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Essays on Classical Composers' Productivity, Migration and War

Karol Jan Borowiecki

Supervisor: John O'Hagan

Thesis Submitted to Trinity College Dublin

In fulfilment of the requirements for the degree of Doctor of Philosophy (Ph.D.)

June 2011

DECLARATION

I hereby declare that this thesis has not been submitted as an exercise for a degree at this or any other university. It represents entirely my own work. I agree that the library may lend or copy this thesis upon request.

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30th June 2011

To my sister Emilia.

Twoje imię zasługuje

zawsze na pierwsze miejsce.

Summary

This thesis is based on a unique data set that contains records for prominent classical composers. The novelty of these data allows for the overcoming of methodological challenges of previous studies as well as data limitation issues of mainstream research. Therefore, the investigations and findings presented in this thesis it is hoped contribute new insights to several fields in economics. In particular, this thesis contains the first investigation of the causal relationship between geographic clustering and productivity of composers. It further illuminates how war impacts on the number of composers located in a country or their probability to emigrate during war. Finally, an exploration of the influence of war on creative production is conducted.

Methodological issues that lie at the core of urban and productivity economics literature are addressed in Chapter 2. Previous research has not adequately estimated the impact of geographic clustering on productivity because of endogeneity, omitted variable and heterogeneity issues. Building on the composer data set allows the employment of an exogeneous and individual-level instrumental variable – the distance between composers' birthplace and a geographic cluster – in order to model the incidence of clustering. Based on composers born between 1750 and 1899, the findings indicate that as a result of the positive externalities associated with geographic clusters, composers were up to 33 per cent more productive and have composed approximately one additional work every four years. It is further established that top composers and composers who migrated to the cluster are the greatest beneficiaries of clustering. Finally, the results imply that the benefit increases with the clustering intensity and that the presence of other composers, as opposed to availability of better location specific amenities, such as cultural infrastructure, was the most important determinant of the associated productivity gains.

Geographic clusters have often shifted over the last centuries and academics, who try to explain such dynamics, have frequently argued that wars might have been an important determinant for geographic shifts of hub locations. The hypothesis posited is investigated in the following part of this thesis, in particular a study on the influence of war on geographic concentration and migration intensity of classical composers is provided. In Chapter 3 it is explored whether, and to what extent, the incidence of war affects the migration intensity of 164 prominent classical composers born after 1800. For

this purpose the aggregate stock of composers in a country is modelled. The results indicate the existence of a negative relationship between the incidence of war and the number of artists located in a country. The incidence of international non-colonial wars result in a decrease of roughly seven per cent and the occurrence of intra-state wars leads to a drop of the composer stock of around eleven per cent. In a rough comparison framework with the total population, the results imply that composers were markedly more likely to be forced into conflict-related emigration than an average citizen of a country. The findings indicate that the share of composers in the overall population drops due to the incidence of war. Finally, the results suggest a markedly persistent, large and negative impact of composers' war-related outmigration on a country's creative potential in the long run.

Chapter 4 provides a continuation of this investigation and exploits further the unique individual-level feature of the data set. This approach is particularly meaningful as research on micro-motivations and incentives of forced migrants is mostly out of scope. Individual-level data on forced migrants is not available, because it is not feasible or secure to, for example, conduct representative surveys on migrants in regions where war takes place. Therefore, the investigation presented provides new, in a sense pioneering, insights on the decision-making process of the conflict-induced migrant, the associated dynamics of conflict-induced migration and the determinants of choice of a destination country. The main results are consistent with the findings presented in the previous chapter: the incidence of inter-state wars increases composers' probability to emigrate by around seven per cent and the incidence of intra-state wars by up to nineteen per cent. The results further imply that conflict impacts the migration intensity with a lag of approximately one year and that the choice of a destination country in times of war is suboptimal from the perspective of composers' career.

A related question concerns the impact of war on creative production. It is an especially intriguing issue as the relationship between conflict and artistic output is ambiguous. In Chapter 5 an explanation for the contradiction of previous research, which is termed as the war-art puzzle, is proposed. For a global sample of 115 prominent classical composers born after 1800, their annual productivity is linked with the incidence of wars. The methodology consists on comparison of age-productivity profiles that are constructed for times of peace and during certain types of war. The results

visualise that composers' output is significantly higher during defensive, or not lost inter-state conflicts and that it is significantly lower during civil wars or offensive international wars, than in times of peace.

Acknowledgements

'Music is at once the product of feeling and knowledge, for it requires from its disciples, composers and performers alike, not only talent and enthusiasm, but also that knowledge and perception which are the result of protracted study and reflection.' Alban Berg (1885-1935)

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Contents

CHAPTER 1

Introduction

1. Introduction

1.1 Opening note

With a rising number of economists and increasing research intensity in economics, it becomes gradually more difficult for a young economist to conduct an empirical study with a meaningful contribution based on conventional data sets. This dissertation is a selection of four innovative papers that are based on a unique database. Using new data enables contributing interesting insights on 'old topics' or addressing problematic issues that were not tackled appropriately in previous research.[1] The papers encompassed by this dissertation contribute to various fields in economics, ranging from economic history, through cultural economics, productivity economics, economics of migration, conflict economics to urban economics.

The research is based on a sample of prominent classical composers, as identified by Murray (2003). The data set employed covers composers' life-time migration patterns and is extracted from large music dictionaries. The emerging data set records the exact location where each composer was in every year of his life.[2] This data have been introduced and described by O'Hagan and Borowiecki in an article published in 2010 in the *Journal of Historical Methods*. The authors outline in a systematic way the birth locations and migration patterns of 522 prominent composers and provide a detailed investigation of migration and clustering patterns for composers born between 1750 and 1899. The results indicate a remarkable clustering intensity of the creative individuals covered and the authors try to explain the emerging picture. O'Hagan and Borowiecki use qualitative arguments, based on economic theory and anecdotal evidence, in order to propose that composers might have benefited from positive externalities associated with geographic clusters. Similar arguments were already presented in previous studies on the clustering of visual artists (Kelly and O'Hagan, 2007, O'Hagan and Hellmanzik, 2008). The relevant literature nevertheless lacks empirical evidence for the existence of positive externalities in creative clusters. Of even greater importance is the overall lack of

[1] This economic research is certainly not the first that employs unusual data sets. Mostly renowned for unconventional economic research, sometimes tagged as freakonomics, is probably Steven Levitt. Duggan and Levitt (2002), for example, employ data from sumo wrestling and analyze the existence of corruption, or Chiappori, Levitt and Groseclose (2002) test the game theoretical idea of mixed strategies based on penalty kicks in soccer.

[2] As the database encompasses only male composers, we use the male form. With each further reference to composers we mean *prominent* composers who are in the focus of my studies.

knowledge on the benefits associated with locating of individuals or firms in hub locations. It is well established that the best are located in locations with a high concentration of alike agents and that in such locations workers earn more (e.g. Glaeser and Mare, 2001), firms perform better (e.g. Nickell, 1996) and visual artists peak earlier (Hellmanzik, 2010). Nonetheless, the causality is unclear. Are geographic clusters attracting the best agent or are individuals and firms who cluster the best because of positive externalities associated with cluster locations? Despite the importance of this issue for the agents involved, as well as for policy makers, knowledge on causality between geographic clustering and productivity is still very limited. Therefore, in this dissertation I try to fill the gap and provide an extensive exploration of the presence and magnitude of a location benefit for classical composers, with a particular focus on the causal relationship.

The clustering benefit hypothesis is investigated in Chapter 2, where an analysis of the causal impact of locating in a geographic cluster on composers' artistic productivity is provided. Composers' productivity is primarily measured by the number of important compositions written in a given year as listed in Gilder and Port (1978) – a recognized survey of important classical compositions. In an extension to this study an investigation of composers' lifetime music-related achievements, measured with an index score for each composer introduced by Murray (2001), is conducted. In order to estimate the causal impact of geographic clustering on productivity, exogenous birthplace-cluster distance is used as an instrumental variable for the incidence of clustering.[3] In order to ensure the validity of the proposed instrument, the study focuses on classical composers born between 1750 and 1899, when travelling was becoming possible, due to inventions mostly associated with the industrial revolution, however still relatively difficult and expensive in terms of time and cost, and therefore, distance mattered. The instrumental variable method makes it credible to assert that the association between clustering and productivity is a causal relationship rather than simply a correlation. Furthermore, as it is unique for each individual it becomes possible to also control for composers' heterogeneity and hence overcome identification

[3] A recent article in The Economist (2009) states: 'Travel used to be exotic; now it is commonplace. In a globalised environment it is possible to be a world-class artist anywhere on the planet, and many of the most exciting artists will be working from places that previously were not even on the art map.' With a focus of my analysis on a historical time period, when travelling was 'exotic', we can propose an innovative and valid instrumental variable identification strategy. See the paper for further details.

problems of the mainstream urban productivity literature. The findings suggest that productivity of individuals who located in Paris, London or Vienna (i.e. the cities with the highest concentration of composers) increased strongly due to the positive externalities associated with those locations. Composers who worked in one of the geographic clusters were around 33 per cent more productive and have composed approximately one additional work of significance every four years. The productivity gains are attributed to interactions that took place between composers in geographic clusters, rather than due to some location specific attributes. It is further demonstrated that top composers and composers who migrated to the cluster locations are the greatest beneficiaries. Finally, the results imply that the location benefits are persistent and depend on the clustering intensity.

A further hypothesis posited in O'Hagan and Borowiecki (2010) explains the marked geographic shifts of the cluster locations over time. The authors propose that war might have been an important determinant for the observed changes of the hub locations. Therefore, the third Chapter (Borowiecki, 2011b) and fourth Chapter (Borowiecki, 2011c) elaborate on this possibility and provide the first study of conflict-induced migration of creative individuals. For those investigations the focus is laid on prominent composers born after 1800 as it allows merging the composer data set with a comprehensive conflict database - the Correlates of War (Sarkees, 2000). Both studies investigate whether, and to what extent, the incidence of war affects the migration intensity. Borowiecki (2011b) models the aggregate stock of composers in a country and finds that periods of war correspond negatively with the number of artists located in a country. This approach enables to compare the extent of composers' forced migration to the overall population. The results indicate that conflict-induced migration intensity is considerably higher for composers than for the overall population and that the share of composers in the overall population drops due to the incidence of war. The picture emerging provides a further interesting insight on a substantial decrease in the country's creative potential in the long run due to the observed outmigration.

Borowiecki (2011c) exploits further the unique properties of the data set and provides an individual level analysis of composers' probability to emigrate. This study provides first insights on the decision making process of the forced migrant, the associated dynamics of conflict-induced migration and the determinants of choice of a

destination country. The results imply that conflict impacts the migration intensity with a lag of approximately one year and that the choice of a destination country in times of war is suboptimal from the career's perspective. The main results are consistent in both articles and indicate that the incidence of inter-state wars decreases composers stock (or increases composers' probability to emigrate) by around seven per cent and the incidence of intra-state wars by over ten per cent. The findings indicate the existence of a strong influence of war on composers' location choice and migration intensity. A query that immediately arises is whether and, if yes to what extent, does conflict impact artistic production. This interesting question is investigated in Chapter 4 of this dissertation.

The fifth Chapter (Borowiecki, 2011d) investigates the relationship between composers' productivity and the incidence of war. How does war affect creative production? It is a very intriguing question that has been analysed in a variety of forms and contexts by numerous social scientists from various academic disciplines. Historians seem to be unified in the argument that war is destructive and detrimental to the creative process itself. For decades distinguished scholars have not found any significant negative impact of war on arts or on the number of great artists. On the contrary, some studies revealed a positive impact of conflict on arts and artists. The ambiguous and counterintuitive relationship between war and arts that was found in previous research is termed as the *war-art puzzle*. In Chapter 5 there is provided a discussion of anecdotal evidence as well as the proposition that certain types of war might have served as an inspiration for numerous masterpieces and that the topic of war often finds a broad audience. In the quantitative approach, the incidence of conflict is linked with composers' productivity and composers' age-productivity profiles for periods of peace and war are constructed. The results imply a highly heterogeneous impact of conflict on creative production: defensive or not-lost international wars correspond with significantly higher productivity, whereas composers' artistic output is lower during civil wars as well as offensive or lost inter-state.

Chapter 6 provides concluding remarks. The key results are briefly reviewed and several links to contemporary issues are developed. The final chapter contains also a list of tentative recommendations for today's authorities. Finally, future research possibilities are presented and discussed.

1.2 Conditions, Migration and Clustering of Composers since 1750

Scherer (2004) observed that in the late seventeenth century a transition was already taking place from a century-old system of private patronage to a new market for musical services and freelance composing activity. The role of royal appointments or employment by the church and nobility of composers gradually decreased and was replaced by musical composition as an entrepreneurial activity. A new classical composition developed into a product which had a value and a market price and the composer became a producer who faced diverse incentives to 'produce' in certain cities and countries. This trend was leveraged by the Industrial Revolution of the late 18th century and early 19th century when the middle-class rapidly expanded, becoming prosperous and so developing an interest in classical music. With the industrial revolution there also came better techniques in the manufacture of instruments allowing for cheaper production and several technological improvements of instruments – most importantly – the Fortepiano was introduced. The benefits of the new technological advancements were manifold in the market for new compositions. First, concert performances were no longer restricted to churches and it was possible to perform before larger audiences. For example, before the emergence of the piano in the second half of the XVIII century, the organ, the clavichord and the harpsichord were the only keyboard instruments available. Each of those instruments had some deficiency: the clavichord was soft and low and hence only suitable for intimate use, the harpsichord could not deliver subtle gradations of volume and the organ was restricted to being played only in the building where it was located. Next, groups of individuals and investors, sometimes under the directives of a composer, came together and provided the funding for public performances in the newly-built concert halls now in existence in numerous cities. Second the demand for new music and teaching increased as there was a growing trend among the middle-class of holding private musical performances in their homes to entertain guests. In many European - and later American - middle-class families, children demonstrated their social graces by playing the piano, the violin, or other instruments. Along with the development of musical journals and reviews there was an increase in the publication of sheet music which facilitated a wide dissemination of new compositions. Third, with the introduction of better instruments composers could create

more sophisticated works and hence become more distinguishable by their composition. In the era of Romanticism in music (ca. 1815-1910), for example, composers have expanded the formal structures within a work, making a piece more passionate and expressive. Previously unused chords or innovative chord progressions were introduced, enriching the harmonic language. Moreover, audiences became more sophisticated and were generally prepared to listen only to new music, usually works written no more than a decade earlier. Classical music clearly lost its elitist image and was broadly composed for the individual.

With uniquely distinguishable and internationally well-known works composers were not restricted to any particular location. With the decrease in travel costs especially the geographic impediments became practically non-existent. It must be stressed that composition was not the only source of income. Composers could find employment as directors of private orchestras, conservatory professors, private teachers or they could act as impresarios and organize their own opera or concert performances. Despite the growth of nationalism during the Romantic Era which reached its peak during the World Wars, composers possessed an unprecedented wealth of opportunities and hence their migration intensity remained very high and their geographical spread was wider than it had ever been historically. Composers became independent freelancers and could seek employment in a variety of countries.

According to O'Hagan and Borowiecki (2010) composers tend to locate in geographic clusters, even though the clustering intensity seems not to be as marked as in the case of visual artists, especially in the first half of the twentieth century. An arising question is why do composers, visual artists and other creative people tend to cluster? A related but different issue is why do they do so in particular cities? As argued by O'Hagan and Borowiecki, it would be extremely difficult to demonstrate 'scientifically' why Paris, among all of the major cities in Europe, became the main center for clustering of composers and visual artists but a general and convincing argument can be posited (see, e.g., Cowen 2000; Kelly and O'Hagan 2007). One of the key reasons not discussed above is the simple issue of adjusting for the population of the cities in question. For example, in 1850 London had a population of 2.23 million and Paris a population of 1.31 million (see Scherer 2004). Vienna had a population of only 0.45 million, in contrast, and other cities were even smaller: Naples had 0.42 million,

Moscow had 0.37 million, and Madrid had 0.26 million. In terms of composers per head of city population Vienna would emerge as the most important city by far, more so than Paris or Moscow.

In some ways, the more interesting question from an innovation perspective is why artists and composers and, indeed, so many other prominent innovative workers, such as the designers of computer software or academic historians and economists, tend to cluster so much at all. This was covered in Kelly and O'Hagan (2007) and also very well in Andersson and Andersson (2006), and the same analysis can be applied to composers. An interesting question related to the above is why there was so much clustering of prominent composers. A possible factor is that many of them need either a symphony orchestra or an opera company to perform and test their work.

A further argument relates to increasing globalization and the greatly reduced cost (in terms of time and price) of travel and, hence, of opportunities for long-term and short-term movement. However, previous evidence would not bear this out. As Scherer (2004, p. 124) states, 'the geographic mobility of composers in the eighteenth and nineteenth centuries ... would astonish modern-day Europeans.' This is seen clearly in O'Hagan and Borowiecki (2010; Table 2, p. 84). In the fifteenth century all 51 prominent composers moved on a long-term basis, 39 per cent of them to another country. The corresponding figure for the sixteenth century was 23 per cent, the nineteenth century was 23 per cent and the twentieth century was 18 per cent. Thus the evidence would suggest that with increasing ease of travel there was in fact less long-term movement outside one's country, with no clear pattern in relation to internal movement over the centuries.

It does appear though that there was increasing short-term, work-related movement over time. This is as one might expect. Movement in the past was so difficult and costly that it was in many cases long-term. However, with reduced cost and time requirements it became possible to have work-related mobility for shorter periods, while maintaining a home base.

1.3 Chapter Specific Acknowledgments

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CHAPTER 2

Geographic Clustering and Productivity:

An Instrumental Variable Approach for Classical Composers

2. Geographic Clustering and Productivity:

An Instrumental Variable Approach for Classical Composers

Abstract

It is difficult to estimate the impact of geographic clustering on productivity because of endogeneity issues. We use birthplace-cluster distance as an instrumental variable for the incidence of clustering of prominent classical composers born between 1750 and 1899. We find that geographic clustering strongly impacts the productivity of clustering individuals: composers were around 33 per cent more productive while they remained in a geographic cluster. Top composers and composers who migrated to the cluster are the greatest beneficiaries of clustering. The benefit depends on the clustering intensity and has a long-term impact.

Keywords: geographic concentration, cities, mobility, productivity, urban history, composer

JEL Classifications: D24, J24, J61, N90, O47, R11, Z19

2.1 Introduction

The best are located in geographic clusters. In locations with a high concentration of individuals or firms, workers earn more (e.g. Glaeser and Mare, 2001), firms perform better (e.g. Nickell, 1996), visual artists peak earlier (Hellmanzik, 2010); but knowledge on causality is still limited. Are geographic clusters attracting the best or are individuals and firms who cluster the best because of positive externalities associated with cluster locations? In other words, is self-selection driving the empirical evidence on better performance in geographic clusters, or does there exist a clustering benefit? This question is of considerable importance not only for individuals or firms that are located in geographic clusters, but also for policymakers who try to replicate the success stories of clusters such as Silicon Valley and create, for example, special economic zones in their regions. However, without knowledge of the causal relationship between clustering and productivity, interventionism can cause harmful distortions to the market (Desrochers and Sautet, 2004).

There is a large body of literature that highlights the association between geographic clustering (or more in general – locating in cities) and productivity (see Rosenthal and Strange, 2004, for a review). However, the existing literature does not always adequately address the endogeneity of clustering to productivity and thus does not convincingly establish a causal relationship. Apart from endogeneity issues, omitted variables (e.g. quality of local infrastructure) may drive both clustering and economic outcomes, producing misleading estimates. A further problem arising is that individuals are not homogeneous and it is essential to take account of individual characteristics (Glaeser and Mare, 2001). Ciccone and Hall (1996) tackled first the endogeneity problems and have used macroeconomic series as instrumental variables. However, if aggregated data series are used it is not possible to control for heterogeneous effects of individuals.

This study addresses both identification issues. The analysis is based on a unique individual-level data set that allows to control for individual's heterogeneity and to employ valid individual-based instruments to account for endogeneity and omitted-variable bias. We use exogenous geographic birthplace-cluster distance as an instrumental variable for the incidence of clustering in order to estimate the impact of locating in geographic clusters on productivity. The instrumental variable method makes

it credible to assert that the association between clustering and productivity is a causal relationship rather than simply a correlation. Geographic distance can be an important determinant for location choice in historical time periods when travelling was constrained. We therefore chose for the analysis the time period roughly associated with the beginnings and duration of the industrial revolution. In the late 18th and 19th centuries, due to technological inventions such as the railway or the steamboat, travelling was possible, however still very expensive in terms of time and price (see Clark, 2007).[4] We also focus, for several reasons, on only one specific group of individuals – on classical composers. First, as argued by O'Hagan and Borowiecki (2010), composers were highly mobile individuals with a marked need to cluster in order to exploit economies of scale. Composers needed either a symphony orchestra or an opera company and the complementary infrastructure, such as concert hall or opera house, in order to perform and test their compositions. Second, composers in the period analyzed were very independent artists with a remarkable entrepreneurial drive (Scherer, 2001, or Scherer, 2004); they became market oriented and can be regarded as producers who supply cultural goods (new compositions) and provide certain services, such as teaching, organising tours, performing etc. Third, the period encompasses many of the most influential composers hence data is relatively good available and reliable. A further implicit advantage of the time period chosen is that it covers only deceased composers hence a study of a whole life-time output becomes possible.

The data set employed is extracted from large music dictionaries and it covers a global sample of 116 prominent classical composers born between 1750 and 1899. The emerging picture indicates that in the time period analyzed Paris was the predominant geographic cluster for classical music, followed by Vienna and London. Using valid instruments for the incidence of clustering we explore the causal relationship between working in a cluster and productivity measured with the number of significant compositions. The findings suggest a high and positive cluster effect on composers' productivity who located in the geographic cluster studied (i.e. Paris, Vienna and London). As a result of the positive externalities associated with geographic clusters, composers were up to 33 per cent more productive and have composed approximately one additional work every four years. Further, we find heterogeneity in the returns: the

[4] In the Identification Section we provide further evidence on how geographic distance markedly determines location choice in historical time periods with decreasing importance over time.

productivity of the top composers increased by roughly 200 per cent (i.e. 1.5 additional works per annum) and composers who moved to a geographic cluster (i.e. migrant individuals) wrote around 67 per cent more compositions (i.e. one additional work every two years). We also investigate the impact of geographic clustering on composers' lifetime music-related accomplishments (measured with an index score proposed by Murray, 2003) and can confirm the results. Finally, we find that the benefit increases with clustering intensity and that the presence of other composers, as opposed to better availability of location specific amenities, such as cultural infrastructure, was the most important determinant of the associated productivity gains.

Given the finding that migrant individuals are the greatest beneficiaries of clustering, this study relates also to the elite migration literature (see Commander et al., 2004, for review). The migration of skilled individuals is regarded to be costly for the sending country, because of lost investment in education, high fiscal costs and labor market distortions. Individuals who migrate must thus experience a sufficiently higher benefit in order to cover the associated cost of moving. Nevertheless usually research 'cannot adjudicate on whether migration improves (...) productivity' (Hunter et al., 2009). This article relates also to cultural economics research. Several recent studies demonstrated remarkable clustering intensity of visual artists (O'Hagan and Hellmanzik, 2008) or classical composers (O'Hagan and Borowiecki, 2010). The authors explain the observed clustering patterns and speculate the existence of positive externalities associated with geographic clusters. In this article we are able to analyze those hypotheses and to estimate the clustering benefit in terms of artistic productivity. The results provide important contributions that fill a gap in both strands of the literature.

The remainder of this chapter is organized as follows. In the Section 2.2, we provide an overview of the theory on externalities associated with geographic clusters and discuss the possible mechanism. In the Section 2.3, we describe the data. In the Section 2.4, we discuss the identification strategy. In the Section 2.5, we present the empirical findings, and in the last section, we provide concluding remarks.

2.2 The Mechanism

In the following, we describe how locating in a geographic cluster can impact composers' productivity. We briefly outline three formal theories of a benefit associated with geographic clustering, as outlined in Glaeser et al. (1992), apply the arguments to the case of classical composers and provide anecdotal evidence.

There are three predominant theories that explain the incidence of geographic clustering and advocate the associated benefit of clustering or, in a broader sense, of urbanization. The economics of innovation literature provide arguments on the existence of geographic boundaries to information flows or knowledge spillovers, particularly tacit knowledge (e.g. Marshall, 1890). It is argued that the concentration of tacit knowledge increases with geographic proximity and leads to faster and easier spillover effects between firms in an industry. In other words, the cost of transmitting knowledge rises with distance; therefore proximity and location matter. The theory should apply also to creative industries and classical music composition. In cities with a particularly high concentration of composers, when some kind of face-to-face contact between artists is enabled, synergies and spillovers may positively impact the individual's ability to innovate.

Historical archives assert that close contact and collaboration between prominent composers was common. For example, informal gatherings were repeatedly hosted by colleagues or friends, as recorded in a letter from Carl Kragen to his friend - Robert Schumann (1810-1856):

> *Tomorrow (...) [Franz] Liszt [1811-1886] is to play at our house with [Karol] Lipinski [1790-1861]! Do come for it! Ah, if you could only induce [Felix] Mendelssohn [1809-1847] and his wife to come too!* (Letter of 27 March 1840)

With geographic proximity many professional or private relationships were formed. Among all the composers and musicians Franz Liszt met during his career, his friendship with Hector Berlioz (1803-1869) holds an exceptional place. The relationship between

the two towering figures of the musical and cultural world of their time began during Berlioz's first performance of Symphonie Fantastique (1830) at the Paris Conservatoire in the French capital. In a different geographic cluster – in London - Berlioz met Richard Wagner (1813-1883). The German composer recollects the encounter as well as his first impression of his new colleague's composition skills as follows:

> *When five years ago destiny brought us closer together in London, I boasted of having an advantage over you: I could understand and appreciate your works perfectly, while you could only get an imperfect idea of mine because of your lack of knowledge of the German language, to which my dramatic conceptions are so closely bound.* (Letter of 22 February1860)

Wagner had also a work relationship with Giacomo Meyerbeer (1791-1864) from whom he received not only financial support but more importantly a recommendation for his works to be staged in Paris in 1840 (Grove, 2009). The exchange with Meyerbeer was also of benefit to Wagner in an inspirational sense – the composition of the Italian master sent his protégé into a state of enthusiastic euphoria:

> *At this time I also saw the 'Prophet' for the first time – the prophet of the new world: I felt happy and exalted.* (Letter of 13 March 1850)

The second theory advocating a clustering benefit is posited by Porter (1990). He agrees with the conclusion of Marshall and his followers but suggests a different mechanism. In Porter's view, the local competition in specialized, geographically-concentrated industries is the biggest stimulus for growth. It is posited that the presence of multiple rivaling individuals might be the source of important incentives for out-performing the competitor. Considering the economics of superstars in which 'small numbers of people earn enormous amounts of money and dominate the activities in

which they engage' (Rosen, 1981) and a 'Winner-Take-All Society' (Frank and Cook, 1995), the importance to write better works than the other individual seems to be of considerable importance also in classical music.

The high concentration of composers might create a very competitive working environment, where only extraordinary performance is acknowledged. Amadeus Mozart (1756-1791) was aware of that and was mostly motivated to make his presence in the French capital:

> *In Paris they are accustomed to hear nothing but Gluck's choruses. Only place confidence in me; I shall strive with all my might to do honor to the name of Mozart. I have no fears at all on the subject.* (Letter of 28 February 1778)

In 1778, the year Mozart spent in Paris, his productivity peaked and he wrote 19 influential compositions, as recorded in Gilder and Port (1978). Mozart's productivity in Paris was three times higher than his average annual productivity of around 6.6 compositions. The atmosphere of fierce competition remained in the French metropolis for many following years. One of Wagner's rehearsals in Paris, as described in the composer's memoires, was attended by Berlioz - his rival in opera composition:

> *What is certain is that at that time I felt like a little schoolboy next to Berlioz; (...) Berlioz (...) remained silent throughout; he neither encouraged nor discouraged me, but only sighed with a weary smile that 'things in Paris were difficult'.* (Wagner, 2008)

The third theory of positive externalities associated with geographic clusters is proposed by Jacobs (1969), who argues that the most important knowledge transfers come from outside the core industry. The dissemination of complementary knowledge between economic agents of diverse backgrounds facilitates search and experimentation

in innovation. In a geographic cluster it is the presence of a high level of diversity that might lead to increasing returns and could give rise to so called 'diversification' externalities. Knowledge may spillover between composers specializing in different types of works (e.g. concert or theater works) or between composers and other creative individuals (e.g. writers).

Composers of the time period analyzed were highly literate and fully part of the cultured world of the local elite. The diverse entourage of composers is well documented in a letter from Berlioz to his sister Adele:

> *Last Monday we had a kind of little country outing. My friends came to spend half a day with us. They included famous musicians and poets, Messrs. Alfred de Vigny, Antoni Deschamps, Liszt, Hiller and Chopin. We talked and discussed art, poetry, thought, music, drama, in short everything that constitutes life (...).* (Letter of 12 May 1834)

A letter from Liszt to the Parisian writer George Sand (1804-1876) provides further records of the diverse network of classical composers:

> *As the exigencies of my profession will not allow me leisure to return so soon to Paris, (...) I should beg you to let me do the honors (...) to Chopin.* (Letter of 21 May 1845)

Franz Schubert's (1797-1828) tremendous productivity was mostly due to his unique ability to fuse poetry and music. Schubert continually sought out verse that conveyed meaning and was suited through its declamation for musical realization. His assiduous search led him to more than 150 poets, including Schiller, Goethe, Klopstock and Ruckert. The literary works of Heinrich Heine (1797-1856), who spent the longest part of his career in Paris, were set to music by a number of composers such as Robert

Schumann, Johannes Brahms (1833-1897), Hugo Wolf (1860-1903), Pietro Mascagni (1863-1945) and Felix Mendelsohn.

Further location benefits could stem from economies of scale as a result of sharing the same specific cultural infrastructure, for example, a concert hall and symphony orchestra or an opera house and opera company, i.e. infrastructure that is very cost intensive and requires a critical mass both in form of demand and supply. In fact, as argued by Krugman (1991), the presence of demand and related supply industries in a location attract further suppliers.[5] Clustering benefits might be also attributable to the use of the same distribution channels. A letter from Liszt to Chopin documents a recommendation of a Parisian editor: '(...) you will have every reason to be satisfied with his [the editors'] activity and with whatever he does. Mendelssohn, whom he met in Switzerland two years ago, has made him his exclusive editor for France, and I, for my part, am just going to do the same' (Letter of 21 May 1845). On a different occasion, Liszt had recommended the works of Schumann to Pacini, a music Publisher in Paris, 'This second arrangement is by Schumann, a young composer of very great merit. It is more within the reach of the general public, and also more exact than my paraphrase' (Letter of 30 September 1838). Furthermore, additional location benefits might stem from backwards linkages that are emerging in geographic clusters: the presence of composers led to better production of musical instruments, the development of music journals and reviews, the improvement of sheet music publication, and the higher attractiveness of acting as impresarios.

On the other hand, it must be noted that there might exist also some cost of clustering with regard to artistic output. Composers opportunity cost of writing one additional work may be higher in geographic clusters because of the presence of several alternative sources of income. In locations where classical music played an important role, composers could have engaged in other activities, such as teaching in music school, delivering private tuition, performing, running music institutes or acting as an

[5] The model introduced in Krugman (1991) does not link however geographic concentration with productivity increases. While it is very likely that better demand, for example, dependent on the favour and patronage of elites, attracted further composers to a location, it is not clear that those individuals have to experience productivity increases. In other words, demand specific factors could be more responsible for the geographic distribution of individuals rather than have explanatory power of differences in their productivity. See also Section 2.5.4 for a placebo test that mitigates the worry of demand-driven productivity gains.

impresario. The availability of alternative engagements might have not always been complementary to composition of new pieces.

2.3 Data

The sampling technique aims at assuring maximum objectivity and reliability. As a result of data availability issues we focus only on prominent individuals and use the list of the most important composers from Murray (2003). Murray's work is based on numerous international references hence the risk of country- or marketing-biases in the selection is minimal. The study of human accomplishment is conducted for several fields, including classical music, and for each outstanding individual in every discipline an index score is determined, based on the amount of space allocated to her or him in the reference works. The index score is normalised for all individuals listed in each discipline so that the lowest score is one and the highest score is 100.

Data on composers' artistic output is taken from 'The Dictionary of Composers and Their Music' (Gilder and Port, 1978). The two prominent musicologists provide a list of 275 composers born between 1500 and 1949 with their important works dated and arranged chronologically. Gilder and Port aim to provide a dictionary 'of lasting value as a permanent reference (...) [that contains] (...) complete factual information about who wrote what, and when' (Gilder and Port, 1978, preface). The dictionary is a recognized survey of the most influential classical compositions and served often as a source for composer's output (e.g. Simonton, 1991). In a study like this it is important for a number of reasons to consider only the important works. First, the influential compositions are the reason why a composer is considered nowadays to be a prominent artist. Only such works made a significant contribution to the classical music canon and reflect composers' quality. Second, we eliminate the bias that would be caused by consideration of composers' jottings, trifling pieces or tentative works (i.e. by exercises of no lasting value), as well as propaganda pieces and some commercial productions (i.e. low-quality works written with a short-term profit orientation). A third implicit advantage is the

omission of unfinished works.[6] Combining both sources (i.e. Gilder and Port, 1978, and Murray, 2003) for the period analyzed an intersection of 116 composers emerges.

For those composers we extract background information from Grove Music Online (2009), the leading online source for music research. This large multivolume dictionary is detailed enough to track the movements of all 116 composers, especially work-related migration. It is 'a critically organized repository of historically significant information' (Grove, 2009, Preface) and hence is an ideal source for the purposes of this article. In this study we focus only on the periods of a composer's life when music-related work was predominant, i.e. when a composer was composing, giving tours, conducting philharmonics, teaching at music schools, managing music institutions, or travelling in search of inspiration. We therefore exclude from the analysis the infancy, time spent on education or training, retirement years, and periods when only other (i.e. not music-related) professions were exercised.[7]

In Table 1 summary statistics on the composers encompassed by this study is presented. Panel A depicts that the covered artists were engaged in music-related work during most of their lives (around 45 out of 67 years).[8] The duration of music related education or training lasted on average nine years. The father, mother or any other family member was often engaged in a music-related activity (e.g. father was composing, mother played violin). The average yearly output is equal to 0.77 and suggests that an artist composed roughly three important works every four years. The mean of Murray's Index Score (MIS) is equal to 12.7 points. There exists a very high correlation of 0.62 between composers' total lifetime production and the MIS. Twelve per cent of the composers were born in the second half of the 18th century, one third were born in the first part of the 19th century and the remaining artists were born in the late 19th century (Panel B). In Panel C it can be observed that the number of

[6] In the Robustness Section we employ Murray's Index Score as an alternative measure for composers' quality. The results remain consistent. We have also considered a number of other data sources on productivity, for example, performances at leading concert halls or CD releases. The alternative approaches are however hardly feasible, mostly due to lack of access to such data. Furthermore, one would not be able to disentangle the importance of a historical composer from the influence of a contemporary performer. Finally, concert repertoires and especially albums contain various works, sometimes even works written by different composers; separating the importance of a single piece would not be possible.

[7] This restriction is relaxed in a robustness test that is based on composer's entire lifetime and when Murray's Index Score is used to measure individual's overall lifetime productivity. The test is described in the Section 2.5.3.

[8] See Table A1 for an extended list and essential background information of composers included in this study.

observations for composer and year is sufficient for a reliable quantitative analysis and increases over time. France and the Germanic countries (i.e. Germany, Austria or Switzerland) accounted for the highest share of births of important composers – more than 20 per cent each, followed by Italy and Russia with each around 12 per cent of births (Panel D). The births of the remaining artists are fairly spread among other - mostly European - countries.

Next, we investigate what cities were the most important for classical music and composers. We conduct a ranking of major cities using four different criteria. First, we measure the number of years an average composers spent in each city encompassed by the data set. Second, we count composers who have visited a city at least once in their life. Third, we calculate how many times each location was chosen as the main work destination, i.e. where a composer spent the longest part of his musical career. Fourth, we total the number of composers' births for each city. The summary is presented in Table 2. It becomes obvious that Paris was the predominant location, where the average composer has spent around 13.7 years. The French capital was visited by 66 composers and was the birthplace of nine. While the French capital emerges as the most important geographic cluster, also other locations played a role.[9] London was visited by 39 composers and chosen as primary destination by 13 artists, while Vienna was visited by 35 composers and served for nine artists as the main work location. The importance of the fourth most important city - St. Petersburg - is considerably lower and each further city played a smaller role.

The above observations can be reaffirmed when comparing the importance of cities throughout the entire time period. Figure 1 illustrates the number of composers located in Paris, Vienna, London, as well as in ten other cities that follow in importance the three exclusively-analyzed locations. Paris was consistently the single most important location throughout the entire time-period. The significance of Vienna and London can also be confirmed.

In Table 3 we present a brief summary for each of the three predominant locations (i.e. geographic clusters). Information on all composers is compiled in Panel A

[9] The dominance of Paris was also argued by Hall (1998), albeit without quantitative support. Hall identified the French metropolis as 'the capital of light' for cultural activity that attracted not only artists but also intellectuals throughout the world.

and on composers born in any of the geographic clusters is summarized in Panel B. In accordance with O'Hagan and Borowiecki (2010) composers born in any of the geographic clusters (and especially in Paris) remained remarkably immobile. Out of the 10 artists born in Paris, three never left the city and the remaining spend less than two years outside the French metropolis. The time spent outside the Viennese and London clusters is approximately 8 years.

2.4 Identification

The aim of the econometric analysis is to estimate the causal relationship between composers' productivity and the incidence of geographic clustering.[10] In order to deal with potential endogeneity of the incidence of clustering, we identify the location variable as follows:

$$cluster_{ijt} = \alpha_i + \alpha_t + \beta\, distance_{ij} + \gamma_1\, age_{it} + \gamma_2\, age_{it}^2 + \delta\, X_i + \varepsilon_{it}. \qquad (1)$$

The geographic distance between the birthplace of composer *i* and the geographic cluster *j* ($distance_{ij}$) is employed to instrument in the first stage for the incidence of locating of composer *i* in cluster *j* at year *t* ($cluster_{ijt}$). The birthplace-cluster distance is captured as a logarithm in order to allow for decreasing importance of large distances.[11] It would be most desirable to use a measure of economic distance that accounts for travel times, travel cost and cultural differences. One possibility would be to approximate economic distance with trade flows. Inter-city trade data is however mostly unavailable or incomplete (Dittmar, 2010). We propose therefore, to use linear

[10] The proposed identification strategy and the results have to be interpreted with caution in light of Deaton's (2010) questioning of the credibility of instrumental variable estimation techniques.

[11] For composers born in a geographic cluster (i.e. when the birthplace-cluster distance is equal to zero) the $distance_{ij}$ term is likewise set equal to zero. An alternative way to account for decreasing importance of large distances is to use a quadratic distance polynomial. This however might lead to over-identification. With the aim to keep this research as simple and robust as possible, primarily a single logarithm distance term is employed. Nonetheless the results would remain consistent throughout all specifications if different measures of the birthplace-cluster distance were employed (e.g. distance measured at level or as a quadratic polynomial).

distance ('air-line distance').[12] Year-by-year variation of the distance term is not necessary in order to establish a correlation between the birthplace-cluster distance and the incidence of locating in a geographic cluster. Composers' probability of locating at a certain location in a given year depends throughout his entire lifetime on the birthplace-cluster distance. In order to control for unobserved changes over individual's lifetime, we further control for composer-specific time effects with a quadratic age polynomial (age_{it} and age_{it}^2). The quadratic term takes also account of decreasing productivity levels at higher ages. The Equation (1) contains further composer dummies (α_i) to take account of composers' heterogeneity and we also introduce time dummies (α_t) to deal with intertemporal differences in travel and productivity differences. Furthermore, in some specifications we take account of composers' characteristics (X_i), such as music-background of family members or duration of composers' music-related education. The standard errors (ε_{it}) are clustered at the composer level, allowing for correlations between observations of a single composer (within individual *i*), but remaining independent between composers (i.e. individual *i* and *j* do not have correlated errors).

