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Live Music in the Time of Corona: On the Resilience and Impact of a Philharmonic Orchestra on the Urban Economy

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Abstract: During the COVID-19 pandemic, many governments enforced epidemic policies of social distancing, restrictions of professional practice, and the prohibition of cultural live performances. Because such policies dried up important sources of income in the cultural and tourism industries, this paper examines how cultural institutions coped with this crisis. Drawing on the case of the Mannheim Philharmonic Orchestra in Germany, we collected original data and employed a regional economic impact analysis to determine both the financial resilience of the Orchestra and its impact on the urban economy. Because the Orchestra could not reduce costs during the COVID-19 pandemic, public subsidies were crucial to fill the income gap of missed live concerts. In turn, the regional impact analysis suggests that the Orchestra maintained its positive effect on the economic demand for goods and services in the urban economy. When balancing the city's subsidies with the rental (city concert halls) and tax incomes generated by the Orchestra's local impact, the Orchestra managed to induce surplus revenue for the city's treasury.

Keywords: creative industries; cultural industries; philharmonic orchestra; regional economic impact; urban economy; economic geography; Germany



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1. Introduction

In the public perception, cultural performances primarily contribute to creating an educational and entertainment offering that enriches the city and its inhabitants, contributing to their overall quality of life. For a long time, research and planning therefore recognized culture as a soft location factor [1], i.e., as having only an indirect economic effect, such as attracting highly qualified workers. Current studies which have looked at the appeals of the creative class [2,3] and the importance of arts and culture to urban innovation, have focused on the direct economic impact of culture on the economic development of cities.

The cultural and creative industries [4–7] not only comprise a large number of economic sectors that generate jobs and create value through their commercial offerings, they also compose a disproportionate share of the creative work in cities, which supports creativity and innovativeness and has an impact on other economic sectors [8].

An outstanding example of this in Europe is the construction of the Guggenheim Museum in the Basque Country, which stimulated the economic development of Basque in significant ways. Known as the ‘Bilbao Effect’, initial investments of more than USD 180 million were already amortized after seven years of construction and led to an overnight boost in tourism in Bilbao [9]. Similarly, the new opera house in Oslo attracted additional visitors, making Oslo a tourist destination [10]. Therefore, it is hardly surprising that, e.g., the New Leipzig Charter on Sustainable European Cities sees culture as the center of sustainable urban development [11,12].

Economic crises, and the COVID-19 crisis in particular, have shown that the consumption of cultural goods such as music is strongly affected by economic development and economic outlook [13]. During recessions, private households reduce their spending on leisure and culture to secure the basic goods needed for daily life. In turn, the regional

economic benefit of cultural service providers declines, and many cultural organizations and workers run the risk of insolvency and failure. An underlying question based on this observation is how the positive regional economic impact of cultural service providers might be stabilized in times of crisis. In particular, in social market economies such as Germany, state interventions are often seen as a solution to prevent providers of cultural goods from market extinction. Given the federal system of the German state, there are different types of public subsidies at different regional levels.

This paper pursues the two following research goals to contribute to the current debate on cultural industries and a post-COVID-19 economy: first, we aim to trace how the COVID-19 crisis has affected the Philharmonic Orchestra as well as the Orchestra's impact on the urban economy. To assess these effects, we employ a regional economic impact modeling approach to calculate the effects the Orchestra has on local demand, employment, value-added and local tax revenues in the period between 2018 and 2022. Second, we examine the effect of public subsidies on the survival of the Orchestra. We found evidence that the public subsidies not only helped sustain the Orchestra and spurred its continued growth, but, at the same time, the city earned higher returns than the initial subsidies given.

2. Theoretical Background

2.1. COVID-19 and the Live Music Industry

Over the last decades, digitization and the shift to consuming music via streaming services has led to declining revenues in the music industry. As a solution for musicians to compensate these losses in income, the use of digital services was proposed to raise popularity, and then transform that popularity into income from live events [14,15].

Compared with previous economic crises (e.g., the financial crisis of 2007/2008), which had reduced the demand for music services, the COVID-19 pandemic has been an exception. Due to anti-COVID-19 regulations, live music performances became practically forbidden. In other words, the single most important income for orchestras across Germany dried up, and digital solutions could hardly compensate for those losses. Live Nation, a world-leading ticket provider and event agency, promoted approximately 40,237 live events in 2019, whereas this number sunk to only 8117 (2020) and 17,234 (2021) events during the pandemic [16].

The global revenues generated by live events in the music industry dropped by 75 percent in 2020 when compared with the revenues in the year before COVID-19 [17]. Forecasts showed that in 2021 the revenues were estimated to be 50 percent below revenues in 2019. While the revenues of live performances had dropped, the revenues for digital streaming remained stable, with a slight growth in 2020 [17].

