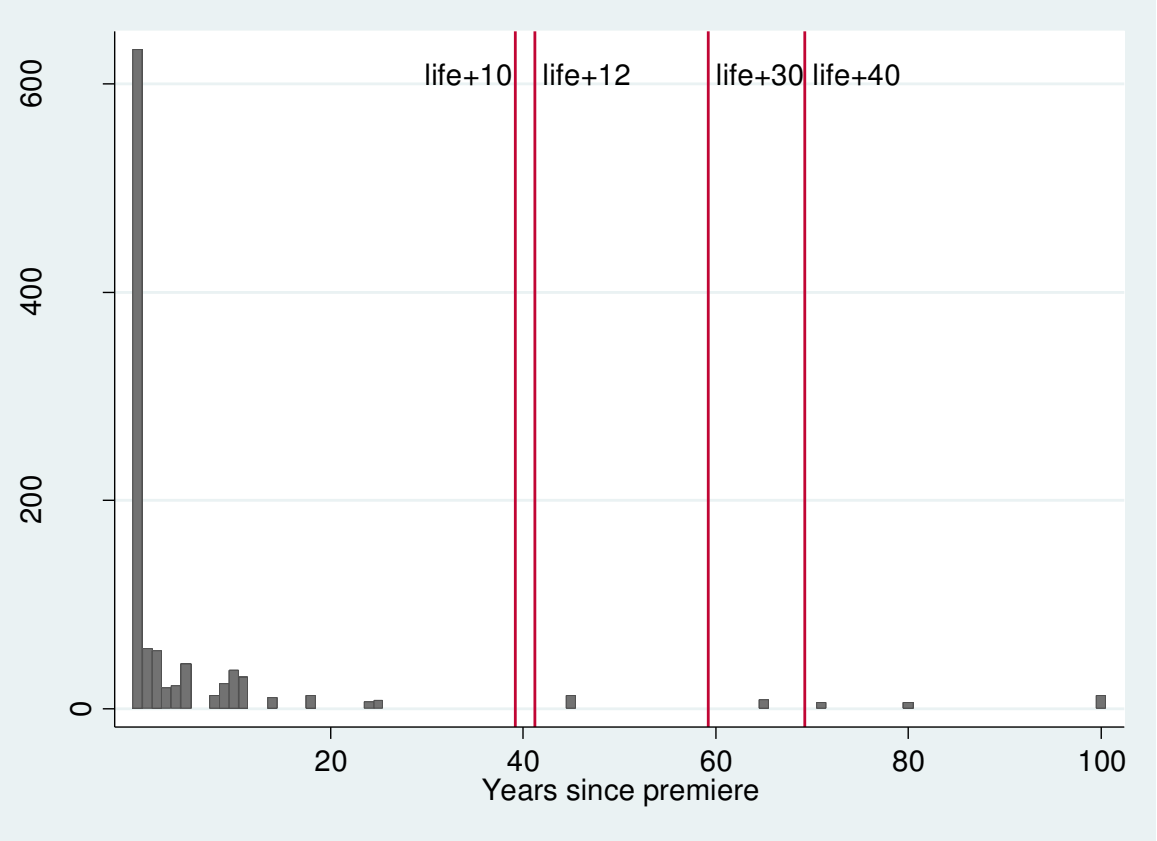
Notes: Data include 478 new operas that premiered between 1780 and 1821 within the year 1900 borders of Italy. We have collected these data from Loewenberg (1978), Dassori (1903), and Ambiveri (1998). Lombardy & Venetia adopted copyright laws as part of a broader packet of French laws in 1801, after 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 NEW OPERAS PER STATE AND YEAR



