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Bachelor Thesis Economie en Bedrijfseconomie

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# The market for musical

# talent in the Baroque era

A statistical approach to migration patterns of composers in the 17<sup>th</sup> and 18<sup>th</sup> century

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Abstract: This thesis investigates the market for compositional talent in the Baroque. This is done by looking at the relationship between the size of the city the composer worked and the distance he travelled. Other explanatory variables are added to provide insight into the factors determining the worth of a composer. The data reveal that multiple aspects are involved in this market for talent. Central are the distance a composer travelled, and whether or not he visited Italy. Furthermore, when a composer slowly rose to a high function in music, this often was in a big city. In conclusion, the hypothesis that a market for musical talent existed in the Baroque era can be confirmed.

# Contents

# Introduction

In the oeuvre of J.S. Bach we see several works in which nations are mentioned in the title: the French Suites, the English suites and the Italian concerto. Most of these works were given this distinction only later. However, this naming is a noteworthy example of the importance of national styles in the baroque era. Also in performing classical music very clear differences exist in performing music from France or from Italy, for instance in ornamentation. Further, in music history it is fairly well known that many Italian composers worked in Dresden. Italian musicians dominated music in this electoral city (Robins, 2016).

These facts hint at the importance of migration for musicians. They give rise to multiple questions, regarding for instance the reason for the migration of composers. Another question is how the migration of these composers influenced the spread of musical styles through Europe. Often in music scholarship a qualitative approach is taken. This provides us with important insights. As an example, if we would be interested in the spread of musical styles through Europe, we might look at the important composer Giacomo Jacomo Carissimi. Pupils of this important composer held positions in Augsburg, Fulda, Mainz, Copenhagen, Danzig and many others (Oxford University, 2018). This gives rise to the presumption that Carissimi played a central role in the spread of the Italianate baroque style.

Interesting as this info is, it is not relevant for writing a bachelor thesis in economics. However, when examining the migration patterns of composers further, it becomes clear there is an abundance of unorganized data about classical musicians in general. Furthermore, the migration patterns we see might lead us to the presumption that a very well-functioning labour market might exist. The challenge now is to organize this data and quantify it in such a way that information regarding this market for talent can be drawn from it.

The central goal of this thesis is proving a market for musical talent in the baroque exists. The main hypothesis is: a market for compositional talent existed between the various courts in the baroque era. In proving this, two variables play a central role: the distance the composer travelled and the size of the city in which he works. Moreover we are interested in the specific elements that might play a role in this labour market. For instance, info about the composers education is often known. This also enables us to examine the effects of the migration patterns of composers on the spread of national styles. If a market exists, a composer who visited Italy or France might be in higher demand than one who did not. By combining al these variables into a regression we can test our hypothesis.

This thesis is divided in four parts. Firstly in a literature review, existing literature on related topics is reviewed. Then in methodology the quantitative methods used are shown and the exact dimensions

of the dataset are specified. Thirdly in results multiple OLS regression are run, which brings us to the conclusion in part four. In the conclusion the main findings of the research are summarized and several suggestions for further research are given.

# Literature review

## Research on competition in Baroque music

Ample research is available about music in the 17<sup>th</sup> and 18<sup>th</sup> century. The research by Scherer (2001) is a good starting point when we want to look at composers in the Holy Roman Empire around 1700. Scherer makes the point that every small court in Germany had his own composer. The situation was very different in other countries like France, where only one court was in place in Paris. The large amount of observations available concerning composers in the Holy Roman Empire could provide valuable insight into the market for compositional talent. The situation was very different in other countries like France, where only one court was in place in Paris.

The research by Scherer was not published in an economic journal, but does take a statistical approach. He looks at the whole of Europe first and finds that in Germany, Italy, and Austria, relatively, more composers per capita have been born. The main research question is whether young composers were induced to look for a career in music if they were born in a feudal system compared to a free city. By doing this in fact he looks at the competition among courts in obtaining compositional talent. However this hypothesis cannot be defended with any of the findings of this research. It is not seen that all those courts (and the huge demand for music that came with it) urged more young men to make music their profession. Also the clear argument is made that between 1796 and 1813, the environment changed drastically because of the invading French forces in Germany. Noblemen often fled their courts and when they came back dismissed or downsized their orchestras.

