COPYRIGHTS AND CREATIVITY- EVIDENCE FROM ITALIAN OPERAS*

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This paper exploits variation in the adoption of copyright laws – due to idiosyncratic variation in the timing of Napoléon's military victories – to investigate the causal effects of copyright laws on creativity. To measure variation in artistic creativity, we examine new operas across eight Italian states between 1770 and 1900. This analysis indicates that the adoption of basic level of copyright protection raised both the level and the quality of creative output in states with copyrights. Much of this increase was driven by immigrant composers, who were attracted to states with favorable copyright terms. The benefits of stronger intellectual property rights decline dramatically with existing levels of protection.

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Copyrights establish intellectual property in creative goods, ranging from books, music, and film to news, images, and software "to create incentives for creative effort."[1] Compared with patents, copyrights create intellectual property rights that are narrowly defined, avoiding many of the pitfalls that are due to overly broad patents.[2] This trait, and the increasing economic importance of copyrightable content (such as music, news, or film), have turned copyrights into a key institution for encouraging creativity, innovation, and ultimately economic growth.

Yet, due the extreme dearth of experimental variation, systematic evidence on the causal effects of copyrights continues to be scarce. Studies of copyright piracy have found that copyright violations have no significant effects on sales or on the quality of popular music (Oberholzer-Gee and Strumpf 2007, Waldfogel 2012). Analysis of online content on Wikipedia (Nagaraj 2016) and in investigative reporting (Cagé, Hervé, and Viaud 2016), however, suggest that copyrights may play a critical role in determining the reuse of online content, such as images and news stories.[3] Analyses of book prices and contract data, have further shown that - starting from low levels of existing protection – shifts towards longer copyright terms can raise the price of copyrighted content (Li et al. 2014) and increase payments to authors (MacGarvie and Moser 2014).[4] These analyses, however, have been unable to identify the causal effects of having a copyright law on creativity, even though this is the primary purpose of copyrights.

This paper exploits plausibly exogenous variation in the adoption of copyright laws – as a result of idiosyncratic variation in the timing of Napoléon's military victories– to investigate the effects of copyrights on artistic creativity. In 1796, Napoléon began his Italian campaign by invading the Kingdom of Sardinia at Ceva. Although he was unable to subdue Sardinia at the time, two other states, Lombardy and Venetia, were annexed to France and adopted French laws, including the French copyright law of 1793. In 1801, Lombardy and Venetia began to grant

[1] *Sony Corp. of America v. Universal City Studios,* 464 U.S. 417, 104 S. Ct. 774, 78 L. Ed. 2d 574 (1984).
[2] Most importantly, overly broad patents increase litigation risks, especially if the description of "patentable subject matter" is vague. In the 1990s and early 2000s, attorneys used broad and vaguely defined patents as a mechanism to cover a broad range of potential down-stream uses for their inventions. Recently, however, US courts have rejected attempts to assert broad patents, and the rise of Inter Partes Reviews, has allowed parties accused of infringement to challenge and invalidate the scope of overly broad patents.
[3] For music, comparisons of the number of active composers across countries with and without copyrights yield no conclusive evidence on the effects of copyrights (Scherer 2004, pp. 195-196).
[4] Nagaraj (2016) finds that images from baseball cards on copyright are less likely to be reproduced on Wikipedia. Cagé, Hervé, and Viaud (2016) show that 25 percent of original news stories in France in 2013 were copied by another outlet within 4 minutes. Biasi and Moser (2016) find that forced copyright licensing, which substantially reduces price, can encourage the diffusion and use of copyrighted scientific texts.

authors and composers exclusive rights to their works for the duration of their lives, plus another ten years for their heirs (*Legge 19 fiorile anno IX repubblicano*, Art.1-2).

In 1804, the French parliament adopted the *code civil*, a codified system of civic laws that replaced the traditional system of feudal laws and aristocratic privilege.[5] The code civil left copyrights intact in states with copyright laws but did not introduce them to states without such laws. As a result, all of Italy was exposed to the French army and revolutionary ideas but only Lombardy and Venetia adopted the French copyright system (Treccani 2001, p. 64).

We exploit this unique setting identify the causal effects of copyrights on creativity. To measure variation in creative output, we have constructed a new data set on 2,598 operas that premiered across eight Italian states between 1770 and 1900.[6] These data reveal a substantial increase in the number of new operas in states with copyrights after 1801. Baseline estimates indicate that Lombardy and Venetia produced 2.1 additional operas per year compared with other Italian states after 1801. Relative to an average of 1.4 operas per state and year across all of Italy before 1801, this implies a 150 percent increase.

In addition to increasing the number of new works, the adoption of copyright laws may also influence the quality of creative output. Copyrights, which grant composers intellectual property in repeat performances, increase composers' payoffs from creating long-lived pieces.[7] Copyright laws may also increase quality by relaxing composers' budget constraint and allowing them to shift some of their time towards creating higher quality pieces. Rich historical records on opera performances make it possible to control for quality. First, we capture differences in the historical popularity of operas through lists of notable historical performances in Alfred Loewenberg's *Annals of Opera* (1978). Loewenberg (1978) reports notable historical performances for 245 of our 2,598 operas (roughly 10 percent). These data indicate a 4.6-fold increase in the creation of historically popular operas in response to copyrights. Second, we

[5] See Acemoglu, Cantoni, Johnson, and Robinson (2011) for a discussion of the broader set of reforms, and how they extended to German states that were conquered by Napoléon. Acemoglu et al. show that German states that were exposed to the code civile and related reforms experienced higher rates of subsequent growth.

[6] The beginning and end years of the sample are given by musicologists periodization of opera during the 18th and 19th century. 1770 is the beginning of the *bel canto* period of classical music. The term *bel canto* means beautiful singing and denotes an Italian vocal technique that emphasizes beauty of sound rather than dramatic expression. 1900 is the final year of the Italian *verisimo.* Coming from the Italian root vero*, verismo* was a period or realism, associated with Italian composers such as Ruggero Leoncavallo and Giacomo Puccini.

[7] The 1801 law included so-called performance rights, which allowed composers to charge fees for performances of their work. Performance rights remained composers' main source of revenue until the mid-19th century (Scherer 2004, p. 178). Britain adopted performance rights in 1842 and the United States in 1870 (Scherer 2004, p. 180).

capture differences in the longevity or durability of operas, based on their availability as complete recordings on Amazon in 2014. These data indicate a 10-fold increase in the creation of durable operas in response to the adoption of copyrights.

Complementary tests examine the correlation between copyrights and the creation of new operas across all eight Italian states between 1770 and 1900. After Lombardy and Venetia adopted copyrights in 1801, the remaining six Italian states established their own laws between 1826 and 1840. Many, if not all of these changes occurred as a result of Italy's progress towards unification, independently of lobbying. OLS regressions reveal a strong positive correlation between the existence of a copyright law and opera output. States with copyrights produced more than twice as many operas, and they also created more historically popular and durable operas.

Copyright *extensions* beyond the life of the composer, however, appear to have no benefits for creativity. Data on repeat performances show that even high-quality operas were rarely performed after the first 20 years, which is significantly less than initial copyright length implied by *life + 10*. OLS regressions for the full sample of copyright extensions across all of Italy indicate that extensions from *life + 10* to *life + 30* years are associated with 1.1 new operas per state and year, less than one third of the effect implied by the initial adoption of copyrights. Further extensions to *life + 40* years for heirs are associated with a *decline* in output, and they are not statistically significant. Regressions for high-quality and durable operas confirm that the benefits of copyright extensions decline with the length of existing terms.

What was the role of immigration in determining the effects of copyrights on creativity? Specifically, did copyrights help to increase the quantity and quality of new operas by attracting immigrants from states with less favorable terms? Recent work on superstar patentees has found that lower tax rates have helped to attract superstar inventors to countries with more favorable terms (Akcigit, Baslandze, and Stantcheva 2016). In fact, variation in state taxes even appears to influence the location of such inventors within the United States (Moretti and Wilson 2016). By allowing creative people to keep more of the social surplus they create, intellectual property rights may create similar effects, and motivate creative people to move to states that protect their intellectual property. To investigate this issue, we use detailed biographic data on composers to identify immigrant composers. These data show that immigrants created three

times as many additional operas per year after 1801 in Lombardy and Venetia compared with other states, even though there is no evidence of general migration flows towards these states.[8]

We also examine effects on natives, who were subject to both negative and positive productivity shocks as a result of copyrights. On the one hand, copyright laws strengthened the payoffs from creating more and better work for natives as well as immigrants. And, in the long run, the inflow of composers from other states may have creating new opportunities for learning and increased the supply of trained musicians.[9] But in the short run, domestic composers may have produced fewer opera because demand for operas may have been fixed, and they now had to compete with immigrants. With the caveat that our results for native composers are based on an extremely small sample, they are consistent with such negative short-run effects.[10]

To examine the role of variation in infrastructure and demand, we examine city-level data on theaters, including information on the seating capacity and the year of establishment for each theater. These data yield no evidence for a differential growth in theater construction for Lombardy and Venetia before 1801. But city-level data show that locations with a better pre-existing infrastructure benefitted more from copyrights: Cities that had two or more theaters in 1800 experienced a disproportionate increase in output in response to copyrights.

I. Historical Background

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

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

Demand was so great that, by the end of the 17th century, ten theaters performed operas in Venice alone. Opera was entertainment and the Italian public took to it with enthusiasm and

[8] See, for example, Romani 1977, p. 27.
[9] Moser, Voena, and Waldinger (2014), for example, find that the arrival of German Jewish émigrés in the United States led to a large increase in invention by domestic inventors in the research fields of émigrés.
[10] Borjas and Doran (2012), for example, find that US mathematicians published fewer articles - in journals, whose publication slots are fixed in the long run – in response to the arrival of Russian mathematicians after 1990.

some vehemence. Beyle (1824, p.9), for example, describes a performance of Rossini's *La Scala di Seta* at the 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 (Valle 1823, p. 155; Scherer 2008, p. 5), typically within a couple of months (Valle 1823, p. 157). For example, the Teatro Torre Argentina in Rome commissioned Gioacchino Rossini (1792-1868) to compose *Il Barbiere di Siviglia* on December 17, 1815, and *Il Barbiere* premiered in Rome roughly six weeks later, on February 5, 1816 (Panico 2002, p. 62).[11] Without copyright laws, composers had no claims to compensation for repeat performances (Scherer 2008, p. 5).

In the absence of copyright protection, piracy was rampant. Mozart, for example, wrote to his father in 1782 that he felt indebted to the Baron von Riedesel because Riedesel had bought the score for *Die Entführung aus dem Serail* directly from him instead of acquiring a cheaper version from a copyist (Scherer 2004 p. 167). Without copyrights, impresarios 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 pointing out that he could get one elsewhere at half the asking price" (Rosselli 1996, p. 74).[12]

Instead of relying on payments from repeat performances, composers 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, many Italian composers moved to France to take advantage of the French copyright law. Vincenzo Bellini (1801-1835), for example, praised the French copyright system for allowing composers to collect royalties from provincial towns

[11] In 1819, Rossini complains again about the six-week deadline: "…you know very well that scarcely six weeks are allowed me to compose an opera" (Moore 1854, p. 823).

[12] Data on payments to composers are scarce, and tend to be available only for successful composers. Rossini, for example, received around 1,000 francs per opera (Moore 1854, p. 823). Using a rare data set of payments from publishers to 19th-century authors, MacGarvie and Moser (2014) document that payments to authors increased in response to an extension in the length of copyrights. Successful authors, such as Sir Walter Scott, benefitted most from this extension. For musicians, payments for publication (printing) rights remained modest until the mid-19th century. For example, the publisher Ricordi paid Bellini 4,000 Austrian lire (3,489 francs) for the rights to reprint *La Sonnambula,* one third of the flat fee that Bellini had received to compose the opera (Rosselli 1996, p. 75).

where the opera circulated after the initial production.[13] In Italy's Two Sicilies, 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. Napoléon's Military Campaign in Northern Italy

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

To curb Napoléon's grasp on Europe, Piedmont, Austria, England, Russia, Turkey, and Sweden united against France in the Second Coalition on March 12, 1799. Austria was defeated in the battle of Marengo (June 14, 1800) and Napoléon 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 Became the Only States to Adopt Copyright Laws in 1801

On May 9, 1801, Legge n. 423 (Repubblica Cisalpina, 19 florile IX articles 2 and 7) extended the French copyright law of 1793 to the French-controlled parts of Italy that formed Lombardy and Venetia. This law granted composers exclusive rights to performances of their

[13] Letter from September 4, 1834, cited in Rosselli (1996, p. 119).
[14] 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.

pieces for the duration of their lives plus an additional 10 years for their heirs. The original text of the law reads (authors' translation):

> "Authors of all types, including composers, painters, and the artists that create engravings or drawings, will benefit for their entire lives from the exclusive rights to sell and distribute their works in the Cisalpine Territory, and to sell the property in full or in parts. Their heirs will enjoy these same rights for a period of ten years after the authors' death." (*Legge 19 fiorile anno IX repubblicano, Art.1-2*).[15]

This new law gave composers the right to collect royalties for repeat performances of their operas in Lombardy and Venetia, starting from the day of the first performance (Celletti 1959, p. 518).[16] Operas that premiered in Lombardy or Venetia were under copyright in Lombardy and Venetia, but not in other states.

Performance data (which we collected for this paper and introduce below) indicate that enforcement was effective. No opera that had premiered in Lombardy or Venetia after the adoption of copyrights in 1801 was performed by another theater in Lombardy and Venetia after that year (Appendix Table A1). By comparison, operas that had premiered in Lombardy and Venetia before 1801 (and were therefore not protected under the 1801 law) were frequently performed by other theaters in the same state. [17]

Due to the timing of Napoléon's military victories, only Lombardy and Venetia adopted the French copyright law, while the rest of Italy came under the influence of French laws and institutions *without* adopting copyrights until 1826 or later.

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[15] Authors' translation from the Italian: "Gli Autori di scritture d'ogni maniera, i Compositori di musica, i Pittori, e i Disegnatori, che faranno incidere quadri, o disegni, godranno per l'intero decorso della loro vita il diritto esclusvio di vendere e distribuire le opera loro nel Territorio Cisalpino, e di cederne la proprietà in tutto, o in parte. I loro Eredi godranno lo stesso diritto per lo spazio di dieci anni dopo la morte degli Autori."

[16] Referring to the 1801 copyright law, Celletti (1959, p. 518) explains that copyrights begin with the first performance: "L'esercizio dei diritto di autore sulla riproduzione e sullo spaccio di un'opera comincia dalla prima rappresentazione di questa." Although the 1801 law also included reproduction rights, performance rights were composers' main sources of revenues. "But it took the combination of copyright protection, Italians' love of opera, and the love of money shared by Ricordi and Verdi to carry the reduction enterprise to its height of sophistication... In 1851, Verdi was paid the unprecedented sum of 14,000 francs (£550) for the publication rights, not including performance rental royalties, to *Rigoletto*" (Scherer 2004, p. 180). Unlike Italy and France, Britain's law did not include performance rights until the 1842 Copyright Act. The United States added performance rights in 1870 (Scherer 2004, p. 178).

[17] Similarly, operas that premiered in other states after 1801 (and were therefore not protected by the laws of Lombardy and Venetia) continued to be performed in other states, including Lombardy and Venetia. Weinstock (1963, p. 353) writes about Donizetti's *Roberto Devereux*, which had premiered in Naples in 1937: "A pirated version of it was sung at the Teatro Re, Milan, late in 1837 or early in 1838" (Weinstock 1963, p. 353).

> "In Italy, the first recognition of intellectual property came with the *Legge 19 fiorile anno IX* (May 9, 1801) of the Cisalpine Republic [of Lombardy and Venetia], followed by the Edict of September, 23 1826 for the Papal State [of Rome], and the Decree February 5, 1828 for the Kingdom of the two Two Sicilies" (Treccani 2001, p. 64).[18]

France had adopted copyrights in 1793 to replace the royal privileges, which had been abolished in the French Revolution of 1789.[19] On March 21, 1804, the Parliament of France adopted the (Napoléonic) *code civil.* The *code* was agnostic about copyrights; it did not introduce them to states without copyright laws and left them in place for states that had adopted such laws already. As a result, Lombardy and Venetia adopted the *code* and kept their copyright systems whereas other Italian states – which came under French influence after 1804 – adopted the *code civil* without copyrights (Treccani 2001, p. 64). In Italy, these states included the Kingdom of Sardinia (under French influence in 1804), Parma (1805), Tuscany (1809), the Kingdom of Naples (1812), and the Papal State (1812).[20]

Lombardy and Venetia's copyright laws also remained in place after the 1815 Congress of Vienna placed Lombardy and Venetia under the rule of Austria's Kaiser Franz I (1768-1835) in 1815.[21] The borders that the Congress drew within Italy remained intact until unification: the Kingdom of Lombardy and Venetia, the Kingdom of Sardinia (for simplicity, Sardinia), the Duchy of Parma and Piacenza (Parma), the Duchy of Modena and Reggio (Modena), the Grand Duchy of Tuscany, the Papal State, and the Kingdom of the Two Sicilies.[22] We use these borders to define units of analysis.

Lombardy and Venetia remained the only Italian states with copyrights for 25 years (Figure 1). Copyrights for operas that had premiered in Lombardy were enforceable in Venetia, and vice versa. In other Italian states, however, theaters could continue to perform operas under copyrights in Lombardy or Venetia without compensating composers. Performance data indicate that enforcement of these laws was effective; operas that had premiered in Lombardy and

[18] Authors' translation from the Italian: "In Italia, il primo riconoscimento della proprietà intellettuale si ebbe con la legge 19 fiorile anno IX (9 maggio 1801) della Repubblica Cisalpina, a cui seguirono l'editto 23 settembre 1826 per lo Stato Pontificio e il decreto 5 febbraio 1828 per il Regno delle Due Sicilie."

[19] More specifically, the 1793 law created exclusive publication rights for the duration of the composer's life plus 10 years, whereas a 1791 French law, which abolished censorship in the performing arts, had created exclusive performance rights for life plus five years. The 1791 law was codified as Article 428 of the *code pénal* of 1810. We thank François Velde for helping us to clarify these points about the French law.

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

[21] *Codice civile universale austriaco pel Regno Lombardo-Veneto*, 1815, Regno Lombardo-Veneto.

[22] 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.

Venetia were performed by other theaters in Lombardy and Venetia until 1801, but not afterwards (Appendix Table A1).[23]

I.C. Other States Adopt Copyrights Starting in 1826

On September 28, 1826, an edict by 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 life plus 30 years for heirs, the longest duration 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. The records of the German Bundesversammlung include an 1825 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 available evidence suggests no lobbying in the Two Sicilies, our data show that opera output had begun to increase *before* the Two Sicilies adopted copyrights (from two new operas in 1795, three in 1800, two in 1805, and two in 1810, to 15 new operas in 1827, the year before 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).

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 into a bilateral

[23] Napoléon's Army also brought with it a thriving business of gambling, as managers installed roulette wheels in their theaters. These innovations swept through all occupied parts of Italy. "As the French armies took over other parts of Italy… (the *impresario*) Balochino opened up the gambling monopoly in Venice while Barbaja (another *impresario*) similarly conquered Naples….to these were added, in 1809, Lucca and, after further Napoléonic conquests, various former papal and Austrian cities (Rosselli 1986, pp. 29-30).

copyright treaty with Austria, which granted exclusive rights for the duration of a composer's life plus 30 year after the composer's death (Convenzione Austro-Sarda 22 May 1840, Regno di Sardegna). Within weeks, all other Italian states except the Two Sicilies joined the agreement, creating a unified copyright system that covered nearly all of Italy.[24] 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*.[25]

On April 27, 1859, Sardinia began its military efforts to unify Italy with the Second Italian War of Independence against Austria (Pecout 1999, p. 167). On July 21, 1858 French Emperor Napoléon 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, five states – Lombardy, Modena, Parma, Tuscany, and the Two Sicilies – joined Sardinia to form the Kingdom of Italy (Pecout 1999, p. 170). On June 25, 1865, the Kingdom's first copyright law extended terms from life plus 30 to life plus 40 years (Legge 25 June 1865, n.2337, It.). On June 29, 1866, the Kingdom of Italy declared war on Austria, beginning the Third War of Independence. Italy lost at 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 was dissolved into the Kingdom of Italy, and a decree

[24] 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.

[25] Verdi and his publisher Ricordi used copyrights to levy hefty fees for each performance (of 400 Francs, equivalent to three months' earnings for a building craftsman). This motivated some agents to ignore copyrights and lobby for a repeal of Sardinia's laws. In an 1850 letter to Verdi, Ricordi explained the principle of price discrimination: "It is more advantageous to provide access to these scores for all theaters, adapting the price to their special means, because I obtain much more from many small theaters at the price of 300 or 250 Lire, than from ten or twelve at the price of a thousand" (cited in Scherer 2004, pp. 179). Ricordi proposed negotiating with each theater separately. Verdi accepted the scheme and Ricordi enforced it through a team of field agents.

of King Vittorio Emanuele II extended the Kingdom's laws to Venetia (Regio Decreto 4 November 1866, n.3300, It.). On September 20, 1870, after the Breach of Porta Pia, Vittorio Emanuele II annexed the Papal State to the Kingdom of Italy (Pecout 1999, pp. 183-189). A decree on October 9 (Regio Decreto 9 October 1870, n.5903, It.) extended the Kingdom's laws to the Papal State. Now all of Italy offered copyrights for the composer's live plus 40 years.

II. DATA

Data for this analysis include information on copyright length and on premieres of Italian operas in eight states within the borders of 1900 Italy.[26] 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 composers between 1770 and 1900. For all 2,598 operas, our data include the title of the opera, the name of its composer, the year of the premiere, the theater, city, and state in which the opera was first premiered. Our sample begins in 1770, the first year of the Italian *bel canto* period (1770-1830), which included Gioacchino Rossini (1792-1868), Vincenzo Bellini (1801-1835), and Gaetano Donizetti (1797-1848). It was followed by *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). Our sample ends in 1900, 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 dell'Ottocento Italiano* (Ambiveri 1998). For 254 premieres

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

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.[27] 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 dell'Ottocento Italiano* lists premieres by Italian composers whose operas were performed by city orchestras and whose birth years range from 1792 (the birth year of Rossini) and 1900. Ambiveri (1978) lists 71 premieres by 45 composers between 1770 and 1900. Among the three references, Loewenberg (1978) is the most restrictive: 133 of 1,353 operas in Dassori (1903) and none of 71 operas in Ambiveri (1998) are included.