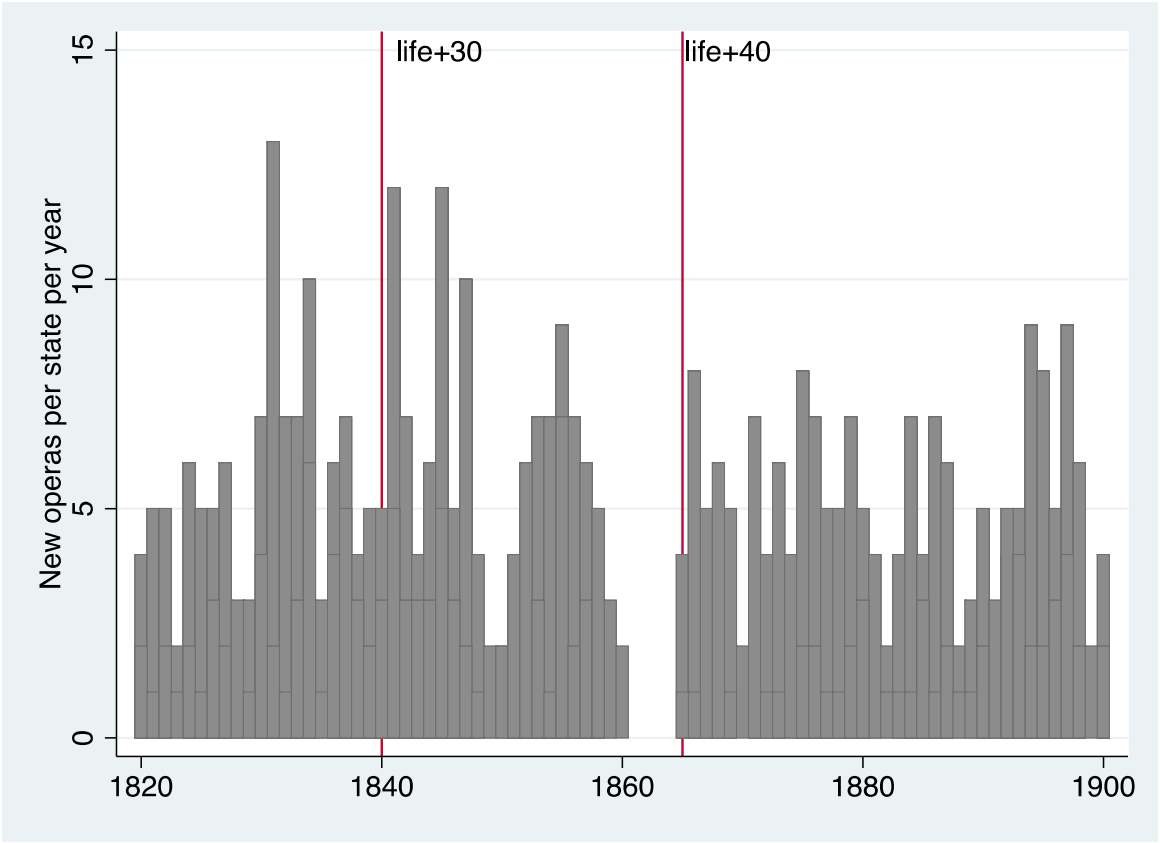
Notes: Point estimates and 95% confidence intervals for β_r in $opera_{it}=\beta_0 + \beta_t\ Lombardy\ \&Venetia_i \times year_t + \varphi_i + \delta_t + \varepsilon_{it}$ where the dependent variable counts the number of new operas premiered per state and year. The variable *Lom&Ven* equals 1 for Lombardy 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 – 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*.

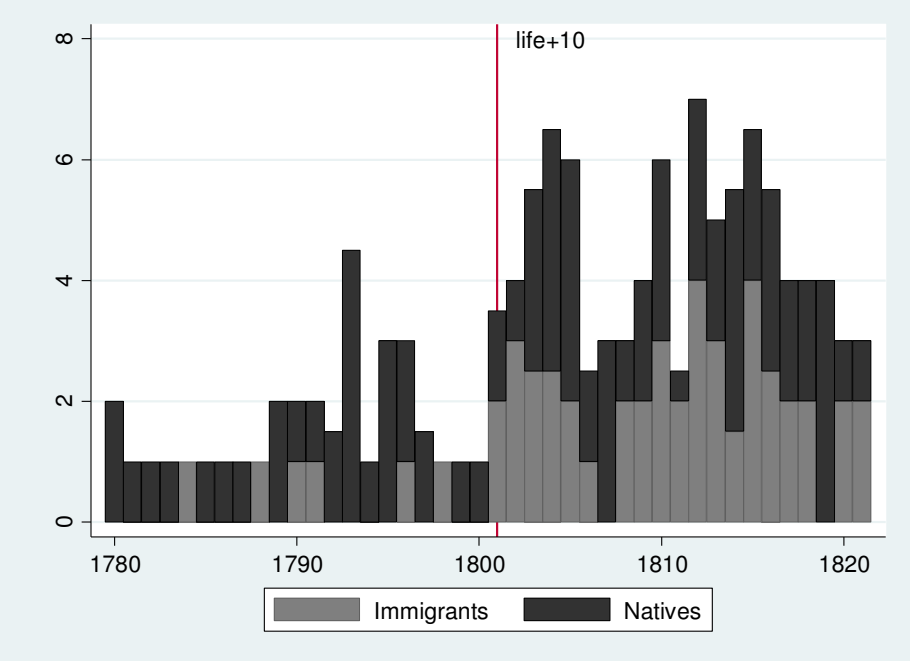
FIGURE 5 – NEW OPERAS PREMIERED PER STATE AND YEAR
IN LOMBARDY AND VENETIA, 1820-1900



