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Cultural Infrastructure and Regional Economic Well-Being in Germany - Are we creative yet?

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Abstract.

The influence of the creative class on regional economic well-being is discussed by using the concepts of Richard Florida. We apply this theory on the level of all German major cities in a 10 year period from 1997 to 2006. The theoretical part gives an overview about similar applications. The empirical part firstly describes the development of the theatre, employment and population structures of these cities. Secondly, these data are used to investigate a possible connection between theatre variables and economic growth (approximated by the municipal net tax base). We apply a balanced panel estimation with cross-section fixed effects on the data. It is shown that there is a connection between the growth of the number of theatre actors (proxy for the dimension of the creative class) and the growth of the net tax base. The growth of the number of actors Granger causes the growth of the net tax base. This result supports Florida's theory that the dimension of the creative class influences the economic well-being of a region.

Keywords: creative class, regional economic well-being, fixed effects estimation

JEL-classification: C33 (Models with Panel Data), R11 (Regional Economic Activity: Growth, Development, and Changes), J24 – (Human Capital)

1 Introduction

Are cultural activities and infrastructure an indicator for regional economic well-being in German cities? Inspired by the award of European Capital of Culture 2010 for the Ruhr area, we will follow up this question from the perspective of economists. Instead of analysing the economic impact and prerequisites of this award we will focus on the situation of cultural infrastructure in the long run and its function as driver for regional economic growth.

This paper investigates whether the hypothesis, that cultural infrastructure and regional economic well-being are not only related (cf. Behr/Gnad/Kunzmann, 1990, 7)¹ but causally connected, is supported by empirical data on cultural infrastructure in Germany. We test Richard Florida's theory that it is in fact the creative people who are the main drivers for regional economic growth (and not vice versa) and combine this hypothesis with the assumption of a signalling function of cultural infrastructure (as advocated, e. g., by Prinz, forthcoming).

The empirical part of the analysis is based on data of cultural infrastructure (public and private theatres, orchestras and public libraries)² in German cities with a population of over 100,000 citizens.³ To allow for long-term developments and to research the causality of the phenomenon, we included data from 1997 to 2006 in the analysis.

The paper is structured as follows: The second section describes the theory of the creative class and the connection between this theory and the signalling function of cultural infrastructure for the members of the creative class. The third section gives a short overview over the results of previous empirical studies on the association between culture and regional economic development in Germany. In the fourth chapter a descriptive overview of the cultural infrastructure in German cities and the results of our econometric analysis of the relationship between regional economic well-being and cultural infrastructure are presented. The last section concludes.

¹ Systematic empirical studies of the impact of cultural activities in Germany started in the early nineties of the last century. One of the first analyses in North Rhine-Westphalia, e. g., took place in 1981 and 1985 (cf. Behr/Gnad/Kunzmann, 1990, 21).

² There is a gap between traditional (i. e. pre-electronic) kinds of cultural activities and the modern (new media) sector: While the former has less impact in terms of direct economic effect than the latter, it can be of great importance as input or source of creativity for the production of other cultural goods as well as for the development of the new communication- and knowledge-oriented sectors of the economy (Dziembowska-Kowalska/Funck, 1999, 1387). In our paper we concentrate on the effect of what Dziembowska-Kowalska/Funck (1999) call pre-electronic.

³ Included in the analysis are all cities that had a population of 100,000 or more at least once in the time span from 1997 to 2006 according to the respective volumes of the Statistisches Jahrbuch deutscher Gemeinden (Statistical yearbook of German municipalities).

2 The theory of the creative class and the signalling function of cultural infrastructure

In today's post-industrial society the importance of human capital has vastly grown. As the transmission of information and transportation of goods has gotten easier and easier, stages of physical production can be divided into independent processes on spatially separated sites. This phenomenon, called by Krugman 'slicing up of the value chain', underlines the importance of the mobile creative thinkers. Companies are drawn to places where these highly valuable potential employees are inclined to live. Therefore, it is the decision of the highly mobile creative class which moulds the decisions of the companies. On the other hand the regions, cities and towns are dependent on the companies and their settlement. Thus local politicians have to find ways to attract the creative people who in turn attract successful and promising corporations. For these decision-makers attractiveness for the creative class is not an end in itself. It is the transformation of this attraction into output of the creative industry that matters (Florida, 2004, 244).

