

What Makes a Great Composer? An Economist's Answer based on a Millennium of Data
(Tentative title)

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Karol J. Borowiecki
Department of Economics
University of Southern Denmark
Odense, Denmark
kjb@sam.sdu.dk

and

Marc T. Law
Department of Economics
University of Vermont
Burlington, VT, USA
Marc.Law@uvm.edu

Why do we still listen to Wolfgang Amadeus Mozart's music but not Antonio Salieri's?

How did Ludwig van Beethoven's personal afflictions—deafness, illness, and financial stress—affect his creative output?

Is Nadia Boulanger better known as a teacher than a composer because she was a woman?

Why did so many 18th and 19th century composers move to Vienna, Paris, or London, despite unfavorable living conditions in those cities?

What accounts for Aaron Copeland's acclaim as the "dean of American composers"?

Questions like these have for centuries preoccupied musicians, musicologists, cultural historians, and lovers of western classical music. With rare exception, however, the existing scholarship is piecemeal and focusses its attention on the lives and works of single composers, primarily the most successful ones, from an exclusively qualitative or musical perspective. In this book, we address these classic questions as well as many others by using a "big data" approach that involves assembling and analyzing data on thousands of famous and not-so-famous western classical composers who lived between 1100 and the present day. We quantify information held within compilations of musical themes, bibliographies, biographies, dictionaries and encyclopedias of musicians and their teachers, the personal correspondence of composers, and a variety of other sources to systematically uncover the myriad factors that influenced composers' output and creativity, using theories drawn from economics and other social sciences to motivate and interpret our findings. By the end of this book, we hope to provide the most rigorous, data-intensive answer to the age-old question of what makes a great composer.

Summary

Our basic story is as follows. While the greatness of a composer is difficult to pin down, it can be measured in a variety of ways, and is ultimately a function of the lifetime quality and quantity of a composer's output, which, in turn, is determined by a composer's productivity, i.e., her production per unit of time. Economics provides a guide for thinking about the factors that affect a composer's productivity. Some are happenstance, like being born in the right time and place, being a man (especially in the past, when women were treated unequally), possessing sufficient talent, having access to family wealth, or living during periods of war or political unrest. Factors like these are largely outside a composer's immediate influence but nevertheless have a systematic impact on the quality and quantity of her work, which we examine and account for in our analyses. Others, however, are a joint product of a composer's life choices and her exogenous circumstances. In common with studies of productivity, we find that the quality of a composer's human capital—the knowledge and skills that a composer invests in and accumulates during her lifetime—matters, with higher-quality teachers producing higher-quality composers. We also find that composers respond to incentives in the same way as producers of other goods and services, with greater competition inducing composers to increase the quantity and quality of their music. Additionally, like other industries such as software engineering, financial services, and automobile manufacturing, musical composition is subject to agglomeration economies, where being physically proximate to one's peers improves the quality and quantity of one's own output. Psychological factors, often neglected by economists in their studies of productivity, are also important, perhaps because composition is ultimately a creative act. These and others are among the influences we quantify as determinants of a composer's greatness.

While this book is co-authored, most of the original research underlying it was undertaken by one of us (Karol J. Borowiecki), who is a leading authority in the economic history of classical composers. Previously published in peer-reviewed economics, economic history, and interdisciplinary journals (e.g., Borowiecki 2010, 2012, 2013, 2014, 2015a, 2015b, 2017, 2022, Borowiecki and Kavetsos 2015, Borowiecki and O'Hagan, 2012, 2013, O'Hagan and Borowiecki, 2010), this underlying research is highly acclaimed and has won or been nominated for a variety of prizes, including the Association for Cultural Economics International President's Prize (2010), the EliteForsk Award of the Danish Ministry of Higher Education and Science (nominated in 2022), and the Silver Medal of the Royal Danish Academy of Sciences (nominated in 2022, but not elected). Additionally, it has attracted the attention of international media outlets including *The Washington Post*, the *Australian Broadcasting Corporation*, *Money*, *The Telegraph*, and the *Boston Globe*, and it has been discussed on the radio and in various podcasts. of the findings we plan to present in the book, however, are new and have not been published before. Additionally, until now, this body of scholarship has not been assembled in a single place, nor has it been thread together as a coherent, unified story, which is the contribution of the other author (Marc T. Law), an economic historian who is also a classical music enthusiast with a deep knowledge of music history. As applied economists who happen to be music lovers, we believe that *What Makes a Great Composer* will become an important resource for economists and economic historians interested in the economics of culture, innovation, and creativity, as well as historians, musicologists, musicians, and classical music aficionados.