To check the completeness of our sample, we compare a list of 89 composers 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.B. 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 1597 and 1940; 254 of the 2,598 operas in our sample entered the *Annals of Opera* between 1770 and 1900. Among the 254 operas listed in Loewenberg (1978), the median opera was performed 8 times until 1940 (with an average of 2.7 performances and a standard deviation of 4.7).

To measure variation in the artistic durability of newly created operas, we search Amazon.com for operas that were still available for sale in 2014.[28] We search for composer's first and last name along with the title of each of the 2,598 operas. To measure the quality of complete operas, rather than specific arias, we restrict this measure to operas that were available as complete recordings in 2014; it 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

[27] Loewenberg (1978) also lists the librettist, translations into other languages, and the source for the opera's plot.
[28] www.amazon.com, accessed from March 22 to March 28, 2014.

available as a complete recording in 2008 from Arthaus Musik and in 2012 from Virgin Classics; we therefore record the *Amazon* dummy for *La Traviata* to equal 1. By comparison, a search for Domenico Cimarosa's *Penelope* yields no results and we record the Amazon dummy to equal 0.

To check for bias in these alternative measures of quality, we compare them with each other, as well as with all Italian operas that New York's Metropolitan opera performed between 1900 and 2014.[29] *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, but they also show that works by Pacini were *more* likely to be included in Loewenberg (which suggests that the assessment in *Opera Today* may be affected by some bias as well).[30] 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, which we use for this analysis). 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

[29] The Metropolitan data expand data in Moser (2012), which cover 25 operas at the Metropolitan between 1900 and 1950 by 9 Italian composers; these 25 operas were performed a total of 128 times until 1950. We have expanded these data by adding performances between 1950 and 2014.

[30] 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.

(1771-1839), and Francesco Morlacchi (1784-1841), and 4 each by Pietro Generali (1773-1832), Pietro Mascagni (1863-1945) and Amilcare Ponchielli (1834-1886).

II.C. Demographic Data

Demographic data include the birth and death years for 705 composers of 2,598 new operas between 1770 and 1900. The oldest composer in our data is Giovanni Paisiello (1741-1816), and the youngest is Stefano Donaudy (1879-1925). The longest-lived composer was Vincenzo Mela (1803-1897), and the shortest-lived was Nicola Manfroce (1791-1813). The average composer lived for 59.7 years (with a median of 67.2 years), roughly 5 years more 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 33.6 years old at the time of the premiere (with a median of 32 years). Composers of notable operas in Loewenberg (1978) and composers of durable operas (on Amazon 2014) were roughly two years older at 35.9 years (with a standard deviation of 15.13) and 35.6 years (with a standard deviation of 9.2) respectively.[31] Below, we use these data, along with information on birth and death years, to estimate the remaining years of copyright protection for each opera, and determine how many times it was performed.

To examine the influence of composer migration, we collect information on the birth places for all 705 composers from Dassori (1903), Ambiveri (1998), and the *New Grove Dictionary of Music and Musicians* (2001).

III. Changes in Opera Output for Lombardy and Venetia after 1801

Summary statistics indicate a large increase in output after Lombardy and Venetia adopted copyrights in 1801. In the 20 years before 1801, from 1781 to 1800, composers in Lombardy and Venetia created 1.6 new operas per state and year (Table 1). In the first 20 years after the adoption of copyrights, from 1801 to 1820, they produced 4.6 new operas per state and year, a 189 percent increase. By comparison, the number of new operas per state and year

[31] The average composer of an Italian opera that the Met played between 1900 and 2014 was 36.2 years old at the time of the premiere (with a standard deviation of 13.5). Available data on the social background of composers show that most composers in our data came from families of musicians. Among 493 composers with information on father's occupation, 210 fathers were musicians, 141 were composers, and 9 were chapel masters (from the *The New Grove Dictionary of Music and Musicians* (2001) and Treccani (2001). Among 24 composers with information on the occupation of the mother, 8 mothers were spinners, 6 nobles, and 2 were singers.

increased much less in other Italian states that did not offer copyrights, with 1.4 operas per state and year until 1801 and 2.1 afterwards, a 54.8 percent increase.

Annual data on new operas suggest no differences in output trends until 1801 (Figure 2). In a typical year between 1781 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),[32] and 1795 to 1796 when Giuseppe Farinelli (1769-1836) produced three new operas in Venice.[33] 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 laws on the creation of new operas, we estimate OLS difference-in-differences regressions:

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

where the dependent variable is the number of new operas that premiered in state i in year t between 1781 and 1820. 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 years after 1800. Under the assumption that changes in opera output would have been comparable for Lombardy and Venetia and other Italian states *without copyrights*, the coefficient β estimates the effect of copyrights on the creation of new operas. 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. Standard errors ε_{it} are estimated as robust in the

[32] *Giannina and Bernardone*, *Giunio Bruto*, *Il Convito* by Cimarosa and *Angelica e Medoro* by Andreozzi. All four operas were notable performances in Loewenberg (1978).
[33] *L'indolente*, *Duello per un Compimento*, and *Terza Lettera in* 1795 and *I Giouchi d'Agrigento*, *Idomeneo*, and *Cid nelle Spagne* in 1796. Three of these operas were notable performances in Loewenberg (1978).

main specification, and with clustering at the state level for the pre- and post-copyright period in robustness checks (following Bertand et al. 2004, p.14, Appendix Tables A3 and A4). [34]

Estimates of the baseline equation indicate that composers in Lombardy and Venetia created 2.2 additional operas per state and year after 1800, compared with other Italian states that did not adopt copyright laws (Table 2, column 1, significant at 1 percent). Relative to an average of 1.4 new operas per state and year across all Italian states until 1800, this implies a 2.6-fold increase. Excluding state fixed effects leaves the estimated effect at 2.1 additional new operas per state and year (Table 2, column 2, significant at 1 percent). We also estimate quasi-maximum likelihood Poisson regressions as an alternative to address the count data characteristics of the opera data. Average treatment effects of this regression indicate a smaller but significant increase by 1.1 additional operas per year for states that offered copyrights (Table 2, 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 separately for each year, allowing it to be different from zero before the adoption of copyrights in 1801:

$$opera_{it} = \sum_{r=1781}^{1820} \beta_r \, Lombardy \,\&\, Venetia_i \times year_r + \varphi_i + \delta_t + \varepsilon_{it} \qquad (2)$$

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

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

[34] With only eight states, the number of clusters is too small (Cameron et al. 2008) to cluster at the state level. Moreover, because only two of eight states are treated, we cannot estimate the t-wild bootstrap (MacKinnon and Webb 2016). Sub-clustering the wild bootstrap estimate is not appropriate for difference-in-differences estimates because clusters (states) switch from control to treatment (MacKinnon and Webb 2016). For simplicity, we therefore report robust standard errors in the main regressions. (Notably, robust is equivalent to clustering at the level of state-year pairs in our setting). Robustness checks with clustering at the state level, collapsing years for the pre- and post-copyright period (following Bertrand et al. 2004) confirm the main results (Appendix Tables A3 and A4).

that adopted copyrights in 1801 produced 2.3 additional operas per year after 1801 (Table 2, column 3, significant at 1 percent). Specifications that allow for a separate linear pre-trend for each state indicate a differential increase by 2.4 additional operas (Table 2, column 4, significant at 1 percent). We also estimate a de-trended version of equation (1) by estimating a linear pre-trend for Lombardy and Venetia and subtracting the estimated pre-trend from the dependent variable $opera_{it}$. De-trended estimates confirm the main results, with 2.2 additional operas for states with copyrights after 1801 (Appendix Table A5, column 1, significant at 1 percent).

III.C. Estimates for a Synthetic Lombardy and Venetia – with Copyrights

As an additional robustness check, we construct a *synthetic Lombardy without copyright laws* from data for Italian states without copyright laws that most closely match the characteristics of the real Lombardy. Following Abadie, Diamond and Hainmueller (2012) and Abadie and Gardeazabal (2003), we use a Mahalanobis matching estimator to construct the synthetic country.[35] Abadie and Gardeazabal create a synthetic Basque region (without terrorism) from the characteristics of other Spanish regions to evaluate the effects of terrorism on GDP growth over time. Abadie, Diamond and Hainmueller (2012) extend the earlier to create a synthetic control for California to examine the effects of a large-scale tobacco control program that California implemented in 1988.

We apply their methods to create the synthetic Lombardy by matching the characteristics of the real Lombardy as closely as possible through a weighted average of the characteristics of other Italian states with similar characteristics, but *without* copyright laws. Let J be the number of available control countries without copyright laws and let W be a $(J \times 1)$ vector of non-negative weights $(w_1, w_2, \ldots w_J)$' that sum to one. The scalar w_j represents the weight that country j is given in constructing the synthetic Lombardy. Let X_1 be a $(K \times 2)$ vector of the number of seats (as a measure of demand), and the number of active composers (as measure of supply) in Lombardy and Venetia, and let X_0 be a $(K \times J)$ matrix of the values for these same variables in the set of possible control countries. Let the $(K \times K)$ matrix V be the inverse sample variance covariance matrix of the matching variables. This is the weighing matrix of the Mahalanobis

[35] Abadie and Gardeazabal (2003) construct a weighing matrix to mimic the growth path of GDP in the Basque country. Moser (2005) applies the Mahalanobis estimator to examine the effects of the absence of patent protection on innovation, and in particular on the direction of innovation, in 19th century Switzerland. See Abadie and Imbens (2004) for a comprehensive discussion of the Mahalanobis estimator.

matching estimator (Rubin 1977, Rosenbaum and Rubin 1983). The vector of weights W^* is chosen to minimize $(X_1-WX_0)'V(X_1-WX_0)$. Each country is allowed to be used as a match twice, equivalent to allowing one replacement.[36]

Appendix Figure A1 reports results for an estimated time path of opera output for a synthetic Lombardy. Comparing these estimates with the observed time path of opera output in the real Lombardy lends further support to the hypothesis that the introduction of copyright laws led to a substantial increase in output. In a counterfactual Lombardy without copyright laws, the average number of new operas per year would have been 2.3 – half lower than the output of the real Lombardy with copyright laws. Comparable estimates for Venetia (Appendix Figure A2) are subject to more noise, but they also indicate that opera output in a synthetic Venetia without copyright laws. would have been 66 percent lower than the output of the real Venetia with copyright laws.

III.D. Effects on the Quality of Compositions

Beyond increasing the number of new operas, the creation of copyrights may also influence the quality of new operas. For example, the right to charge theaters for repeat performances (so-called performance rights established by the 1801 law) may have increased the expected revenue from creating high-quality operas that would be performed more than once. Without copyrights, composers were only paid for the first performance, and received no payments for repeat performances. With the 1801 copyright law, composers could expect additional revenues from operas that were popular enough to be repeated.

Copyrights may have also increased the quality of operas if composers had an intrinsic preference for producing high-quality pieces, and if the additional revenue from copyrights relaxed their budget constraint enough to allow them to substitute quality for quantity. Biographical evidence confirms that many musicians depended on opera writing as a source of income. Gioachino Rossini, for example, 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

[36] Allowing one replacement produces higher quality matches by increasing the number of possible matches.

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's letters also suggest that he had a clear intrinsic preference for quality, which was quite independent from the taste of his customers:

"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 explains how he purposefully produced lower quality work in response to meager payments from opera managers 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).

Giuseppe Verdi is another later example of a composer who responded to the profit incentives of copyright. Scherer (2001, pp. 179-180) reports that Verdi earned substantial income from score sales and performance fees under Sardinia 1850 copyright law. This income freed Verdi from the need to work like a "galley slave" and compose at a frantic pace (Scherer 2001, pp. 179-180). Data on Verdi's output support this claim: Between 1840 and 1849, Verdi composed 14 operas; in the 1850s he composed 7 operas, including *Rigoletto* 1851, *Il Trovatore* (1853), *La Traviata* (1853), *Simon Bocanegra* (1857), and *Un Ballo de Maschera* (1859). In the 1860s Verdi produced two operas. In the 1870s, 1880s, and 1890s Verdi produced one opera each, *Aida* (1871), *Otello* (1887), *Falstaff* (1893), each of them a masterpiece.

Over time, the quality of operas may have been amplified by improved training opportunities and other types of agglomeration externalities (Marshall 1890), for example by attracting high-skilled singers, which complemented a composers' work. Consistent with this idea, a 19-year old Rossini appeared on the scene in 1811, 10 years after the adoption of copyrights. Between 1811 and his death in 1868, Rossini premiered 14 of his 33 operas in Lombardy and Venetia, including 5 Milan and 9 in Venetia. As early as 1824 Beyle observes that Rossini's operas were more popular and original compared with contemporaries:

> "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).[37]

Case studies of individual composers, such as Vincenzo Pucitta (1778-1861) suggest that composers produced better operas when they had copyrights. Pucitta composed two run-of-the-mill operas when he was 22 in Parma (*Le Nozze senza Sposa*) and Florence (*Bianca de' Rossi*). Neither of them entered Loewenberg's (1978) list of notable performances, and neither of them is available on Amazon today. As soon as Lombardy and Venetia adopted copyrights, Puccita moved to Milan, where he premiered *Il Fuoruscito* at Teatro La Scala, one month after the adoption of copyrights. In the following years Pucitta premiered *Il Puntiglio* in Milan (1802), *Zelinda and Lindoro* (1803) in Venice, and *La Finta Pazza* (1804) in Milan. All operas that Pucitta premiered in Lombardy and Venetia entered Loewenberg's *Annals*, and one of them (*Il Fuoruscito*) is still available for sale today.

Giovanni Pacini (b. in Catania, Two Sicilies 1796, d. 1867) is another composer who appears to have created better operas when his work was protected by copyrights. Between 1801 and 1813, Pacini composed two operas in our data: (*Don Pomponio* (1811) premiered in Naples, and *La Ballerina Raggiratrice* (1812) premiered in Florence). None of them entered Loewenberg (1978), and neither is available on Amazon today. In his Memoirs, Pacini (1875) calls these operas "rather superficial." In 1813 Pacini moved to Milan, where he composed his most famous operas, including *Annetta e Lucindo* (1813), *Il Carnevale di Milano* (1815), *Un Matrimonio per Procura* (1815), *Adelaide e Comingio* (1818), and *Il Barone di Dolsheim* (1819). All these operas entered Loewenberg's *Annals*, and *Adelaide e Comingio* is also still available for sale on Amazon. Case studies of individual composers may, however, attribute learning and improvements as composers age to the introduction of copyrights.

To systematically examine the effects of copyrights on the quality of new operas, we repeat the baseline specifications with two alternative measures for quality. The first measure captures historically popular operas, based on records of notable performances between 1781 and 1820 in Loewenberg's (1978) *Annals of Opera*. Summary statistics indicate that composers began to produce significantly more historically popular operas after the introduction of copyrights in 1801. Between 1781 and 1800, composers in Lombardy and Venetia created 0.1

[37] Another example of a prominent latecomer is Vincenzo Bellini. Born in Catania (Two Sicilies) in 1801, Bellini moved to Milan in 1827, and premiered most of his operas there (Weinstock 1971, p.134), including *Il Pirata* (1826), *La Sonnambula* (1831) and *La Norma* (1831).

new operas per year that entered Loewenberg (1978). After 1801 composers in Lombardy and Venetia created 0.6 historically popular operas per state and year (a 4.6-fold increase). By comparison, the number of new historically popular operas increased much less in other states, from 0.1 per year until 1801 to 0.2 afterwards (a 100-percent increase).

Re-estimating equation (1) for historically popular operas indicates that composers created 0.4 additional popular operas per state and year after 1801 in Lombardy and Venetia compared with other states (Table 3, column 1, significant at 1 percent). Relative to an average of 0.1 premieres per year before 1801, this implies a 5.6-fold increase. Excluding state fixed effects leaves the estimate at 0.4 (Table 3, column 2, significant at 1 percent). These results are robust to alternative specifications for pre-trends. Regressions with a pre-trend for Lombardy and Venetia imply an additional increase by 0.5 historically popular operas (Appendix Table A5, column 1, significant at 1 percent). Regressions with a separate pre-trend for each Italian state imply an increase by 0.4 (Appendix Table A5, column 2, significant at 1 percent). Alternative estimates with a de-trended dependent variable confirm an increase by 0.4 historically popular operas (Appendix Table A6, column 4, significant at 1 percent).

We also examine variation in the *average quality of new operas*, measured by the ratio of high-quality operas over all new operas in state *i* and year *t*. These regressions indicate a nearly two-fold increase in average quality in response to copyright laws. Difference-in-differences estimates imply that the share of historically popular operas among all new operas increased by an additional 10.4 percent per state and year after 1801 in Lombardy and Venetia (Table 3, column 3, significant at 5 percent), which implies a 1.9 fold increase in average quality..

Copyrights also increased the *number of repeat performances* (Appendix Table A6). Operas that composers wrote in Lombardy and Venetia under copyrights were performed one additional time on average until 1821 (0.933, Appendix Table A6, significant at 5 percent), which implies a 165 percent increase compared with an average of 1.53 repeat performances until 1801. Operas that composers wrote with copyrights were also more successful *in the same year*, with 9.6 additional performances (Appendix Table A6, column 4, significant at 1 percent), which implies a 3.75-fold increase compared with the pre-copyright average of 2.69 repeat performances in the year of the premiere.

An alternative measure for quality identifies operas that were especially durable through operas that continued to be for sale on Amazon in 2014. Summary statistics indicate that

composers from Lombardy and Venetia produced significantly more durable operas after the introduction of copyrights in 1801. Between 1781 and 1800, composers in Lombardy and Venetia premiered 0.03 durable operas per state and year. Between 1801 and 1820, they produced 0.4 per year (14.3 times more, Table 1). By comparison, composers from other parts of Italy premiered 0.03 durable operas per year until 1800 and 0.2 afterwards (5 times more).

Regressions with durable operas as an outcome variable indicate that composers in Lombardy and Venetia created 0.3 additional durable operas per year after 1801 compared with other Italian states (Table 3, column 5, significant at 5 percent). Relative to an average of 0.03 durable operas per year before 1801, this implies a 10.3-fold increase. Excluding state fixed effects leaves the estimate at 0.3 (Table 3, column 6, significant at 5 percent). Regressions with a pre-trend for Lombardy and Venetia indicate an increase by 0.3 durable operas (Appendix Table A5, column 4, significant at 5 percent), and regressions with state-specific linear pre-trends imply an increase by 0.3 durable operas (Appendix Table A5, column 5, significant at 5 percent). Alternative estimates with a de-trended dependent variable confirm an increase by 0.3 durable operas (Appendix Table A7, column 6, significant at 5 percent).

Estimates for changes in the average quality of new operas indicate a 1.4-fold increase in the share of durable operas in response to copyright laws. OLS estimates imply that the share of exceptionally durable operas among all new operas increased by an additional 6.9 percent per state and year after 1801 in Lombardy and Venetia (Table 3, column 3), compared with a pre-1801 share of historically popular operas of 5.1 percent. Excluding state fixed effects leaves the estimated increase at 6.7 percent (Table 3, column 4).

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

A complementary set of tests examines changes in the creation of new operas across all Italian states between 1770 and 1900. All of these states adopted copyright laws between 1826 and 1840. Many of them adopted copyrights as part of a political process of unification, rather than in response to lobbying by composers. For example, states that were politically close to Sardinia adopted copyright terms of *life+30* when they co-signed Sardinia's Bilateral Treaty with Austria in 1840 (Ubertazzi 2000, p. 50). On the opposite extreme, Sicily's adoption of copyrights for *life+30* in 1828 may have been precipitated by lobbying from two prominent Italian authors (but not composers). Carlo Mele (1792-1841) and Pasquale Stanislao Mancini (1817-1888) had

argued for the importance of copyright laws in the 1820s (Pomba et al. 1986, p. 86).[38] To be conservative, however, we interpret estimates below as a correlation between copyright laws and creativity, rather than a causal effect.

Summary statistics show that output increased after states adopted copyright laws (Appendix Table A6). For example, composers in Sardinia created 3.0 new operas per year after the adoption of copyrights (1840-1864) compared with 2.5 without copyrights (1828-1839), and composers in Sicily produced 17.1 premieres per year after the adoption of copyrights (1828-1839) compared with 12.0 before (1826-1827). OLS regressions for the full sample estimate

$$opera_{it} = \beta\, copyright_{it} + \varphi_i + \delta_t + \varepsilon_{it} \qquad (3)$$

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 produce an additional 2.7 new operas per state and year in states with copyrights compared with states without copyrights (Table 4, column 1, significant at 1 percent). Relative to a mean of 1.2 new operas per year in states without copyrights, this implies a 2.3-fold increase. Regressions with state-specific linear pre-trends suggest that composers in states with copyrights produce 2.5 additional new operas per year compared with states without copyrights (Table 4, column 2, significant at 1 percent). Average treatment effect (ATE) of an QML Poisson regression imply that composers in states with copyrights produce 1.0 additional premieres compared with states without copyrights (Table 4, column 3, significant at 1 percent).

Summary statistics also indicate that composers in states with copyrights produced more historically popular operas than composers in states without copyrights. Composers in states with copyrights produced 0.6 historically popular operas per year, compared with 0.2 in other states. OLS regressions with controls for variation across states and over time indicate that composers in states with copyrights produced 0.2 more new operas per year (Table 4, column 4, significant at 10 percent). Relative to a mean of 0.1 premieres per year without copyrights, this implies a 2.6-fold increase in the creation of new historically popular operas. Regressions with state-specific linear pre-trends indicate that states with copyrights produced 0.1 additional new operas per year compared with states without copyrights (Table 4, column 5, not significant).

[38] Mancini later argued that the Two Sicilies' decision not to join the Bilateral Treaty between Sardinia and Austria contributed to its cultural decline in the 1840s and 1850s (Pomba et al. 1986, p.87).