 A significant amount of existing research also looks into the economic aspects of music composition. It is clear that certain economic aspects played a significant role in the breakthrough of music in the Baroque era. Vaubel (2005) researches the role of competition in Baroque music and finds that the most famous composers come from the most fragmented countries: Italy and Germany. It is argued that the flourishing of music in the Baroque era is partly due to competition in all the different small states. The Baroque princes also stimulated innovation, because novelties in music may give them more prestige. When J.S. Bach grew up in Thuringia, 22 separate courts existed in Thuringia alone. It is clear that all these courts competed for composers and musicians, most certainly partly by paying higher salaries. This is a good starting point for the research in this thesis: richer courts had the ability to pay these higher salaries, thus attracting greater compositional talent.

Vaubel also looks into the average duration of employment. He finds that, on average, the mobility was much higher among composers in Italy and Germany in the Baroque era. We take this as another indication that competition played a major role in the development of music around 1700.

There is more research stressing the element of competition. The enormous profusion of talent in composition could be compared with something happening in baseball now (Baumol and Baumol, 1994). Every young man which seems to display a certain talent will be urged to pursue a career in composing (or, nowadays, baseball). This research also stresses the fact that it is not only competition, but also very high demand for all sorts of musicians and composers in general. At the slightly less prestigious courts a lot of jobs were also offered for the slightly less talented composers.

The second part of the research by Baumol and Baumol examines Mozart's financial situation and surroundings, which is interesting but not particularly relevant for this thesis. They also explain that the market for music composition is changing in Mozart's Vienna. We already see this with Haydn. Almost the whole of his life he was employed at the Esterhazy court. However at the end of his life he spent a few years in London, becoming a millionaire by nowadays standards. He was acting as a free agent there, which would become the standard in later ages. This has consequences for this thesis: we will have to stop collecting data after approximately 1800, when economic circumstances are changing radically.

## Research on comparable groups

The historic-economic research into the migration patterns of composers has a parallel with the literature on the migration patterns of other artists. Kelly and O'Hagan (2007) examine the broad historic pattern of the migration of prominent visual artists. They principally look at the statistics about the birthplaces of the most famous artists in almost the whole known western cultural history. It is striking to see that Germany in the 17th and 18th century does not play a very big role as the origin of cultural talent. However, just like in this thesis, Italy is very important and is often seen as the country where a lot of talent comes from. The main finding of their research is that clustering frequently happens, for instance in Paris. We see this in music as well, mainly in the romantic era, which broadly speaking consists of the 19th century.

The exact reason for clustering still has to be researched. As reasons for the particular location Kelly and O'Hagan mention great wealth, intense competition for the work of artists, artistic freedom, the presence of a few hugely influential and talented artists, and good artistic infrastructure. From their research we draw the important insight that artists (visual artists as well as musicians) are an occupational group with historically a high mobility.

O'Hagan and Walsh (2017) repeat their research on with the visual artists for the 146 most important Western Philosophers. Like in the case of visual artists they find clustering of philosophers activities. Like with music and visual arts, Paris was an important centre in the 19th century. They find that 80% of the researched philosophers did publish their first major work after migrating. This might indicate

positive effects on productivity from migration. We might see this parallel in music as well. This increased productivity might be due to positive spill-overs from clustering too.

It is important to note that each significant philosopher will create a network of less important philosophers and thus a small cluster in itself. This is not argued in the paper, but the demand for philosophy might be of a quite different nature than the demand for music. In the Baroque era musical demand was often fulfilled with the attraction of one court musician.

## Research on migration and clustering of composers

What was done for visual artists and philosophers was done for composers in a very comparable way. O'Hagan and Borowiecki (2010) used data from Grove Music Online, and identify the most important composers. They then take a statistical approach and look into the migration patterns of these composers. Their starting point is 1750. For this thesis mainly their findings for 1750-1800 are relevant. They find that Germanic composers often stayed in Germany. In France they find a strong clustering in Paris. In Germany there is no such clustering, only Vienna plays a minor role. This is indeed what we would expect with all the different small courts in the Holy Roman Empire.

We have to be cautious with drawing too much conclusions for this thesis from this research by O'Hagan and Borowiecki, since starting from approximately 1780 composers start to become free agents, who are not necessarily employed at a court or employer (as we showed by looking at Baumol and Baumol, 1994). The research by O'Hagan and Borowiecki after that focuses on clustering, which is clearly seen with composers. This paper is the first paper that identifies in a statistical way the clustering of important composers.