Given our training, we naturally rely heavily on economic theories and methods to motivate our analysis and guide our research design. Specifically, we draw on the theory of human capital, theories of agglomeration externalities, and basic microeconomic principles concerning

the role of incentives and competition to provide an overarching framework for our thinking about the determinants of composer greatness. Because musical composition is as much an economic activity as an artistic or expressive one, economics has something to add to our understanding of what shapes the quality and quantity of a composer's output. Our belief is that an analysis of western classical composers that uses an economic approach is entirely complementary to the extraordinarily rich literature by music historians and musicologists that examines the lives and works of individual composers or musical eras (e.g., Rosen 1971, 1995). We have no desire to supplant this literature. Indeed, because the greatness of composers can be viewed through a variety of lenses that are not mutually exclusive, our overall perspective is interdisciplinary, and we also take seriously a variety of political, institutional, historical, social, and psychological hypotheses that have been advanced to explain composer productivity. Finally, although the research underlying this book is based on state-of-the-art data science and econometric methods, we intend to present our results in a non-technical way using tables, graphs, maps, and diagrams. Our objective is for *What Makes a Great Composer* to be readable by an interdisciplinary audience of economists, historians, sociologists, political scientists, musicologists, musicians, music lovers, and general interest readers.

Our contribution and related works

Why should a pair of economists write a book about western classical composers? One reason is that composers have been mostly neglected by economists. Among economists and economic historians who study the creative industries, visual artists and writers have received far more attention than composers. Several books have been published in the past two decades that quantitatively examine various aspects of the market for visual art, and the lives and works of

painters, sculptors, and writers (see, for instance, Galenson 2001, 2006, 2009; Greenwald 2021). However, except for Scherer (2004), there have been no books that study composers using an economic approach. This seems a significant omission given the prominent place that names like Bach, Beethoven, and Brahms occupy in western civilization. We view *What Makes a Great Composer* as building on Scherer's seminal book. Scherer raises many of the same questions as we do, for instance, the role of agglomeration economies and human capital in influencing composer productivity. Following the lead of Baumol and Baumol (1994), he also addresses issues, for instance, how political fragmentation affected the market for composers. However, Scherer's quantitative work is based on a much smaller sample of composers, focusses exclusively on the 18th and 19th centuries, and uses simpler methods to analyze cruder data. In contrast, we examine the lives and works of thousands of composers spanning several centuries. Additionally, technological improvements in the last 20 years allow us to address many of the same questions as Scherer does but in a more refined, sophisticated, and systematic way. Finally, we examine and control for a host of other factors that influence composer productivity that Scherer could not.

A second reason for studying composers is that their analysis poses unique challenges, especially with respect to the measurement of quality or greatness. Economists who study the visual arts have the benefit of market prices—paintings are sold at auctions or by gallerists—which can be used to proxy for artistic quality. While musical manuscripts are occasionally sold, those prices do not reflect the social value of a composition, which is the value of the music that can be played using that score. Accordingly, the auction price of the manuscript of a Schumann song cycle does not convey the same information about the song cycle's social value as the auction price of an Andy Warhol painting. An important contribution of *What Makes a Great Composer* is to devise alternative measures of quality or greatness. Our measures are based on the rankings

of expert musicians and musicologists, the level of scholarly attention paid to a composer in musical dictionaries (the length of biographical entries), the influence of a composer's work on other composers (measured by the similarity of musical themes), and the frequency with which a composer's music is listed to today (popularity on streaming services like Spotify). While most of these measures are based on the judgement of posterity and therefore reflect current tastes and preferences, we also measure the impact that composers had on each other, which may reflect their ability to change musical preferences over time. Individually, none of these are perfect measures of quality or greatness, but it turns out that they are highly correlated, and, in combination with one another, allow us to tell a coherent story.

A final reason we study composers is to shed light on the economics of creativity. It is widely agreed that creativity is a key ingredient of innovation and therefore fundamental to economic growth and human welfare. However, creativity is not easily measured, nor are the factors that influence it well understood. In *What Makes a Great Composer*, we use novel data to contribute to the measurement of creativity and to documenting its underlying drivers in an important area of human achievement. An understanding of creativity in the context of western classical music may also inform what stimulates creativity in a variety of occupations, including other artists like painters, sculptors, writers, but also scientists and engineers, inventors, and business entrepreneurs.