In this vein Richard Florida developed his theory of the creative class. Similar to the ideas of Mills (1951) and Fischer (1975; 1995) and Jacobs⁴, Florida (2004; 2005) developed a theory of creativity-driven regional development (see NN, 2005, 205). The share of members of the creative class thereby is an indicator for long-term economic growth of a region. Florida uses a broad definition of creative class and differentiates between three groups: First, the "super-creative core", i.e. persons who are directly involved in creative work. These are persons where creativity is part of their job description like artists and scientists. Second, "creative professionals" are included, persons who are creative in problem solving or where creativity is a non-essential but important mean of their work. Florida goes one step further and thirdly includes employees like secretaries who use improvisation to handle everyday occupational situations (Florida, 2004, 68 - 71). The share of members of the creative class (approx. 30%) of the total working force is to be evaluated with this categorization kept in mind.

Starting from these considerations the importance of this creative class of people has to be stressed. According to Richard Florida's theory of the creative class (as developed in Florida, 2002a, 2002b, 2005a) this class of people is essential for a region's economic growth in today's economy. Creative cities therefore are "breeding places in the knowledge economy" (Hospers, 2003, 143) and Pacione (2009, 339) explains the rising importance of the creative

⁴ Cf. Hospers/van Dalm (2005).

industries (and knowledge industries in total) by their functions as key drivers for the fifth Kondratieff wave.

As Prinz (forthcoming) points out, people try to collect information on certain characteristics of prospective places to live. This *ex ante* collection is easy in some dimensions and very hard in others. While basic economic data on a region, like rate of unemployment, or GDP per head, can be attained quite easily, other factors especially the so-called soft and quasi-soft factors are harder to collect *ex ante*. For some of the interesting characteristics of a region individuals will therefore have to rely on the signal function of institutions or events. Prinz (forthcoming) argues that cultural infrastructure like theatres, museums and operas fulfil this signal function for the members of Florida's Creative Class. The existence of institutions in a city or region justifies the expectation that the people who live there value these institutions (even if oneself is no frequent theatregoer, e. g.) and the vicinity to persons who value the possibility to go to the theatre. This can be seen as a valuable good to certain people.

What are the decisive factors for people who are free to choose their location of residence? In the broadest sense it has to be a place where it is "nice" to live, and of course the requirements and expectations are different from person to person. Some characteristics of social and physical surroundings might play important roles in the determination of human well-being, e. g. weather (cf. Peterson, 2003) and environmental quality (cf. Gyourko/Kahn/Tracy, 1999). However, for the members of what Richard Florida defines as the "creative class", creativity itself could be an important factor. First it could be an important input factor as to be and stay creative an amount of creative experience (active consumption of cultural activities) is required. Second, even if you do not actually consume certain kinds of cultural activities you could like to be with people who do or who share this point of view (indirect signalling function) (cf. Prinz, 2009). Additionally, the existence of certain infrastructure guarantees the possibility to consume the activities if that desire should arise (option characteristic).⁵ The interest for cultural activities, e. g. is quite high in all parts of society; the difference though lies in the various types of culture that is dominantly consumed by the members of these parts.

In Germany the municipalities finance nearly fifty percent of the public cultural expenditures (Bundestag, 2007, 54).⁶ Cultural policy can therefore play an important role on the municipal

⁵ Of course, the heterogeneity of Florida's creative class could be a problem here. The demands of the "hyper-creative core" can be quite different from the creative professionals and the creative supporter class.

⁶ The other main player in Germany's cultural policy are the states, while on national level only very specific cultural activities are funded and organized.

level as a tool for economic policy (cf. Volkmann, 1999, 17). We hypothesize that municipal expenditures for cultural infrastructure (theatres, museums, etc.) are an indicator for the level of cultural activities in a city. First, the municipally funded facilities are signals for outsiders that the city is a place with the option to consume cultural events, second they also function as a signal that the city is a place where people similarly-minded will also be or strive to be (for the role of cultural expenditures as signals cf. Prinz, 2010). The funded infrastructure also has a multiplier effect for the existence and thriving of diverse sub-cultural activities. This way “highbrow” - culture like theatres, museums and orchestras works as an indicator for the cultural attractiveness of a city, where cultural attractiveness is one factor for a city’s “livability”.

When the causality in the relation of economic resources of a region and the level of cultural activities is investigated, one has to be careful:⁷ Due to the fact that cultural activities in Germany are partly funded by means of the municipalities, from the respective state and by voluntary donations of citizens, the economic situation within a region imposes a restriction to the amount of resources available for cultural infrastructure etc. This becomes especially true as in Germany the municipal expenditures for cultural activities are voluntary (in contrast to obligatory expenditures, e. g. social benefits) and therefore susceptible to reductions in times of financial shortages. Additionally, the amount of donations by citizens is more likely to be higher if the economic situation in a region is better. Thus, it seems clear that causality runs in one direction: the economic potential of a region restricts the amount of (publicly funded) cultural infrastructure. If Florida’s considerations on the importance of the creative class for regional growth hold true for Germany, we should also find a causal influence in the opposite direction: From cultural infrastructure to regional economic well-being.