The analysis is conducted at composer-year level and we estimate the impact of locating in a city with a high geographic concentration of composers (i.e. in a geographic cluster) on their productivity levels. In the geographic clusters analyzed, apart from prominent composers (for only which data is available) many other composers whose life accomplishments were not great enough to be listed in Murray (2003) were located. It is also very likely that composers encompassed in the analysis interacted with other not-listed artists. By establishing the impact of locating in a geographic cluster, we therefore also account for the benefit due to interactions with all other creative individuals located in the cluster location. As a result, the proposed identification strategy mitigates some of the non-random extreme sample selection bias.[13]

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[12] A similar solution is proposed by Dittmar (2010) who employs linear distance from Mainz, where the printing press was invented, as an instrument for the incidence of printing technology adoption in European cities. As air-line distance is only an approximation of the unobserved economic or cultural distance, the correlation between the instrument and the endogeneous variable will contain some bias.

[13] An alternative way of estimating clustering benefits would be to estimate the total number of composers in each location and to establish its impact on composers' productivity. The problem arising with such identification strategy is that the distribution of non-prominent composers is not clear. Consider, for example, unique work-location choices due to individual specific reasons (e.g. Frederic Chopin and George Sand stay in Majorca in 1838-39). Nonetheless, as a robustness test we employ the alternative approach (i.e. geographic clustering measured by the number of prominent composers located in a city) and find consistent results (Section 2.5.4).

The validity of the identification strategy rests on three assumptions. First, there exists a significant first-stage relationship with sufficient explanatory power. We investigate therefore the probability to locate in a geographic cluster as a function of the logged birthplace-cluster distance. The estimated probabilities of locating in Paris are presented in Panel A of Table 4. The first-stage relationship between birthplace-Paris distance and locating in Paris in a given year is determined precisely at confidence levels of over 99 per cent. This relationship holds in probit (column (1) and (2)) and in ordinary least squares (OLS) specifications (column (3) and (4)) with and without composer-age controls. The estimations are robust to the inclusion of composer-specific controls (column (5)) and when further controls for the decade are included (column (6)). We further extend the analysis by including two further cities that were very important destinations for classical composers, i.e. Vienna and London. We report in Panel B of Table 4 the corresponding probability-to-locate-coefficients for all three predominant locations. The point estimates for all three cities are similar in size, sign and significance to the estimations for Paris on a stand-alone basis. The results using probit and linear specifications are very similar, and from now on, the attention is restricted to the linear specifications. There is also no sign of the instrument being weak (Cragg-Donald eigenvalue statstics are at least 79.06).[14] Composers born further away from the cluster are typically less probable to locate in the French capital. The negative, non-linear first-stage relationship for Paris and for all three geographic clusters is presented graphically in Figure 2, using a local polynomial regression method with an Epanechnikov kernel. The relationship would remain stable also if composers born in a cluster (i.e. individuals whose birthplace-cluster distance is equal to zero) are excluded.

The second required condition for the validity of the instrumental variable employed is that composers' output must depend on geographic clustering, and the birthplace-cluster distance impacts composers' productivity only through its impact on clustering. Now, it might be the case that composers who locate not directly in a cluster but in its vicinity, might benefit from the proximity to a cluster, for example, because of better access to existing ideas (Bottazzi and Peri, 2003). To prevent this kind of

[14] Stock and Yogo (2005) propose a test based on the Cragg-Donald minimum eigenvalue statistic to investigate for weak instruments. Stock and Yogo estimate the critical value of the Cragg-Donald eigenvalue statistic to be equal to 16.38 for a model with one endogenous regressors and one instrument, and 22.30 for a model with one endogenous regressors and three instruments. The reported Cragg-Donald eigenvalue statistics at the bottom of each Panel of Table 3 clearly exceed the critical values and hence indicate little risk of weak instrument bias.

proximity-effect we treat all locations within a radius of 50-miles from Paris, Vienna or London as the geographic cluster itself.[15] A further potential bias could arise if there is spatial correlation in, for example, wealth, education or culture. It is however relatively unlikely that birth regions within an increasing radius from Paris (that is in all cardinal directions) would expose a consistent change in an unobserved variable. It is even less likely if all three locations are analysed, as the distance radii would intersect and grossly prevent any spatial correlation bias.

Third, the instrument needs to be as good as randomly assigned. Given that a person cannot affect his birth location after he is born and that births are almost uniformly dispersed over geographic space this assumption seems to be satisfied. Furthermore, there is relatively little parental choice over location of birth, especially in a period when migration was difficult. A potential violation might however result if families that, for example, place a strong emphasis on musical education chose to live in or close to a geographic cluster. Children of these families may have better musical skills or better access to a relevant social network. Either factor could induce a positive correlation between the incidence of clustering and the unobserved determinants of productivity (i.e. ε_{it} in Equation (1)) and hence violate the randomness assumption. We therefore employ data on musical background of composer's family members (as recorded in Grove, 2009) and investigate this concern below.

We begin by estimating the effect of engagement of any family member in a music-related activity on composers' probability to locate in any of the three geographic clusters. The results are reported in columns (1) to (4) of Table A1. It can be viewed in column (1) that the estimated coefficients are marginal, usually not significant and have almost no explanatory power. In column (2) we demonstrate that the controls introduced for the musical background of composers' family members do not bias the distance terms. Next, we split all composers into two samples depending on whether a composer's family members were engaged in any relevant music-related activity. We report in column (3) the impact of the birthplace-cluster distance on clustering for

[15] The size of the radius was used by O'Hagan and Borowiecki (2010). In only three cases the locations had to be readjusted. Claude Debussy was born in St Germain-en-Laye and Georges Bizet spent some time during 1870's in Bougival. Both locations lie approximately 10 miles from the city center of Paris and are treated as Paris. Sir Arnold Bax was born in Streatham, less than 10 miles from the city center of London. At present, the three locations discussed are districts of Paris or London.

composers who had at least one family member engaged in any music related activity. In column (4) we present the results for composers with no such family member. The distance effect is very similar for both sub-samples and the exogeneity of the instrument can be once again confirmed. We further analyze the relationship between the indicators for musical background of composers' family members and the birthplace-cluster distance itself. The results are presented in column (5) of Table A1. This is the most demanding test as it analyzes to some extent the spatial distribution of composers' birth locations and not only the incidence to locate in the geographic cluster. It is reassuring that the family controls included or sub-sampling hardly affect the probability to locate in it or the birthplace-cluster distance. Composers' decision to locate in Paris, Vienna or London, as well as their birth location was fairly independent from the influence of family and hence the risk of non-randomness of the instrument mitigates.

With further confidence in the validity of the proposed instrumental variables a brief demonstration of the unique importance of distance in historical time periods is provided. We argue that geographic distance was a decisive factor for the choice of a work location in time periods when travelling was heavily constrained, by time or cost. We therefore divide all annual observations equally into four different time-periods and investigate how the importance of the distance variable changes over time for the geographic clusters. The results are summarized in Panel A of Table A2. To facilitate interpretation of the distance coefficients a quadratic distance polynomial is introduced. The estimated coefficients are the largest in size and most precisely estimated for the earlier decades, until roughly the 19th century. If a composer was born 100 miles further away from Paris, he was roughly 16% less likely to migrate towards the French capital and this relationship exposes decreasing returns. From the beginning of the 20th century the relevance of distance diminishes markedly: the coefficients fall in size and the explanatory power of the restricted model drops (the R-squared term decreases from around 0.5 to below 0.1). In the last sub-period a birth-location 100 miles away from Paris, reflects a decrease in the probability to cluster in the French Metropolis only by around 1.2%. Employing average distances from Paris, Vienna or London we estimate the probability to locate in any of the three geographic clusters and find consistent results. Those patterns provide indication that the proposed identification strategy works best for historical time periods and indicates that travelling in such periods was indeed difficult and costly. Next, we move over to composers' productivity function.

The second-stage equation estimates the impact of clustering on composers' productivity:

$$output_{it} = \alpha_i + \alpha_t + \beta\, cluster_{ijt} + \gamma_1\, age_{it} + \gamma_2\, age_{it}^2 + \delta\, X_i + \varepsilon_{it}, \qquad (2)$$

where the variable of main interest - composer's productivity ($output_{it}$) - measures the number of important works written by composer i in year t (as listed in Gilder and Port, 1978). We use two-stage least squares estimator as it is typically the most efficient instrumental variable estimator and should be preferred even in the case when the endogenous variable is dichotomous (see, for example, Wooldridge, 2002). The next section presents the main empirical findings.

2.5 The Effect of Geographic Clustering on Composers' Productivity

2.5.1 Main Results

In the following, we analyze the effect of locating in a geographic cluster on composers' productivity using the regression model proposed above. Table 5 summarizes the results for Paris (Panel A) and for Paris, Vienna or London (Panel B).

Column (1) shows the OLS relationship between locating in a geographic cluster and the number of written compositions in a given year. The correlation between clustering and composers' output is almost zero if it is controlled for composer-age, composer and time effects.[16] The instrumental variable (IV) estimates are presented in columns (2) to (5). The IV-results yield always a positive coefficient that is robust to the inclusion of controls for composer-specific age trends, composer controls, as well as the introduction of controls for time trends.[17] It is interesting to observe that the location coefficients are significant only if one controls for composer effects. This provides

[16] If all controls are dropped we find a negative correlation between clustering in Paris and productivity (OLS-coefficient is equal to -0.189 and marginally significant with a p-value of 0.098). We report only the most robust regression.

[17] As described in the previous section, composer-specific time trend is estimated with a quadratic polynomial (i.e. *age* and *age-squared*), composer controls are estimated with an indicator function that is equal to one for each single composer and time controls are estimated with an indicator function that is equal to one for each decade.

further support for the chosen individual-level approach and is consistent with the arguments presented in Glaeser and Mare (2001). Since we have instrumented for the incidence of clustering, we make the causal assertion that composers benefited from the positive externalities associated with the geographic cluster. In the preferred specifications (after we control for age effects, composers' heterogeneity and time trends) the estimated IV-parameter is equal to around 0.25 (t-statistics 2.04): a composer who located in Paris was composing around one additional work every four years as a result of being located in the cluster. If one considers the average annual productivity of composers (i.e. 0.77 works per year, Table 1), the size of the estimated impact of clustering on productivity is economically relevant and indicates that around one third of composers' output was a result of the positive externalities associated with a cluster. We find very similar results, in terms of sign, size and significance, also for the aggregated analysis of Paris, Vienna and London.

In all specifications the estimated IV-parameters are always considerably higher than the corresponding OLS point estimates. There could be a number of reasons for this difference. First, there might exist a proxy measurement error leading to a bias of the OLS coefficients. Changes in composers productivity was not the result of their physical presence in the geographic cluster but rather their interaction with other creative individuals. A binary indicator that records whether or not a composer was located in a geographic cluster is only a rough approximation for social interactions. In consequence, measurement error might attenuate the OLS-coefficients, while the IV identification may pick up a more robust measure of the effect of geographic clustering. Second, it is possible that the geographic clusters not only positively impacted productivity of composers who worked in those locations but also attracted individuals who were less productive than the average artist. In this context, self-selection of composers to the most important locations for classical music might somewhat equalize the clustering benefit and hence attenuate the OLS estimates.

Another reason why higher IV-parameters have been obtained might be the fact that these parameters can be interpreted as a Local Average Treatment Effect as proposed by Imbens and Angrist (1994). It is possible that certain types of composers benefit to a different extent from clustering. This could be the case if the best composers who cluster are able to benefit more from the location due to, for example, better inter-

personal skills. As a result the clustering effect for those composers might be greater. We investigate this possibility by dividing composers into top 10 composers (ranked by Murray's Index Score), all remaining composers and the bottom 16 composers.[18] The OLS and IV results are reported in columns (3) to (8) in Table 6 (columns (1) and (2) report the baseline results). While the OLS coefficients remain very low and fairly stable for all three sub-groups, we find major differences in the IV point estimates. Column (4) presents the IV results for the highest ranked composers. It is obvious that clustering returns to composers' productivity are considerably higher for the top 10 composers than for the full sample.[19] We report in column (6) the IV-estimates for all remaining composers (i.e. after the top 10 composers are excluded) and conclude that the coefficients slightly decrease, remain however consistent with the baseline findings. Column (8) shows the clustering effect on the output of the worst 16 composers. Interestingly, the productivity of the lowest-ranked composers decreases due to the incidence of locating in a geographic cluster. That suggests that clustering might have had also a detrimental effect on productivity levels. The results are similar for Paris as well as if further Vienna and London are included. Furthermore, we find that the Cragg-Donald EV statistic is the lowest for the top 10 composers and the highest for the worst composers. This indicates that the instrument has the highest effect on the lower ranked composers. One possible reason why geographic distance matters most for the worse composers might be the fact that the less successful artists are more likely to face higher cost of travel, be it because of their financial disadvantage or inferior network.

One further source of heterogeneous responses to geographic clustering might depend on whether the individual was born in the cluster or moved to it during his life. It is again quite likely that composers who moved to the geographic cluster have experienced very different location benefits at the new destination than the local artist. This could be attributable to, for example, the diverse background and experience of the migrant composer. We analyze this possibility by excluding from the full sample composers who were born in one of the geographic clusters analyzed.[20] In Panel A of

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[18] The worst composers are individuals with a Murray's Index Score of 2 or below. It is the lowest possible cut-off point, as none of the 3 composers with a Murray's Index Score of 1 has visited any of the cluster locations.

[19] This finding is consistent with Waldinger (2010) who studied peer effects among university scientists and found the highest clustering externalities for students in top 10 departments.

[20] Note that all of the excluded composers have also spent the longest part of their work lives in the geographic cluster (i.e. in their birth locations).

Table 6 we first drop ten composers who were born in Paris and re-estimate the parameters based on 106 artists who, if located in Paris, then only due to migration from other locations. In Panel B of Table 6 we exclude 18 composers who were born in Paris, Vienna or London. Table 6 reports the correlations (column (9)) and the causal effect (column (10)) between the incidence of geographic clustering and the number of compositions written. The OLS-coefficients are comparable with the estimates of the unrestricted sample. The IV-estimates for the migrant composers yield markedly higher coefficients of around 0.5, while remaining significant at the 1%-significance level. The estimated parameters for the migrant composers roughly double in size and indicate that migrant composers experienced a distinctly higher benefit due to the positive externalities associated with a geographic cluster. This finding seems to be in line with Feldman and Audretsch (1999) who find that greater output in terms of innovative activity occurs in geographic regions comprising of a diverse set of economic agents. We conclude that in geographic clusters top composers as well as migrant composers were greater beneficiaries than the average artist.

2.5.2 Robustness Analysis

In the following, we report a large number of tests that indicate that the findings are very robust. We present the results in Table 7. First, in addition to the binary control variables for individual effects, we include an indicator function whether any parent of the composer was engaged in a music related activity. Given that the source of the data set - the Grove Music Dictionary - records music-related engagements of the parents only if they are of considerable quality and importance, the variable should serve as a good proxy of composers' musical skills. The results are presented in column (2) of Table 7 (column (1) reports the baseline results). The estimated coefficients are now somewhat larger and estimated with higher precision.[21] This indicates that depending on composers' parental background, the experienced clustering benefit slightly varied. The main results find nevertheless strong support for their reliability.

During composers' music related education, whether it was private tuition or formal studies in conservatoires, meaningful personal ties were likely to have been

[21] The estimated coefficients on parental music-background is equal to 0.41 (Std. Err. 0.38) for Paris and 0.27 (Std. Err. 0.38) for all three clusters.

established. It is therefore likely that individuals' clustering benefit varied depending on the music-related education time. We hence introduce further controls for the duration of each composer's musical education as recorded in Grove (2009). The point estimates, reported in column (3) provide further support for the robustness of the main findings.[22] It is encouraging that the introduction of these powerful individual controls (parental music background and duration of music education) hardly changes the findings.

One may worry that some of the composers' visits to a geographic cluster were so brief that exchange with other artists was not possible due to time constraints. In such cases, the estimated coefficients might be biased. We therefore re-estimate the regressions omitting the observations in which composers remained in the cluster less than one year.[23] The results which are reported in column (4) remain consistent.

A related concern is that while only 18 composers were born in any of the three geographic clusters, markedly more died in Paris (30 composer deaths), Vienna (8) or London (7), and the death year of each individual was not a full year of creative work, unless the death occurred on the last day of December which is very unlikely. We analyze this issue by estimating the regressions after the death year has been excluded from the analysis. The coefficients reported in column (5) are estimated with high precision and remain positive. Encouragingly, the results can be reaffirmed.

Another worry is that composers might have visited not only the geographic cluster but also a different location in a given year. This could bias the clustering effect due to the externalities associated with the other location. We investigate this concern by re-estimating the regressions after excluding observations for years in which a composer has visited apart any of the geographic clusters also a different location. Again, the results, as reported in column (6), are very similar.

It is possible that the incidence of war influences the productivity of a creative individual. Borowiecki (2011d) demonstrates that historical wars had a heterogeneous impact on classical composers' creative production. Depending on the type of war,

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[22] The estimated coefficients on music related education time is equal to 0.041 (Std. Err. 0.0026) for Paris and 0.040 (Std. Err. 0.0025) for all three clusters. The point-estimates are significant and indicate that additional ten years of music-related education or training correlate with a higher annual productivity by around 0.4 works.

[23] Note that while Grove (2009) includes very detailed information on composer travels, the data are very often available only on annual basis.

military conflict might have had a positive or a negative effect. As the analysis is conducted for a very long time period during which a number of wars occurred, we address this concern by re-estimating the regressions while focusing only on years with no major exogenous shocks, such as war or epidemics.[24] The IV-parameters, as presented in column (7), indicate that the results are not driven by any exogenous disruptions.

We further investigate whether the results are not driven by composers with extreme productivity levels. For this robustness test we exclude composers whose Murray's index was one standard deviation above or below the average. In column (8) can be viewed that the coefficients on the geographic cluster effect hardly change and the robustness of the findings can be once again concluded.[25]

As we establish the effect of locating in a certain city on composers' productivity, one could worry about correlated standard errors within cities. We analyze this possibility by clustering the standard errors at the city level, allowing for correlations between observations of a single city (e.g. within Paris), but remaining independent between cities (e.g. Paris and Vienna do not have correlated errors). The IV-estimates are reported in column (9) and are statistically undistinguishable from zero at 99.9 per cent confidence intervals.

Finally, one could worry about the migration constraints of composers born in countries with strict regulation of emigration, such as the USSR. We therefore drop 14 Russian composers that have potentially experienced such constraints.[26] The results for the restricted sample are presented in column (10) and indicate robustness of the main findings. Furthermore, the Cragg-Donald eigenvalue statistic hardly changes suggesting that geographic distance impacted Russian composers in a presumably coherent way.

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[24] We exclude the years in which any of the following conflicts or epidemics occurred: the French Revolution (1789-99), Napoleonic Wars (1799-1815), the cholera outbreak in 1832 and 1849, the war on Prussia (1870-71) and both World Wars (1914-18 and 1939-44). We find consistent results also after excluding only single observations for composers who were located in a given year in a country that was engaged in war or in a region affected by the epidemic outbreaks. We report the results only for the stronger test.

[25] As one might expect, the point estimates somewhat decrease in size. This is attributable to the left-skewed distribution of productivity and by excluding composers with extreme productivity levels we drop mostly the higher ranked composers who were the greatest beneficiaries of geographic clustering.

[26] Note that even though all Russian composers were born between 1804 and 1891, that is before the onset of the socialistic regime, some might have experienced it during later stages of their lives.

2.5.3 Alternative Productivity Measure

One might criticize the shortcomings of the output variable. The number of written important compositions does not account for composer's achievements due to other music-related engagements such as teaching or performing. This might be especially the case for composers located in geographic clusters, as in those locations other engagements might have been particularly attractive and good available, leading to higher opportunity costs of composing. In this section we investigate this possibility and employ a broader measure of composers' lifetime productivity.

Murray's Index Score (MIS) is the broadest available measure of composers' lifetime achievements. Murray (2003) conducted a vast survey of outstanding classical composers employing a wide selection of international references and based on the amount of space allocated to each composer in the reference works he calculates the MIS. The index is normalized for all composers so that the lowest score is 1 and the highest score is 100.

The MIS is a time-invariant measure of composers' lifetime accomplishments, which enforces the robustness test to be conducted for composers' entire lifetime. As in previous parts, the focus is on establishing the relationship between geographic clustering and composers overall lifetime productivity, measured with the MIS. For this reason we propose two ways to capture geographic clustering. First, we measure the total music-related working time that a composer spent in a cluster location. Second, we use a binary indicator with the value one if a geographic cluster was composer's main work destination, i.e. if the composer has spent the longest part of his musical career in the cluster. In order to deal with varying longevities and to allow for a typical concave age-productivity profile we introduce a quadratic life duration polynomial. We further control for time trends by introducing indicator functions for each of the three half-century birth cohorts.[27]

Table A3 reports the OLS-estimates (columns (1) and (3)) and the IV-results (columns (2) and (4)). The correlation coefficients for Paris and London are negative, albeit often not significant. For Vienna we find positive and significant OLS-estimates.

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[27] The estimated equation is:

$MIS_i = \beta_1 + \beta_2(\text{Geographic cluster})_i + \beta_3(\text{Life duration})_i + \beta_4(\text{Life duration})^2_i + \sum_{j=1}^{3} \beta_j(\text{Birth cohort})_{ij} + \varepsilon_i$.

The IV- parameters are always positive and significant at the usual confidence levels. Furthermore, the regressions yield always markedly higher IV-estimates than the corresponding OLS-coefficients. Every year the composer spent in Paris resulted in a 0.24 point increase of his MIS and the choice of the French capital as the primary work destination resulted in a marked increase of 9.52 points on Murray's scale. For Vienna we obtain the highest and most precise IV-results, presumably because of the intense concentration of top composers in the Austrian capital (O'Hagan and Borowiecki, 2010). Encouragingly, the main findings are confirmed. The employment of a very different measure for composers' lifetime accomplishments and a different methodological approach (lifetime analysis instead of annual) does not alter the conclusions from the previous analyses.

2.5.4 Peer Effect and Large City Effect

It is possible that composers benefited in the geographic clusters analyzed not only due to the concentration of other artists (i.e. positive peer effects), but also due to some large city specific factors. In large cities one might expect, for example, higher demand for cultural goods, better cultural infrastructural or easier access to related industries (e.g. sheet music publishers). All such large city amenities correlate highly with composers' clustering intensity. Composers are most likely to be found in cities with high demand for cultural goods and with good cultural infrastructure; music publishers are most prone to be located where the concentration of composers is the highest etc. It is therefore unlikely that any of the estimated geographic cluster effects might not be related (directly or indirectly) to composers' clustering intensity. Nonetheless, we address this issue in two ways. First, we run a falsification test and estimate how composers' productivity was impacted by the incidence of locating in large cities that were not clusters. Second, we investigate the impact of composers' concentration rate on their productivity levels.

We conduct a placebo test that estimates the location benefit of large cities that were not a geographic cluster for classical composers, i.e. large cities that were not a popular destination for composers of the time period analyzed. For this exercise we select all cities that had in 1750 a population size of at least 100 thousand (as recorded in Mitchell, 1975) and were not a common destination for classical composers. We identify

eight non-cluster large cities: Amsterdam, Copenhagen, Hamburg, Madrid, Milan, Naples, Palermo and Venice.[28] Analogous to the previous methodological approach, we instrument for the incidence of locating in those cities with distances between composers' birthplace and each city, in order to estimate the associated productivity gains. It is econometrically a very difficult task, as we focus on variables with very few non-zero observations and hence extremely little variation. We therefore aggregate all large non-cluster cities and store them under one variable.[29]

In columns (1) and (2) of Table A4 we present the results of the falsification test. The IV-estimate is small in size and not significant, albeit positive. We conclude that the location benefit associated with large cities was considerably smaller (statistically negligible) than in the case of geographic clusters. This evidence points at the importance of geographic clusters.

We decompose the positive location benefit associated with geographic clusters (i.e. Paris, Vienna and London) into a peer effect and a large city effect. This approach enables also to shed some light on the size of the productivity gains associated with the clustering intensity. For this exercise we count all composers located in each location that is recorded in the data set and estimate the impact of the geographic concentration rate on composers' productivity. In order to obtain a causal impact of the clustering rate (rather than simply a correlation) we use geographic distance as instrumental variables. In analogy to the main identification strategy, we use three instrumental variables (i.e. logged distances between composers' birthplace and Paris, Vienna or London) in order to instrument for the concentration rate, as well as the incidence of locating in any of the geographic clusters. It is argued that composers born further away from a geographic cluster have experienced a lower number of other composers during their life. The

[28] Six out of those eight non-cluster large cities are located in countries that were predominant destinations for classical composers in previous periods (i.e. Low countries in XV century, Spain in XVI century and Italy in XVI and XVII centuries; compare O'Hagan and Borowiecki, 2010). It is therefore likely that those locations, as a reason of historical path dependence, expose particularly high predispositions for classical music in the analyzed time period (e.g. good cultural infrastructure) and hence are particularly suitable for the intended test. The average total time that composers spent in each of those eight cities is 48.1 years (standard deviation 40.8). The large non-cluster locations were visited on average by 4.75 composers (standard deviation 3.5).

[29] Disaggregated introduction of all cities is only possible until the inclusion of composer control, i.e. in a regression with only age and time controls. In such case, the OLS-estimates are all negative or not-significant (with the exception of Amsterdam). The IV-results are usually negative and never significant (not reported).

parameters for the distance terms are estimated with high precision (not reported) and we obtain a large Cragg-Donald eigenvalue statistic.

Columns (3) to (8) of Table A4 show OLS and IV results for the analysis of composers' clustering intensity. All OLS and IV returns from clustering intensity are positive and mostly significant. It is also obvious that the IV-estimates are larger in size than the correlation parameters. The IV-coefficient estimated with the usual controls and reported in column (4) indicates that composers' productivity increases by approximately 0.2 works annually for every ten more composers located in his location. We further introduce controls for the incidence of locating in any of the geographic clusters (i.e. in only Paris or in Paris, Vienna or London). This separates the clustering effect from the noise associated with the large city effect. We find even greater IV-coefficients for the clustering intensity and negative IV-estimates for the geographic clusters. We conclude that the previously estimated location benefits associated with the analyzed geographic clusters are resulting from positive peer effects. Furthermore, the negative location coefficients indicate that if in Paris, Vienna or London were no composers present, locating in those three large cities would be detrimental to artists' productivity. This result provides important support for the singular importance of geographic clustering and the associated peer effects. Composers' productivity increased due to the benefits associated with peer effects and not as a result of large city specific factors.

2.6 Conclusion

This study addresses an important methodological problem that lies at the core of empirical literature on the positive externalities associated with geographic clusters. We overcome potential heterogeneity bias and endogeneity of clustering issues by using a novel data set for 116 important classical composers born between 1750 and 1899. The research design allows to control for individual effects and to use exogenous distances between composer's birthplace and a geographic cluster as instrumental variables for the incidence of locating in a cluster location. We find that composers who located in a geographic cluster benefited significantly in terms of written compositions or overall lifetime music-related accomplishments. The location benefit is even greater for top composers or migrant composers, i.e. artists who moved to the cluster. Given the

findings, the study contributes as well to migration economics research: individuals with a diverse background and experience who migrated towards a geographic cluster were more innovative in their creative production. Furthermore, this study provides empirical evidence for a posited hypothesis in cultural economics literature that artistic production experience improves in artistic centers.

2.7 Tables

Table 1. Summary statistics (116 Composers).

	Mean	Standard Deviation
	A: Background information	
Life span (in years)	66.85	15.07
Duration of career (in years)	44.94	14.31
Education or training time (in years)	8.90	5.38
Father's music-related engagement	0.41	0.49
Mother's music-related engagement	0.26	0.44
Music-related engagement of any other family member	0.31	0.46
Compositions (per annum)	0.77	1.35
Murray's Index Score	12.67	17.16
	B: Birth cohort	
Birth cohort 1750-1799	0.12	0.33
Birth cohort 1800-1849	0.33	0.47
Birth cohort 1850-1899	0.55	0.50
	C: Composer-years observations	
Period 1750-1799	99	-
Period 1800-1849	744	-
Period 1850-1899	1655	-
Period 1900-1989	2715	-
	D: Birth country	
British Isles	0.08	0.27
France	0.22	0.42
Germanic Countries	0.23	0.42
Italy	0.13	0.34
Russia	0.12	0.33
Spain	0.03	0.16
Eastern Europe	0.09	0.28
Rest of Europe	0.03	0.18
Rest of World	0.06	0.13

SOURCES: Grove (2009), Gilder and Port (1978) and Murray (2003).
NOTE: The British Isles include composers from England, Scotland, Ireland and Wales. Eastern Europe relates to composers born in7 any of the Eastern Europe countries as classified by United Nations Statistical Division, with the exclusion of Russia. The Germanic Countries relate to the three German-speaking countries of Germany, Austria and Switzerland. Rest of Europe covers composers from all other European countries. Rest of World relates to composers that do not fit in any of the other categories.

Table 2. Important cities for classical composers.

Average time spent during musical career (in years)		Visits during musical career (in composers)		Primary destination (in composers)		Births (in composers)	
Paris	13.70	Paris	66	Paris	34	Paris	9
London	3.56	London	39	Vienna	13	Vienna	5
Vienna	3.15	Vienna	35	London	9	London	3
St. Petersburg	3.05	Berlin	26	St. Petersburg	8	St. Petersburg	3
Berlin	1.66	New York	23	Moscow	5	Cologne	2
Moscow	1.29	St. Petersburg	20	Berlin	4	Hamburg	2
New York	1.22	Rome	18	Budapest	3	Venice	2
Rome	1.16	Rome	15	Milan	3	Berlin	1
Budapest	0.96	Boston	11	Rome	3	Copenhagen	1
Milan	0.91	Moscow	11	Copenhagen	2	Leipzig	1
Venice	0.79	Milan	10	Leipzig	2	Naples	1
Copenhagen	0.78	Prague	9	Venice	2	Prague	1
Boston	0.72	Venice	7	Boston	1	Rome	1
Prague	0.37	Dresden	6	Dresden	1	Stockholm	1
Leipzig	0.30	Leipzig	5	Naples	1	Budapest	0
Naples	0.25	Naples	5	Prague	1	Dresden	0
Dresden	0.23	Budapest	4	Stockholm	1	Madrid	0
Stockholm	0.23	Cologne	4	Hamburg	0	Milan	0
Madrid	0.19	Copenhagen	3	New York	0	Moscow	0
Hamburg	0.15	Madrid	3	St. Petersburg	0	New York	0

SOURCES: See Table 1.

Table 3. Geographic clusters: Summary statistics.

	Paris	Vienna	London
	A: All composers		
Visits during musical career (in composers)	66	35	39
Primary destination (in composers)	34	13	8
Years spent in cluster during musical career	13.70	3.15	3.56
	(19.66)	(8.99)	(10.45)
Birthplace-cluster distance (in 1000 mile)	0.75	0.38	0.57
	(1.15)	(0.27)	(0.43)
Compositions (per annum)	0.63	1.55	1.04
	(1.10)	(2.62)	(1.25)
	B: Composers born in cluster		
Births (in composers)	9	5	3
Never left cluster (in composers)	3	1	0
Time outside cluster (in years)	1.90	8.40	8.00
	(1.66)	(12.18)	(3.46)

SOURCES: See Table 1.

Table 4. Birthplace-cluster distance and clustering (116 composers).

Dependent Variable: Locating in cluster

Explanatory Variables	PROBIT		ORDINARY LEAST SQUARES			
	(1)	(2)	(3)	(4)	(5)	(6)
	A: Cluster (Paris)					
Birthplace-Paris distance	-0.171***	-0.408***	-0.118***	-0.118***	-0.147***	-0.130***
	(0.0335)	(0.0439)	(0.00705)	(0.00713)	(0.000710)	(0.00830)
composer-age controls		yes		yes	yes	yes
composer controls		yes			yes	yes
decade controls		yes				yes
Observations	5213	2441	5213	5213	5213	5213
R-squared	0.249	0.5298	0.280	0.280	0.758	0.769
Cragg-Donal EV Statistic			281.9	274.2	136.1	121.3
	B: Cluster (Paris, Vienna, London)					
Birthplace-Paris distance	-0.159***	-0.472***	-0.130***			-0.133***
	(0.0320)	(0.0104)	(0.00830)			(0.00879)
Birthplace-Vienna distance	-0.0360*	-0.566***		-0.160***		-0.156***
	(0.0209)	(0.0545)		(0.00999)		(0.0247)
Birthplace-London distance	-0.0884***	-0.476***			-0.128***	-0.135***
	(0.0231)	(0.00785)			(0.00314)	(0.00667)
composer-age controls		yes	yes	yes	yes	yes
composer controls		yes	yes	yes	yes	yes
decade controls		yes	yes	yes	yes	yes
Observations	5213	3502	5213	5213	5213	5213
R-squared	0.243	0.4838	0.769	0.663	0.667	0.684
Cragg-Donal EV Statistic			121.3	71.6	73.1	79.1

NOTE: Standard errors are clustered at the composer level and reported in parentheses. Columns (1) and (2) present marginal probit effects, evaluated at explanatory variable mean values, and pseudo *R*-square terms. The birthplace-cluster distances are logged. We do not report composer-specific age time trend (estimated with a quadratic polynomial), composer controls (estimated with an indicator function that is equal to one for each single composer) and time controls (estimated with an indicator function that is equal to one for each decade). ***/**/* indicate estimates that are significantly different from zero at 99/95/90 per cent confidence.

Table 5. Clustering and artistic output of composers (116 composers).

Dependent Variable: Number of compositions

	OLS	INSTRUMENTAL VARIABLE			
Explanatory Variables	(1)	(2)	(3)	(4)	(5)
	A: Cluster (Paris)				
Cluster (Paris)	-0.00209	0.0864	0.0615	0.277***	0.252**
	(0.0931)	(0.212)	(0.202)	(0.0158)	(0.123)
composer-age controls	yes		yes	yes	yes
composer controls	yes			yes	yes
decade controls	yes				yes
Observations	5213	5213	5213	5213	5213
R-squared	0.445	.	0.013	0.424	0.443
Cragg-Donal EV Statistic		281.9	274.2	136.1	121.3
	B: Cluster (Paris, Vienna, London)				
Cluster (Paris, Vienna, London)	0.0803	0.217	0.194	0.278***	0.253**
	(0.0866)	(0.193)	(0.191)	(0.0153)	(0.124)
composer-age controls	yes		yes	yes	yes
composer controls	yes			yes	yes
decade controls	yes				yes
Observations	5213	5213	5213	5213	5213
R-squared	0.445	0.002	0.027	0.425	0.444
Cragg-Donal EV Statistic		99.7	96.2	89.1	79.1

NOTE: Standard errors are clustered at the composer level and reported in parentheses. The first-stage results are presented in Panel A and Panel C of Table 2. The incidence of locating in a geographic cluster is estimated with a logged birthplace-cluster distance. We do not report composer-specific age time trend (estimated with a quadratic polynomial), composer controls (estimated with an indicator function that is equal to one for each single composer) and time controls (estimated with an indicator function that is equal to one for each decade). ***/**/* indicate estimates that are significantly different from zero at 99/95/90 per cent confidence.

Table 6. Heterogeneity in returns.
Dependent Variable: Number of compositions

Explanatory Variables	All Composers		Top 10 composers		All remaining composers		Worst 16 composers		Migrant Composers	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
	OLS	IV	OLS	IV	OLS	IV	OLS	IV	OLS	IV
	A: Cluster (Paris)									
Cluster (Paris)	-0.00209	0.252**	0.0716	1.553***	0.0226	0.228***	0.00316	-0.287***	0.00524	0.519***
	(0.0931)	(0.123)	(0.570)	(0.135)	(0.0890)	(0.0633)	(0.147)	(0.0818)	(0.0996)	(0.0847)
composer-age controls	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
composer controls	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
decade controls	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
Composers	116	116	10	10	106	106	16	16	106	106
Observations	5213	5213	413	413	4800	4800	754	754	4782	4782
Cragg-Donal EV Statistic		121.3		57.4		135.9		227.2		79.1
	B: Cluster (Paris, Vienna, London)									
Cluster (Paris, Vienna, London)	0.0803	0.253**	-0.0712	3.563***	0.0778	0.227***	-0.0520	-0.292***	0.0929	0.483***
	(0.0866)	(0.124)	(0.375)	(0.724)	(0.0786)	(0.0628)	(0.0869)	(0.0823)	(0.0963)	(0.0894)
composer-age controls	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
composer controls	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
decade controls	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
Composers	116	116	10	10	106	106	16	16	98	98
Observations	5213	5213	413	413	4800	4800	754	754	4436	4436
Cragg-Donal EV Statistic		79.1		35.8		92.8		127.6		68.9

NOTE: See Table 5.

Table 7. Robustness of instrumental variable results.