The clustering of classical composers is also looked at separately by Borowiecki (2013). He researched the causal relationship between being in a cluster and having an increased productivity using the case of the clustering of classical composers in for instance Paris. He tried to tackle problems which often occurred in previous, similar research, such as the endogeneity of clustering with productivity. This was done using a unique individual-level data set containing classical composers, which deals with the endogeneity problem and omitted-variable bias. Using an instrumental variable approach, he finds evidence of a causal relation between being in a cluster and productivity (measured by having written a work seen as significant nowadays). The instrumental variable approach yields stronger estimated effects than the OLS regression. The author further convincingly argues that future work location is strongly influenced by the birth location of the composer. If a composer is born further away from a cluster, the likelihood of him working in that cluster in the future gets smaller.

The case of migration of classical composers' migration features in other research as well. Borowiecki (2013) specifically focuses on the costs of war and the migration it induces. The time period looked at is 1800-1949, so this research starts where this thesis ends. He finds that the incidence of a civil war makes it 19% more likely that a composer migrates. Moreover, he shows that composers in times of war choose countries that are safe and familiar for them, not necessarily the ones with the best career perspectives. This information combined with the research by Scherer (2001) means it is important for us not to include observations during war time, i.e. after 1800 when the French troops invaded the Holy Roman Empire. These migrations are not anymore caused by a market for talent, but induced by war.

## Research on the job of Kapellmeister

A lot has been written about the job of 'Kapellmeister'. We should include some of this information in this literature review, since we are specifically are looking into the duties of this musicians. Owens (1995) wrote a very extensive research into the Hofkapelle at Württemberg. She lists the duties of the Kapellmeister. The central responsibility of the Kapellmeister is to get music performed at the court. It is important to note that this was a way to bring the Württemberg court into higher repute. This again strengthens the point Vaubel (2005) makes about the role of competition in Baroque music. The most important duty in this of course is composing the very music that has to be performed.

However, there is much more to tell from the research of Owens. It is clear that, at least in Württemberg, the Kapellmeister stood in high esteem. The musicians were ordered to have respect for the Kapellmeister. In fact, the Kapellmeister was not just a musician, but also their manager and supervisor. The Kapellmeister was responsible for the behaviour of musicians. He should further keep an up to date inventory of all music owned. The Kapellmeister was the central person in music at a court. In our age we would call him conductor, orchestral director, and composer at the same time.

## Research on the link between economics and arts

Links between the court musicians in the Holy Roman Empire and economics nowadays can be made in a rather unexpected way. Falck, Fritsch, and Heblich (2011) analyse the extent to which endogenous cultural amenities affect the spatial equilibrium share of high-human-capital employees. They look whether for instance good musical institutions attract a big share of high-human-capital employees. Of course endogeneity is a big problem in this. They solve this by looking at Baroque opera houses in Germany to overcome this. It is known that Opera Houses were often financed by taking on enormous debts: the regions which got them where not necessarily richer.

This research is very relevant for this thesis because it is good evidence of the prestige of music in this era. 'These opera houses, many of which still exist, acted as tangible symbols of their builders' prestige.' The paper in the end finds that regions with an opera house are still economically more prosperous nowadays. The authors test for the robustness of this conclusion by repeating the study with some counterfactual locations for opera houses. In the end this might give reason to invest in cultural amenities now to fuel economic growth.

All previously mentioned literature is also still relevant in modern day economics of music. A relation between wealth and perceived quality of music might still exist (Vézina). In this very short research the publication of the 1000 best albums are found to be positively correlated with GDP growth. GDP growth seems to matter for the composition of very popular albums. This is an important parallel for what we are trying to prove: rich courts attracting more talented composers. It is likely that in the Baroque era very different mechanisms were at hand than in modern day popular music. Still, we can see the parallel between this research and this thesis.

## Conclusion

Concluding we see that a sizeable literature quite a lot of research exists on the migration patterns of composers. There is also a lot of information available on the breakthrough of Baroque music. However there is no research which looks at the migration patterns combined with the wealth of the cities to which the composers migrated. This thesis aims to look at this specific element of a market for compositional talent.

