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IMPACT OF THE COVID-19 PANDEMIC ON PERFORMING ARTS IN JAPAN: ANALYSIS OF QUANTITATIVE AND QUALITATIVE CHANGES BEFORE AND AFTER THE PANDEMIC

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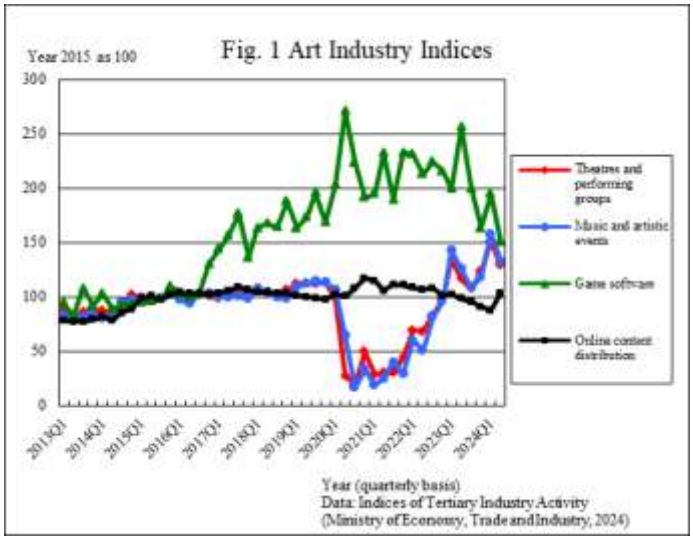
Abstract

To examine quantitative and qualitative changes in theatre arts in Japan before and after the COVID-19 pandemic, a questionnaire survey was conducted among theatres receiving government support for performing arts. The key findings are as follows: Firstly, across-the-board support measures for theatres during the pandemic have impacted the quality of post-pandemic performances, resulting in a noticeable decline. This is because subsidy distributions did not take into account the quality of productions, which ultimately lowered the overall standard. Secondly, regions with substantial cultural funding generally sustain high-quality performances. This indicates that well-developed soft local infrastructure for theatre arts and relatively larger numbers of people involved in performing arts contribute to higher quality standards. Thirdly, by genre, 'traditional Japanese performing arts' and 'festivals' saw increases in both costs and the number of events. In contrast, 'opera, ballet and musicals' and 'plays' experienced declines. Despite their high quality, these genres received less than 20% of their funding from government grants, with organisers shouldering 50 to 60% of the costs, rendering their financial efforts crucial for sustaining continued performances. Fourthly, enhancing performance quality relies not only on the performers themselves but also on the contributions of support staff, creative contributors, and stage designers. These findings provide valuable implications for future cultural policy.

Keywords: COVID-19 pandemic, performing arts, production function, theatre productivity, cultural policy

INTRODUCTION



COVID-19 first emerged in China in 2019, and the first cases of infection in Japan were confirmed in January 2020. Since personal contact was confirmed to be the main route of infection, COVID-19 had a severely negative impact on service industries that depend on in-person interaction, affecting society at large and the overall economy. In February 2020, the Japanese government urged event organisers to cancel, postpone or scale back large events, causing the performing arts industry to become among the hardest-hit sectors by COVID-19 (ACA, 2020a; MOF, 2022). Performing arts, whether theatre plays or music concerts, are traditionally experienced through live interaction between the performers and the audience members, making in-person attendance an essential component. For this reason, in response to the government requests, theatre operators adopted the Guidelines for Preventing the Spread of COVID-19 in Theatres and Concert Halls in May 2020, while the theatre industry released the Guidelines for COVID-19 Infection Prevention Measures in Performing Arts in June 2020. These Guidelines included measures mandating mask wearing and social distancing within event venues, resulting in a significant decline in audience members.

The global impact of COVID-19 on cultural and artistic activities stalled similar activities in Japan (ACA, 2020b; OECD, 2021; UNESCO, 2021; WIPO, 2022). This decline is reflected in the Indices of Tertiary Industry Activity published by the Ministry of Economy, Trade and Industry (METI, 2024) of Japan in 2023. Fig. 1 shows the indices of performing arts, with the 2015 indices set at 100. They indicate that, while online and supplementary services grew due to people being encouraged to stay at home and avoid crowded spaces, theatres and performing groups (drama and music groups giving live performances) experienced a stark decline in activity compared to other service industries, starting from 2020. However, after COVID-19 restrictions were eased around April 2023, a marked recovery in performing arts activities became evident. Despite this rebound, many local theatres, which frequently engage in nonprofit activities, remain underrepresented in the Indices of Tertiary Industry Activity. As Taichi Sakaiya (2003) and Takafusa Nakamura (2007) once stated, since the establishment of Japan as a modern state, the government has always managed industries from a

producer/provider-centric standpoint, with insufficient focus being placed on the consumer side. As a result, consumer-related statistical data are lacking. In the domain of cultural and artistic activities, which are seen as acts manifested on the consumer side, surveys and studies have only been sporadically conducted by Japan's Agency for Cultural Affairs (ACA) and local governments (47 prefectures and 1,718 municipalities) as the need has arisen.

The impact of COVID-19 on cultural and artistic activities has been assessed jointly by the ACA and various arts organisations (ACA, 2020c). However, these surveys also focused primarily on the providers of cultural services, with little investigation into the adverse effects on audiences as consumers of the arts. While the Japanese government offered subsidies to cultural and artistic organisations, support for audiences was limited, with restrictions on outings being the primary approach to the consumers. One measure allowed ticket costs from cancelled events to be treated as tax-deductible donations, but such support for consumers was minimal.

The results of surveys conducted from the provider side reveal that COVID-19 had a profound impact on cultural and artistic activities, but the effects on audiences and participants remain largely unknown. In light of this, the author conducted a comparative study on the government's support programmes for performing arts, contrasting conditions before COVID-19 with the state of recovery after the restrictions were lifted. This study aims to gauge to what extent theatre activities have recovered, and identify any significant changes. These findings are intended to inform future responses for theatres during pandemics and support future cultural policy making and cultural promotion measures in Japan, especially from a consumer-centric standpoint.

SURVEY ON THEATRE ACTIVITIES BEFORE AND AFTER THE COVID-19 PANDEMIC

To quantitatively understand the activities of theatres and concert halls across Japan, the survey presented in this paper analysed the activities of these facilities based on productions held there that met certain quality standards. Unlike previous studies that focused on theatre productivity as revealed through annual activity, this survey focused on the effects of COVID-19 on the performing arts, particularly their implementation. The survey was conducted through a questionnaire independently designed by the author, and did not overlap with existing studies by the ACA or other government agencies or think tanks.

Survey method

To describe the survey method, the categorisation of performing arts adopted in the survey, and the basis for assessing the quality of performing arts—namely, the awarding of government financial support—are first explained, followed by more specific survey details.

The types of performing arts included in this survey are divided into the following categories: classical music; popular music (including jazz); opera, ballet and musicals; plays; traditional Japanese performing arts (such as Noh and Kabuki); educational programmes (theatre works designed to educate pupils and students in performing arts); and festivals (comprehensive events combining multiple performance genres). These categories reflect Japan's unique development of performing arts, which differs from that of the West (ACA, 1988, 1999). The rationale for this categorisation, along with the history of the development of performing arts in Japan, is provided below.

In the survey, music is divided into the categories of 'classical music' and 'other types', because classical music and other genres have distinct histories in Japan. Beginning in the Meiji Era, the government has promoted Western music (particularly, Western classical music) as part of its modernisation efforts, fostering audiences for over 150 years through dedicated music education policies. The government has also provided opportunities for Japanese students to study classical music in the West. Popular music genres initially developed niche audiences before WWII, who enjoyed them mainly by listening to recordings. Following the end of the war, such genres gained broader appeal, aided by the presence of US military bringing jazz and rockabilly to the Japanese public. Jazz in particular grew more mainstream. In the 1960s, musicians who had engaged in postwar jazz events began organising projects to invite foreign entertainers to Japan, and events like the Beatles' Japan Tour in 1966 significantly boosted the popularity of Western pop music.

In the category of plays, opera was introduced during the Meiji Era, while musicals and ballet began to gain traction before WWII. Musicals took off in the 1960s on the back of visiting American performances. Ballet schools for young children flourished in the same period, leading to a lasting interest in ballet among Japanese children, which has continued to date. Opera, ballet and musicals are differentiated from other forms of plays in the survey because their professional performances require extensive technical support and large-scale, specialised equipment.