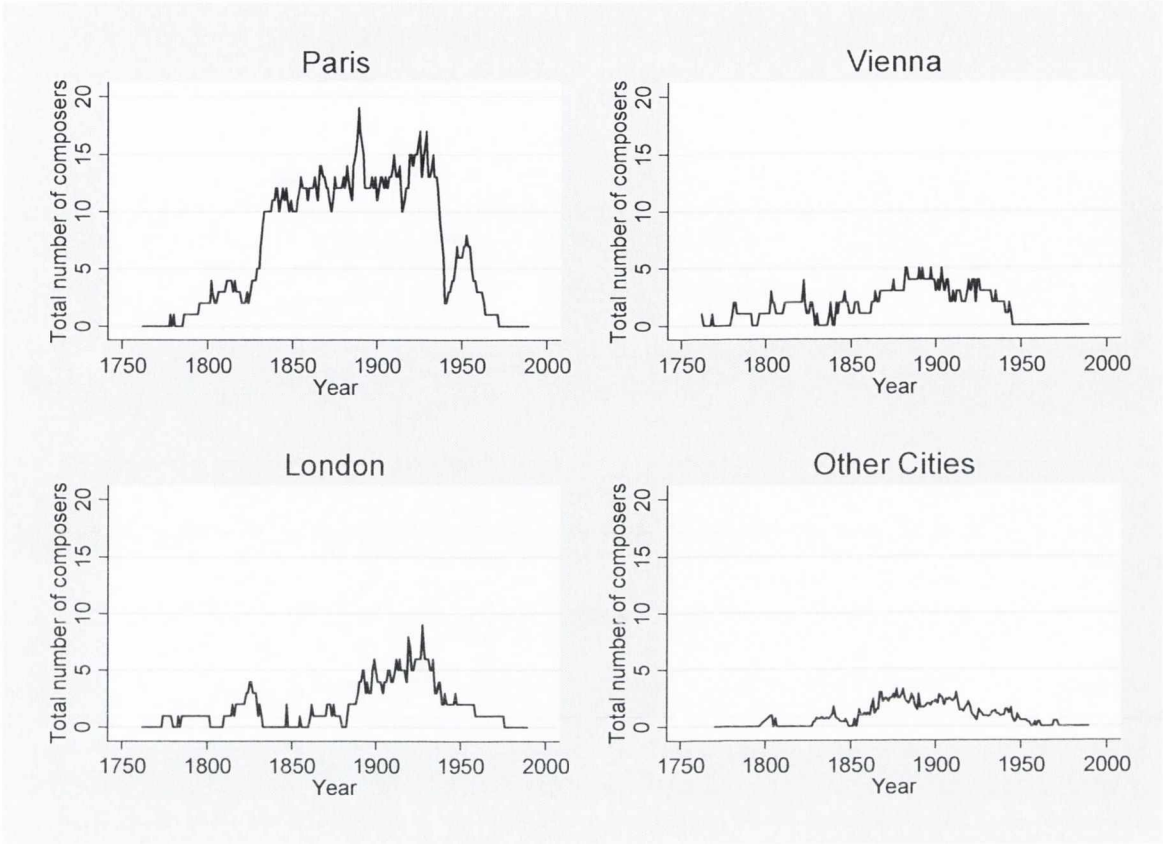
Dependent Variable: Number of compositions

	Full sample	Full sample	Full sample	Short visits excluded	Death year excluded	Multiple locations excluded	Extreme events excluded	Extreme composers excluded	St. Err. clustered at city level	Russian composers excluded
	(1) IV	(2) IV	(3) IV	(4) IV	(5) IV	(6) IV	(7) IV	(8) IV	(9) IV	(10) IV
	A: Cluster (Paris)									
Cluster (Paris)	0.252**	0.354***	0.321***	0.265**	0.224***	0.239**	0.241*	0.187*	0.252***	0.243*
	(0.123)	(0.0947)	(0.0711)	(0.123)	(0.0673)	(0.116)	(0.138)	(0.0968)	(0.069)	(0.134)
composer-age controls	yes	yes	yes	yes	yes	yes	yes	yes	Yes	Yes
composer controls	yes	yes	yes	yes	yes	yes	yes	yes	Yes	Yes
time controls	yes	yes	yes	yes	yes	yes	yes	yes	Yes	Yes
music background of parents controls		yes								
music-related education controls			yes							
Composers	116	116	116	116	116	116	116	101	116	102
Observations	5213	5213	5213	5182	5118	5135	4625	4588	5213	4611
Cragg-Donal EV Statistic	121.3	121.3	121.3	134.2	127.5	135.2	111.8	126.0	121.3	134.6
	B: Cluster (Paris, Vienna, London)									
Cluster (Paris, Vienna, London)	0.253**	0.343***	0.319***	0.261**	0.223***	0.270**	0.246*	0.184*	0.253***	0.241*
	(0.124)	(0.0635)	(0.0703)	(0.125)	(0.0666)	(0.123)	(0.141)	(0.0954)	(0.069)	(0.135)
composer-age controls	yes	yes	yes	yes	yes	yes	yes	yes	yes	Yes
composer controls	yes	yes	yes	yes	yes	yes	yes	yes	yes	Yes
time controls	yes	yes	yes	yes	yes	yes	yes	yes	yes	Yes
music background of parents controls		yes								
music-related education controls			yes							
Composers	116	116	116	116	116	116	116	101	116	102
Observations	5213	5213	5213	5167	5118	5091	4625	4588	5213	4611
Cragg-Donal EV Statistic	79.1	79.1	79.1	83.2	83.8	87.5	70.3	90.1	79.1	77.2

NOTE: See Table 5.

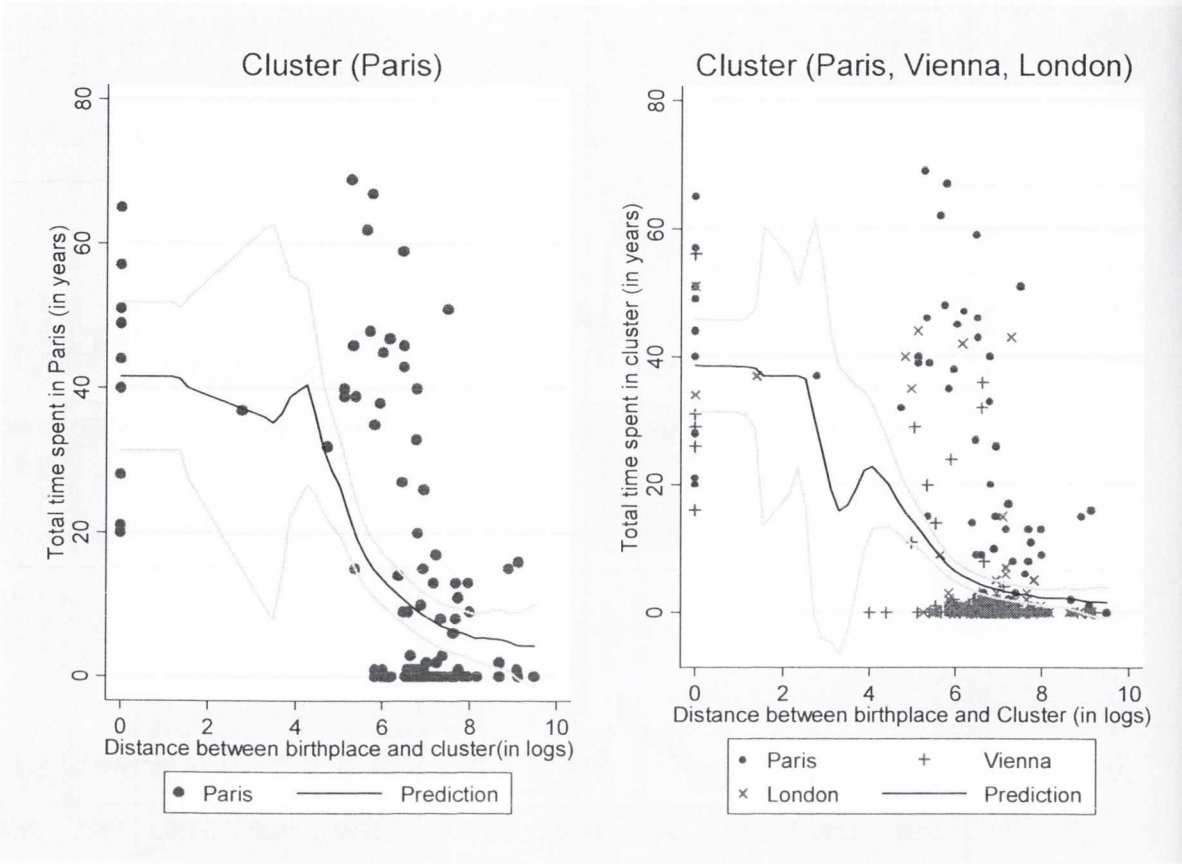
2.8 Figures

Figure 1. Importance of geographic clusters.



NOTE: The panel with 'Other Cities' depicts the composer count for the ten largest cities after Paris, Vienna and London, deciding upon 'Aggregated time spent during musical career' criterion (i.e. St. Petersburg, Berlin, Moscow, New York, Rome, Budapest, Milan, Venice, Copenhagen and Boston).

Figure 2. Birthplace-cluster distance and clustering.



NOTE: The depicted prediction is based on a local polynomial regression method with an Epanechnikov kernel and it is presented along with a 95%-confidence interval.

2.9 Appendix

Table A1. Clustering and parental background.

Dependent Variable:	Locating in cluster				Birthplace-cluster distance
	Full sample (1)	Full sample (2)	Composers with any family member engaged in any music-related activity (3)	Composers with no family member engaged in any music-related activity (4)	Full sample (5)
	A: Cluster (Paris)				
Birthplace-Paris distance		-0.116***	-0.116***	-0.128***	
		(0.00768)	(0.00614)	(0.0200)	
Father engaged in any music-related activity	-0.0661	-0.0356			0.263
	(0.0776)	(0.0631)			(0.412)
Mother engaged in any music-related activity	0.152	0.0618			-0.773
	(0.0918)	(0.0665)			(0.601)
Any other family member engaged in any music-related activity	-0.0556	-0.0745			-0.162
	(0.0815)	(0.0626)			(0.466)
Observations	5213	5213	3363	1850	5213
R-squared	0.029	0.280	0.328	0.220	0.032
	B: Cluster (Vienna)				
Birthplace-Vienna distance		-0.0839***	-0.0849***	-0.0912***	
		(0.0139)	(0.0195)	(0.0180)	
Father engaged in any music-related activity	0.0623	0.0304			-0.380
	(0.0394)	(0.0326)			(0.312)
Mother engaged in any music-related activity	-0.0907***	-0.0369*			0.642***
	(0.0275)	(0.0218)			(0.244)
Any other family member engaged in any music-related activity	0.0479	0.0135			-0.410
	(0.0458)	(0.0328)			(0.404)
Observations	5213	5213	3363	1850	5213
R-squared	0.048	0.298	0.245	0.458	0.061
	C: Cluster (London)				
Birthplace-London distance		-0.0956***	-0.103***	-0.0914***	
		(0.0136)	(0.0227)	(0.0190)	
Father engaged in any music-related activity	0.0271	0.0200			-0.0746
	(0.0442)	(0.0355)			(0.270)
Mother engaged in any music-related activity	-0.0501	-0.0209			0.306
	(0.0364)	(0.0335)			(0.242)
Any other family member engaged in any music-related activity	0.00635	0.00295			-0.0356
	(0.0475)	(0.0384)			(0.256)
Observations	5213	5213	3363	1850	5213
R-squared	0.009	0.246	0.201	0.327	0.010

NOTE: See Table 4.

Table A2. Importance of geographic distance over time.

Dependent Variable: Locating in cluster

EXPLANATORY VARIABLES	Entire period (1762-1989)	1st quartile (1762-1868)	2nd quartile (1869-1902)	3rd quartile (1903-1928)	4th quartile (1929-1989)
	(1)	(2)	(3)	(4)	(5)
	A: Cluster (Paris)				
Birthplace-Cluster distance	-0.342***	-1.677***	-1.659***	-0.243**	-0.118*
	(0.0790)	(0.229)	(0.182)	(0.0932)	(0.0649)
(Birthplace-Cluster distance)^2	0.0417***	0.671***	0.634***	0.0280**	0.0120
	(0.0135)	(0.118)	(0.0997)	(0.0130)	(0.00838)
Observations	5213	1336	1301	1299	1277
R-squared	0.144	0.353	0.478	0.077	0.064
	B: Cluster (Paris, Vienna, London)				
Birthplace-Cluster distance	-0.673***	-1.401***	-1.786***	-0.619***	-0.439***
	(0.0727)	(0.295)	(0.167)	(0.102)	(0.0953)
(Birthplace-Cluster distance)^2	0.103***	0.549***	0.685***	0.0957***	0.0645***
	(0.0137)	(0.162)	(0.110)	(0.0181)	(0.0163)
Observations	5213	1336	1301	1299	1277
R-squared	0.301	0.277	0.570	0.254	0.252

NOTE: Standard errors are clustered at the composer level and reported in parentheses. The birthplace-cluster distances are measured at level and the unit is a thousand miles. The aggregated cluster distance (Panel B) is calculated with the following formula:

$distance_{it} = c_t\, distance_{birthplace,cluster} + (1-c_t)/C \sum_{c=1}^{C} (distance_{birthplace,\ cluster})$, where c=1 if cluster={1,2,…,C}, 0 otherwise.

***/**/* indicate estimates that are significantly different from zero at 99/95/90 per cent confidence.

Table A3. Composers' lifetime accomplishments.
Dependent Variable: Murray's Index Score

	Full sample	Full sample	Full sample	Full sample
	(1)	(2)	(3)	(4)
	OLS	IV	OLS	IV
	A: Cluster (Paris)			
Total time spent in cluster (in years)	-0.0888	0.239*		
	(0.0677)	(0.127)		
Primary destination (binary)			-4.408	9.521**
			(3.190)	(4.557)
Life duration controls	yes	yes	yes	yes
Birth cohort controls	yes	yes	yes	yes
Composers	116	116	116	116
Observations	116	116	116	116
R-squared	0.157	0.027	0.161	0.030
Cragg-Donal EV Statistic		3.88		3.43
	B: Cluster (Vienna)			
Total time spent in Cluster (in years)	0.600*	1.469***		
	(0.309)	(0.491)		
Primary destination (binary)			20.45***	38.34***
			(7.141)	(10.75)
Life duration controls	yes	yes	yes	yes
Time controls	yes	yes	yes	yes
Composers	116	116	116	116
Observations	116	116	116	116
R-squared	0.245	0.041	0.279	0.179
Cragg-Donal EV Statistic		1.18		2.83
	C: Cluster (London)			
Total time spent in cluster (in years)	-0.124*	0.563*		
	(0.0677)	(0.315)		
Primary destination (binary)			-5.465**	24.69*
			(2.512)	(14.31)
Life duration controls	yes	yes	yes	yes
Birth cohort controls	yes	yes	yes	yes
Composers	116	116	116	116
Observations	116	116	116	116
R-squared	0.153	.	0.154	.
Cragg-Donal EV Statistic		2.27		1.65

NOTE: Standard errors are clustered at the composer level and reported in parentheses. The incidence of clustering is estimated with birthplace-cluster distance. The life duration controls are estimated with a quadratic polynomial (not reported). Time controls are estimated with an indicator function that is equal to one if composer's birth occurred in a given half century (not reported). ***/**/* indicate estimates that are significantly different from zero at 99/95/90 per cent confidence.

Table A4. Placebo test. Clustering intensity.
Dependent Variable: Number of compositions

	Placebo test		Clustering intensity					
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	OLS	IV	OLS	IV	OLS	IV	OLS	IV
Large non-cluster cities	0.0398	0.157						
	(0.0838)	(0.126)						
Clustering intensity			0.0123*	0.0203**	0.0284**	0.114	0.0128	0.0380**
			(0.00639)	(0.00986)	(0.0120)	(0.108)	(0.0104)	(0.0154)
Cluster (Paris)					-0.282	-1.159		
					(0.174)	(1.429)		
Cluster (Paris, Vienna, London)							-0.00815	-0.221***
							(0.132)	(0.0811)
composer-age controls	yes	yes	yes	yes	yes	yes	yes	yes
composer controls	yes	yes	yes	yes	yes	yes	yes	yes
decade controls	yes	yes	yes	yes	yes	yes	yes	yes
Observations	5213	5213	5213	5213	5213	5213	5213	5213
R-squared	0.445	0.444	0.445	0.445	0.446	0.431	0.445	0.444
Cragg-Donal EV Statistic		62.00		81.97		81.97		81.97

NOTE: Standard errors are clustered at the composer level and reported in parentheses. I do not report composer-specific age time trend (estimated with a quadratic polynomial), composer controls (estimated with an indicator function that is equal to one for each single composer) and time controls (estimated with an indicator function that is equal to one for each decade). The 'Large non-cluster cities' variable aggregates the observations for Amsterdam, Copenhagen, Hamburg, Madrid, Milan, Naples, Palermo and Venice. I instrument for it with eight logged distances between composers' birthplace and each city. The 'Clustering intensity' variable measures the number of composers located in each city. I instrument for it with three logged distances between composers' birthplace and Paris, Vienna or London. ***/**/* indicate estimates that are significantly different from zero at 99/95/90 per cent confidence.

CHAPTER 3

Are Composers Different?

Historical Evidence on Conflict-induced Migration

3. Are Composers Different?

Historical Evidence on Conflict-induced Migration

Abstract

In this paper we explore whether, and to what extent, the incidence of war affects the migration intensity of 164 prominent classical composers born after 1800. We model the aggregate stock of composers in a country and find that periods of war correspond negatively with the number of artists. We also find that conflict-induced migration intensity is considerably higher for composers than for the overall population and demonstrate that the share of composers in the overall population drops due to the incidence of war. We further find that the observed outmigration substantially diminishes the country's creative potential in the long-run.

Keywords: migration, refugee, conflict, war, geographic concentration, composer

JEL Classifications: D74, F51, J61, Z10

3.1 Introduction

History has shown the devastating consequences of wars for societies marred by violence. One consequence of periods of social upheaval is the massive dislocation of populations. Among those forced to emigrate are creative individuals, who are particularly important in contributing to the attractiveness of a location. However little is known about how war affects those talented individuals.

Let us consider two exemplary cases found in biographies of prominent classical composers, who are the focus of this study. First, Serge Rachmaninoff who fled from Moscow during the Revolution in 1905, where he spent the longest part of his life. The reason for the emigration of the prominent Russian composer was the incidence of an intra-state conflict that included terrorism, worker strikes, peasant unrest and military mutinies. Rachmaninoff left behind a lucrative job as conductor at the Bolshoi Theater and moved to Dresden. A second influential composer - Dmitry Shostakovich - was full professor at the Leningrad Conservatory when the Nazis invaded Russia and forced the artist to leave Leningrad in 1941. The composer of the 'Seventh Symphony' was evacuated by train through Moscow to Kuybishev, about 800 km to the east in the southern Urals. The choice of location and hence the lives of both composers were considerably affected by internal or international conflict. The undisclosed question is however whether composers, or more generally creative individuals, differ and to what extent from the average citizen with regard to conflict-induced migration?

We hypothesise that creative individuals might be relatively more prone to emigration in times of military conflict than the average citizen and there are three main reasons why this may be so. Firstly, in times of war, when the fulfilment of basic needs is endangered, the demand for cultural goods diminishes or disappears. Secondly, the artist is hindered in her creative work; be it a funding shortage or lack of security. Thirdly, the laws of the potential host country might provide incentives to immigration of skilled labour. Therefore creative individuals are forced to leave the regions where war or civil unrest affects the social order. Forming a linkage between classical composers, as a sample of creative individuals, and the overall population is markedly important. The investigation provides a new and significant contribution to the knowledge on the consequences of war.

While it is established that refuge flows increase due to conflict, it is not clear how the migration intensity of sub-groups is affected. Are refugee flows homogeneous across the entire population or are certain groups more prone to be affected by war and hence more likely to emigrate in times of conflict. In this paper with the employment of a unique data set we are able to illuminate the war-impact on a particularly valuable part of the population – on the creative individuals

In this paper we conduct an econometric analysis of the hypothesis and investigate the impact of conflict on the aggregated number of composers in a country. The benefit of an aggregate analysis is threefold. First, it allows to conduct a comparison with the overall population and to draw conclusions on the relative conflict-induced migration intensity of the creative people. Second, a study of the share of composers in the total population becomes possible. Third, an investigation of the impact of composers' outmigration on the country can be conducted.

The data set used covers a global sample of the 164 prominent classical music composers, born after 1800.[30] For the selected composers we extract background information as well as migration records from large, comprehensive dictionaries of music and link the data with the incidence of wars. We find a significant highly negative relationship between wars and the stock of prominent composers within a country. The incidence of intra-state wars leads to a drop of the composer stock of around 11 per cent and the occurrence of international non-colonial wars result in a decrease of roughly 7 per cent. In a rough comparison framework with the total population, the results imply that composers were markedly more likely to be forced into conflict-related emigration than an average citizen of a country. We also demonstrate that composers' share in the population declines by up to ten per cent. While the overall population is by far not a perfect benchmark, the findings tentatively indicate an important hidden cost of conflict for a country in terms of a marked loss of creative individuals.[31] Furthermore, we find a markedly persistent, large and negative impact of composers' war-related outmigration on a country's creative potential in the long run.

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[30] See O'Hagan and Borowiecki, 2010, for a detailed discussion of the selection issue.

[31] Unfortunately disaggregated population data for the analyzed time period is not available and comparing the magnitude of composers' conflict-induced emigration flows against other comparison groups (e.g. other creative individuals) are not feasible in this research.

The results are consistent with previous findings of research on the causes of the overall conflict-induced migration. It is often argued that the extent of forced migration varies according to the different kinds of conflict involved. Wars between states have generated substantial refugee flows, however not as numerous as civil wars. The smallest emigration wave is caused by colonial wars (e.g. Schmeidl, 1997). Further studies investigate what country or war characteristics correlate most with forced migration and find violence as the most important determinant, be it government violence or dissident violence, while measures of economic conditions (e.g. GNP) are mostly insignificant (e.g. Moore and Shellman, 2004). This article adds also to research on the consequences of war-related migration flows. Scholars seem to agree that refugees have a negative impact on the security conditions of the source and host region or country as well as on relations between the two (e.g. Zolberg et al., 1989). There have been identified a series of spillover or external effects of conflicts in one country leading to lower economic growth and welfare (Murdoch and Sandler, 2002) or harmful health effects in neighboring states (e.g. Hazem et al., 2003). One of the few studies on the benefits associated with forced migration is presented in Sarvimaki et al. (2009) who analyze long-term effects of forced migration after Finland ceded parts of its territory and find that being displaced had significant positive effects on economic performance.[32]

All in all this paper also relates to the cultural economics literature. A marked clustering activity was demonstrated among visual artists (O'Hagan and Hellmanzik, 2008) and composers (O'Hagan and Borowiecki, 2010). The authors suggest that war could bring an artistic cluster to an end and shift it to another location. Given the importance of geographic clustering for creative individuals the incidence of conflict might have a profound impact on their migration intensity. The understanding of geographic clustering or de-clustering, and also of the inter-temporal geographic shifts of artistic clusters, is fairly limited and based only on qualitative analyzes.

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[32] This article also relates to studies of war within the literature of economic history. It is argued that aside from the high direct costs of war, conflicts comprise large indirect costs, such as a persistent decrease in bilateral trade, national income and global economic welfare (e.g. Findlay and O'Rourke, 2007), disadvantageous effects on relative prices (O'Rourke, 2007) or shrinkage of consumption (Goldin and Lewis, 1975).

The weight of our findings builds upon a number of articles that have been written about the importance of creative individuals to the development and attractiveness of a region. The creative people supply cultural goods and have a direct impact on a country's cultural capital (Throsby, 1999). It is argued that the presence of cultural talent allows for higher quality of life (Nussbaum and Sen, 1993) and greater happiness (Layard, 2005) among the general population. A rich culture of arts and entertainment attracts entrepreneurs and creative individuals from other disciplines to a cluster (Andersson and Andersson, 2006). Geographic clustering and the associated peer-effects are an important driver for creative production of classical composers (Borowiecki, 2011a) and lead to better development of visual artists' careers (Hellmanzik, 2010).

The rest of the chapter proceeds as follows: in the next section we introduce the methodology and describe the data. In the Section 3.3, we present and discuss our findings and finally in the last section we conclude.

3.2 Methodology

3.2.1 Estimation Framework

We propose a model for composer's choice of location based on Krugman (1991) who developed a location-choice model for manufacturing firms. This parallel can be drawn as long as we treat classical composers of the 19th and 20th century as producers who supply cultural goods (i.e. new compositions). This proposition seems to be valid especially for the case of prominent composers that are encompassed by this study. Those artists became influential because of the compositions that they have 'produced' and not due to, for example, provided services such as teaching or performing. Furthermore, composers of the period analyzed are independent individuals with a remarkable entrepreneurial drive (Scherer, 2004). They became market oriented and were free to choose their engagements.

Krugman's influential model of economic geography suggests that supply and demand attract new firms to certain locations:

$$supply = f(supply,\ demand) \qquad (1)$$

$$+ \qquad +$$

In order to reflect most adequately the theory we propose the following empirical model:

$$Log(composer_{jt}) = \beta_0 + \sum_{i=1}^{4} \beta_i Log(composer_{j,t-1}) + \beta_5 Log(population_{jt}) + \\ + \beta_6 GDPpc_{jt} + \beta_7 Inter-state\_war_{jt} + \beta_8 Inter-state\_war_{jt} + decade_t + u_{jt} \qquad (2)$$

where $Log(composer_{jt})$ is the log number of composers in country j at year t, which is dependent on its four lagged values, on a set of variables that approximate the national demand for cultural goods and the incidence of war. The lagged $Log(composer_{jt})$ terms correspond with the importance of supply concentration. In addition the lagged terms capture the trend of a country in relation to the concentration of composers and take account of the highly autocorrelated property of the underlying data. The persistency of the $Log(composer_{jt})$ term is particularly high because composers stayed in a country for long periods of time, sometimes for their whole lives.[33] The proxies for contemporary demand for cultural goods and services provided by classical composers are based on the size of demand ($Log(population_{jt})$) and the purchasing power of each individual ($GDPpc_{jt}$). Krugman's model is extended by war variables that account whether country j is engaged in year t in war fought with a other state (i.e. Inter-state war_{jt}) or in war fought within state borders between government and non-government forces (i.e. Intra-state war_{jt}). We also take account of inter-temporal changes of travel possibilities and composers' conditions with separate indicator functions for each decade ($decade_t$). Country fixed effects (β_0) are included in order to capture time-invariant country characteristics that may be related to composers' stock. The standard errors are clustered at the country level, allowing for correlations between observations of a single country (within j), but remaining independent between countries (i.e. countries i and j do not have correlated errors).

[33] Given the extraordinary persistence of the data (the lagged *Log(composer)* terms are significant and positive up to the 7th lag) we believe that the proposed dynamic model would provide superior results, rather than, for example, integer-value time-series models. Note also that introduction of four lagged *Log(composer)* terms maximizes model information criteria and is preferred by the *F*-test. In the Robustness Checks Section we investigate different model specifications.

A possible criticism of our approach is that the involvement of a composer's country of residence in a war does not necessary mean that the artist must have witnessed the conflict. Nevertheless, we believe that direct experience of a war is not the only channel through which a creative individual might get affected. The impact might work for example through a change in a nations wealth due to a war and hence a change in demand, or through a change in societies cognition of security in times of war. It also acknowledged that the propensities to emigrate in times of war might vary depending on whether the individual was directly exposed to the war or experienced the conflict only indirectly. As the available war data sets do not provide any details on the geographic extent of wars, we are unable to differentiate between direct and indirect exposures to war. The further presented results must be interpreted in light of this caveat.

3.2.2 Data Sources

Composer Database

In constructing the data set every effort was put into insuring maximum objectivity and reliability. The list of the most important composers is taken from Murray (2003) who provided a considerable and recognised survey of outstanding contributions to the arts and sciences from ancient times to the mid-twentieth century. Murray's work is based on numerous international references hence the risk of country- or marketing-biases in the selection is held to a minimum. The study of human accomplishment is conducted for several fields, including classical music, and for each outstanding individual in every discipline an index score is determined, based on the amount of space allocated to her or him in the reference works. The index score is normalised for all individuals listed in each disciplne so that the lowest score is 1 and the highest score is 100.

Given the limited time availability of the population, GDP and war data sets, we restrict the composers' database to individuals born after 1800. There are several implicit advantages of focusing on the 19^{th} and 20^{th} century. First, classical composers in the period analyzed were found to be extraordinary mobile individuals (O'Hagan and Borowiecki, 2011c) and hence sensible mobility analyzes become possible. Second, data on the lives of composers are available and relatively reliable, as opposed to, for example, artists of earlier

periods. Third, the geographic spread of composers is very high and hence a study covering several countries becomes enabled. Fourth, the period chosen covers wars that significantly shaped most recent history. Next, the period under consideration covers only deceased composers hence an analysis of whole life periods becomes possible and, finally, the study encompasses many of the most influential composers of all time.

For the composers covered by this study we extracted their background information and migration patterns from Grove Music Online (2009), the leading online source for music research, provided by Oxford University Press. In this analysis the focus is directed only at the life periods of a composer in which music-related work dominated, i.e. when a composer was composing, giving tours, conducting philharmonic orchestras, teaching at music schools, managing music institutions or simply travelling in search of inspiration. The benefit of this restriction is the mitigation of individual's heterogeneity bias. It is obvious that, for example, a music student or an individual engaged only in non-music related activities would face very different migration propensities than a composer. By excluding the infancy, education and retirement life periods as well as periods in which only other professions were practised, we ensure that the individual from the sample was in fact a composer and hence comparable.[34] The location changes are recorded from the first year a composer becomes involved in a music-related activity other than learning, for example, the artist composes his first work. Moreover, in order to study the extent of war-related emigration from a country, the data set needs to be revised for composers who left the country in order to serve the army, sustained a conflict-related death, or were imprisoned abroad in forced labour camps. Consequently a total of seven composers are excluded from the sample and as a result this study encompasses 164 prominent composers.[35] In the Robustness Section we further exclude composers who died during the incidence of a war and find consistent results.

In order to observe variation in the data and still keep the research feasible we have restricted this study to the ten countries where the greatest number of classical composers was located. As this restriction is arbitrary, we will provide robustness checks and

[34] See Robustness Checks Section for a discussion of a potential endogeneity bias.
[35] We exclude the following composers: Alban Berg, Henry Cowell, Olivier Messiaen, Nikolay Myaskovsky, Carl Orff, Richard Wagner and Ralph Vaughan Williams.

demonstrate that the results remain stable when a further three countries are included or when three countries are excluded. For the time period 1816 to 1997 we include Austria, England, France, Germany, Italy, Russia, Switzerland and USA, while for 1918-1997 the study in addition covers Czech Republic and Hungary.[36]

Population and GDP Database

The population and GDP per capita data sets are adapted from Maddison's (2006) widely cited statistics on world population. The data series are available annually, covering 1820 until 2006, for a number of countries. For a few missing years the population and GDP per capita series were linearly interpolated. Population is measured in thousands at mid-year and GDP per capita is measured in 1990 USD. We believe that composers in the 19th and 20th century would most probably select a country for settlement based upon population size (size of the potential demand) and GDP per capita (individual wealth). In the Robustness Section however we will investigate the stability of results when different measures are used, for example, population and wealth growth rates. It must be also acknowledged that the Madisson (2006) estimates could be considerably biased especially for earlier time-periods. Gregory Clark (2009), for example, provides a very critical assessment of Maddison's statistics and 'the mysteries of his craft'. Nonetheless, despite such critical voices, Maddison's database has been used in high-profile publications and is the most suitable source for the purpose of this research.

Conflict Database

The data on conflict is based on the Correlates of War (COW), a reliable database introduced and described by Sarkees (2000), and recognised by the broader scientific community. The COW data set identifies conflicts between states (inter-state wars) and

[36] Note that for 1816-1918, during the existence of the Austria-Hungary Union, the composers as well the wars in Austria and Hungary are aggregated and stored under "Austria". Likewise, as the authors of the conflict database aggregate the wars for Germany and Italy for the period before the unification in 1871 and during the 19th century, respectively, we similarly aggregate composers for both states. As all composers in Czechoslovakia (state existing from 1918 to 1993) were located within the boarders of Czech Republic, we use the contemporary name.

within states (intra-state wars) that occurred between 1816 and 1997[37], and it lists a number of records for each war, e.g. the exact dates when a state became involved in a war, the number of battle-related deaths sustained by the participants' armed forces, the size of the pre-war population and pre-war armed forces, and dummies for the continent where the war occurred, whether the participant was victorious or has initiated the war.

The variables of main interest in the proposed model (2), inter- and intra-state wars, will be measured in several ways. Most simply, we propose dummies for the identity of a country that was involved in a war in a particular year. Next, taking into account the findings of recent research we propose three different ways to capture the varying levels of war-related violence. First, we measure the war variables with the number of battle-related deaths sustained by the participant's armed forces.[38] Second, we will create a ratio between the participant deaths sustained and the pre-war population size. Third, a ratio will be introduced between the participant deaths sustained and the size of pre-war armed forces. Taking account of the varying duration of wars we will express all three intensity measures per year of duration of a conflict.

In the case of inter-state wars, we will also differentiate between wars fought on the continent of the country and colonial wars, i.e. conflicts that occurred on other continents. The intra-state wars occurred per definition within the boundaries of the participating state. Ideally, one would want to account whether each war involved occupation. Unfortunately, such records are not provided by the authors of the COW database.[39]

3.2.3 Data Inspection

A summary of composer's characteristics is presented in Table 1. The data set encompasses individuals who were engaged in music-related work during most of their lives (around 47

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[37] The COW database also covers extra-state wars, i.e. wars between a state and a non-state entity. However, as none of these wars occurred within the boundaries of any of the countries analyzed, we will not include extra-state wars in our analysis.

[38] For intra-state wars the number of deaths covers the total battle deaths of all participants, i.e. of the government and non-government forces. We believe that this measure takes best account of civil war violence.

[39] Note that the econometric investigation is conducted on annual basis and accounts for war duration. Furthermore, we take control of violence. As wars involving occupation are presumably of longer duration and could coincide with higher violence levels, the chosen approach mitigates somewhat the bias arising due to lack of occupation controls.

out of 69 years). The mean duration of music-related education or training, as recorded in the source, lasted around 7.5 years. Approximately half of the composers had at least one family member involved in a music-related activity (e.g. mother played piano, brother was a conductor). The mean Murray's Index Score is 7.7 with a marked right skewed distribution. France and the Germanic countries accounted for the highest share of births of important composers – approximately 23 per cent each, followed by Russia with 12 per cent births, Italy and East European countries with each around 8 per cent births.[40] The fairly wide geographic spread of composers' births in connection with their high migration intensity enables a study of various wars that have occurred in several countries. Approximately one third of the composers were born in the first half of 19th century, a half was born in the second part of 19th century and the remaining artists were born in the 20th century. In the last panel of Table 1 we observe that during each composer's career, his country of residence was involved during more than 8 years in international wars and 0.88 years in civil wars. Composers experienced during their music-related working lives on average 3.8 inter-state wars and 1.1 intra-state wars.

The relationship between the number of composers in England, France, Germany and Italy – the predominant countries for classical music – and the incidence of war is depicted in Figure 1. It can be observed that the French coup of 1851 corresponds with a slight decrease in the total number of composers in France. The Crimean War of 1853 to 1856 brings the French rising composer stock to a temporary halt. The first decreasing trend in the number of composers in France can be observed during the civil unrest of 1871 when the communards took over Paris and during the incidence of the Franco-Prussian war in 1870 to 1871. Also Germany experienced a decrease in the number of composers during the Franco-Prussian war. A considerable drop in the number of composers can be observed in all countries during the First World War. In France the decrease is particularly marked during the early stages of the world war when the Allied Powers suffered considerably more causalities than the Central Powers. In later stages of the war after the Allied Forces regained their strength the composer stock in France increases again, while in Germany, for example, it continues to drop until the very end of the conflict. The drop in the Italian

[40] See Table 1 Note for description of country grouping.

composer stock during World War Two conflict is somewhat delayed and occurs only from 1915 onwards when Italy ceased being neutral and entered the war on the Entente side. A marked drop occurs also in England and the decrease roughly continues until the Second World War. The incidence of the Second World War coincides with a decrease in the number of composers in Italy and a large irreversible drop in France. It can be also observed that for certain types of war the number of composers actually increases, for example, in Italy during the Italo-Turkish war of 1911 to 1912. The war against the Ottoman Empire was fought in northern Africa - on a different continent; it was further clearly dominated by Italy and bestowed the European belligerent profitable territories in Libya and the Aegean Sea. On overall, the emerging picture provides important graphical support for a negative impact of civil and continental wars on the number of composers in England, France, Germany and Italy.

Further insights on the relationship between the composer stock and the incidence of wars can be gathered in Table 2 where we list the average number of composers before and during international and civil wars. The average number of composers located in a country declines only marginally during inter-state wars. The decrease is larger and statistically significant for international wars that occurred on the continent of composer's residence. During wars that took place on a different continent (i.e. colonial wars) the number of composers rises. Intra-state wars coincide with a large drop in composer stock.

3.3 Results

The regressions based on the proposed model (2) are presented in Table 3. The log number of composers in a country is mostly statistically significant and in such cases positively related on the previous log numbers of composers in a country. The relationship is also positive; however not significant with the population size and the individual wealth.

In the regression reported in the first column we observe that the influence of all inter-state wars on the dependent variable remains insignificant and only the impact of intra-state wars is significant, and as hypothesised, with a negative sign. In the second column we differentiate between inter-state wars fought on the continent of the country (i.e. continental

wars) and inter-state wars that occurred on other continents (i.e. mostly colonial wars). We find that only wars fought within the continent impact negatively the log number of composers. The incidence of wars fought on other continents correlates positively with composers' choice of location. As colonial wars, which are fought by wealthy states with a high international prestige, can serve as a proxy for countries' overall economic and social welfare rather than the incidence of a conflict, we will exclude in the entire remaining analysis wars that are fought on other continents. The results are reported in column 3 and indicate that the incidence of continental inter-state wars and intra-state wars result respectively in a 7 per cent and 11 per cent decrease of composers in a country during each year of a war. Both estimates are significant at the 95 per cent level, however not significantly different from each other. The fourth column presents a specification with only one dummy variable that accounts for any non-colonial war (i.e. either continental inter-state war or intra-state war). The coefficient on non-colonial wars is highly significant and indicates a 7.8 per cent decrease of the composer stock due to the incidence of non-colonial war. In column 5 a significant negative relationship can be observed between the numbers of battle-related deaths sustained by the participants' armed forces and the dependent variable. The number of the most important composers would decrease by roughly 22 per cent for every 100,000 battle related deaths in intra-state wars. The corresponding impact of inter-state wars is considerably smaller but nonetheless significant at the 99 per cent confidence level. Also the difference between both coefficients is statistically significant with a *p*-value below 0.01. The further two measures of conflict violence are ratios between battle-related deaths sustained by the participants' armed forces and either the pre-war population size (column 6) or the pre-war armed forces (column 7). An annual battle-related loss of 1 per cent population during inter-state conflict would decrease composers' concentration in a country by over 26 per cent. A fifty per cent loss of the pre-war armed forces during a year of inter-state wars would lead roughly to a sixteen per cent decrease in the number of composers in a country.[41] The coefficients for intra-state wars, while still negative and large in size, are not significant at conventional levels.

[41] Note that as the pre-war armed forces are often much lower than the forces during wartime after conscription, a 50 per cent loss in the size of pre-war armed forces seems possible. Note also that the coefficients on international continental war and civil war are not statistically different from each other.

The estimated coefficient for intra-state wars is greater in absolute terms than the inter-state wars estimate. The difference is however only statistically significant for the specification when one accounts for war-related deaths (as reported in column (5)). The results indicate higher emigration intensity during civil wars than international conflicts and are consistent with previous literature. This could be the case due to the higher probability that a composer directly experiences an intra-state war as it was fought within the borders of the country where the composer resided. Whereas continental inter-state wars have been also fought abroad and would therefore influence composers' well-being only through an indirect channel, for example, by a reallocation of funds from cultural patronage to warfare. Furthermore, an additional source of disorganization during civil wars that might have lead to higher emigration rates is the ambiguity of the enemy. During inter-state wars however the enemy is clear and the propensity to emigrate could even diminish in some cases due to patriotic motives.

Conflict induced migration flows might not be homogeneous across the entire population. Little is known how various parts of the affected population respond to the incidence of war. In this analysis we are able to investigate the war impact on one particular group of conflict-induced migrants, the creative class, represented by classical composers. In the following we provide efforts to compare composers' war-related migration patterns with the overall population. It is a very risky exercise as the population benchmark obviously differs from classical composers in a number of dimensions. Furthermore, with the population data we will not be able to disentangle population deaths from the emigration intensity. Nonetheless, we follow this approach motivated by the potential insights such comparison framework might deliver.

We first estimate the impact of wars on migration patterns within the whole population. We use an amended version of the Model (2) where we introduce the log population size as dependent variable and present in the first column of Table 4 the point estimates. The incidence of international continental war leads to a small, albeit statistically significant decrease of 0.26 per cent in the overall population and intra-state war reduces the population by around 0.11 per cent. The estimated parameters for the whole population are markedly smaller than the predicted impact of wars on composers stock in a country. If we

could take account of war-related deaths of the population the parameters would be even smaller.

Next, we link the number of composers in a country with its population by creating a fraction term. We then investigate how the incidence of war affects the share of the composer stock in the overall population. The second column of Table 4 reports the coefficients. During continental inter-state wars the share of composers diminishes by 5.1 per cent and the occurrence of civil-wars result in a 9.9 percentage drop. Taking into account the previously observed decrease of the absolute number of composers in a country and also a significant decrease of the actual share of classical composers in the overall population, we find that the composer stock decreases more dramatically than the overall population. We conclude a significant, above-average loss of the creative stock due to the incidence of war.