# Methodology

## Data collection

Data for this thesis was collected from the *Grove Music Online*, one of the largest reference works on western classical music. The goal of the search was to find all known composers who at some point in their career worked in the Holy Roman Empire in the Baroque era. However, it is hard to distinguish the exact position a composer had. Furthermore the amount of composers found was too large to process for a bachelor thesis. To solve these two points a search term was added: Kapellmeister. Only composers who had this function at some point in their life are included in the regression. It is important to note that this search query also finds mentions of this functions in other languages. For instance, composers functioning as *Maestro di Capella* are included in the dataset. The complete search query was as follows: Kapellmeister; biographical article; 1600-1800; Composer or Arranger; Austria, Germany, Holy Roman Empire, Hungary, Prussia, Italy. This in the end yielded 248 composers. 209 of these at some point in life were Kapellmeister.

## Distance calculation

From these 209 composers all work- and study locations were listed. Then, for every place where the composer was Kapellmeister, the distance travelled was calculated. The distance was measured using linear distance. Ideally, it would be better to use an adequate estimation of the economic distance between places, however there is not enough data available to do this. Linear distance is not perfectly correlated with economic distance, this might cause a  bias in the results. In existing literature however, this solution is also chosen by Dittmar (2011). He measures the linear distance from where the printing press was invented as an instrument for the occurrence of the use of the new printing technology in European cities.

The distance is measured by calculating the distance between the place the composer has worked or studied furthest away from the concerned working place. One could argue that it would be better to take total linear distance travelled. However, this does not necessarily yield better results. A composer whom had to switch jobs a lot would in this way get a very high distance travelled, while this might even indicate his composing quality was under par. Furthermore calculating total distance travelled would give some problems. For instance when the exact birth location in Thuringia is not known, but the composer did study in Naples, we can still use this observation with our current method. When we would use total distance travelled, measurement would become less accurate.

It is assumed that every composer also studied in his native town. With a significant amount of composers the exact information about their youth is not known. With the composers of which the information about their first years is known, we very often see that the father of a composer gives

the first lessons. Thus, if the birth location is the furthest from the concerned work location, this distance is used in the dataset.

## Further independent variables

The distance to Venice is listed for every working location. Venice was one of the centres of Italian music and culture. The distance between Venice and the location in which the composer is working might influence the market for compositional talent. For instance in Hamburg, it might be the case that the Italian style of music making is in higher demand because of its relative rarity. In locations far from Italy a composer who mastered the Italianate style could be in higher demand because of this.

For every composer dummy variables are added. If a composer ever was officially appointed organist at a court or church, this is in the dataset. It is important that his appointment was official: in the Baroque era musicians could play more than one instrument. It is likely that most of all viewed composers could play organ. Furthermore for every composer which ever studied at a university, this is added in the dataset. It is not always known whether or not a composer has in fact graduated from university. Therefore, every composer which at some point in his life studied at a university is treated equal.

In some cases composers never leave their native city. They work and study there their whole life. This does however not have to mean that their talent was not valued. Certainly, in bigger cities network effects might be working. A composer can learn and develop multiple styles from other countries while staying in his city of birth, especially if this city is an important musical centre. To control for this network effects a dummy variable is added. If a composer was not initially appointed as a Kapellmeister, but only rose to that function later, this is added in the data. This is especially important in, for instance, a city like Dresden. A large amount of Italians worked at this court. When subsequently a German composer came to study in Dresden, he learned about the Italian style of composing. The adding of the dummy variable whether or not a composer slowly rose in function, aims to capture this effect. However, not the whole effect of this will be captured. To do this in a more satisfying way, a full network analysis within a group of composers would be necessary.

All composers working locations are then divided into three different classes:
- Class 1: The city has between 0 and 3999 inhabitants in 1700. If data is not available, but the city has less than 30000 inhabitants, class 1 is given.
- Class 2: The city has between 4000 and 19999 inhabitants in 1700. If data is not available, but the city has more than 30000 inhabitants, class 2 is given.

- Class 3: The city has 20000 or more inhabitants in 1700. If the city is a national court, class 3 is given.

In some cases the location of the court is not in the biggest city of the margraviate or territory. In these cases the population data of the biggest city in the margraviate or territory is used. The size of the city is one of the key elements in this thesis, since it an appropriate indicator for the wealth of a city. This is true because of the Malthusian Mechanism which links higher income to higher population growth (Galor and Weil, 2000). Until 1820 there was hardly any growth in output per capita. Any extra income earned enabled the population to grow. Thus, when a city is bigger, we know it is richer.