The focus of the empirical section of this paper is to test for this hypothesis for German major cities.

⁷ For a recent comprehensive overview on the criticisms on Florida’s theory and his empirical approach, see Möller/Tubadji (2009).

3 The impact of cultural activities for regional economic well-being in Germany – A short overview

Richard Florida applied his theory on data from the U.S. as well as on data from Europe (Florida, 2004; Florida/Tinagli, 2004) but only on a nationwide aggregation. Fritsch/Stützer (2006, 22-23; 2009) applied Florida's theory on a regional level in Germany and find supporting empirical evidence. They state that the development in the job market is not as important as the openness of society (share of the foreign population) and the region's quality of life (measured as the diversity of the supply with cultural goods and the weight of the educational and the health sector). Fritsch/Stuetzer (2009, 20) also warn against the problems arising from Florida's broad definition of the creative class. This definition could be far too heterogeneous to allow inferences on preferences for openness, e. g. the evaluation of tolerance might be considerably different between bohemians like artists or actors and investment bankers.

Boschma/Fritsch (2007) investigate Florida's theses empirically in eight European countries (Denmark, Netherlands, Finland, Germany, Norway, Sweden, Switzerland and the United Kingdom). They find that the share of the creative class is on a low level in Germany compared to other European countries. They employ regression analysis to show that there is a significant effect of regional job growth on the share of the creative class (or vice versa, as causality of the effect is unknown).

Möller/Tubadji (2009) employ dynamic panel techniques to test Florida's theory with data on market labor performance in Germany. As an indicator for regional economic well-being they choose growth rates of employment and income.⁸ Möller/Tubadji (2009) find evidence that the share of creative people within a region has a causal effect on the economic well-being in that region. They also show that it is not primary the liberal milieu of Bohemian life that attracts creative class in Germany but that prosperity of region is a more important factor.

In the next section it is tested whether these findings are supported by data on cultural infrastructure.

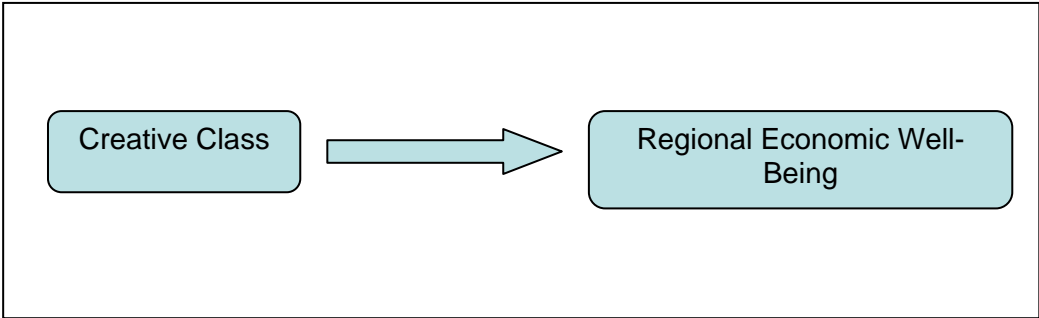
⁸ This is due to the problems of assessing the Gross Domestic Product on the level of counties, Möller/Tubadji, 2009, 279.

4 Empirical estimations and results

While Florida (2005, 102) does not find an association between cultural institutions and the share of the creative class in population, there are results from studies (like Glaeser, 2001) which find a positive correlation between these factors (cf. Marlet/ van Woerkens, 2005).

The relation indicated by Florida is as depicted in figure 1: The creative class in a region is one of the determinants for the economic well-being in this region.

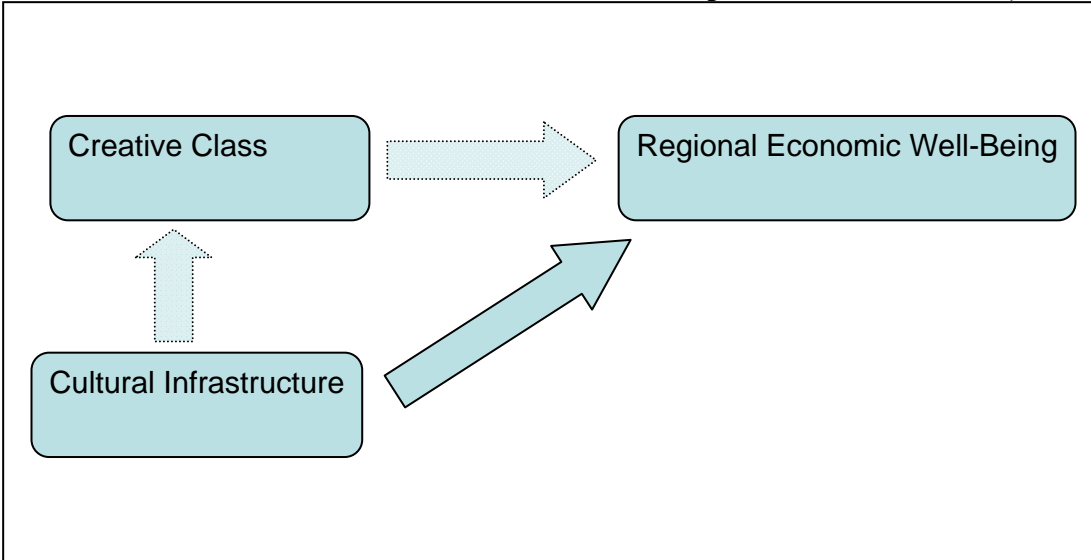
Figure 1: Causal relationship between creative class and regional economic well-being