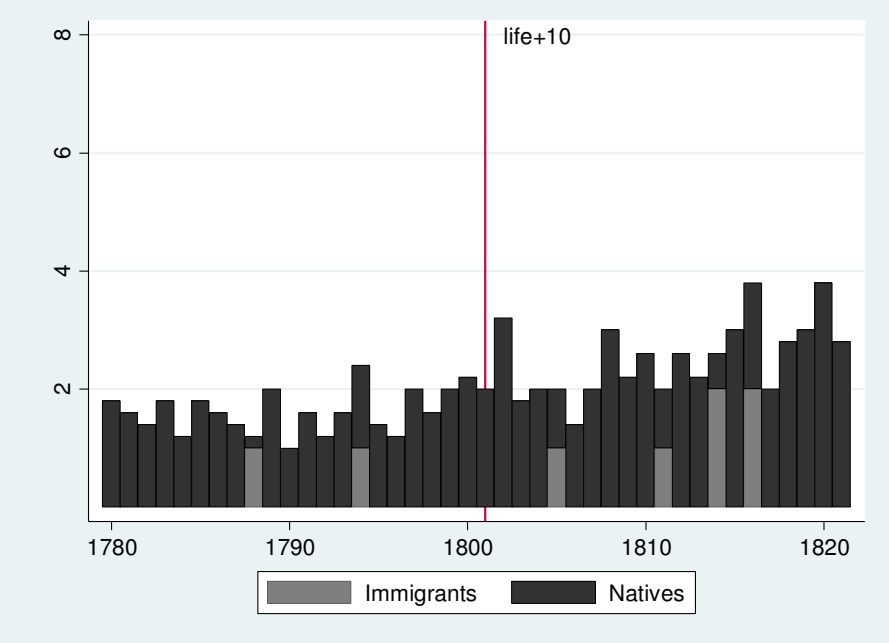
Notes: Data include 580 new operas that premiered between 1820 and 1900 in Lombardy and Venetia. We have collected these data from Loewenberg (1978), Dassori (1903), and Ambiveri (1998). The vertical line corresponds to the bilateral Treaty between Kingdom of Sardinia and Austria that extended copyright length from *life+10* to *life+30*, and Italian copyright law of 1865 that extended copyright length from *life+30* to *life+40*.