Along these lines one might ask why we focus on classical composers instead of classically trained performers—for instance, singers, pianists, or conductors—who are also a source of creativity in western music. Our answer is that composers and performers play different roles in “performative production” and possess different sets of skills; it is one thing to conduct a Mahler symphony and quite another thing to compose on. While there is some overlap in skills (e.g.,

Frédéric Chopin was a phenomenal pianist as well as a great composer piano music), there need not be (e.g., Joseph Haydn wrote the most popular trumpet concerto without knowing how to play the trumpet while Hans von Bülow was a distinguished conductor but only a middling composer). Additionally, while performers also exercise a degree of creativity in musical interpretation, their scope for expressing it—especially in the context of western classical music, which, unlike jazz, demands a degree of fidelity to the score, and therefore, to the composers’ intentions—is more circumscribed than the composer’s. To put it differently, a musical composition furnishes an example of what Mokyr (2002, p. 4) calls “prescriptive knowledge.” Prescriptive knowledge is necessarily incomplete; no composition cannot be fully specified in writing, which implies there a role for the performer to express her creativity, but one that is limited by what is written in the score. Accordingly, many may play Mozart, but regardless of the performer, it is still Mozart.

What Makes a Great Composer is complementary to the pathbreaking scholarship of Dean Keith Simonton, who also takes a data-driven approach to the study of classical composers (see, for example, Simonton 1991). Simonton, like us, is interested in what determines composer greatness. Among other things, his work examines how biographical influences affect a composer’s work, and how the career trajectories of composers compare with scientists, innovators, and other geniuses (Simonton 1994). However, our work differs from Simonton’s as we use different data sources, analyze a larger sample of composers, and consider economic influences (e.g., agglomeration externalities, human capital, incentives) that he does not.

Our book is also related to a growing body of quantitative scholarship on “famous people”—innovators, inventors, entrepreneurs, artists, academics, and other creatives (see, for instance, Bell, Chetty, Jaravel, Petkova, and Van Reenen 2019; de la Croix and Licandro 2015; de

la Croix, Docquier, Fabre, and Stelter 2022; de la Croix and Goñi 2022; Serafinelli and Tabellini 2022; Zanardello 2022). Among other things, this body of work finds that famous people tend to cluster geographically, are highly mobile, are more likely to be from high income families, benefit from early exposure to their craft (either through family or where they lived during childhood), and experienced longevity improvements earlier than the general population. We find that western classical composers resemble other famous people along many of these margins.

What Makes a Great Composer can also be related to studies that examine the returns to human capital. A vast literature in economics analyzes the relationship between human capital and various contemporaneous or within-lifetime metrics of personal and professional success like income, health, or subjective measures of well-being (for overviews see Deming 2022 and Bleakley 2010). In contrast, we investigate the returns to a composer's human capital beyond her lifetime, in terms of her greatness as we view it today. Our focus is different for two reasons. The first is pragmatic; we lack systematic data on within-lifetime outcomes (for instance, earnings) for most composers. The second is conceptual; when it comes to composers, as well as painters, writers, and other artists, the ultimate return is one's reputation beyond the grave. Indeed, what primarily interests the classical music-loving public is not what makes a composer commercially successful during her lifetime, but what makes her great in the judgment of posterity.

Finally, the approach we take in *What Makes a Great Composer* should be contrasted with the framework advanced by Rosen (1981) in his seminal article on the economics of superstars. According to Rosen, in a market where there is widespread agreement on quality and no congestion externalities in consumption, one or two producers can dominate the market. This "winner take all" phenomenon is clearly at work among classical composers, where only a handful of composers from any era are known by everyone, even though there were dozens of

composers in each era who might have been nearly as good. Rosen's framework may therefore provide an answer to why Ludwig van Beethoven's (1770-1827) reputation towers over Johann Nepomuk Hummel's (1778-1837) or Ferdinand Ries' (1784-1838), and why we still listen to the music of Johannes Brahms (1833-1897) while Max Bruch (1838-1920) and Joachim Raff (1822-1882) are mostly neglected. While Rosen's theory explains the outsized returns (at least in terms of reputation) earned by the very top tail of composers, it does not explore what made these composers better than the rest. This is our contribution. By studying the determinants of composer productivity using the full distribution of composers, we uncover the deeper factors underlying composer greatness.

Summary of chapters

This book will consist of 10 chapters. **Chapter 1** sets the stage by posing the question of what makes a great composer and contrasting the approach taken by most scholars, which entails the careful analysis of the life and works of individual composers, with our approach, which involves collecting and analyzing "big data" on thousands of composers. The key insight here is that by only focusing on a handful of great composers, existing scholarship cannot identify the factors that drive greatness because it lacks a comparison group. Studies of single composers may therefore lead us to draw incorrect inferences about the causes of greatness in musical composition, especially since single-composer studies focus almost exclusively on a handful of the most important composers. The big data approach affords us two advantages. First, because it involves analyzing data about famous as well as lesser-known composers, we solve the problem of selection bias. Second, quantification facilitates comparisons that are not easily made using a purely qualitative approach.