Traditional Japanese performing arts include Noh, Kabuki, *Bunraku* (puppet theatre), storytelling arts like *Rakugo* and *Rokyoku*, Japanese music genres such as *Koto* and *Shamisen*, and traditional dances like *Nihon-buyo* and *Ryukyu* dance. *Shishimai* (lion dances), *Kagura* (Shinto music), *Gagaku* (court music) and *Shirabyoshi* (singing dance) are also other forms of traditional performing arts. However, they are usually performed as part of ceremonies and rituals, and rarely in theatres. For this reason, the survey focused on Gagaku as the representative art form of this category.

The survey only covered performances that met specific quality standards in order to assess both the quantity and quality of performances before and after the pandemic. Providing high-quality works is important not only for the art form itself but also for audience education. Since most performances are held in major urban centres, random sampling in a nationwide survey can heavily lean toward events in large cities, thereby skewing the data. In provincial areas, performance opportunities are limited, but when they do arise, they are typically of high quality, ensuring good cultural access for local residents. Therefore, a complete enumeration approach, considering all performance instances, was considered the most appropriate for a realistic assessment of performing arts in regional areas.

The Japanese government's support for performing arts operates through two main policies (ACA, 1999). The first involves direct support for theatre organisations, covering operating expenses such as training for specialised personnel and outreach initiatives. However, this funding is limited to a small number of large theatres (seven or eight per year) that meet specific criteria: they must have a fixed seating capacity of over 1,500, hold performances for at least 10 months annually, and host a resident theatre or music company.

The second policy is the provision of subsidies by the Japan Arts Council (JAC) and the Japan Foundation for Regional Art-Activities (JAFRA). These grant programmes were established in the mid-1990s, with each theatre eligible to receive one grant per year. The selection process is rigorous, involving months of in-person deliberation by an expert review panel. After the conclusion of each funded project, an audit is conducted by the Board of Audit of Japan to ensure accountability. The survey presented in this paper covers theatre performances that passed JAC and JAFRA screening. Since governmental support for large theatre organisations is limited to a handful of specific, rare large theatres, this type of support does not merit inclusion in a nationwide assessment.

To optimise the use of public funds, JAC and JAFRA subsidies are not granted to the same performing arts project simultaneously. While JAC prioritises audience development and JAFRA focuses on enhancing regional cultural access, there is little practical difference between the types of high-quality projects selected by each agency. Additionally, JAC and JAFRA allocate grants based on whether the applicant is a local government entity, and on the specifics of the application. As a result, there is no conflict in integrating the activities of both agencies to assess the quality of performing arts. Practically, performing arts organisers submit their costs and projected revenues to JAC and JAFRA, which in turn assess grant applications for quality. Typically, high-quality productions receive larger subsidies, and a clear correlation exists between the subsidy amount and the quality of the work, as reflected by the subsidy-to-revenue ratio.

To examine the state of implementation of theatre performances before and after the COVID-19 pandemic, the survey first looked at FY2023, which includes the month of April when the COVID-19 restrictions were lifted. This was to make the survey results available as early as possible so as to inform future response planning, although the importance of allowing for a longer post-pandemic recovery period was noted. In Japan, most theatres in regional areas were established and are managed by the local government (only 5% are private, according to the 2021 Social Education Survey published by the Ministry of Education, Culture, Sports, Science and Technology (2021)), and such theatres are subject to the budgetary system of the local government operating on a fiscal year basis from April to March. As reference, FY2019, immediately before the outbreak of the COVID-19 pandemic, would have been an ideal year to use for comparison with FY2023. However, since theatre activities in a single year would be far from representative, FY2017 and FY2018 were also included so as to minimize statistical discrepancies among years, theatres, and regions, with regard to the pre-pandemic situation.

The questionnaire survey was conducted from July through August 2024, with questionnaire forms sent to the target theatres by poste restante, complemented by telephone and email surveys upon their return. They were sent to all theatres that had held performances receiving government grants. In the years covered in the survey, approximately 800 productions received grants, each theatre being eligible for one grant per production per year. This figure includes performances held annually or receiving repeated support.

The overall response rate was 62.6% (492/786), and the by-year response rates were 72.2% (143/198) for FY2017, 60.6% (131/216) for FY2018, 56.2% (113/201) for FY2019, and 61.4% (105/171) for FY2023. The numerator in the parentheses denotes the number of valid responses, while the denominator denotes the total number of theatre performances selected for grants by JAC or JAFRA.

ANALYSIS AND SURVEY RESULTS

Target performances and regional distribution

Applications to JAC and JAFRA are made by theatres through Japan's 47 prefectural governments (regional government entities between municipalities and the national government). Since these prefectures largely align with historic regional divisions dating back to medieval Japan, providing strong historical social unity, they are useful in observing regional cultural characteristics. Figure 2 indicates the distribution of theatre performances covered in the survey (i.e., those receiving grants) among the prefectures. The four degrees of red shading correspond to four ranks of the total number of selected performances in each prefecture in the four years studied. In other words, the 12 prefectures in the darkest red belong to the highest

rank, with the largest numbers of performances selected for grants. They tend to be concentrated in the Tokyo Metropolitan region (Tokyo and Kanagawa prefectures) and the Kansai region (Osaka and Hyogo prefectures). Hokkaido is also among the top 12. This is probably because Hokkaido offers many opportunities for its residents in provincial towns, broadly scattered over a vast area, to appreciate performing arts. On the other hand, smaller numbers of performances tend to be selected in Western Japan, especially in the Kyushu and the San-in regions. While this may be generally due to depopulation, some prefectures in Western Japan do have large numbers of selected performances, reflecting the local governments' enthusiasm for arts promotion.

Fig. 2 Grant-receiving theatre-performances by prefectures

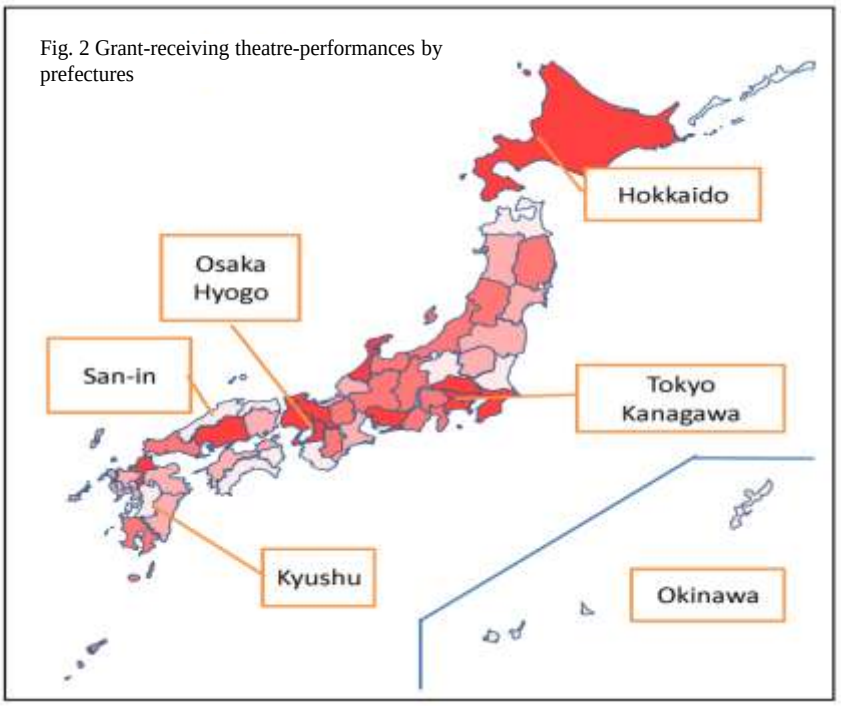


Table 1 indicates the correlations between the number of theatre performances selected for grants and several social indices deemed to be related to that number, including population density and local government expenditure for artistic and cultural activities. These indices in the Table, such as the number of theatres, were taken from the same fiscal years covered in the survey. A high correlation was found between the number of selected performances and the following items, respectively: the number of theatres, the performing artist population, and arts and culture expenditure (the local government's total spending on arts and culture), but not arts and culture expenditure as a percentage of the local government's total budget. A high correlation was also found between the number of theatres and arts and culture expenditure, which seems natural, considering that sufficient funding is required to develop theatre facilities

and provide high-quality theatre arts. In general, demand for arts and culture tends to increase with residents' income, but almost no correlation was found between the number of selected performances and prefectural residents' per capita income. Likewise, there was almost no correlation between the number of selected performances and the local government's arts and culture expenditure as a percentage of the total budget, usually indicative of the degree of priority given to arts and culture policy. A positive correlation between the number of selected performances and population density seems to indicate a considerable degree of influence of good theatre access and the theatre-going population.