FIGURE 6 – NEW OPERAS PER STATE AND YEAR, IMMIGRANTS VS NATIVES, 1780-1821

PANEL A: LOMBARDY AND VENETIA



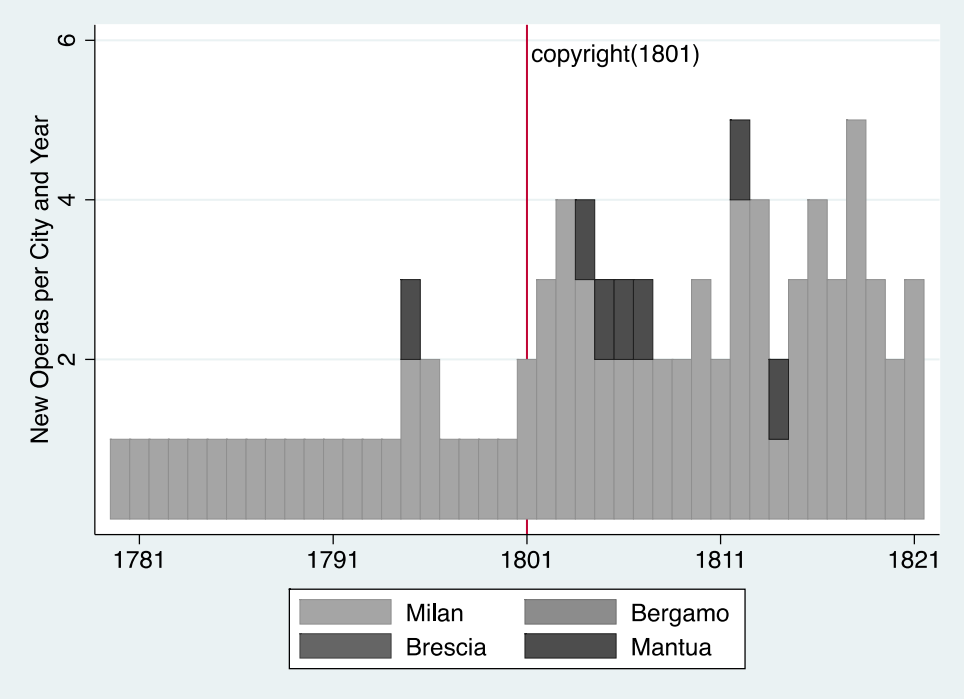
PANEL B: OTHER STATES



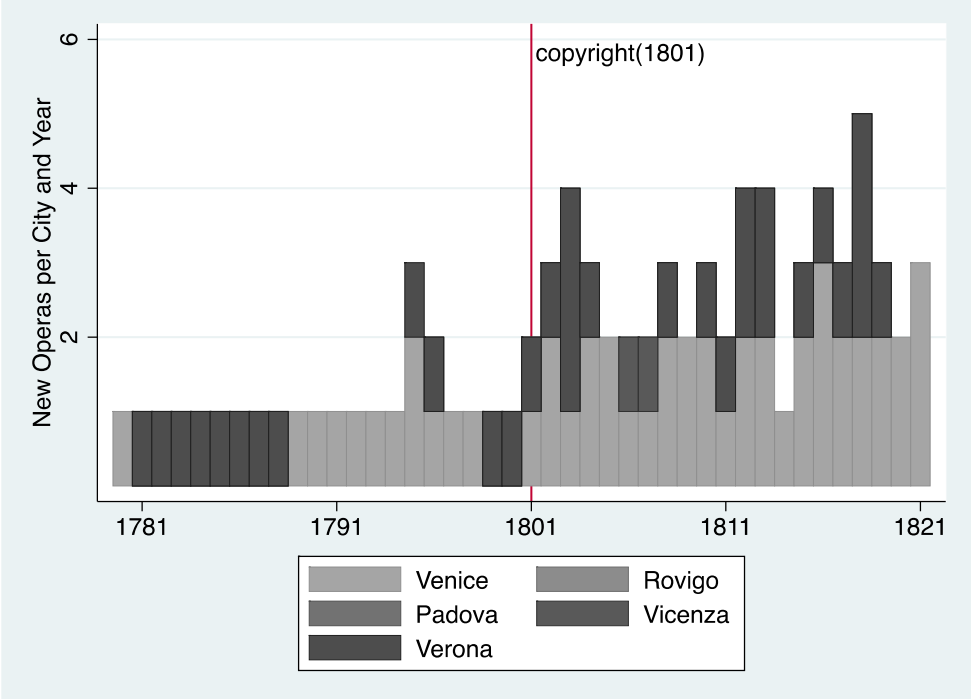
Notes: Operas by natives are defined as operas composed by a composer born in the same state as premiere state. Operas per immigrants are defined as operas composed by a composer born in a different state than premiere state. We collected data on opera premieres from Ambiveri (1998), Dassori (1903),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