Chapter 2 presents our theoretical framework and introduces our data sources. We discuss how greatness depends on the lifetime quality and quantity of a composer's work and how lifetime output is in turn a function of a composer's productivity, or output per unit time. We develop a framework which posits that a composer's productivity is driven by human capital (e.g., teacher quality), physical capital (e.g., access to concert halls and opera houses), agglomeration externalities (e.g., proximity to other composers), psychological condition (e.g., emotional state of mind), incentives and institutions (e.g., competition, job tenure, the patronage system, copyright), and chance (e.g., having wealthy parents, being born into a family of musicians, or living during times of war and social unrest). We then discuss how we measure output, the quality or greatness of a composer and her work, and the various factors that influence it. We demonstrate that our various measures of greatness, which rely on the judgments of experts (rankings and the length of biographical entries), the revealed preferences of the music-listening public (the frequency with which a composer's work is streamed on Spotify), or our own independent metrics of composer influence (the similarity of musical themes) are highly correlated with one another. We will also discuss the importance of holding musical era constant when comparing composers, since musical eras differ in terms of their popularity today, and the level of scholarly interest in particular composers may also be a function of when a composer lived (either because scholarly attention reflects current tastes, or because documentation of composers' lives varies by period). Finally, the chapter also presents our data sources and discusses how we convert qualitative information from the texts of dictionaries, bibliographies, biographies, encyclopedias, and letters into quantitative data about a composer's output and life experiences.

Chapter 3 presents descriptive data on the lives of over 12,000 composers, as well as approximately 500 “great” composers, who lived between the 12th century and the mid 20th century. We examine trends in their birthplaces, occupations (many were not full-time composers), the types of music they wrote (e.g., chamber music, symphonic music, sacred music, opera), the musical instruments that were dominant in their work, and the cities where they lived. This allows us to see how the greatest composers differed from others along a wide range of margins. We will also use these data to trace patterns of specialization among composers in the types of music that they wrote and investigate whether specialization is supply-driven or demand-driven, and if it is linked to where composers were born, the era during which they lived, or whether they may have traveled throughout their lifetimes. This will allow us to shed some light on the question of why some composers, like Mozart and Handel, were generalists who excelled in a variety of genres while others, like Verdi or Rossini, were specialists and are known almost exclusively as opera composers.

Our investigation of the determinants of composer greatness and productivity begins in **Chapter 4** where we examine the development of composers’ human capital, with specific attention to the role of teachers. Typically, composers learned their craft by studying with other composers, informally through private lessons or formally as students in music conservatories. These connections between students and teachers of composition are well documented in composers’ biographies and other references. But how important were a composer’s teachers? And what was the nature of their influence? To investigate these questions, we combine information about teacher-student lineages for a large sample of composers with novel data on thousands of musical themes written since 1450 and use the similarity of musical themes to estimate the impact of teachers on their students. We find that connected composers (i.e., those

that share a teacher-student relationship) produced more similar music than unconnected ones and that the similarity of a student's music to his teacher's is not constant but dissipates gradually over time. Teacher influence is also multi-generational, with the similarity of themes extending to a teachers' grand-students (i.e., her student's students) as well as great-grand-students. Higher quality teachers (i.e., teachers who invest more heavily in their students and whose music is superior according to a wide variety of metrics) have more influence on their students' music than lower quality teachers. Additionally, higher quality teachers produced higher quality composers. Taken as a whole, the evidence indicates that human capital formation through teachers was an important ingredient of composer greatness.

In **Chapter 5** we examine the role of incentives and institutions, and how they shape the quantity and quality of a composer's work. Economics teaches us that competition incentivizes producers to reduce their costs through productivity improvements and to innovate by improving product quality or increasing product differentiation. These incentives operated in the market for musical compositions. Taking advantage of a natural experiment afforded by the location of a composer's birthplace, we find that composers who lived in close geographic proximity produced more music, which is evidence of competition encouraging greater productivity. Competition also spurs musical innovation; we find that composers who operated in competitive markets produced music that was thematically dissimilar to their geographic peers. Other incentives and opportunities also affected the quantity and quality of a composer's work. Composers who were more financially secure, either because they were from wealthier backgrounds, or because they were earning high incomes, produced more innovative music, suggesting that a financial cushion encourages greater risk taking. In contrast, those who experienced financial stress improved their productivity but wrote music that was more like their peers; financial insecurity encourages

greater production but also conformity in musical style. Consistent with most studies, we find that job security has a negative impact on composer productivity. Finally, we will review the literature on how incentive influencing institutions like patronage, competing courts, and copyright affected composer productivity and innovation over time and space (Baumol and Baumol 1994; Scherer 2004; Vaubel 2005; Giorcelli and Moser 2020).