Composers in states with copyrights also produced more durable operas (0.5 per year) compared with composers in states without copyrights (0.2 per year). OLS regressions show that composers in states with copyrights produced 0.3 additional durable operas per year (Table 4, column 6, significant at 1 percent). Relative to an average of 0.1 durable operas per year in states without copyrights, this implies a 4-fold increase. Regressions with state-specific linear pre-trend indicate that composers in states with copyrights produced 0.3 additional new operas per year (Table 4, column 7, significant at 1 percent). Overall, we conclude that the adoption of copyright laws was associated with a significant increase in the quantity and quality of operas.

III.F. Copyright Extensions

We now examine how copyright *extensions,* which are the topic of copyright policies today, influence the quantity and quality of creativity. In the United States, for example, the 1998 Sonny Bono Copyright Term Extension Act extended the length of copyrights from *life+50* to *life+70* for individuals and from 75 to 95 years for corporate owners.[39]

Compared with modern changes in copyright terms, many of the copyright extensions in 19th-century Italy were linked with broader political changes, and less dependent on lobbying by composers. For example, Lombardy and Venetia extended their copyright terms from *life+10* to *life+30* in 1840, when they were under Austrian rule, to comply with the Bilateral Treaty between Austria and Sardinia (Ubertazzi 2000, p. 50).[40] In 1865, copyright terms in Lombardy and Venetia, as well as in five other states, increased from *life+30* to *life+40* after these states formed the new Kingdom of Italy. In 1870, the Papal State, as the final independent state, extended its copyrights to *life+40* as it was annexed by Italy (Ubertazzi 2000, p. 81)

Data on repeat performances from Loewenberg (1978) show that even high-quality operas are rarely performed after the first 20 years (Figure 4). This implies that only a small number of exceptionally durable pieces stand to gain from copyright extensions beyond the life of their creator. To estimate the length of copyrights that is implied by remaining length of a composer's life, we use data on life and death years of all 705 composers to construct life tables

[39] Pub. L. No. 105-298, 112 Stat. 2827 (1998), codified as amended 17 U.S.C. §§ 108, 203, 301-304.
[40] Guiseppe Verdi (1813-1901) took full advantage of copyright protection, but he is unlikely to have influenced Lombardy's law of 1840. Verdi premiered his first opera, *Oberto, Conte di San Bonifacio*, at Teatro La Scala in Milan, on November 17, 1839. According to Rosselli (2000, p. 27), *Oberto* "met a fair success", although the composer "had not exactly arrived." The opera that "launched Verdi into the upper-class social life of Milan" (Rosselli 2000, p. 37) was *Nabucco*, which premiered in Milan in 1842, two years after the 1840 law.

for Italian composers. Life table estimates exceed the average age at death because they are conditional on a composer's survival to age 34, 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 (33.6, roughly 34 years) would expect to live another 29.3 years (Appendix Table A2):

$$\begin{aligned} R(34[1800,1804] &= 0.2 * R([30,34],[1800,1804]) + 0.8 * R([35,39],[1801,1804]) \\ &= 0.2 * 29.75 \text{ years} + 0.8 * 29.23 \text{ years.} \end{aligned}$$

For a copyright term of *life + 10* this implies an expected copyright term of 39.2 years.

Less than one third of operas (27 of 173 in Loewenberg) still played after 39 years, the expected duration of copyrights under *life + 10*.[41] Another 24 exceptional operas (13.9 percent) were still performed after 59 years, the duration of copyrights under *life + 30*. Only 20 operas in Loewenberg (11. 6 percent) still played after 69 years the duration of copyrights under *life+40*.

Opera data also indicate no significant increase in output in response to extensions beyond *life + 10*. 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 copyrights increased to *life+30* in 1840, output stayed nearly unchanged at 5.6 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 9.6 percent to 5.11 between 1865 and 1900.

To systematically examine the effects of copyright extensions, we estimate:

$$opera_{it} = \beta_1 Adoption_{it} + \beta_2 (Beyond\ Life+10)_{it} + \beta_3 (Beyond\ Life+30)_{it} + \varphi_i + \delta_t + \varepsilon_{it} \quad (4)$$

where the dependent variable counts new operas per state *i* in year *t* between 1770 and 1900. The explanatory variable $Adoption_{it}$ equals 1 if state *i* offers copyright protection in year *t*. The

[41] The number of repeat performances is similar for new operas between 1781 and 1800 that premiered in Lombardy and Venetia and other states (Appendix Figure A1). On average 165 operas in Loewenberg's *Annals* were performed 10 times, including 7.5 times within the first 40 years (the expected length of copyrights under *life+10*) and 2.8 times afterwards. 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).

explanatory variable *Beyond Life+10*$_{it}$ equals 1 for years after state *i* has extended the length of copyrights beyond the composer's life plus 10 years for heirs. Similarly, *Beyond Life+30*$_{it}$ equals 1 after an extension of the state's copyright terms beyond life plus 30 years for heirs.

OLS estimates for the variable *Adoption* indicate that states which offered basic levels of copyright protection produced 3.2 additional new operas per state and year after they had adopted copyrights, compared with themselves in the pre-period (Table 5, column 1, significant at 1 percent). Relative to a mean of 1.2 new operas per state and year for states without copyrights in this sample, this implies a 3.7-fold increase.

Notably, the size and significance of the estimates declines with longer terms of copyrights. *Extensions beyond life+10* are associated with 1.1 new operas per state and year, less than one third of the effect implied by the initial adoption of copyrights. *Extensions beyond life+30* are associated with a *decline* in output, and they are not statistically significant. These results are robust to the inclusion of a state-specific linear pre-trend (Table 5, column 2). Average treatment effect (ATE) for the QML Poisson model confirm the declining benefits of copyright extensions on creative output. States with basic levels of copyright protection produced 1.1 additional operas per state and year compared with states without copyrights (Table 5, column 3, significant at 1 percent). By comparison, estimates for *Extensions beyond life+10* and *Extensions beyond life+30* are not statistically significant.

Regressions for high-quality operas also show that the benefits of copyright extensions decline with the length of existing terms. States that offered basic copyright protection produced 0.3 additional historically popular operas per year compared with states without copyrights (Table 5, column 4, significant at 1 percent). Relative to a mean of 0.1 historically popular operas per state and year in states without copyrights, this implies a 4-fold increase. *Extension beyond life+10* are associated with 0.25 additional historically popular operas per state and year.[42] Yet, copyright extensions beyond *life+30* are not associated with additional historically popular operas.

Alternative estimates for durable operas confirm these results. States with copyrights produced 0.4 additional durable operas per year (Table 5, column 6, significant at 1 percent). Compared with a mean of 0.1 new operas per state and year in states without copyrights, this

[42] A test for the equality of estimates for *Adoption* and *Extension beyond life+10* coefficients rejects the null hypothesis of equality with a *p*-value of 0.582.

implies a 5-fold increase. *Extensions beyond life+10* and *life+30* are associated with 0.2 and 0.1 additional durable operas per state and year, respectively (Table 5, column 6, significant at 5 percent, and at 10 percent with the inclusion of a state-specific linear pre-trend).

IV. MIGRATION

Biographical evidence suggests that the adoption of copyrights helped to attract prolific composers to work in Lombardy and Venetia. For example, Saverio Mercadante (1795-1870), born in Altamura (Two Sicilies), premiered his first opera, *L'Apoteosi di Ercole*, in Naples in 1819, and moved to Milan the following year. He composed *Elisa and Claudio* there in 1820 and *Il Posto Abbandonato* in 1821, followed by *Andronico* in Venice in 1821 (De Napoli 1952, p.75). Another prolific composer, Vincenzo Pucitta (1778-1861), born in Civitavecchia (Papal State), moved to Milan in 1801 and premiered *Il Fuoruscito* there in the same year. Pucitta created two more operas in Milan (*Il Puntiglio* 1802 and *La Finta Pazza* in 1804), and another in Venice (*Zerinda e Lindoro* 1803). Puccitta composed 12 of his 19 operas between 1801 and 1826 (when the Papal State adopted copyrights) in Lombardy and Venetia.

IV.A. Operas by Immigrants

The share of immigrant composers also increased more in states with copyrights even though none of these states received significant inflows of general migration (e.g., Romani 1955, p. 27).[43] Nine of 48 composers who created at least one opera in Lombardy and Venetia between 1781 and 1800 were natives to another state (18.75 percent, Appendix Figure A2, Panel A). After the adoption of copyrights, Lombardy and Venetia's share of immigrant composers increased to 131 of 149 composers between 1801 and 1820 (87.92 percent). At the same time, the share of immigrants remained stable in other states, with 25.68 percent until 1800, and 26.36 percent afterwards (Appendix Figure A2, Panel B).[44]

[43] 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. Migration increased after railways reduced transportation costs (Villari 1989, pp. 134-142). The first Italian line (7.64km between Naples and Portici in the Two Sicilies) was inaugurated on October 3, 1839. 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 the Papal State (1846, 63km).

[44] For symmetry, we treat any composer who was not born in the state of the premiere as an immigrant. This means that composers from Lombardy are treated as immigrants in Venetia, and vice versa. None of the 14 immigrants to Venetia until 1800 was born in Lombardy, however, and none of the 20 immigrants to Lombardy was born in

In fact, historical records suggest that Lombardy and Venetia began to attract prolific composers from other parts of Europe after 1801. Beyle (1824, pp. xxv-xxvi), for example, observes: "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 between 1795 and 1820."[45]

Opera output by immigrants increased significantly more in Lombardy and Venetia after 1800 compared with other Italian states. In these two states, composers who had been born in a different state created 1.18 new operas per state and year until 1800 and 4.0 afterwards (Figure 6, Panel A). In other states, immigrants produced 1.1 new operas until 1800 and 1.7 afterwards (Figure 6, Panel B).

To evaluate these changes with a full set of controls, we re-estimate equation (1) for operas by immigrants. OLS estimates confirm that immigrants created an additional 2.2 operas per state and year after 1800 in Lombardy and Venetia compared with other states (Table 6, column 1, significant at 1 percent). Relative to an average of 1.1 operas by immigrants per state and year across Italy until 1800, this implies a 3.0-fold increase. Results are robust to the inclusion of a linear pre-trend for Lombardy and Venetia as well as the inclusion of a separate linear pre-trend for each state (Table 6, columns 2 and 3, significant at 1 percent). QML Poisson estimates indicate an average treatment effect of 1.2 additional operas per state and year (Table 6, column 4, significant at 1 percent), which implies a 108.9 percent increase.

IV.B. Operas by Natives

Empirical evidence on native composers who were born in the state where they composed is based on a much smaller sample but nevertheless suggestive. Summary statistics indicate that natives produced *fewer* operas in Lombardy and Venetia after 1800 compared with natives in other Italian states. In Lombardy and Venetia, the count of new operas by natives per state and year declined from 2.6 until 1800 to 1.5 afterwards (Figure 6, Panel A). At the same

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Venetia. After 1801, 3 of 21 immigrants to Venetia were born in Lombardy, and 1 of 21 immigrants to Lombardy was born in Venetia. We examine city-level variation that may motivated these migrants in more detail below.

[45] Foreign-born composers and their operas are not included in our estimates because we focus on Italian-born composers.

time, output by natives in other states remained nearly unchanged, with 1.88 until 1800 and 1.89 afterwards (Figure 6, Panel B).[46]

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

These results are consistent with findings in Borjas and Doran (2012) which suggest that US mathematicians who had to compete with Russian immigrants for journal space published *less* after the collapse of the Soviet Union. Similar to native US mathematicians, native composers in Lombardy and Venetia had to compete with immigrants for opportunities to perform. In the short run, these opportunities may have been limited by existing infrastructure and demand, leading to a temporary reduction in output by natives.

V. Interactions Between Copyrights and Demand

To examine how the adoption of copyright laws interact with variation in demand and in the infrastructure to perform operas, we exploit variation *within Lombardy and Venetia*. Importantly, both states experienced a clear increase in creative output after they adopted copyrights. In Lombardy, opera output increased by a factor of three, from 1.1 new operas per year until 1800 to 3.6 afterwards (Figure 7, Panel A). In Venetia, output more than doubled, from 0.8 new operas per year until 1800 to 1.9 afterwards (Figure 7, Panel B).

Within Lombardy, the increase in opera production was concentrated in Milan (Figure 7, Panel A). Between 1781 and 1800, composers in Milan created roughly one new opera per year. With copyrights, output increased to four new operas in 1803, three in 1804, two per year between 1805 and 1809, three in 1810, two in 1811, and four in 1812. In 1818, composers in Milan produced five new operas. At the same time, composers created four new operas in Mantua between 1801 and 1820, one in Bergamo, and one in Brescia. City-level data for Venetia

[46] In Lombardy and Venetia, the number of native composers (born in the state where the opera premiered) increased from 9 between 1781 and 1800 to 15 between 1801 and 1820. In other states, the number of native composers increased slightly less, from 26 until 1800 to 37 afterwards.

also indicate geographic concentration, albeit at a smaller scale. Between 1781 and 1800, composers in Venice created 14 new operas, while composers in Vicenza and Verona produced 9 and 2 operas each. After 1801, 47 of 62 operas premiered in Venice. Another 10 operas premiered in Verona, 2 in Padova, and 3 in Vicenza.

One notable characteristic of Milan was its sheer size, with a population of 124,000 in 1800 (Malanima 2015, p. 4). By comparison, Brescia (the next largest city) had 38,000 people, Bergamo had 36,000, and Mantua 25,000. City size in turn is correlated with the density of skilled performers and with the demand for shows. Both of these factors increase the payoffs from creating more and better music, which, theoretically, should amplify the benefits of copyrights.

To proxy for city-level variation in demand and in the infrastructure to perform, we examine historical data on theaters that were large enough to perform operas. Antonini (2000, p. 23) records such data for theaters that had staged at least one opera by 1800, and explains that theaters needed around 100 seats to play operas.

Until 1801, these data indicate comparable trends for Lombardy and Venetia and the rest of Italy (Figure 8). In 1770, 9 cities in Lombardy and Venetia had on average 0.3 theaters that were large enough to stage operas, and 16 cities in other Italian states had on average 0.3 such theaters. In 1791, Padova and Mantua each opened a new theater; this increased the number of theaters per city to 0.4 for Lombardy and Venetia. In 1800, the opening of the Teatro Comunale in Florence increased the number of theaters in other states to 0.3.

After 1800, the number of theaters increased to 0.5 per city and year between 1801 and 1820 in Lombardy and Venetia, and to 0.3 in other parts of Italy. Theater construction continued at a steady pace until the 1860s, reaching 0.7 theaters per city and year between 1821 and 1861 in Lombardy and Venetia and 0.5 in other states. The greatest expansion occurred after Italy's unification in 1861, which increased demand for opera across Italy (Morelli 2012). In 1865, the number of theaters increased to 0.8 in Lombardy and Venetia, and 0.6 in other states (Figure 8). By 1900, it had reached 1.3 for Lombardy and Venetia and 1.25 in other states.

To investigate the interaction between copyrights and pre-existing differences in infrastructure and demand, we estimate differential effects for cities with two or more theaters in 1800. Only Venice (Venetia) and Florence (Tuscany) had three theaters in 1800 that were large

enough to stage operas (Appendix Figure A3, Panel A). Another four cities had two theaters in 1800: Milan (Lombardy), Naples (Two Sicilies), Turin (Sardinia), and Ferrara (Papal State).

Cities with the two or three theaters in 1800 also offered the largest number of seats (Appendix Figure A3, Panel B). Three theaters in Venice held a total of 2,521 people (Appendix Figure A3, 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). Three theaters in Florence could host a total audience of 2,177 people. Milan had the largest number of seats in any Italian city, with space for 2,030 people at La Scala (founded in 1778) and for another 1,500 at Teatro Carcano (founded in 1797). Brescia had the smallest seating capacity, with space for 99 people in the Teatro Comunale (founded in 1739).

To test whether cities with a better pre-existing infrastructure benefitted more from copyrights, we interact the variable *Lombardy & Venetia * post* with an indicator for cities that had two or more theaters in 1800. OLS estimates indicate that cities with two or more theaters created 2.1 additional operas per year after 1800 (Table 7, column 1, significant at 1 percent) compared with other Italian cities that had none or only one theater. Relative to a pre-1801 mean of 0.3 new operas per city and year, this implies a 7-fold increase. Controlling for a separate linear pre-trend for cities with two or more theaters increases the estimate to 2.2 (Table 7, column 2, significant at 1 percent), which implies a 7.3-fold increase.

Analyses of high-quality operas confirm the additional increase for cities with more existing theaters. OLS regressions for historically popular operas indicate that cities with two or more theaters created 0.3 additional high-quality operas per year after 1800 (Table 7, column 3, significant at 5 percent). Controlling for a separate linear pre-trend for cities with two or more theaters leaves this estimate nearly unchanged at 0.3 (Table 7, column 4, significant at 5 percent). Regressions for operas that were still available for Amazon in 2014 indicate that cities with two or more theaters created 0.4 additional durable operas per year after 1800 (Table 7, column 5, significant at 10 percent). Controlling for a separate linear pre-trend for cities with two or more theaters does not affect this estimate (Table 7, column 6, significant at 10 percent).

Alternative regressions with the number of seats instead of the number of theaters confirm these results (Appendix Table A10). For example, baseline estimates imply that cities with 1,000 or more seats produced 1.8 additional after 1800 compared with other cities (Appendix Table A10, column 1, significant at 1 percent).

VI. Conclusions

This paper has exploited the adoption of copyright laws in parts of Northern Italy – as a result of Napoléon's military campaign – to examine the effects of copyrights on creativity. An analysis of variation in the number of new operas that composers created across eight Italian states indicates a 150 percent increase in the number of new operas in Lombardy and Venetia, the two states that adopted copyrights in 1801. Importantly, the data also show that composers created *better* operas with copyrights, as measured by historical popularity and durability.

These results suggest that basic levels of intellectual property rights protection – through narrow and short-lived copyright terms – can increase both the quantity and quality of creativity. Intuitively, copyrights that grant composers intellectual property in repeat performances strengthen their incentives to produce high-quality work. If copyrights have positive income effects, composers who have an intrinsic preference for quality, such as Rossini (Beyle 1824, pp. 199), may also shift some of their efforts towards creating new high-quality work – independently of its income potential. As copyrights attract new composers, positive agglomeration effects, through better inputs and training opportunities for composers, may further improve quality.

Importantly, these effects are limited to short-lived property rights, and there are no comparable benefits of copyright extensions. Data on repeat performances show that only a small number of exceptionally durable operas were still performed after 20 years. Even among high-quality operas, nearly half of all operas only played within the first five years. In Lombardy and Venetia, the creation of new operas did not increase after copyright extensions beyond the life of composers (to *life+30* in 1840 and *life+40* in 1865).

More generally, our results suggest that well-defined and limited intellectual property rights can encourage creativity. This is particularly notable given that the sum of the historical evidence on patents suggests that policies which limit the scope of patents are most effective at encouraging technical innovations (Moser 2013). For example, empirical analyses of 19th-century world's fairs indicate that countries without patent laws were exceptionally innovative, albeit in a small number of industries (Moser 2005). Similarly, analyses of 20th-century patent policies suggest that compulsory licensing, which allows potential competitors to use patents without the consent of the patent owner, can promote innovation among patent owners and other

firms (Moser and Voena 2012, Bianchi et al. 2016). Intuitively, the narrow scope of copyrights avoids major problems with the current patent system. Broad patent rights fuel litigation by raising the risk that inventors – inadvertently – infringe on existing patents. Our analysis suggests that narrowly defined intellectual property rights can avoid these issues and promote creativity and 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.

Akcigit, Ufuk, Salome Baslandze, and Stefanie Stantcheva. 2016. "Taxation and the International Mobility of Inventors." *American Economic Review*, 106(10): 2930–2981.

Abadie, Alberto, Alexis Diamond, and Jens Hainmueller. 2012. "Synthetic Control Methods for Comparative Case Studies: Estimating the Effect of California's Tobacco Control Program". *Journal of the American Statistical Association*, 105(490): 493-505.

Antonini, Bianca M. 2000. *Editoria musicale, 1750-1930.* Edizioni ETS. Pisa.

Apthorp, William F. 1901. *The opera, past and present and historical sketch*. Scribner. New York.

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.* Printed for T. Hookham, Old Bond Street, by J. and C. Adlard, 23, Bartholomew Close. London.