FIGURE 7 – NEW OPERAS PER CITY AND YEAR, 1780-1821

PANEL A: LOMBARDY



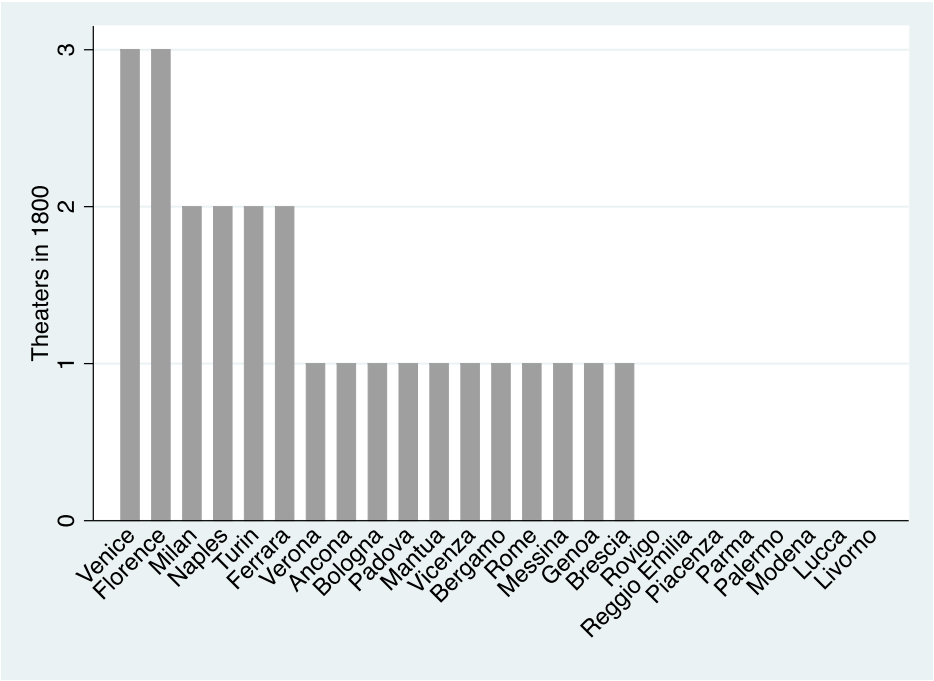
PANEL B: VENETIA



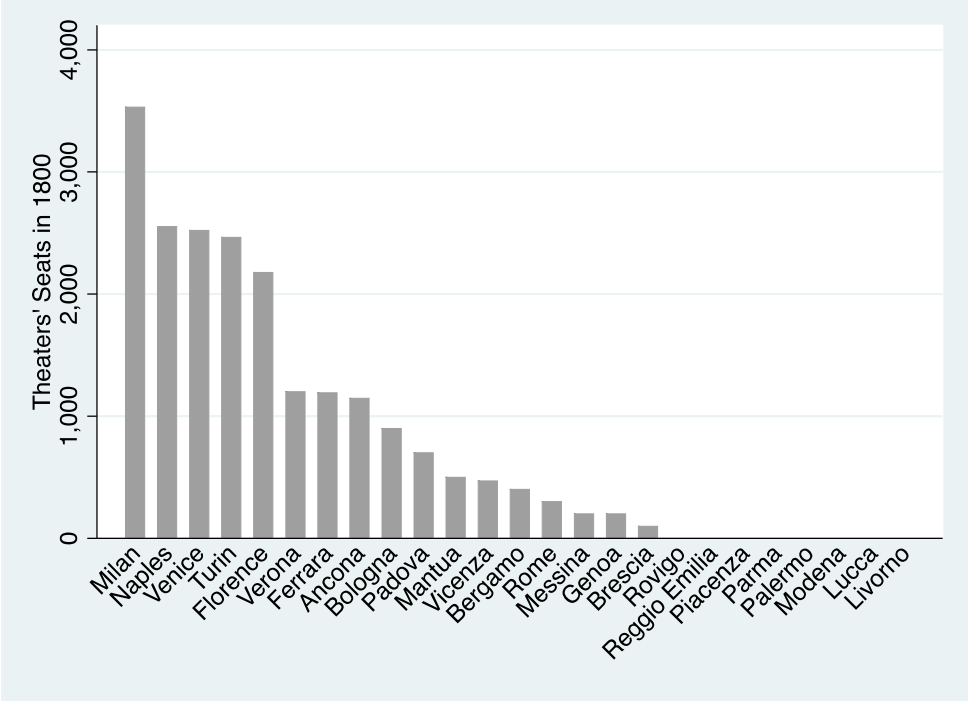
Notes: Data for 348 new operas that premiered in Lombardy and 232 new operas that premiered in Venetia between 1780 and 1821, from Ambiveri (1998), Dassori (1903), and Loewenberg (1978).

FIGURE 8 – PRE-1801 COUNTS OF THEATERS AND SEATS PER CITY

PANEL A: THEATERS PER CITY IN 1800



PANEL B: SEATING CAPACITIES PER CITY IN 1800



Notes: Theaters (Panel A) and theater seats (Panel B) in 1800 for cities that premiered at least one opera between 1780 and 1821. Data are from Ambiveri (1998), Dassori (1903), and Loewenberg (1978) and Antolini (2000).

APPENDIX

NOT FOR PUBLICATION

TABLE A1 – 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 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* include 42 operas that premiered between 1780 and 1821 and were for sale on Amazon in March 2014.

TABLE A3 – MATRIX OF MIGRATION WITHIN ITALY:
COMPOSERS BY STATE OF BIRTH AND LOCATION OF PREMIERE FOR THEIR FIRST OPERA
PANEL A: 1780-1800

Composed in:	**Lombardy**				**Venetia**				
Born in:	Bergamo	Brescia	Mantua	Milan	Padova	Rovigo	Venice	Verona	Vicenza
Sardinia	0	0	0	0	0	0	0	0	0
Modena	0	0	0	0	0	0	0	0	0
Parma	0	0	0	0	0	0	0	0	0
Tuscany	0	0	0	0	0	0	0	0	0
Lombardy	0	0	0	0	0	0	0	0	0
Venetia	0	0	0	0	0	0	0	0	0
Rome	0	0	0	0	0	0	1	1	0
Sicily	0	0	0	0	0	0	0	0	0

PANEL B: 1801-1821

Composed in:	**Lombardy**				**Venetia**				
Born in:	Bergamo	Brescia	Mantua	Milan	Padova	Rovigo	Venice	Verona	Vicenza
Sardinia	0	1	1	9	0	0	2	0	0
Modena	0	0	0	0	0	0	0	0	0
Parma	0	0	0	3	0	0	0	0	0
Tuscany	0	0	0	3	0	0	0	0	0
Lombardy	1	1	1	5	0	0	0	0	0
Venetia	0	0	0	1	0	0	0	0	0
Rome	0	0	3	12	0	0	6	1	1
Sicily	0	0	0	10	0	0	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 reports 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).