During COVID-19 the situation was even worse for classical orchestras, for which live events rather than revenues from recordings have always been a major source of income [13]. Further, the continuous rise in overall revenues from live events until 2019 was driven by large-scale events performed by national and international reputable artists [18]. Yet, at the same time, revenues had been declining for small-scale theaters, music halls, and music clubs, which offered platforms for young talent and newcomers, and represent a vibrant part of the urban night-time economy [19,20]. The term night-time economy alludes to the necessity for visiting urban areas at night to understand the potential of culture for the economic growth of cities [20]. The urban night-time economy has long been the subject of strategies to improve a city's competitiveness in the globalized economy [19,21]. Since the 1990s, many cities have adopted public policies as part of creative city approaches to attract tourists, investors, and highly skilled workers [21,22] while addressing problems such as the dying of music clubs with supportive policies [20]. Indeed, studies provide evidence that cities that operate symphony orchestras, opera houses, etc. are more successful at attracting and retaining highly skilled labor [23]. In other words, cultural service providers of live acts offer long-term benefits for urban economies. However, following the *uno actu* principle, live acts cannot be reproduced, nor can they be caught at a later date [24].

Consequently, it is challenging for cultural service providers to compensate for losses before or after an economic crisis.

2.2. Regional Economic Impact Assessment

Cultural work serves the public interest by securing and expanding cultural education and entertainment in a variety of ways. However, even in times of economic prosperity, a large part of the cultural economy often fails to achieve economic viability from the proceeds of admission fees alone. Instead, contributions are required from the private sector, through sponsorship and donations from companies, foundations or charities held by the civil sector [25], and from the public sector as part of cultural policy funding. Many theaters and concert halls as well as drama and orchestra ensembles would not be able to sustain themselves without this support. The COVID-19 crisis has increased the importance of such funding to compensate for the revenues gained from live events. In addition, public funding supports security planning and the professionalization of funded institutions, which often contributes to the attraction of additional funding and more efficient structures.

Due to the high level of competition for public funding, the public sector must consider the distribution and use of its subsidies appropriately and needs to justify them accordingly. In addition to the political struggle, there has been increased focus on the question of what economic effect can be achieved with the help of the funds used. In order to measure the direct economic effects of public funding for a specific geographic area of impact, regional impact analyses are particularly suitable [26,27]. Researchers have investigated the economic impact of both cultural institutions, such as the Lucerne Theater [11] or British theaters [28], and of cultural events, such as the Jazz Festival in Perugia [29], individual rock concerts [30], or a folk music festival in Finland [31].

In contrast, the present study is dedicated to the task of measuring the direct economic impact of a musical ensemble in a geographic area of influence, namely the impact of the Mannheim Philharmonic Orchestra in the city of Mannheim. The city of Mannheim, the case of interest in this analysis, has been a ‘City of Music’ member of the global UNESCO network of Creative Cities since 2014. It has committed itself to supporting its cultural and creative economy with numerous initiatives in cultural policy and economic development. The UNESCO Creative City Network connects cities that have made a special contribution to music and want to exchange experiences, concepts, and model practices in the field of contemporary art and culture. Other German cities, including Berlin, Heidelberg, Karlsruhe, Hanover, and Potsdam are also part of this network. As part of the Mannheim Model for the Promotion of the Music Industry, founded in 1999, the city created the position of a representative for music and pop culture, founded the subsidiary ‘Start Up Mannheim’ for the promotion of the creative industry, and established the ‘Mannheim Music and Pop Culture’ initiative.

Both spatial incidence analyses, which use cost-benefit considerations to balance subsidies used against regional revenues, and more complex multiplier analyses, which include the stimulation of demand in related economic sectors through intermediate inputs, are used to evaluate the economic impact of cultural institutions. Regarding the Mannheim Philharmonic Orchestra, the present study evaluates both aspects, i.e., the cost-benefit balance for the local government as well as the economic impact on the entire urban economy of Mannheim.

3. The Mannheim Philharmonic Orchestra

The Mannheim Philharmonic Orchestra was founded in 2009 as a unique organizational concept in Europe to build a bridge between the training of orchestral musicians at the State Music Academies on the one hand, and their professional employment in orchestras and philharmonic orchestras on the other [32]. The Orchestra pursues three main goals: first, to provide excellent support for young musicians at the highest artistic level; second, to make an important contribution to the cultural offerings of the city of Mannheim; and third, to promote the musical education of children and young people.

Since its founding, over 500 young musicians from more than 40 countries have performed at over 60 concerts in the city of Mannheim. In the 2021/2022 season, more than 5000 guests attended the concerts. In addition, the Orchestra has reached more than half a million people annually in 105 nations to date through live broadcasts of its concerts on the Internet. Video views have already more than doubled since 2019 [32].

In addition to the local concerts held in the city of Mannheim and the live broadcasts around the world, the Mannheim Philharmonic Orchestra has toured and guest-performed extensively at major concert venues in Europe, including, for example, in Antwerp, Hamburg, Madrid, Milan, and Munich. The Orchestra's growing international reputation is reflected, among other things, in the fact that various world-class soloists regularly give guest performances at Philharmonic concerts in Mannheim.