Table 1 Correlation between the number of selected performances and social indices

	No. of selected performances	No. of theatres	Prefectural residents' per capita income	Population density	Arts and culture expenditure	Arts and culture expenditure as % of total budget	Performing artist population
No. of selected performances	1.000	0.808	0.270	0.752	0.739	-0.031	0.776
No. of theatres		1.000	0.243	0.745	0.819	-0.047	0.730
Prefectural residents' per capita income			1.000	0.335	0.289	-0.073	0.418
Population density				1.000	0.738	-0.076	0.881
Arts and culture expenditure					1.000	0.336	0.764
Arts and culture expenditure as % of budget						1.000	-0.073
Performing artist population							1.000

NB: **: Correlation coefficient valid at 1% (both sides), N: 188 (47 prefectures x 4 years)
Data: Social Education Survey (Ministry of Education, Culture, Sports, Science and Technology of Japan, 2021), Monthly Labour Survey (Ministry of Health, Labour and Welfare of Japan (MHLW), 2022), Basic Survey on Wage Structure (MHLW, 2022), Population Estimates (Ministry of Internal Affairs and Communications of Japan (MIAC), 2022), Employment Status Survey (MIAC, 2022), National census (Statistics Bureau of acaJapan, 2022), National Area Survey (The Geospatial Information Authority of Japan, 2022), Survey of the state of local cultural administration (ACA, 2022).

To examine whether the structure of theatre arts hosting has shifted regionally from before to after the COVID-19 pandemic, a cross-sectional analysis was conducted by year using the highly correlated items in Table 1 as explanatory variables. The data were pooled for the three years before the pandemic (FY2017–2019). This is because regional structural changes were assumed to be minimal within that period, and pooling increased the sample size, thus improving statistical accuracy. The number of projects selected for grants was set as the dependent variable, using the items 'number of theatres', 'population density', 'arts and culture expenditure' and 'performing artist population' as explanatory variables. However, since these items were positively correlated, it was necessary to address potential multicollinearity.

Firstly, the distribution of selected performances among the prefectures in the three years prior to the COVID-19 pandemic was examined to check for year-to-year similarity. A different distribution pattern of selected performances among the prefectures for each year would signify fixed effects of distribution, possibly lowering the independence of the number of

selected performances. When the intra-class correlation coefficient (ICC) was calculated for the number of selected performances by year from FY2017 to FY2019, it was found to be -0.0121, indicating almost no difference in distribution across these years. This suggested that any fixed effects from year-to-year differences were negligible. Therefore, the data from FY2017 to FY2019 were pooled to represent the pre-pandemic number of selected performances and were compared to the 2023 distribution. Since the explanatory variables had different units, each variable was converted to z-scores to standardise their effects on the dependent variable, and remove unit-based biases from the regression coefficients.

Formula (1) provided below represents the estimation model for the number of selected performances for the FY2017–2019 period, while Formula (2) models the number of selected performances for FY2023. With variables standardised as z-scores, the intercept becomes zero, and standardised regression coefficients range approximately between -1 and +1, making it possible to analyse each explanatory variable's relative influence on the dependent variable. The explanatory variables were chosen based on high correlation as indicated in Table 1. This was done while avoiding multicollinearity and selecting those variables that would clearly highlight structural distribution changes between the pre- and post-pandemic years, and that were statistically significant. The variance inflation factor (VIF) for the variables 'number of theatres', 'arts and culture expenditure' and 'performing artist population' in both Formulas (1) and (2) ranged between 2.25 and 3.71, indicating no multicollinearity concerns. The normality of residuals was also verified. In Formula (2), the t-value for including the number of theatres as an explanatory variable was 1.03, which is not statistically significant, suggesting its statistically negligible influence on the number of selected performances. The estimated coefficient for the number of theatres was 0.197, indicating that even if statistically significant, its impact on the number of selected performances would be minimal. Thus, the influence of the number of theatres on the number of selected performances has notably diminished compared to pre-COVID levels.

Estimation of number of selected performances before COVID-19 (N:141 = 47 pref. × 3 FYs)

$$\mathrm{Ln}(\text{number of selected performances}) = 0.505\mathrm{Ln}(\text{number of theatres}) + 0.380\mathrm{Ln}((\text{performing artist population}) \cdots\cdots\cdots (1)$$

$$(7.05) \qquad (5.53) \qquad \text{Degree-of-freedom adjusted } R^2 : 0.766$$

t-value in parentheses

Estimation of number of selected performances since COVID-19 (N:47 = 47 pref. × 1 FY)

$$\mathrm{Ln}(\text{number of selected performances}) = 0.383\mathrm{Ln}(\text{number of theatres}) + 0.319\mathrm{Ln}((\text{performing artist population}) \cdots\cdots\cdots (2)$$

$$(3.02) \qquad (3.43) \qquad \text{Degree-of-freedom adjusted } R^2 : 0.724$$

t-value in parentheses

The variable 'performing artist population', common to the two formulas examined, is believed to have a large influence on the number of selected performances, especially in provincial areas, where large percentages of performances are often provided by performing artists who reside locally. Unlike in the West, most theatres in Japan operate as rental facilities, and this encourages the tendency for theatres to be used for performances by locally residing performing artists, for geographical convenience. As a result, productions at theatres in regions with a high concentration of performing artists tend to be rich in variety and quality, leading to larger numbers of applications for JAC and JAFRA grants and awarded grants. Since the COVID-19 pandemic, the influence of arts and culture expenditure on the number of selected performances has grown, surpassing the influence of the performing artist population as reflected in the coefficients. The item 'arts and culture expenditure' represents the total amount that each local government entity spends per year on artistic and cultural activities, including theatre construction costs and grants for performing arts projects. During the period studied, from FY2017 to FY2023, there was almost no new theatre construction in the country, and local government arts and culture expenditures went mostly to cultural projects and theatre operation (including event hosting). There is a general tendency for improvement in soft infrastructure relating to theatre arts to contribute to the development of high-quality performing arts, influencing the number of grants provided to related theatres. In FY2023, subsidies provided to theatres during the pandemic were maintained, enabling the financial assistance of even lower-quality theatre arts. This has reinforced the tendency for only high-quality productions to apply for and receive grants. The analysis in this section covers the entire class of performances selected for grants. To take a closer look at the particulars of theatre arts, the sections that follow only analyse the beneficiary performances at theatres from which valid responses were obtained in the questionnaire survey.

Increase in support for local governments and change in quality of beneficiary theatre performances

The total amount of arts and culture expenditure by local governments of Japan shifted over the years from some 700 to 800 billion yen in the first half of the 1990s, boosted by the country's economic bubble, to less than 300 billion yen around 2010 in a general downward trajectory (ACA,

Table 2 Grants for high-quality theatre productions as % of governmental subsidies

(Million yen)

FY		Theatre operating cost (A)	Govt. subsidies for theatre operation (B)	(B)/(A)	JAC and JAFRA grants (C)	(C)/(B)
FY2017-2019	Average	4,233.3	111.3		4.8	
	Frequency	141	141		141	
	Standard deviation	4,221.1	181.8		5.6	
	Total	5,96,894.4	15,698.5	2.6%	670.2	4.3%
FY2023	Average	5,492.2	243.2		3.7	
	Frequency	47	47		47	
	Standard deviation	5,153.9	335.5		4.2	
	Total	2,58,132.3	11,428.1	4.4%	172.1	1.5%
All four years	Average	4,548.0	144.3		4.5	
	Frequency	188	188		188	
	Standard deviation	4,491.4	236.0		5.3	
	Total	8,55,026.7	27,126.5	3.2%	842.3	3.1%

2022). In more recent years, however, the amount has picked up again, reaching almost 500 billion yen. The local governments' arts and culture expenditure, which includes theatre construction costs, fluctuates in line with general economic trends reflected in local public-interest investment projects. As for theatre-operating and event-hosting costs, the total amount has been stable at around 300 billion yen, with very little year-to-year change.

Table 2 indicates the amounts of theatre operating costs and JAC and JAFRA grants (awarded to high-quality theatre productions) in the fiscal years studied in the survey, thus showing the changes from pre-pandemic to post-pandemic years. The averages are annual, per-prefecture figures. The 'frequency' figure, 47 for FY2023, corresponds to the total number of prefectures, while 141 for FY2017–2019 corresponds to the total number of prefectures multiplied by three (years). Before the pandemic, the percentage of government support out of the total theatre operating cost was a virtually negligible 2.6%. Of this small portion, JAC/JAFRA grants accounted for 4.3% pre-pandemic and dropped to 1.5% post-pandemic in FY2023. This was due to not only a decline in the amount of JAC/JAFRA grants but also a more-than-two-fold increase in the national government's subsidies for theatre operation (from 111.3 million yen to 243.2 million yen per prefecture on average), as compared to the pre-pandemic years. The average amount of a grant awarded to a high-quality production decreased by about 1 million yen, from 4.8 to 3.7 million yen.