The incidence of war results in a marked outmigration of classical composers and also the share of composers in the overall population drops. An arising question concerns the long run impact of the observed outmigration of creative people. How does the loss of composers affect a country's creative potential in the long term? Due to the unique length of the data set, an investigation of the long run impact of war becomes possible.

The impact of outmigration on composers' stock five years later is presented in Panel A and the effect for various other time periods is depicted in Panel B of Table 5. The first column in Panel A presents the correlation coefficient between the growth rate of composers stock (i.e. overall outmigration) in year t and the logged size of composers' stock five years later (i.e. *Log(composer), t+5*). The estimation indicates that a one per cent higher growth rate in composers' stock results in a 0.16 per cent higher number of composers in five years. The second and third columns present the relationship between composers' outmigration rates in times of continental inter-state war or intra-state war and composers' stock five years later. The results indicate that emigration of one per cent of composers' caused by an international conflict will lead to a decrease of around 0.58 per cent of the number of composers in five years time. The coefficient on the outmigration rate during civil wars is also negative however statistically undistinguishable from zero. In the fourth column we combine all three variables and can confirm the large negative impact of

outmigration associated with inter-state wars. The fifth column presents results when further the incidences of war are introduced. The coefficients on intra-state and inter-state wars are negative albeit statistically insignificant. It is very interesting to observe that while the influence of wars has no impact on the number of creative people five years later, the negative effect of outmigration caused by international wars remains large and highly significant. This provides important evidence that the long term composers' stock is not so much affected by the incidence of war (and presumably the associated disorganization, decrease in wealth etc.) but rather by the outmigration of fellow composers.

The Panel B presents the impact of outmigration and the overall growth rate of composers on composers' stock one, two, three, five, ten, fifteen and twenty years later. The growth in the number of composers affects the composers stock for a period of around five years. After that period the coefficient looses the significance. The effect of outmigration related to intra-state wars is similar in size to the continental inter-state war outmigration in the first two years after the conflict and disappears afterwards. The only persistent impact can be observed for outmigration associated with continental inter-state war. While the overall growth rate of composers' stock has no long-term influence on the number of composers' in a country, it must be noted that the effect of war-related outmigration remains persistent and very stable in size over a very long time period. A war-related decrease in the aggregated number of composers by seven per cent results in a presumably permanent drop of the composer stock by over three per cent. The findings provide important evidence on the existence of a long-run destructive impact of continental wars on the creative potential of a country.

3.3.1 Robustness Checks

Disentangling the Effect of Migration

The empirical model proposed in this paper estimates the impact of conflict of war on the stock of composers per country. Focusing on aggregate numbers might not always allow us to disentangle convincingly the effects of death and migration; even though we have already excluded composers who sustained conflict-related deaths, left the country in order to serve the army or were imprisoned abroad in forced labour camps. For instance, if destruction and

upheaval during wars creates significant health hazards, large numbers of composers could be dying not because of the fighting, but because of health risks associated with wars. Furthermore, during wars composers might have decided to retire, i.e. have ceased to be engaged in any music-related activity, and hence have dropped out from the data set.

In order to analyze these potential biases we restrict the sample by the observations that might have lead to spurious results. We first exclude from the analysis 23 composers who died in a country that was engaged in warfare in that particular year.[42] Second we further restrict the sample by 10 composers who retired in a year when their country of residence was engaged in war.[43] In Table A2.1 (Appendix 2) we report the re-estimated relationship between the incidence of conflict and the restricted numbers of composers in a country. We observe that the coefficients decrease only marginally in dimension, remain always negative and significant, and hence we conclude consistency of the main findings.[44]

Endogeneity

Another worry might be that composers decision to enter the labour market or to leave it (i.e. retire) might be affected by the incidence of war and be hence endogeneous. The risk of endogeneity of entering the labour market is presumably low due to the way the data is recorded. The migration patterns of a composer are recorded from the first year he becomes involved in a music-related activity other than learning, which would be usually the composition of the first work. Now while the engagement in a new profession, for instance as a music teacher, might be postponed due to the incidence of war (and be hence endogeneous), it is relatively unlikely that a composer would not compose his first works during a conflict. A further source of endogeneity bias might be the decision to exit the

[42] We exclude the following composers: Adolphe Adam, Bela Bartok, Sir Arnold Bax, Arrigo Boito, Gustave Charpentier, Cesar Cui, Claude Debussy, Duke Ellington, Stephen Foster, Reingol'd Moritsevich Glier, Jerome Kern, Ernst Krenek, Charles Lecocq, Pietro Mascagni, Otto Nicolai, Max Reger, Ottorino Respighi, Carl Ruggles, Arnold Schoenberg, Alexander Scryabin, Igor Stravinsky, Sir Arthur Sullivan, Alexander von Zemlinsky.

[43] We further exclude the following composers: Arensky, Anton Stepanovich, Irving Berlin, Ernest Bloch, Aaron Copland, Henri Duparc, Ruggero Leoncavallo, Frederick Loewe, Camille Saint-Saens, Anton Webern, Ermanno Wolf-Ferrari.

[44] In the main results we decide to report the unrestricted sample, i.e. we do not restrict the sample by composer deaths or retirements, as likewise we do not restrict the sample by new entrants of composers (e.g. birth or beginning of career).

labour market and to retire. However, as the underlying database covers prominent composers, whose lives evolved around classical music, retirement is hardly observable. The average duration of retirement is only 1.19 years (standard deviation 4.76). The only notable reason for retirement is an illness, which in some cases could be exogenous as well.[45] Nonetheless, we address this issue by investigating the war-impact separately on the stock of composers in education and the stock of retired composers as well as on the aggregated stock of composers (i.e. artists during career, education or retirement). The estimations for the extended sample are reported in the second column of Table A2.2. The estimated coefficients for inter-state wars remain unchanged and for intra-state wars decrease marginally. It is encouraging to observe the consistency of the results for the aggregated composer stock.[46]

A related concern is the risk of endogeneity of war. It is possible that some omitted variables are correlated with the number of composers in a country and the incidence of war. If such variables are country specific and varying over time, the introduced controls might not capture that variation adequately. To address this concern, a large set of country-decade controls is introduced. The additional control variables are indicator functions that take the value one for each country and each decade. The estimates are presented in Table A2.10. It is encouraging to observe that the coefficients on the war variables are consistent and that the results are not biased by any factors that vary over time within a country.

A final concern related to endogeneity of a variable is reverse causality. In this research design however this potential bias is hardly an issue. The causal relationship between composer stock and war appears to be clear: war influences the number of composers in a country and not the other way round.

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[45] For example, Henri Duparc retired in 1885 for 48 years due to neurasthenia or Copland Aaron in 1972 for 19 years due to the Alzheimer disease.

[46] In a disaggregated analysis we also find that inter-state wars consistently decrease the number of composers in education by 8.9 per cent and no significant influence of intra-state wars. The incidence of inter-state wars increases composers' decision to retire by 2.3 percent and we lack of a sufficient number of observations in order to estimate the impact of intra-state wars on the retired composer stock (results not reported).

War Outbreak

The outbreak of wars is spread throughout the year and the annual observations often do not cover wars that lasted the entire year, i.e. from January 1st to December 30th. As it is possible that the outburst of a war during the later months of the year had a different or even no impact on composers stock, we investigate the consistency of the results depending on the timing of war. We therefore drop the annual observations in which a war started in the quarter of the year. The estimation is presented in the second column of Table A2.3 (the first column depicts the baseline results). As the risk of a war timing bias might exist also in the case of wars that ended early in the year, we further exclude conflicts that ended in the first quarter of a year and report the point estimates in the third column. The fourth column reports the strongest test in which we exclude entire wars if it started or ended in the last or first quarter of the year respectively. The estimated coefficients of the war impact in all three specifications remain consistent in significance, sign and size with the main results. With further confidence in the reliability of our results, we further disaggregate the annual war effect depending whether the conflict lasted a full year or less. The estimates can be viewed in the fifth column. As one might expect the annual impact of wars is somewhat larger in size for wars that lasted an entire year. The estimated coefficients for wars that lasted less than a full year are smaller in size and remain significant only for the intra-state wars. The negative impact for civil wars that lasted less than a full year, as well as the observed variation in the estimated coefficients for intra-state wars in the second to fourth columns, is presumably caused by substantially shorter duration of approximately 0.88 years (Table 1). In conclusion, it is encouraging that the negative impact of war on the composer stock despite minor variation caused by the timing of war remains strong and is persistent throughout all estimations.

Country Selection

Next, we analyze how the results change when a different number of countries are considered in the study. Table A2.4 depicts the results when the original selection of ten countries, where most of the classical composers have been located, is extended by an

additional three countries, or three countries are subtracted.[47] It can be observed that the estimates do not differ statistically for the changes conducted in the country selection. While we do not claim that the relationship between war and composer's migration is the same for all countries, we conclude that the later countries played such a minor role in the development of classical music that they do not alter in any notable way the results.

Extreme Country Characteristics

This robustness test examines whether or not the results are biased by a country with some extreme characteristics. First, we exclude France from the estimations – the country where the most composers were located. Second, Russia is excluded as it was the country with the most wars and years of war. Third, we exclude the USA as no wars were fought on its continent in the 20th century, while it was an important destination for composers. From Table A2.5 it can be concluded that the results remain stable. Next, we exclude Austria as the dissolution of the Austro-Hungarian Empire in the early 20th century might have caused a jump in the data and hence a bias in our estimations. We conclude from Table A2.6 that the results are not affected.

Different Methodological Approaches

We have conducted a number of alterations to the econometric model and also to the ways in which variables are measured. The results remain consistent in sign and significance when, for example, the lagged values and country characteristics are included at first difference, with different measures of population and GDP and also with different number of lagged terms (Table A2.8 and Table A2.9).

Ideally one would further investigate the consistency of the results when controls for wealth inequalities are included. It could be possible that a country with a very rich elite would be more attractive for a composer than a country where wealth is spread out in a more even manner. The available data on income inequalities are however scarce, lack the

[47] The original selection of ten countries, as previously introduced, is extended by Denmark, Netherlands, Spain (study of 13 countries) or restricted by Czech Republic, Hungary and Switzerland (study of 7 countries).

required continuity and do not sufficiently cover the countries or time periods analysed in this article. Therefore, any further specifications accounting for wealth distribution within nations is out of scope in this research. On the other hand, the national wealth might be a superior determinant for cultural infrastructure, as only wealthy countries are financially capable to, for example, build and maintain expensive concert halls or opera houses. Furthermore, the introduction of country controls that also take to some extent account of heterogeneous behaviour of the population caused by wealth inequalities should further mitigate the arising bias.

3.4 Conclusion

In this study we provide important insights into the relationship between the incidence of wars and the migration of important classical composers, who in a broad sense serve as a representation of creative individuals. We employ a unique database that contains detailed records on migration of prominent composers, extracted from large music dictionaries, and link it with the occurrence of inter-state and intra-state wars for the time period 1816 to 1997. Based on dynamic fixed-effects estimation techniques we demonstrate a negative relationship between the incidence of wars and the number of composers in a country. The findings that are robust to a number of tests are consistent with research conducted on the causes of war-related migration: wars within states lead to higher emigration rates compared with wars between states, albeit the difference is not statistically significant. We further propose a rough comparison framework and conclude that composers are considerably more prone to forced emigration than an average citizen and also that the share of composers in the overall population decreases due to the incidence of war. And finally, we demonstrate that outmigration related to international wars decreases in the long-term the creative potential of a country.

This paper complements studies on the consequences of forced migration, which proclaim a strong negative impact of forced migrants on the receiving countries. In the period analyzed, as creative individuals might be expected to be relatively numerous among the forced migrants, some positive effects for the host countries can also be observed. Consider for example the European composers who emigrated to the USA during the

Second World War and gave considerable benefit to the cultural life of several American cities. Furthermore, this study sheds some light on the understanding of the marked geographic clustering of artists. The incidence of conflict is a significant driver of composers' location choice and hence wars might have contributed to geographic shifts of creative clusters. For example, after the Second World War the prominence of Paris as a cluster for classical music decreased, while the importance of New York strongly increased. Taking into consideration the literature on the importance of creative individuals for a location, the loss of the most talented individuals should be regarded as an important cultural cost of conflict that is faced by countries engaged in warfare. The disclosed cost might lead to the conclusion that the total cost of historical wars is higher than previously estimated. In particularly since war-related outmigration has a permanent negative impact on composers' stock in the country. Further research with a focus on individual characteristics of the forced migrant is needed to illuminate precisely the micro-level determinants of conflict-induced migration. In particular, studies on the destination of forced migrants, such as that of Borowiecki (2011c), could potentially provide new insights.

3.5 Tables

TABLE 1
DESCRIPTIVE STATISTICS: COMPOSERS' SUMMARY (n=171)

	Mean	Standard Deviation
	A. General characteristics	
Life-span (years)	69.45	15.18
Duration of career (years)	46.55	15.71
Duration of music-related education or training (years)	7.57	6.01
Involvement of any family member in any music-related activity	0.56	0.41
Murray's Index Score	7.74	10.80
	B. Birth country	
British Isles	0.07	0.26
Eastern Europe	0.08	0.28
France	0.23	0.42
Germanic Countries	0.23	0.42
Italy	0.08	0.28
Russia	0.12	0.33
Rest of Europe	0.07	0.17
USA	0.10	0.3
World	0.01	0.11
	C. Birth period	
Born 1800-1849	0.32	0.47
Born 1850-1899	0.54	0.50
Born 1900-1949	0.14	0.34
	D. Wars experienced during career	
Inter-state wars (years)	8.34	6.21
Intra-state wars (years)	0.88	1.88
Inter-state wars (count)	3.81	1.87
Intra-state wars (count)	1.13	1.27

SOURCE: Data on composers are obtained from Grove Music Online (2009) and Murray (2003). War data is employed from the Correlates of War data set (Sarkees, 2000).
NOTE: The summary is based on 171 prominent composers as listed in Appendix 1. The British Isles includes composers from England, Scotland, Ireland and Wales. Eastern Europe relates to composers born in any of the Eastern Europe countries as classified by United Nations Statistical Division, with the exclusion of Russia. The Germanic Countries relate to the three German-speaking countries of Germany, Austria and Switzerland. Rest of Europe covers composers from all other European countries. Rest of the World relates to composers that do not fit in any of the other categories. Inter-state wars/intra-state wars occurred in the country of residence of 152 composers/54 composers.

TABLE 2
DESCRIPTIVE STATISTICS: WARS AND COMPOSERS

	Average number of composers		
	During 4 years before war (1)	During war (2)	Difference (2) - (1)
Inter-state war (Continental or Colonial)	5.83	5.79	-0.04
	(0.46)	(0.48)	(0.68)
Continental war	6.87	7.84	-0.98
	(0.41)	(0.48)	(0.63)*
Colonial war	8.52	11.21	2.68
	(0.66)	(0.84)	(1.07)***
Intra-state war	4.51	2.51	-2.00
	(0.64)	(0.45)	(0.81)***

NOTE: Standard errors are in parentheses. ***/**/* indicate estimates that are significantly different from zero at 99/95/90 per cent confidence.

TABLE 3
WARS AND COMPOSERS

EXPLANATORY VARIABLE	Dependend variable: Log(composer)						
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Log(composer), t-1	0.727***	0.721***	0.724***	0.727***	0.705***	0.721***	0.725***
	(0.0387)	(0.0366)	(0.0369)	(0.0374)	(0.0398)	(0.0375)	(0.0381)
Log(composer), t-2	0.134**	0.135**	0.137**	0.136**	0.136**	0.136**	0.135**
	(0.0545)	(0.0531)	(0.0528)	(0.0530)	(0.0531)	(0.0533)	(0.0542)
Log(composer), t-3	-0.0238	-0.0231	-0.0242	-0.0248	-0.0147	-0.0226	-0.0221
	(0.0338)	(0.0356)	(0.0349)	(0.0347)	(0.0392)	(0.0349)	(0.0345)
Log(composer), t-4	0.0791**	0.0817**	0.0810**	0.0801**	0.0858**	0.0829**	0.0795**
	(0.0312)	(0.0301)	(0.0308)	(0.0309)	(0.0331)	(0.0335)	(0.0320)
Log(population)	0.0990	0.0956	0.102	0.103	0.0943	0.0819	0.0882
	(0.0741)	(0.0764)	(0.0737)	(0.0759)	(0.0665)	(0.0756)	(0.0771)
GDP per capita	0.00206	0.00179	0.00240	0.00209	0.00196	0.00126	0.00130
	(0.00598)	(0.00605)	(0.00618)	(0.00599)	(0.00594)	(0.00538)	(0.00554)
Inter-state war (all)	-0.00840						
	(0.0117)						
Inter-state war (colonial)		0.0601**					
		(0.0226)					
Inter-state war		-0.0643**	-0.0709**				
		(0.0210)	(0.0228)				
Intra-state war	-0.125***	-0.112***	-0.111***				
	(0.0202)	(0.0213)	(0.0209)				
Non-colonial war				-0.0780***			
				(0.0181)			
Inter-state war deaths					-0.0342***		
					(0.00545)		
Intra-state war deaths					-0.225***		
					(0.0479)		
Inter-state war deaths adjusted by pre-war population						-0.261***	
						(0.0719)	
Intra-state war deaths adjusted by pre-war population						-1.397	
						(0.925)	
Inter-state war deaths adjusted by pre-war armed forces							-0.00328***
							(0.000963)
Intra-state war deaths adjusted by pre-war armed forces							-0.00797
							(0.00613)
Country fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Time controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	1163	1163	1163	1163	1163	1163	1163
R-squared	0.947	0.945	0.945	0.909	0.946	0.944	0.944
Number of countries	10	10	10	10	10	10	10

NOTE: All specifications are estimated by generalized least-squares and contain time-controls (that are estimated with an indicator function equal to one for each decade; not reported). Heteroscedasticity robust standard errors are clustered at the country level and reported in parentheses. All inter-state wars are continental inter-state wars (i.e. wars that occurred on the continent of the participating country), unless stated otherwise. All variables are included at year t, unless stated otherwise. ***/**/* indicate estimates that are significantly different from zero at 99/95/90 per cent confidence.

TABLE 4

WARS AND POPULATION

	Dependend variable (DV):	
EXPLANATORY VARIABLE	Log(population) (1)	Log(composers share in population) 2)
Log(DV), t-1	1.510***	0.711***
	(0.0984)	(0.0408)
Log(DV), t-2	-0.510**	0.155**
	(0.204)	(0.0548)
Log(DV), t-3	0.0731	-0.0407
	(0.136)	(0.0330)
Log(DV), t-4	-0.0748**	0.0827**
	(0.0281)	(0.0339)
GDP per capita	0.000120	0.000157
	(9.81e-05)	(0.00733)
Inter-state war	-0.00267*	-0.0517***
	(0.00123)	(0.0157)
Intra-state war	-0.00117*	-0.0989*
	(0.000602)	(0.0460)
Country fixed effects	Yes	Yes
Time controls	Yes	Yes
Observations	1704	1060
R-squared	0.759	0.914
Number of countries	10	10

NOTE: All specifications are estimated by generalized least-squares and contain time-controls (that are estimated with an indicator function equal to one for each decade; not reported). Heteroscedasticity robust standard errors are clustered at the country level and reported in parentheses. All inter-state wars are continental inter-state wars (i.e. wars that occurred on the continent of the participating country). Each dependent variable is estimated as a function of its four lagged terms. All remaining variables are included at year t. ***/**/* indicate estimates that are significantly different from zero at 99/95/90 per cent confidence.

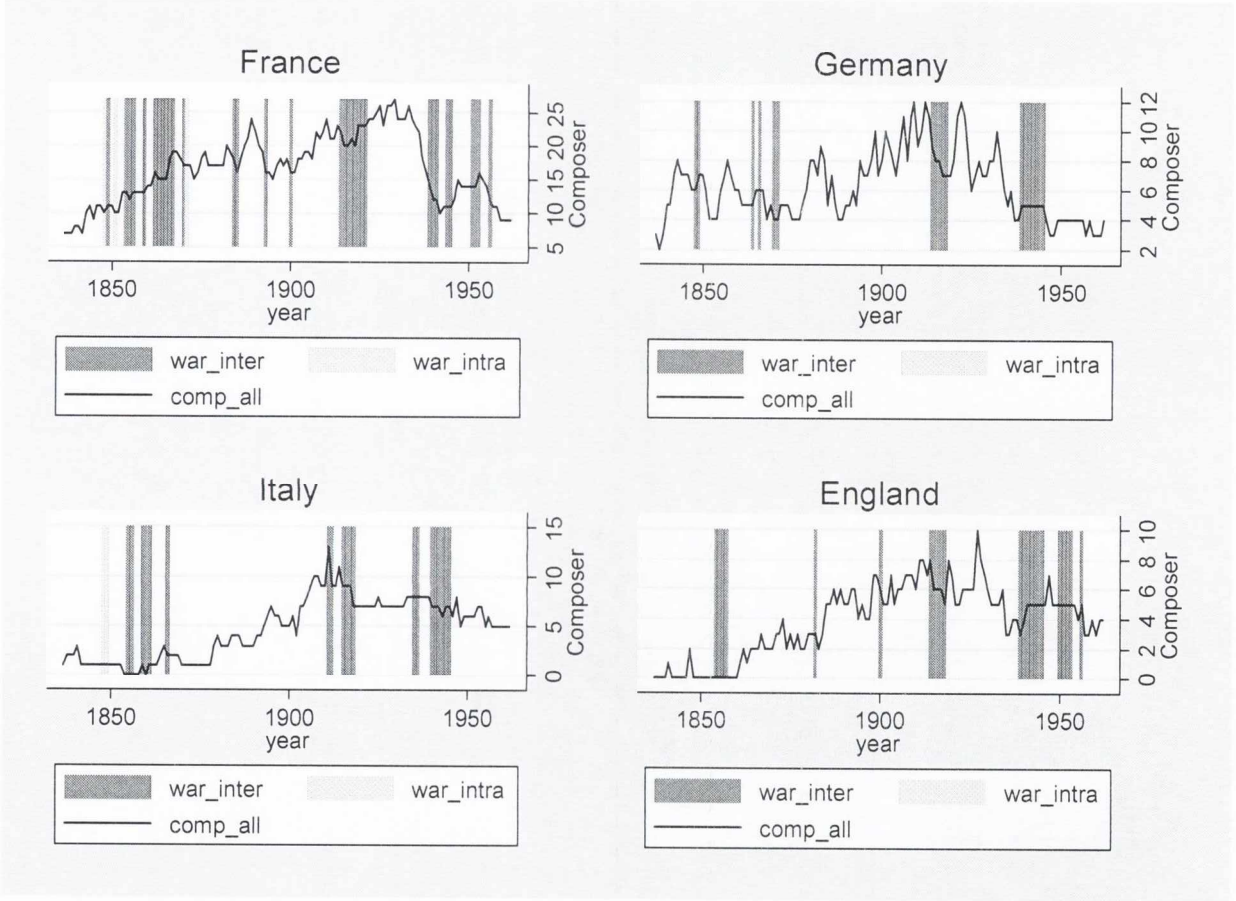
TABLE 5. EMIGRATION AND THE LONG-TERM

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	A: Mid-term impact						
	Log(composer), t+5	Log(composer), t+5	Log(composer), t+5	Log(composer), t+5	Log(composer), t+5		
Composers growth, t	0.159***			0.109**	0.109**		
	(0.0401)			(0.0438)	(0.0437)		
Intra-state war outmigration, t			-0.314	0.0682	0.147		
			(0.265)	(0.342)	(0.368)		
Inter-state war outmigration, t		-0.577***		-0.481***	-0.452***		
		(0.123)		(0.109)	(0.131)		
Intra-state war, t					-0.144		
					(0.0827)		
Inter-state war, t					-0.0328		
					(0.0664)		
Population and wealth controls	Yes	Yes	Yes	Yes	Yes		
Time controls	Yes	Yes	Yes	Yes	Yes		
Country fixed effects	Yes	Yes	Yes	Yes	Yes		
Observations	1144	1144	1144	1144	1144		
R-squared	0.579	0.580	0.577	0.582	0.583		
Number of countries	10	10	10	10	10		
	B: Long-term impact						
	Log(composer), t+1	Log(composer), t+2	Log(composer), t+3	Log(composer), t+5	Log(composer), t+10	Log(composer), t+15	Log(composer) t+20
Composers growth, t	0.170***	0.195***	0.0897*	0.109**	0.0511	0.0360	0.0284
	(0.0430)	(0.0496)	(0.0436)	(0.0438)	(0.0622)	(0.0431)	(0.0529)
Intra-state war outmigration, t	-0.415***	-0.439***	-0.111	0.0682	0.140	0.0545	-0.0298
	(0.0964)	(0.0944)	(0.403)	(0.342)	(0.192)	(0.363)	(0.226)
Inter-state war outmigration, t	-0.554***	-0.286**	-0.457***	-0.481***	-0.467**	-0.329***	-0.421**
	(0.0529)	(0.101)	(0.104)	(0.109)	(0.169)	(0.0694)	(0.132)
Population and wealth controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Time controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	1200	1184	1169	1144	1093	1044	992
R-squared	0.592	0.584	0.579	0.582	0.553	0.563	0.558
Number of countries	10	10	10	10	10	10	10

NOTE: All specifications are estimated by generalized least-squares and contain time-controls (that are estimated with an indicator function equal to one for each decade not reported). Heteroscedasticity robust standard errors are clustered at the country level and reported in parentheses. All inter-state wars are continental inter-state wars (i.e. wars that occurred on the continent of the participating country). Population and wealth controls are estimated with log population and GDP per capita. ***/**/* indicate estimates that are significantly different from zero at 99/95/90 per cent confidence.

3.6 Figures

FIGURE 1. WARS AND COMPOSERS



SOURCE: Grove Music Online (2009) and Sarkees (2000).
NOTE: The number of composers is depicted with a black line. Dark grey/light grey bars indicate the incidence of an inter-state war/intra-state war.

3.7 Appendix

APPENDIX 1
LIST AND DESCRIPTION OF VARIABLES

VARIABLE NAME	DESCRIPTION
A. COMPOSER VARIABLES	
Log(composer)	Logged number of all composers located in country
B. COUNTRY CHARACTERISTICS	
GDP per capita	GDP in 1990 USD adjusted by population size
Log(population)	Population in thousands at mid-year (in logs)
C. WAR VARIABLES	
Inter-state war (all)	Inter-state war dummy (=1 if inter-state war occurred in year t, 0 otherwise)
Inter-state war (colonial)	Inter-state war dummy (=1 if inter-state war occurred in year t *on other continent than country j*, 0 otherwise)
Inter-state war	Inter-state war dummy (=1 if inter-state war occurred in year t *on the continent of country j*, 0 otherwise)
Intra-state war	Intra-state war dummy (=1 if intra-state war occurred in a year t, 0 otherwise)
Inter-state war deaths	Annual battle-related deaths of a continental inter-state war (in 100,000)
Intra-state war deaths	Annual battle-related deaths of an intra-state war (in 100,000)
Inter-state war deaths adjusted by pre-war population	Annual battle-related deaths of a continental inter-state war adjusted by the pre-war population size (in percentage points)
Intra-state war deaths adjusted by pre-war population	Annual battle-related deaths of an intra-state war adjusted by the pre-war population size (in percentage points)
Inter-state war deaths adjusted by pre-war armed forces	Annual battle-related deaths of a continental inter-state war adjusted by the pre-war population size (in percentage points)
Intra-state war deaths adjusted by pre-war armed forces	Annual battle-related deaths of a intra-state war adjusted by the pre-war population size (in percentage points)

SOURCE: Composer variables are created based on information obtained from Grove Music Online (2009) and Murray (2003). Country characteristics are taken from (Madisson, 2006). War variables are employed from the Correlates of War data set (Sarkees, 2000).

APPENDIX 2
ROBUSTNESS CHECKS
TABLE A2.1
WARS AND COMPOSERS (Robustness Check: Disentangling the Effect of Migration)

	Dependend variable: *Log(composer)*							
	141 Composers (23 composers who *died* in a country that was engaged in warfare in that year are exluded.)				131 Composers (33 composers who *died or retired* in a country that was engaged in warfare in that year are exluded.)			
EXPLANATORY VARIABLE	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Log(composer), t-1	0.762***	0.751***	0.762***	0.762***	0.750***	0.736***	0.748***	0.750***
	(0.0508)	(0.0567)	(0.0504)	(0.0500)	(0.0489)	(0.0550)	(0.0479)	(0.0480)
Log(composer), t-2	0.0526	0.0530	0.0588	0.0579	0.0698*	0.0710**	0.0764**	0.0750**
	(0.0378)	(0.0345)	(0.0327)	(0.0332)	(0.0323)	(0.0293)	(0.0298)	(0.0298)
Log(composer), t-3	0.00320	0.0106	-0.00174	-0.00121	-0.0143	-0.00675	-0.0192	-0.0184
	(0.0431)	(0.0493)	(0.0476)	(0.0466)	(0.0606)	(0.0662)	(0.0653)	(0.0638)
Log(composer), t-4	0.0870*	0.0861*	0.0881*	0.0877*	0.0918	0.0911	0.0926	0.0916
	(0.0450)	(0.0453)	(0.0440)	(0.0438)	(0.0516)	(0.0525)	(0.0513)	(0.0502)
Log(population)	0.0650	0.0822	0.0557	0.0553	0.130*	0.152**	0.122*	0.121*
	(0.0677)	(0.0669)	(0.0636)	(0.0635)	(0.0592)	(0.0603)	(0.0567)	(0.0552)
Log(GDP)	-0.0379	-0.0440	-0.0307	-0.0312	-0.0904***	-0.0993***	-0.0837***	-0.0833***
	(0.0440)	(0.0456)	(0.0437)	(0.0434)	(0.0266)	(0.0300)	(0.0252)	(0.0235)
Inter-state war	-0.0424*				-0.0526*			
	(0.0226)				(0.0244)			
Intra-state war	-0.0929***				-0.0911***			
	(0.0163)				(0.0184)			
Inter-state war deaths		-0.0202***				-0.0243**		
		(0.00567)				(0.00797)		
Intra-state war deaths		-0.209***				-0.216***		
		(0.0332)				(0.0330)		
Inter-state war deaths adjusted by pre-war population			-0.136*				-0.178*	
			(0.0634)				(0.0789)	
Intra-state war deaths adjusted by pre-war population			-2.894***				-2.881***	
			(0.381)				(0.378)	
Inter-state war deaths adjusted by pre-war armed forces				-0.00121				-0.00170
				(0.00108)				(0.00132)
Intra-state war deaths adjusted by pre-war armed forces				-0.0306***				-0.0301***
				(0.00387)				(0.00371)
Country fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Time controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	1126	1126	1126	1126	1114	1114	1114	1114
Adjusted R-squared	0.875	0.877	0.876	0.875	0.862	0.865	0.863	0.863
Number of countries	10	10	10	10	10	10	10	10

NOTE: All specifications are estimated by generalized least-squares and contain time-controls (that are estimated with an indicator function equal to one for each decade; not reported). Heteroscedasticity robust standard errors are clustered at the country level and reported in parentheses. All inter-state wars are continental inter-state wars (i.e. wars that occurred on the continent of the participating country). All variables are included at year t, unless stated otherwise. ***/**/* indicate estimates that are significantly different from zero at 99/95/90 per cent confidence.

TABLE A2.2
WARS AND COMPOSERS (Robustness Check: Sample Selection)

	Dependend variable (DV):			
EXPLANATORY VARIABLE	Log(composer)	Log(composers in education)	Log(composers in retirement)	Log(composers during career, education or retirement)
	(1)	2)	(3)	(4)
Log(DV), t-1	0.724***	0.803***	0.488*	0.732***
	(0.0369)	(0.0647)	(0.194)	(0.0327)
Log(DV), t-2	0.137**	-0.0517	0.0494	0.132***
	(0.0528)	(0.0821)	(0.0479)	(0.0198)
Log(DV), t-3	-0.0242	0.0300	-0.0220	0.0271
	(0.0349)	(0.0546)	(0.0171)	(0.0315)
Log(DV), t-4	0.0810**	-0.0550	0.0430	0.0305
	(0.0308)	(0.0493)	(0.137)	(0.0246)
Log(population)	0.102	-0.0464	-0.367	0.115**
	(0.0737)	(0.0557)	(1.418)	(0.0362)
GDP per capita	0.00240	0.105**	-0.0961***	0.00337
	(0.00618)	(0.0338)	(0.0139)	(0.00583)
Inter-state war	-0.0709**	-0.0890*	0.0234*	-0.0702**
	(0.0228)	(0.0397)	(0.00815)	(0.0234)
Intra-state war	-0.111***	0.0468	0	-0.0839***
	(0.0209)	(0.0906)	(0)	(0.0196)
Country fixed effects	Yes	Yes	Yes	Yes
Time controls	Yes	Yes	Yes	Yes
Observations	1163	400	95	1258
Adjusted R-squared	0.909	0.705	0.738	0.931
Number of countries	10	8	4	10

NOTE: See Table A2.1.

TABLE A2.3
WARS AND COMPOSERS (Robustness Check: War Outbreak)

	Dependend variable: Log(composer)				
EXPLANATORY VARIABLE	Baseline	Annual observations excluded if war started in last quarter of year	Annual observations excluded if war started in last quarter or ended in first quarter of year	Wars excluded if started in last quarter or ended in first quarter of year	Disaggregated war-impact depending on war duration
	(1)	(2)	(3)	(4)	(5)
Log(composer), t-1	0.724***	0.727***	0.703***	0.704***	0.724***
	(0.0369)	(0.0359)	(0.0394)	(0.0389)	(0.0364)
Log(composer), t-2	0.137**	0.134**	0.160**	0.157**	0.139**
	(0.0528)	(0.0534)	(0.0576)	(0.0583)	(0.0516)
Log(composer), t-3	-0.0242	-0.0366	-0.0397	-0.0409	-0.0261
	(0.0349)	(0.0309)	(0.0297)	(0.0299)	(0.0355)
Log(composer), t-4	0.0810**	0.0921**	0.0973**	0.0992**	0.0805**
	(0.0308)	(0.0308)	(0.0326)	(0.0336)	(0.0315)
Log(population)	0.102	0.109	0.102	0.105	0.101
	(0.0737)	(0.0702)	(0.0710)	(0.0707)	(0.0749)
GDP per capita	0.00240	0.00190	0.00258	0.00188	0.00213
	(0.00618)	(0.00592)	(0.00610)	(0.00593)	(0.00604)
Continental war	-0.0709**	-0.0723**	-0.0689***	-0.0676**	-0.108**
	(0.0228)	(0.0259)	(0.0188)	(0.0230)	(0.0429)
Intra-state war	-0.111***	-0.111***	-0.0829**	-0.153**	-0.148***
	(0.0209)	(0.0214)	(0.0366)	(0.0629)	(0.0247)
Continental war (< 1 year)					-0.0287
					(0.0173)
Intra-state war (< 1 year)					-0.0890**
					(0.0339)
Country fixed effects	Yes	Yes	Yes	Yes	Yes
Time controls	Yes	Yes	Yes	Yes	Yes
Observations	1163	1128	1063	1038	1163
Adjusted R-squared	0.909	0.910	0.913	0.913	0.909
Number of countries	10	10	10	10	10

NOTE: See Table A2.1.

TABLE A2.4

WARS AND COMPOSERS (Robustness Check: Country Selection)

Dependend variable: *Log(composer)*

	GENERALIZED LEAST-SQUARES							
	13 countries (Austria, Czech Republic, Denmark, England, France, Germany, Hungary, Italy, Netherlands. Russia, Spain, Switzerland and USA)				7 countries (Austria, England, France, Germany, Italy, Russia and USA)			
EXPLANATORY VARIABLE	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Log(composer), t-1	0.740***	0.724***	0.737***	0.741***	0.727***	0.701***	0.722***	0.726***
	(0.0371)	(0.0398)	(0.0377)	(0.0383)	(0.0395)	(0.0440)	(0.0410)	(0.0411)
Log(composer), t-2	0.111*	0.110*	0.110*	0.109*	0.125*	0.124*	0.124*	0.123*
	(0.0530)	(0.0532)	(0.0533)	(0.0541)	(0.0607)	(0.0604)	(0.0609)	(0.0619)
Log(composer), t-3	-0.00701	0.00102	-0.00578	-0.00516	-0.0179	-0.00603	-0.0160	-0.0153
	(0.0343)	(0.0370)	(0.0341)	(0.0339)	(0.0401)	(0.0458)	(0.0402)	(0.0399)
Log(composer), t-4	0.0690**	0.0732**	0.0705**	0.0673**	0.0873**	0.0941**	0.0898**	0.0864**
	(0.0294)	(0.0316)	(0.0317)	(0.0303)	(0.0329)	(0.0354)	(0.0363)	(0.0342)
Log(population)	0.128*	0.120*	0.110	0.116*	0.112	0.105	0.0912	0.0990
	(0.0624)	(0.0574)	(0.0631)	(0.0639)	(0.0716)	(0.0650)	(0.0764)	(0.0765)
GDP per capita	0.00297	0.00237	0.00185	0.00183	0.00249	0.00139	0.000522	0.000974
	(0.00639)	(0.00611)	(0.00550)	(0.00566)	(0.00632)	(0.00584)	(0.00516)	(0.00548)
Inter-state war	-0.0746***				-0.0766**			
	(0.0222)				(0.0227)			
Intra-state war	-0.109***				-0.107***			
	(0.0197)				(0.0217)			
Inter-state war deaths		-0.0346***				-0.0377***		
		(0.00504)				(0.00562)		
Intra-state war deaths		-0.220***				-0.231***		
		(0.0457)				(0.0545)		
Inter-state war deaths adjusted by pre-war population			-0.267***				-0.279***	
			(0.0699)				(0.0715)	
Intra-state war deaths adjusted by pre-war population			-1.341				-1.369	
			(0.867)				(0.975)	
Inter-state war deaths adjusted by pre-war armed forces				-0.0034***				-0.0039***
				(0.000955)				(0.000848)
Intra-state war deaths adjusted by pre-war armed forces				-0.00752				-0.00762
				(0.00555)				(0.00637)
Country fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Time controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	1335	1335	1335	1335	1000	1000	1000	1000
Adjusted R-squared	0.901	0.903	0.901	0.901	0.918	0.920	0.918	0.917
Number of countries	13	13	13	13	7	7	7	7

NOTE: See Table A2.1.