Chapter 6 concerns agglomeration economies as a source of composer productivity. We outline the various hypotheses (e.g., reduced transport costs, shared physical capital, labor pooling, and knowledge spillovers) that economists have offered to explain why people and industries cluster geographically. Based on these theories, we argue that composers clustered in cities primarily for two reasons. First, because cities provided access to physical capital (e.g., concert halls and opera houses) and teams of specialized workers (e.g., musicians and musical ensembles like orchestras and choirs) that were required for musical production but involved high fixed costs, there were scale economies to having many composers in the same place. Additionally, in a world of high information and transportation costs, where new music was performed locally and diffused with long lags, co-location facilitated knowledge spillovers by making it easier for composers to learn from each other. Using a sample of composers for whom we have reasonably complete data on their annual output and where they lived in each year of their lives, we show that clustering in certain key cities (Vienna, Paris, and London) bestowed economically significant productivity gains. However, clustering came at a cost of higher mortality risk, perhaps due to the dangers of living in cities during an era of poor urban sanitation, or the stress of working in a more competitive environment. Finally, we will use our theory of agglomeration externalities to frame a discussion of the rise and decline of certain cities or regions as important centers of musical innovation.

Chapter 7 deals with the link between composers' emotional states and their productivity. A growing literature suggests that a worker's productivity may also be heavily dependent on her emotional well-being. This link between output and emotional state may be especially important for creative industries like musical composition. While many scholars posit a relationship between artists' psychological state and their productivity, the evidence is scant, largely because there are no consistent measures of artists' emotional state throughout the life cycle. To remedy this deficiency, we mine the lifetime personal correspondence of three composers—Mozart, Beethoven, and Liszt—to create well-being indices that vary throughout their life spans, and we examine how their productivity tracks these indices of well-being. We find that negative emotional well-being increases composer productivity, but that the impact depends on the type of negative emotional well-being. Anger and anxiety, it turns out, do not improve productivity, but sadness does. These results accord with the literature, which finds that depression is an important source of creativity in the arts.

Western classical composers lived during turbulent times. How were their lives and work affected by tumultuous events like wars and revolutions? Do shocks enhance or reduce artistic productivity? Can war be a source of artistic inspiration? We explore these questions in **Chapter 8**. Several interesting findings emerge from this analysis. First, wars provoke composer migration with civil wars inducing more international migration than international wars. Second, the best composers were more likely to emigrate, and composers in general were more likely to migrate in response to war than the general population. Third, wars reduce composer productivity on average, but the impacts are heterogeneous and depend on the type of war and the age of the composer at the time of the war. Defensive wars and wars in which a composer's home country

is victorious raise productivity. Meanwhile, wars significantly reduce the productivity of composers over the age of 50, but only have a negligible impact on those younger than 30.

Chapter 9 turns attention to the much-neglected female composer. How under-represented were women among composers? What factors facilitated or discouraged women from entering this profession? And why are so few women included in rankings of the greatest composers? We document the representation of women among thousands of composers across time and space. We then explore how factors like family wealth, having a mother with musical training, or being married or related to another composer, may have differentially affected male and female composers. Finally, we examine whether women were less likely to become great composers because they lacked access to higher quality teachers, and whether women were more likely to become famous as teachers than composers.

Chapter 10 is our concluding chapter. We begin by posing the question of why only a handful of the greatest composers are known today even though there were many other composers who were almost as good, using Rosen's (1981) theoretical framework on the economics of superstars. We then contrast Rosen's approach with ours. While Rosen's framework provides the answer to why the very top tail of composers enjoys outsized (reputational) returns, it does not explain why the very top was different from the rest, which is our contribution. We summarize our broad thesis about the determinants of composer greatness and highlight our major findings. We also discuss other factors we have missed that may have influenced composer productivity and greatness, as well as the role played by the fact that many composers also pursued other careers, either as musician-performers (e.g., conductors, pianists) or in unrelated fields (e.g., politics). Finally, we will relate our findings to the broader literature on the productivity of artists, academics, technological innovators, inventors, and entrepreneurs,

and discuss what our study of composers can teach us about the drivers of creativity more generally.

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