Baten, Joerg, Nicola Bianchi, and Petra Moser. 2016. "Effects of Compulsory Licensing on Innovation. Historical Evidence from German Patents after WWI." Working Paper. http://papers.ssrn.com/sol3/papers.cfm?abstract_id=2417532

Borjas, George, and Kirk B. Doran. 2012. "The Collapse of the Soviet Union and the Productivity of American Mathematicians." *Quarterly Journal of Economics*, 127(3): 1143-1203.
Cagé, Julia, Nicolas Hervé, and Marie-Luce Viaud 2016, "The Production of Information in an Online World: Is Copy Right?" Working Paper, Science Po Paris.
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. 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. Dizionario Lirico (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.
Feinstein, Johnathan S. 2015. The Creative Development of Fields: Learning, Creativity, Paths, Implications. *Journal of the Knowledge Economy*, Vol.6, No.2, pp.1-40.
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. 2001. *Enciclopedia Italiana di scienze, lettere ed arti*. Milano.
Kaufman, Tom. "Loewenberg: Annals of Opera, 1597-1940." *Opera Today,* January 5, 2005.
Loewenberg, Alfred. 1978. *Annals of Operas (1597-1940).* Oxford University Press. 3rd edition rev. and corrected. First published 1943; revised 1955. Oxford.
Li, Xing, Megan MacGarvie, and Petra Moser. 2014. "Dead Poets' Property - How Does Copyright Influence Price?", *SSNR Working Paper.*
MacGarvie, Megan, and Petra Moser, ed. 2014. *"*Copyright and the Profitability of Authorship*"* Forthcoming in Avi Goldfarb, Shane Greenstone, and Catherine Tucker. *The Economics of Digitization: An Agenda*.
MacKinnon, James G., and Matthew D. Webb. 2016. "The Subcluster Wild Bootstrap for Few (Treated) Clusters." Working Paper. http://qed.econ.queensu.ca/working_papers/papers/qed_wp_1364.pdf
Malanima, Paolo. 2015. "Italian Urban Population 1300-1861 (The Database)." Available at http://www.paolomalanima.it/default_file/Italian%20Economy/Urban_Population.pdf, accessed on 08/31/2016.
Marshall, Alfred. 1890. *Principles of Economics*. Macmillan, London.
Mittermaier, K. 1840. "Neueste Gesetzgebung in Italien über den Schutz des literarischen Eigenthums und des Rechts an Kunstwerken" *Kritische Zeitschrift für Rechtswissenschaft und Gesetzgebung des Auslandes.* Bd. 12. pp. 461 – 467. Accessed

from *Digitale Bibliothek des Max-Planck-Instituts für Europäische Rechtsgeschichte* 2010-09-05T15:29:20Z
Moore, John Weeks. 1854. *Complete Encyclopædia of Music, Elementary, Technical, Historical.*
Moretti, Enrico, and Daniel Wilson, forthcoming. "The Effect of State Taxes on the Geographical Location of Top Earners: Evidence from Star Scientists" *American Economic Review*, forthcoming.
Morelli, Maria Teresa. 2012. *L'Unità d'Italia nel Teatro. Istituzioni Politiche, Identità Nazionale e Questione Sociale*. Bulzoni Editore. Roma.
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,* Volume 102(1): 396-427.
Moser, Petra, Alessandra Voena and Fabian Waldinger. 2014. "German Jewish Émigrés and US Invention." *American Economic Review*, 104(10): 3222-55.
Nagaraj, Abishek. forthcoming. "Does Copyright Affect Re-use? Evidence from the Google Books Digitization Project." *Management Science*.
Oberholzer-Gee, Felix, and Koleman Strumpf. 2007. "The Effect of File Sharing on Record Sales: An Empirical Analysis." *Journal of Political Economy*, 115 (1): 1-42.
Pacini, Giovanni. 1875. *Le mie memorie artistiche* (2nd ed.). Sala Bolognese: Arnaldo Forni. Bologna.
Panico, Paolo. 2002. *Verdi Businessman*, Gruppo Editoriale Atman. Biella.
Pecout, Gilles. 1999. *Il lungo Risorgimento: la nascita dell'Italia contemporanea (1770-1922).* Pearson Paravia Bruno Mondadori.
Pomba, Giuseppe, Carlo Tenca, and Gian Pietro Vieusseux. ed. 1986. *Scritti sul Commercio Librario in Italia*. Edited by Maria Iolanda Palazzolo. Archivio Guido Izzi: Distribuzione Bonacci. Roma.
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. 1986. *The Opera Industry in Italy from Cimarosa to Verdi: The Role of the Impresario.* Cambridge University Press, New York.
Rosselli, John. 1996. *The Life of Bellini.* Cambridge University Press, New York.
Rosselli, John. 2000. *The Life of Verdi.* Cambridge University Press, New York.
Scherer, Friedrich. M. 2004. *Quarter Notes and Bank Notes: The Economics of Music Composition in the 18th and 19th Centuries.* Princeton University Press. Princeton.
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.
Ubertazzi, Luigi Carlo. 2000. *I Savoia e gli Autori*, in Quaderni di AIDA n.3. Giuffrè. Milano.
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.
Joel Waldfogel, 2012."Copyright Protection, Technological Change, and the Quality of New Products: Evidence from Recorded Music since Napster," *Journal of Law and Economics*, 55(4), 715 - 740.
Weinstock, Herbert. *Donizetti and the World of Opera in Italy, Paris, and Vienna in the First Half of the Nineteenth Century.* Pantheon Books. 1963.

TABLE 1 – MEAN NEW OPERAS AND STATE CHARACTERISTICS IN ITALY, 1781-1800

	LOMBARDY & VENETIA	OTHER STATES
New Operas	1.575	1.350
Theaters	4.550	2.033
Theaters' seats	3,585	1,620
Cities with opera theaters	9	16
Number of active composers	2.000	1.225
Population	340,000	200,000

TABLE 2 – OLS AND QML POISSON REGRESSIONS,
DEPENDENT VARIABLE IS NEW OPERAS PER STATE AND YEAR, 1781-1820

	(1)	(2)	(3)	(4)	(5)
		OLS (1-4)			Poisson ATE (5)
Lombardy & Venetia *post	2.201***	2.147***	2.263***	2.430***	1.061***
	(0.404)	(0.422)	(0.472)	(0.470)	(0.329)
Lombardy & Venetia		0.320			
		(0.238)			
State FE	Yes	No	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes
Linear pre-trend for Lombardy & Venetia	No	No	Yes	No	No
State-specific linear pre-trend	No	No	No	Yes	No
Pre-1801 mean	1.406	1.406	1.406	1.406	1.406
N (year-state pair)	320	320	320	320	320
R-squared	0.800	0.726	0.800	0.819	
Robust standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1					

Notes: The dependent variable *new operas per state and year* measures the number of new operas in state *i* and year *t* between 1781 and 1820. The indicator variable *Lombardy & Venetia* equals 1 for Lombardy and Venetia, which adopted copyright laws in 1801. The indicator variable *post* equals 1 for years after 1800. *Pre-1801 mean* reports the average number of new operas per state and year until 1800. State fixed effects control for variation in opera output that is constant over time. Year fixed effects control for variation over time that is shared across states. Columns (1-4) are estimated using OLS; column (5) reports the average treatment effect (ATE) of a quasi-maximum likelihood Poisson regression with conditional fixed effects. Data include 677 new operas created between 1781 and 1820 across eight Italian states within the year 1900 borders of Italy.

TABLE 3 – OLS WITH ALTERNATIVE MEASURES FOR HIGH-QUALITY OPERAS, 1781-1820

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Historically popular operas (1-4) *Annals of Operas*				Long-lived operas (5-8) *Amazon*			
	Number (1-2)		Share (3-4)		Number (5-6)		Share (7-8)	
Lombardy & Venetia * post	0.407***	0.401***	0.104**	0.101**	0.280**	0.275**	0.069**	0.067**
	(0.152)	(0.153)	(0.047)	(0.047)	(0.129)	(0.130)	(0.033)	(0.033)
Lombardy & Venetia		0.041		-0.015		-0.000		-0.014
		(0.067)		(0.035)		(0.028)		(0.014)
State FE	Yes	No	Yes	No	Yes	No	Yes	No
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Linear pre-trend for Lombardy & Venetia	No	No	No	No	No	No	No	No
State-specific linear pre-trend	No	No	No	No	No	No	No	No
Pre-1801 mean	0.094	0.094	0.055	0.055	0.025	0.025	0.051	0.051
N (year-state pair)	320	320	320	320	320	320	320	320
R-squared	0.342	0.297	0.245	0.217	0.360	0.299	0.297	0.224

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

Notes: The dependent variables are *new operas per state and year* that measures new operas created in state *i* and year *t* between 1781 and 1820 in columns 1-2 and 5-6 and the *share of new operas per state and year* in columns 3-4 and 7-8. State borders are defined by the year 1900 borders of Italy. Columns (1-4) report results for *historically popular operas* in Loewenberg's (1978) *Annals of Operas*. Columns (5-8) report results for *long-lived operas* that were still for sale on Amazon in 2014. The indicator variable *Lombardy & Venetia* equals 1 for Lombardy and Venetia, which adopted copyright laws in 1801. The indicator variable *post* equals 1 for years after 1800. *Pre-1801 mean* reports the average 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 control for variation over time that is shared across states. Columns (1-4) estimate OLS regressions for operas created between 1781 and 1820 and entered Loewenberg's (1978) *Annals of Operas*, a compendium of notable performances; columns (6-10) estimate OLS regressions for operas created between 1781 and 1820 and were available as complete recordings on Amazon in 2014.

TABLE 4 – OLS AND QML POISSON,
DEPENDENT VARIABLE IS NEW OPERAS PER STATE AND YEAR, 1770-1900

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	OLS (1-2)		Poisson ATE (3)	Historically popular (4-5) *Annals of Operas*		Long-lived operas (6-7) *Amazon*	
Copyright	2.683***	2.532***	0.952***	0.188*	0.130	0.327***	0.303***
	(0.436)	(0.452)	(0.149)	(0.098)	(0.102)	(0.111)	(0.115)
State FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
State-specific linear pre-trend	No	Yes	No	No	Yes	No	Yes
Pre-copyright mean	1.173	1.173	1.173	0.123	0.123	0.105	0.105
Observations	1,048	1,048	1,048	1,048	1,048	1,048	1,048
R-squared	0.706	0.729		0.370	0.390	0.350	0.358
Robust standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1							

Notes: The dependent variable *new operas per state and year* measures new operas created in city *i* and year *t* between 1770 and 1900. Columns (4-5) report results for *historically popular operas* in Loewenberg's (1978) *Annals of Operas*. Columns (6-7) report results for *long-lived operas* that were still for sale on Amazon in 2014. *Copyright* is an indicator variable that equals 1 if state *i* offers copyright protection in that year. *Pre-copyright mean* reports the mean of the dependent variable – new operas per state and year – for year-state pairs *without* copyrights. Specifications (1-2) and (4-7) 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 across eight Italian states within the year 1900 borders of Italy. Columns (1-2) and (4-7) are OLS; column (3) reports the average treatment effect (ATE) of the conditional fixed effects quasi-maximum likelihood Poisson regression.

TABLE 5 – EXTENSIONS OF COPYRIGHT LENGTH,
DEPENDENT VARIABLE IS NEW OPERAS PER STATE AND YEAR, 1770-1900

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	OLS (1-2)		Poisson ATE (3)	Historically popular (4-5) *Annals of Operas*		Long-lived operas (6-7) *Amazon*	
Copyright Adoption	3.188***	3.456***	1.078***	0.303***	0.242*	0.403***	0.433***
	(0.515)	(0.686)	(0.129)	(0.103)	(0.124)	(0.122)	(0.159)
Extension beyond *life+10*	1.074***	1.472**	-0.021	0.245***	0.178*	0.162**	0.208*
	(0.381)	(0.590)	(0.180)	(0.075)	(0.104)	(0.066)	(0.121)
Extension beyond *life+30*	-0.265	-0.153	-0.266	-0.032	-0.042	0.109**	0.116*
	(0.753)	(0.773)	(0.250)	(0.249)	(0.253)	(0.053)	(0.065)
State FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
State-specific linear pre-trend	No	Yes	No	No	Yes	No	Yes
Pre-copyright mean	1.173	1.173	1.173	0.123	0.123	0.105	0.105
Life+10 mean	4.109	4.109	4.109	0.587	0.587	0.511	0.511
Life+30 mean	4.397	4.397	4.397	0.340	0.340	0.237	0.237
Observations	1,048	1,048	1,048	1,048	1,048	1,048	1,048
R-squared	0.710	0.733		0.378	0.393	0.354	0.362
Robust standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1							

Notes: The dependent variable *new operas per state and year* measures new operas created in city *i* and year *t* between 1770 and 1900. Columns (4-5) report results for *historically popular operas* in Loewenberg's (1978) *Annals of Operas*. Columns (6-7) report results for *long-lived operas* that were still for sale on Amazon in 2014. *Copyright Adoption* is an indicator variable that equals 1 if state *i* offers copyright protection in that year. *Extension beyond life+10* is an indicator variable that equals 1 if state *i* extends copyright length beyond the life of composer plus 10 years for heirs. *Extension beyond life+30* is an indicator variable that equals 1 if state *i* extends copyright length beyond the life of composer plus 30 years for heirs. *Pre-copyright mean* reports the mean of the dependent variable – new operas per state and year – for year-state pairs *without* copyrights; *Life+10 mean* reports the mean of the dependent variable for year-state pairs that offer *life+10* copyright protection; *Life+30 mean* reports the mean of the dependent variable for year-state pairs that offer *life+30* copyright protection. Specifications (1-2) and (4-7) 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 across eight Italian states within the year 1900 borders of Italy. Columns (1-2) and (4-7) are OLS; column (3) reports the average treatment effect (ATE) of the conditional fixed effects quasi-maximum likelihood Poisson regression.

TABLE 6 – OLS AND QML POISSON REGRESSIONS,
DEPENDENT VARIABLE IS NEW OPERAS PER STATE AND YEAR BY IMMIGRANTS AND NATIVES, 1781-1820

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
		Immigrants (1-4)				Natives (5-8)		
		OLS (1-3)		Poisson ATE (4)		OLS (5-7)		Poisson ATE (8)
Lombardy & Venetia * post	2.240***	2.035***	1.928***	1.231***	-1.580*	-1.634	-1.106	-0.486***
	(0.318)	(0.461)	(0.445)	(0.206)	(0.940)	(1.751)	(3.320)	(0.000)
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
State FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Linear pre-trend for L&V	No	Yes	No	No	No	Yes	No	No
State-specific linear pre-trend	No	No	Yes	No	No	No	Yes	No
Pre-1801 mean	1.133	1.133	1.133	1.133	2.057	2.057	2.057	2.057
N (year-state pairs)	291	291	291	291	87	87	87	87
R-squared	0.844	0.844	0.859		0.879	0.879	0.880	
Robust standard errors. *** p<0.01, ** p<0.05, * p<0.1								

Notes: The dependent variable *new operas per state and year* measures the number of new operas in state *i* and year *t* between 1781 and 1820. Columns (1-4) estimate regressions for operas by *immigrants*: composers who were born in a different state than the state of the premiere. Columns (5-8) report results for *natives*: composers who were born in the state where the opera premiered. The variable *Lombardy & Venetia* equals 1 for Lombardy and Venetia, the two Italian states that adopted copyrights in 1801. The variable *post* equals 1 for years after 1800. The *pre-1801 mean* reports the average number of new operas per state and year until 1800. State fixed effects control for variation in opera production at the level of states that is constant over time. Year fixed effects control for variation over time that is shared across states. Columns (1-3) and (5-7) report OLS estimates. Columns (4) and (8) report the average treatment effect (ATE) of a quasi-maximum likelihood Poisson regression with conditional fixed effects. Data include 677 new operas created between 1781 and 1820 across eight Italian states within the year 1900 borders of Italy.

TABLE 7 – CITY-LEVEL REGRESSIONS WITH INTERACTIONS FOR THEATER INFRASTRUCTURE IN 1800
DEPENDENT VARIABLE IS NEW OPERAS PER CITY AND YEAR, 1781-1820

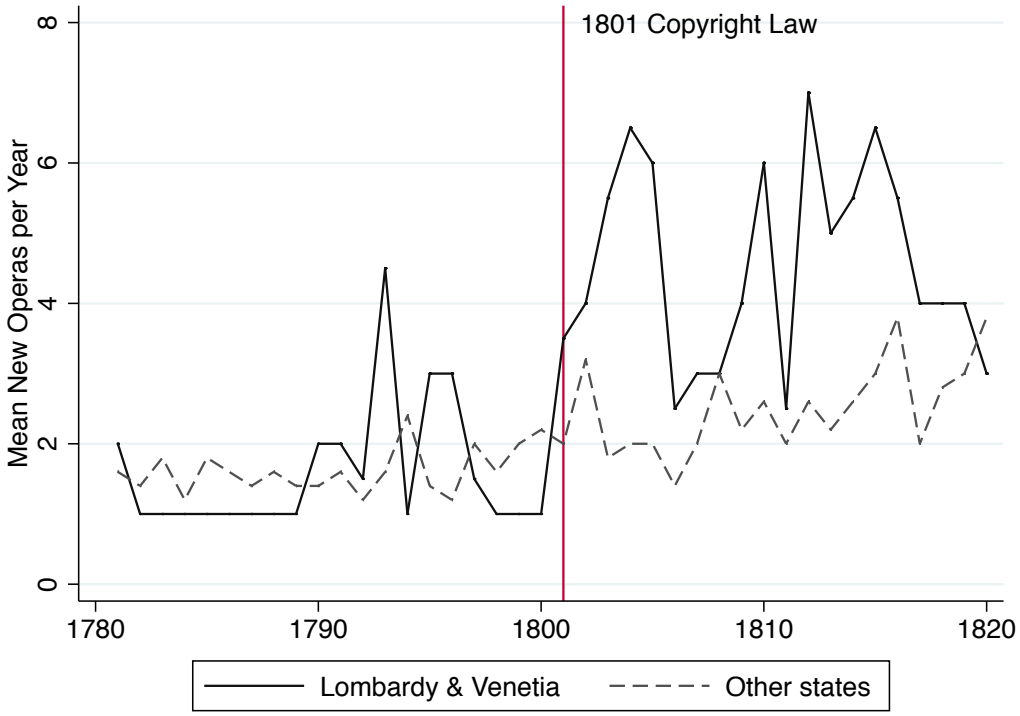
	(1)	(2)	(3)	(4)	(5)	(6)
	All Operas (1-2)		Historically popular operas *Annals of Opera* (3-4)		Long-lived operas *Amazon* (5-6)	
Lombardy & Venetia * post * 2 or more theaters	2.120***	2.118***	0.289**	0.298**	0.392*	0.388*
	(0.321)	(0.328)	(0.227)	(0.120)	(0.229)	(0.226)
Lombardy & Venetia*post	0.412***	0.414**	0.021	0.011	0.036	0.041
	(0.128)	(0.183)	(0.024)	(0.028)	(0.029)	(0.036)
City FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Linear pre-trend for L&V	No	Yes	No	Yes	No	Yes
Pre-1801 mean	0.266	0.266	0.021	0.021	0.007	0.007
N (year-city pair)	1,050	1,050	846	846	843	843
R-squared	0.589	0.589	0.315	0.315	0.331	0.331
Robust 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 in city *i* and year *t* between 1781 and 1820 (columns 1-2). Columns (3-4) report results for *historically popular operas* in Loewenberg's (1978) *Annals of Operas*. Columns (5-6) report results for *long-lived operas* that were still for sale on Amazon in 2014. The indicator variable *Lombardy & Venetia* equals 1 for cities in Lombardy and Venetia, which adopted copyright laws in 1801. The indicator variable *post* equals 1 for years after 1800. The indicator variable *2 or more theaters* equals 1 for city *i* if that city had two or more theaters before 1801. The variable *Lombardy & Venetia* equals 1 for Lombardy and Venetia, the two Italian states that adopted copyrights in 1801. *Pre-1801 mean* reports the average number new operas created per city and year until 1800. Data include 677 new operas created between 1781 and 1820 across eight Italian states within the year 1900 borders of Italy.

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

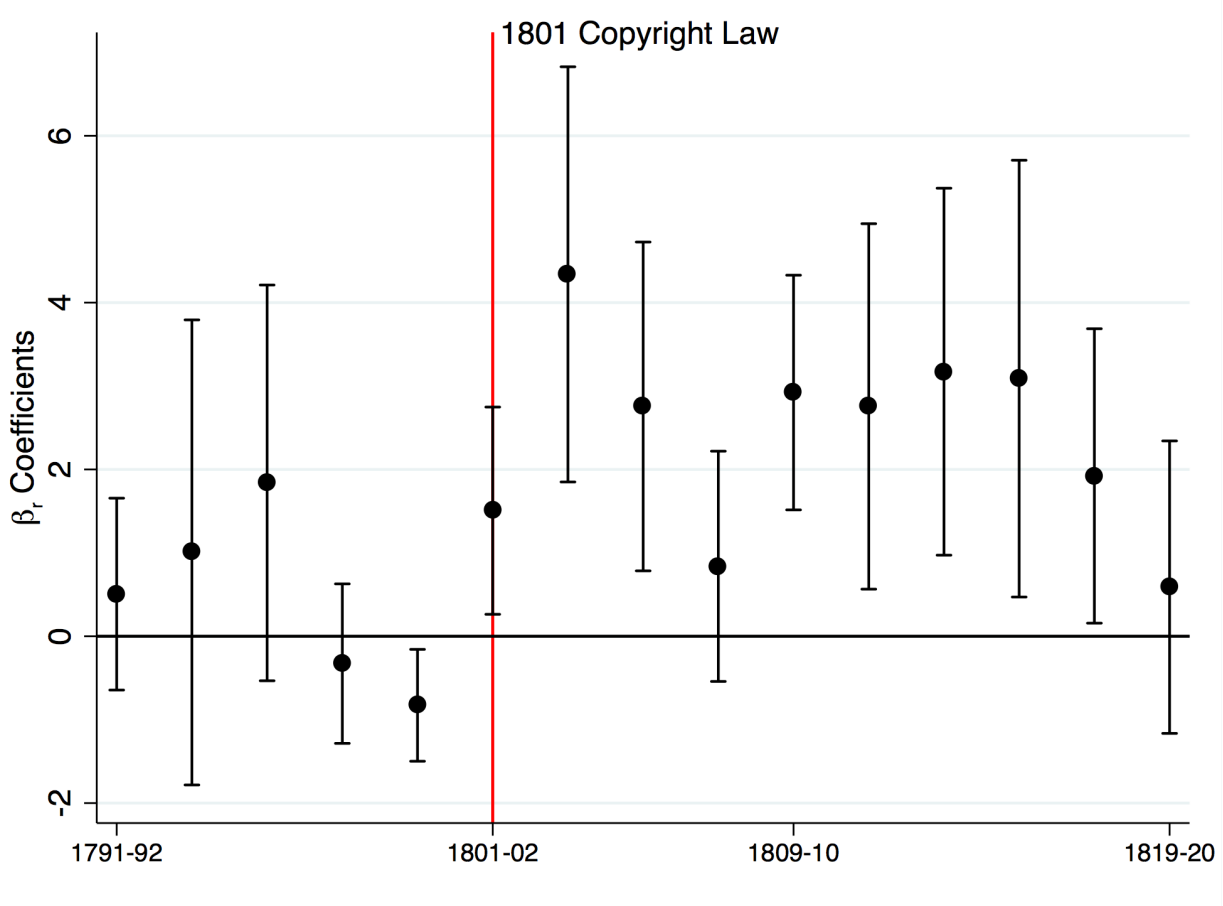
Notes: The area in grey covers Lombardy and Venetia, which adopted copyrights in 1801 after they had fallen under French rule. We use Italy's borders in 1900 to define the country of Italy and the borders drawn by the Congress of Vienna in 1815 to draw state borders within Italy. The shapefile for Italy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

FIGURE 2 – NEW OPERAS PER STATE AND YEAR IN ITALY, 1781-1820



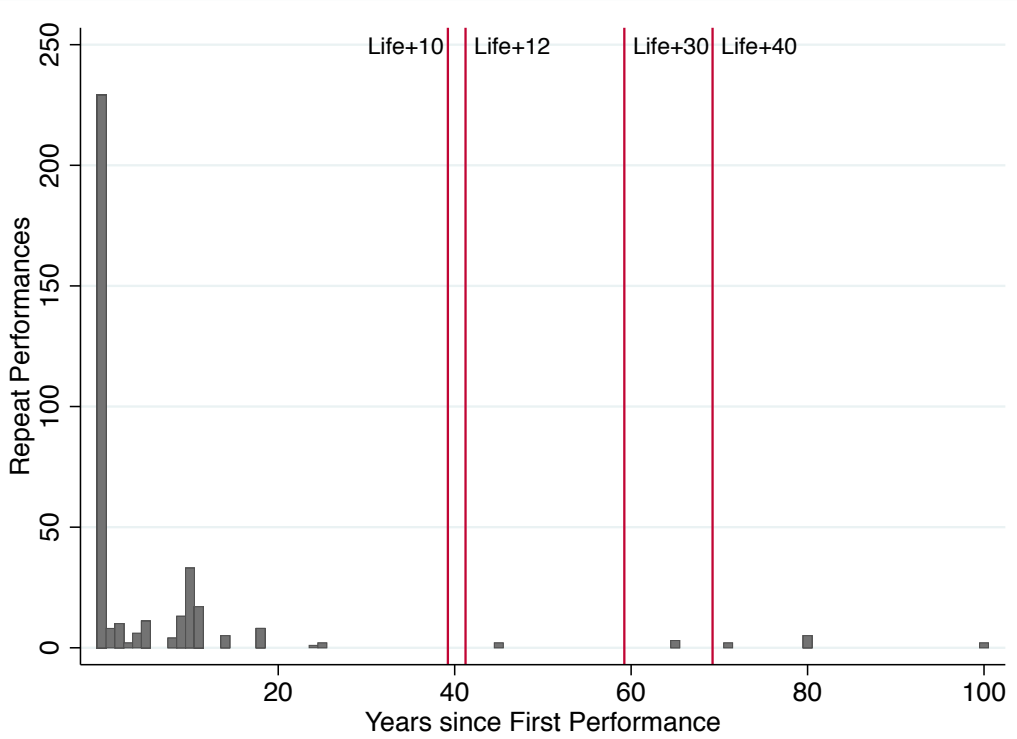
Notes: New operas per state and year counts new operas in state *i* and year *t* between 1781 and 1820. State borders are defined by the year 1900 borders of Italy. *Lombardy & Venetia* adopted copyright laws in 1801, after they had fallen under Napoleonic rule. *Other States* include Sardinia, Modena and Reggio, Parma and Piacenza, Tuscany, Papal States and Sicily. Data include 677 new operas that premiered between 1781 and 1820 across eight Italian states within the year 1900 borders of Italy.