As a non-profit organization under private law, the Orchestra does not pursue any economic interests in making a profit; instead, it focuses its activities solely on qualifying musicians and making a cultural contribution to the city of Mannheim. Since ticket revenues cannot cover the operating costs of the society or the musicians' stipends, the Orchestra relies on financial support from public, private, and civil society sponsors. Since its founding, the Orchestra has not only generated increasing concert revenues—with the exception of the concert break during the COVID-19 pandemic in the 2020/2021 season—but the Orchestra has also received increasing support from donations from civil society and sponsorship from private actors. These funds have financed a significant portion of the scholarships for musicians, as well as the concert performances.

On a smaller scale, the City of Mannheim has in the past sponsored individual concerts and events for the Mannheim Philharmonic Orchestra. This project-related funding has usually had a direct regional economic effect. For each of the 2019/2020 and 2020/2021 seasons, the City of Mannheim provided an operating subsidy of EUR 50,000, which made a basic contribution to the necessary operating and personnel expenses of the organization (at the time this report was prepared, the 2021/2022 season had almost been completed. Because six out of seven orchestra concerts had already taken place, the majority of expenses and income had become regionally effective). Furthermore, the Orchestra was able to attract additional public funding in the following season and professionalize its concert operations beyond the musical ensemble in management and fundraising, contributing to its viability. Since the operating grants were provided in tranches, they primarily affected the expenditure structures of the following seasons.

In 2022, however, the city's cultural funding was not renewed [33]. The withdrawal of financial support from the city of Mannheim has threatened the continued existence of the Mannheim Philharmonic Orchestra. This is because municipal funding is also a necessary prerequisite for eligibility for funding through other public funding programs, such as the institutional cultural funding of the State Ministry of Science, Research, and the Arts. Due to the demands of different social areas on public funding, there is a well-founded interest in determining the effect of public funding on the regional economy. In this way, it can be shown, for example, how much targeted public funding affects the urban economy and whether these effects, in turn, generate urban revenues that can compensate for the funding.

4. Methods

This study uses regional multiplier analysis to determine a detailed model of the economic impact of the cultural work of the Mannheim Philharmonic Orchestra and to evaluate it in terms of the subsidies used by the city. The methodological basis for the analysis is a regional economic impact model, which the authors have further developed to assess the regional impact of universities as public research and educational institutions [26,27,34–36].

The data basis for conducting the regional multiplier analysis is a primary data set collected by the Mannheim Philharmonic Orchestra [32], which was systematically analyzed in collaboration with the authors. The data set includes information on expenditures and funding for various years. Missing data, which were not within the influence of the Orchestra's reporting, were supplemented either via official statistics or via justified esti-

mates based on equivalent studies. Overall, the comprehensive and differentiated primary survey contributes to the fact that the present study achieves a high validity and relies to a lesser extent on estimates and assumptions when compared to similar studies. The regional multiplier analysis is used to model the periodic economic effect of the expenditures associated with a facility on increasing demand, value-added, income, and jobs and tax revenues. The total effect is the sum of three individual effects [34]:

1. *Direct effect.* The sum of the demand and regional effects of the Orchestra's operations, its musicians, and out-of-town audience constitutes the direct effect. (a) The demand effect takes into account which part of the expenditures is actually spent on consumption. These are the material and investment expenditures of the Orchestra as well as the expenditures of the scholarship holders excluding taxes, social security contributions, and other deductions, such as those for saving purposes. (b) The regional effect is the share of consumption-related expenditures that are spent on procurement, investment, and consumption in the city of Mannheim [37].
2. *Indirect effect.* As a result of the direct demand for goods and services by the Orchestra, its musicians, and out-of-town concertgoers, there is an increase in the production of corresponding goods. In order to meet this increased demand, an increased quantity of intermediate inputs is also necessary, so that the additional production is passed on to the upstream sectors as demand. The calculation of this intersectoral multiplier effect is based on the interdependencies between the economic sectors in Mannheim. The nationwide input–output table [38] maps these relationships nationwide. Based on established estimation methods [39,40], this study models the regional interdependencies in the City of Mannheim.
3. *Induced effect.* In order to provide for the additional production, the demand for labor grows simultaneously in the affected economic sectors. The additional economic effect resulting from this increased employment describes the induced effect. As a result of the increased employment, the sum of wages and salaries paid out in the upstream sectors rises. Part of this income flows back into the regional economy as consumer demand and in turn generates regional economic effects. The increase in employment in the upstream sectors runs simultaneously with the increase in production. Indirect and induced effects can therefore be determined jointly based on regional economic linkages using a combined multiplicator [26,41,42].