TABLE A4 – 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)

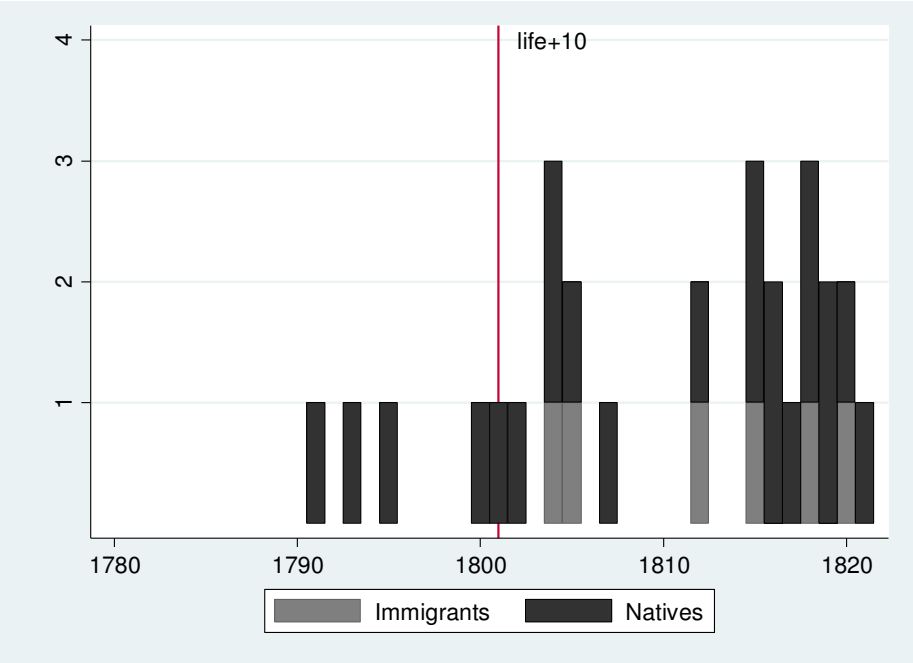
TABLE A5 – THEATERS PER STATE AND YEAR, 1780-1821

	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

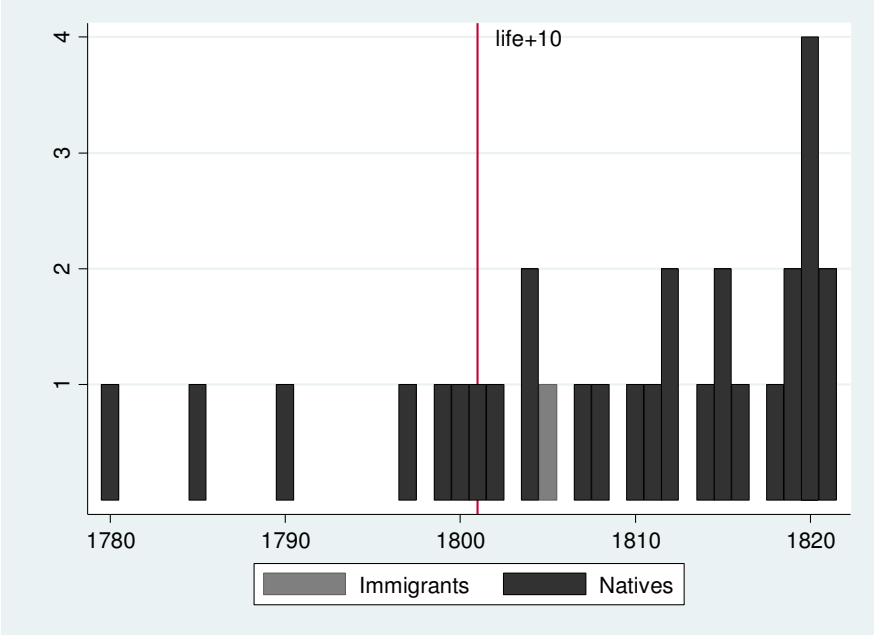
Notes: 100 seats is a standard lower bound for a theater that has enough capacity to host an opera (e.g. Antolini 2000, p.132). Data on theaters>100 seats are from Antolini (2000). Information on theaters that performed at least 1 opera are drawn from Loewenberg (1978, premieres and other performances),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