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



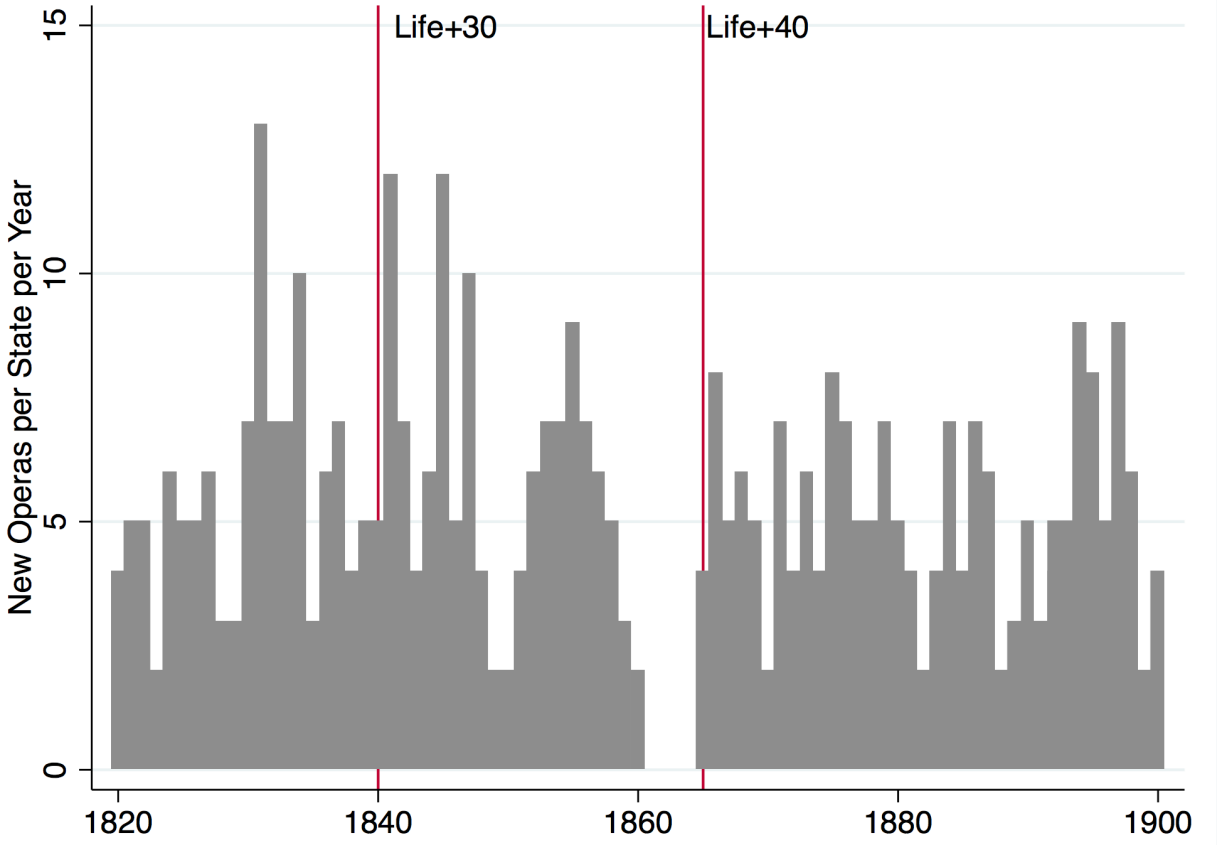
Notes: Point estimates and 95% confidence intervals for β_r's coefficients in the regression $opera_{it}=\Sigma\ \beta_r\ Lombardy\ \&\ Venetia_i \times year\ interval_r + \varphi_i + \delta_t + \varepsilon_{it}$ where the dependent variable counts new operas in state *i* and year *t*. The variable *Lombardy & Venetia* equals 1 for Lombardy and Venetia, which adopted copyright laws in 1801. The variable $year\ interval_r$ indicates two-year intervals between 1791 and 1820; years between 1781 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_t controls for variation over time that is shared across states. The vertical line denotes the adoption of copyright laws by *Lombardy and Venetia* in 1801. Data include 677 new operas between 1781 and 1820 across eight Italian states 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 1781-1800



Notes: Performances per year for the first 100 years since the premiere for 165 operas that premiered across Italy between 1781 and 1800 and entered Loewenberg's (1978) *Annals of Operas.* Performances to the left of the vertical line would be on copyright under a regime of *life + 10*, which Lombardy and Venetia began to offer in 1801. The expected length of copyright under *life + 10* equals 39.23 years: 10 years plus the expected remaining years of life for a composer in the year of the premiere for 705 composers and 2,598 operas 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*.

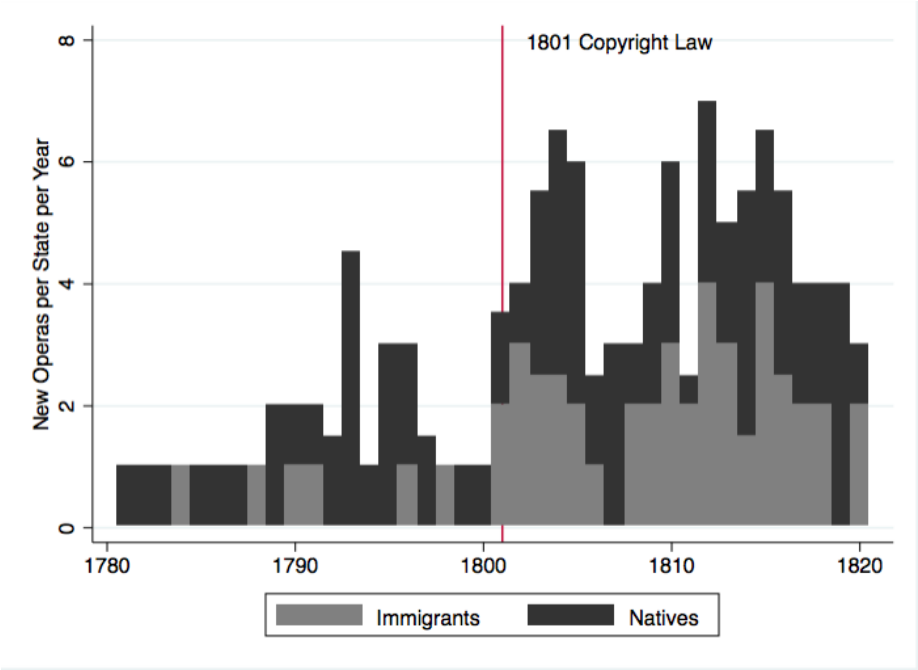
FIGURE 5 – NEW OPERAS PREMIERED PER STATE AND YEAR
IN LOMBARDY AND VENETIA, 1820-1900



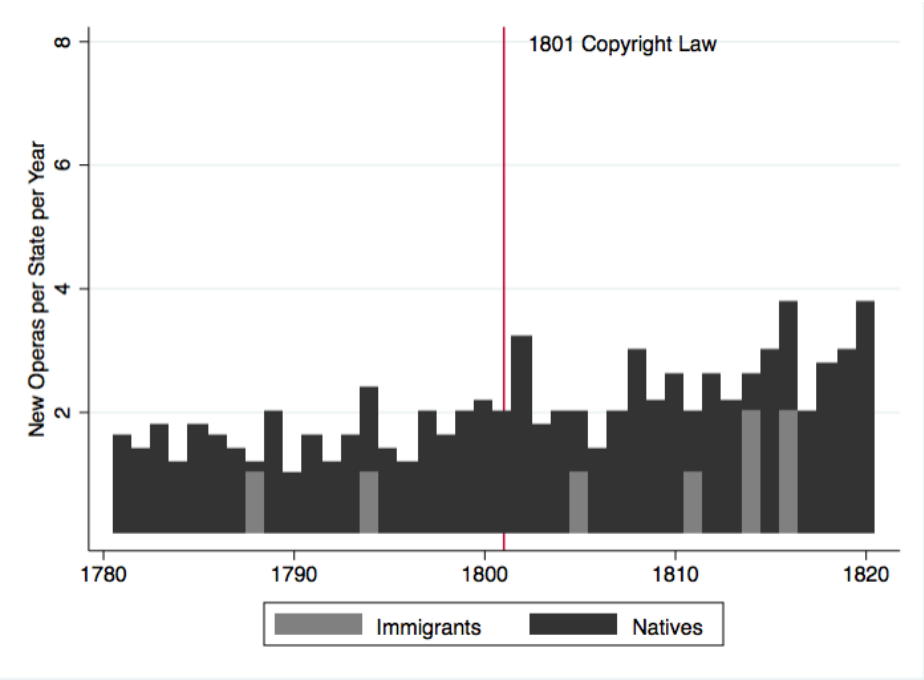
Notes: Lombardy & Venetia adopted copyright laws in 1801, after they had fallen under Napoleonic rule. The vertical lines correspond to the bilateral treaty between Kingdom of Sardinia and Austria of 1840 that extended copyright length from *life+10* to *life+30*, and to the Italian copyright law of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

FIGURE 6 – NEW OPERAS PER STATE AND YEAR, IMMIGRANTS VS NATIVES, 1781-1820

PANEL A: LOMBARDY AND VENETIA



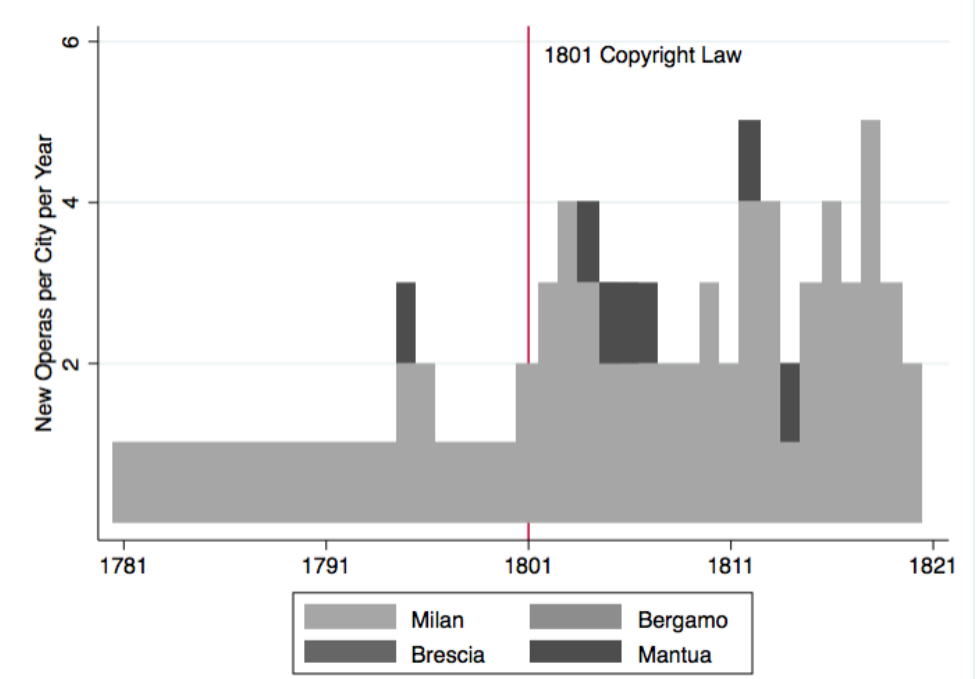
PANEL B: OTHER STATES



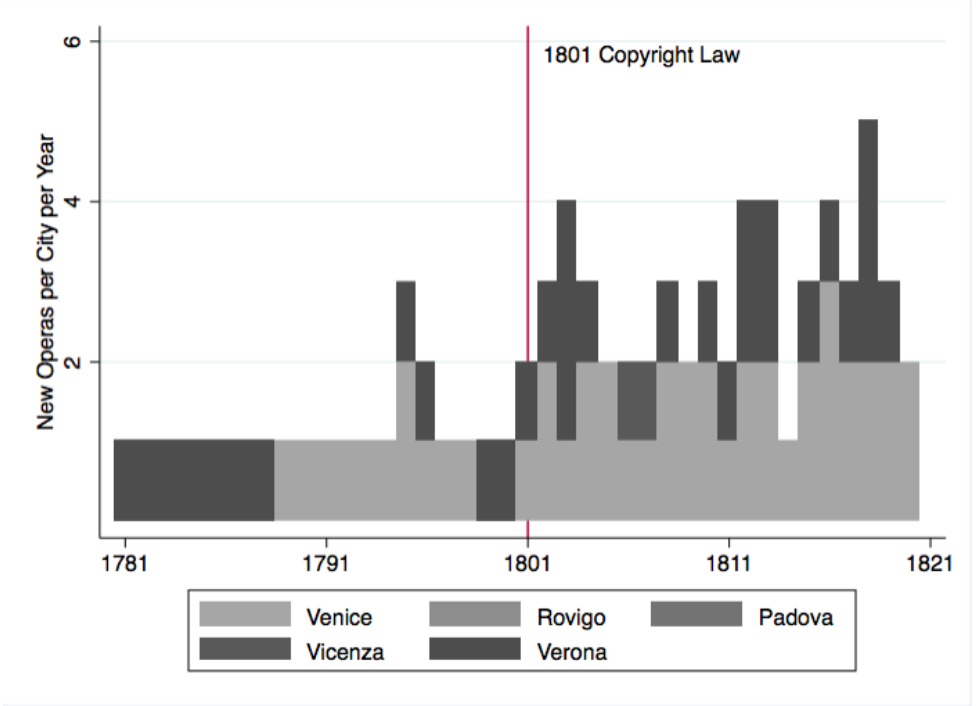
Notes: *Immigrants* are composers who were born in a different state than premiere's state; *natives* are composers who were born in the state where the opera premiered. The vertical line denotes the adoption of copyright laws by *Lombardy and Venetia* in 1801. Data include 677 new operas that premiered between 1781 and 1820 across eight Italian states within the year 1900 borders of Italy.

FIGURE 7 – NEW OPERAS PER CITY AND YEAR, 1781-1820

PANEL A: LOMBARDY

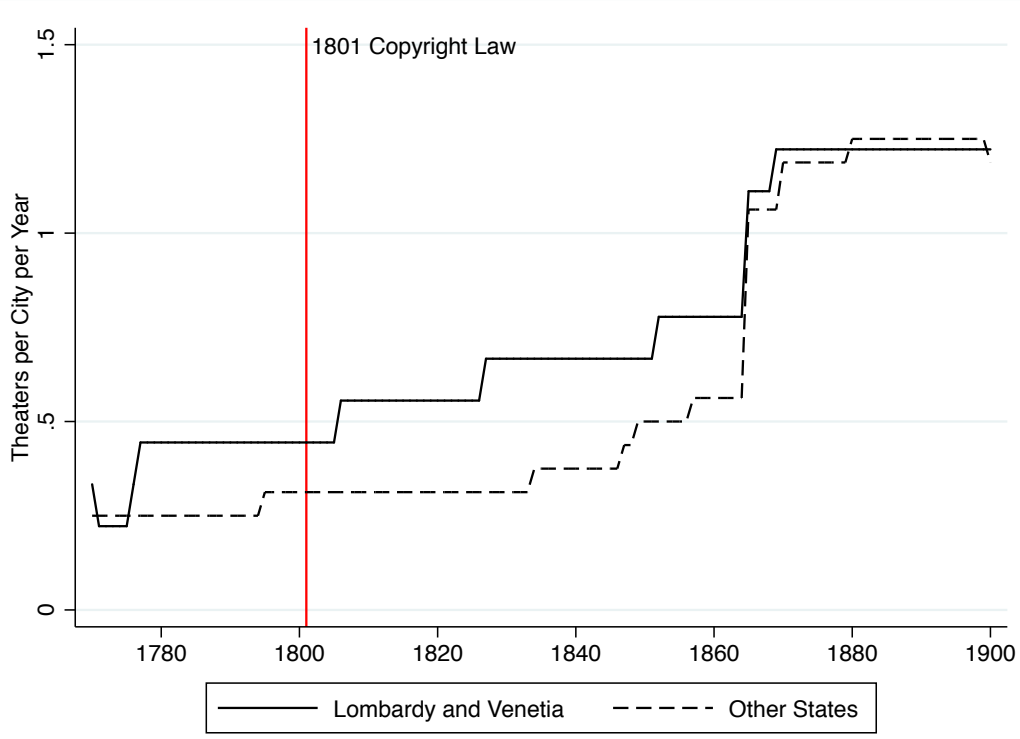


PANEL B: VENETIA



Notes: Data for 348 new operas that premiered in Lombardy (Panel A) and 232 new operas that premiered in Venetia (Panel B) between 1781 and 1820. The vertical line denotes the adoption of copyright laws by *Lombardy and Venetia* in 1801.

FIGURE 8 – AVERAGE NUMBER OF THEATERS PER CITY PER YEAR, 1770-1900



Notes: Average number of theaters that performed at least one opera per city per year in Lombardy and Venetia and other Italian states between 1770 and 1900, within the year 1900 borders of Italy. The vertical line denotes the adoption of copyright laws by *Lombardy and Venetia* in 1801. Theater data are from Antonini (2000).

APPENDIX

NOT FOR PUBLICATION

APPENDIX

NOT FOR PUBLICATION

TABLE A1 – ENFORCEMENT:
PERFORMANCES AFTER THE PREMIERE BY THE (ROW) STATE OF A PREMIERE AND THE (COLUMN) STATE OF A PERFORMANCE

PANEL A: 1781-1800

Performed in: / Premiered in:	Sardinia	Modena	Parma	Tuscany	Lombardy	Venetia	Rome	Sicily
Sardinia	0	0	0	0	0	0	0	0
Modena	0	0	0	0	0	0	0	0
Parma	4	0	0	0	2	3	0	5
Tuscany	0	0	0	1	0	2	2	4
Lombardy	0	0	0	0	0	0	0	0
Venetia	3	1	4	6	7	3	1	10
Rome	1	0	0	3	0	5	4	8
Sicily	6	7	0	4	0	2	5	11

PANEL B: 1801-1820

Performed in: / Premiered in:	Sardinia	Modena	Parma	Tuscany	Lombardy	Venetia	Rome	Sicily
Sardinia	2	0	0	4	0	0	2	4
Modena	0	0	0	0	0	0	0	0
Parma	0	0	0	0	0	0	0	0
Tuscany	0	0	0	0	0	0	0	0
Lombardy	0	0	0	1	0	0	2	1
Venetia	2	0	0	1	0	0	0	1
Rome	3	0	4	0	0	0	0	3
Sicily	2	0	5	0	0	0	2	4

Notes: Count of performances from Loewenberg (1978) for 62 operas that premiered in a row state between 1781 and 1820 and were performed at least once in the column state after the premiere. Cells with copyright protection are shaded: Operas that had premiered in Lombardy and Venetia after 1801 were under copyright in Lombardy and Venetia, but not in other states.

TABLE A2 – LIFE TABLES FOR COMPOSERS OF OPERAS

	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 composed 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 from Dassori (1903), Ambiveri (1998), and the *New Grove Dictionary of Music and Musicians* (2001).