Source: Own description.

In the present analysis this relationship is measured indirectly: Cultural infrastructure as one of the parameters within the direct grasp of municipal administration is hypothesized to have a direct impact on the amount of creative class in a region which again has a direct impact on regional economic well-being. Measured here is the indirect impact of cultural infrastructure via this two-step connection (see figure 2).

Figure 2: Indirect Measurement in present analysis (continuous arrow: relationship measured, dashed arrows: relationship intended to measure)



Source: Own description.

Now let us have a look at the data. The data which are used are from the Statistisches Jahrbuch Deutscher Gemeinden which is annually published by the Deutscher Städtetag. The Deutscher Städtetag is the pressure group of the German cities. We construct a balanced panel data set by collecting annual data of 85 German cities for a ten year period. The chosen cities are so-called “Großstädte” (major cities) with a population of 100,000 or more inhabitants during the period from 1997 to 2006.

To measure the level of cultural life in a city we collected the following data:

- number of public theatre performances a year
- number of actors in a public theatre
- annual expenditures for public theatres a year
- number of private theatre performances a year
- annual public benefits for private theatres
- number of orchestra performances a year
- number of musicians which form an orchestra
- annual expenditures of orchestras
- number of libraries
- expenditures for libraries

The question of cities’ economic growth is a problem as GDP data is difficult to survey on the local level. Instead the net tax base for each city was used as proxy. The net tax base consists of the net local business tax receipts which are generated in the respective city, and the rates of the income tax, the value added taxes, the taxes on land and buildings and residual local taxes like the dog licence fee. The grants and financial support of higher administrative levels are no part of the net tax base. Therefore, the net tax base is a good proxy for the local dimension of an economy. To control for other influences on the tax base of a city, variables for the number of employees and the number of inhabitants of a city are also included in the estimations.⁹

Since the Deutscher Städtetag did not survey the data for private theatres, orchestras and libraries annually, these data are not used for our regressions, as there were only three

⁹ In the years 1999 and 2006 there were no data of the number of employees available which force us to use linear interpolation. We calculate the mean of the years 1998 and 1999 respectively of the years 2005 and 2007 for each city to get the lacking data. Over and above that there are few other missing values of the number of employees which are also interpolated in a linear way. The situation for the number of inhabitants in 2004 is similar. These data are also interpolated in a linear way.

investigations of these data during ten years. Therefore only data on public theatres are included. Data on the following three variables concerning public theatres are assessed:

- number of public theatre performances a year
- number of actors in a public theatre
- annual expenditures for public theatres a year