The regional economic impact of the Orchestra can be modeled for various economic indicators. The demand effect captures the total demand of the Orchestra and its members and visitors in Mannheim, as well as the indirect and induced demand effects arising from this. The value-added effect describes the shared value of a good that is added to the economic sector. The direct value-added effect of the Orchestra is therefore to be understood as the cultural work performed there, and includes the sum of personnel compensation and stipends [43]. The direct, indirect, and induced employment income generated regionally as a result of the demands of the Orchestra and its members define the income effect. To determine the employment effect, these incomes can be translated into concrete employment figures using industry-specific job coefficients. Finally, the tax effect takes into account the payments of income or sales tax in the state of Baden–Württemberg associated with consumer demand and additional income, some of which are passed on to the municipalities via apportionments (most of the tax revenue of the state of Baden–Württemberg is attributable to income tax and sales tax. Other types of taxes are not taken into account in this study due to their low revenues). Since these types of taxes are joint taxes, the revenues accrue jointly to the federal and state governments, with a certain share being passed on to the municipalities via apportionment. The present analysis only takes into account the municipal share that accrues to the independent city of Mannheim.

5. Results: Resilience and Local Economic Impact of the Orchestra

5.1. Development of Costs and Income during COVID-19

The financial reporting of the Mannheim Philharmonic Orchestra follows the orchestra season starting and ending in the middle of the year. As COVID-19 reached Germany in March 2020, and the majority of the concerts of the season 2019/2020 had already been performed, this season technically represents the last pre-COVID-19 season. During the pandemic, the economic consequences of anti-COVID-19 regulations were drastic. Bans on live performances hit the Mannheim Philharmonic Orchestra during the 2020/2021 season, and concerts could only take place in the new 2021/2022 season.

Due to contracts negotiated before the COVID-19 crisis, it was difficult to reduce costs during the COVID-19 season. The overall expenditures of the Mannheim Philharmonic Orchestra only dropped slightly from EUR 580,000 in 2019/2020 to EUR 567,000 in 2020/2021. Expenses could only be reduced for the rental costs of concert halls, services for hospitality, sound and music technology, and stipends. Against the trend, the Mannheim Philharmonic Orchestra started hiring additional employees for management and support services in 2020/2021 to prepare for the post-COVID-19 2021/2022 season. Apart from planning the current and upcoming season, these employees concentrated on raising additional funds from the public, civic, and private sectors. These efforts led to donations being raised and subsidies of EUR 306,000 in 2019/2020 to EUR 471,000 in 2020/2021, and up to EUR 670,000 in 2021/2022. The main sources of subsidies were public COVID-19 aids paid for by the federal state of Baden–Württemberg and by the central government. In 2020/2021, these subsidies added up to EUR 270,000, and up to EUR 200,000 in 2021/2022. Additionally, subsidies from the City of Mannheim of EUR 50,000 in 2019/2020 and in 2020/2021, as well as specific funding that required previous investments by the local municipality of EUR 65,000 in 2019/2020 and EUR 50,000 in 2020/2021 and 2021/2022, secured financial income during the COVID-19 crisis and helped to compensate for the missing income from concerts. Income from concerts amounted to EUR 197,000 in 2019/2020, whereas it dropped to EUR 46,000 in 2020/2021, before the situation normalized again in 2021/2022 with concert revenues growing to up to EUR 260,000.

5.2. Attraction of Out-of-Town Concert Guests

It is due to the preparations in 2020/2021 that the Orchestra was able to bear total expenditures of EUR 1.782 million in 2021/2022. These expenditures comprised of EUR 1.366 million for investments, materials, and services, as well as EUR 416,000 for the remuneration of the staff and the scholarships for the musicians. In addition, the Orchestra attracted over 5000 concert guests from all over Germany and abroad. During the COVID-19 season of 2020/2021 only 500 guests attended the concerts, whereas there were around 4200 visitors in 2019/2020 (see Table 1).

Based on the counterfactual assumption that without the Orchestra's cultural offerings, a large proportion of the guests would attend classical music concerts elsewhere, the guests' expenditures must also be included in the impact calculation. Without the Orchestra, the city of Mannheim would attract less purchasing power from other regions and a certain part of the existing demand for music concerts would flow away. For this reason, the Orchestra can be viewed as the reason that out-of-town concert guests trigger additional demand in Mannheim during their stay.

This additional demand is directed towards the consumption of goods and services in the retail trade (e.g., experience shopping), private and public transport (e.g., parking fees, tickets), gastronomy (e.g., restaurants, cafés), and the hotel industry (overnight stays). Here, the expenditures of residents are to be excluded, since their expenditures were already being incurred and have no additional effect on the city's value added [29]. Instead, the calculation is limited to out-of-town visitors who come to Mannheim in large part due to the concert event.

Table 1. Empirical and estimation parameters of the regional multiplier model.