The drastic increase in theatre operation subsidies is explained by the post-pandemic continuation of the emergency support measures adopted in response to demand from performing artists during COVID-19. Concretely, in accordance with the 'Support for Cultural and Artistic Activities during COVID-19' policy, the Japanese government provided theatres and artistic and cultural organisations with a total of 40 billion yen (ACA's total budget is about 110 billion yen in a normal year, including cultural asset preservation costs), and this policy was partially carried forward to FY2023. In other words, the pandemic brought an unprecedentedly large amount of funds, unmatched in previous cultural policy measures, to theatre operators, irrespective of the contents or quality of their theatre productions. Once government support was launched on such a scale, incrementalism typical of the public sector made it difficult to scale back the budget, with performing artists and theatre operators calling for continued

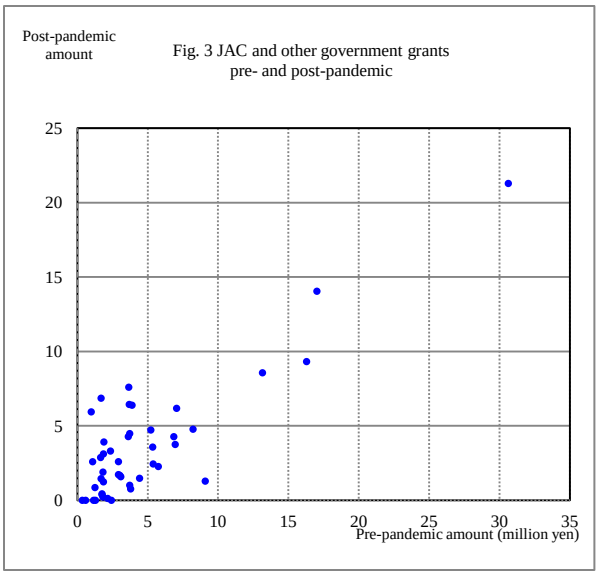


Fig. 3 JAC and other government grants pre- and post-pandemic

financial assistance. As a result, compared to the pre-pandemic years, the theatre operating cost increased 1.3-fold; government support for such costs doubled, but grants for high-quality theatre performances decreased by 20%. The expanded theatre operation cost stood out among all post-pandemic changes.

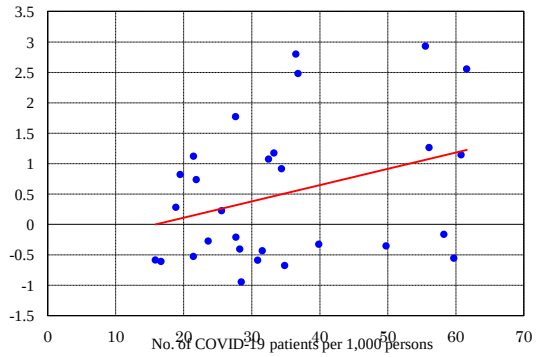
Distribution of pre- and post- pandemic subsidies to local governments

As mentioned in the preceding section, the emergency support policy measures during the COVID-19 pandemic affected the government's post-pandemic subsidy policy, causing the number of high-quality theatre performances to decrease. This section looks into pre- and post-pandemic differences in the distribution of subsidies to local governments. Since the spread of COVID-19 varied from one region to the other, how the local circumstances of COVID-19 influenced theatre operation subsidies can be used as an indicator of changes in subsidy distribution.

Fig. 3 plots the amounts of grants awarded to local governments for high-quality performances, with the horizontal axis representing the pre-pandemic amount (the arithmetic average of the three years studied) and the vertical axis the FY2023 amount. There is almost no correlation between pre- and post-pandemic amounts for the prefectures receiving up to 10 million yen (correlation coefficient: 0.119). On the other hand, a high correlation coefficient (0.851) was found in four entities receiving 10 million yen or more, which suggests that they received large amounts, irrespective of the pandemic. It is surmised that grant applications fluctuated among the prefectures that received smaller amounts, due to the circumstances of their theatre activities.

Fig. 4 plots the rates of increase (ratio) in the national government's theatre operation subsidies to local governments, excluding grants for high-quality performances, and the numbers of COVID-19 patients per unit of population in respective local governments. They are the cumulative numbers of patients covering the period from the confirmation of the first COVID-19 cases in Japan to FY2023 (through to the end of March 2024). The local governments with a negative rate of increase received lower subsidies post-pandemic than pre-pandemic. Fig. 4 indicates that, as a general trend, the more COVID-19 patients there were per unit of population, the higher the rates by which their subsidies increased (correlation

Fig. 4 Rate of increase in theatre subsidies and number of COVID-19 patients per unit of population



coefficient: 0.355). The red straight line in the figure represents a linear approximation. On the whole, more prefectures saw an increase in theatre operation subsidies. Since the support measures that commenced during the pandemic are likely to be sustained at present, it is surmised that theatre operation subsidies were provided generally in accordance with the local state of the pandemic, although subsidies for high-quality performances decreased. It can be said that priority was given to supporting the operation of theatres confronted with the expanding pandemic, with little or no consideration given to the quality of theatre arts they were producing, thus resulting in an overall decline in the quality of performing arts.

Numbers of theatre productions by year and genre and hosting costs

Table 3 shows the number and percentage of theatre productions by genre (the categories defined for the study) and other figures before and after the pandemic. The Table indicates a clearly polarised trend wherein the figures increased for ‘classical music’, ‘traditional Japanese performing arts’, ‘educational programmes’, and ‘festivals’, while those for ‘popular music’, ‘opera, ballet and musicals’, and ‘plays’ decreased.

As for pre- to post-pandemic changes in the performance hosting cost for each genre (annual arithmetic average), the cost for ‘classical music’ dropped from 5.13 million yen to 4.31 million yen, while the cost for ‘popular music’, which had already surpassed the figure for ‘classical music’ before the pandemic, increased post-pandemic, almost doubling the previous figure. The hosting cost for ‘opera, ballet and musical’, which is relatively higher than that of other genres due to the time and labour required for casting and production at normal times, decreased from 10.51 million yen to 8.83 million yen. The cost for ‘traditional Japanese performing arts’ showed an upward trend. The hosting cost for ‘festivals’, which is usually considerable due to their nature comprising multiple types of performances, increased further. The number of ‘festivals’ is usually relatively small, but on an annual average basis, the number increased by 76% post-pandemic. The hosting cost for this genre also increased by 61% from 5.86 million yen to 9.45 million yen, the highest rate of increase among all the genres.

Genre-specific JAC/JAFRA grants showed a general downward tendency, but they increased for ‘popular music’, ‘plays’, ‘traditional Japanese performing arts’ and ‘festivals’, and decreased for the other genres. A decrease in the average per-project amount of JAC or JAFRA grant, which is quality-dependent, suggests overall quality deterioration. The annual average of the total amount of subsidies for ‘festivals’ increased by 96% (13.43/20.6 million yen/FY2023), the highest rate of increase among all genres. As for the other genres, all the figures dropped, with the exception of those for ‘traditional Japanese performing arts’, whose figures remained almost unchanged on a yearly basis.

From the above, it can be stated that the genre of 'festivals' showed a particularly marked increase both in terms of the number of events and the total amount of JAC/JAFRA grants. The upward trend in the number of 'festivals' is deemed to be related to Japan's recent policy of regional vitalisation through tourism. Efforts are being focused on measures to increase visitors to provincial areas through tourist attractions, often developed on the basis of cultural resources. In this movement, hosting festivals is viewed as an effective way to attract a sizeable number of visitors at one time. This trend can be attested to in the analysis of by-genre performing arts expenditure and the number of events held.

Performing arts income and expenditure

Fig. 5 and Fig. 6 show the distributions of performing arts expenditure (= income) before and after the pandemic, respectively. Since Fig. 5 covers the events held in the three pre-pandemic years, the frequency values are around three times higher than in Fig. 6. However, general pre- and post-pandemic trends point to the fact that most performances were held with a hosting cost below 7.5 million yen, with an upper limit of 30 million yen. As indicated in Table 3, the average hosting cost was 6.46 million yen pre-pandemic (standard deviation: 69,200 yen) and 6.48 million yen post-pandemic (standard deviation: 88,800 yen).