Table 1: Correlation between the theatre sector variables

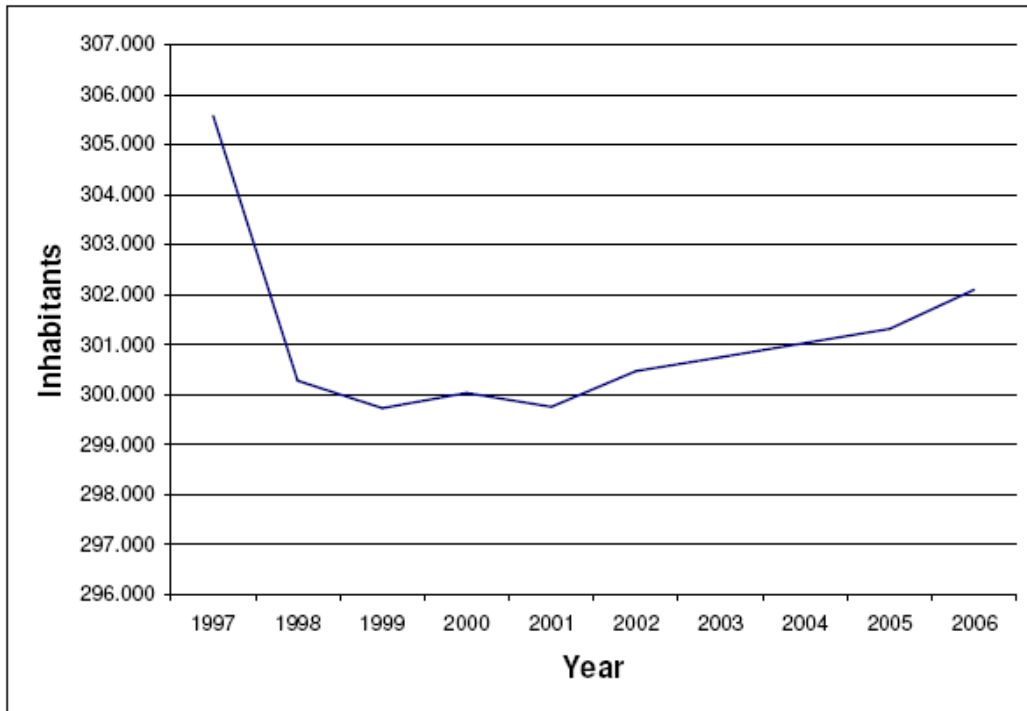
Variables	number of performances	number of actors	expenditures for theatres
number of performances	1	0,943	0,8258
number of actors		1	0,8472
expenditures for theatres			1

Source: Own estimations based on the Data of the Statistisches Jahrbuch Deutscher Gemeinden.

As these variables are highly correlated only the number of the theatre actors was included to avoid multicollinearity. We do so because the theatre actor can be seen as a kind of creative entity.

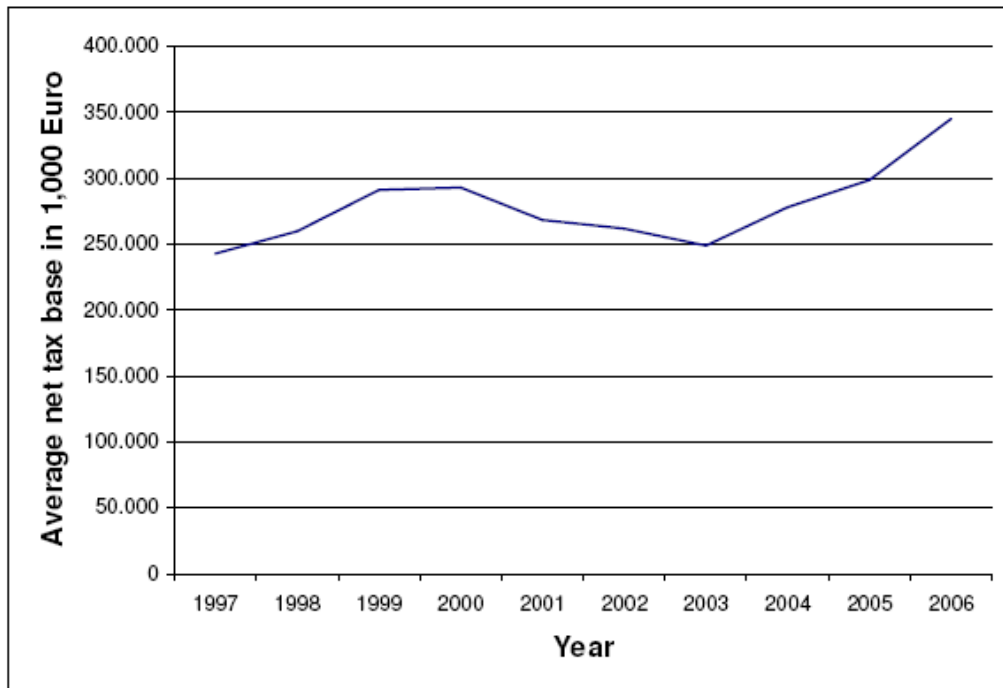
The following figures show the average changes in the data during the period between 1997 and 2006.