Every time a composer starts to work as a Kapellmeister in a new location, this is an additional observation in the dataset. This implies that a composer which has worked in four locations is in the data four times as often as a composer which only worked in one place. However, this does not have to be a problem for the results of the regression. For every new location in which a composer works, a new contract was made between the composer and court. Every combination of composer and court is valuable information about the market for compositional talent.

In the regressions all composers which died after 1806 were left out. The search method in *Grove Music Online* is not transparent in which composers it shows when searching for 1600-1800. The year 1806 is chosen because it is the formal end of the Holy Roman Empire. It is however also around 1800 that the Baroque and Classical eras in art and music come to an end. Starting from 1800 Romanticism takes over. This also means composers become free agents and thus are not always working at courts anymore.

## Variable overview

| | |
|---|---|
| Year of Birth | Year of birth of the composer |
| Year of Death | Year of death of the composer |
| Italy | 1 if the composer ever visited Italy, 0 otherwise |
| France | 1 if the composer ever visited France, 0 otherwise |
| Organist | 1 if the composer ever worked as organist, 0 otherwise |
| University | 1 if the composer ever was enlisted as a student at a university, 0 otherwise |
| Distance | The highest distance between the working location concerned in this match and any place the composer has known to have worked or studied before. |
| Class | The class rating of the city concerned in this match. Either 1, 2, or 3 |
| Previous class | The class of the city where the composer previously worked as Kapellmeister. Either 0, 1, 2, or 3. |

| | Distance Venice | The distance between the working location concerned in this match and Venice. |
|---|---|---|
| | Career growth | 1 if the composer was not appointed as Kapellmeister initially, 0 otherwise |

## Summary statistics

| Variable | Obs | Mean | Std. Dev. | Min | Max |
|---|---|---|---|---|---|
| class | 313 | 2.172524 | 0.735291 | 1 | 3 |
| Distance | 313 | 530.345 | 367.1727 | 0 | 1978 |
| italy | 313 | 0.373802 | 0.484587 | 0 | 1 |
| france | 313 | 0.067093 | 0.250583 | 0 | 1 |
| organist | 313 | 0.313099 | 0.478098 | 0 | 1 |
| university | 313 | 0.271566 | 0.445479 | 0 | 1 |
| previousclass | 313 | 0.744409 | 1.102957 | 0 | 3 |
| distancevenice | 313 | 607.4537 | 277.9351 | 0 | 1765 |
| careergrowth | 313 | 0.357828 | 0.480129 | 0 | 1 |
| Yearofbirth | 303 | 1663.01 | 51.6007 | 1560 | 1766 |

# Results

## Correlation table

Before examining the results of the regression it is important to look at the correlations between all pairs of variables. If strong correlation between variables exists, the problem of multicollinearity might arise. There is reason to expect this: when a composer visits Italy, we expect maximum distance travelled to rise. In the regressions we will have to check whether or not these issues inflated standard errors.

| | class | distance | italy | france | organist | university | previousclass | distance venice |
|---|---|---|---|---|---|---|---|---|
| class | 1 | | | | | | | |
| distance | 0.352 | 1 | | | | | | |
| italy | 0.2682 | 0.5026 | 1 | | | | | |
| france | -0.0456 | 0.1073 | -0.0224 | 1 | | | | |
| organist | 0.0647 | 0.037 | 0.1296 | -0.0154 | 1 | | | |
| university | -0.0261 | -0.0868 | -0.2193 | -0.1063 | 0.066 | 1 | | |
| previousclass | 0.1178 | 0.281 | 0.0834 | -0.0885 | -0.0666 | 0.0961 | 1 | |
| distancevenice | 0.1492 | 0.3798 | -0.1162 | 0.0223 | 0.0207 | 0.1981 | 0.1203 | 1 |
| Yearofbirth | 0.0036 | 0.0627 | 0.0371 | -0.0215 | -0.1571 | -0.066 | -0.0294 | 0.0299 |

By looking at the correlation table we indeed see a correlation between distance travelled and whether or not the Kapellmeister visited *Italy.* Further it is notable that distance and distance to Venice are correlated. This means the distance a composer travelled and the distance this particular working location is from Venice is positively correlated. There might be multiple reasons for this. First is that a lot of composers originate from Italy. As they migrate from Italy to the Holy Roman Empire their total distance travelled is almost perfectly correlated with the distance from Venice. Second reason is that if a composer travels much further than most of his contemporaries, this is often also further from Venice. This goes for cities like Stockholm, London, or Kaliningrad. These 'outliers' might strongly influence the correlation. A different, economically more interesting explanation, is that the Italian style is in higher demand when the distance to Italy rises. In the terms of a market: the supply of Italian style is low and thus prices rise. In the table we see the correlation between having visited Italy and the distance to Venice are negatively correlated. When the distance from Venice increases, fewer composers have visited Italy. Thus, the last explanation is plausible.