	2016/2017 ^a	2018/2019	2019/2020	2020/2021	2021/2022
Expenditures by the Orchestra in EUR	257,187	452,114	498,429	437,102	1,366,553
On rents in EUR ^b	22,747	32,154	57,438	23,043	253,052
On hospitality in EUR	27,923	52,666	68,776	42,014	141,695
On sound and music technology in EUR	4349	6335	20,698	-	2100
On logistics in EUR	7180	6200	4120	1586	13,333
On video in EUR	10,147	14,782	14,488	-	12,600
On music services and advertising in EUR	110,905	203,987	199,746	222,276	566,264
Other expenses in EUR	73,936	135,991	133,164	148,184	377,509
Share of expenses in the city in % ^c	67	80	90	70	90
Stipends for musicians in EUR	35,248	68,714	35,020	18,500	184,065
Number of stipends	196	196	177	74	413
Share of musicians living in city in % ^d	15	25	30	35	20
Expenditures by employees in EUR	6103	40,912	46,761	111,480	231,708
Number of other employees	1	3	3	6	7
Employer contribution social security in EUR	703	4589	5271	12,036	26,517
Total gross wages in EUR	5400	36,323	41,490	99,444	205,191
Share of employees in the city in % ^d	100	100	100	67	71
Expenditures by concert visitors in EUR	99,299	178,849	231,587	27,583	280,575
Concert visitors ^e	1800	3242	4198	500	5086
Share of visitors living in the city in %					31
Share of external visitors (day) in %					38
Share of external visitors (overnight) in %					31
Consumption (excluding the concert)					
Per external visitor in EUR ^f					26.8
Per external overnight visitor in EUR ^f					147
Share of Value Added Tax in %					14.76

Notes: ^a To assess the impact of COVID-19 on the Orchestra as well as the regional economic impact of the Orchestra on the city of Mannheim, we focus on a comparison of the four seasons between 2018/2019 and 2021/2022. Since 2018/2019 the Orchestra has been managed by full-time employees and has been treated as a professional project orchestra. In addition, we report data for the 2016/2017 season to exemplify the differential impact of a volunteer project orchestra managed by part-time employees. Since the Orchestra transitioned from a volunteer to a professional orchestra during the 2017/2018 season, we excluded it from our analysis. ^b corresponds to the values exclude expenditures for municipal operations, 100% of which was local demand; ^c corresponds to the proportion of material and capital expenditure in the city of Mannheim excluding hall rentals, as these go 100% to Mannheim's municipal operations; ^d corresponds to the regional share of expenditure; ^e corresponds to the number and origin of guests that could be precisely determined from the digital booking system for the 2021/2022 reporting year, but not for previous seasons. Therefore, the values for the year under review were taken on a pro rata basis for the other years; and ^f corresponds to the expenditure per visitor and is taken from the Report on Tourism as an Economic Factor of the Rhine–Neckar Region (2019): https://issuu.com/rhein-neckar/docs/wirtschaftsfaktor_tourismus_neu_s (accessed on 27 May 2022).

Since the geographic origin, the motive for the journey, the duration of the stay, and the amount of consumption accompanying the concert by non-resident concertgoers are not precisely recorded statistically and could only be approximated even by guest surveys, the relevant parameters must be realistically estimated on the basis of existing knowledge of the Orchestra and via comparable studies. Problems in estimating the number of visitors also arise when cultural services are provided free of charge or when, for example, several concerts are held per day or even simultaneously as part of a festival [29]. The number of concert visits per visitor varies considerably, depending on the nature of the festival and what it offers [44]. Based on realistic reference data, total consumption expenditures of out-of-town concertgoers amount to EUR 281,000 in the city of Mannheim. These expenditures exclude admission fees for the concerts, as these are already included in the Orchestra's expenditures and should not be counted twice [44].

The primary expenditures recorded above do not have a full effect on the urban economy. Since only a part of the expenditure has a regional impact on demand, a regional ratio must first be determined in order to calculate the direct effect. The regionally effective expenditures are then determined in their multiplier effect for the other economic sectors

in the urban economy as indirect and induced effects. The sum of the three effects forms the total effect, which can be represented for various economic indicators (see Table 2).

Table 2. Regional economic impact of the Philharmonic Orchestra in the city of Mannheim 2020.

		2016/2017 ^a (Volunteer Orchestra)	2018/2019	2019/2020	2020/2021 (COVID 19)	2021/2022
Demand in EUR	Direct	285,422	575,621	685,138	112,603	1,625,467
	Indirect	25,068	39,389	48,336	45,823	141,047
	Induced	27,409	38,405	46,793	49,669	167,953
	Total	337,900	653,415	780,267	208,095	1,934,468
Value added in EUR	Direct	41,350	109,627	81,781€	129,981	415,773
	Indirect	156,325	216,909	264,609€	288,515	955,073
	Induced	16,642	23,318	28,411€	30,156	101,973
	Total	214,316	349,854	374,801€	448,652	1,472,819
Employment	Direct	1	3	3	4	5
	Indirect	2	3	3	4	14
	Induced	0	0	1	1	2
	Total	4	6	7	9	21
Income in EUR	Direct	10,687	53,502	51,996€	105,919	242,004
	Indirect	79,271	111,073	135,334€	143,650	485,747
	Induced	9288	13,014	15,856€	16,831	56,912
	Total	99,246	177,589	203,186€	266,400	784,663
Local taxes and public incomes in EUR	Direct	24,203	35,418	36,011€	25,475	263,260
	Indirect	2527	3586	4342€	4620	15,590
	Induced	294	412	502€	533	1802
	Total	27,024	39,416	40,855€	30,628	280,652

Notes: ^a To assess the impact of COVID-19 on the Orchestra as well as the regional economic impact of the Orchestra on the city of Mannheim, we focus on a comparison of the four seasons between 2018/2019 and 2021/2022. Since 2018/2019 the Orchestra has been managed by full-time employees and has been treated as a professional project orchestra. In addition, we report data for the 2016/2017 season to exemplify the differential impact of a volunteer project orchestra managed by part-time employees. Since the Orchestra transitioned from a volunteer to a professional orchestra during the 2017/2018 season, we excluded it from our analysis.