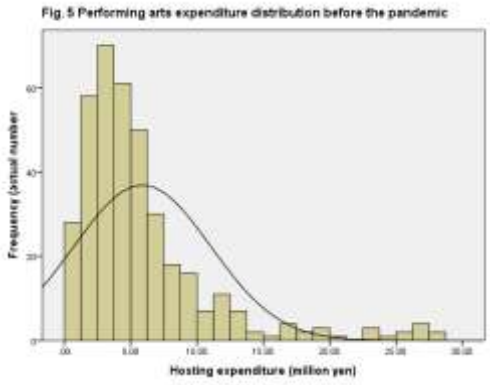
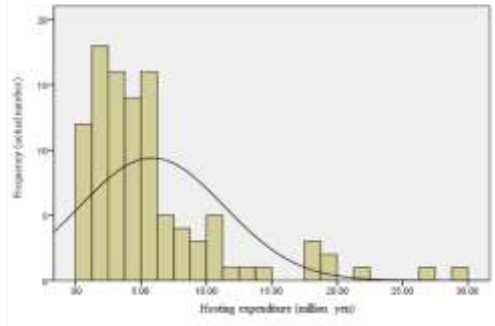


Fig. 6 Performing arts expenditure after the pandemic



The distributions in Figs. 5 and 6 indicate that the number of events costing up to 15 million yen was 358 (92.5% of the total) pre-pandemic and 96 (91.4% of the total) post-pandemic. Normal distribution curves are provided in the two figures, but evidently, they do not represent the actual results. The Shapiro-Wilk test also rejects normal distribution.

Table 4 provides the breakdown of hosting income items by genre. It shows that both before and after the pandemic, the largest income source was ‘organiser’s contribution’, that is, the cost borne by the organiser. Before the pandemic, the average percentage of this income source out of the total was 60%, with the genre-specific figures ranging from 48.6% for ‘popular music’ to 63.3% for ‘educational programmes’. After the pandemic, the figures decreased on the whole, particularly for ‘traditional Japanese performing arts’. The second largest income source, both before and after the pandemic, was ‘admission fees’ followed by ‘JAC/JAFRA grants’. All other income sources, such as ‘donations’, ‘subsidies’, ‘programme (merchandise) sales’, and ‘participation fees’, were much smaller both in absolute value and percentage. The ‘organiser’s contribution’ was required because sufficient subsidies were not obtained, following screening in the JAC or JAFRA grant application procedure. Following the example of Western countries, the Japanese government, notably ACA and METI, is trying to popularise matching grants through a designated donation system. However, they are not yet as widespread as in the United States, since donation itself is not a long-established concept in Japan. As a result, even in the case of theatre productions benefitting from JAC/JAFRA grants, a large portion of income comes from the organiser’s contribution and admission fees. Dependence on these income sources is even greater for theatre productions that do not receive JAC/JAFRA grants.

Table 4 Pre- and post-pandemic breakdown of income items by genre (Million yen)

Genre	COVID-19 code		JAC/ JAFRA grants	Admission fees	Co-organiser's contribution	Subsidies	Donations	Programme (merch.) sales	Participation fees	Organiser's contribution	Total
Classical music	0	Average	1.049	1.741	0.010	0.095	0.051	0.020	0.049	3.166	5.132
		% of total	20.4%	33.9%	0.2%	1.8%	1.0%	0.4%	1.0%	61.7%	100.0%
	1	Average	0.819	1.535	0.054	0.087	0.022	0.021	0.172	2.417	4.308
		% of total	19.0%	35.6%	1.3%	2.0%	0.5%	0.5%	4.0%	56.1%	100.0%
Popular music	0	Average	0.928	2.966	0.064	0.024	0.302	0.006	0.004	3.183	6.549
		% of total	14.2%	45.3%	1.0%	0.4%	4.6%	0.1%	0.1%	48.6%	100.0%
	1	Average	1.190	3.320	0.000	0.000	0.071	0.000	0.008	3.675	7.074
		% of total	16.8%	46.9%	0.0%	0.0%	1.0%	0.0%	0.1%	51.9%	100.0%
Opera, ballet and musicals	0	Average	1.835	3.177	0.074	0.297	0.100	0.108	0.123	6.636	10.515
		% of total	17.4%	30.2%	0.7%	2.8%	1.0%	1.0%	1.2%	63.1%	100.0%
	1	Average	1.720	2.899	0.000	0.553	0.107	0.143	0.132	4.995	8.829
		% of total	19.5%	32.8%	0.0%	6.3%	1.2%	1.6%	1.5%	56.6%	100.0%
Plays	0	Average	0.939	1.522	0.139	0.125	0.078	0.019	0.051	3.012	4.945
		% of total	19.0%	30.8%	2.8%	2.5%	1.6%	0.4%	1.0%	60.9%	100.0%
	1	Average	1.081	1.387	0.067	0.740	0.000	0.013	0.034	2.886	5.127
		% of total	21.1%	27.1%	1.3%	14.4%	0.0%	0.3%	0.7%	56.3%	100.0%
Traditional Japanese programmes	0	Average	1.014	2.813	0.041	0.091	0.034	0.099	0.000	3.150	6.228
		% of total	16.3%	45.2%	0.7%	1.5%	0.6%	1.6%	0.0%	50.6%	100.0%
	1	Average	1.105	5.172	0.050	0.143	0.075	0.219	0.000	3.384	9.042
		% of total	12.2%	57.2%	0.6%	1.6%	0.8%	2.4%	0.0%	37.4%	100.0%
Educational programmes	0	Average	0.867	0.972	0.000	0.146	0.004	0.005	0.312	2.480	3.919
		% of total	22.1%	24.8%	0.0%	3.7%	0.1%	0.1%	7.9%	63.3%	100.0%
	1	Average	0.530	0.478	0.000	0.004	0.000	0.003	0.131	1.793	2.409
		% of total	22.0%	19.9%	0.0%	0.2%	0.0%	0.1%	5.4%	74.4%	100.0%
Festivals	0	Average	1.212	1.913	0.059	0.068	0.416	0.032	0.037	3.331	5.856
		% of total	20.7%	32.7%	1.0%	1.2%	7.1%	0.5%	0.6%	56.9%	100.0%
	1	Average	1.343	3.753	0.040	0.006	0.436	0.003	0.370	4.840	9.448
		% of total	14.2%	39.7%	0.4%	0.1%	4.6%	0.0%	3.9%	51.2%	100.0%
Total	0	Average	1.164	2.249	0.060	0.135	0.102	0.049	0.067	3.800	6.462
		% of total	18.0%	34.8%	0.9%	2.1%	1.6%	0.8%	1.0%	58.8%	100.0%
	1	Average	1.090	2.641	0.038	0.237	0.082	0.071	0.118	3.297	6.484
		% of total	16.8%	40.7%	0.6%	3.7%	1.3%	1.1%	1.8%	50.9%	100.0%

NB: The number of performances, provided in Table 3, are omitted from this table due to limited space.

At the beginning of the 21st century, the principle of cost bearing according to benefits was introduced for the use of governmental facilities, thus increasing the burden shouldered by the users. Accordingly, as compared to the pre-pandemic years, the percentage of 'JAC/JAFRA grants' has shrunk while that of 'admission fees' has grown post-pandemic. Even in the genres for which the percentage of 'admission fees' has decreased, namely 'plays' and 'educational programmes', the rate of decrease is not substantial.

A look at the breakdown of expenditure items, divided based on whether or not subsidies were provided, reveals that the direct cost item 'performance' accounts for the largest percentage, between approximately 40 and 60%, except for the genres of 'opera, ballet and musicals', 'plays', and 'educational programmes' (see Table 5).