Figure 3: Average population of German major cities



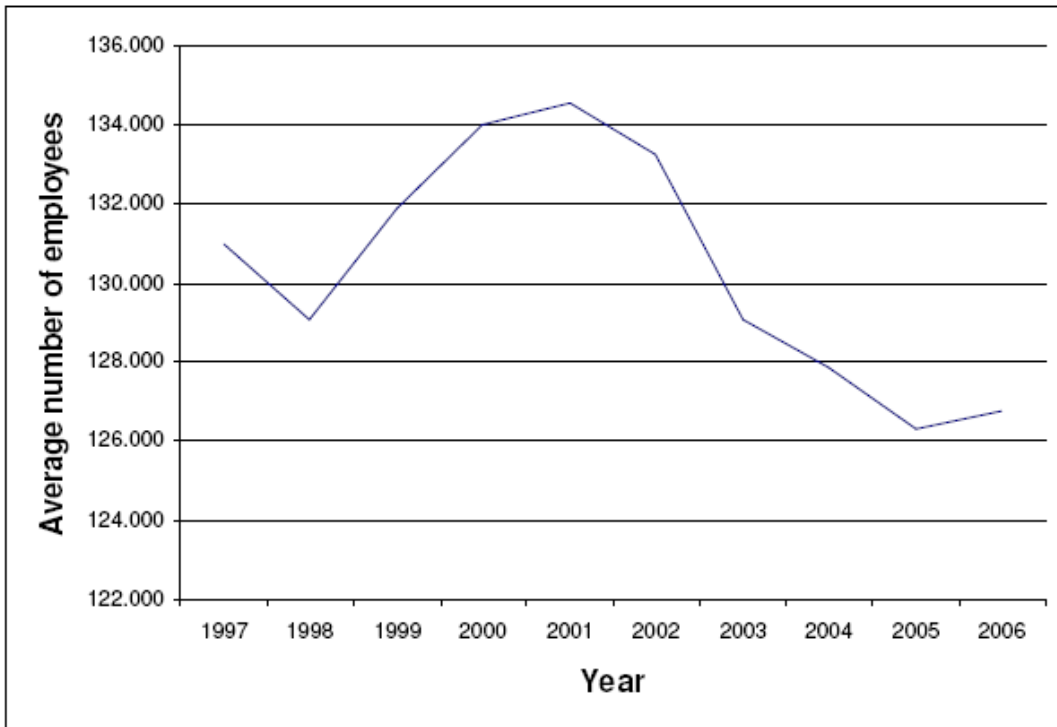
Source: Own estimations based on the Data of the Statistisches Jahrbuch Deutscher Gemeinden.

Figure 4: Average net tax base of German major cities in 1,000 Euro



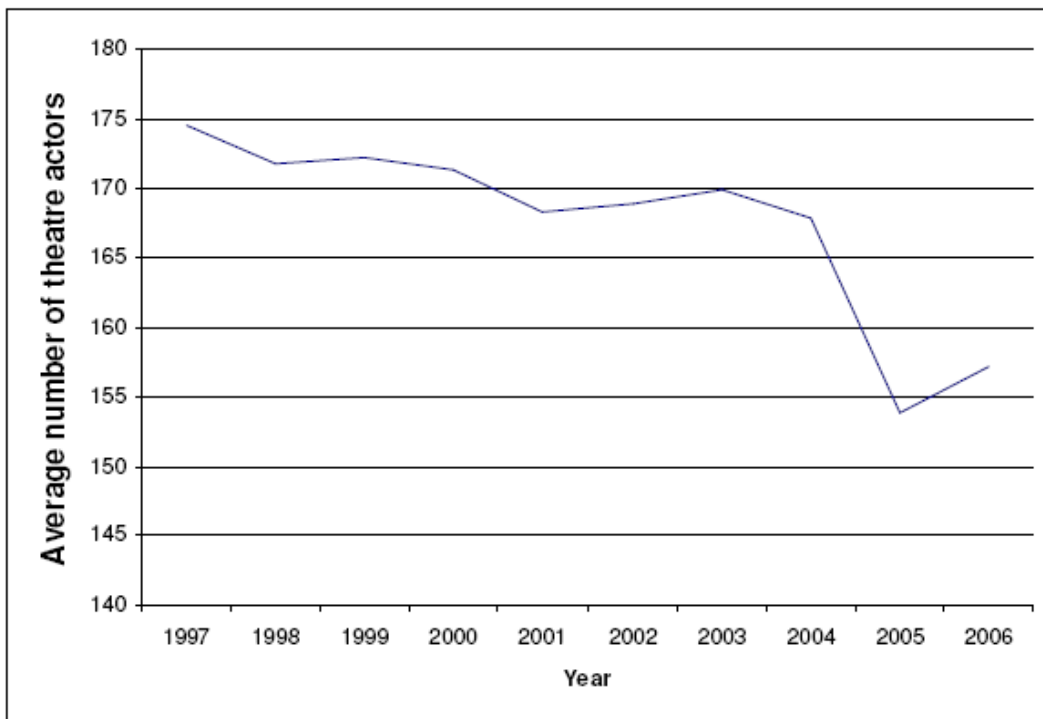
Source: Own estimations based on the Data of the Statistisches Jahrbuch Deutscher Gemeinden.