5.3. Regional Economic Impact on Demand, Value-Added, Employment, Income and Tax

Demand effect. Before the COVID-19 crisis in 2019/2020 the primary expenditures of the Orchestra, its members, and concert guests (EUR 812,000) generated a direct demand effect in the city of Mannheim of EUR 685,000. Based on the methodology of the regional multiplier analysis, this results in a total demand effect of EUR 780,000 via preliminary economic links. During the COVID-19 season of 2020/2021 the direct effect dropped to EUR 113,000, and the total demand effect has been reduced by 73 percent to the level of EUR 208,000. However, already in 2021/2022, the direct effect rose up to EUR 1.625 million and the total effect up to EUR 1.934 million. This effect is 148 percent higher than the total demand effect before the COVID-19 crisis.

Value added effect. In 2019/2020, the total effect of gross value added (GVA) by the Orchestra amounted to EUR 375,000. This includes a direct effect of EUR 82,000, an indirect effect of EUR 265,000, and an induced effect of EUR 28,000. Comparing these numbers with the COVID-19 season of 2020/2021 reveals an increase in all value-added effects. Due to public subsidies, the Mannheim Philharmonic Orchestra followed its growth path by hiring new people and by extending job contracts. These expenditures increased the direct effect up to EUR 130,000. Adding the indirect effect of EUR 289,000 and the induced effect of EUR 30,000 led to a 19 percent higher total effect on urban GVA of EUR 449,000 in comparison to the 2019/2020 season. In 2021/2022 the effects increased again, ending with a total effect of EUR 1.473 million.

Employment effect. The Mannheim Philharmonic Orchestra managed to grow continuously between the 2016/2017 and 2021/2022 seasons. While in 2016/2017 the Orchestra employed a part-time employee, in 2018/2019 and 2019/2020 there were three employees, including someone in a full-time position. In 2020/2021, the number of employees

increased to six employees and in 2021/2022 to seven employees. Of these employees, three in 2019/2020, four in 2020/2021, and five in 2021/2022 were registered residents of Mannheim. In addition to this direct effect, the Orchestra generated indirect and induced employment effects, which can be derived from the income effect using sector-specific job coefficients and add up to a total employment effect of seven jobs in 2019/2020, nine jobs in 2020/2021 and twenty-one jobs in the post-COVID-19 season of 2021/2022.

Income effect. We observed related effects on regional incomes. The Orchestra paid gross salaries and stipends of EUR 82,000 before the COVID-19 crisis in 2019/2020 and EUR 130,000 during the COVID-19 2020/2021 season and EUR 389,000 in 2021/2022 to staff and musicians. In 2019/2020 EUR 52,000 went to staff and musicians residing in the city of Mannheim. Against usual expectations, this effect increased in 2020/2021, up to EUR 106,000. During the post-COVID-19 season, this effect appears to have more than doubled. Spending these incomes in Mannheim generated indirect and induced income effects, which, including the direct effect, add up to a total income effect of EUR 203,000 in 2019/2020, EUR 266,000 in 2020/2021, and up to EUR 785,000 in 2021/2022.

Local tax and public income effect. The Orchestra not only achieves a multiplier effect for the city economy but it also induces direct revenues for the public sector, in this case the local government of the city of Mannheim, in the form of fees, contributions, and taxes. The direct, indirect, and induced impact of the Orchestra, its members, and out-of-town guests on demand is accompanied by increased income and sales tax revenues, which are passed on directly to the municipalities on a pro rata basis via the municipal levy. In 2019/2020, the City of Mannheim earned EUR 9000 from income and sales tax that were earned by the Mannheim Philharmonic Orchestra and EUR 32,000 from the Orchestra's rentals of public orchestra halls, which adds up to EUR 41,000. During the COVID-19 season of 2020/2021, the total effect dropped to EUR 31,000, consisting of EUR 8000 in tax revenues and EUR 23,000 from rentals. In 2021/2022, EUR 21,000 in wage and income tax and EUR 7000 in sales tax were incurred in this context (in 2016, the city received revenues from the allocation of sales tax in the amount of EUR 110,110 and income tax in the amount of EUR 486,620 (source: <https://www.haushaltssteuerung.de/steuer-daten-stadt-mannheim.html>, last accessed on 27 May 2022)). In addition, the municipal operations recorded approximately EUR 253,000 in revenue for hall rentals by the Mannheim Philharmonic Orchestra. In total, the city treasury thus generated additional and direct revenue of EUR 281,000 as a result of the Orchestra's activities.