Table 5 Pre- and post-pandemic breakdown of expenditure items by genre (Million yen)

Genre	Covid-19 code		Performance	Music	Creative work	Stage	Travel	Communication	Advertising	Printing	Others	Total expenditure
Classical music	0	Average	3.217	0.123	0.146	0.359	0.482	0.051	0.285	0.323	0.148	5.132
		% in expenditure	62.7%	2.4%	2.8%	7.0%	9.4%	1.0%	5.6%	6.3%	2.9%	100.0%
	1	Average	2.643	0.174	0.129	0.200	0.270	0.060	0.321	0.251	0.372	4.308
		% in expenditure	61.4%	4.0%	3.0%	4.6%	6.3%	1.4%	7.4%	5.8%	8.6%	100.0%
Popular music	0	Average	3.252	0.158	0.284	0.824	0.845	0.026	0.635	0.308	0.216	6.549
		% in expenditure	49.7%	2.4%	4.3%	12.6%	12.9%	0.4%	9.7%	4.7%	3.3%	100.0%
	1	Average	2.902	0.184	0.160	0.493	2.107	0.076	0.580	0.215	0.483	7.074
		% in expenditure	41.0%	2.6%	2.3%	7.0%	29.8%	1.1%	8.2%	3.0%	6.8%	100.0%
Opera, ballet and musicals	0	Average	2.965	0.472	1.037	4.365	0.390	0.075	0.399	0.473	0.338	10.394
		% in expenditure	28.5%	4.5%	10.0%	42.0%	3.8%	0.7%	3.8%	4.6%	3.3%	100.0%
	1	Average	2.427	0.543	1.521	3.200	0.136	0.091	0.209	0.251	0.658	8.829
		% in expenditure	27.5%	6.2%	17.2%	36.2%	1.5%	1.0%	2.4%	2.8%	7.4%	100.0%
Plays	0	Average	1.303	0.179	0.590	1.701	0.317	0.061	0.232	0.295	0.266	4.945
		% in expenditure	26.4%	3.6%	11.9%	34.4%	6.4%	1.2%	4.7%	6.0%	5.4%	100.0%
	1	Average	1.100	0.189	1.020	1.474	0.273	0.107	0.334	0.362	0.625	5.127
		% in expenditure	21.4%	3.7%	19.9%	28.8%	5.3%	2.1%	6.5%	7.1%	12.2%	100.0%
Traditional Japanese performing arts	0	Average	2.786	0.040	0.342	1.575	0.561	0.074	0.300	0.353	0.196	6.228
		% in expenditure	44.7%	0.6%	5.5%	25.3%	9.0%	1.2%	4.8%	5.7%	3.1%	100.0%
	1	Average	4.063	0.045	0.427	2.482	0.786	0.069	0.483	0.440	0.381	9.042
		% in expenditure	44.9%	0.5%	4.7%	27.5%	8.7%	0.8%	5.3%	4.9%	4.2%	100.0%
Educational programmes	0	Average	1.287	0.213	0.387	0.995	0.123	0.045	0.287	0.370	0.211	3.919
		% in expenditure	32.8%	5.4%	9.9%	25.4%	3.1%	1.1%	7.3%	9.4%	5.4%	100.0%
	1	Average	0.438	0.216	0.329	0.827	0.016	0.035	0.199	0.234	0.315	2.409
		% in expenditure	18.2%	9.0%	13.7%	34.3%	0.7%	1.5%	8.3%	9.7%	13.1%	100.0%
Festivals	0	Average	2.391	0.149	0.359	1.022	0.729	0.106	0.411	0.469	0.218	5.856
		% in expenditure	40.8%	2.6%	6.1%	17.5%	12.4%	1.8%	7.0%	8.0%	3.7%	100.0%
	1	Average	2.805	0.283	1.464	1.634	0.717	0.648	0.549	0.263	0.634	9.448
		% in expenditure	29.7%	3.0%	15.5%	17.3%	7.6%	6.9%	5.8%	2.8%	6.7%	100.0%
Total	0	Average	2.576	0.201	0.481	1.740	0.470	0.061	0.341	0.361	0.230	6.437
		% in expenditure	40.0%	3.1%	7.5%	27.0%	7.3%	1.0%	5.3%	5.6%	3.6%	100.0%
	1	Average	2.506	0.219	0.658	1.455	0.493	0.128	0.366	0.300	0.478	6.484
		% in expenditure	38.6%	3.4%	10.2%	22.4%	7.6%	2.0%	5.6%	4.6%	7.4%	100.0%

NB: The total expenditure is omitted from this table due to limited space, income being equal to expenditure (as in Table 4).

Performance: fees for actors, dancers, MCs, and other performers

Music: fees for music composition, music arrangement, lyrical composition, assistant conducting, choir conducting, musical instrument rental, sheet music rental, sheet music reproduction, sheet music production, music instrument tuning, rehearsal accompan

Creative work: fees for direction, choreography, stage management, various forms of assistance, audio, lighting, visual planning, stage art design, costume design, script writing, various forms of instruction

Stage: cost for sets and props, stage art, costumes, makeup, equipment rental, venue installation, venue dismantling, venue rental, venue facility rental

For the genres of 'opera, ballet and musicals' and 'plays', the largest cost item was 'stage' due to the importance of stage sets and equipment. The 'performance' cost tends to be large for 'festivals' since they combine multiple genres. For 'educational programmes', which are held to offer education by performing arts professionals, expenses tend to increase due to the outsourcing of theatre works. Since most of these events are held in theatres operated by local governments, they do not involve significant promotional activities, unlike in the case of privately

run theatres, for which audience attraction is essential. As a result, the 'advertising' cost accounts for less than 10% for almost all genres. Internet-related expenses are classified under the 'communication' cost, which increased 1.5- to 2-fold for all genres except for 'traditional Japanese performing arts' as a result of the official recommendation of Internet-assisted remote viewing to avoid infection through in-person attendance at crowded theatres during the pandemic. Despite the increase, this cost item is very small in both percentage terms and absolute value, at 128,000 yen.

The cost items whose percentage changed significantly due to the pandemic are 'travel' for 'popular music' and for 'educational programmes': the former showed an increase while the latter decreased. These changes, even if relatively small, had a large impact because their absolute value was small. The increased 'travel' cost for 'popular music' can probably be explained by the increase in the number of performers and/or the longer distances travelled by performers. Yet, given the very small change in the 'performance' cost, the increased 'travel' cost is most likely due to the post-pandemic employment of performers from more distant areas. As for the decreased 'travel' cost for 'educational programmes', it may be explained by the participation of performing artists from nearby areas.

Generally, changes brought by the pandemic in the income items include decreased JAC/JAFRA grants and increased admission fees. However, analysis of the contents of theatre arts in terms of expenditure items revealed almost no change. In particular, there is little to confirm the general public adherence to the national government's recommendation for online viewing of performing arts due to the pandemic. High-quality theatre productions normally require creative labour by theatre personnel, but the greater availability of theatre operation subsidies independent of quality seems to have led theatres in the direction of sacrificing quality. General-purpose subsidies to combat the negative impact of COVID-19 have not resulted in expenditure related to qualitative improvement in theatre arts, generating concern over qualitative deterioration.

Impact of COVID-19 on audience size

It is easy to suppose that the restrictions on in-person interaction during COVID-19 caused theatre audience sizes to shrink immediately following the outbreak of COVID-19. Table 6 shows the number of audience members per performance before and after the pandemic. The average of all genres combined dropped by 4.2% from 819.3 to 784.7 persons. By genre, on the other hand, the audience size for 'traditional Japanese performing arts' increased by 5.7%, as did that for 'plays', although by a mere 1.2%. The audience size for all other genres shrank, with diverse degrees of impact among the genres: 'popular music' saw a one-third drop, 'classical

music' decreased by 10.7%, 'opera, ballet and musicals' by 16.9%, 'educational programmes' by 28.9%, and 'festivals' by 3.7%. However, it is important to note that the audience size for 'popular music' before the pandemic had a large standard deviation, with five large-scale events each attracting over 1,000 audience members before the pandemic, contrasting with only one post-pandemic event with 1,019 persons. The post-pandemic figures for 'traditional Japanese performing arts' and 'festivals' also showed a large standard deviation because large-scale events were held post-pandemic. The genre 'traditional Japanese performing arts' includes Noh plays, which are usually held in small theatres, and Kabuki, which is held in large theatres. The post-pandemic reopening of large Kabuki theatres contributed to the audience increase. For this reason, the audience size of 'traditional Japanese performing arts' was comparable to that of 'festivals' and 'opera, ballet and musicals'. The link between theatre size and audience size seems evident.