TABLE A2.5

WARS AND COMPOSERS (Robustness Check: Countries with Extreme Characteristics)

Dependend variable: *Log(composer)*

EXPLANATORY VARIABLE	GENERALIZED LEAST-SQUARES											
	France dropped				Russia dropped				USA dropped			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Log(composer), t-1	0.753***	0.738***	0.750***	0.755***	0.760***	0.760***	0.760***	0.763***	0.744***	0.728***	0.744***	0.748***
	(0.031)	(0.031)	(0.031)	(0.031)	(0.031)	(0.031)	(0.031)	(0.031)	(0.031)	(0.031)	(0.031)	(0.031)
Log(composer), t-2	0.143***	0.142***	0.143***	0.141***	0.154***	0.153***	0.153***	0.153***	0.140***	0.139***	0.140***	0.139***
	(0.038)	(0.038)	(0.038)	(0.038)	(0.038)	(0.038)	(0.038)	(0.039)	(0.038)	(0.037)	(0.038)	(0.038)
Log(composer), t-3	-0.0234	-0.0147	-0.022	-0.0219	-0.039	-0.0369	-0.0369	-0.0367	-0.0263	-0.0149	-0.0244	-0.0247
	(0.038)	(0.037)	(0.037)	(0.038)	(0.038)	(0.038)	(0.038)	(0.038)	(0.037)	(0.037)	(0.037)	(0.037)
Log(composer), t-4	0.0858***	0.0912***	0.0880***	0.0836***	0.0842***	0.0852***	0.0858***	0.0816***	0.0925***	0.0991***	0.0937***	0.0899***
	(0.030)	(0.030)	(0.030)	(0.030)	(0.031)	(0.031)	(0.031)	(0.031)	(0.030)	(0.030)	(0.030)	(0.030)
Log(population)	-0.0905***	-0.0953***	-0.0837***	-0.0836***	-0.100***	-0.0936***	-0.0921***	-0.0933***	-0.0887***	-0.0975***	-0.0845***	-0.0830***
	(0.027)	(0.027)	(0.028)	(0.028)	(0.024)	(0.024)	(0.024)	(0.024)	(0.024)	(0.024)	(0.024)	(0.024)
GDP per capita	0.153**	0.169**	0.137*	0.137*	0.191***	0.173**	0.165**	0.171**	0.134*	0.174**	0.131*	0.124*
	(0.077)	(0.077)	(0.078)	(0.079)	(0.074)	(0.075)	(0.074)	(0.075)	(0.074)	(0.074)	(0.074)	(0.075)
Inter-state war	-0.0818***				-0.0543**				-0.0712***			
	(0.028)				(0.026)				(0.024)			
Intra-state war	-0.0977**				-0.116*				-0.104**			
	(0.047)				(0.067)				(0.045)			
Inter-state war deaths		-0.0316***				-0.0306***				-0.0306***		
		(0.008)				(0.011)				(0.007)		
Intra-state war deaths		-0.203***				-0.167*				-0.244***		
		(0.048)				(0.091)				(0.052)		
Inter-state war deaths adjusted by pre-war population			-0.271***				-0.175**				-0.219***	
			(0.074)				(0.068)				(0.064)	
Intra-state war deaths adjusted by pre-war population			-1.240**				-1.086**				-3.509***	
			(0.510)				(0.491)				(0.918)	
Inter-state war deaths adjusted by pre-war armed forces				-0.00327**				-0.00184				-0.00268**
				(0.001)				(0.001)				(0.001)
Intra-state war deaths adjusted by pre-war armed forces				-0.00684*				-0.00593				-0.0366***
				(0.004)				(0.004)				(0.010)
Observations	1014	1014	1014	1014	1012	1012	1012	1012	1045	1045	1045	1045
Adjusted R-squared	9	9	9	9	9	9	9	9	9	9	9	9
Number of countres	0.9	0.902	0.901	0.9	0.905	0.906	0.906	0.905	0.894	0.897	0.895	0.895

NOTE: See Table A2.1. All regressions contain country fixed effects (not reported).

TABLE A2.6

WARS AND COMPOSERS (Robustness Check: Countries with Extreme Characteristics)

Dependend variable: *Log(composer)*

EXPLANATORY VARIABLE	GENERALIZED LEAST-SQUARES			
	Austria dropped			
	(1)	(2)	(3)	(4)
Log(composer), t-1	0.707***	0.688***	0.706***	0.708***
	(0.0395)	(0.0433)	(0.0410)	(0.0415)
Log(composer), t-2	0.179***	0.178***	0.179***	0.178***
	(0.0393)	(0.0391)	(0.0389)	(0.0399)
Log(composer), t-3	-0.0191	-0.00905	-0.0176	-0.0175
	(0.0413)	(0.0461)	(0.0411)	(0.0408)
Log(composer), t-4	0.0569*	0.0605*	0.0566*	0.0547*
	(0.0253)	(0.0286)	(0.0272)	(0.0265)
Log(population)	0.0910	0.0848	0.0833	0.0859
	(0.0775)	(0.0724)	(0.0807)	(0.0803)
GDP per capita	0.000217	-0.000363	-0.000661	-0.000629
	(0.00599)	(0.00551)	(0.00505)	(0.00523)
Inter-state war	-0.0722**			
	(0.0277)			
Intra-state war	0.0983***			
	(0.0199)			
Inter-state war deaths		-0.0305***		
		(0.00464)		
Intra-state war deaths		-0.196***		
		(0.0481)		
Inter-state war deaths adjusted by pre-war population			-0.240**	
			(0.0983)	
Intra-state war deaths adjusted by pre-war population			-0.705	
			(0.534)	
Inter-state war deaths adjusted by pre-war armed forces				-0.00319**
				(0.00120)
Intra-state war deaths adjusted by pre-war armed forces				-0.00416
				(0.00282)
Country fixed effects	Yes	Yes	Yes	Yes
Time controls	Yes	Yes	Yes	Yes
Observations	1024	1024	1024	1024
Adjusted R-squared	0.914	0.916	0.914	0.914
Number of countries	9	9	9	9

NOTE: See Table A2.1.

TABLE A2.7

WARS AND COMPOSERS (Robustness Check: Model Selection)

Dependend variable: *Log(composer)*

EXPLANATORY VARIABLE	GENERALIZED LEAST-SQUARES (1)	(2)	(3)	(4)
D.Log(composer), t-1	-0.246***	-0.260***	-0.248***	-0.246***
	(0.0430)	(0.0448)	(0.0434)	(0.0439)
D.Log(composer), t-2	-0.0699**	-0.0830*	-0.0724**	-0.0706**
	(0.0294)	(0.0367)	(0.0300)	(0.0294)
D.Log(population)	0.445	-0.155	0.406	0.691
	(0.955)	(1.120)	(0.974)	(0.984)
D.GDP per capita	0.0337*	0.0330*	0.0296*	0.0340*
	(0.0168)	(0.0164)	(0.0153)	(0.0168)
Inter-state war	-0.0706**			
	(0.0238)			
Intra-state war	-0.0881***			
	(0.0185)			
Inter-state war deaths		-0.0306***		
		(0.00324)		
Intra-state war deaths		-0.199***		
		(0.0434)		
Inter-state war deaths adjusted by pre-war population			-0.237***	
			(0.0597)	
Intra-state war deaths adjusted by pre-war population			-1.201	
			(0.831)	
Inter-state war deaths adjusted by pre-war armed forces				-0.00307***
				(0.000903)
Intra-state war deaths adjusted by pre-war armed forces				-0.00663
				(0.00503)
Country fixed effects	Yes	Yes	Yes	Yes
Time controls	Yes	Yes	Yes	Yes
Observations	1181	1181	1181	1181
Adjusted R-squared	0.090	0.104	0.093	0.087
Number of countries	10	10	10	10

NOTE: See Table A2.1.

TABLE A2.8

WARS AND COMPOSERS (Robustness Check: Model Selection)

Dependend variable: *Log(composer)*

EXPLANATORY VARIABLE	GENERALIZED LEAST-SQUARES (1)	(2)	(3)	(4)
Log(composer), t-1	0.728***	0.709***	0.723***	0.727***
	(0.0395)	(0.0424)	(0.0395)	(0.0402)
Log(composer), t-2	0.141**	0.140**	0.140**	0.139**
	(0.0501)	(0.0508)	(0.0511)	(0.0514)
Log(composer), t-3	-0.0247	-0.0145	-0.0234	-0.0234
	(0.0352)	(0.0396)	(0.0351)	(0.0347)
Log(composer), t-4	0.0884**	0.0920**	0.0882**	0.0857**
	(0.0299)	(0.0319)	(0.0322)	(0.0307)
D.Log(population)	-0.136	-0.815	-0.101	0.157
	(1.249)	(1.352)	(1.264)	(1.253)
D.Log(GDP)	0.239***	0.220**	0.212**	0.242***
	(0.0673)	(0.0678)	(0.0653)	(0.0730)
Inter-state war	-0.0573**			
	(0.0243)			
Intra-state war	-0.117***			
	(0.0214)			
Inter-state war deaths		-0.0317***		
		(0.00483)		
Intra-state war deaths		-0.234***		
		(0.0364)		
Inter-state war deaths adjusted by pre-war population			-0.229**	
			(0.0717)	
Intra-state war deaths adjusted by pre-war population			-1.569*	
			(0.818)	
Inter-state war deaths adjusted by pre-war armed forces				-0.00263**
				(0.00102)
Intra-state war deaths adjusted by pre-war armed forces				-0.00956
				(0.00557)
Country fixed effects	Yes	Yes	Yes	Yes
Time controls	Yes	Yes	Yes	Yes
Observations	1163	1163	1163	1163
Adjusted R-squared	0.909	0.911	0.910	0.909
Number of countries	10	10	10	10

NOTE: See Table A2.1.

TABLE A2.9. WARS AND COMPOSERS (Robustness Check: Model Selection). Dependend variable: *Log(composer)*

EXPLANATORY VARIABLE	Model with no lags (1)	(2)	(3)	(4)	Model with two lags (5)	(6)	(7)	(8)	Model with six lags (9)	(10)	(11)	(12)
Log(composer), t-1					0.712***	0.689***	0.707***	0.710***	0.729***	0.702***	0.725***	0.729***
					(0.0431)	(0.0413)	(0.0430)	(0.0438)	(0.0450)	(0.0495)	(0.0466)	(0.0467)
Log(composer), t-2					0.181**	0.194***	0.184***	0.182**	0.133	0.135	0.134	0.134
					(0.0499)	(0.0497)	(0.0494)	(0.0500)	(0.0725)	(0.0724)	(0.0725)	(0.0735)
Log(composer), t-3									-0.0449	-0.0334	-0.0444	-0.0432
									(0.0457)	(0.0532)	(0.0462)	(0.0460)
Log(composer), t-4									0.0520	0.0509	0.0509	0.0497
									(0.0353)	(0.0367)	(0.0370)	(0.0363)
Log(composer), t-5									0.0650*	0.0682**	0.0658*	0.0640*
									(0.0283)	(0.0257)	(0.0272)	(0.0269)
Log(composer), t-6									-0.00426	0.00180	-0.00263	-0.00442
									(0.0268)	(0.0287)	(0.0278)	(0.0270)
Log(population)	1.014**	1.015**	1.008**	1.009**	0.0962	0.0978	0.0805	0.0840	0.0720	0.0609	0.0448	0.0529
	(0.413)	(0.387)	(0.408)	(0.408)	(0.0729)	(0.0664)	(0.0752)	(0.0740)	(0.0615)	(0.0570)	(0.0670)	(0.0671)
GDP per capita	0.114*	0.109*	0.109*	0.109*	0.00565	0.00499	0.00377	0.00401	4.49e-05	-0.000953	-0.00185	-0.00133
	(0.0522)	(0.0503)	(0.0498)	(0.0501)	(0.00790)	(0.00774)	(0.00690)	(0.00718)	(0.00620)	(0.00558)	(0.00530)	(0.00570)
Inter-state war	-0.0581				-0.073**				-0.0736**			
	(0.0491)				(0.0228)				(0.0221)			
Intra-state war	-0.301**				-0.08***				-0.114***			
	(0.0839)				(0.0234)				(0.0242)			
Inter-state war deaths		-0.066***				-0.037***				-0.038***		
		(0.0139)				(0.00494)				(0.00616)		
Intra-state war deaths		-0.53***				-0.232***				-0.238***		
		(0.0769)				(0.0396)				(0.0553)		
Inter-state war deaths adjusted by pre-war population			-0.41**				-0.265***				-0.279***	
			(0.130)				(0.0666)				(0.0727)	
Intra-state war deaths adjusted by pre-war population			-2.982*				-1.532				-1.507	
			(1.444)				(0.816)				(0.942)	
Inter-state war deaths adjusted by pre-war armed forces				-0.00611*				-0.0037***				-0.0038***
				(0.00252)				(0.000752)				(0.000800)
Intra-state war deaths adjusted by pre-war armed forces				-0.0202				-0.00910				-0.00873
				(0.0111)				(0.00538)				(0.00632)
Observations	1054	1054	1054	1054	1023	1023	1023	1023	982	982	982	982
Adjusted R2	0.633	0.643	0.633	0.632	0.915	0.917	0.915	0.915	0.917	0.920	0.918	0.917
Number of countres	7	7	7	7	7	7	7	7	7	7	7	7

NOTE: See Table A2.1. All regressions contain country fixed effects (not reported).

TABLE A2.10

WARS AND COMPOSERS (Robustness Check: Country-decade controls)

Dependend variable: *Log(composer)*

EXPLANATORY VARIABLE	GENERALIZED LEAST-SQUARES (1)	(2)	(3)	(4)
Log(composer), t-1	0.503***	0.492***	0.507***	0.505***
	(0.0314)	(0.0473)	(0.0490)	(0.0492)
Log(composer), t-2	0.0771**	0.0801	0.0795	0.0782
	(0.0339)	(0.0513)	(0.0514)	(0.0522)
Log(composer), t-3	-0.0566*	-0.0449	-0.0550	-0.0550
	(0.0333)	(0.0467)	(0.0413)	(0.0412)
Log(composer), t-4	0.0208	0.0270	0.0204	0.0179
	(0.0296)	(0.0388)	(0.0370)	(0.0358)
D.Log(population)	-0.00699	-0.0386	0.0132	0.0329
	(0.272)	(0.395)	(0.374)	(0.374)
D.Log(GDP)	-0.0344***	-0.0318*	-0.0330*	-0.0349**
	(0.0126)	(0.0153)	(0.0147)	(0.0142)
Inter-state war	-0.0547**			
	(0.0270)			
Intra-state war	-0.137***			
	(0.0473)			
Inter-state war deaths		-0.0284**		
		(0.00895)		
Intra-state war deaths		-0.251***		
		(0.0427)		
Inter-state war deaths adjusted by pre-war population			-0.194	
			(0.117)	
Intra-state war deaths adjusted by pre-war population			-1.860	
			(1.149)	
Inter-state war deaths adjusted by pre-war armed forces				-0.00327**
				(0.00134)
Intra-state war deaths adjusted by pre-war armed forces				-0.0111
				(0.0111)
Country fixed effects	Yes	Yes	Yes	Yes
Time controls	Yes	Yes	Yes	Yes
Country-decade controls	Yes	Yes	Yes	Yes
Observations	1163	1163	1163	1163
Adjusted R-squared	0.927	0.929	0.927	0.927
Number of countries	10	10	10	10

NOTE: See Table A2.1.

CHAPTER 4

Conflict-induced Migration of Composers:

An Individual-level Study

4. Conflict-induced Migration of Composers: An Individual-level Study

Abstract

This article investigates the impact of war on the probability to emigrate of 164 prominent classical composers born after 1800. This study provides first insights on the decision making process of the forced migrant, the associated dynamics of conflict-induced migration and the determinants of choice of a destination country. We find that the incidence of inter-state wars increases composers' probability to emigrate by around seven per cent and the incidence of intra-state wars by roughly nineteen per cent. The results imply that conflict impacts the migration intensity with a lag of approximately one year. We also find that the choice of a destination country in times of war is suboptimal from the career's perspective.

Keywords: migration, refugee, conflict, war, geographic concentration, composer

JEL Classifications: D74, F51, J61, Z10

4.1 Introduction

The costs of war are manifold. One of the most disastrous aspects of war are conflict-induced displacements of populations. Millions of people have left their homes for fear of politically motivated harm and seek as refugee asylum abroad. Such decisions to move are based on individual motivations. Little is however known about the decision making process of the conflict-induced migrant. It is also not clear what are the dynamics of forced migration and the determinants for choice of a destination country. The lack of such knowledge is particularly meaningful as political responses and the design of efficient policies for interventionism or delivery of efficient support for conflict-induced migrants becomes impossible.

The research on the causes and consequences of conflict-induced migration is hindered by the lack of adequately disaggregated data. The usually employed data sets are available only for whole refugee communities and contain the caveat of over-aggregation. Therefore, research on micro-motivations and incentives of forced migrants are mostly out of scope (Salehyan, 2007). There are no individual-level data sets available, because it is not feasible or secure to, for example, conduct representative surveys on migrants in regions where war takes place. In this article we overcome this problem by using historical data on prominent classical composers. It is the first attempt to identify the determinants of displacement at the individual level using rigorous statistical analysis. This article provides new, in a sense pioneering, insights on the decision-making processes of conflict-induced migrants.[48]

The data set employed is extracted from large, comprehensive music dictionaries and it covers a global sample of 164 prominent classical composers born between 1800 and 1949. We find that the incidence of an international conflict increases composers' probability to emigrate by around seven per cent and the incidence of civil war by roughly nineteen per cent. We further shed light on the dynamics of individuals' decision making process and find that conflict impacts with a lag of approximately one year. The results indicate that while in times of peace the best composers are more likely to emigrate, in

[48] In order to keep this research feasible and to ensure a reliable exploitation of the underlying data-set, we focus only on conflict-induced migration, as opposed to forced migration in general. Other forms of forced migration could be a result of politically motivated repressions, such as the dismissal of scientist in Nazi Germany (see Waldinger, 2011), or natural disasters.

times of war, the probability of emigration of the highest ranked composers decreases. The results also imply that the likelihood of emigration decreases for composers who have a family member involved in a music-related profession and can thus possibly avail of a better network that allows them to sustain the conflict without emigration. We also investigate the choice of a destination country and find that conflict-induced migrants make suboptimal decisions with regard to their musical careers. In times of war composers emigrate to countries that they already know and are familiar with, rather than, as it occurs in times of peace, to countries that would be beneficial for their musical development.

The rest of the chapter proceeds as follows. In the next section, we present related literature. In the Section 4.3, we introduce the data sources. In the Section 4.4, we present and discuss the empirical analysis, and in the last section, we provide concluding remarks.

4.2 Literature

There exists a large amount of influential research on the economic and political causes and consequences of conflict-induced migration. However, the data sets employed in this literature strand are usually available only on macro level and face the problem of over-aggregation. The data is disposable only for whole refugee communities and does not allow for studies of micro-motivations and incentives that theorists emphasize (Salehyan, 2007). The data constraint is of particular importance as the decision to emigrate is clearly based on *individual* motivations and there are many personal factors that facilitate or impede migration, such as personal sensitivities, intelligence or awareness of conditions elsewhere (e.g. Peterson, 1958). To our knowledge, the only individual-level study of conflict-induced migration is conducted by Engel and Ibanez (2007), who investigate the determinants of displacement for the case of Colombia. They use household-level surveys and estimate a random utility model of displacement.

Individual-level research is particularly important as migrants are very heterogeneous. Borjas (1987) argues that not necessary the most skilled individuals decide to emigrate but that self-selection is a very important driver to migration and hence it is dependent on the attributes of an individual. Interestingly, in countries with restrictive

immigration policies where asylum seekers constitute a relatively large share of immigrants, the hypothesis raised by Borjas are not always confirmed. Pederson et al. (2008), for example, find that immigration does not necessary occur to richer countries, indicating that welfare is not an important attraction for immigrants. This could be explained, as argued by the authors as well as by Nannestad (2007), by the fact that refugees are constrained in the choice of country, for example, by logistics. Furthermore, asylum seekers might not act as income maximizers but rather try to maximize the chance of being admitted as a refugee. In the light of those arguments, we would expect in this article to find that conflict-induced migrants are more likely to choose poorer countries and countries that are potentially safer destinations.

Migration flows depend also on the political environment of the origin country. Epstein et al. (1999) argue that in countries with easy contest for privilege the best individuals will emigrate first, whereas when contests are difficult, the worse are more prone to leave the country first. A possible determinant of the difficulty of contest and an important driver for outmigration is the incidence of war. It is further established that both, the type of conflict as well as the associated violence level determine migration flows. Civil wars have generated the highest migration rates, followed by wars between states. Whereas, the smallest emigration wave is caused by colonial wars (e.g. Schmeidl, 1997). Government violence or dissident violence are found to be important determinants, while measures of economic conditions (e.g. GNP) are mostly insignificant (e.g. Engel and Ibanez, 2007).

All in all, this paper also contributes to the cultural economics literature. O'Hagan and Hellmanzik (2008) have demonstrated a marked migration and geographic clustering activity for visual artists and O'Hagan and Borowiecki (2010) for classical composers. The authors provide qualitative arguments and suggest that war could bring an artistic cluster to an end and shift it to another location. Empirical evidence on war-related geographic de-clustering patterns, and also on the inter-temporal geographic shifts of creative clusters, is however not available. Knowledge on those dynamics is particularly meaningful as, on the one hand, geographic clustering is of considerable importance for creative production (e.g. Borowiecki, 2011a), on the other hand, migration might benefit the quality of artistic output (Hellmanzik, 2009). Borowiecki (2011b) models the aggregate stock of composers in a country and argues that the negative impact of war on the number of artists is much larger in

absolute terms than on the total population. The findings indicate an important cultural cost of conflict in form of the loss of creative individuals and, since creative individuals might be expected to be relatively numerous among the forced migrants, some positive effects for the host countries.[49]

4.3 Data

The selection of the composers covered by this study is based on Murray (2003) who provided a considerable and recognised survey of outstanding contributions to the arts and sciences from ancient times to the mid-twentieth century. The study of human accomplishment is conducted for several fields, including classical music, and for each outstanding individual in every discipline an index score is determined, based on the amount of space allocated to her or him in the reference works. The index score is normalised for all individuals listed in each discipline so that the lowest score is 1 and the highest score is 100. Since Murray's work is based on numerous international references there exists hardly a risk of a bias towards the country where a reference work has been published or marketed.[50]

The focus of this analysis is put on individuals born after 1800, since the population, GDP and especially war data sets are available from that period onwards. There are several implicit advantages of the selected time period of the 19th and 20th century. First, classical composers in this period were found to be extraordinary mobile individuals (O'Hagan and Borowiecki, 2010, and Borowiecki, 2011b) and hence sensible migration analyzes become possible; especially as the geographic spread of composers is very high. They became market oriented agents with a remarkable entrepreneurial drive (Scherer, 2004). Next, data on the lives of composers are available and relatively reliable, as opposed to, for example, artists of earlier periods. Furthermore, the period chosen covers wars that significantly shaped most recent history and encompasses many of the most influential composers of all time. Finally, the period under consideration covers only deceased composers hence an analysis of whole life periods becomes possible.

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[49] The potential benefits for the host region however are subject to an efficient assimilation of the immigrants and a realization of the 'immigration surplus', which can be often hindered by irrational behaviour or malevolent motives of natives or immigrants, as argued in Nannestad (2009).

[50] See O'Hagan and Borowiecki (2010) for a discussion and an example of marked country- or marketing-bias in some recognised reference works.

We use Grove Music Online (2009), the leading online source for music research, for the extraction of background information and migration patterns for the composers encompassed in this article. This large multivolume dictionary contains detailed biographies of all composers encompassed by this study and it is 'a critically organized repository of historically significant information' (Grove, 2009, Preface); therefore it is an ideal source for the purposes of this article.[51]

The focus of this analysis is directed only at the life periods of a composer in which music-related work dominated, that is when the composer was composing, giving tours, conducting philharmonic orchestras, teaching at music schools, managing music institutions or simply travelling in search of inspiration. The advantage of such restriction is the mitigation of individual's heterogeneity bias. Obviously a music student or an individual engaged only in non-music related activities would face very different migration propensities than a composer. By excluding the infancy, education and retirement life periods as well as periods in which only other professions were practised, we ensure that the individual from the sample was in fact a composer. The location changes are recorded from the first year a composer becomes involved in a music-related activity other than learning, for example, the artist composes his first work.

The data on wars is taken from the Correlates of War (COW), as introduced in Sarkees (2000). The employed database identifies conflicts between states (inter-state wars) and within states (intra-state wars) that occurred between 1816 and 1997. Furthermore, the COW database provides a number of records for each war, e.g. information in which region of the world the war occurred, the number of battle-related deaths sustained by the participants' armed forces and the size of the pre-war population.

The analyzed time period coincides with several changes in the political structure of countries, hence the following adjustments have to be made. As the authors of the conflict database aggregate the wars for Germany and Italy for the period before the unification in 1871 and during the 19th century, respectively, we similarly aggregate composers for both states. For the years 1816-1918, during the existence of the Austria-Hungary Union, the

[51] Note that the biographies included in the Grove Music Dictionary provide primarily music-related information (e.g. music-related parental background or duration of music training); any other records such as duration of general education are not consistently available.

composers as well the wars in Austria and Hungary are aggregated. As all composers in Czechoslovakia (state existing from 1918 to 1993) were located within the boarders of Czech Republic, we use the contemporary name. Furthermore, in order to study the extent of war-related emigration from a country, the data set needs to be revised for composers who left the country in order to serve the army, sustained a conflict-related death, or were imprisoned abroad in forced labour camps. Consequently a total of seven composers are excluded from the sample and as a result this study encompasses 164 prominent composers.[52]

The population and GDP per capita records are obtained from Maddison (2006). The used statistics on world population contains annual data from 1820 until 2006 for a majority of world countries. For a few missing years the population and GDP per capita series were linearly interpolated. Population is measured in thousands at mid-year and GDP per capita is measured in 1990 USD.

4.4 Empirics

This section describes and discusses the empirical analysis of this article. First, we propose the econometric estimation framework. Second, we report summary statistics. Third, we present and discuss the relationship between war and migration intensity. Fourth, we shed light on the heterogeneity of composers, and finally, we investigate what determines the choice of a particular destination country.

4.4.1 Methodology

We propose a model that estimates the probability to emigrate based on a specification at the individual year level:

$$P(Emigrate_{itc} = 1) = \beta_0 + \beta_1 War_{tc} + \beta_2 Age_{itc} + \beta_3 Age^2_{itc} + \beta_4 Composer_i +$$

[52] We exclude the following composers: Alban Berg, Henry Cowell, Olivier Messiaen, Nikolay Myaskovsky, Carl Orff, Richard Wagner and Ralph Vaughan Williams.

$$+ \beta_5 Year_t + \beta_6 Country_c + \beta_7 Demand_{tc} + \beta_8 X_i + \varepsilon_{itc} \quad (1)$$

The dependent variable ($Emigrate_{itc}$) is an indicator function that takes the value one for the composer i in the year t if he emigrated from the country c.[53] We are primarily interested how the probability to emigrate is influenced by the incidence of war (War_{tc}), which is measured with an indicator function that takes the value one if a war occurred in year t in country c. Therefore, of main interest is the coefficient β_1. In order to assure a robust estimation of the war impact, we introduce a number of control variables. We control for composer age effects with a quadratic age polynomial (age_{itc} and age_{itc}^2). In order to take account of unobservable composers' heterogeneity, the specification contains further indicator functions that take the value one for each single composer (and zero otherwise). We also include dummy variables for each single year to deal with unobserved time heterogeneity. The introduction of country controls accounts for difference between countries.[54] We account for demand specific factors by introducing control variables for logged population size and GDP per capita. In additional specifications we further control for some of composers' characteristics that could potentially influence the decision to migrate (e.g. duration of musical education). The standard errors (ε_{itc}) are clustered at the composer level, allowing for correlations between observations of a single composer (within individual i), but remaining independent between composers (i.e. individual i and j do not have correlated errors). As the dependent variable is binary we estimate a maximum-likelihood probit model and report the marginal effects, that is, the discrete change in the probability for the dependent variable for an infinitesimal change in the probability for each explanatory variable. In this research design reverse causality is not an issue. The causal relationship between migration and war appears to be clear: war potentially influences composers' migration intensity, not the other way round.

The COW database allows to disaggregate the war variable (i.e. War_{tc}) into inter-state war (i.e. war fought with an other state) and in intra-state war (i.e. war fought within

[53] Note that all international migration moves is consider and not only moves from a composer's birth country (i.e. country c is not necessary composers' birth country).

[54] As proposed by Vaubel (2005), a high degree of political fragmentation could significantly lower the migration cost between neighbouring jurisdictions. The employed country control variables account for this type of differences.

state borders between government and non-government forces). In the case of inter-state wars, we will also differentiate between wars fought on the continent of the country and colonial wars, i.e. conflicts that occurred on other continents. This division is motivated by the ample difference between those two types of international conflict. Colonial wars, which are usually fought by wealthy states with a high international prestige, might impact composers' migration patterns in a very different way than non-colonial wars.

A possible criticism of our approach is that the involvement of a composer's country of residence in a war does not necessary mean that the artist must have witnessed the conflict. A war could have happened in a different part of the country where the artist was located or it might have been fought only abroad. Nevertheless, we believe that direct experience of a war is not the only channel through which a creative individual might get affected. The impact might be indirect and could work for example through a change in a nations wealth due to a war and hence impact the demand, or through a change in societies cognition of security in times of war. We also acknowledge that the propensities to emigrate in times of war might vary depending on whether the individual was directly exposed to the war or experienced the conflict only indirectly.[55]

4.4.2 Data Inspection

A summary of composer's characteristics is presented in Table 1. The data set encompasses individuals who were engaged in music-related work during most of their lives (around 47 out of 69 years). Approximately one third of the composers had a father who was involved in a music-related activity (e.g. played piano, acted as conductor), the mother was engaged in music in around 26 per cent of the cases and in 22 per cent there was any other family member of the composer involved in a music-related activity. The mean Murray's Index Score is 7.7 with a marked right skewed distribution. Nearly one third of the composers were born in the first half of the 19th century, a half was born in the second part of the 19th century and the remaining artists were born in the 20th century. In roughly nine per cent of the yearly observations composers migrated, which indicates that they moved between

[55] As the available war data sets do not provide any details on the geographic extent of wars, we are unable to differentiate between direct and indirect exposures to war. The further presented results must be interpreted in light of this caveat.

countries almost six times during their lives. In the last panel of Table 1 we observe that composers' country of residence was involved during more than eight years in international wars and 0.88 years in civil wars. The duration of inter-state wars is 3.2 years and is higher than the duration of intra-state wars that lasted around 2.4 years. Almost every composer lived at some stage during his life in a country engaged in an international war and 54 out of the studied individuals lived in a country involved in an intra-state conflict.

The list of wars that are encompassed in this article along with their duration is provided in Table 2. The average intra-state war occurred in a country where 3.8 composers were located and inter-state wars engaged countries with 13.6 artists. The composer was located in a country involved in civil war on average during 1.6 years before he emigrated or the war ceased. International wars lasted for 2.8 years before the conflict finished or the composer left the country.

Table 3 provides a summary of the countries that played some role as the place of residence of classical composers. It can be viewed that France was the predominant country of residence for composers of the analyzed time period (visited by 73 artists and the average composer spent there 12.5 years). France is followed by United States (64 visits, 6.8 years), Germany (58 visits, 5 years) and Italy (31 visits, 4.1 years). Russia and Austria was visited by around 25 composers each, where the average artist spent 3.5 and 2.4 years of his life, respectively. The average country was engaged in 3.1 inter-state wars with a total duration of 8.3 years and in around one intra-state war with a total duration of 2.7 years.

Preliminary evidence for higher emigration rates in times of war can be gathered in Table 4 where we summarize the mean migration rates depending on the presence or absence of a conflict in the country of composers' residence. It can be observed in Panel A that around 8.7 per cent of all composers emigrate in the absence of any inter-state war. The share of migrant artists diminishes to 5.7 per cent in times of international conflict. The decrease indicates that emigration rates were by around three percentage points lower during inter-state wars than during peace. We next disaggregate the inter-state war variable into wars fought on the continent of the country (i.e. non-colonial wars) and wars that occurred on other continents (i.e. colonial wars). This division is motivated by the fundamental difference in the nature between those types of war. The colonial wars are

fought in remote regions and should not have a detrimental effect to, for example, the cognition of security. Furthermore, the colonial wars are fought by wealthy states with a high international prestige and such wars could rather indicate the countries' overall economic and social welfare rather than the incidence of a conflict. As expected the difference in migration intensity differs substantially depending on the geographic extent of the war. During non-colonial wars 11.5 per cent of composers emigrate. This indicates that approximately 33 per cent more composers emigrate if an inter-state war occurs than in times of peace. During colonial wars the share of composers who emigrate decreases by 4.5 percentage points. We observe also marked differences in the migration intensity depending on the presence or absence of intra-state wars. During civil wars as many as 7.3 per cent more composers leave their country of residence. All discussed differences are significantly different from zero at the usual confidence intervals.

4.4.3 Migration and War

Table 5 summarizes the results based on the proposed Model (1). In the regression reported in column (1) we observe that inter-state wars correspond with a marked increase of the emigration rate. Composers were 9.8 per cent more likely to depart from their country of residence during an international non-colonial conflict. The impact of intra-state wars is also positive albeit statistically undistinguishable from zero. The incidence of colonial wars has a negative impact on the emigration rate and the estimated coefficient indicates a 2.2 percentage decrease of the migration probability. The specification also contains controls for demand-related factors: logged population size (an approximation for the size of potential demand) and GDP per capita (a proxy for individual wealth). The point estimates on both variables have a negative sign (albeit not always significant different from zero), indicating composers' lower probability to emigrate from countries with larger population size or higher GDP per capita.

Due to the reasons described in the previous subsection, we drop the colonial wars variable and re-estimate the correlations between emigration rates and the incidence of a non-colonial inter-state war or intra-state war. The obtained point estimates on the war

variables, as reported in column (2), remain positive and indicate that during non-colonial wars or civil wars composers exposed consistently a higher propensity to emigrate.

An arising question concerns the dynamics of the war impact. It is important to understand whether higher emigration occurs in anticipation or as consequence of the war. Therefore, we study the lags and leads of the war variables and report the results in column (3). The impact of international non-colonial wars remains high and significant in the year of the conflict and carries somewhat over to the next year. The influence of intra-state wars remains positive in the year the war occurs and rises considerably in the year afterwards. The importance of intra-state wars becomes visible with a delay of one year and the estimated coefficient indicates that composers were twenty per cent more likely to emigrate if a civil war occurred in the previous year. Those effects disappear two years after the incidence of each conflict. There is also no significant relationship between wars and the probability to emigrate before the occurrence of the war. The total estimated impact of intra-state wars is greater than the effect of inter-state wars. The results are consistent with previous literature that found civil wars causing higher emigration rates than international conflicts.

The difference in the timing of the war effect on emigration might be caused by a consistent difference in the duration of international wars and civil wars. As the inter-state wars last on average 0.8 years longer than intra-state wars (Table 1), composers have considerably more time to respond to the conflict and to emigrate. To analyse the possibility of a lagged response to war, we exclude all wars that lasted longer than one year. The findings for the restricted sample, that covers eight inter-state wars and nine intra-state wars that lasted one year or less, are presented in column (4). The estimated coefficients for both types of war are much more comparable in their timing: international inter-state wars and intra-state wars have the greatest effect on composers' emigration rates with an annual delay. Civil wars lead to a highly significant increase of the emigration rate in the following year by around 18.6 per cent and non-colonial wars increase the probability to emigrate by seven per cent (with a p-value of 0.108).

In the last specification (reported in column (5)) we analyze the impact of wars on composers' immigration probabilities. An investigation is provided of the association

between the incidence of war in the destination country and the probability to immigrate to that country. The employed data set records in which year a composer has immigrated to a country and the probability to immigrate variable (i.e. $Immigrate_{itc}$) is modelled as a function of the participation of that country in war. The estimated coefficients on the war impact on immigration are marginal in size and not significant. It is reassuring that while the war-influence has a positive impact on the emigration rate, no such effect can be observed on the immigration rate. In other words, composers' probability to immigrate to a country is independent from the incidence of war. This result confirms that the analyzed wars have a clear negative impact on the stock of composers in a country, rather than simply an impact on the overall migration intensity. It is also encouraging to observe that the coefficients on the demand specific variables have now a positive sign and have an increasing influence on composers' probability to immigrate to a country.

Each war is unique and capturing the incidence of a war with a dummy variable might not adequately account for its heterogeneity. In particular the varying level of war-related violence, as suggested by recent research, might have a strong impact on migration rates. Therefore, we further take account of the varying intensities of conflict. We introduce a variable that measures the number of battle-related deaths sustained by the armed forces of composer's country of residence.[56] In order to adjust the variable for differences in size between countries, as well as inter-temporal differences in country size, we express the battle-related deaths in relation to the pre-war population size of the country where the composer resided. We further take account of varying durations of wars and express the term per year of duration of a conflict.

The results are reported in Appendix 1. The estimated point estimates for the war-related deaths per population size are positive and statistically significant for both types of war. An annual battle-related loss of one per cent of population during a non-colonial conflict would increase composers' probability to emigrate by over ten per cent and during civil war by around sixteen per cent. It is encouraging that the results are consistent with the results discussed above as well as with findings from previous research: migration

[56] For intra-state wars the number of deaths covers the total battle deaths of all participants, i.e. of the government and non-government forces. We believe that this measure takes best account of civil war violence. Both variables are obtained from the COW database.

intensities increase with rising war-related violence and intra-state wars cause higher emigration rates.

One might further worry about the bias arising due to lack of control for war effects. In particular when it comes to 'big' and 'small' wars a differentiation might prove important. Such disaggregation is however a difficult task given the limited availability of war records. We restrict the sample by deciding upon the number of annual deaths. Annual observations in which a war occurred that had less than 1,000 deaths are dropped. The point estimates for the restricted sample are presented in column (3) in Appendix 1. It can be viewed that the results are very similar to the baseline specification.

Emigration in times of war might not be a free choice, in particular if a composer is located in a totalitarian state. To some extent any bias arising due to unobserved differences between countries is already addressed by the inclusion of country controls. In addition to that we exclude all annual observations if a composer was located in Russia. The estimation for the restricted sample as reported in column (2) of the table in Appendix 2 indicates the robustness of the results.

Finally, we account for composers' migration history. For this reason we count all moves that occurred during a composer's life and introduce that measure as an additional control variable that reflects his individual preferences. The results are presented in column (3) in Appendix 2. As one would expect, the migration history variable has a positive association with the probability to emigrate. The main results remain however very stable.

4.4.4 Heterogeneity of Migrants

We further analyze the differences in the emigration rates depending on the quality of the individual. We distinguish between composers quality based on Murray's Index Score (MIS). In addition we approximate composers' quality with the presence of a music-related engagement of the composer's family members. In particular, we differentiate between artists whose either father, mother or any other family member was involved in a music-ralated activity. Since the Grove Dictionary lists musical engagement of family members only if those are of considerable importance, the proposed indicator functions could

possibly approximate composers inherited skills and provide some rough indication on his inborn quality. It is supposedly more likely for somebody to be better in a craft that has been exercised by his parents than otherwise.[57] Therefore, the employment of the proposed variables allows to shed some light on composer's migration intensity depending on his quality.

The heterogeneous war-effects on composers' emigration probabilities are reported in Table 6. Column (1) summarizes the baseline results (that is non-colonial inter-state war at year *t* or intra-state war at *t-1*). In column (2) we investigate which individual characteristics correspond with higher emigration rates and include MIS, as an approximation of composers' quality, and an indicator function for the presence of any music-related engagement of composers' father, mother or any family member. We find that composers with higher MIS are more likely to emigrate: ten points more on MIS result in an increase of the probability to emigrate by around 1.8 per cent. Composers whose family members are engaged in a music-related activity are more likely to emigrate. The increase in the emigration propensity is the highest if composer's mother or any other family member had music background. In a further specification we combine the war variables and the individual controls. The results are reported in column (3). The main results can be confirmed: inclusion of the additional individual controls does not alter the war-effect on emigration. We also observe that the point estimates for the measures of composers' characteristics remain consistent.

Next, we introduce interaction terms and study how the war-impact differs depending on individual's traits. In column (4) we introduce interaction terms between the conflict variables and MIS. We find consistent, positive and significant estimates for both war terms which provide further reassurance with regard to the robustness of the main results. It is also disclosed that the coefficients for the interaction terms are negative, albeit insignificant at the usual confidence levels. This indicates that all composers are affected by war, independent of their MIS. We further include interaction terms between the war variables and the indicator function for music-related background of composers' father, mother or any other family members. The findings can be viewed in columns (5) to (7). The

[57] It could be also the case that composers with family members involved in a related profession can avail of their network and have better access to demand and related supply industries.

overall war-effect remains consistent in size and sign: composers are significantly more prone to emigrate in times of war. Interestingly, no additional effect can be observed for composers with family members involved in music-related activity. The estimated coefficients on the interaction terms are never significant, suggesting no difference between artists if the proposed disaggregation is conducted.