Some of the results in the correlation table already provide some information relevant for the hypotheses.  First is the correlation between class and distance. The strong correlation between these variables might indicate a market for talent. Second is the correlation  between distance travelled and previous class. When the composer worked in a large city before, the distance he travels rises. The correlation between the distance from Venice and whether or not the composer had a university schooling is a finding which has a clear explanation. Composers only studied at universities in the Holy Roman Empire, not in Italy. This explains why composers which studied at a university, also worked far from Venice.

### Simple analysis

For this research, the main interest is the relation between *class* and *distance*. If there is a statistically significant relation between the class (size) of a city and the distance a composer travelled, we can confirm our main hypothesis. This can be tested using a straightforward regression:

$$distance = \beta_0 + \beta_1 class$$

| distance | Coef. | Std. Err. | t | P>|t| |
|---|---|---|---|---|
| class | 172.4774 | 27.59255 | 6.25 | 0 |
| _cons | 145.5771 | 63.50831 | 2.29 | 0.023 |

From this regression we can conclude that if the class of the city of the particular match is higher, the distance the composer travelled is also higher. This result is statistically significant against every confidence level. This confirms our main hypothesis: the bigger cities were able to attract composers from further away.

## Advanced analysis

We are interested in other factors which might play a role in the market for talent. To see the effect of all these variables we need a different dependent variable. The dependent variable in this case should be *class*, not *distance*. For instance, we are not interested in the effect a university education has on the total distance travelled. The main interest is whether or not a university education makes it more likely that the composer works in a bigger city.

$$class = \beta_0 + \beta_1 distance + \beta_2 italy + \beta_3 france + \beta_4 organist + \beta_5 university$$
$$+ \beta_6 previousclass + \beta_7 careergrowth + \beta_8 distancevenice + \beta_9 Year\ of birth$$

| class | Coef. | Std. Err. | t | P>t |
|---|---|---|---|---|
| distance | 0.00051 | 0.0001519 | 3.36 | 0.001 |
| italy | 0.2329055 | 0.1043703 | 2.23 | 0.026 |
| france | -0.0483021 | 0.1627968 | -0.3 | 0.767 |
| organist | -0.0101204 | 0.0865946 | -0.12 | 0.907 |
| university | 0.0485812 | 0.0940149 | 0.52 | 0.606 |
| previousclass | 0.0419662 | 0.0394694 | 1.06 | 0.289 |
| careergrowth | 0.3763597 | 0.0863364 | 4.36 | 0 |
| distancevenice | 0.0001805 | 0.0001746 | 1.03 | 0.302 |
| Yearofbirth | 0.0002301 | 0.0008473 | 0.27 | 0.786 |
| _cons | 1.150019 | 1.406991 | 0.82 | 0.414 |

Above results are again satisfying for confirming our hypothesis. Three of the independent variables are statistically significant: *distance*, *Italy* and *careergrowth*. Note that the distance is measured in kilometres: the estimate for this variable is rather big. The difference between the estimates for visiting Italy and the estimates for visiting France is striking to see. For composers who visited Italy it is very clear they on average worked in a bigger and thus richer city. For France we do not see this. The intuition behind this is not entirely clear. The most obvious explanation for this is that the Italianate style of music (or teaching) was in higher demand than the French one. Another striking result is the estimate and significance for *careergrowth*. There are several factors which might cause this result. The most straightforward explanation is that bigger cities provide more opportunities for growing in function. This might be the sole reason for this estimate. However it is also possible that a composer in fact becomes more valuable because of network effects. If a composer starts as a regular orchestral player and builds his career until he is the Kapellmeister, this could be so because he learned from the earlier, renowned musical directors in this particular city.

We have to check for multicollinearity to determine whether or not the standard errors are inflated. This is done by checking the Variance inflation factor (VIF).

| distance | 1.91 | organist | 1.08 |
| italy | 1.58 | careergrowth | 1.07 |
| distancevenice | 1.44 | france | 1.05 |
| previousclass | 1.16 | Yearofbirth | 1.03 |
| university | 1.15 | Mean VIF | 1.27 |

This means the estimated standard error for *distance* is √1.91 = 1.38 times higher than it would have been if it was not correlated to any of the other variables. These results do not give reason to remove variables from the regression.