Table 6 By-genre audience size pre- and post-pandemic

(1,000 persons)

Genre	COVID-19 code	Average	Frequency	Standard deviation
Classical music	0	681.4	91	409.5
	1	608.7	29	304.3
Popular music	0	879.5	39	1305.6
	1	564.9	7	310.3
Opera, ballet and musicals	0	1026.9	78	630.8
	1	853.8	15	615.4
Plays	0	747.4	74	527.8
	1	756.6	15	643.3
Traditional Japanese performing arts	0	716.8	64	708.4
	1	974.4	20	1311.9
Educational programmes	0	725.4	24	412.1
	1	516.0	9	331.5
Festivals	0	1297.7	17	774.0
	1	1250.2	10	1172.1
Total	0	819.3	387	694.8
	1	784.7	105	791.0
	Average of all genres	811.9	492	715.7

NB: COVID-19 code: 0 for pre-pandemic, 1 for post-pandemic FY2023

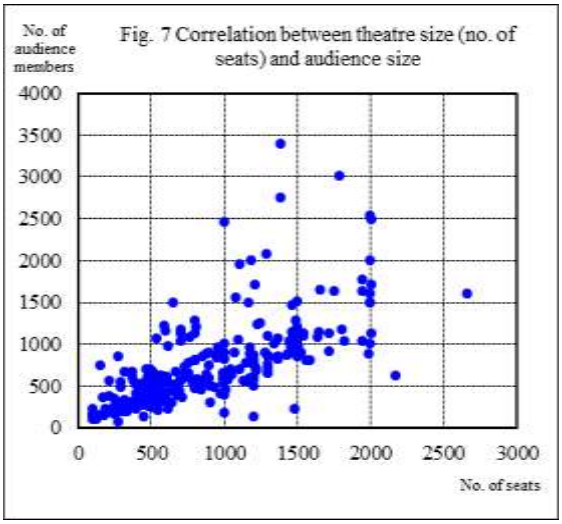


Fig. 7 Correlation between theatre size (no. of seats) and audience size

Fig. 7 indicates the correlation between the number of seats in theatres that gave performances, and their audience size. The correlation coefficient is 0.693, demonstrating that theatre size influences the audience size. With regard to this link, the theatres whose audience size passed the 45-degree line in the figure presented the same performance several times (as part of their repertoire) possibly to save on preparatory costs (such as the fixed stage installation cost required for each performance). The average stage turnover ratio for all genres was 1.52 throughout the pre- and post-pandemic years (see Table 7). Most music concerts were unique performances, whereas 'opera, ballet and musicals', 'plays' and 'traditional Japanese performing arts' performances were repeated events with a high turnover ratio. As for 'educational programmes', the turnover ratio suggests that they were most likely implemented as unique events. The per-performance range of turnover was wide, judging from the standard deviation, for 'plays' pre-pandemic and 'traditional

Japanese performing arts' pre- and post-pandemic. This is probably because some productions were incorporated into the repertoire after the pandemic.
This leads to the question of how audience size relates to performance cost.

Table 7 By-genre theatre seat turnover ratio pre- and post-pandemic

Genre	COVID-19 code	Average	Frequency	Standard deviation
Classical music	0	1.09	91	0.28
	1	1.10	29	0.41
Popular music	0	1.18	39	0.82
	1	1.14	7	0.38
Opera, ballet and musicals	0	1.76	78	1.06
	1	1.33	15	0.62
Plays	0	2.09	74	1.95
	1	1.53	15	1.13
Traditional Japanese performing arts	0	1.63	64	1.64
	1	2.30	20	4.05
Educational programmes	0	1.38	24	0.71
	1	1.11	9	0.33
Festivals	0	1.47	17	0.72
	1	1.20	10	0.42
Total	0	1.55	387	1.28
	1	1.44	105	1.87
	Average of all genres	1.52	492	1.43

NB: COVID-19 code: 0 for pre-pandemic, 1 for FY2023, immediately post-pandemic

Table 8 Performance cost per audience member pre- and post-pandemic

Thousand yen)

Genre	COVID-19 code	Average	Frequency	Standard deviation
Classical music	0	8.06	91	3.84
	1	8.28	29	5.32
Popular music	0	9.20	39	7.04
	1	10.92	7	9.31
Opera, ballet and musicals	0	11.27	78	8.51
	1	10.76	15	6.70
Plays	0	7.30	74	4.96
	1	9.64	15	8.19
Traditional Japanese performing arts	0	9.38	64	7.07
	1	9.09	20	6.68
Educational programmes	0	7.03	24	6.14
	1	5.39	9	3.33
Festivals	0	6.29	17	5.52
	1	11.08	10	7.13
Total	0	8.75	387	6.44
	1	9.18	105	6.60
	Average of all genres	8.84	492	6.47

NB: COVID-19 code: 0 for pre-pandemic, 1 for FY2023, immediately post-pandemic

Table 8 shows that the overall average performance cost per audience member was 8,840 yen. By genre, the performance cost of 'educational programmes' dropped markedly by 23.3%. On the other hand, 'festivals' saw a 76.2% increase. Pre- to post-pandemic changes for all other genres were only slight and almost negligible. From FY2017 to FY2023, the consumer price index was up 7.2% for all items and up 7.8% for theatre tickets. Considering the price hike, the overall 4.9% increase in theatre performance cost per audience member actually signifies an approximately 3% decrease. In general, increased spending makes it possible to employ more talented performers and prepare higher-grade stage sets, thereby producing higher-quality theatre arts. It is thus possible to suppose a correlation between performance quality and cost within the same genre in a short period, during which the performance in question does not structurally change. Therefore, significant qualitative improvement cannot be expected in the genres that experienced little change in performance cost, namely, those other than 'plays', 'educational programmes' and 'festivals'. Conversely, marked qualitative change is likely to have occurred for 'plays' and the other genres whose performance cost markedly increased. Theatre performance income is made up of ticket sales and other components, such as government subsidies and the theatre's own contribution. Admission fees paid by audience members account for about 40% of the total expenditure (see Tables 4 and 5), which roughly corresponds to the direct cost for performers' fees. Considering that performance income equals performance expenditure as a governmental service output in the national economic accounts, and that a performance represents the final demand, it can be stated that audience members attending a performance actually enjoy a utility worth about 2.5 times the cost they incur by paying for just the performers' fees.

Relationship between resources invested in a performance and output

For analysis in this section, a performance is treated as a standalone project, and the resources invested, including human resources such as the performers themselves, and physical resources, represented by stage equipment, are considered. The output is defined as the government service output value based on the national economic accounts, where performance income is equated to output value and final demand value (Atkinson, 2005; Ogawa, 2017). The method used to analyse the relationship between resources invested in a performance and output using the production function is explained below with reference to published papers based on Edagawa (2020, 2021).

For human resources, the 'performance', 'music', and 'creative work' costs are calculated using the average income of performing artists by prefecture, and are converted into man-hours. Following Keynes (1936) and Uzawa (1986)'s methods, the quality of labour is assessed using average wages per person (mean labour costs), as elaborated in existing research (Edagawa, 2020, 2021). The 'performance' cost refers to expenses for the performers who appear on stage, but the staff supporting the performance include numerous behind-the-scenes professionals such as stage directors, musical instrument tuners, assistant conductors, directors, costume dressers, designers for costumes and wigs, translators, and scriptwriters (see the notes below Table 5). These additional costs are included in the 'music' and 'creative work' costs, which also cover wages for lighting and sound operators involved in stage production. Focusing solely on 'performance' as the human resources investment could lead to an underestimation of the total input. In Table 5, 'performance' is added to the sum of 'music' and 'creative work' (this cost item is collectively referred to as 'labour'), and the percentage obtained by dividing the total sum by the sum of the last two items is indicated. It accounts for 13.6% in all genres combined. By genre, however, its percentage varies considerably and is particularly high for 'opera, ballet and musicals', that is, comprehensive performing arts that are impossible for performers to realise alone; 'plays' and 'festivals', for which stage direction plays an important role; and 'educational programmes' intended to teach about performing arts. Therefore, taking into account only the performers who appear on the stage is far from an accurate measurement of the human resources invested in a performance.

As for physical resources input, the 'stage' cost encompasses general expenses required to set up the stage, including rental fees. However, since staff wages related to stage management such as lighting and sound are accounted for in the 'music' cost, the 'stage' cost here strictly refers to expenses associated with facilities and equipment, essentially capital rental costs for temporary theatre use. Previous research employed a Cobb-Douglas production function for such analysis. The Cobb-Douglas function, initially developed for manufacturing,

has been widely adapted to service industries as a robust tool for evaluating production and productivity (Konishi and Nishiyama, 2009).

In previous studies, the author used a method of analysis focusing on year-long production by facilities such as theatres. In this study, it is applied to one-off performance projects. Whether input resources are considered to be fixed or variable depends on the relative duration of the production period under analysis. For a single performance, inputs (resources invested) are closely tied to those of production alone and do not affect other productions. There is no need to account for any time lag between resource input and its contribution to production. Thus, inputs are considered variable. Human and physical resources can be procured on the market, fitting into a flow concept. Physical resources, like human resources, do not take on a stock-like character; rather, they are regarded as a flow of services within a specific period from preparation to the conclusion of the performance. Theatre rentals can also be procured on the market (Imai, Uzawa, Komiya, Negishi, and Murakami, 1971).