6. Appraisal of the Regional Impact during COVID-19

6.1. Funding Efficiency

In addition to calculating the regional economic impact, it is necessary to evaluate the magnitude of this effect in comparison to the funding provided [26]. In the case of the Mannheim Philharmonic Orchestra, it can be shown that ongoing business operations, scholarships, and the expenditures of concertgoers generated a gross value added of EUR 1.473 million within the Mannheim city district in 2021/2022. This corresponds to 29 times the municipal subsidy of EUR 50,000 in 2021. Even during the COVID-19 crisis in 2020/2021, the gross value added in the city of Mannheim of EUR 449,000 substantially overrides the municipal subsidy of EUR 50,000 (see Figure 1).

A large part of the gross value added is fed by indirect effects, which stimulate demand in related sectors of the economy via intermediate inputs and thus benefit the entire city economy. The additional income accruing to the city treasury each year as a result of the concerts offered by the Mannheim Philharmonic Orchestra can be compared to the municipal cultural subsidy. The City of Mannheim provided the Orchestra with an operating subsidy of EUR 50,000 in 2020 and 2021. Subtracting the direct tax and rental income of the municipality generated by the Orchestra's activities in 2020/2021 (EUR 31,000) and 2021/2022 (EUR 280,000), this results in a revenue surplus of EUR 211,000 during the two seasons. This finding is in line with other studies on cultural institutions and events, which show that the additional tax revenue generated by the economic impact

compensates for the amount of public funding, as in the case of the theater in Lucerne [11], or even exceeds it, as in the case of the Kaustinen Folk Music Festival in Finland [31]. In such cases, cultural promotion turns into a direct profit situation for the public sector. Nonetheless, it needs to be acknowledged that the Orchestra received a total of EUR 470,000 in public COVID-19 subsidies from the federal state and the central government (i.e., EUR 270,000 in 2020/2021, and EUR 200,000 in 2021/2022). The income and sales taxes generated by the activities of the Philharmonic Orchestra within the urban economy created revenues for the federal state of Baden–Württemberg and the German government of EUR 397,000, EUR 65,000 in 2020/2021 and EUR 332,000 in 2021/2022. As our regional multiplier model only accounts for demand and income within the urban economy of Mannheim, the full extent of tax incomes is widely underestimated. Hence, it is justified and reasonable to conclude that the subsidies were in full balance with the revenues earned from city income and taxes.

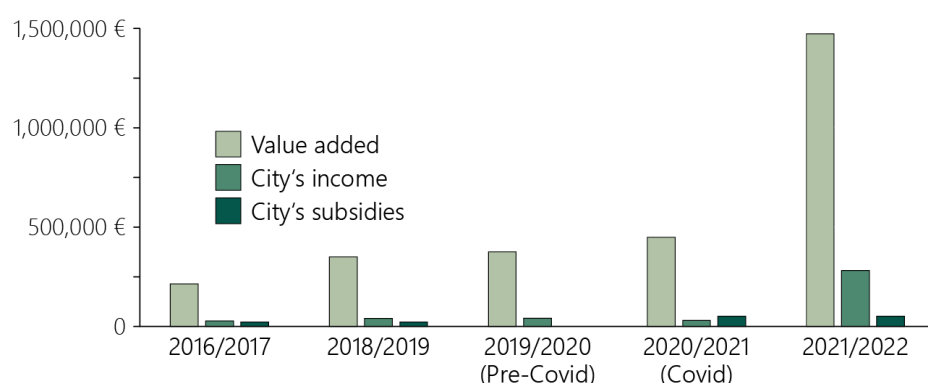


Figure 1. Ratio of city subsidies, orchestra-related revenues, and effect of the Philharmonic Orchestra on city gross value added over the course of several seasons.

6.2. Underestimation of the Real Impact

This analysis is based on a detailed primary survey by the Orchestra [32], supplementary analysis of official statistics, and a proven methodology for determining regional economic effects of educational institutions [26,27,34]. It therefore enjoys high validity. In addition, the calculation model requires several unavoidable assumptions. In order to not overestimate the regional economic impact of the Orchestra, this study models the effects according to a conservative strategy, which leads to an underestimation of the actual impact of the Orchestra in Mannheim.

Numerous factors influence the actual effect which must be disregarded in the analysis. The expenditures of the Orchestra, musicians, and guests also have an impact on the profits of companies located in Mannheim, which in turn lead to direct municipal revenues through trade tax. Since the trade tax revenue per business varies greatly in practice, the trade tax effect of the expenditures of the Orchestra and guests cannot be reliably estimated. In any case, the actual tax revenue generated by the Orchestra for the City of Mannheim is higher than calculated in the present model. Furthermore, the Mannheim Philharmonic Orchestra also provides free services, such as training courses and musical lessons for children and young people in the city of Mannheim. However, the users of these services are not precisely quantified and the origin and consumption behavior of the users and their families in the city of Mannheim are unknown. Therefore, it can be assumed that the training courses have further effects on attraction and demand in Mannheim, which are not taken into account in the present impact analysis.