TABLE A3 – OLS, DEPENDENT VARIABLE IS NEW OPERAS PER STATE AND YEAR, 1781-1820

	(1)	(2)	(3)	(4)
		OLS (1-4)		
Lombardy & Venetia *post	2.201***	2.147**	2.263***	2.430***
	(0.677)	(0.853)	(0.559)	(0.632)
Lombardy & Venetia		0.320		
		(0.488)		
State FE	Yes	No	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
Linear pre-trend for Lombardy & Venetia	No	No	Yes	No
State-specific linear pre-trend	No	No	No	Yes
Pre-1801 mean	1.406	1.406	1.406	1.406
N (year-state pair)	320	320	320	320
R-squared	0.800	0.726	0.800	0.819

Standard errors clustered at the state level for pre- and post-copyright period in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Notes: The dependent variable *new operas per state and year* measures the number of new operas in state *i* and year *t* between 1781 and 1820. The indicator variable *Lombardy & Venetia* equals 1 for Lombardy and Venetia, which adopted copyright laws in 1801. The indicator variable *post* equals 1 for years after 1800. *Pre-1801 mean* reports the average number of new operas per state and year until 1800. State fixed effects control for variation in opera output that is constant over time. Year fixed effects control for variation over time that is shared across states. Columns (1-4) are estimated using OLS; column (5) reports the average treatment effect (ATE) of a quasi-maximum likelihood Poisson regression with conditional fixed effects. Data include 677 new operas created between 1781 and 1820 across eight Italian states within the year 1900 borders of Italy.

TABLE A4 – OLS WITH ALTERNATIVE MEASURES FOR HIGH-QUALITY OPERAS, 1781-1820

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Historically popular operas (1-4) *Annals of Operas*				Long-lived operas (5-8) *Amazon*			
	Number (1-2)		Share (3-4)		Number (5-6)		Share (7-8)	
Lombardy & Venetia * post	0.407***	0.401***	0.104**	0.101*	0.280**	0.275**	0.069**	0.067
	(0.152)	(0.153)	(0.026)	(0.048)	(0.129)	(0.130)	(0.023)	(0.043)
Lombardy & Venetia		0.041		-0.015		-0.000		-0.014
		(0.067)		(0.041)		(0.028)		(0.013)
State FE	Yes	No	Yes	No	Yes	No	Yes	No
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Linear pre-trend for Lombardy & Venetia	No	No	No	No	No	No	No	No
State-specific linear pre-trend	No	No	No	No	No	No	No	No
Pre-1801 mean	0.094	0.094	0.055	0.055	0.025	0.025	0.051	0.051
N (year-state pair)	320	320	320	320	320	320	320	320
R-squared	0.342	0.297	0.245	0.217	0.360	0.299	0.297	0.224

Standard errors clustered at the state level for pre- and post-copyright period in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Notes: The dependent variables are *new operas per state and year* that measures new operas created in state *i* and year *t* between 1781 and 1820 in columns 1-2 and 5-6 and the *share of new operas per state and year* in columns 3-4 and 7-8. State borders are defined by the year 1900 borders of Italy. Columns (1-4) report results for *historically popular operas* in Loewenberg's (1978) *Annals of Operas*. Columns (5-8) report results for *long-lived operas* that were still for sale on Amazon in 2014. The indicator variable *Lombardy & Venetia* equals 1 for Lombardy and Venetia, which adopted copyright laws in 1801. The indicator variable *post* equals 1 for years after 1800. *Pre-1801 mean* reports the average 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 control for variation over time that is shared across states. Columns (1-4) estimate OLS regressions for operas created between 1781 and 1820 and entered Loewenberg's (1978) *Annals of Operas*, a compendium of notable performances; columns (6-10) estimate OLS regressions for operas created between 1781 and 1820 and were available as complete recordings on Amazon in 2014.

TABLE A5 – CONTROLLING FOR LINEAR PRE-TRENDS, OLS WITH ALTERNATIVE MEASURES FOR HIGH-QUALITY OPERAS, 1781-1820

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Historically popular operas (1-4) *Annals of Operas*				Long-lived operas (5-8) *Amazon*			
	Number (1-2)		Share (3-4)		Number (5-6)		Share (7-8)	
Lombardy & Venetia * post	0.462***	0.436***	0.055	0.042	0.301**	0.283**	0.051	0.045
	(0.153)	(0.156)	(0.057)	(0.058)	(0.131)	(0.134)	(0.032	(0.033)
State FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Linear pre-trend for Lombardy & Venetia	Yes	No	Yes	No	Yes	No	Yes	No
State-specific linear pre-trend	No	Yes	No	Yes	No	Yes	No	Yes
Pre-1801 mean	0.094	0.094	0.094	0.094	0.025	0.025	0.025	0.025
N (year-state pair)	320	320	320	320	320	320	320	320
R-squared	0.342	0.297	0.343	0.360	0.360	0.299	0.360	0.373
Robust standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1								

Notes: The dependent variables are *new operas per state and year* that measures new operas created in state *i* and year *t* between 1781 and 1820 in columns 1-2 and 5-6 and the *share of new operas per state and year* in columns 3-4 and 7-8. State borders are defined by the year 1900 borders of Italy. Columns (1-4) report results for *historically popular operas* in Loewenberg's (1978) *Annals of Operas*. Columns (5-8) report results for *long-lived operas* that were still for sale on Amazon in 2014. The indicator variable *Lombardy & Venetia* equals 1 for Lombardy and Venetia, which adopted copyright laws in 1801. The indicator variable *post* equals 1 for years after 1800. *Pre-1801 mean* reports the average 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 control for variation over time that is shared across states. Columns (1-4) estimate OLS regressions for operas created between 1781 and 1820 and entered Loewenberg's (1978) *Annals of Operas*, a compendium of notable performances; columns (6-10) estimate OLS regressions for operas created between 1781 and 1820 and were available as complete recordings on Amazon in 2014.

TABLE A6 –OLS AND QML POISSON REGRESSIONS WITH COUNTS OF REPEAT PERFORMANCES
DEPENDENT VARIABLE IS NUMBER OF REPEAT PERFORMANCES 1781-1820

	(1)	(2)	(3)	(4)	(5)	(6)
	Total Count of Repeat Performances (1-3)			Repeat Performances in the Year of the Premiere (4-6)		
	OLS (1-2)		Poisson ATE (3)	OLS (4-5)	Poisson ATE (6)	
Lombardy & Venetia * post	0.933**	1.110**	2.661***	9.577***	9.122**	1.715***
	(0.439)	(0.457)	(0.000)	(2.181)	(2.358)	(0.000)
State FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Pre-1801 mean	1.54	1.54	1.54	2.69	2.69	2.69
N (year-state pair)	320	320	320	320	320	320
R-squared	0.888	0.852		0.990	0.988	

Notes: The dependent variables are *total count of repeat performances* that measures the number of repeated performance of new operas normalized by the number of year left in our sample; and *repeat performance in the year of the premiere* that measures the number of repeat performance in the premiere year. Columns 1-2-4-5 report the OLS estimations, columns 3 and 6 the QML Poisson estimations. *Pre-1801 mean* reports the average number of the dependent variable before 1801.

TABLE A7 – OLS AND QML POISSON REGRESSIONS DE-TRENDING THE DEPENDENT VARIABLE, NEW OPERAS PER STATE AND YEAR, 1781-1820

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	All Operas (1-3)			Historically popular operas (4-5) *Annals of Operas*		Long-lived operas (6-7) *Amazon*	
	OLS (1-2)		Poisson ATE (3)	OLS (4-5)		OLS (6-7)	
Lombardy & Venetia * post	2.201***	2.147***	1.061***	0.407***	0.401***	0.280**	0.275**
	(0.378)	(0.399)	(0.299)	(0.152)	(0.146)	(0.126)	(0.127)
Lombardy & Venetia		0.320			0.041		-0.000
		(0.194)			(0.050)		(0.023)
State FE	Yes	No	Yes	Yes	No	Yes	No
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Linear pre-trend for Lombardy & Venetia	No	No	No	No	No	No	No
State-specific linear pre-trend	No	No	No	No	No	No	No
Pre-1801 mean	1.406	1.406	1.406	0.094	0.094	0.025	0.025
N (year-state pair)	320	320	320	320	320	320	320
R-squared	0.809	0.734		0.342	0.307	0.365	0.303

Standard errors clustered at the state level for pre- and post-copyright period in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Notes: The dependent variable *new operas per state and year* measures new operas created in city *i* and year *t* between 1781 and 1820 and is de-trended by a linear pre-trend for Lombardy and Venetia, calculated on the pre-1801 data. Columns (4-5) report results for *historically popular operas* in Loewenberg's (1978) *Annals of Operas*. Columns (6-7) report results for *long-lived operas* that were still for sale on Amazon in 2014. *Pre-copyright mean* reports the mean of the dependent variable – new operas per state and year – for year-state pairs *without* copyrights. Specifications (1-2) and (4-7) estimate OLS regressions; specification (3) estimates the average treatment effect (ATE) of the conditional fixed effects quasi-maximum likelihood Poisson regression. Data include 677 new operas created between 1781 and 1820 across eight Italian states within the year 1900 borders of Italy.

TABLE A8 – LENGTH OF COPYRIGHT AND COUNTS OF NEW OPERAS CREATED PER STATE AND YEAR, 1770-1900

	1770-1800	1801-1825	1826-1827	1828-1839	1840-1864	1865-1869	1870-1900
Sardinia	no copyright 0.45 operas	no copyright 1.52 operas	no copyright 1.00 operas	no copyright 2.50 operas	life+30y 2.96 operas	life+40y 2.80 operas	life+40y 4.06 operas
Modena	no copyright 0.03 operas	no copyright 0.20 operas	no copyright 2.00 operas	no copyright 0.33 operas	life+30y 0.48 operas	life+40y 0.00 operas	life+40y 0.48 operas
Parma	no copyright 0.23 operas	no copyright 0.28 operas	no copyright 0.00 operas	no copyright 0.42 operas	life+30y 0.36 operas	life+40y 0.60 operas	life+40y 0.45 operas
Tuscany	no copyright 0.19 operas	no copyright 0.92 operas	no copyright 2.00 operas	no copyright 2.58 operas	life+30y 2.08 operas	life+40y 2.40 operas	life+40y 2.71 operas
Lombardy	no copyright 0.23 operas	life+10y 5.04 operas	life+10y 6.00 operas	life+10y 6.17 operas	life+30y 4.96 operas	life+40y 5.60 operas	life+40y 5.03 operas
Venetia	no copyright 1.16 operas	life+10y 3.44 operas	life+10y 2.00 operas	life+10y 2.92 operas	life+30y 2.52 operas	life+40y 0.60 operas	life+40y 1.77 operas
Papal State	no copyright 0.65 operas	no copyright 3.4 operas	life+12y 3.00 operas	life+12y 1.91 operas	life+30y 2.60 operas	life+30y 3.20 operas	life+40y 3.65 operas
Sicily	no copyright 2.06 operas	no copyright 4.60 operas	no copyright 12.00 operas	life+30 17.08 operas	life+30y 9.28 operas	life+40y 4.80 operas	life+40y 4.55 operas

Notes: The variable *new operas per state and year* is the average number of operas premiered in state *i.* (columns) between year t and year *t+r* (rows). *No copyright* indicates that state *i* did not offer copyrights protection in that time period. *Life +10, 30, or 40* indicate that state *i* offers exclusive rights in an opera for the duration of a composer's life plus 10, 30, or 40 years after his death. For example, on average 1.16 operas were premiered in Venetia between 1770 and 1800, when the state offered no copyrights protection.

TABLE A9 – NEW OPERAS PER STATE AND YEAR, IMMIGRANTS VS NATIVES, 1781-1820

	LOMBARDY & VENETIA			OTHER STATES		
	All Operas (N=677)					
	All	Immigrants	Natives	All	Immigrants	Natives
1781-1820	3.063	2.703	1.875	1.717	1.411	1.887
1781-1800	1.575	1.176	2.556	1.350	1.119	1.884
1801-1820	4.550	4.000	1.467	2.083	1.685	1.889
	Historically popular operas: *Annals of Opera* (N=62)					
	All	Immigrants	Natives	All	Immigrants	Natives
1781-1820	0.363	0.175	0.042	0.121	0.052	0.161
1781-1800	0.125	0.029	0.111	0.083	0.020	0.269
1801-1820	0.600	0.300	0	0.158	0.083	0.083
	Long-lived operas: *Amazon* (N=42)					
	All	Immigrants	Natives	All	Immigrants	Natives
1781-1820	0.225	0.162	0.042	0.088	0.019	0.081
1781-1800	0.025	0.000	0	0.025	0.010	0.038
1801-1820	0.425	0.300	0.067	0.150	0.028	0.111

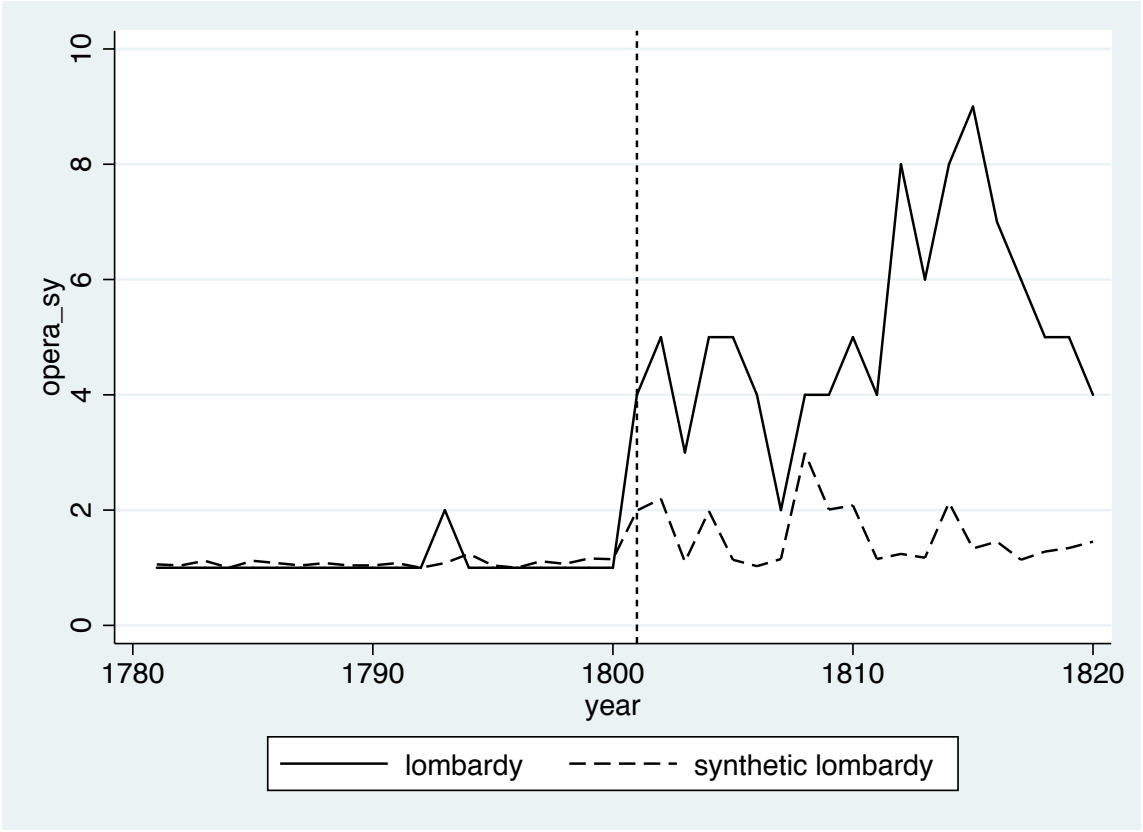
Notes: *Lombardy & Venetia* adopted copyright laws in 1801, after they had fallen under Napoleonic rule. *Other States* include Sardinia, Modena and Reggio, Parma and Piacenza, Tuscany, Papal States and Sicily. *Immigrants* are composers who were born in a different state than premiere's state. *Natives* are composers who were born in the state where the opera premiered. Data include 677 new operas that premiered between 1781 and 1820 within the year 1900 borders of Italy. *Historically popular operas* include 62 operas that premiered between 1781 and 1820 and are listed in Loewenberg's (1978) *Annals of Opera*, a compendium of notable performances between 1597 and 1940. *Long-lived operas* include 42 operas that premiered between 1781 and 1820 and were for sale on Amazon in March 2014.

TABLE A10 – CITY-LEVEL REGRESSIONS WITH INTERACTIONS FOR THEATERS' SEATS IN 1800
DEPENDENT VARIABLE IS NEW OPERAS PER CITY AND YEAR, 1781-1820

	(1)	(2)	(3)	(4)	(5)	(6)
	All Operas (1-2)		Historically popular operas *Annals of Opera* (3-4)		Long-lived operas *Amazon* (5-6)	
Lombardy & Venetia * post * 1,000 or more seats	1.826***	1.929***	0.269*	0.272*	0.241*	0.252*
	(0.302)	(0.297)	(0.142)	(0.143)	(0.141)	(0.142)
City FE	Yes	Yes	Yes	Yes	Yes	Yes
Year 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	0.017	0.017	0.007	0.007
N (year-city pair)	1,050	1,050	846	846	842	842
R-squared	0.631	0.632	0.282	0.282	0.337	0.338
Robust standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1						

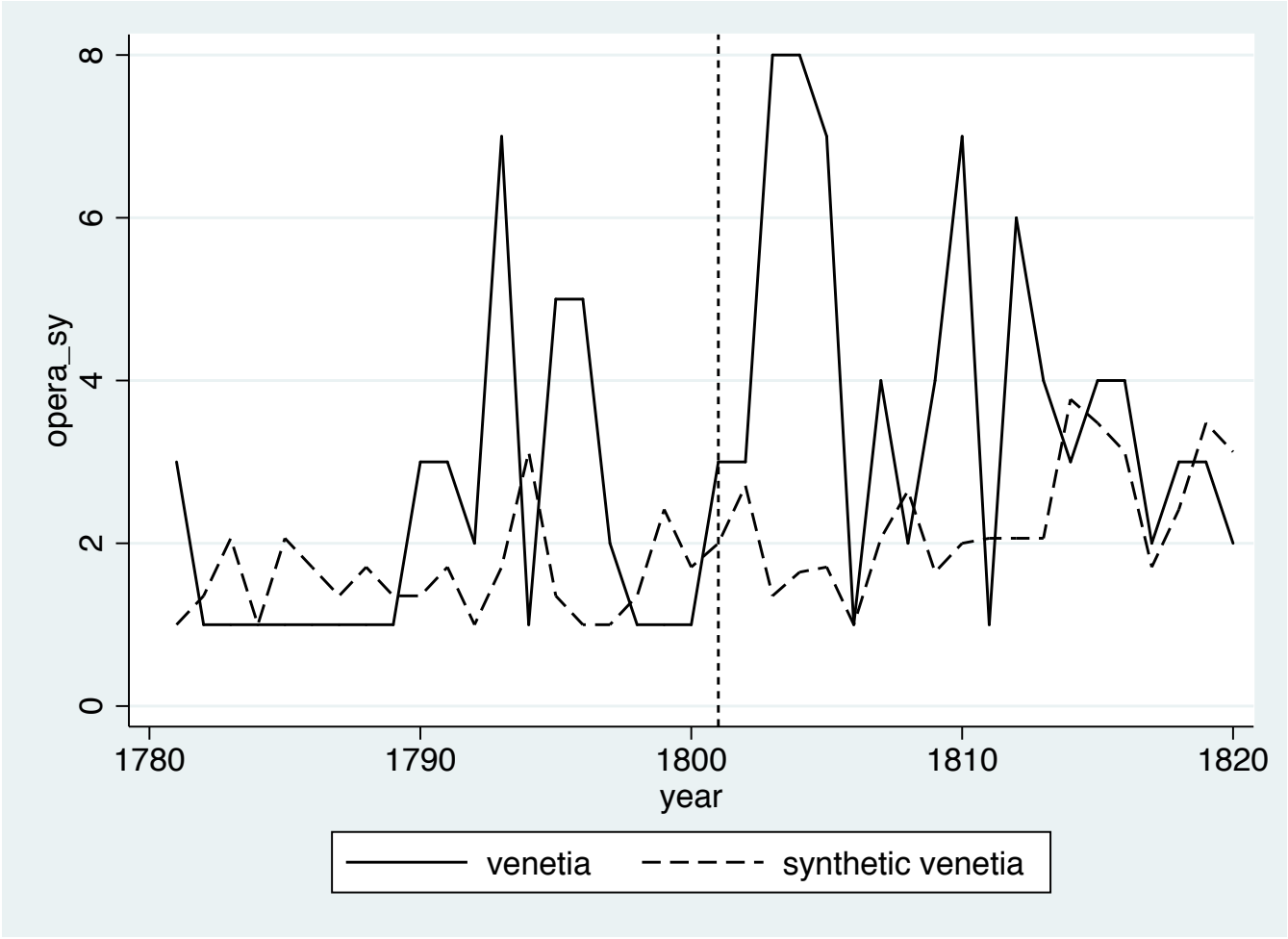
Notes: The dependent variable *new operas per year and city* measures of new operas created in city *i* and year *t* between 1781 and 1820 (columns 1-2). Columns (3-4) report results for *historically popular operas* in Loewenberg's (1978) *Annals of Operas*. Columns (5-6) report results for *long-lived operas* that were still for sale on Amazon in 2014. The indicator variable *Lombardy & Venetia* equals 1 for cities in Lombardy and Venetia, which adopted copyright laws in 1801. The indicator variable *post* equals 1 for years after 1800. The indicator variable *1,000 or more seats* equals 1 for city *i* if that city had 1,000 or more theaters' seats before 1801. *Pre-1801 mean* reports the average number new operas created per city and year until 1800. Data include 677 new operas created between 1781 and 1820 across eight Italian states within the year 1900 borders of Italy.

FIGURE A1 – SYNTHETIC CONTROL: NEW OPERAS PER STATE PER YEAR IN LOMBARDY



Notes: Number of new operas between 1781 and 1820 in Lombardy (Panel A) and Venetia (Panel B). Synthetic Lombardy and Venetia are obtained by using the method proposed by Abadie et al. (2012).