The emerging picture is very interesting. While the better composers are more likely to emigrate in times of peace, it is not so anymore if a war breaks out. In times of war, all artists are affected by war and are prone to emigrate. This finding is somewhat in line with Epstein et al. (1999). In times of peace, when the contest for privilege is easy, the best composers emigrate first. Whereas, when the contest becomes difficult, as it is presumably the case in times of war, the selection changes.

4.4.5 Destination of Migration

An important question concerns the choice of a destination country: why does the forced migrant chose a particular destination? With the data set employed in this article we are able to overcome data limitations of previous research and we provide new insights on the determinants of choice of the destination country. We investigate the differences between the destination country and the origin country by focusing on a number of variables. We study whether the forced migrant has been before at the destination country and whether the destination country is the individual's country of birth. Furthermore, we analyze the differences in the number of composers, population size and GDP per capita between the destination and origin countries.[58]

We summarize the results in Table 7. In column (1) we observe that 56 per cent of all immigrations took place to a country that has been visited before by the migrant. Composers' birth country was chosen in around 28 per cent times for the destination. We further find that individuals moved to countries with a 0.75 higher number of composers,

[58] As the focus of this analysis lies on the choice of a particular country, rather than on modelling whether immigration occurred, we do not use the Model (1). It would be preferred to estimate a model that accounts for differences in characteristics between all possible destination countries and the origin country, i.e. a model that would also provide insights on the issue why a composer has *not* chosen a particular country. We refrain however from this approach due to the lack of data on all potential destinations, i.e. all countries that could have been chosen but were not.

349 thousand lower population size and a GDP higher by 110 USD per individual. In columns (2) and (3) we disaggregate the observations into immigrations that are triggered by war, i.e. if war was present in the origin country, and moves that occurred in times of peace, i.e. during absence of war in the country of origin. The differences between those observations are summarized in column (4). It can be viewed that if the move occurred during war, composers are over nine per cent more likely to immigrate to a country where they have been before. Artists are also four per cent more prone to return to their country of birth if the move is triggered by war. Furthermore, if the migration is caused by the incidence of conflict in the origin country, composers are moving to a country with 2.1 less composers, 25 million lower population size and 815 USD lower GDP per capita.

The investigation of correlation is further complemented by a simple regression analysis. For this reason we estimate the relationship between the previously discussed set of variables and the incidence of migration when the origin country was involved in war (as opposed to migration when origin country has been at peace).[59] The results are presented in Table 8. It can be observed that each analyzed variable on a stand-alone basis has a similar relationship in terms of sign to the results discussed previously (columns (1) to (4)). The association between immigration in times of war and the choice of a country where one has been before or difference in GDP per capita is only marginally outside the usual significance intervals (p-value is equal to 0.128 and 0.111, respectively). Column (5) combines all variables in one specification when further composer age, year and country controls are introduced as well as the error term is clustered at composer level. The probability of choosing a country that a composer has been before is higher by 29 per cent in times of war. The country with a lower composer stock and smaller population is more likely to be chosen by the conflict-induced migrant. In contrary to previous findings, the destination in times of war has a greater GDP per capita. It must be however noted that this specification contains possibly some noise due to multicollinearity issues, as for example, countries with larger population would have consistently more composers and often also greater wealth. Another problem with this specification is that the number of observations decreases substantially due to perfect predictability of some of the control variables.

[59] The formal model to be estimated is given by: $P((\text{Immigrate during war}_{itc}) = 1) = \beta_0 + \beta_1(\text{Been before at destination})_{tc} + \beta_2(\text{Difference in number of composers})_{tc} + \beta_3(\text{Difference in population})_{tc} + \beta_4 k(\text{Difference in GDP pc})_{tc} + \beta_5 \text{Age}_{itc} + \beta_6 \text{Age}^2_{itc} + \beta_7 \text{Year}_t + \beta_8 \text{Country}_c + \varepsilon_{itc}$.

The disclosed patterns seem to indicate that during times of war composers emigrate to countries where they have been before (or where they have been born). It is possible that the decision to emigrate in times of war has been made under pressure and in an environment where life might be endangered and cognition of security is low. Therefore, composers' main motivation for the emigration could be simply the exit from the country engaged in war and the move to a secure region. In times of peace, however, composers migrate to countries that seem to be better for them from the perspective of their careers. The chosen destination, if there is no pressure in form of war, is a larger and presumably wealthier country. Furthermore, it is a country with more classical composers where more occasions are available for peer-effects that, in light of Borowiecki (2011a), could lead to productivity gains of composers and thus be beneficial for their career. The results provide quantitative support for the explanations proposed in Nannestad (2007). Refugees choose more secure and relatively poorer destination countries than the average migrant. The emerging picture also adds to the argument of Ibanez and Moya (2009) on the vulnerability of forced migrants.

4.5 Conclusion

This article provides new insights into the decision making process of forced migrants. The analysis is based on a unique database that records basic background information and migration patterns of 164 prominent classical composers, and link it with the occurrence of inter-state and intra-state wars for the time period 1816 to 1997. We find that the incidence of international non-colonial war increases composers' probability to emigrate by approximately seven per cent and the incidence of civil war leads to around nineteen per cent higher emigration propensities. The findings are consistent with previous research conducted on the causes of war-related migration: wars within states lead to higher emigration rates compared with wars between states. Our results are also in coherence with previous findings of increasing refugee flows with higher war-related violence. We further find that conflict impacts individual's migration intensity with a lag of around one year and we provide an analysis of the characteristics of forced migrants. We finally investigate the choice of a destination country and find that conflict-induced migrants make suboptimal

choices regarding their musical development. In times of war composers emigrate to countries that they already know and are familiar with, instead of choosing countries that would be beneficial for their career.

This paper, apart from complementing studies on the magnitude and dynamics of forced migration, adds to the understanding of the marked shifts of artistic clusters. The incidence of conflict is a significant driver of composers' emigration intensity and hence wars might have contributed to geographic shifts of creative clusters. Considering the research on the importance of creative individuals for a region, the loss of the most talented individuals should be regarded as an important cultural cost of conflict that is faced by countries engaged in warfare.

4.6 Tables

Table 1. Composer Statistics.

	Mean	Standard Deviation
	A. Background information	
Life span (in years)	69.45	15.18
Duration of Career (in years)	46.55	15.71
Music-related engagement of father	0.33	0.47
Music-related engagement of mother	0.26	0.44
Music-related engagement of any other family member	0.22	0.42
Murray's Index Score	7.74	10.80
	B. Birth cohort	
Birth cohort 1800-1849	0.32	0.47
Birth cohort 1850-1899	0.54	0.50
Birth cohort 1900-1949	0.14	0.34
	C. Migration	
Migration (per annum)	0.09	0.28
Migration (per composer)	5.95	3.90
Return migration (per annum)	0.02	0.15
	D. Wars that the country of residence of the composer participated in	
International wars (in years)	8.34	6.21
Civil wars (in years)	0.88	1.88
Duration of international wars (in years)	3.20	2.14
Duration of civil wars (in years)	2.39	3.21
Number of composers who experienced international war	152	-
Number of composers who experienced civil war	54	-

SOURCE: Data on composers are obtained from Grove Music Online (2009) and Murray (2003). War data is employed from the Correlates of War dataset (Sarkees, 2000).
NOTE: This Table presents summary statistics for 171 composers.

Table 2. War Statistics.

Name of war	Duration		Number of composers residing in country engaged in war	Duration of composer's stay in country if it is engaged in war
	From	To		
Civil wars				
Russia vs. Circasians	1829	1840	3	5.0
Austria-Hungary vs. Magyars	1848	1849	1	1.0
Austria-Hungary vs. Viennese	1848	1848	2	1.0
France vs. Republicans	1848	1848	10	1.0
Two Sicilies vs. Liberals	1848	1848	1	2.0
France vs. Royalists	1851	1851	10	1.0
Untied States of America vs. Confederacy	1861	1865	1	3.0
Russia vs. Poles of 1863	1863	1864	4	1.8
France vs. Communards	1871	1871	17	1.0
Spain vs. Carlists of 1872	1872	1876	1	1.0
Untied States of America vs. Sioux India	1876	1876	1	1.0
Russia vs. Workers/Peasants	1905	1906	9	1.8
Russia vs. Kirghiz & Kazables	1916	1917	4	2.0
Russia vs. Anti-Bolsheviks	1917	1921	5	2.2
Finland vs. Communists	1918	1918	1	1.0
Hungary vs. Anti-Communists	1919	1920	2	2.0
Mexico vs. Huerta Led Rebels	1923	1924	1	1.0
Mexico vs. Cristeros	1926	1930	1	3.0
Russia vs. Central Asian Rebels	1931	1934	4	3.3
Brazil vs. Paolistas	1932	1932	1	1.0
Austria vs. Socialists	1934	1934	5	1.0
Spain vs. Asturian Miners	1934	1934	2	1.0
Spain vs. Fascists	1936	1939	2	3.5
Average			3.83	1.60
International wars				
Mexican-American	1846	1848	1	1.0
Austro-Sardinian	1848	1848	3	1.7
First Schleswig-Holstein	1848	1848	8	1.8
Roman Republic	1849	1849	11	1.0
Crimean	1853	1856	18	2.6
Italian Unification	1859	1859	16	1.0
Italo-Sicilian	1860	1861	1	1.0
Franco-Mexican	1862	1867	21	4.6
Second Schleswig-Holstein	1864	1864	8	1.0
Seven Weeks	1866	1866	9	1.0
Franco-Prussian	1870	1871	21	2.0
Russo-Turkish	1877	1878	5	2.0
Anglo-Egyptian	1882	1882	3	1.0
Sino-French	1884	1885	18	1.9
Franco-Thai	1893	1893	16	1.0
Spanish-American	1898	1898	2	1.0

Boxer Rebellion	1900	1900	25	1.0
Russo-Japanese	1904	1905	8	2.0
Italo-Turkish	1911	1912	11	1.7
World War I	1914	1918	65	3.8
Russo-Polish	1919	1920	3	1.7
Hungarian-Allies	1919	1919	5	1.0
Franco-Turkish	1919	1921	22	2.9
Sino-Soviet	1929	1929	3	1.0
Italo-Ethiopian	1935	1936	8	2.0
Changkufeng	1938	1938	4	1.0
World War II	1939	1945	64	5.0
Russo-Finnish	1939	1940	5	2.0
Korean	1950	1953	38	3.4
Russo-Hungarian	1956	1956	4	1.0
Sinai	1956	1956	15	1.0
Vietnamese	1965	1975	15	6.7
Falklands	1982	1982	2	1.0
Gulf War	1990	1991	5	1.0
Average			13.62	2.83

SOURCE: See Table 1.

Table 3. Country Statistics.

Country	Number of composers that visited country	Average duration of stay (in years)	International wars		Civil wars	
			Number (count)	Total duration (in years)	Number (count)	Total duration (in years)
Austria	24	2.4	6	17	3	3
Czech	11	1.6	1	1	0	0
Denmark	4	0.5	1	2	0	0
United Kingdom	25	3.2	8	21	0	0
Finland	2	0.4	2	8	1	1
France	73	12.5	13	34	3	3
Germany	58	5.0	6	18	0	0
Hungary	5	0.6	3	7	1	2
Italy	31	4.1	9	21	1	2
Netherlands	7	0.8	2	4	0	0
Poland	1	0.1	1	1	0	0
Russia	27	3.5	11	25	6	27
Spain	5	0.5	1	1	3	10
Sweden	3	0.1	0	0	0	0
Switzerland	14	1.2	0	0	0	0
United States	64	6.8	7	25	2	6
Average	15.78	1.92	3.13	8.30	0.96	2.70

SOURCE: See Table 1.
NOTE: Reported are only countries where the average composers stayed at least 0.1 years.

Table 4. Migration and War. Descriptive Evidence.

	Emigration if war absent (1)	Emigration if war present (2)	Difference (2) - (1)
	A. International wars		
All international wars	0.0867	0.0576	-0.0291*
	(0.0027)	(0.0114)	(0.0140)
Non-colonial wars	0.0850	0.1147	0.0296*
	(0.0026)	(0.0216)	(0.0191)
Colonial wars	0.0866	0.0415	-0.0451*
	(0.0027)	(0.0129)	(0.0182)
	B. Civil wars		
Intra-state war	0.0851	0.1579	0.0728*
	(0.0026)	(0.0421)	(0.0322)

NOTE: Standard errors are in parentheses. * denotes coefficients that are different from zero at the 10% confidence interval.

Table 5. Migration and War.

EXPLANATORY VARIABLES	Emigrate (1)	Emigrate (2)	Emigrate (3)	Emigrate (4)	Immigrate (5)
Inter-state war (t-2)			0.0218	0.0161	
			(0.0339)	(0.0368)	
Intra-state war (t-2)			-0.0283	-0.0318	
			(0.0286)	(0.0274)	
Inter-state war (t-1)			0.0437	0.0701	
			(0.0397)	(0.0544)	
Intra-state war (t-1)			0.201***	0.186***	
			(0.0884)	(0.0920)	
Inter-state war (t)	0.0986***	0.0660***	0.0674***	-0.0116	-0.0182
	(0.0398)	(0.0283)	(0.0297)	(0.0385)	(0.0154)
Intra-state war (t)	0.0185	0.0179	0.0251	0.0894	0.00658
	(0.0306)	(0.0304)	(0.0331)	(0.0914)	(0.0282)
Inter-state war (t+1)			-0.0211	-0.0371*	
			(0.0165)	(0.0153)	
Intra-state war (t+1)			0.00955	0.0676	
			(0.0433)	(0.0860)	
Colonial war	-0.0218				
	(0.0128)				
log(Population)	-0.0557	-0.0601	-0.0556	-0.0976*	0.0161*
	(0.0478)	(0.0480)	(0.0477)	(0.0527)	(0.00847)
GDP pc	-0.00678	-0.00868*	-0.00905**	-0.00698	0.00278
	(0.00468)	(0.00464)	(0.00460)	(0.00676)	(0.00380)
composer-age controls	yes	yes	yes	yes	yes
composer controls	yes	yes	yes	yes	yes
year controls	yes	yes	yes	yes	yes
country controls	yes	yes	yes	yes	yes
Observations	5258	5258	5258	4105	5258
R-squared	0.191	0.191	0.196	0.212	0.227

NOTE: Probit estimation techniques are employed. Marginal effects and pseudo R-square terms are reported. Standard errors are clustered at the composer level and reported in parentheses. All variables are estimated at year *t*, unless stated otherwise. The 'Inter-state war' variable records international non-colonial wars. We do not report composer-age controls (estimated with a quadratic age polynomial), composer controls (estimated with dummy variables equal to one for each composer), year controls (estimated with dummy variables equal to one for each year), nor country controls (estimated with dummy variables equal to one for each country). The fifth column reports estimates for a restricted sample of wars that lasted only one year or less (inter-state wars include: Austro-Sardinian, First Schleswig-Holstein, Roman Republic, Italian Unification, Second Schleswig-Holstein, Seven Weeks, Hungarian-Allies and Russo-Hungarian; intra-state wars include: Austria vs. Socialists, Austria-Hungary vs. Viennese, Brazil vs. Paolistas, Finland vs. Communists, France vs. Republicans, France vs. Royalists, Spain vs. Asturian Miners, Two Sicilies vs. Liberals and United States of America vs. Sioux Indians). ***/**/* indicate estimates that are significantly different from zero at 99/95/90 per cent confidence.

Table 6. Heterogeneity of Conflict-induced Migrants.

EXPLANATORY VARIABLES	Emigrate (1)	Emigrate (2)	Emigrate (3)	Emigrate (4)	Emigrate (5)	Emigrate (6)	Emigrate (7)
Inter-state war	0.211**		0.211**	0.342***	0.232**	0.119	0.213**
	(0.0884)		(0.0884)	(0.124)	(0.108)	(0.0847)	(0.103)
Intra-state war (t-1)	0.0650**		0.0650**	0.0731**	0.0439	0.0623*	0.0639**
	(0.0286)		(0.0286)	(0.0340)	(0.0285)	(0.0327)	(0.0311)
Murray's Index Score (MIS)		0.00176**	0.00202**	-0.00180			
		(0.000812)	(0.000818)	(0.00179)			
Music-related engagement of father (Father)		0.0151	0.0204		0.0404		
		(0.0313)	(0.0321)		(0.112)		
Music-related engagement of mother (Mother)		0.397***	0.428***			0.00144	
		(0.151)	(0.155)			(0.0801)	
Music-related engagement of any other family member (Family)		0.280***	0.287***				0.00322
		(0.0822)	(0.0837)				(0.0811)
Inter-state war * MIS				-0.000591			
				(0.00126)			
Intra-state war * MIS				-0.00550			
				(0.00415)			
Inter-state war * Father					0.0538		
					(0.0378)		
Intra-state war * Father					-0.0243		
					(0.0360)		
Inter-state war * Mother						0.00461	
						(0.0279)	
Intra-state war * Mother						0.0941	
						(0.102)	
Inter-state war * Family							0.00242
							(0.0307)
Intra-state war * Family							-0.00202
							(0.0557)
composer-age controls	yes	yes	yes	yes	yes	yes	yes
composer controls	yes	yes	yes	yes	yes	yes	yes
year controls	yes	yes	yes	yes	yes	yes	yes
country controls	yes	yes	yes	yes	yes	yes	yes
demand controls	yes	yes	yes	yes	yes	yes	yes
Observations	5258	5258	5258	5258	5258	5258	5258
R-squared	0.191	0.182	0.191	0.192	0.191	0.191	0.191

NOTE: Probit estimation techniques are employed. Marginal effects and pseudo R-square terms are reported. Standard errors are clustered at the composer level and reported in parentheses. All variables are estimated at year *t*, unless stated otherwise. The 'Inter-state war' variable records international non-colonial wars. We do not report composer controls (estimated with dummy variables equal to one for each composer), year controls (estimated with dummy variables equal to one for each year), country controls (estimated with dummy variables equal to one for each country), nor demand controls (i.e. logged population and GDP per capita).***/**/* indicate estimates that are significantly different from zero at 99/95/90 per cent confidence.

Table 7. Destination of Migration. Characteristics and Differences to Origin Country.

	All migration	Migration during peace in origin country	Migration during war in origin country	Difference
	(1)	(2)	(3)	(3) - (2)
Been before at destination	0.559*	0.546*	0.640*	0.094*
	(0.021)	(0.023)	(0.056)	(0.062)
Destination is birth country	0.277*	0.240*	0.283*	0.043
	(0.019)	(0.050)	(0.021)	(0.056)
Difference in number of composers	0.754*	1.054*	-1.093	-2.148*
	(0.420)	(0.447)	(1.193)	(1.209)
Difference in population	-349.1	2658.2*	-22659.6*	-25317.8*
	(3583.9)	(3682.3)	(12425.1)	(11012.3)
Difference in GDP pc	110.5	207.4*	-608.2	-815.6*
	(0.155)	(0.155)	(0.618)	(0.478)

NOTE: Standard errors are in parentheses. Differences are calculated between destination country and origin country. * denotes coefficients that are different from zero at the 10% confidence interval.

Table 8. Destination of Migration. Characteristics and Differences to Origin Country.

	Immigrate during war	Immigrate during war	Immigrate during war	Immigrate during war	Immigrate during war
	(1)	(2)	(3)	(4)	(5)
Been before at destination	0.0448				0.289**
	(0.0290)				(0.239)
Difference in number of composers		-0.00269*			-0.0176**
		(0.00153)			(0.00536)
Difference in population			-5.34e-07**		-2.14e-06**
			(2.41e-07)		(1.05e-06)
Difference in GDP pc				-0.00885	0.0578***
				(0.00554)	(0.0289)
composer-age controls	no	no	no	no	yes
year controls	no	no	no	no	yes
country controls	no	no	no	no	yes
Observations	549	536	362	362	53
R-squared	0.0053	0.0073	0.0188	0.0099	0.691

NOTE: Standard errors (except column (5) where errors have been clustered at the composer level) are in parentheses. The dependent variable is an indicator function that takes the value one if migration coincided with war in the origin country and zero for migration in times of peace. Differences are calculated between destination country and origin country. ***/**/* indicate estimates that are significantly different from zero at 99/95/90 per cent confidence.

4.7 Appendix

Appendix 1. Migration and War-related Violence.

EXPLANATORY VARIABLES	Emigrate (1)	Emigrate (2)	Emigrate (3)
Inter-state war	0.0707**		0.0591**
	(0.0300)		(0.0284)
Intra-state war	0.0168		0.0187
	(0.0302)		(0.0308)
Inter-state war deaths adjusted by pre-war population		0.105**	
		(0.0469)	
Intra-state war deaths adjusted by pre-war population		0.164*	
		(0.0998)	
composer-age controls	yes	yes	yes
composer controls	yes	yes	yes
year controls	yes	yes	yes
country controls	yes	yes	yes
Observations	5260	5260	5134
R-squared	0.19	0.19	0.19

NOTE: Column (3) reports point estimates for wars with more than 1,000 deaths per annum. See Table 6.

Appendix 2. Migration and War. Robustness Tests.

EXPLANATORY VARIABLES	Emigrate (Baseline category) (1)	Emigrate (Russia dropped) (2)	Emigrate (Migration history) (3)
Inter-state war (t)	0.0660***	0.0845***	0.0660**
	(0.0283)	(0.0328)	(0.0283)
Intra-state war (t)	0.0179	0.0108	0.0179
	(0.0304)	(0.0404)	(0.0304)
Migration history			0.00867*
			(0.00449)
log(Population)	-0.0601	-0.0634	-0.0601
	(0.0480)	(0.0482)	(0.0480)
GDP pc	-0.00868*	-0.00860*	-0.00868*
	(0.00464)	(0.00464)	(0.00464)
composer-age controls	yes	yes	yes
composer controls	yes	yes	yes
year controls	yes	yes	yes
country controls	yes	yes	yes
Observations	5258	4834	5258
R-squared	0.191	0.201	0.191

NOTE: Probit estimation techniques are employed. Marginal effects and pseudo R-square terms are reported. Standard errors are clustered at the composer level and reported in parentheses. All variables are estimated at year *t*. The 'Inter-state war' variable records international non-colonial wars. We do not report composer-age controls (estimated with a quadratic age polynomial), composer controls (estimated with dummy variables equal to one for each composer), year controls (estimated with dummy variables equal to one for each year), nor country controls (estimated with dummy variables equal to one for each country). Migration history measures the number of international moves of each composer (See also Panel C in Table 1). ***/**/* indicate estimates that are significantly different from zero at 99/95/90 per cent confidence.

CHAPTER 5

War and Creativity:

Solving the War-Art Puzzle for Classical Music Composition

5. War and Creativity:

Solving the War-Art Puzzle for Classical Music Composition

Abstract

The relationship between conflict and artistic output is ambiguous. This article proposes an explanation for the contradiction in research, which we term the *war-art puzzle*. We employ a global sample of 115 prominent classical composers born after 1800 and link their annual productivity with the incidence of wars. We construct age-productivity profiles and find that the impact of wars on creative production is markedly heterogeneous - composers' productivity was significantly higher during defensive or victorious international wars and lower during intra-state conflicts, offensive or lost international wars.

Keywords: productivity, conflict, war, innovation, composer

JEL Classifications: D24, D74, J24, F51, O31, N40, Z10

There is something suspicious about music, gentlemen. I insist that she is, by her nature, equivocal. I shall not be going too far in saying at once that she is politically suspect. - Herr Settembrini, ch. 4.

(Thomas Mann, *The Magic Mountain*, Fischer, 1924)

5.1 Introduction

What is the relationship between war and artistic creativity? How does conflict affect the emergence of great artists and masterpieces? In a variety of forms and contexts, these questions have long intrigued numerous social scientists from various academic disciplines. Historians seem to be unified in the argument that war is destructive and detrimental to the creative process itself. For decades distinguished scholars have not found any significant negative impact of war on arts or on the number of great artists. On the contrary, some studies revealed a positive impact of conflict on arts and artists. The ambiguous and counterintuitive relationship between war and arts that was found in previous research, we propose to term the *war-art puzzle*.

In this study we focus on important classical composers and attempt to explain the *war-art puzzle*. We briefly discuss exemplary cases and argue that certain types of war served as an inspiration for numerous masterpieces and that the topic of war often finds a broad audience. The main contribution of this article however is an econometric analysis of a varying relationship between war and composer's artistic output when differentiations between various types, initiations, outcomes or geographic extent of wars are conducted. For this study, a unique data set that covers migration patterns, extracted from music dictionaries, and artistic output of prominent classical music composers, is linked with the incidence of war as recorded in the Correlates of War data set (Sarkees, 2000). The database encompasses a global sample of 115 important composers born between 1800 and 1950.

We construct age-productivity profiles, to adjust for age effects, and find that composers' output is significantly higher during defensive, or not lost inter-state conflicts and that it is significantly lower during civil wars or offensive international wars. This paper demonstrates that exogenous conditions – the presence of peace or incidence of wars - have

an important influence on composers' productivity, especially when account is taken of various kinds of war.

This work apart from providing an important contribution to the understanding of the relationship between historical wars and creative production, relates to a series of papers on the productivity of modern visual artists. Galenson (2000) and Galenson and Weinberg (2000 and 2001) demonstrated that artists born before 1920 were likely to have produced their most valuable work late in their careers, whereas artists born in the 1920s and 1930s were more likely to have done their most valuable work at an early age. The authors argue that the decline observed in the peak age over time was caused by a shift in the nature of the demand for contemporary art. Ginsburgh and Weyers (2006) do not accept the last conclusion and claim the importance of exogenous shocks such as World War II.[60] This paper provides support for the Ginsburgh and Weyers' argument.

The remainder of this chapter is organized as follows. In the next section, we provide an overview of the two contradictory strands in the literature. In the Section 5.3, we propose an explanation of the observed contradictions. In the Section 5.4, we describe the data. In the Section 5.5, we present and discuss our main findings, and in the last section we provide concluding remarks.

5.2 Contradictions in qualitative and quantitative Research

Several distinguished scholars provide qualitative discussions of history and claim that war and internal unrest have a negative impact on artistic creativity and artists. Toynbee (1972) studies the rise and fall of 23 civilizations and describes how the suppression of conflict enables the flourishing of arts and great cultures. Only peace and the absence of internal frontiers enable circulation of ideas and discoveries, whereas military history provides a continuing illustration of the 'disastrous effects of relying on an old-fashioned technique instead of pressing on to meet the future with creative innovations.' Wright (1942) provides a thorough study of the institution of war, historically, legally and culturally, and concludes

[60] The age-price profiles presented (Galenson and Weinberg 2000, p. 772) indicate a marked increase in the quality of work that begins during the 1930s and 1940s. Moreover, the figures suggest that artists who during their career have experienced the Second World War produced paintings of a higher value.

'war in itself has never constructed (...) cultural institutions or practises, and it has often destroyed old organizations and customs.' The destructiveness of military conflict is also argued by Sorokin (1937), where internal disturbances and wars were defined as the sharpest forms of disorganization of a system of social relationships; a society without balanced fundamental norms and values cannot raise its own culture or create arts. Simonton (1975) focuses in a broad sense on supply-side aspects and speculates that, in times of war, investment of time, capital and labour might be switched from any activity not directly related to national defence or aggression. Expanding the argument proposed for demand-side considerations, it could be expected that in times of war when the fulfilment of basic needs is endangered or not satisfied, the demand for arts and cultural goods presumably falls and hence the incentives for artistic output decrease.

In recent decades social scientists however have not succeeded in establishing the negative impact of conflict on artistic creativity and number of great artists; despite having used a variety of databases and followed different methodological approaches. Simonton (1975) studies the impact of war on creativeness of Western Civilization from 700 B.C. to 1839 A.D. His sample consists of approximately 5,000 creative individuals, grouped in 127 generations, cited in an international collection of about 50 histories, anthologies, and biographical dictionaries. The war variable was defined as the number of war years within each generation and the hypothesis analyzed, that the number of creators in one generation is a negative function of the number of wars, was rejected. In a later study, Simonton (1976) studied the correlations between imperial instability (i.e. number of revolts and rebellions in the context of large empire states) and discursive creativity in the field of science, philosophy, literature and classical music. All observations were allotted to 122 generations covering the time period from 540 B.C. to 1900 A.D. The estimated coefficients were found to be positive and indicate that a higher number of creators existed in times of imperial instability – a tentative indication of a positive impact of war on creativity. More recently, Murray (2003) investigates the impact of war and internal unrest on the number of important European visual artists, writers, composers and scientists. These individuals are grouped by generation and the data set covers the period from 1400 to 1950. In a restricted regression, the variables that characterize war and social unrest had no significant effect on the number of important figures in a generation. The employment of an expanded model,

when several other explanatory and control variables are included, suggests that the impact of war on human accomplishment is positive and highly significant. Hellmanzik (2010) studied clustering premiums for visual artists and regressed prices of paintings on artist's age and several control variables, including dummies for both World Wars. The results indicate that artworks painted during World War I and World War II are valued higher by 6.1 per cent and 47.8 per cent, respectively. This finding is even more interesting as the war-premiums exceed on average the estimated cluster premiums.

Are the historians wrong in their claims concerning the destructiveness of war with regard to arts and culture? If not, why was no support found in the data? In the following section we provide efforts to explain the observed ambiguity, termed as noted earlier the *war-art puzzle*.[61]

5.3 Solution of the War-Art Puzzle

Why does the *war-art puzzle* exist? The answer might be twofold. First, it lies in the fact that some types of war often served as an important stimulus for masterpieces. Artists were inspired during times of war, which resulted in great artworks that bestowed on them the status of one of 'the most prominent' artists. Second, art inspired by war usually deals with the topic of war and this subject has broad appeal. War admirers find exciting the thrill connected to victories and the sheer exercise of power, whereas pacifists appraise the symbolic value of the disastrous and tragic events of military conflicts.[62]

Let us consider two examples. First, 'Wellington's Victory' - an orchestral work that was composed in 1813 by Ludwig van Beethoven to commemorate the Duke of Wellington's victory over Joseph Bonaparte's forces at the Battle of Vitoria in Spain. The bombastic piece, with its fanfares, cannonades and themes from British patriotic songs was thunderously acclaimed, especially by the English audience. Critics regard the composition to be 'tailored for popular success', one of the first mass productions that appeared at the 'dawn of the age [of] modern commercial propaganda' (Kinderman, 2009). A second

[61] The arguments, examples and findings presented throughout the paper should however under no circumstances be understood as an argument in favour of wars.

[62] If the number of contemporaneous war-related movies is any indicator, it can be concluded that the topic of war attracts also contemporary audience.

influential composition, 'Symphony No. 7' (also 'Leningrad Symphony') was composed by Dimitri Shostakovich within a month after the Nazis invaded Russia in the year 1941. The composer described the work to be 'about terror, slavery, and oppression of the spirit' and the composition became an icon of the resistance, suffering and hopes of the Russian people. Shostakovich's masterpiece received hundreds of performances, both in Russia and abroad.

The two examples presented are influential compositions that were written under the influence of a victorious or a defensive war. Other types of war might have had a negative impact on composition. Possibly, if some wars would not have occurred, the classical music canon might include some additional great compositions. Would Richard Wagner's leaving have been richer if he had not emigrated because of a civil war - the May Uprising of 1849 - from Dresden to an exile in Zurich, where he spent 12-years in isolation from the German musical environment and lived mostly without any notable income? How would the career of Carl Orff have developed if he were not drafted into the army in 1917, when he got severely wounded at the front and almost died due to his injuries? We will never know the answers to these specific questions. We can however employ a bigger sample of composers and use econometric methods in order to investigate the average relationship between composers' productivity and various types of war.

5.4 Data

This study builds upon a unique data set that covers a global sample of 115 prominent classical composers born between 1800 and 1949. The selection of the birth period is done for several reasons. First, data on the lives of composers are available and are relatively reliable, as opposed to, for example, composers of earlier periods. Second, the period chosen covers only deceased composers, and hence an analysis of a whole life output becomes possible. Third, the period encompasses many of the most influential composers of all time. Fourth, it covers wars that significantly shaped most recent history. Fifth, the geographic spread of births is fairly wide and composers' migration intensity is relatively high and hence a study of various types of war in a number of countries becomes possible.

The sampling technique aims at assuring maximum objectivity and reliability. The names of the most important composers are taken from Murray (2003). Murray's work is based on numerous international references and hence the risk of country- or marketing-biases in the selection is negligible. Data on composers' artistic output is taken from Gilder and Port (1978) which provides a qualitative selection of the most important works for 275 prominent classical composers born between 1500 and 1949. Gilder and Port aim to provide a dictionary 'of lasting value as a permanent reference (...) [that contains] (...) complete factual information about who wrote what, and when' (Gilder and Port, 1978, preface). The dictionary is a recognized survey of the most influential classical compositions and served often as a source for composer's output (e.g. Simonton, 1991). Furthermore, if we combine both sources (i.e. Gilder and Port, 1978, and Murray, 2003) for the period analyzed a relatively high intersection of 115 composers emerges.

For those composers we extract the birth locations and detailed information on their migration patterns from the Grove Music Online (2009), the leading online source for music research, as claimed by the authors of the dictionary. This large multivolume dictionary is 'a critically organized repository of historically significant information' (Grove, 2009, Preface) and is detailed enough to track the movements of all 115 composers.

What results is a unique data series that records the country of residence for each composer in every year of his life. In this study we focus only on the periods of a composer's life when music-related work was predominant, i.e. when a composer was composing, giving tours, conducting philharmonics, teaching at music schools, managing music institutions, or travelling in search of inspiration. The aim of this restriction is to analyze the life period in which an individual from the sample was in fact a composer. Hence the infancy, education and retirement life periods are excluded as well as periods in which only other professions were practised.

The war data set is based on the Correlates of War (COW), a reliable database introduced and described by Sarkees (2000). The COW data set identifies conflicts within

states and between states that occurred between 1816 and 1997[63], and lists a number of records for each war. The available information enables us to take account of war heterogeneity and to conduct distinctions between various types of war. First, we will differentiate between civil wars (*intra-state wars*) and international wars (*inter-state wars*). Second, the inter-state wars will be divided into *defensive* and *offensive inter-state wars*, based on the record whether a participating state has initiated an international war. Third, a division of wars will be conducted with regard to its *outcome*. The COW data set provides records whether an inter-state war participant was on the winning side, losing side or whether a tie resulted. Fourth, we differentiate between *continental wars*, i.e. wars that occurred on the continent of the participating country, and *colonial wars*, i.e. wars that occurred only on a continent different to that of the participant's continent. The composer and war data sets are linked through the country where a composer was located in a given year.[64]

For the composers included in this study we present a summary of the data in Table 1. The data set encompasses composers who were engaged in music-related work during most of their lives (around 46 out of 68 years). France and the Germanic countries (i.e. Germany, Austria, Switzerland) accounted for the highest share of births of important composers – approximately 20 per cent each, followed by Russia with 14 per cent of births, Italy and Easter European countries each with around 10 per cent of births.[65] One third of the composers were born in the first half of the 19th century, around 58 per cent were born in the second part of the 19th century and the remaining artists were born in the early 20th century.

Most of the important compositions are concert works (0.42 works per year), followed by chamber works (0.17 works per year) and theater works (0.13 works per year), while church compositions play only a marginal role (0.016 works per year). On average the

[63] The COW database covers also extra-state wars, i.e. wars between a state and a non-state entity. However, as none of these wars occurred within the boundaries of any of the countries analyzed, we do not include extra-state wars in our study.

[64] Note that for 1816-1918 (for the duration of the Austria-Hungary Union) the COW database aggregates wars in Austria and Hungary. To maintain consistency we also aggregate composers in that two countries for that time period. In analogy to the COW records we also aggregate composers for Germany and Italy for the period before the unification in 1871 and during the XIX century, respectively.

[65] See Table 1 for details on grouping of countries.

total yearly output is equal to 0.73 and suggests that an artist during his career was composing two important classical works in less than three years.

The average composer was located in a country that has been engaged during 1.1 years in intra-state wars and around 8.2 years in inter-state wars. The duration of defensive and offensive international conflict faced by the country of composers' residence was approximately 4.9 and 3.4 years, respectively. The wars in which composers' country of residence was victorious or that ended with a tie lasted 2.5 years and the conflicts lost had a duration of 5.8 years. The wars analyzed were fought either on the continent of the participating country (2.4 years) or on other continents (5.8 years).

In Table 2 we summarize composers' annual creative production outcomes, measured as the number of written works, for the entire lifetime as well as for the periods when a certain type of war lasted. In the third column we present the differences between the average lifetime production and the observed productivity during each type of war. We find here a first indication for marked differences in artistic production depending on the presence of peace or war. Composers were significantly less productive during intra-state wars as well as offensive and lost inter-state wars. We also observe that international defensive or not lost conflicts correspond with a significantly higher creative production.

5.5 Empirics

5.5.1 Model Specification

The aim of the econometric analysis is to provide a robust comparison of composers' lifetime productivity in times of peace and during certain types of war. The methodological approach resembles the identification strategy of Galenson and Weinberg (2000 and 2001) which we extend and apply in a very different context and to composers, as opposed to visual artists. Based on point estimates we generate age-productivity profiles for composers that have experienced peace or a certain type of war in a given year during their careers.

We estimate therefore a regression in which the number of important compositions written in one year is expressed as a polynomial in the age of the composer, interacted with war dummies. The causal relationship between creativity and war seems to be clear: war

influences artistic output, not the other way round; therefore reverse causality is not an issue.[66] The regression contains also a number of control variables. Taking account of unobserved heterogeneity of composers we include controls for each individual. The analysis stretches over a long time period in which composers' working conditions might have substantially changed over time. In order to capture this temporal variation we introduce binary variables for the year a work was composed. As different working conditions might have also existed between countries, we include a binary country control.[67]

Formally, the specification is given by:

$$composition_{it} = (\beta_1 age_{it} + \beta_2 age^2_{it} + \beta_3 age^3_{it} + \beta_4 age^4_{it})(peace_{it} + \sum_{k=1}^{K} war_{kit}) + \\ + \sum_{l=1}^{115} \psi_l I(i=l) + \sum_{m=1824}^{1992} \rho_m I(t=m) + \sum_{n=1}^{24} \mu_n I(country_{it}=n) + u_{it}, \quad (1)$$

where $composition_{it}$ denotes the number of important works written by composer i in year t and age_{it} indicates the age of composer i in year t; $peace_{it}$ is a binary variable equal to one if the country of residence of composer i was not engaged in war in the year t; war_{kit} is an indicator function that is equal to one for the type of war to be considered k that occurred in the country of residence of composer i in year t; Ψ_l indicates a set of dummy variables for individual composers ($I(i=l)$ is an indicator function equal to one if $i=l$); ρ_m denote a set of controls for each year and μ_n a set of control variables for each country ($I(t=m)$ is equal to one if the considered annual productivity occurred in the year m and $I(country_{it}=n)$ is equal to one if the considered annual productivity was written in country n). This methodology bears some similarity to the way Galenson and Weinberg (2000 and 2001) calculated cohort

[66] Note that the impact might not be direct and some transmission mechanism could be involved, for example the negative effect of conflict on composers' productivity might work through a decrease in wealth.

[67] Note that with the introduction of the controls described we address also the problem of hidden co-linearity. This issue would be negligible if wars were fully exogenous incidences. Conflicts however might be attributable to determinants from within the system, i.e. to variables that impact also artistic output. For example, bad economic conditions might have impacted the incidence of a war and might also correlate with the level of creative production.
As an additional control we have tried to include country-specific time trends (i.e. binary variables for a country *and* decade, or country *and* quarter-century) and found consistent results (not reported).

effects, whereas here we interact the age effect with the incidence of war rather than a cohort indicator.