Figure 5: Average number of employees in German major cities



Source: Own estimations based on the Data of the Statistisches Jahrbuch Deutscher Gemeinden.

Figure 6: Average number of theatre actors in German major cities



Source: Own estimations based on the Data of the Statistisches Jahrbuch Deutscher Gemeinden.

As can be seen in the figures the population level of German major cities is relatively constant. A distinction between Western German and Eastern German cities has to be made because some Eastern German cities have lost population since the German reunification in 1990. Looking at the tax base a general positive trend can be recognized even when the tax base declines in some years. Similarly to changes in the levels of the tax base also changes in the levels of the employees could be explained by cyclical effects. With regards to the number of actors a negative trend seems to exist. 19 of the 85 cities do not have a theatre and for this reason their number of actors is zero.

Table 2 shows a big spread between the different cities grouped by population. This leads to the assumption that there is a high heterogeneity between the different cities.

Table 2: Comparison of major cities grouped by population

Inhabitants	>500,000	300,000- 499,999	200,000- 399,999	150,000- 199,999	<150,000
Average net tax base in 1,000 Euro	1,076,622	313,169	184,777	143,649	88,828
Average number of actors	399.99	272,72	196,91	92,81	73,11
Average number of employees	429,241	168,829	99,867	71,314	53,865

Source: Own estimations based on the Data of the Statistisches Jahrbuch Deutscher Gemeinden.

Now we will take a look at our empirical results concerning the link between cultural indicators and the growth of the economy. First, we want to show that publicly funded cultural infrastructure is used as a region's signal to attract members of the creative class and second that the agglomeration of creative people is leading to higher regional economic well-being.

Florida's theory of the creative class ties up to creative individuals like theatre actors who can be interpreted as a creative entity. Creative people can be interpreted as multipliers of economic growth because they help to create a creative environment where social but also economic ideas can grow. As mentioned before we will use the number of theatre actors to measure the creative potential of a city. Beyond that we have to define the specific regressand. Ideally, the GDP for each city would be the appropriate regressand. As there are no annual

valid data for the level of the cities, we use the net tax base of the communities. This is a variable which is adequate to measure the direction and the level of a proxy economic growth in municipalities and cities as it can easily be surveyed.

After defining this regressand we will now take a look at the regressors. It would not be enough to use only the number of actors as regressor because there are definitely some other very important parameters which influence the tax base. Namely, the number of employees and the number of inhabitants in a city influence the net tax base. These variables will be used as control variables to show that the number of actors has an effect which goes over and above the number of inhabitants and the number of employees.

Starting from the considerations on the causal influence from creative activities on regional economic well-being and taking into account the aforementioned restrictions we formulate the following hypothesis.

Hypothesis: The growth of the number of theatre actors positively influence the growth of the net tax base.

As a high correlation exists between the number of actors, the number of employees and the number of inhabitants, the problem of massive multicollinearity would arise (see table 3). For this reason the model was built using the first differences of the variables. Thus, not the absolute number of actors etc. was included in the analysis but their increase since the respective previous year. As the correlation analysis shows there is no considerable correlation between these transformed values (see table 4).

Table 3: Correlation between potential regressors

Variables	number of actors	number of inhabitants	number of employees
number of actors	1	0,8087	0,8179
number of inhabitants		1	0,9552
number of employees			1

Source: Own estimations based on the Data of the Statistisches Jahrbuch Deutscher Gemeinden.

Table 4: Correlation between the first differences of potential regressors

Variables	Δnumber of actors	Δnumber of inhabitants	Δnumber of employees
Δnumber of actors	1	0,0727	0,1274
Δnumber of inhabitants		1	0,0152
Δnumber of employees			1

Source: Own estimations based on the Data of the Statistisches Jahrbuch Deutscher Gemeinden.

Therefore, our hypothesis that the growth of the number of theatre actors has a positive influence on the growth of the net tax base is analyzed using the following specification:

$$\Delta\text{Taxbase} = \text{Trend} + \Delta\text{Actors} + \Delta\text{Employees} + \Delta\text{Population}$$

$\Delta\text{Taxbase}$ is the increase of the net tax base between year t-1 and the following year t. ΔActors , $\Delta\text{Employees}$ and $\Delta\text{Population}$ are the corresponding differences in the number of actors, employees and the population in the same period. The trend variable is considered because the visual analysis suggests a positive trend in the level of the tax base (see depiction). This trend could be effected by a mixture of long-term growth of the economy and inflation which might play a role as data on the nominal tax base are employed.

To take into account the heterogeneity of the 85 different cities a panel regression for 10 periods from 1997 to 2006 is estimated where cross-section fixed effects are included. That means that the fixed effects regression uses a dummy variable for each city.