Our main hypothesis is now confirmed. However the dataset provides opportunities to expand our research to a small extent. One of these options is the time effects that might arise. We can combine this with the presumed network effects, as captured in the variable *careergrowth*. There might be reason to think that with the development of the baroque styles, network effects become more powerful. This would mean that when a composer was born later, it becomes more likely he slowly rose in career. We can test this using following hypothesis:

$$Yearofbirth = \beta_0 + \beta_1 careergrowth$$

| Yearofbirth | Coef. | Std. Err. | t | P>t |
|---|---|---|---|---|
| careergrowth | 2,553352 | 5,999142 | 0,43 | 0,671 |
| _cons | 1655,397 | 3,591592 | 460,91 | 0 |

The coefficient of this regression is indeed positive. This might indicate network effects rising in importance with the progress of musical styles. However, the results are not statistically significant. This can be because the sample size is not sufficiently large. However, it might also be the case that this effect we expected does not play a role in reality. Since the results are also not close to being significant, the last option is likely.

## Analysis with logarithmical distance

Above results are clear, but one issue remains unsolved. Using linear distance has proven to be statistically significant. However, linear distance might not be the ideal way to control for the distance composers have travelled. When we would use the logarithm of distance this could make the analysis more realistic. It is intuitive that it does not make a big difference whether a composer has travelled 1000 or 1300 kilometres, but that the difference between 0 and 300 kilometres travelled is very interesting. Doing this provides us with the following results.

$$\log(distance) = \beta_0 + \beta_1 class$$

| (log)distance | Coef. | Std. Err. | t | P>|t| |
|---|---|---|---|---|
| class | 0.2955895 | 0.087055 | 3.4 | 0.001 |
| _cons | 5.261009 | 0.2006517 | 26.22 | 0 |

This does not cause any changes that would affect our judgement of the hypothesis. This could change when all other variables are added.

$$class = \beta_0 + \beta_1 \log(distance) + \beta_2 italy + \beta_3 france + \beta_4 organist + \beta_5 university$$
$$+ \beta_6 previousclass + \beta_7 careergrowth + \beta_8 distancevenice + \beta_9 Year\,of\,birth$$

| class | Coef. | Std. Err. | t | P>t |
|---|---|---|---|---|
| (log)distance | 0.0459475 | 0.0440274 | 1.04 | 0.298 |
| italy | 0.3783568 | 0.0971191 | 3.9 | 0 |
| france | -0.0002829 | 0.1661168 | 0 | 0.999 |
| organist | -0.0133401 | 0.0882015 | -0.15 | 0.88 |
| university | 0.0137583 | 0.0956474 | 0.14 | 0.886 |
| previousclass | 0.0647751 | 0.0397635 | 1.63 | 0.104 |
| distancevenice | 0.000417 | 0.0001618 | 2.58 | 0.01 |
| careergrowth | 0.3694692 | 0.0885022 | 4.17 | 0 |
| Yearofbirth | 0.0003038 | 0.0008627 | 0.35 | 0.725 |
| _cons | 0.8223561 | 1.452375 | 0.57 | 0.572 |

The difference with earlier regressions is notable. The estimate for *logdistance* is not statistically significant anymore. Part of the effect which before was in the independent variable distance is now explained by other variables in the regression. This also gives reason to think that in earlier regressions part of the explanation for the coefficient was due to observations of which the distance was very high. However, all this does not lead rejecting our hypothesis. Notably, the coefficient for *Italy* has become bigger and more significant. This still leads us to the assumption a market for musical talent exists. The other coefficient which was significant before was *careergrowth*: this did not change. The distance to Venice became more important in this regression.

## Sensitivity analysis
One could argue that above results could be the result of the arbitrary way the cities are classified. To control for this, we will duplicate the research with a different classification.

- Class 1: The city has between 0 and 2999 inhabitants in 1700. If data is not available, but the city has less than 15000 inhabitants, class 1 is given.
- Class 2: The city has between 3000 and 9999 inhabitants in 1700. If data is not available, but the city

has more than 15000 inhabitants, class 2 is given.