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

PANEL A: LOMBARDY AND VENETIA



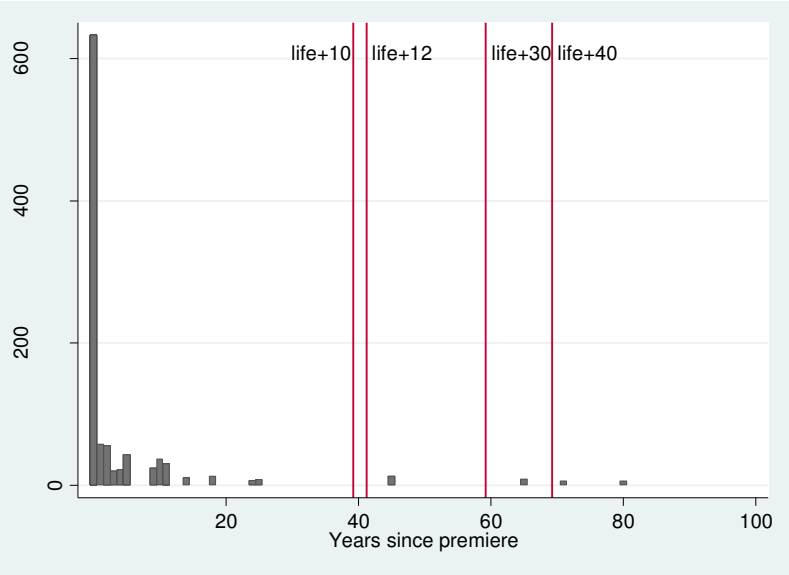
PANEL B: OTHER STATES



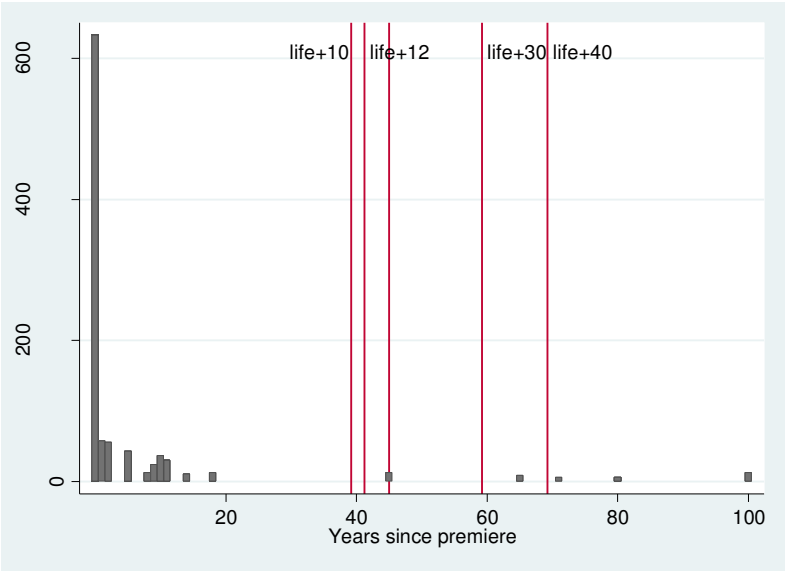
Notes: *New native composers* are defined as composers who premiered their first opera in the state in which they were born, based on records of opera premieres in Ambiveri (1998), Dassori (1903), and Loewenberg (1978), per state *i* and year *t*.

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

PANEL A: LOMBARDY AND VENETIA

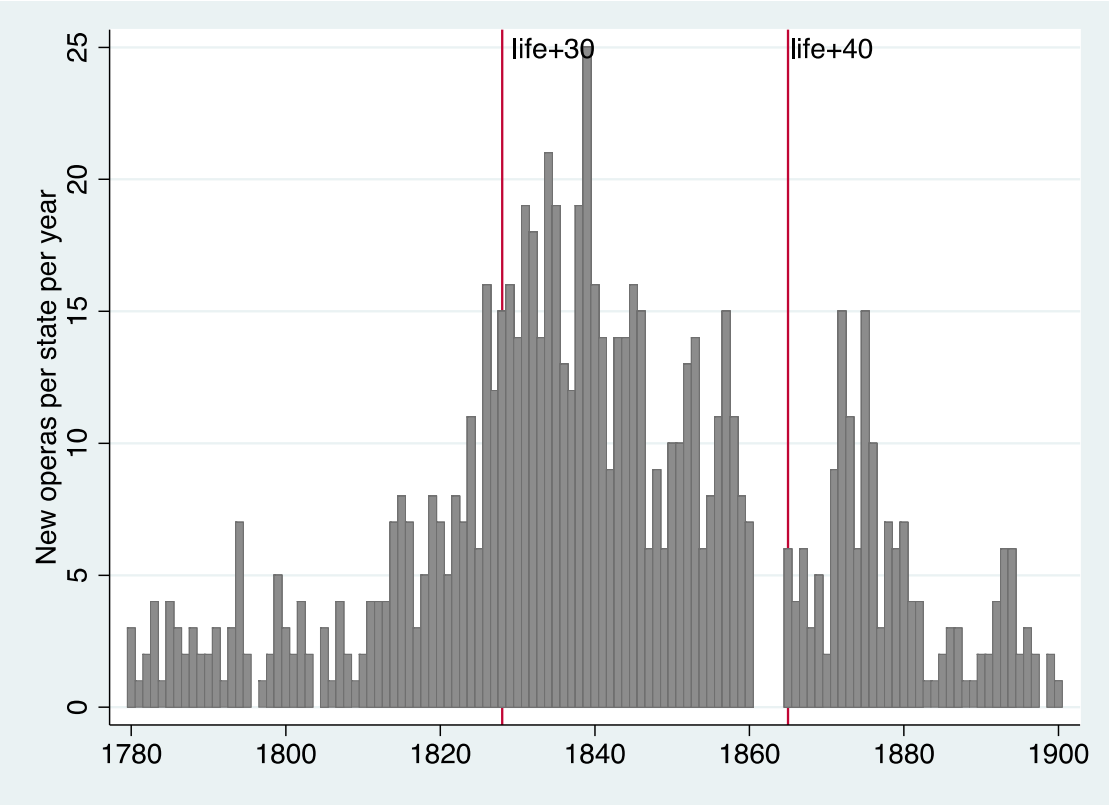


PANEL B: OTHER ITALIAN STATES



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*.