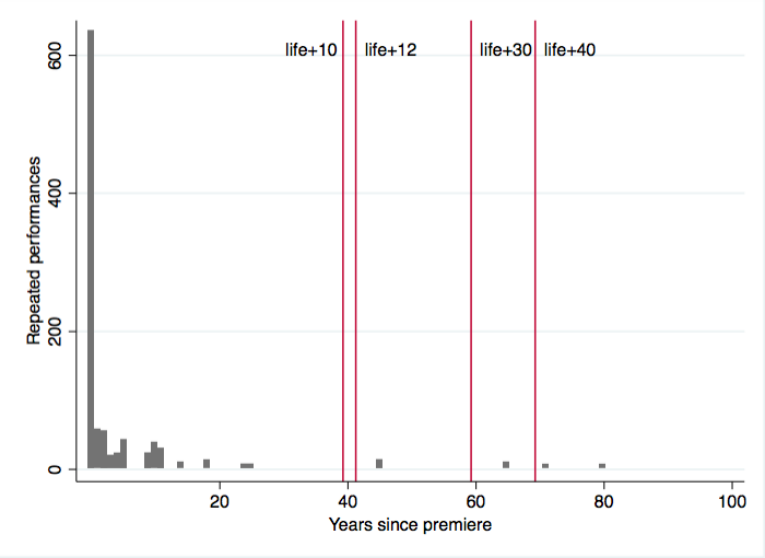
FIGURE A2 – SYNTHETIC CONTROL: NEW OPERAS PER STATE PER YEAR IN VENETIA



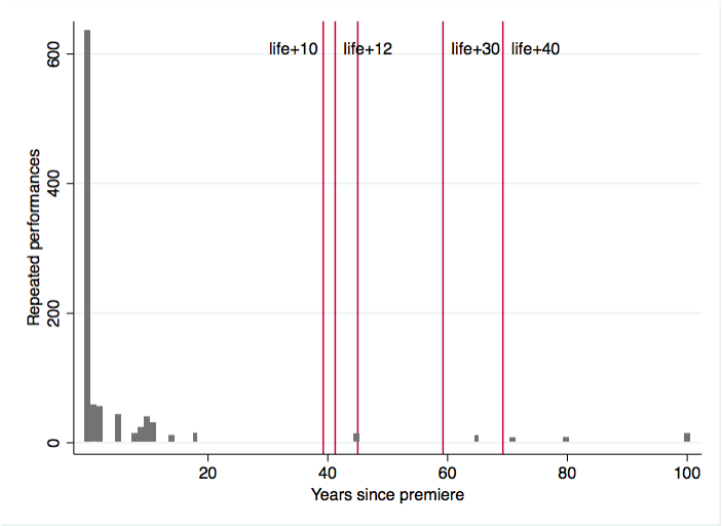
Notes: Number of new operas between 1781 and 1820 in Lombardy (Panel A) and Venetia (Panel B). Synthetic Lombardy and Venetia are obtained by using the method proposed by Abadie et al. (2012).

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

PANEL A: LOMBARDY AND VENETIA



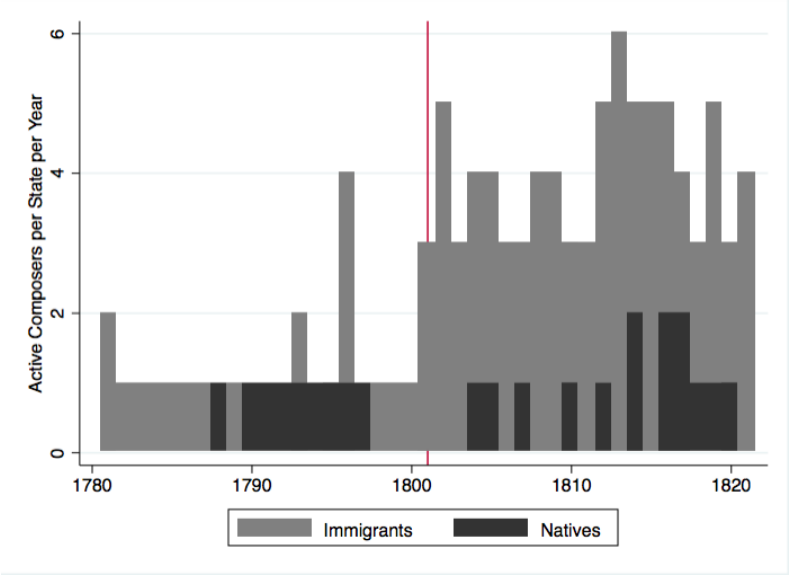
PANEL B: OTHER ITALIAN STATES



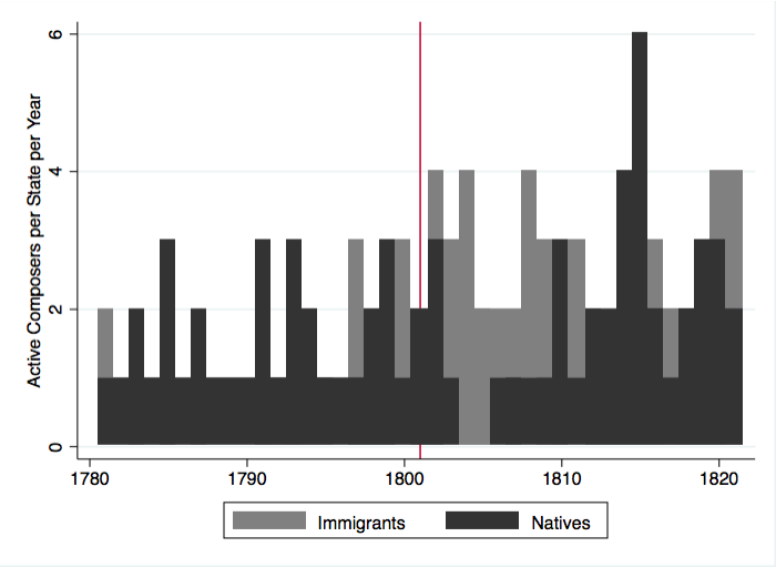
Notes: Performances per year for the first 100 years after the premiere for 165 operas that premiered between 1780 and 1800 (from Loewenberg 1978). Panel A includes performances in Lombardy and Venetia, which adopted copyright laws in 1801. Panel B includes performances in other states. Performances 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 operas 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 – ACTIVE COMPOSERS PER YEAR, IMMIGRANTS VS NATIVES, 1781-1820

PANEL A: LOMBARDY AND VENETIA



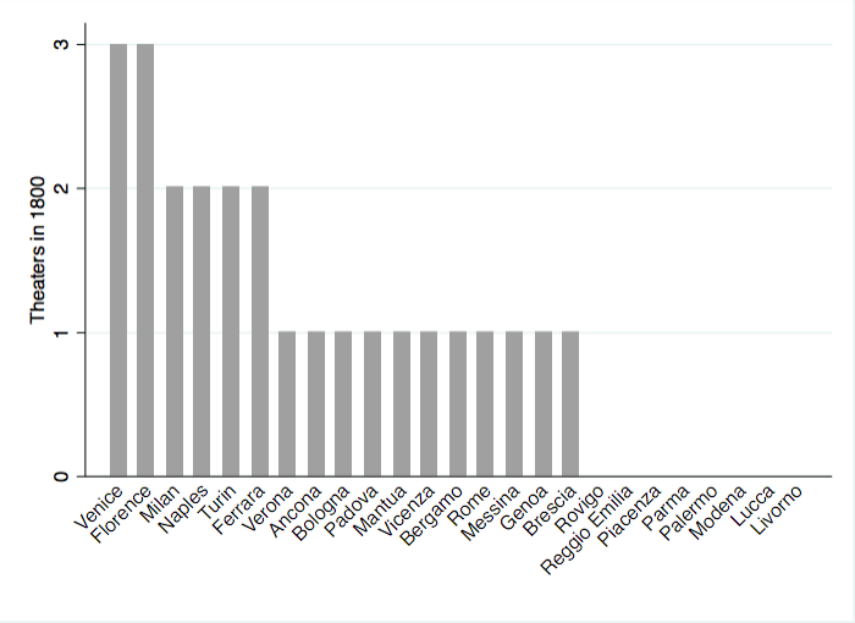
PANEL B: OTHER STATES



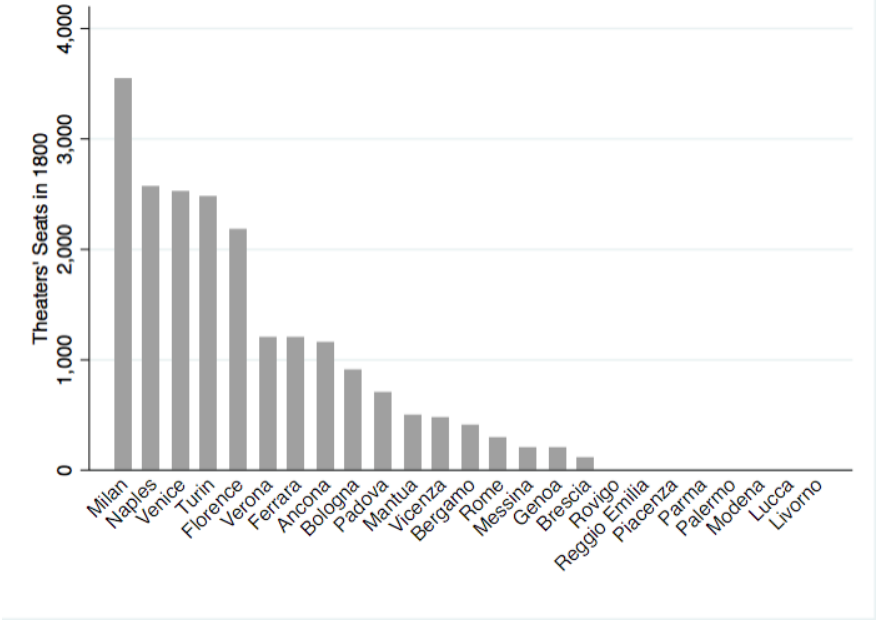
Notes: *Lombardy & Venetia* adopted copyright laws in 1801, after they had fallen under Napoleonic rule. *Other States* include Sardinia, Modena and Reggio, Parma and Piacenza, Tuscany, Papal States and Sicily. *Immigrants* are composers who were born in a different state than premiere's state. *Natives* are composers who were born in the state where the opera premiered. Data include 584 composers who were *active*, i.e. that premiered at least one opera between 1781 and 1820 within the year 1900 borders of Italy.

FIGURE A4 – 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 1781 and 1820. Data are from Ambiveri (1998), Dassori (1903), and Loewenberg (1978) and Antonini (2000).

TABLE A1 – ENFORCEMENT:
PERFORMANCES AFTER THE PREMIERE BY THE (ROW) STATE OF A PREMIERE AND THE (COLUMN) STATE OF A PERFORMANCE

PANEL A: 1781-1800

Performed in: / Premiered in:	Sardinia	Modena	Parma	Tuscany	Lombardy	Venetia	Rome	Sicily
Sardinia	0	0	0	0	0	0	0	0
Modena	0	0	0	0	0	0	0	0
Parma	4	0	0	0	2	3	0	5
Tuscany	0	0	0	1	0	2	2	4
Lombardy	0	0	0	0	0	0	0	0
Venetia	3	1	4	6	7	3	1	10
Rome	1	0	0	3	0	5	4	8
Sicily	6	7	0	4	0	2	5	11

PANEL B: 1801-1820

Performed in: / Premiered in:	Sardinia	Modena	Parma	Tuscany	Lombardy	Venetia	Rome	Sicily
Sardinia	2	0	0	4	0	0	2	4
Modena	0	0	0	0	0	0	0	0
Parma	0	0	0	0	0	0	0	0
Tuscany	0	0	0	0	0	0	0	0
Lombardy	0	0	0	1	0	0	2	1
Venetia	2	0	0	1	0	0	0	1
Rome	3	0	4	0	0	0	0	3
Sicily	2	0	5	0	0	0	2	4

Notes: Count of performances from Loewenberg (1978) for 62 operas that premiered in a row state between 1781 and 1820 and were performed at least once in the column state after the premiere. Cells with copyright protection are shaded: Operas that had premiered in Lombardy and Venetia after 1801 were under copyright in Lombardy and Venetia, but not in other states.

TABLE A2 – LIFE TABLES FOR COMPOSERS OF OPERAS

	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 composed 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 from Dassori (1903), Ambiveri (1998), and the *New Grove Dictionary of Music and Musicians* (2001).

TABLE A3 – OLS, DEPENDENT VARIABLE IS NEW OPERAS PER STATE AND YEAR, 1781-1820

	(1)	(2)	(3)	(4)
		OLS (1-4)		
Lombardy & Venetia *post	2.201***	2.147**	2.263***	2.430***
	(0.677)	(0.853)	(0.559)	(0.632)
Lombardy & Venetia		0.320		
		(0.488)		
State FE	Yes	No	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
Linear pre-trend for Lombardy & Venetia	No	No	Yes	No
State-specific linear pre-trend	No	No	No	Yes
Pre-1801 mean	1.406	1.406	1.406	1.406
N (year-state pair)	320	320	320	320
R-squared	0.800	0.726	0.800	0.819

Standard errors clustered at the state level for pre- and post-copyright period in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Notes: The dependent variable *new operas per state and year* measures the number of new operas in state *i* and year *t* between 1781 and 1820. The indicator variable *Lombardy & Venetia* equals 1 for Lombardy and Venetia, which adopted copyright laws in 1801. The indicator variable *post* equals 1 for years after 1800. *Pre-1801 mean* reports the average number of new operas per state and year until 1800. State fixed effects control for variation in opera output that is constant over time. Year fixed effects control for variation over time that is shared across states. Columns (1-4) are estimated using OLS; column (5) reports the average treatment effect (ATE) of a quasi-maximum likelihood Poisson regression with conditional fixed effects. Data include 677 new operas created between 1781 and 1820 across eight Italian states within the year 1900 borders of Italy.

TABLE A4 – OLS WITH ALTERNATIVE MEASURES FOR HIGH-QUALITY OPERAS, 1781-1820

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Historically popular operas (1-4) *Annals of Operas*				Long-lived operas (5-8) *Amazon*			
	Number (1-2)		Share (3-4)		Number (5-6)		Share (7-8)	
Lombardy & Venetia * post	0.407***	0.401***	0.104**	0.101*	0.280**	0.275**	0.069**	0.067
	(0.152)	(0.153)	(0.026)	(0.048)	(0.129)	(0.130)	(0.023)	(0.043)
Lombardy & Venetia		0.041		-0.015		-0.000		-0.014
		(0.067)		(0.041)		(0.028)		(0.013)
State FE	Yes	No	Yes	No	Yes	No	Yes	No
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Linear pre-trend for Lombardy & Venetia	No	No	No	No	No	No	No	No
State-specific linear pre-trend	No	No	No	No	No	No	No	No
Pre-1801 mean	0.094	0.094	0.055	0.055	0.025	0.025	0.051	0.051
N (year-state pair)	320	320	320	320	320	320	320	320
R-squared	0.342	0.297	0.245	0.217	0.360	0.299	0.297	0.224

Standard errors clustered at the state level for pre- and post-copyright period in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Notes: The dependent variables are *new operas per state and year* that measures new operas created in state *i* and year *t* between 1781 and 1820 in columns 1-2 and 5-6 and the *share of new operas per state and year* in columns 3-4 and 7-8. State borders are defined by the year 1900 borders of Italy. Columns (1-4) report results for *historically popular operas* in Loewenberg's (1978) *Annals of Operas*. Columns (5-8) report results for *long-lived operas* that were still for sale on Amazon in 2014. The indicator variable *Lombardy & Venetia* equals 1 for Lombardy and Venetia, which adopted copyright laws in 1801. The indicator variable *post* equals 1 for years after 1800. *Pre-1801 mean* reports the average 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 control for variation over time that is shared across states. Columns (1-4) estimate OLS regressions for operas created between 1781 and 1820 and entered Loewenberg's (1978) *Annals of Operas*, a compendium of notable performances; columns (6-10) estimate OLS regressions for operas created between 1781 and 1820 and were available as complete recordings on Amazon in 2014.

TABLE A5 – CONTROLLING FOR LINEAR PRE-TRENDS, OLS WITH ALTERNATIVE MEASURES FOR HIGH-QUALITY OPERAS, 1781-1820

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Historically popular operas (1-4) *Annals of Operas*				Long-lived operas (5-8) *Amazon*			
	Number (1-2)		Share (3-4)		Number (5-6)		Share (7-8)	
Lombardy & Venetia * post	0.462***	0.436***	0.055	0.042	0.301**	0.283**	0.051	0.045
	(0.153)	(0.156)	(0.057)	(0.058)	(0.131)	(0.134)	(0.032	(0.033)
State FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Linear pre-trend for Lombardy & Venetia	Yes	No	Yes	No	Yes	No	Yes	No
State-specific linear pre-trend	No	Yes	No	Yes	No	Yes	No	Yes
Pre-1801 mean	0.094	0.094	0.094	0.094	0.025	0.025	0.025	0.025
N (year-state pair)	320	320	320	320	320	320	320	320
R-squared	0.342	0.297	0.343	0.360	0.360	0.299	0.360	0.373
Robust standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1								

Notes: The dependent variables are *new operas per state and year* that measures new operas created in state *i* and year *t* between 1781 and 1820 in columns 1-2 and 5-6 and the *share of new operas per state and year* in columns 3-4 and 7-8. State borders are defined by the year 1900 borders of Italy. Columns (1-4) report results for *historically popular operas* in Loewenberg's (1978) *Annals of Operas*. Columns (5-8) report results for *long-lived operas* that were still for sale on Amazon in 2014. The indicator variable *Lombardy & Venetia* equals 1 for Lombardy and Venetia, which adopted copyright laws in 1801. The indicator variable *post* equals 1 for years after 1800. *Pre-1801 mean* reports the average 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 control for variation over time that is shared across states. Columns (1-4) estimate OLS regressions for operas created between 1781 and 1820 and entered Loewenberg's (1978) *Annals of Operas*, a compendium of notable performances; columns (6-10) estimate OLS regressions for operas created between 1781 and 1820 and were available as complete recordings on Amazon in 2014.

TABLE A6 –OLS AND QML POISSON REGRESSIONS WITH COUNTS OF REPEAT PERFORMANCES
DEPENDENT VARIABLE IS NUMBER OF REPEAT PERFORMANCES 1781-1820

	(1)	(2)	(3)	(4)	(5)	(6)
	Total Count of Repeat Performances (1-3)			Repeat Performances in the Year of the Premiere (4-6)		
	OLS (1-2)		Poisson ATE (3)	OLS (4-5)	Poisson ATE (6)	
Lombardy & Venetia * post	0.933**	1.110**	2.661***	9.577***	9.122**	1.715***
	(0.439)	(0.457)	(0.000)	(2.181)	(2.358)	(0.000)
State FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Pre-1801 mean	1.54	1.54	1.54	2.69	2.69	2.69
N (year-state pair)	320	320	320	320	320	320
R-squared	0.888	0.852		0.990	0.988	

Notes: The dependent variables are *total count of repeat performances* that measures the number of repeated performance of new operas normalized by the number of year left in our sample; and *repeat performance in the year of the premiere* that measures the number of repeat performance in the premiere year. Columns 1-2-4-5 report the OLS estimations, columns 3 and 6 the QML Poisson estimations. *Pre-1801 mean* reports the average number of the dependent variable before 1801.

TABLE A7 – OLS AND QML POISSON REGRESSIONS DE-TRENDING THE DEPENDENT VARIABLE, NEW OPERAS PER STATE AND YEAR, 1781-1820

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	All Operas (1-3)			Historically popular operas (4-5) *Annals of Operas*		Long-lived operas (6-7) *Amazon*	
	OLS (1-2)		Poisson ATE (3)	OLS (4-5)		OLS (6-7)	
Lombardy & Venetia * post	2.201***	2.147***	1.061***	0.407***	0.401***	0.280**	0.275**
	(0.378)	(0.399)	(0.299)	(0.152)	(0.146)	(0.126)	(0.127)
Lombardy & Venetia		0.320			0.041		-0.000
		(0.194)			(0.050)		(0.023)
State FE	Yes	No	Yes	Yes	No	Yes	No
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Linear pre-trend for Lombardy & Venetia	No	No	No	No	No	No	No
State-specific linear pre-trend	No	No	No	No	No	No	No
Pre-1801 mean	1.406	1.406	1.406	0.094	0.094	0.025	0.025
N (year-state pair)	320	320	320	320	320	320	320
R-squared	0.809	0.734		0.342	0.307	0.365	0.303

Standard errors clustered at the state level for pre- and post-copyright period in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Notes: The dependent variable *new operas per state and year* measures new operas created in city *i* and year *t* between 1781 and 1820 and is de-trended by a linear pre-trend for Lombardy and Venetia, calculated on the pre-1801 data. Columns (4-5) report results for *historically popular operas* in Loewenberg's (1978) *Annals of Operas*. Columns (6-7) report results for *long-lived operas* that were still for sale on Amazon in 2014. *Pre-copyright mean* reports the mean of the dependent variable – new operas per state and year – for year-state pairs *without* copyrights. Specifications (1-2) and (4-7) estimate OLS regressions; specification (3) estimates the average treatment effect (ATE) of the conditional fixed effects quasi-maximum likelihood Poisson regression. Data include 677 new operas created between 1781 and 1820 across eight Italian states within the year 1900 borders of Italy.

TABLE A8 – LENGTH OF COPYRIGHT AND COUNTS OF NEW OPERAS CREATED PER STATE AND YEAR, 1770-1900

	1770-1800	1801-1825	1826-1827	1828-1839	1840-1864	1865-1869	1870-1900
Sardinia	no copyright 0.45 operas	no copyright 1.52 operas	no copyright 1.00 operas	no copyright 2.50 operas	life+30y 2.96 operas	life+40y 2.80 operas	life+40y 4.06 operas
Modena	no copyright 0.03 operas	no copyright 0.20 operas	no copyright 2.00 operas	no copyright 0.33 operas	life+30y 0.48 operas	life+40y 0.00 operas	life+40y 0.48 operas
Parma	no copyright 0.23 operas	no copyright 0.28 operas	no copyright 0.00 operas	no copyright 0.42 operas	life+30y 0.36 operas	life+40y 0.60 operas	life+40y 0.45 operas
Tuscany	no copyright 0.19 operas	no copyright 0.92 operas	no copyright 2.00 operas	no copyright 2.58 operas	life+30y 2.08 operas	life+40y 2.40 operas	life+40y 2.71 operas
Lombardy	no copyright 0.23 operas	life+10y 5.04 operas	life+10y 6.00 operas	life+10y 6.17 operas	life+30y 4.96 operas	life+40y 5.60 operas	life+40y 5.03 operas
Venetia	no copyright 1.16 operas	life+10y 3.44 operas	life+10y 2.00 operas	life+10y 2.92 operas	life+30y 2.52 operas	life+40y 0.60 operas	life+40y 1.77 operas
Papal State	no copyright 0.65 operas	no copyright 3.4 operas	life+12y 3.00 operas	life+12y 1.91 operas	life+30y 2.60 operas	life+30y 3.20 operas	life+40y 3.65 operas
Sicily	no copyright 2.06 operas	no copyright 4.60 operas	no copyright 12.00 operas	life+30 17.08 operas	life+30y 9.28 operas	life+40y 4.80 operas	life+40y 4.55 operas

Notes: The variable *new operas per state and year* is the average number of operas premiered in state *i.* (columns) between year t and year *t+r* (rows). *No copyright* indicates that state *i* did not offer copyrights protection in that time period. *Life +10, 30, or 40* indicate that state *i* offers exclusive rights in an opera for the duration of a composer's life plus 10, 30, or 40 years after his death. For example, on average 1.16 operas were premiered in Venetia between 1770 and 1800, when the state offered no copyrights protection.