Several remarks are in order. First, the estimations are conducted with a fourth-order polynomial in the composer's age. We have chosen the degree based on a test for the significance of higher-order terms.[68] The beneficial implication of the fourth-order polynomial is that it allows for single- and double-peaked career cycles. Second, the war variable will vary depending on the criteria of war segmentation imposed. All wars will be partitioned into intra-state and inter-state wars. Furthermore, we will take account of the heterogeneous nature of inter-state wars and will differentiate the international wars based on the initiation (defensive or offensive wars), outcome (lost or not lost wars) and geographic extent (continental or colonial wars). Third, in the model proposed we treat all types of classical compositions as equal. To take account of the heterogeneity of the dependent variable we conduct in the robustness analysis section out-of-sample estimations where the dependent variable is a specific type of classical work (e.g. $concertwork_{ij}$, $chamberwork_{ij}$) and find similar results. We complement this robustness analysis by the inclusion of a dummy for the city where the work was composed.[69] Fourth, in analogy to Galenson and Weinberg we estimate the proposed model using ordinary least squares regression techniques. This is justified by two assumptions. First, we assume no jumps between consecutive observations, i.e. the distance between the $composition_{it}$ variable being equal to, for example, 0 and 1 is assumed to be the same as the distance between 1 and 2.[70] Second, we assume that composers' preference for composing was always non-negative; as the underlying sample consists of the most important composers who devoted their lives to classical music, this assumption seems valid. As a result the dependent variable reflects real

[68] The fourth-order polynomial was chosen by including fifth-order terms in age and testing for their joint significance. An F-test of the hypothesis that the fifth-order terms were jointly zero yielded a p-value of 0.818. The p-value for the F-test that the fourth-order terms were jointly zero was 0.028. Employing a third- or fifth-order polynomial yields comparable results. The results are consistent for all specifications discussed in this paper.

[69] The specific local demand and cultural infrastructure could lead, for example, to the composition of predominantly chamber works in Vienna, concert works in London or theater works in Italian cities. Note that composers also often specialised in a certain type of composition (e.g. Georges Bizet in opera works), hence including composer fixed effects already takes account to some extent of the heterogeneity of compositions.

[70] As a robustness test we estimate a count model and describe the specification in the Section '5.5.3 Robustness Analysis'.

behaviour and is not 'zero inflated'. It is also not restricted upwards, for example, by a maximum value, as there are not any constraints imposed on composers' behaviour.

5.5.2 Econometric Results

We first divide all wars into intra-state and inter-state wars and report the estimated coefficients in Table 3. The age polynomials are estimated precisely and the models fit the data well. The regression estimates for all specifications are quite similar and provide consistent results, so we focus on those from the first specification.[71] Figure 1 plots the age-productivity profiles for years of peace and for periods of intra- or inter-state wars. Composers' productivity in times of peace increases up to the mid-30s before declining; the implied peak occurs at 34.9 years. The age-productivity profile in times of intra-state wars stops increasing at 31 years and it lies clearly below the productivity level corresponding with periods of peace for composers' entire lifetime. The difference is significant at the 99 per cent confidence interval.[72] Productivity during inter-state wars is statistically indifferent at the 5 per cent level from peaceful times. The p-value for the t-test that the productivity is higher in times of inter-state wars than in times of peace was above 0.057.

Second, we sort international wars by their initiation and report the regression estimates in column (1) to (3), Table 4. Figure 2 (based on the model from column 1, Table 4), plots the age-productivity profiles for times of peace and for the duration of defensive or offensive inter-state wars. The plot indicates that during defensive wars composers were more productive and peaked at 31.6 years (i.e. 3.3 years earlier than during peaceful times). The difference is significant with a p-value below 0.01. The number of compositions written during offensive wars is lower than during years of peace and the difference is significant with 99 per cent statistical confidence. The differences are particularly marked for younger composers and seem to converge for artists in their 50s and older.

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[71] Note that with the specifications in Column 2 or 3 we find minor differences in peak ages, which nevertheless are not of prime interest in this study, and, as the controls included vary over composers life-time (i.e. year, country or location controls), the age-productivity profiles contain more noise. The significance, size and direction of the differences in productivity remain however consistent (also throughout all models from Table 3).

[72] The findings are similar for intra-state wars that were won by the governmental forces. There are not enough observations to conduct a reliable analysis of intra-state wars won by the opposition.

Next, we differentiate between various outcomes of international wars and plot in Figure 3 the corresponding age-productivity profiles (based on estimates from column 4, Table 4). The results imply higher productivity rates during wars that ended with victory or tie. The difference is significant at the 99 per cent confidence interval and the peak in productivity occurs relatively early at 31.1 years. The estimated productivity during lost wars is significantly lower, independent of composers' age and peaks late at 38.4 years. The difference is once again highly significant and has a *p*-value below 0.01.

And finally we present in columns (7) to (9) of Table 4 the estimations when international wars are sorted by their geographic extent into continental or colonial conflicts. Figure 4 (based on the model from column 7, Table 4) depicts considerably higher productivity during times of continental wars, despite a temporary convergence during composers' early 50s. The difference is significant at over 99 per cent confidence. Productivity rates during colonial wars however are found to be only marginally lower.

5.5.3 Robustness Analysis

We first take account of the fact that classical works are not homogeneous. Different types of compositions might require for example various production times or access to different cultural infrastructure and hence could potentially disclose a different relationship with the incidence of war. We use an objective criterion and categorize all works into concert, chamber, theater and church works, judging on the type of composition as listed in Table A1. We then re-estimate all age-productivity profiles separately for each category of work and present the results in Figures A1.1 to A1.4.[73] The findings are consistent for concert and chamber pieces as well as mostly for church works – the composition intensity of these three types of works during peace and war correspond with the patterns for the aggregated output variable. The differences in the composition intensity of theater works in times of peace and war are almost invisible and mostly statistically insignificant. A possible

[73] Note that the imposed sorting criteria lead to a loss of many observations and the generated age-productivity profiles are based on a lower number of point-estimates. As a result the productivity profiles contain more noise and sometimes are estimated to lie in the negative area. Moreover, no church work was written in times of intra-state wars, and hence no profile can be constructed for this category of composition and war.

explanation could be the fact that it requires usually much longer production times for theater works which could lead to the diminishment of an immediate effect.

Next, we study the persistency of the war influence and construct age-productivity profiles for t years after the war has ended. The figures depicting composers' productivity 2 years after the war are presented in Figure A2.1 and imply a general convergence of the productivity functions. The convergence is mostly lagged for offensive and colonial inter-state wars: composers' productivity is even lower 1 or 2 years after these types of wars have finished. Within a period of 5 years however all differences lose their significance and the productivity levels during times of war and peace remain statistically undistinguishable. As the impact of war is statistically unobservable a few years after the war, the results of this robustness test provide further indication that it is the impact of wars on creative production we are measuring in the main part and that the incidence of conflict is the reason for the observed differences in the age-productivity profiles.

Further we investigate whether the war-impact differs for composers located in their mother countries and abroad. Table A3 visualises the remarkable migration intensity of composers: 77 per cent of the artists have been engaged during their lives in a music-related activity abroad and have spent on average almost one fourth of their careers abroad. We can however also observe that only a marginal part of the time spent abroad occurred when the host country was engaged in war. The final observation is consistent with the findings of Borowiecki (2011b) which indicates a strong negative relationship between the incidence of war and composers' choice of a residence country – artists were found to be avoiding regions engaged in warfare. As a result for our estimations – the war-productivity relationship found is almost entirely based on composers working in their mother countries and hence their productivity levels should be indistinguishable from the productivities of the entire sample. Figure A3.1 provides support for our expectation. The only exception appears for lost inter-state wars, during which creative productivity does not decrease for composers located in their mother countries and the lower artistic output observed is driven presumably by productivity decreases experienced by immigrant composers.

The sample size of composers living abroad in a country engaged in warfare is in general too small in order to estimate reliably age-productivity profiles for immigrant

artists. We however hazard generating productivity functions for the case of defensive inter-state wars as we believe there might exist critical differences in the impact of defensive wars depending whether the composer is located in his country of birth or abroad. It is quite likely that one of the drivers of higher productivities in times of defensive wars is a patriotic motive. One would expect this channel however to work only for composers located in their mother country and not for immigrants. Figure A3.2 depicts the levels of creative production for composers located in their mother country and abroad. It can be concluded that productivity only of home composers increases during defensive wars while no statistically significant differences can be found for immigrant composers.[74]

One might further suspect that the results are driven by extreme observations, for example, by exceptionally productive composers. The bias would be present if wars were not evenly spread across all composers and if the most productive artists experienced more wars than the average creative individual. We investigate this possibility by dropping the most productive 10 per cent of composers and then reconstructing the age-productivity profiles for the remaining individuals. The results as presented in Figure A4 indicate robustness of the main findings.[75]

Finally, the dependent variable contains observations that take only non-negative integer values. Given the underlying data set, as has been argued in the Section '5.5.1 Model Specification', the employment of OLS-techniques should not lead to any notable bias. Nonetheless, we investigate such possibility by estimating a negative binomial regression. The resulting age-productivity profiles are visualized in Table A5 in the Appendix. It is reassuring that all previous conclusions can be reaffirmed.

5.6 Conclusion

This work aims to contribute to the overall understanding of the relationship between war and creative production, based on the example of classical composers. We propose an explanation, supported by two brief case studies, for the ambiguity of previous research.

[74] Note that we do not have any observations for composers aged below 32, who lived abroad in a country engaged in a defensive war.

[75] We have also found similar results after we excluded best 5%, best 20%, best 5% and worst 5%, best 10% and worst 10%.

Based on a novel database we construct age-productivity profiles for periods of peace and various types of war for a global sample of 115 prominent composers born between 1800 and 1949. We find that international wars which ended with a victory or a tie, as well as defensive or continental inter-state wars, correspond with significantly higher productivity, whereas composers' productivity exhibits a negative correlation with offensive, lost or colonial (especially after the conflict ends) inter-state wars, or civil wars. The results seem to indicate that indeed some types of war have had a positive impact on high-profile creativity.

A possible criticism of our approach is that the involvement of a composer's country of residence in a war does not mean that he must have witnessed the conflict. Nevertheless, we believe that direct experience of a war is not the only channel through which a creative individual might get affected. The impact might work for example through a change in a nation's wealth due to a war, leading to a decrease in demand. Consider offensive or colonial wars – presumably the most expensive types of wars – and the corresponding lower artistic output during or immediately after those wars. Less expensive but probably more disruptive are intra-state wars during which we also observed marked drops in creative productivity. Possibly the change in society's cognition of security during such wars might have impacted both creative production as well as demand for artistic goods. Moreover, one further source of disorganization during civil wars might be the ambiguity of the enemy. But also social aspects must have played a role. The higher artistic productivity associated with victorious wars might correspond with some type of the individual's joy or during defensive wars patriotic motives might have been a further driver for artistic creativity.

While we have not addressed the question of the relationship between wars and the number of great composers, we argue that our results implicitly provide some indication with regard to the emergence of prominent composers. Let us first recollect that the creative output analyzed consists of the most influential works of each composer. It is because of these masterpieces that the composers encompassed by this study are regarded nowadays as the most important. In this sense, war that was demonstrated to have an impact on the number of significant compositions had an indirect influence on the emergence of great composers.

A further question that arises concerns the universality of our findings. We believe that our findings have a more general nature and could apply also to other fields of creative production. Consider, for example, Pablo Picasso who is discussed in Galenson and Weinberg (2001) as an artist who peaked early. A number of Picasso's artworks are inspired by war or deal with the topic of war. Presumably the most famous painting of all ('Guernica'), was depicted only a few days after the German bombing of the Basque town during the Spanish Civil War. Several other examples could be named from an extensive series of Picasso's paintings that reflect the overall sombre mood before, during and after the Second World War.[76] Examples can be also found in literature. Thomas Mann's 'The Magic Mountain' - one of the most influential works of 20th century literature – is a literary masterpiece that was written before and during World War I; it describes the European bourgeois society in the difficult decade before the First World War.

This study provides important insights on the relationship between war and composers' (or more in general – creative individuals') productivity. The most important contribution of this work is the demonstration of a highly heterogeneous impact of conflict on composer's productivity. Overall, the evidence presented indicates that the external environment of a composer may be an indispensable determinant of his productivity. The exogenous conditions - presence of peace or the incidence of war – could have a significant impact on the achievements of creative individuals and hence perhaps have considerably shaped the evolution of the classical music canon.

[76] E.g. *Death's Head*, 1943, *Skull, Sea Urchins and Lamp on a Table*, 1946, *Massacre in Korea*, 1951.

5.7 Tables

Table 1. Descriptive Statistics: Composers' Summary (n=115)

	Mean (1)	Standard Deviation (2)
	A. General characteristics	
Life-span (years)	68.42	14.50
Duration of Career (years)	45.68	14.29
	B. Birth country	
British Isles	0.087	0.283
France	0.217	0.414
Germanic Countries	0.191	0.395
Italy	0.096	0.295
Russia	0.139	0.348
Spain	0.026	0.16
Eastern Europe	0.096	0.295
Rest of Europe	0.043	0.205
USA	0.087	0.283
Rest of World	0.017	0.131
	C. Birth period	
Born 1800-1849	0.339	0.475
Born 1850-1899	0.583	0.495
Born 1900-1949	0.078	0.270
	D. Total works per annum	
Concert	0.420	0.420
Chamber	0.168	0.168
Theater	0.126	0.126
Church	0.016	0.016
Output (= Concert + Chamber + Church + Theater)	0.731	0.731
	E. Relative works per annum	
Concert	0.566	0.455
Chamber	0.205	0.363
Theater	0.205	0.380
Church	0.023	0.138
Output (= Concert + Chamber + Church + Theater)	1.0	-
	F. Wars experienced	
Intra-state wars (years)	1.13	2.25
Inter-state wars (years)	8.25	5.85
Defensive inter-state wars (years)	4.86	4.18
Offensive inter-state wars (years)	3.39	3.47
Lost inter-state wars (years)	2.53	3.27
Not lost inter-state wars (years)	5.77	4.72
Continental wars (years)	2.44	3.26
Colonial wars (years)	5.81	6.12

SOURCES: Data on composers are obtained from Grove Music Online (2009). Number of important compositions is taken from Gilder and Port (1978). War data is employed from the Correlates of War data set (Sarkees 2000).
NOTE: The *British Isles* include composers from England, Scotland, Ireland and Wales. *Eastern Europe* relates to composers born in any of the Eastern Europe countries as classified by United Nations Statistical Division, with the exclusion of Russia. The *Germanic Countries* relate to the three German-speaking countries of Germany, Austria and Switzerland. *Rest of Europe* covers composers from all other European countries. *World* relates to composers that do not fit in any of the other categories.

Table 2. Descriptive Statistics: Composers' Productivity and Wars.

	Observations (1)	Total compositions per annum (2)	Difference: wartime - lifetime (3)
Lifetime	5253	0.731	-
		(1.078)	
Intra-state wars	130	0.461	-0.269*
		(0.845)	(0.095)
Inter-state wars	949	0.719	-0.012
		(1.059)	(0.038)
Defensive inter-state wars	559	0.817	0.086*
		(1.137)	(0.048)
Offensive inter-state wars	390	0.577	-0.154*
		(0.920)	(0.056)
Lost inter-state wars	291	0.474	-0.257*
		(0.848)	(0.064)
Not lost inter-state wars	658	0.827	0.095*
		(1.124)	(0.044)
Continental wars	281	0.783	0.052
		(1.124)	(0.066)
Colonial wars	668	0.692	-0.039
		(1.030)	(0.044)

SOURCES: See Table 1.
NOTE: Standard deviations are reported in parentheses. * indicates estimates significantly different from zero at 95 per cent confidence.

Table 3. Composers' Lifetime Productivity during Intra- and Inter-State Wars
Dependent Variable: $COMPOSITIONS_{ij}$

EXPLANATORY VARIABLE	ORDINARY LEAST SQUARES (1)	(2)	(3)
peace * age	0.225	0.264	0.295
	(0.0468)	(0.0484)	(0.0489)
peace * age^2	-0.00611	-0.00732	-0.00822
	(0.00154)	(0.00157)	(0.00159)
peace * age^3	6.72e-05	8.01e-05	9.12e-05
	(2.11e-05)	(2.17e-05)	(2.19e-05)
peace * age^4	-2.69e-07	-3.08e-07	-3.57e-07
	(1.03e-07)	(1.06e-07)	(1.07e-07)
intra-state war * age	-0.0535	-0.0552	-0.0538
	(0.0481)	(0.0498)	(0.0501)
intra-state war * age^2	0.00306	0.00305	0.00288
	(0.00307)	(0.00317)	(0.00319)
intra-state war * age^3	-5.99e-05	-5.77e-05	-5.30e-05
	(6.11e-05)	(6.30e-05)	(6.32e-05)
intra-state war * age^4	3.80e-07	3.53e-07	3.18e-07
	(3.83e-07)	(3.93e-07)	(3.94e-07)
inter-state war * age	0.00160	0.00791	0.00752
	(0.0200)	(0.0207)	(0.0207)
inter-state war * age^2	-0.000140	-0.000708	-0.000707
	(0.00113)	(0.00115)	(0.00116)
inter-state war * age^3	2.70e-06	1.48e-05	1.47e-05
	(2.03e-05)	(2.07e-05)	(2.08e-05)
inter-state war * age^4	-1.37e-08	-9.17e-08	-8.98e-08
	(1.17e-07)	(1.19e-07)	(1.19e-07)
Composer controls	yes	yes	yes
Year controls		yes	yes
Country controls		yes	yes
Location controls			yes
Observations	5253	5253	5253
R-squared	0.502	0.525	0.535

NOTE: Standard errors are in parentheses.

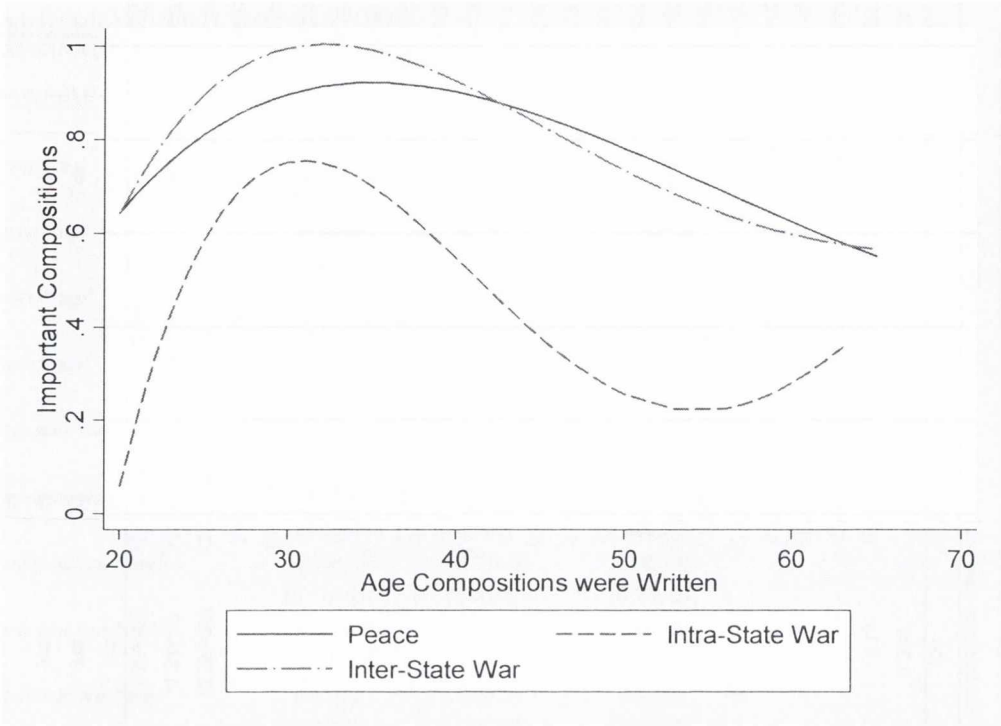
Table 4. Composers' Lifetime Productivity during Various Types of Inter-State Wars
Dependent Variable: $COMPOSITIONS_{ij}$

SORTING CRITERIUM:	BY INITIATION (OLS)			BY OUTCOME (OLS)			BY GEOGRAPHIC EXTENT (OLS)		
EXPLANATORY	war(A): Defensive inter-state wars war(B): Offensive inter-state wars			war(A): Lost inter-state wars war(B): Not lost inter-state wars			war(A): Continental inter-state wars war(B): Colonial inter-state wars		
VARIABLE	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
peace * age	0.241	0.278	0.308	0.238	0.278	0.309	0.235	0.276	0.304
	(0.0466)	(0.0480)	(0.0484)	(0.0462)	(0.0476)	(0.0481)	(0.0470)	(0.0485)	(0.0489)
peace * age^2	-0.00660	-0.00770	-0.00856	-0.00650	-0.00769	-0.00858	-0.00639	-0.00764	-0.00843
	(0.00153)	(0.00157)	(0.00158)	(0.00152)	(0.00156)	(0.00157)	(0.00154)	(0.00158)	(0.00160)
peace * age^3	7.33e-05	8.47e-05	9.54e-05	7.22e-05	8.47e-05	9.58e-05	7.07e-05	8.41e-05	9.38e-05
	(2.11e-05)	(2.16e-05)	(2.18e-05)	(2.09e-05)	(2.15e-05)	(2.17e-05)	(2.12e-05)	(2.18e-05)	(2.20e-05)
peace * age^4	-2.96e-07	-3.29e-07	-3.76e-07	-2.91e-07	-3.30e-07	-3.79e-07	-2.84e-07	-3.26e-07	-3.69e-07
	(1.03e-07)	(1.06e-07)	(1.07e-07)	(1.02e-07)	(1.05e-07)	(1.06e-07)	(1.04e-07)	(1.06e-07)	(1.07e-07)
war(A) * age	-0.00239	0.00307	0.00177	-0.0158	-0.00934	-0.0157	0.00946	0.00983	-0.00890
	(0.0244)	(0.0255)	(0.0255)	(0.0340)	(0.0344)	(0.0345)	(0.0421)	(0.0430)	(0.0433)
war(A) * age^2	0.000502	-7.32e-05	-6.21e-05	0.000245	-0.000191	9.62e-05	-0.000464	-0.000807	0.000190
	(0.00135)	(0.00138)	(0.00139)	(0.00198)	(0.00200)	(0.00201)	(0.00251)	(0.00254)	(0.00256)
war(A) * age^3	-1.41e-05	-1.42e-06	-1.29e-06	4.42e-06	1.29e-05	8.32e-06	8.08e-06	1.77e-05	4.61e-07
	(2.39e-05)	(2.44e-05)	(2.44e-05)	(3.65e-05)	(3.68e-05)	(3.70e-05)	(4.76e-05)	(4.81e-05)	(4.83e-05)
war(A) * age^4	1.06e-07	2.33e-08	2.23e-08	-6.83e-08	-1.23e-07	-9.74e-08	-4.71e-08	-1.20e-07	-2.51e-08
	(1.36e-07)	(1.38e-07)	(1.38e-07)	(2.14e-07)	(2.16e-07)	(2.17e-07)	(2.88e-07)	(2.91e-07)	(2.92e-07)
war(B) * age	0.0340	0.0398	0.0399	0.0195	0.0253	0.0284	-0.00280	0.00840	0.0150
	(0.0321)	(0.0327)	(0.0327)	(0.0236)	(0.0244)	(0.0244)	(0.0227)	(0.0233)	(0.0234)
war(B) * age^2	-0.00268	-0.00312	-0.00311	-0.000943	-0.00149	-0.00166	4.06e-06	-0.000802	-0.00118
	(0.00187)	(0.00190)	(0.00190)	(0.00132)	(0.00135)	(0.00135)	(0.00127)	(0.00129)	(0.00130)
war(B) * age^3	5.79e-05	6.72e-05	6.67e-05	1.38e-05	2.57e-05	2.82e-05	1.00e-06	1.69e-05	2.30e-05
	(3.45e-05)	(3.49e-05)	(3.50e-05)	(2.35e-05)	(2.39e-05)	(2.39e-05)	(2.26e-05)	(2.30e-05)	(2.31e-05)
war(B) * age^4	-3.75e-07	-4.36e-07	-4.30e-07	-5.71e-08	-1.34e-07	-1.45e-07	-6.02e-09	-1.03e-07	-1.34e-07
	(2.02e-07)	(2.05e-07)	(2.05e-07)	(1.34e-07)	(1.36e-07)	(1.36e-07)	(1.29e-07)	(1.31e-07)	(1.31e-07)
Composer controls	yes	yes	yes	yes	yes	yes	yes	yes	yes
Year controls		yes	yes		yes	yes		yes	yes
Country controls		yes	yes		yes	yes		yes	yes
Location controls			yes			yes			yes
Observations	5253	5253	5253	5253	5253	5253	5253	5253	5253
R-squared	0.503	0.526	0.535	0.503	0.525	0.535	0.502	0.525	0.535

NOTE: Standard errors are in parentheses.

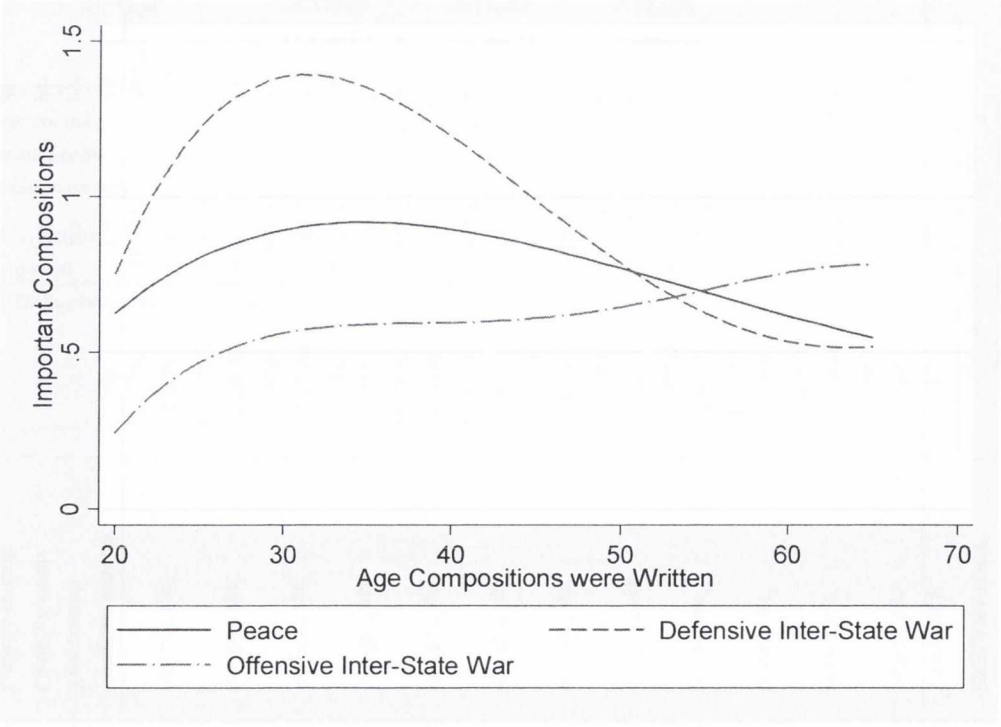
5.8 Figures

Figure 1. Age-Productivity Profiles: Intra- and Inter-State Wars.



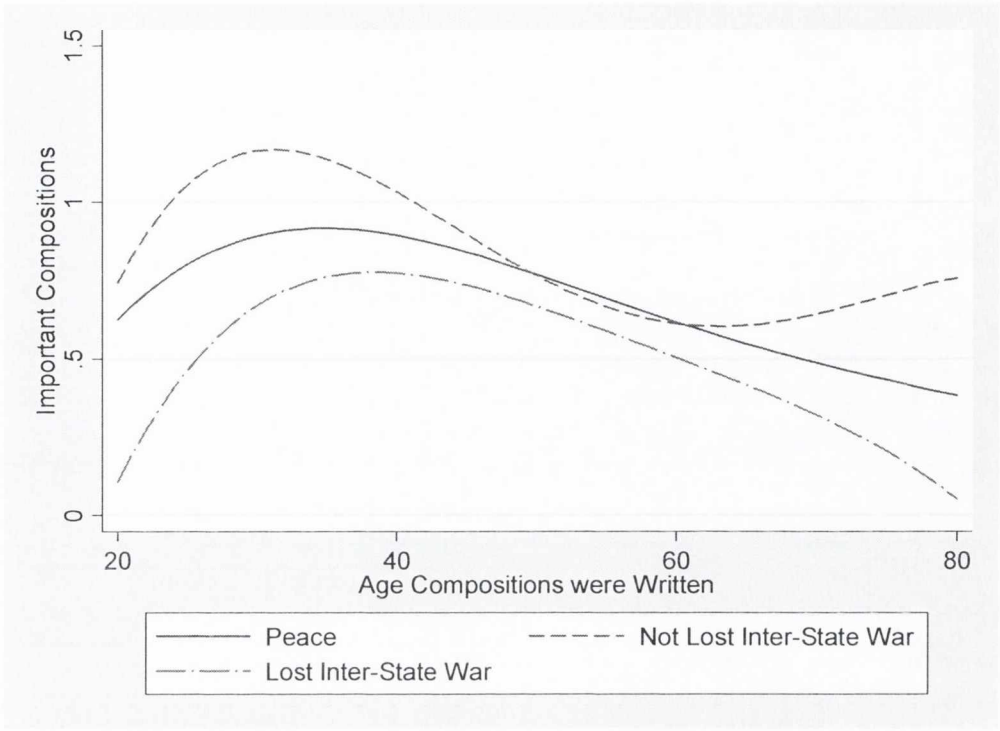
NOTE: Important compositions are calculated from a quartic in age when the composition was written interacted with incidence of war controlling for composer fixed effects. Estimates are based on regression results in column 1, Table 3.

Figure 2. Age-Productivity Profiles: By Initiation of Inter-State Wars.



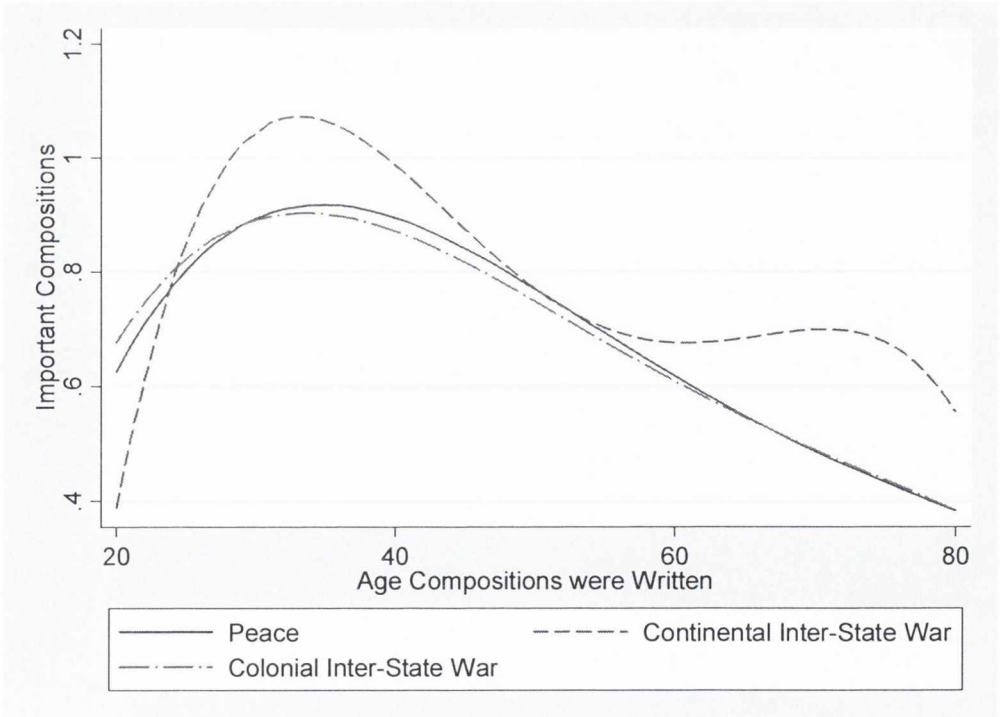
NOTE: Important compositions are calculated from a quartic in age when the composition was written interacted with incidence of war controlling for composer fixed effects. Estimates are based on regression results in column 1, Table 4.

Figure 3. Age-Productivity Profiles: By Outcome of Inter-State Wars.



NOTE: Important compositions are calculated from a quartic in age when the composition was written interacted with incidence of war controlling for composer fixed effects. Estimates are based on regression results in column 4, Table 4.

Figure 4. Age-Productivity Profiles: By Geographic Extent Inter-State Wars.



NOTE: Important compositions are calculated from a quartic in age when the composition was written interacted with incidence of war controlling for composer fixed effects. Estimates are based on regression results in column 7, Table 4.

5.9 Appendix

APPENDIX
ROBUSTNESS ANALYSIS

Table A1. Categories of classical works.

Category	Types of classical works	Observations
Concert	Symphony, overture, march, or other concert form	2208
Chamber	Sonata, quartet, art song, or other chamber form	885
Theater	Ballet, opera, or other theater form	664
Church	Mass, church cantata, or other religious form	84

Table A3. Composers' emigration intensity.

	Mean	
Composers that have worked abroad	0.773	(89 Composers)
Work related time spent abroad	0.233	(1228 Annual observations)
Work related time spent abroad in time of war	0.037	(194 Annual observations)

Figure A1.1. Age-Productivity Profiles: Intra- and Inter-state wars by type of work.

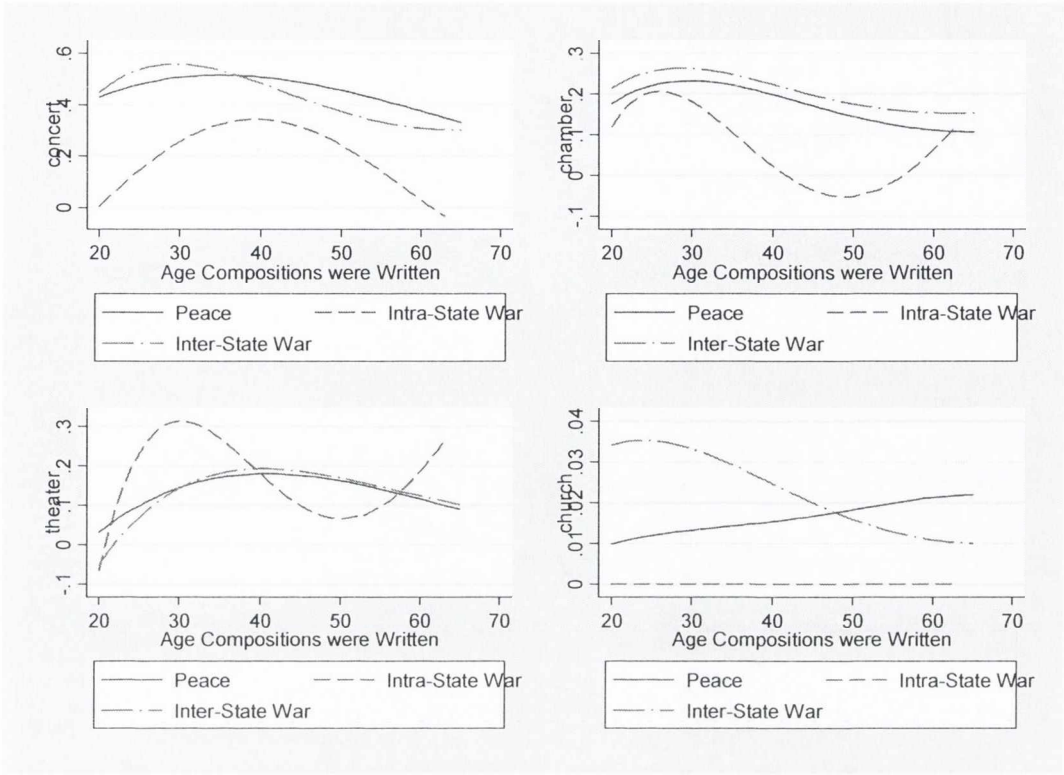


Figure A1.2. Age-Productivity Profiles: By initiation and type of work.

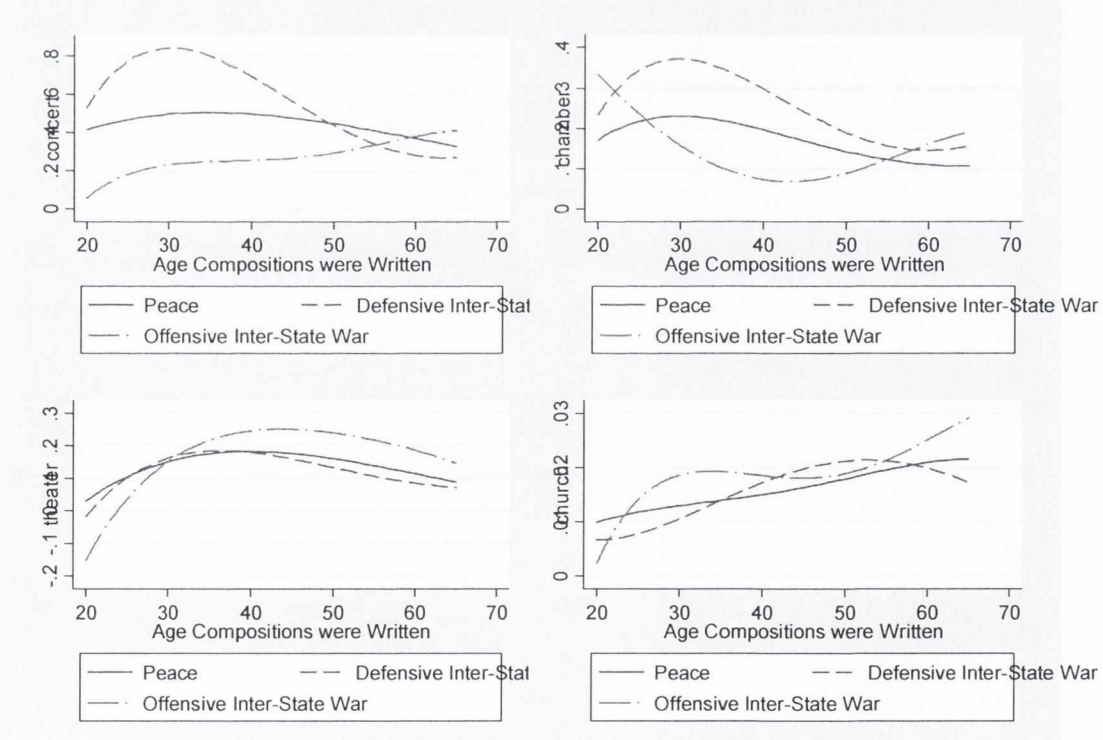


Figure A1.3. Age-Productivity Profiles: By outcome and type of work.