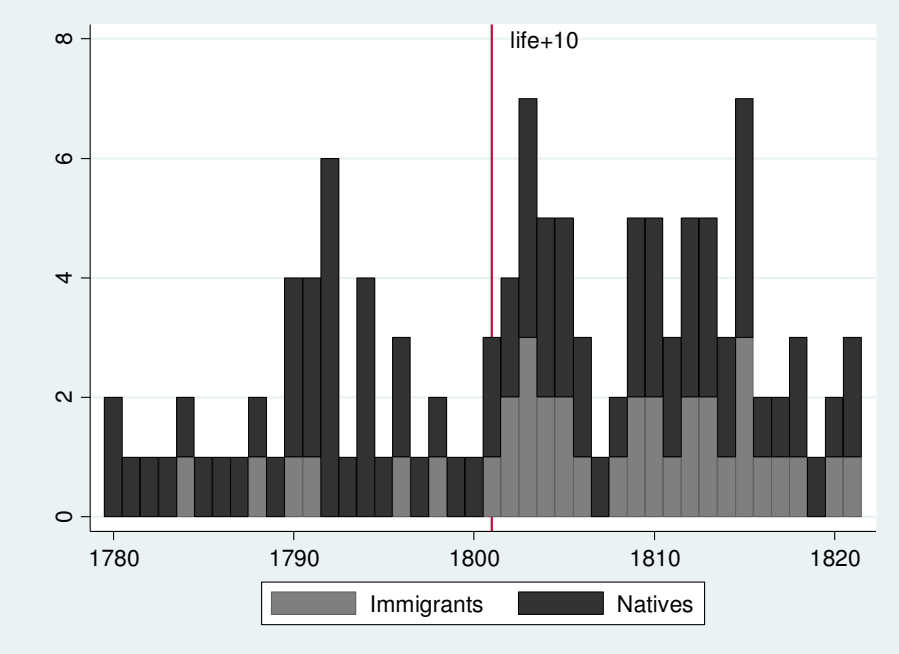
FIGURE A3 – NEW OPERAS PER YEAR IN TWO SICILIES



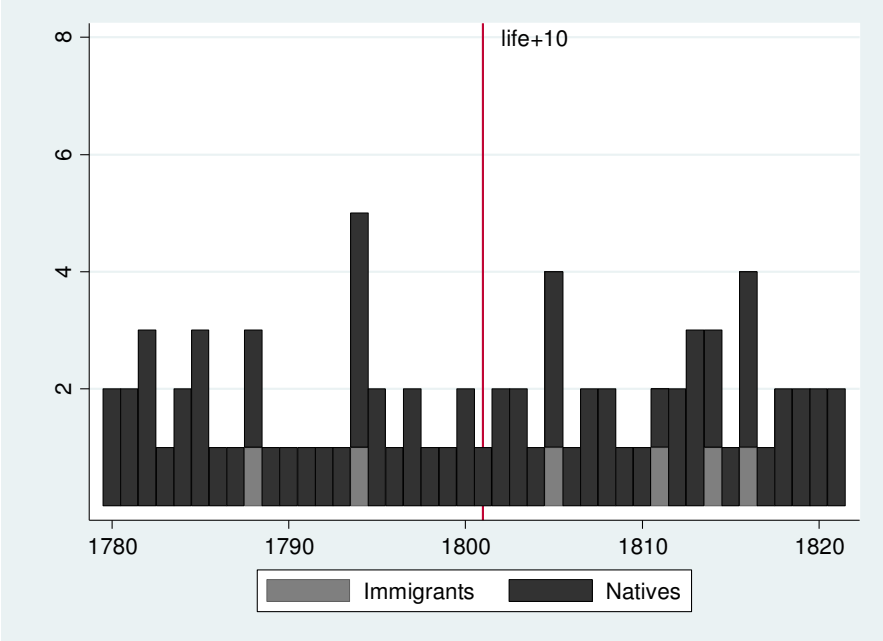
Notes: Data include 478 new operas that premiered in Two Sicilies between 1780 and 1900 within the year 1900 borders of Italy. We have collected these data from Loewenberg (1978), Dassori (1903), and Ambiveri (1998). Two Sicilies adopted copyright laws in 1828 for a length of *life+30* that was extended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

FIGURE A4 – 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).