TABLE A9 – NEW OPERAS PER STATE AND YEAR, IMMIGRANTS VS NATIVES, 1781-1820

	LOMBARDY & VENETIA			OTHER STATES		
	All Operas (N=677)					
	All	Immigrants	Natives	All	Immigrants	Natives
1781-1820	3.063	2.703	1.875	1.717	1.411	1.887
1781-1800	1.575	1.176	2.556	1.350	1.119	1.884
1801-1820	4.550	4.000	1.467	2.083	1.685	1.889
	Historically popular operas: *Annals of Opera* (N=62)					
	All	Immigrants	Natives	All	Immigrants	Natives
1781-1820	0.363	0.175	0.042	0.121	0.052	0.161
1781-1800	0.125	0.029	0.111	0.083	0.020	0.269
1801-1820	0.600	0.300	0	0.158	0.083	0.083
	Long-lived operas: *Amazon* (N=42)					
	All	Immigrants	Natives	All	Immigrants	Natives
1781-1820	0.225	0.162	0.042	0.088	0.019	0.081
1781-1800	0.025	0.000	0	0.025	0.010	0.038
1801-1820	0.425	0.300	0.067	0.150	0.028	0.111

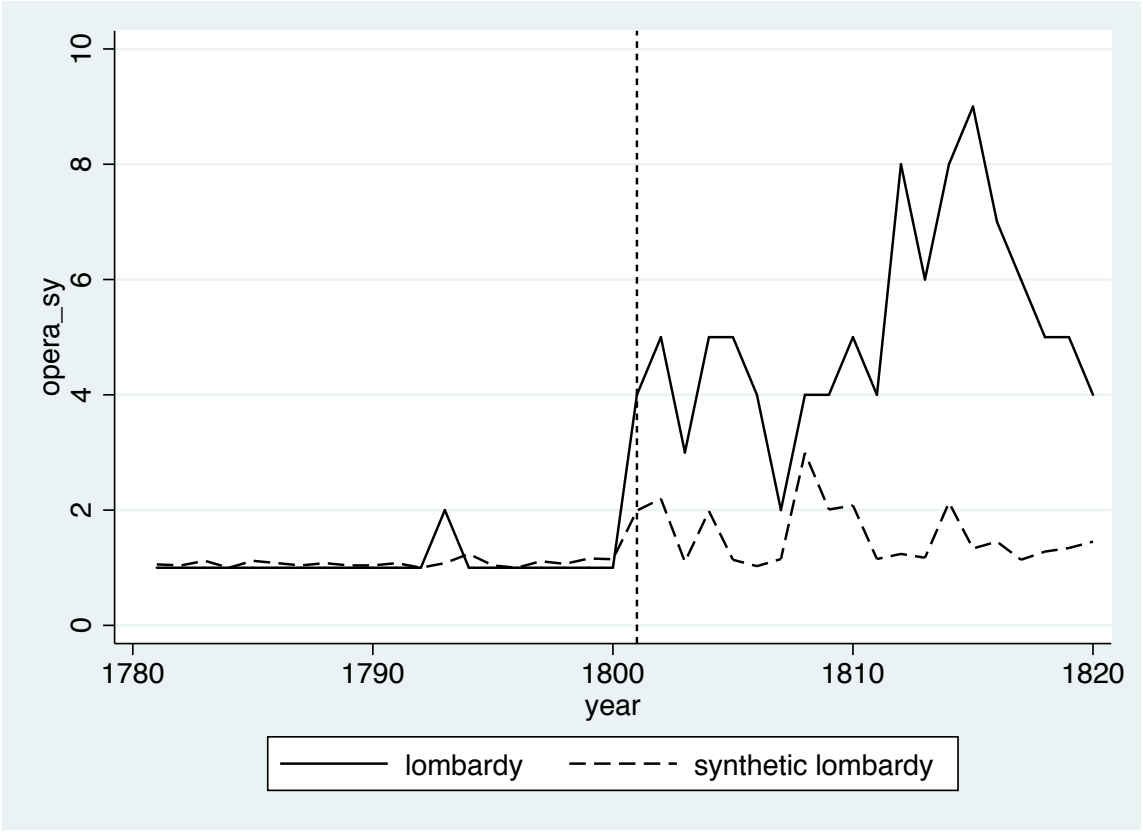
Notes: *Lombardy & Venetia* adopted copyright laws in 1801, after they had fallen under Napoleonic rule. *Other States* include Sardinia, Modena and Reggio, Parma and Piacenza, Tuscany, Papal States and Sicily. *Immigrants* are composers who were born in a different state than premiere's state. *Natives* are composers who were born in the state where the opera premiered. Data include 677 new operas that premiered between 1781 and 1820 within the year 1900 borders of Italy. *Historically popular operas* include 62 operas that premiered between 1781 and 1820 and are listed in Loewenberg's (1978) *Annals of Opera*, a compendium of notable performances between 1597 and 1940. *Long-lived operas* include 42 operas that premiered between 1781 and 1820 and were for sale on Amazon in March 2014.

TABLE A10 – CITY-LEVEL REGRESSIONS WITH INTERACTIONS FOR THEATERS' SEATS IN 1800
DEPENDENT VARIABLE IS NEW OPERAS PER CITY AND YEAR, 1781-1820

	(1)	(2)	(3)	(4)	(5)	(6)
	All Operas (1-2)		Historically popular operas *Annals of Opera* (3-4)		Long-lived operas *Amazon* (5-6)	
Lombardy & Venetia * post * 1,000 or more seats	1.826***	1.929***	0.269*	0.272*	0.241*	0.252*
	(0.302)	(0.297)	(0.142)	(0.143)	(0.141)	(0.142)
City FE	Yes	Yes	Yes	Yes	Yes	Yes
Year 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	0.017	0.017	0.007	0.007
N (year-city pair)	1,050	1,050	846	846	842	842
R-squared	0.631	0.632	0.282	0.282	0.337	0.338
Robust standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1						

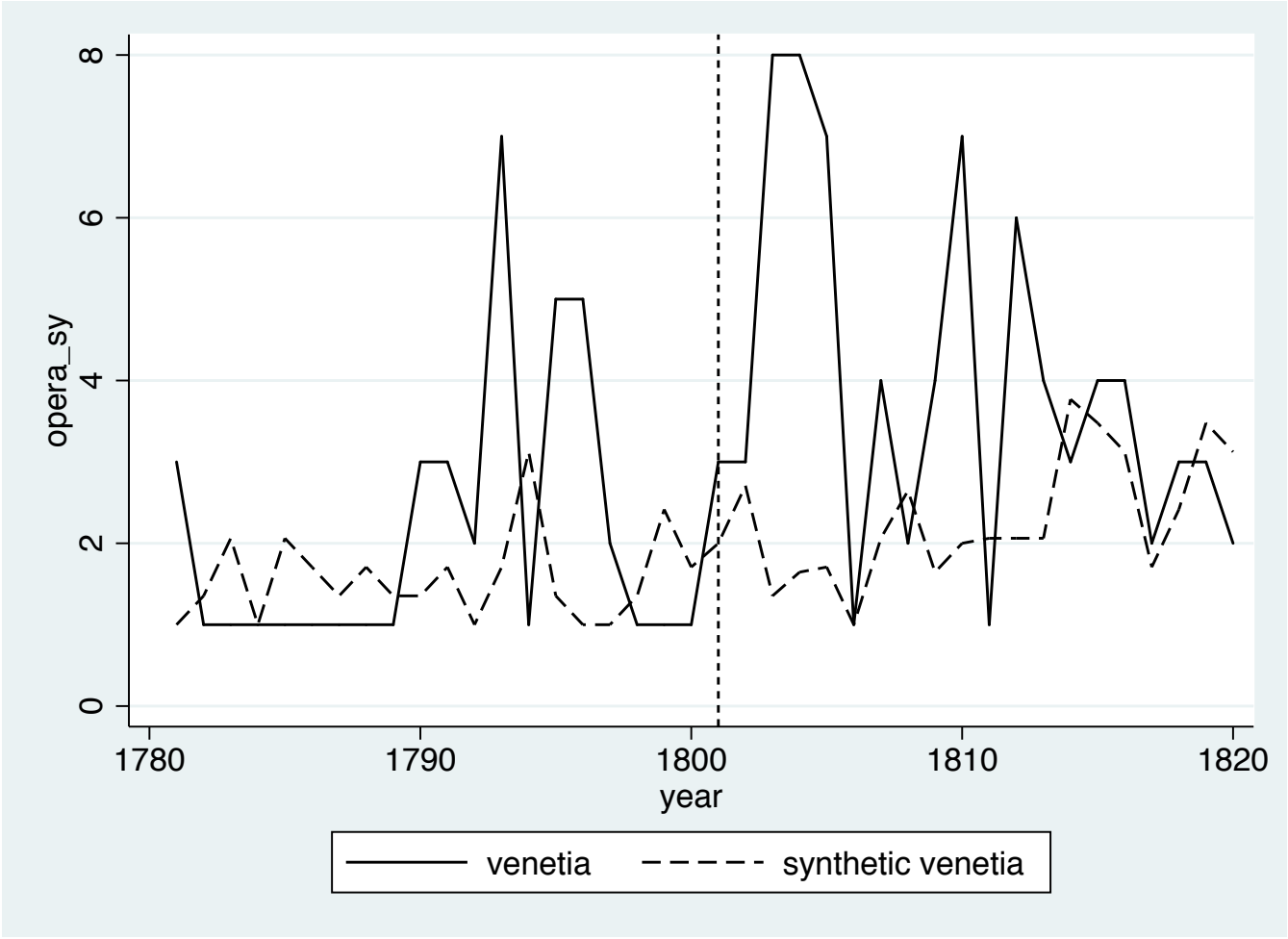
Notes: The dependent variable *new operas per year and city* measures of new operas created in city *i* and year *t* between 1781 and 1820 (columns 1-2). Columns (3-4) report results for *historically popular operas* in Loewenberg's (1978) *Annals of Operas*. Columns (5-6) report results for *long-lived operas* that were still for sale on Amazon in 2014. The indicator variable *Lombardy & Venetia* equals 1 for cities in Lombardy and Venetia, which adopted copyright laws in 1801. The indicator variable *post* equals 1 for years after 1800. The indicator variable *1,000 or more seats* equals 1 for city *i* if that city had 1,000 or more theaters' seats before 1801. *Pre-1801 mean* reports the average number new operas created per city and year until 1800. Data include 677 new operas created between 1781 and 1820 across eight Italian states within the year 1900 borders of Italy.

FIGURE A1 – SYNTHETIC CONTROL: NEW OPERAS PER STATE PER YEAR IN LOMBARDY



Notes: Number of new operas between 1781 and 1820 in Lombardy (Panel A) and Venetia (Panel B). Synthetic Lombardy and Venetia are obtained by using the method proposed by Abadie et al. (2012).

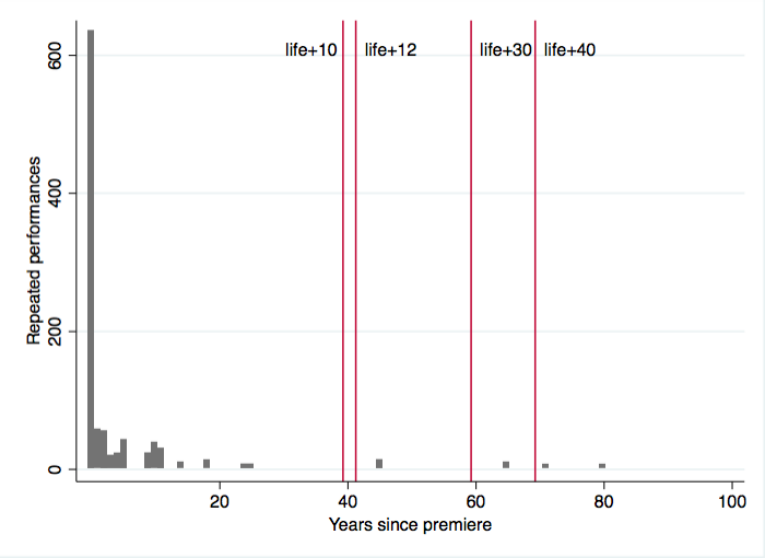
FIGURE A2 – SYNTHETIC CONTROL: NEW OPERAS PER STATE PER YEAR IN VENETIA



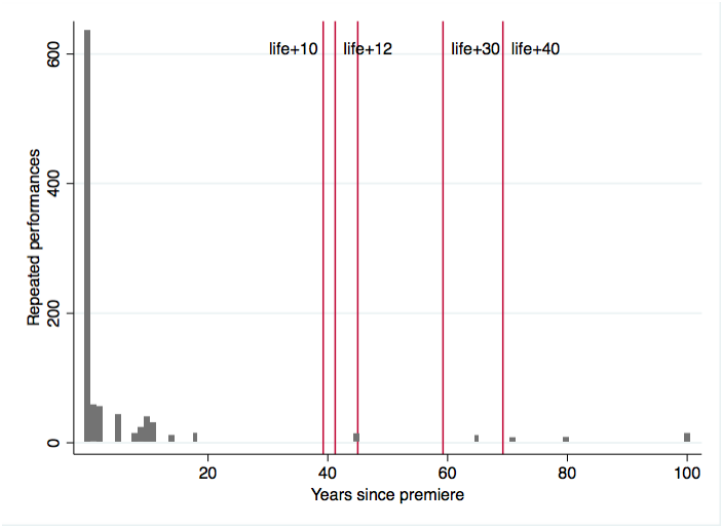
Notes: Number of new operas between 1781 and 1820 in Lombardy (Panel A) and Venetia (Panel B). Synthetic Lombardy and Venetia are obtained by using the method proposed by Abadie et al. (2012).

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

PANEL A: LOMBARDY AND VENETIA



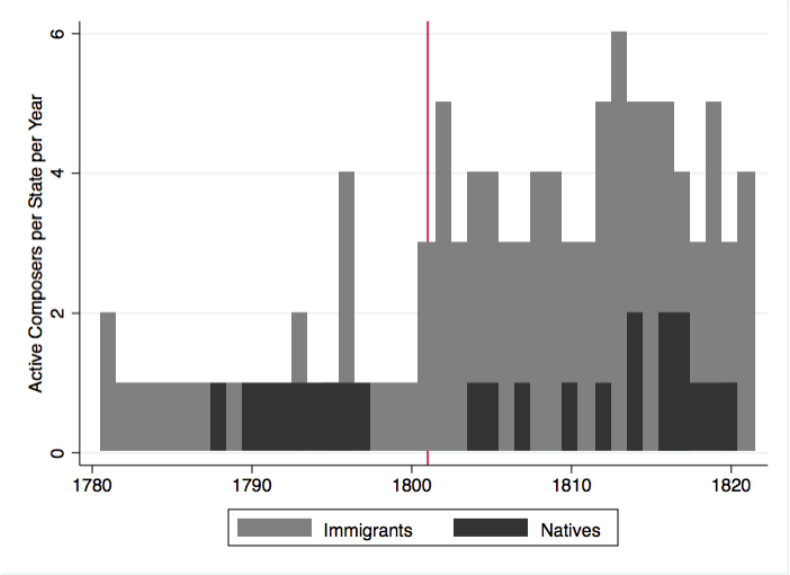
PANEL B: OTHER ITALIAN STATES



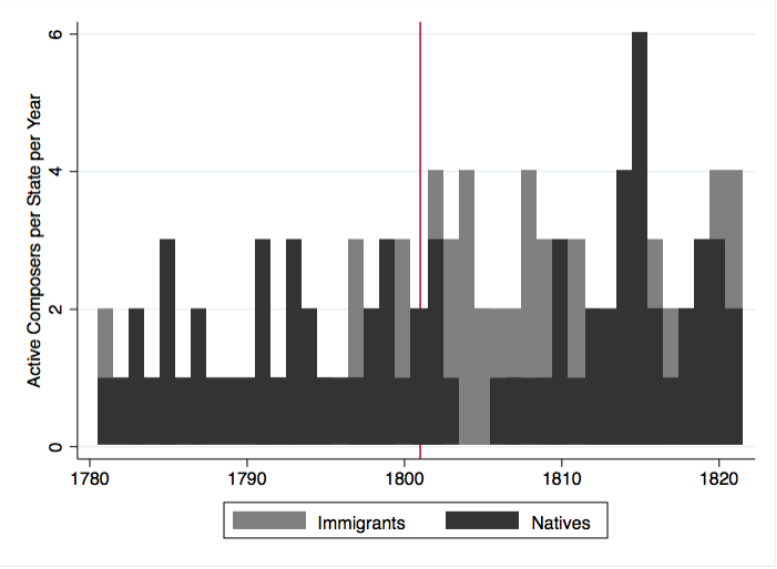
Notes: Performances per year for the first 100 years after the premiere for 165 operas that premiered between 1780 and 1800 (from Loewenberg 1978). Panel A includes performances in Lombardy and Venetia, which adopted copyright laws in 1801. Panel B includes performances in other states. Performances 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 operas 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 – ACTIVE COMPOSERS PER YEAR, IMMIGRANTS VS NATIVES, 1781-1820

PANEL A: LOMBARDY AND VENETIA



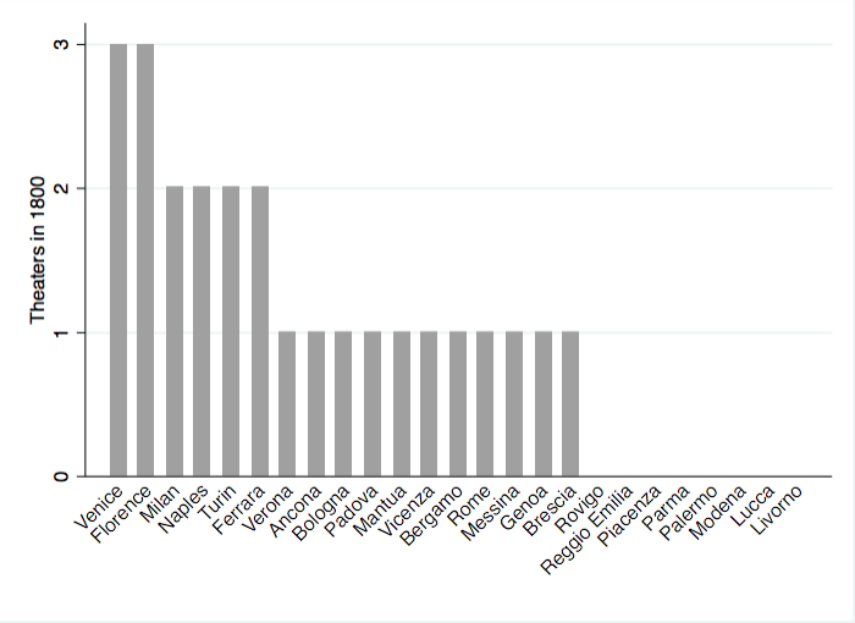
PANEL B: OTHER STATES



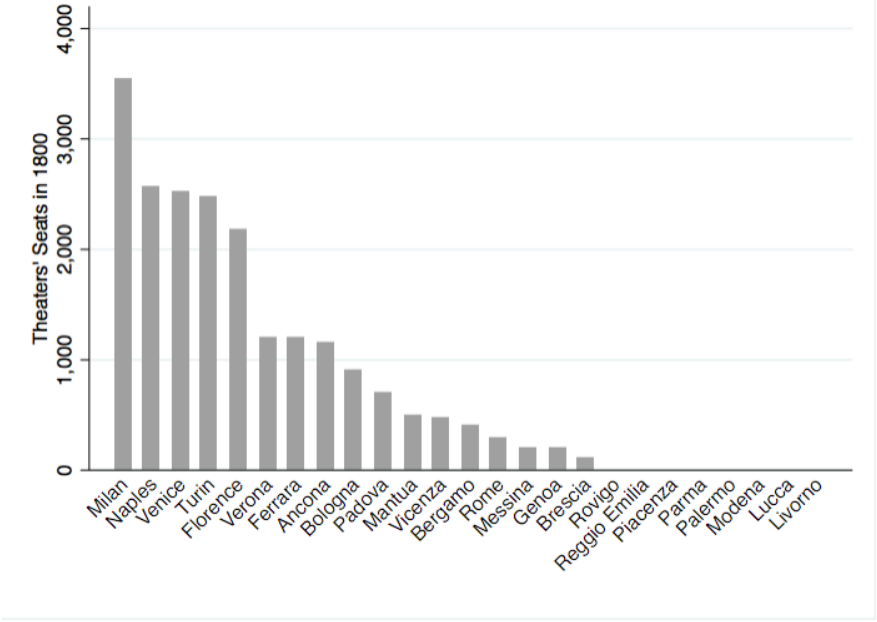
Notes: *Lombardy & Venetia* adopted copyright laws in 1801, after they had fallen under Napoleonic rule. *Other States* include Sardinia, Modena and Reggio, Parma and Piacenza, Tuscany, Papal States and Sicily. *Immigrants* are composers who were born in a different state than premiere's state. *Natives* are composers who were born in the state where the opera premiered. Data include 584 composers who were *active*, i.e. that premiered at least one opera between 1781 and 1820 within the year 1900 borders of Italy.

FIGURE A4 – 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 1781 and 1820. Data are from Ambiveri (1998), Dassori (1903), and Loewenberg (1978) and Antonini (2000).