- Class 3: The city has between 10000 and 34999 inhabitants in 1700

- Class 4: The city has 35000 or more inhabitants in 1700 or is a national court.

With this new classification, first interest is the intuitively simple regression with only two variables.

$$distance = \beta_0 + \beta_1 class$$

| distance | Coef. | Std. Err. | t | P>|t| |
|---|---|---|---|---|
| class | 140.476 | 20.46391 | 6.86 | 0 |
| _cons | 143.0802 | 58.30098 | 2.45 | 0.015 |

We still see a significant result for this regression. The coefficient has become smaller, but this is what we would have expected. We now have four classes instead of three, so the range of the variable *class* is now larger.

The complete regression can also be done again.

$$class = \beta_0 + \beta_1 distance + \beta_2 italy + \beta_3 france + \beta_4 organist + \beta_5 university + \beta_6 previousclass + \beta_7 careergrowth + \beta_8 Yearofbirth$$

| class | Coef. | Std. Err. | t | P>t |
|---|---|---|---|---|
| distance | 0.000905 | 0.000178 | 5.08 | 0 |
| Italy | 0.295584 | 0.133231 | 2.22 | 0.027 |
| France | -0.11077 | 0.22117 | -0.5 | 0.617 |
| organist | -0.09417 | 0.11531 | -0.82 | 0.415 |
| university | -0.00596 | 0.122745 | -0.05 | 0.961 |
| previousclass | 0.007601 | 0.042997 | 0.18 | 0.86 |
| careergrowth | 0.479681 | 0.114635 | 4.18 | 0 |
| Yearofbirth | -0.00061 | 0.00113 | -0.54 | 0.593 |
| _cons | 2.933912 | 1.878168 | 1.56 | 0.119 |

The new classification does not influence the results of the regression in a noteworthy way. All variables that were significant remain so. The direction and magnitude of the coefficient is not altered in a way that has consequences for the main findings of earlier regressions.

# Conclusion

## Summary and main findings

This thesis examines the link between the distance composers travelled and the size of the court or city they were working in. In the 17<sup>th</sup> and 18<sup>th</sup> century important composers functioned as leading musician at a  court, very often as Kapellmeister.  Thus, a large amount of matches between court and composer exists. The size of the city is used as measurement for the wealth in the court. This will provide important insight in the market for compositional talent. To provide further insight in the working of this market for compositional talent, various explanatory variables are added.

In conclusion the main hypothesis can be confirmed. There is a significant relation between the distance a composer travelled and the size of the city he works. Thus, a functioning market for compositional talent in the Baroque era exists. There are other factors playing a major role in this specific labour market. If a composer visited Italy, he on average works at a bigger court. If a composer did not start as leading musician at a court, but gradually made a career, this often took place at a bigger court. The cause of this might be network effects; often the concerned composer was studying and learning from the more renowned leading musician at this big court. With our dataset it was not possible to prove time played a role in these network effects. It is noteworthy that some other variables do not play a role. Whether or not the composer had a university education is not statistically relevant. The same is applicable for whether or not he was an organist. Likewise, studying in France is not a factor of importance. With our dataset it was not possible to prove time played a role in these network effects.

## Suggestions for further research

There are ample suggestions for further research. In collecting the data for this thesis, considerable filtering had to be done. The first suggestion to extend the scale of the research is looking at more countries. All composers in the dataset of this thesis at some point in their lives worked in the Holy Roman Empire or Italy. When this would be changed to the whole of Europe, results might become more significant. This would have to be combined with leaving out search term *Kapellmeister*, since this title will not be used equally as much in all countries. This would radically change the scale of research. In this it would also be very interesting to see the differences between musicians with an appointment as regular musician, Konzertmeister, organist, or Kapellmeister. This is mainly interesting from a musicians point of view. From this perspective it might also be interesting to look at the specific teachers of musicians. This way we can identify the importance of a teacher for the success of a pupil.

There are more possibilities than merely changing the scale of the research. Especially from an economic point of view this is relevant. For instance, it would be interesting to look at time effects more. This could even lead to the deriving of a demand curve for musical talent, thus providing valuable information into factors influencing the value of musicians trough time. A different suggestion is taking a closer look at network effects. In Germany various musical centres like Dresden existed. What effect does it have if a composer has connections to the renowned Italian musicians working there? In conclusion this thesis is an encouragement for further research. It shows that employing statistical methods on cultural historic data can provide valuable economic and musical insights.

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