Table 5: Cross-section fixed effects estimation

dependent variable	Δ Taxbase
independent variables	Coefficient
C	-5617.696
Trend	3534.921***
Δ Actors	268.4057**
Δ Employees	1.0837***
Δ Population	-2.4011***
F-statistic	1.9921***
Adjusted R-squared	0.1026

*** 1% level of significance, ** 5% level of significance, * 10% level of significance

Source: Own estimations.

A likelihood ratio test for redundant fixed effects shows that the use of a fixed effects estimation is adequate because the null hypothesis of redundant fixed effects can be rejected on a 1% level.

Table 6: Redundant fixed effects test

Cross-section F	1.824***
------------------------	----------

*** 1% level of significance, ** 5% level of significance, * 10% level of significance

Source: Own estimations.

As can be seen in table 5 the coefficients are statistically significant. The only coefficient which is not significant is the constant. As expected, a growing number of employees raises the difference of the tax bases. A positive trend arises, indicating a growing difference in the level of the tax base between t-1 and t. However, it is interesting to see that an increase of actors also seems to raise the level of the tax base. This suggests, that there is a link between the number of theatre actors and economic growth respectively economic well-being. Therefore, our hypothesis is supported by the data and a link between creativity and regional economic well-being could be shown. The negative coefficient of the difference of the population is surprising. Apparently, there is no direct link between a higher population and a higher tax base.

The estimation output only shows that there is a connection between the increase of the number of actors and the increase of the tax base. The question of causality is not answered yet. For this reason a Granger causality test with lags from 1 to 4 is used. As shown in table 7

the null hypotheses that the difference of the tax base does not Granger cause the difference of the numbers of actors cannot be rejected in any of the four cases. Meanwhile, the null hypothesis that the difference of the numbers of actors does not Granger cause the difference of the tax base can be rejected for all cases. This leads to the assumption that the difference of actors could cause the difference of the tax bases. At this point it is very important not to confound Granger causality with real causality. In this situation Granger causality means that the value of $\Delta\text{taxbase}_t$ can be explained in a better way by adding delayed values of Δactors to the delayed values of $\Delta\text{taxbase}$. This Granger causality could be a hint of causality which is not imperative however.

Table 7: Granger Causality Tests

Null Hypotheseses	F-Statistic
1 Lag	
$\Delta\text{Taxbase}$ does not Granger cause ΔActors	1.71398
ΔActors does not Granger cause $\Delta\text{Taxbase}$	24.1008***
2 Lags	
$\Delta\text{Taxbase}$ does not Granger cause ΔActors	1.92712
ΔActors does not Granger cause $\Delta\text{Taxbase}$	12.449***
3 Lags	
$\Delta\text{Taxbase}$ does not Granger cause ΔActors	1.56021
ΔActors does not Granger cause $\Delta\text{Taxbase}$	12.6407***
4 Lags	
$\Delta\text{Taxbase}$ does not Granger cause ΔActors	1.81854
ΔActors does not Granger cause $\Delta\text{Taxbase}$	4.93823***

*** 1% level of significance, ** 5% level of significance, * 10% level of significance

Source: Own estimations.

5 Conclusion

In the present analysis we estimated the relationship between cultural infrastructure and regional economic well-being. Following Florida's theory of the creative class we tested data from European major cities.

Evidence was shown that indeed there is a correlation between the number of theatre actors and a city's net tax base. Furthermore we could establish Granger causality in this relation: Indeed, an increase in theatre actors Granger cause an increase in taxes. This supports Florida's theory.

The results of our analysis have to be cautiously interpreted. The explanatory power could be diminished due to data availability and statistical complications. Especially lack of data on small theatres and informal, low budget production of cultural goods could be a problem. Thus, a big part of urban creativity cannot be measured by using variables like the number of theatre actors, the number of theatre performances or cultural expenditures. Even the consideration of the explicit number of persons employed in creative professions could not solve this problem because this would neglect the cultural and creative impacts of amateurs. This problem also exists for alternative subcultures like self-organized theatre groups or art projects which could heavily influence the cultural flair of a city. It is nearly impossible to consider this part of cultural life in quantitative analysis. The problem of causality appears and is tackled in our econometric analysis. Indeed we could show that the growth of the number of theatre actors Granger causes the growth of the net tax base but this is only a hint of causality. The conclusion of real causality cannot be derived from this result.

Another problem is the lack of consideration of the impacts of cultural infrastructure on the outer conurbation area. It can safely be assumed that cultural infrastructure causes spill-over effects for bordering municipalities. These effects could not be included in the present analysis.

Further research could also be useful in the micro mechanisms that build the relationship between cultural life and the attractiveness of a city. Especially the association of life satisfaction and cultural infrastructure should be investigated.

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