The performances were studied to clarify the actual situation during the three-year pre-pandemic period from FY2017 to FY2019 (each fiscal year lasting from April to March), as well as in FY2023 upon the ending of the pandemic. Panel data analysis cannot be applied since the study does not yield panel data of a year-long observation of an identical subject (Kitamura, 2005). As already indicated in the analyses in the preceding sections, government subsidies for performances changed significantly from before to after the pandemic. However, analysis of performance expenditure shows little change in the way performances are conducted. Nevertheless, the subsidies provided to theatres during the pandemic led to an increase in lower-quality performances. To analyse the impact of COVID-19 on stage performances, which is the main objective of this paper, it is essential to compare the production functions of the pre- and post-pandemic years. Based on the expenditure analyses presented in the preceding sections, it appears that there was a shift in quality while performance methods remained mostly unchanged. Thus, pre-pandemic data were pooled, assuming that the production function structure remained stable and only the parameters fluctuated.

A Cobb-Douglas production function was applied to stage performances, represented as follows:

$\ln(Y)=\alpha\ln(K)+\beta\ln(L)+\gamma$

Where

Y = performance income (equivalent to output and final demand, in thousand yen)

K = stage expenses (in thousand yen)

L = labour, calculated as the total of the 'performance', 'music', and 'creative work' costs divided by the average artist income by prefecture and adjusted by annual working hours (measured in man-hours)

α = =capital share

β = labour share

γ = total factor productivity

Pre-pandemic production function (N = 387)

$$\underset{}{\text{Ln(perfome income)}} = \underset{(24.37)}{0.234}\text{Ln(stage cost)} + \underset{(41.45)}{0.676}\text{Ln(no. of performers)} + \underset{(24.02)}{2.488} \cdots\cdots\cdots \quad (3)$$

$$\text{Degree - of - freedom adjusted} \quad R^2 : 0.918 \qquad \text{t - value in parentheses}$$

Post-pandemic production function (N=105)

$$\underset{}{\text{Ln(performance income)}} = \underset{(8.79)}{0.176}\text{Ln(stage cost)} + \underset{(25.76)}{0.701}\text{Ln(no. of performers)} + \underset{(16.39)}{2.643} \cdots\cdots (4)$$

$$\text{Degree - of - freedom adjusted } \mathrm{R}^2 : 0.944 \qquad \text{t - value in parentheses}$$

Fig. 8 indicates performance income, predicted using Formulas (3) and (4), and actual performance income. The correlation coefficient between the two was 0.957, suggesting that the cost items for 'stage' and 'labour' adequately explain the performance income both before and after the pandemic. Additionally, the Variance Inflation Factor (VIF) values for Formulas (3) and (4) were 1.15 and 1.35, respectively, indicating no multicollinearity issues. Residuals from the estimated models were confirmed to follow a normal distribution using the Shapiro-Wilk test, supporting the validity of each equation.

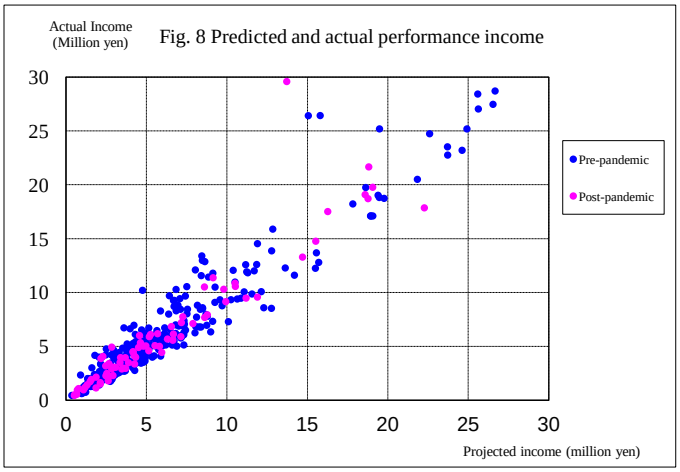


Fig. 8 Predicted and actual performance income

Based on these results, an F-test was conducted to check for structural changes between Formulas (3) and (4). The test confirmed, at a 5% significance level, that the differences between the two formulas are statistically significant. This suggests that, while there was a structural shift in stage performances due to the pandemic, the core explanatory variables, 'stage' and 'labour', remained in the production function, though their parameters changed. Specifically, the parameter for 'stage' decreased, while the parameter for 'labour' increased, indicating a shift in resource impact. Additionally, an increase in the constant term

suggests that total factor productivity (TFP) rose by approximately 17% (exp (-2.488 + 2.643) = 1.17).

It is surmised that the pandemic caused the ‘stage’ parameter to decrease and the ‘labour’ parameter to increase because of the increase in the ‘creative work’ cost representing human resources (see Table 5). The ‘creative work’ encompasses expenses for ‘behind-the-scenes’ staff involved in such tasks as direction, choreography, stage management, audio and lighting planning, and costume design, and they account for the majority of the cost item. As the average of all genres, the ‘performance’ cost, that is, the human resources cost for performers who appear on stage, decreased only slightly, whereas their total working hours dropped from 822.2 man-hours pre-pandemic to 811.5 man-hours post-pandemic. On the other hand, the total working hours of behind-the-scenes staff increased significantly from 213.6 man-hours to 303.5 man-hours. This increase, viewed as accumulated human talent, is believed to have contributed to increasing the total factor productivity through skill level enhancement and transmission of know-how. In other words, qualitative improvement in stage management contributed to higher productivity.

CONCLUSION

This study was conducted to examine quantitative and qualitative changes in theatre arts from before to after the COVID-19 pandemic, based on a questionnaire survey concerning theatre projects receiving governmental assistance via agencies that support performing arts. Analysis of the survey results highlights the following findings.

The across-the-board support provided to theatres during the pandemic resulted in a general qualitative decline in post-pandemic theatre performances. Meanwhile, in the regions that have always had substantial funding for artistic and cultural activities and relatively large numbers of performing artists residing nearby, high-quality theatre arts have been implemented, indicating that well-developed soft infrastructure for performing arts and the size of the local performing arts population contribute considerably to the quality of performing arts.

By genre, the expenditure and number of events increased for ‘traditional Japanese performing arts’ and ‘festivals’, which combine multiple types of performing arts. More conventional types of performances, namely ‘opera, ballet and musicals’ and ‘plays’, saw their expenditure and number of events decrease as a general trend. This suggests that, although many of the theatre projects benefitting from government support are of high quality, organisers’ focus is shifting to events that are more likely to attract visitors. Government grants awarded to performances in these genres, despite their high quality, only account for 20% or less of their total funding. This means that about 60% of costs must be borne by the organisers themselves.

Without their financial effort, it would be extremely difficult for performances to be implemented. The production function analysis using performance cost details clarifies that not only performers but also support staff, creative works and stage sets and equipment greatly contribute to qualitative improvement in theatre arts.

LIMITATIONS OF THE CURRENT STUDY

This study analyzes JAC- and JAFRA-adopted theatre arts projects before and after the COVID-19 pandemic to find out how the pandemic affected theatre arts activities. The study assumes that JAC and JAFRA criteria for adoption remained unchanged throughout FY2017 to FY2023, the period covered by the study. Although aware that the validity of this assumption, as well as the significant discrepancies in the compared sample sizes between the three years prior to the COVID pandemic, and the year since the pandemic, which differ in lengths of time, can impact the statistical soundness of this study, the study believes the method it has adopted as a means of observing the qualitative and quantitative changes to theatre arts before and after the COVID pandemic to be a reasonable approach for appropriately analyzing the effects of COVID within the limitations of available data.

WAY FORWARD

In view of these findings, in future research, it is necessary to conduct further analysis of factors for qualitative change in theatre arts caused by the pandemic, as well as regional differences in efficacy due to cultural policies. Concrete policy proposals also ought to be sought for future qualitative improvement. The METI survey shown in Fig. 1 seems to indicate that the industrial activity of theatre arts has been restored to the pre-pandemic level. Nevertheless, this study points to general qualitative deterioration. During the pandemic, theatre-related organisations, such as the Association of Public Theatres and Halls in Japan and the Liaison Council of Theatres and Halls in Japan, voiced their dissatisfaction with uniformly applied restrictions on theatre activities, due to concern about the negative impact of anti-infection measures on their operations. Indeed, the across-the-board restrictions on and subsidies given to all theatres lowered the quality of theatre performance, as stated above. It is hoped that future policy measures will be focused on qualitative restoration at least to the pre-pandemic level.

In previous studies, the Cobb-Douglas production function was applied to the year-long production of theatres as a management entity in the service industry. In this study, it is applied to one-off performance projects. It would be necessary to elucidate the limits of this approach so as to examine its applicability to other artistic/cultural projects, thereby increasing the

universality of the production function in analysis of arts and culture. Furthermore, future research should aim for more precise understanding of the impact of support staff on performance quality as identified in this study, analysing this factor further within the actual context of each theatre.

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