6.3. Long-Term Impacts

Beyond the annual economic effects determined in the present analysis, the Mannheim Philharmonic Orchestra contributes to further medium- and long-term economic effects. For example, neighboring municipalities and districts in the Rhine–Neckar metropolitan

region also benefit from the influx of day and overnight visitors who come to the region solely because of the concerts held and who engage in additional consumption there. In addition, long-term effects can be expected via the following impact chains:

Tourist spillover effects. The Mannheim Philharmonic Orchestra broadcasts live concerts worldwide via the Internet to more than 100 nations. The number of digital users has more than doubled since 2018 and contributes to the international visibility and increase in tourism attractiveness. In 2019 alone, the number of overnight stays increased by 10 percent compared to the previous year (Data on the development of overnight stays were taken from Stadtmarketing Mannheim [45]). This puts Mannheim alongside Ravensburg and Heilbronn at the top of Baden–Württemberg in terms of attracting new tourists. This effect cannot be attributed solely to the Orchestra or any single other institution. Nevertheless, it can be seen that the growing number of concerts goes hand in hand with the increase in overnight stays in Mannheim.

Musical business foundations. During their time with the Mannheim Philharmonic, the musicians enjoy excellent support for young talent. Half of all the Orchestra's graduates are now employed on a permanent basis, mostly by orchestras or at music schools. The other half of the graduates are freelancers or work part-time with orchestras around the world. To the extent that graduates later found their own ensembles or music schools in the city of Mannheim, they contribute to the economic and cultural development of the city with the knowledge and qualifications they have acquired through the Mannheim Philharmonic Orchestra.

Synergy effects of the cultural offerings. The Mannheim Philharmonic Orchestra forms part of an attractive mosaic of musical offerings in Mannheim, which has been a UNESCO Creative City of Music since 2014. The Orchestra thus contributes to the diversity and attractiveness of the cultural location. However, the mutual reinforcement of the attraction of cultural guests and tourists through the diversity of cultural offerings is difficult to quantify. Nevertheless, it must be acknowledged that a lighthouse project such as the Mannheim Philharmonic Orchestra stimulates the settlement of further ensembles, organizers, music schools, and music teachers who have also settled in Mannheim or the metropolitan region as a consequence or pull effect of the Orchestra. These institutions generate further regional economic effects in the state through their expenditures, which are not included in the present model.

7. Discussion

Due to its high quality and international visibility, and thanks to its basic public funding, the Orchestra succeeded in attracting additional funding from private, public, and civil society sources to sustain its operations. The concept of a talent orchestra, which is unique in Europe, and the high quality of the music concerts, regularly bring top international soloists to Mannheim for guest performances, while the Philharmonic Orchestra is invited to perform on renowned European stages. On the one hand, free live broadcasts attract worldwide attention to the city of Mannheim, on the other hand, local concert offerings contribute directly to increasing the value added in the city's economy.

Drawing on a multiplier analysis we have offered evidence that cultural funding by a municipality or the state is not per se a money-losing investment. In fact, due to regional expenses and the attraction of concert guests from other regions, cultural ventures stimulate additional regional demand and economic growth.

Even during the COVID-19 season, the Orchestra managed to stimulate a regional value added of EUR 449,000, which is nine times higher than the subsidies of the City of Mannheim during this season. Already one year after the COVID-19 crisis, the Mannheim Philharmonic Orchestra's activities raised the value added in Mannheim by EUR 1.472 million. Measured against the gross funding of the city of Mannheim, this results in an impact of more than 29 euros of local gross value added per euro of cultural funding invested.

Accounting for tax incomes during the 2020/2021 and 2021/2022 seasons, the COVID-19 subsidies from the federal state and the central government are almost in balance. On

the municipal level, however, if one also takes into account that the music performances generate direct municipal income from taxes and rents amounting to EUR 311,000 in the 2020/2021 and 2021/2022 seasons, the additional income for the city treasury, including the municipal operations, corresponds to 3.1 times the funding invested.

8. Conclusions

Even if cultural and creative ventures depend on civic donations and public subsidies to secure their cultural and educational mission, their economic impact on the local and urban economy may still compensate or even outweigh the initial subsidies. The detailed impact assessment presented in this study has demonstrated that public support is especially helpful in times of crisis to retain the viability and sustainability of a music orchestra for at least two reasons. First, it provides for basic funding of employees necessary to actively engage in additional fundraising, and it secures the Orchestra's current operation to attain a positive future regional impact on the urban economy. Second, additional public funding opportunities at the federal or state level are often accessible only by demonstrating the receipt of public support by the municipality. This evidence suggests that public subsidies should be assessed in the light of the real regional economic impact of cultural and creative services and performances, which may overcompensate for initial funding and strengthen the resilience of cultural institutions during a global pandemic.

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