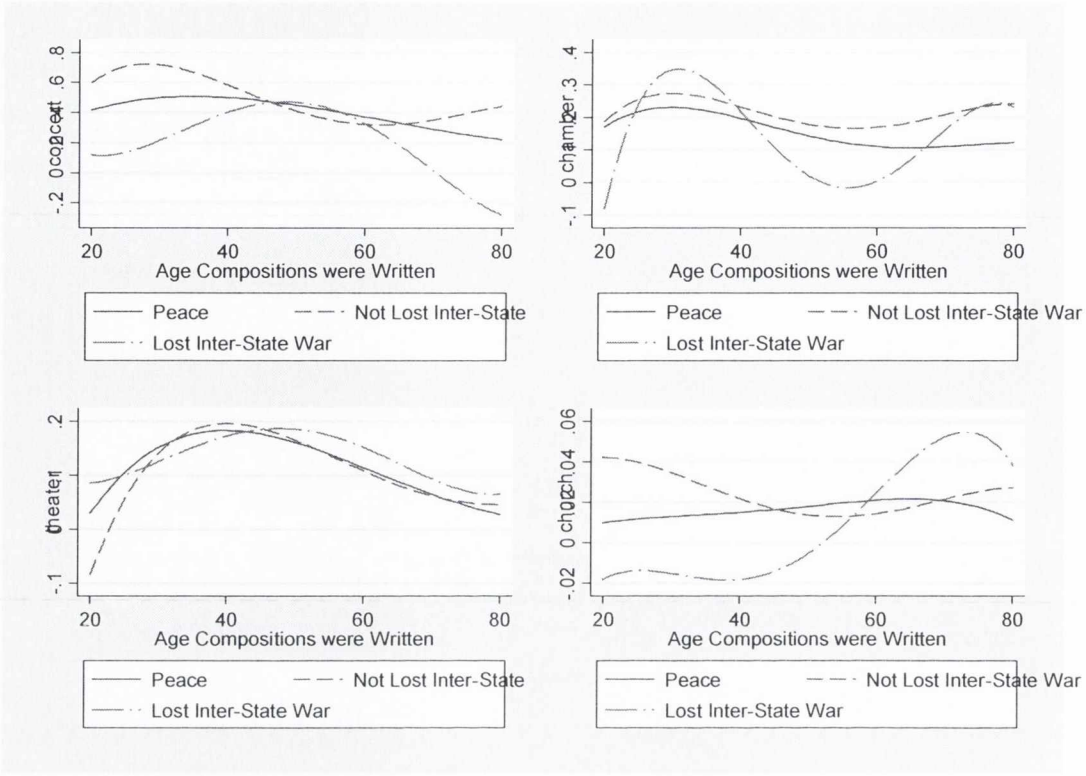


Figure A1.4. Age-Productivity Profiles: By geographic extent and type of work.

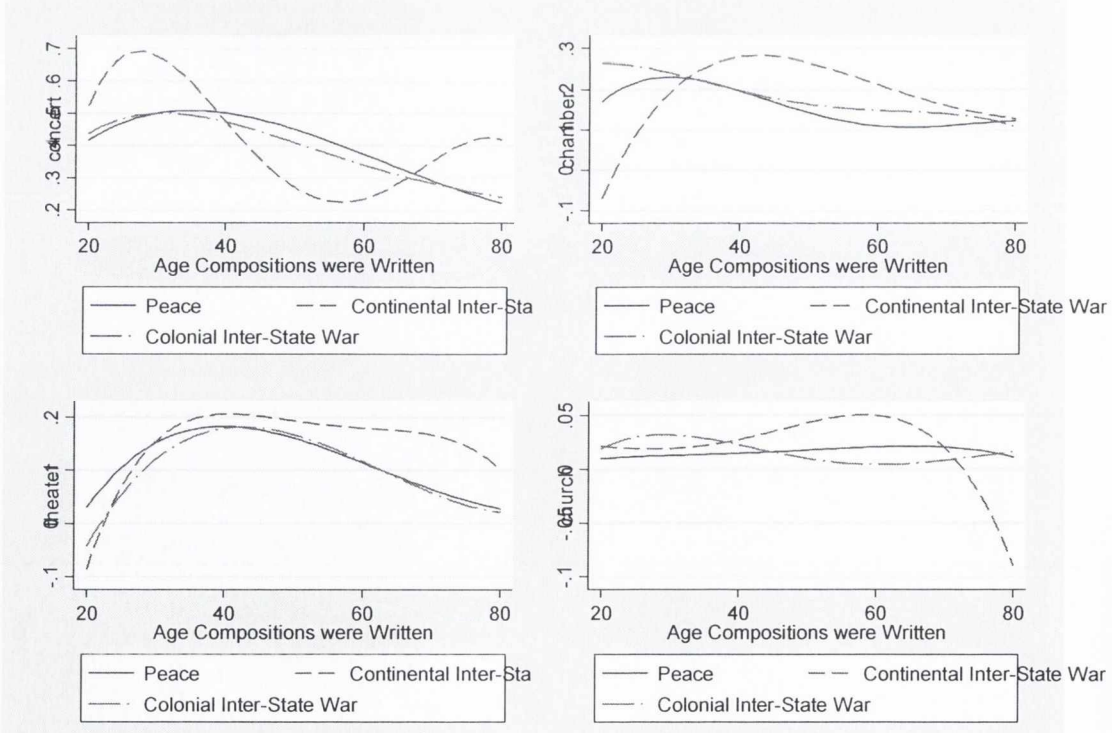


Figure A2.1. Age-productivity profiles 2 years after war.

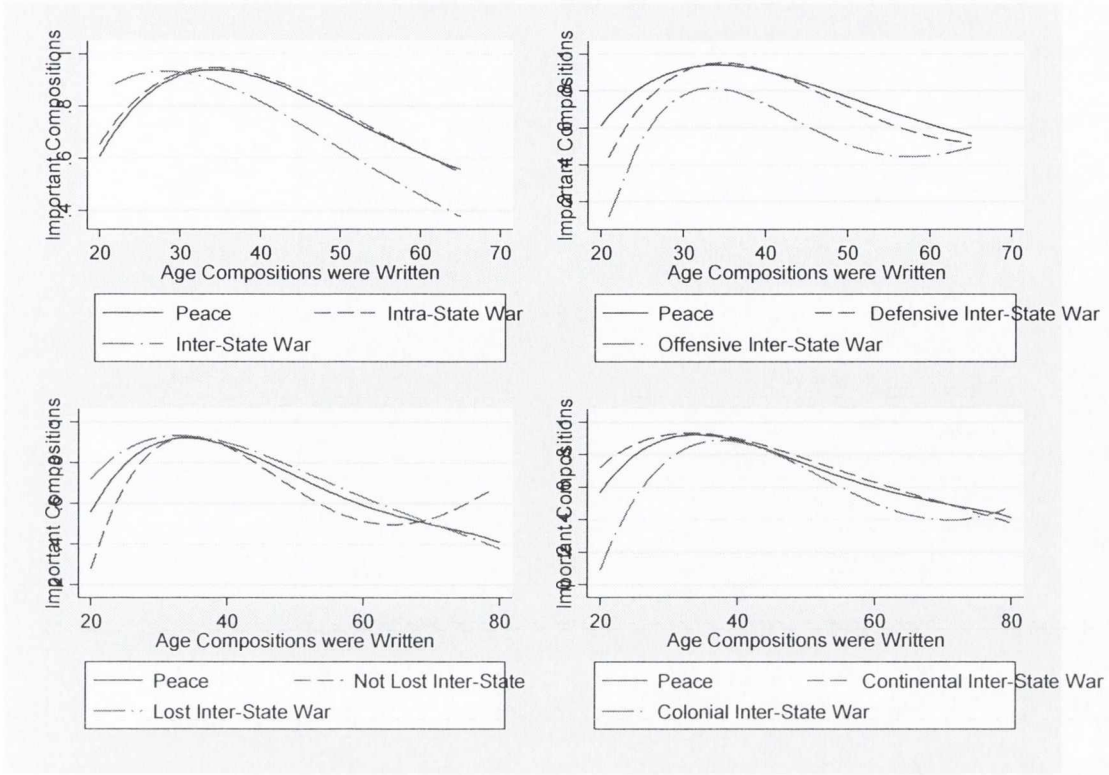


Figure A3.1 Composers' productivity in home country and abroad.

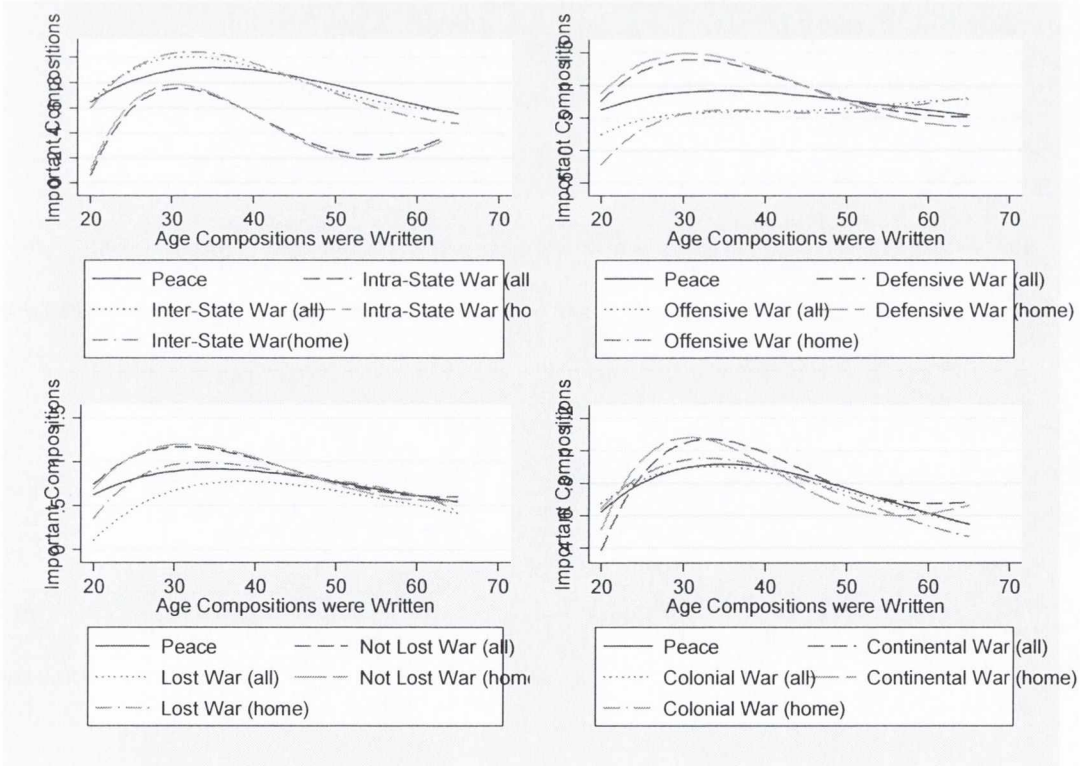


Figure A3.2 Composers' productivity during defensive wars (home country and abroad).

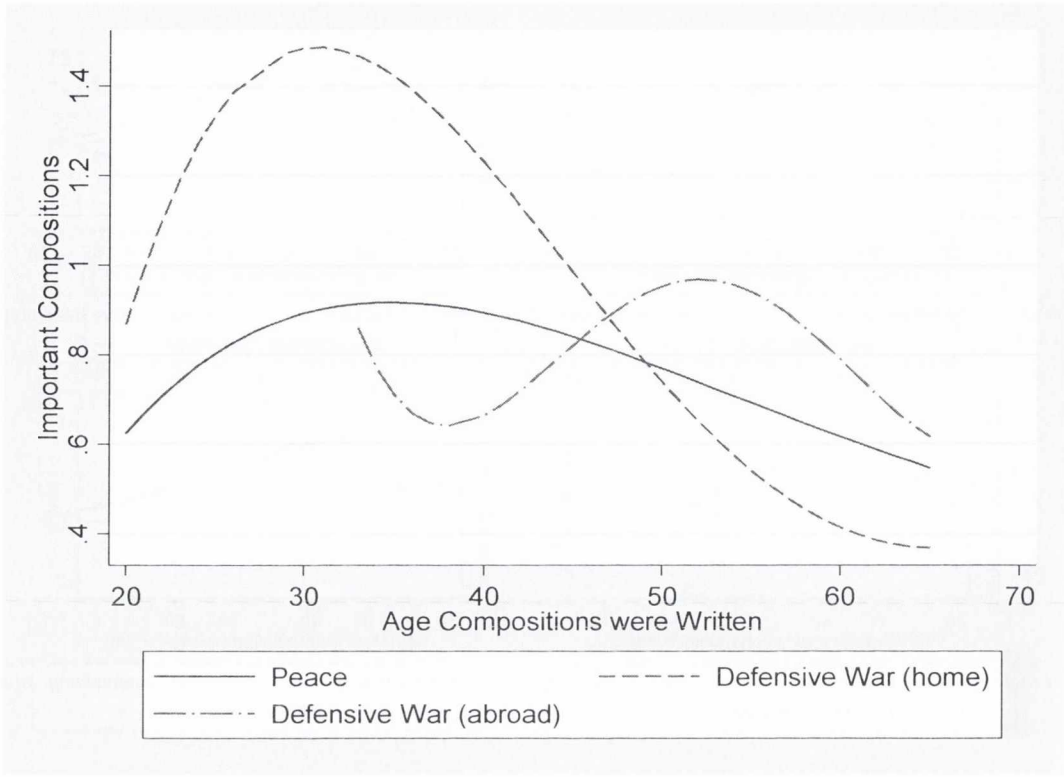


Figure A4. Dropping extreme decile.

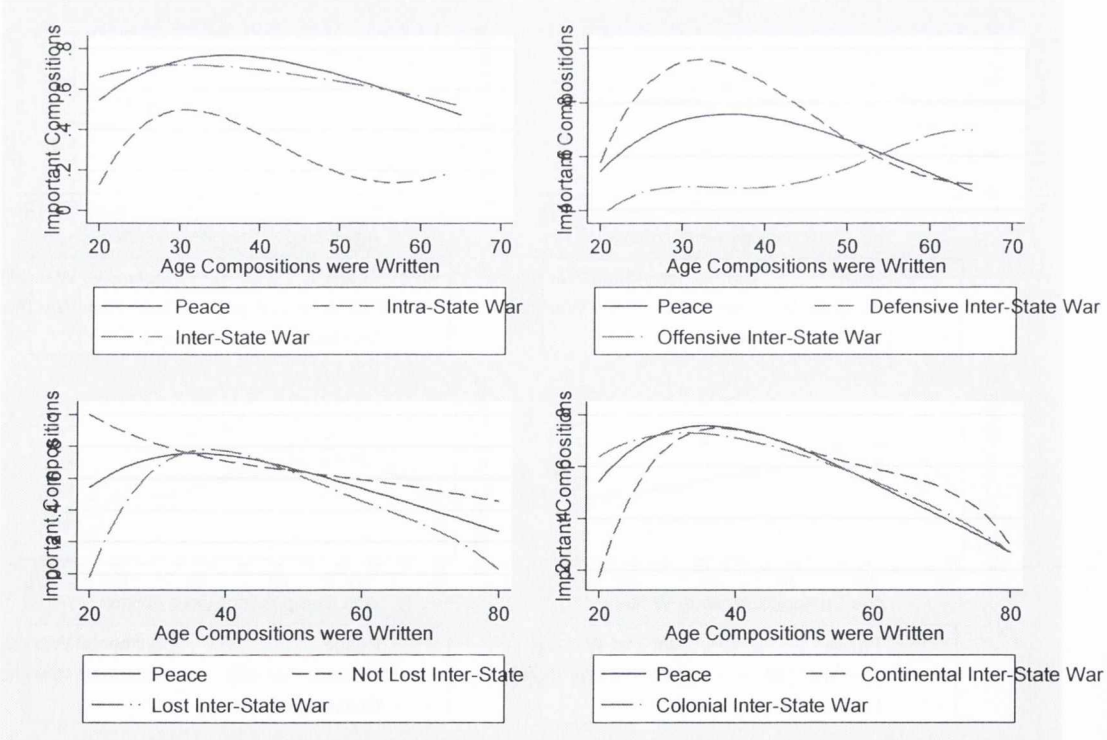
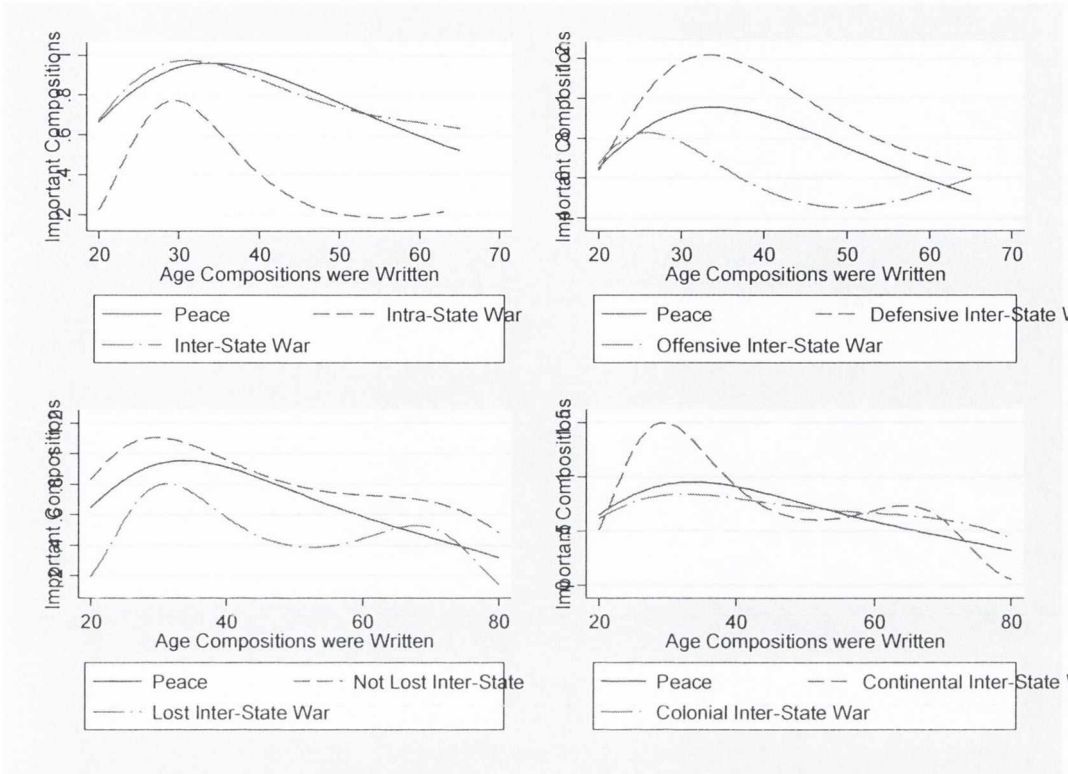


FIGURE A5. Age-productivity profiles: Intra- and inter-state wars (count model).



NOTE: Important compositions are calculated from a quartic in age when the composition was written interacted with incidence of war controlling for composer fixed effects. Estimates are based on a negative binomial regression.

CHAPTER 6

Conclusion

6. Conclusion

6.1 Concluding Remarks

The studies presented in this dissertation are based on a unique database that consists of annual migration patterns of prominent classical composers, extracted from large music dictionaries. This data set is linked with records of composers' artistic output or the Correlates of War database. This thesis is based on a variety of statistical and econometric techniques, such as simple descriptive analyses, maximum likelihood models, ordinary least squares regressions, fixed effects models and two-stage least squares instrumental variables estimations. The study builds also on a range of graphical illustrations, with the age-productivity profiles being the highlight of the figures shown. This thesis contributes to several fields in economics. Given the historical aspects of the studies, the research is of potential interest to the field of economic history. The articles investigate also a number of hypotheses raised by cultural economists and shed interesting insights on the productivity, clustering or migration aspects of creative individuals. The unique individual-level data set allows overcoming methodological challenges encountered by previous urban economics research.

The proposed identification strategy in Chapter 2 deals with both endogeneity and heterogeneity bias, as was not done in previous studies in the field of urban economics. The study sheds light on the causal impact of clustering on productivity, adding so a significant contribution to urban economics or economic geography research. Furthermore, the mentioned study estimates separately the clustering benefit for heterogeneous groups of classical composers and finds that migrant composers are actually the greatest beneficiaries, contributing so to the elite migration literature. The weight of those findings builds upon the contemporary intensity of clustering of creative individuals, such as that of IT-experts located in the Silicon Valley cluster, financial sector works clustered in New York or violin makers in Cremona. Further data limitation issues are tackled in Chapter 3 where the long-run impact of forced migration on the creative potential of a country is illuminated and in Chapter 4 which presents some pioneering insights on the decision making process of the conflict-induced migrant. Despite the size and importance of the research strand on forced migrants, there are almost no micro-level data sets available, because it is not feasible or secure to, for example, conduct representative surveys on migrants in regions where war takes place.

This problem is overcome in the underlying dissertation by building on historical data on highly mobile individuals. The later two studies provide innovative contributions to the literature on conflict. And finally, the puzzling relationship between artistic productivity and the incidence of war is investigated in this thesis. In Chapter 5 it is posited that different types of war have varying effects on creative production. The results indicate the importance of the external environment for creative production, in particular the presence of peace or the incidence of certain types of war, have a significant impact on achievements of the creative individuals and hence have considerably shaped the evolution of cultural accomplishment in history.

6.2 Policy Implication

It is difficult to derive any policies based on this very particular sample of creative individuals and a very specific time period. If one however believes in generality of the results from this research, policy implication can be drafted or, at least some helpful indications for today's policy makers can be sketched. These prescriptions are proposed with the premonitory note that further micro-empirical research and careful case studies are needed to design effective policy responses.

The findings presented in this thesis are of potential interest to authorities responsible for developing geographic clusters, such as special economic zones. The existence of a benefit associated with geographic clusters provides important support for the necessity to foster such hub locations. Since the location benefits stem primarily from interactions with other clustering agents, authorities should foster platforms that enable or facilitate such interactions. Of marked importance is also the finding that the clustering related productivity gains originate not from the presence of potentially better infrastructure or any other large city specific factors, but from the presence of other peers. Composers benefited in geographic clusters due to the interaction with other artists and the productivity gains depend on the number of fellow composers located in the same location. At this stage it is however not entirely clear what attracts individuals (or firms) and whether better infrastructure has not lured a critical mass of agents and contributed so to the development of a geographic cluster. Next, if the main beneficiaries of locating in clusters are individuals (or firms) coming from outside the region, it may be possible to generate mutual gains by cooperation between existing clusters. One

example would be exchange programs that enable individuals to switch between clusters or programs that facilitate firms to launch branches in other geographic clusters.

From the research presented in this thesis, some tentative indications can be also drafted for today's authorities responsible for interventionism of forced migration or delivery of support for conflict-induced migrants. First of all, the studies included in this dissertation illuminate how large was the share of classical composers among the overall population forced to emigrate. As creative individuals – a particularly valuable part of the population - are presumably relatively numerous among the forced migrants, it can be concluded that the total cost of wars might be higher than expected. Furthermore, the incidence of conflict is a significant driver of composers' location choice and hence wars might have contributed to the disappearance of geographic clusters in countries involved in warfare. Particularly meaningful is also the result that war-related outmigration has a permanent negative impact on composers' stock in the country. On the other hand, due to those dynamics in some cases, there can be anticipated some positive effects for the host countries where a relatively high share of creative individuals among the forced migrants can be expected, potentially leading so to the improvement of the local creative industries. Next, if forced migrants choose the destination country based on its associated security levels, refugee flows can be directed by influencing the perception of safety of a destination region. Such interventionism might also increase the efficiency of migration flows. The conflict-induced emigration rate of creative individuals might be decreased by targeted improvement of life conditions and work possibilities in the country of origin. Finally, creative production is found to be related to the incidence of war which can have a highly heterogeneous impact. The evidence originating from this research indicates that the external environment of a creator may be an indispensable determinant of his productivity. The exogenous conditions - presence of peace or the incidence of war – could have a significant impact on the achievements of creative individuals.

6.3 Future Research

As disclosed in Borowiecki (2011a) classical composers who located in geographic clusters benefited and were more productive due to interactions with peers. It is however not entirely clear what is the personal cost of locating in hub locations, especially since

anecdotal evidence suggests that living in large cities could be detrimental to life satisfaction. Fierce competition associated with geographic clusters and the winner-take-all type of the market for music might were detrimental to the wellbeing of an individual. Future research should illuminate the cost of locating in geographic clusters. An ongoing project is conducted by Borowiecki and Kavetsos (2011) and it sheds light on the relationship between working in a geographic cluster and longevity. In order to overcome potential endogeneity issues and omitted variables bias the authors use instrumental variables and endogenize the incidence of locating in a hub locations with geographic distances between composers' birthplace and a geographic cluster. They further endogenize the clustering intensity with the intensity of wars that affected the regions of composers' residence before he was born. The preliminary results indicate that a composer, who was working in locations with many other composers, was significantly shorter alive.

Future research could look more into the overall subjective well-being of creative individuals. In recent years the 'economics of happiness' literature was substantially growing, despite the shortcomings related to the measurement of subjective well-being. Self-reported well-being might be consistently biased due to its subjective and point in time assessment. Other indicators for well-being, such as health indicators or longevity, provide at best only tentative approximations. Extensive projects that record the development of an individual over her life-time (such as the ESRI 'Growing up in Ireland' study) are very expensive and extremely time-consuming. A possible strategy to overcome the data limitation of previous studies as well as to shed light on the dynamics of individual-level well-being could be based on an innovative linguistic inquiry tool. Such computer application could be used in order to investigate letters written by creative individuals, for example by classical composers. The available text analysis software, such as the Linguistic Inquiry and Word Count (www.liwc.net), calculate the degree to which people use different categories of words across a wide array of texts, including emails, speeches, poems, or transcribed daily speech. The computer application can determine the degree any text uses positive or negative emotions, self-references, causal words, and numerous other language dimensions. Based on this, a lifetime well-being index for the covered composers could be calculated. Such index could be linked with the composers' life-time personal developments (for example, family- or career-related events) or national incidences (such as economic conditions,

occurrence of wars etc.), in order to illuminate the determinants of well-being. Such research could become the first well-being analysis of creative individuals and could potentially provide an important contribution to the understanding of psychological aspects of creative production. This project could also add interesting insights on the dynamics of well-being. Furthermore, the results could contribute knowledge on the persistency of well-being determinants. At this stage, it is not clear whether factors that affect well-being are different now than in historical time periods. This knowledge would be particularly meaningful for policy makers who are interested in the well-being of, for example, future generations. Most importantly, however this work would have the potential to become an inspiring cornerstone for future happiness economics research that could be based on historical letters or diaries written by other important historical figures.

Interesting research is also presently conducted by O'Hagan and Borowiecki (2011) who obtained a data set with the aid of an innovative computer application that automatically extracts background information on all composers listed in Grove (2009). The extracted data contains full name, place and date of birth and death, word occurrence of predefined terms and word count in different sections of the results for each of the around 15,000 composer listed in Grove. The obtained data could be used in order to study a number of intriguing hypotheses, such as, for example, the over-time and between country changes of the life duration or the changes of the magnitude of internal or international migration patterns. Furthermore, this innovative methodology might become an important and inspiring cornerstone for future research in economic and social history based on similar historical data sources (e.g. encyclopedia or dictionaries).

DATA APPENDIX

7. Data Appendix

Table 1. Composers included in this study.

Name	Birth Country	Birth Year	Death Year	Murray's Index Score	Chapter 2	Chapter 3	Chapter 4	Chapter 5
Adam, Adolphe	France	1803	1856	3	y	y	y	y
Albeniz, Isaac	Spain	1860	1909	4	y	y	y	y
Alfano, Franco	Italy	1875	1954	1		y	y	
Arensky, Anton Stepanovich	Russia	1861	1906	1	y	y	y	y
Auric, Georges	France	1899	1982	2		y	y	
Auber, Daniel-Francois-Esprit	France	1782	1871	5	y			
Badings, Henk	Netherlands	1907	1986	1		y	y	
Balakirev, Mily Alekseyevich	Russia	1836	1910	6	y	y	y	y
Barber, Samuel	USA	1910	1981	4		y	y	y
Bartok, Bela	Hungary	1881	1945	18	y	y	y	y
Bax, Sir Arnold	England	1883	1953	3	y	y	y	y
Beethoven, Ludwig van	Germany	1770	1827	100	y			
Beck, Conrad	Switzerland	1901	1989	1		y	y	
Bellini, Vincenzo	Italy	1801	1835	9	y	y	y	y
Benoit, Peter	Belgium	1835	1900	1		y	y	
Berg, Alban	Austria	1885	1935	14	y			y
Berlin, Irving	Russia	1888	1987	1		y	y	
Berlioz, Hector	France	1803	1869	41	y	y	y	y
Berwald, Franz Adolf	Sweden	1796	1868	2	y			
Bizet, Georges	France	1838	1875	10	y	y	y	y
Blacher, Boris	Germany	1903	1974	2		y	y	
Bliss, Sir Arthur	England	1891	1975	2	y	y	y	y
Bloch, Ernest	Switzerland	1880	1959	3	y	y	y	y
Boito, Arrigo	Italy	1842	1917	3		y	y	
Boieldieu, Francois Adrien	France	1775	1834	5	y			
Borodin, Aleksandr	Russia	1833	1887	8	y	y	y	y
Brahms, Johannes	Germany	1833	1897	35	y	y	y	y
Bruch, Max	Germany	1838	1920	2	y	y	y	y
Bruckner, Anton	Austria	1824	1896	19	y	y	y	y
Busoni, Ferruccio	Italy	1866	1924	8	y	y	y	y
Bruneau, Alfred	France	1857	1933	2		y	y	
Burkhard, Willy	Switzerland	1900	1954	1		y	y	
Carter, Elliott	USA	1909	2000	4		y	y	
Casella, Alfredo	Italy	1883	1947	4	y	y	y	y
Chabrier, Alexis	France	1841	1894	5		y	y	
Chabrier, Emmanuel	France	1841	1894	5	y	y	y	y
Charpentier, Gustave	France	1860	1956	2	y	y	y	y
Chausson, Ernest	France	1855	1899	3	y	y	y	y
Chavez, Carlos	Mexico	1899	1978	2	y	y	y	y
Cherubini, Luigi	Italy	1760	1842	10				

Chopin, Fryderyk Franciszek	Poland	1810	1849	32	y	y	y	y
Clementi, Muzio	Italy	1752	1832	5	y			
Copland, Aaron	USA	1900	1990	7		y	y	y
Cornelius, C. Peter	Germany	1825	1874	2		y	y	
Cowell, Henry	USA	1897	1965	4		y	y	
Cui, Cesar	Russia	1835	1918	3	y	y	y	y
Dallapiccola, Luigi	Croatia	1904	1975	7		y	y	y
Dargomizhsky, Aleksandr Sergeyevich	Russia	1813	1869	3	y	y	y	y
David, Felicien	France	1810	1876	1		y	y	
Debussy, Claude	France	1862	1918	45	y	y	y	y
Delibes, Clement	France	1836	1890	2		y	y	
Delibes, Leo	France	1836	1891	2	y	y	y	y
Delius, Frederick	England	1862	1934	7	y	y	y	y
Dohnanyi, Ernst von	Hungary	1877	1960	2	y	y	y	y
Donizetti, Gaetano	Italy	1797	1848	9	y			
Dukas, Paul	France	1865	1935	4	y	y	y	y
Dvorak, Antonin	Czech	1841	1904	13	y			y
Duparc, Henri	France	1848	1932	3		y	y	
Durey, Louis	France	1889	1978	1		y	y	
Dvorak, Antonin	Czech	1841	1904	13		y	y	
Elgar, Edward	England	1857	1934	8	y	y	y	y
Ellington, Duke	USA	1899	1973	2		y	y	
Enesco, Georges	Romania	1881	1955	2	y	y	y	y
Falla, Manuel de	Spain	1876	1946	9	y	y	y	y
Faure, Gabriel	France	1845	1924	13	y	y	y	y
Fibich, Zdenek	Bohemia	1851	1901	2		y	y	
Field, John	Ireland	1782	1837	3	y			
Flotow, Friedrich Freiherr von	Germany	1812	1883	2	y	y	y	y
Fortner, Wolfgang	Germany	1908	1987	2		y	y	
Foster, Stephen	USA	1827	1863	2	y	y	y	y
Franck, Cesar	France	1822	1890	15		y	y	
Franz, Robert	Germany	1815	1892	1	y	y	y	y
Gade, Niels Wilhelm	Denmark	1817	1890	3	y	y	y	y
Gerhard, Roberto	Spain	1896	1970	1	y	y	y	y
Gershwin, George	USA	1898	1937	6	y	y	y	y
Glazunov, Aleksandr Konstantinovich	Russia	1865	1936	4	y	y	y	y
Glier, Reingol'd Moritsevich	Russia	1875	1956	1	y	y	y	y
Glinka, Mikhail Ivanovich	Russia	1804	1857	8	y	y	y	y
Gottschalk, Louis	USA	1829	1869	1		y	y	
Gounod, Charles-Francois	France	1818	1893	13	y	y	y	y
Grieg, Edvard Hagerup	Norway	1843	1907	11	y	y	y	y
Haba, Alois	Bohemia	1893	1973	2		y	y	
Harris, Roy	USA	1898	1979	3	y	y	y	y

Hartmann, Karl	Germany	1906	1963	1		y	y	
Hauer, Josef	Austria	1883	1959	1		y	y	
Hindemith, Paul	Germany	1895	1963	19	y	y	y	y
Holst, Gustav	England	1874	1934	5	y	y	y	y
Honegger, Arthur	France	1892	1955	9	y	y	y	y
Humperdinck, Engelbert	Germany	1854	1921	3	y	y	y	y
Ibert, Jacques	France	1890	1962	2	y	y	y	y
d'Indy, Vincent	France	1851	1932	9	y	y	y	y
Ives, Charles Edward	USA	1874	1954	8		y	y	
Janacek, Leos	Czech	1854	1928	7	y	y	y	y
Jolivet, Andre	France	1906	1974	3		y	y	
Kabalevsky, Dmitry Borosovich	Russia	1904	1987	2		y	y	y
Kern, Jerome	USA	1885	1945	1		y	y	
Kjerulf, Halfdan	Norway	1816	1868	1		y	y	
Kodaly, Zoltan	Hungary	1882	1967	7	y	y	y	y
Koechlin, Charles	France	1868	1950	2		y	y	
Krenek, Ernst	Austria	1901	1991	6		y	y	
Lalo, Edouard	France	1823	1892	3	y	y	y	y
Lanner, Josef	Austria	1801	1842	1		y	y	
Lecocq, Charles	France	1832	1918	1		y	y	
Leoncavallo, Ruggero	Italy	1857	1919	3	y	y	y	y
Liszt, Franz	Hungary	1811	1886	43	y	y	y	y
Loewe, Frederick	Germany	1901	1987	1		y	y	
Lortzing, Albert	Germany	1802	1850	4		y	y	
Macdowell, Edward	USA	1860	1908	3		y	y	y
Mackenzie, Alexander	Scotland	1848	1934	1	y	y	y	y
Mahler, Gustav	Austria	1860	1911	23	y	y	y	y
Malipiero, Gian Francesco	Italy	1882	1973	5	y	y	y	y
Martin, Frank	Switzerland	1890	1974	3	y	y	y	y
Martinu, Bohuslav	Czech	1890	1959	3	y	y	y	y
Mascagni, Pietro	Italy	1863	1945	3	y	y	y	y
Massenet, Jules Emile Frederic	France	1842	1912	9	y	y	y	y
Mendelssohn, Felix	Germany	1809	1847	30	y	y	y	y
Messiaen, Olivier	France	1908	1992	13				y
Meyerbeer, Giacomo	Germany	1791	1864	14	y			
Milhaud, Darius	France	1892	1974	13	y	y	y	y
Mozart, Wolfgang Amadeus	Austria	1756	1791	100	y			
Musorgsky, Modeste Petrovich	Russia	1839	1881	16	y	y	y	y
Myaskovsky, Nikolay	Russia	1881	1950	2	y	y	y	y
Nicolai, Otto	Germany	1810	1849	2		y	y	
Nielsen, Carl	Denmark	1865	1931	3	y			y
Novak, Vitezlsav	Bohemia	1871	1949	1		y	y	
Offenbach, Jacques	Germany	1819	1880	6	y	y	y	y

Orff, Carl	Germany	1895	1982	5	y			y
Parker, Horatio	USA	1864	1919	2		y	y	
Petrassi, Goffredo	Italy	1905	2000	2		y	y	
Pfitzner, Hans	Russia	1869	1948	4		y	y	
Piston, Walter	USA	1894	1976	2	y			y
Pijper, Willem	Netherlands	1895	1948	1		y	y	
Pizzetti, Ildebrando	Italy	1880	1968	4		y	y	y
Poulenc, Francis	France	1899	1962	8	y	y	y	y
Prokofiev, Sergey	Russia	1891	1953	12	y	y	y	y
Puccini, Giacomo	Italy	1858	1924	10	y	y	y	y
Rachmaninoff, Serge	Russia	1873	1943	7	y	y	y	y
Ravel, Maurice	France	1875	1937	23	y	y	y	y
Reger, Max	Germany	1873	1916	7	y	y	y	y
Respighi, Ottorino	Italy	1879	1936	3	y	y	y	y
Reyer, Ernest	France	1824	1908	1		y	y	
Rimsky-Korsakov, Nikolay Andreyevich	Russia	1844	1908	15	y	y	y	y
Rossini, Gioachino	Italy	1792	1868	22	y			
Roussel, Albert	France	1869	1937	5	y	y	y	y
Ruggles, Carl	USA	1876	1971	1		y	y	
Saint-Saens, Camille	France	1835	1921	13	y	y	y	y
Satie, Erik	France	1866	1925	7	y	y	y	y
Schaeffer, Pierre	France	1911	1995	2		y	y	
Schmitt, Florent	France	1871	1958	4		y	y	
Schoenberg, Arnold	Austria-Hungary	1874	1951	39	y	y	y	y
Schreker, Franz	Austria	1878	1933	2		y	y	
Schubert, Franz	Austria	1797	1828	44	y			
Schuman, William	USA	1910	1992	2		y	y	y
Schumann, Robert	Germany	1810	1856	42	y	y	y	y
Scryabin, Alexander	Russia	1872	1914	8		y	y	
Sessions, Roger	USA	1896	1985	4	y	y	y	y
Shostakovich, Dmitry	Russia	1906	1975	12		y	y	y
Sibelius, Jean	Finnland	1865	1957	10	y	y	y	y
Spontini, Gaspare	Italy	1774	1851	6	y			
Sinding, Christian	Norway	1856	1941	1		y	y	
Smetana, Bedrich	Czech	1824	1884	12		y	y	y
Stanford, Sir Charles Villiers	Britain	1852	1924	3	y	y	y	y
Strauss, Johann (Jr.)	Austria	1825	1899	5	y	y	y	y
Strauss, Richard	Germany	1864	1949	26	y	y	y	y
Stravinsky, Igor	Russia	1882	1971	45	y	y	y	y
Sullivan, Sir Arthur	England	1842	1900	5	y	y	y	y
Szymanowski, Karol	Poland	1882	1937	4	y	y	y	y
Tailleferre, Germaine	France	1892	1983	2		y	y	
Tavener, John	England	1944	2008	3		y	y	
Tchaikovsky, Pyotr Il'yich	Russia	1840	1893	20	y	y	y	y

Thomas, Ambroise	France	1811	1896	3	y	y	y	y
Thomson, Virgil	USA	1896	1989	3	y	y	y	y
Tippett, Sir Michael	England	1905	1988	5		y	y	y
Vaughan Williams, Ralph	England	1872	1958	9	y			y
Verdi, Giuseppe	Italy	1813	1901	30	y	y	y	y
Villa-Lobos, Heitor	Brazil	1887	1959	4	y	y	y	y
Vogel, Wladimir	Russia	1896	1983	1		y	y	
Wagner, Richard	Germany	1813	1883	79	y			y
Weber, Carl Maria von	Germany	1786	1826	27	y			
Walton, Sir William	England	1902	1983	3		y	y	y
Webern, Anton	Austria	1883	1945	19	y	y	y	y
Weill, Kurt	Germany	1900	1949	5		y	y	
Wellesz, Egon	Austria	1886	1974	2		y	y	
Wolf, Hugo	Austria	1860	1903	11	y	y	y	y
Wolf-Ferrari, Ermanno	Italy	1876	1948	2	y	y	y	y
Zemlinsky, Alexander	Austria	1872	1941	1		y	y	

SOURCE: Composers' Index Score is taken from Murray (2003). All remaining records are obtained from Grove Music Online (2009). Chapter 2 covers composers born between 1750 and 1899 whose works are listed in Gildert and Port (1978). Chapter 3 and 4 covers composers born after 1800. Chapter 5 covers composers born after 1800 whose works are listed in Gildert and Port (1978).

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