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EMPIRICAL ANALYSIS OF PARTICIPATION FREQUENCY IN CULTURAL ACTIVITIES USING THE PUBLIC OPINION SURVEY ON CULTURE IN JAPAN

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Empirical Analysis of Participation Frequency in Cultural Activities Using the Public Opinions Survey on Culture in Japan

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Abstract

Cultural participation is one of the most important research topics in cultural economics. This study investigates the effects of socioeconomic determinants on an individual's cultural participation, using a Zero-Inflated Ordered Probit model. We used data collected from the 2023 Public Opinions Survey on Culture in Japan, conducted by the Agency for Cultural Affairs. We distinguished between direct and indirect modes of cultural activities and compared the effects of socioeconomic determinants on them. The estimation results revealed that most socioeconomic determinants significantly influenced participation probability but not participation frequency. Moreover, the results indicated that some socioeconomic factors play important roles in both direct and indirect modes of cultural activities.

Key Words: Cultural Participation, Socioeconomic Determinants, Zero Inflated Ordered Probit, Public Opinion Survey on Culture

JEL Classification: D12, Z10

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1. Introduction

Cultural participation is one of the most important research topics in cultural economics. Many existing studies have analyzed the socioeconomic determinants that affect consumers' participation in cultural activities, such as going to a museum, enjoying opera concerts, and watching movies, etc.

UNESCO (2012) summarized the general issues of cultural participation, including how to define it, measure it, and create a dataset. It also identified the frequently discussed factors in existing research that are useful for an overview of the topic.

Many studies in the field of applied cultural economics have conducted empirical analyses of cultural participation using microdata. In typical cases, cultural participation is measured as (1) a discrete variable (how many times) or (2) an ordered variable (how often). In both cases, the standard regression model is inadequate. Therefore, we should employ other models that are suitable for cases wherein the dependent variable is discrete or ordered.

Additionally, cultural participation data frequently suffer from the "excess zero" problem, which is caused by many consumers not participating in any cultural activities. Researchers should employ an adequate estimation model to avoid serious bias caused by the excess zero problem.

Some admirable existing studies have resolved these problems by using adequate estimation models. For example, Zero Inflated Poisson (Ateca-Amestoy, (2008)), Zero Inflated Negative Binominal (Ateca-Amestoy, (2008), Muniz et al. (2017)), Double-Hurdle Model with Independent Errors (Muniz et al. (2017)), and Zero Inflated Ordered Probit (Borowiecki and Prieto-Rodriguez (2015), Suarez-Fernandez et al. (2020)).

Existing studies have shown that "income" and "educational background" influence cultural participation. Consumers with higher income exhibit higher participation in cultural activities (Muniz et al. (2017), Courty and Zhang (2018), Suarez-Fernandez et al. (2020)). Additionally, consumers with higher educational levels tend to participate more in cultural activities (Muniz et al. (2017), Courty and Zhang (2018)).

In addition to these two factors, "occupation" also significantly affects consumers' decisions (Borowiecki and Prieto-Rodriguez (2015), Suarez-Fernandez et al. (2020)). This variable is a substitute for "individual disposal time" which is difficult for researchers to observe.

In this study, we employ the Zero Inflated Ordered Probit model and demonstrate empirical results on the socioeconomic determinants that promote consumer participation in cultural activities. Note that our dataset, collected through the 2023 Public Opinions Survey on Culture in Japan, conducted by the Agency for Cultural Affairs, includes not only "direct," but also "indirect" consumption. The details are presented in the next section.

2. Data

As explained in the previous section, our data were collected through the 2023 Public Opinions Survey on Culture in Japan, conducted by the Agency for Cultural Affairs. The original sample size was 3,000; however, our dataset contained 2,255 records after cleaning[2]. The survey asked, "How often did you participate in the corresponding cultural activity last year?" All respondents answered this question on a five-point scale: 0, Never; 1, Once per year; 2, Several times per year; 3, At most, three times per month; 4, Once per week; and 5, Several times per week.

The survey distinguished between three modes of cultural activity: "Attending Live Performances (ALP)," "Consuming Art through Media (CAM)," and "Personally Performing or Creating Art (PPCA)." ALP includes cultural activities with "direct" participation (e.g., concerts, art exhibitions, movies, historical cultural properties, art festivals, music festivals, etc.). CAM includes cultural activities with "indirect" participation (e.g., viewing of cultural activities on TV, radio, CDs/DVDs, Internet streaming, etc.) PPCA includes the creation or performance of cultural and artistic works, lessons, participation in festivals or hands-on activities, etc. We employed the answers for ALP and CAM[3] as dependent variables representing the respondents' frequency of cultural activities.

The explanatory variables were gender dummy, age, age^2, city-group, employment status and forms, income class, educational background, cultural activities in childhood, and no cultural facility dummies. The explanatory variables are defined in Table 1. In addition, we introduced prefecture fixed effects to control for differences between prefectures.

Table 1: Definition of Explanatory Variables

Variable	Definition
Gender	1 if the respondent is female and 0, otherwise.
Age, Age^2	Age of the respondent and its square (the squared term is divided by 100 to adjust the scale.)
Large City	City-Group dummies. Takes the value of 1 if the respondent resides in the corresponding city group distinguished according to population and 0, otherwise. We use " Very Small City " as the reference category
Mid City	
Small City	
Very Small City	

[2] We excluded the records containing missing values, uncertain, answering "Do not know" and "Do not want to answer."

[3] We did not employ PPCA in this study because it contains too many zeros and the parameters could not be estimated.

Regular	Dummies for employment status and forms. Takes the value of 1 if the respondent has the corresponding job and 0, otherwise. We use "Regular" as the reference category
Temporary	
Self-employed	
Homemaker	
Student	
Retired/unemployed	
Income-less1	Annual household income dummies (million yen). Takes the value of 1 if the respondent belongs to the corresponding income class and 0 otherwise. We use "Income-more10" as the reference category.
Income1-2	
Income2-3	
Income3-4	
Income4-5	
Income5-6	
Income6-7	
Income7-8	
Income8-9	
Income9-10	
Income-more10	
High School	Educational-background dummy. Takes the value of 1 if the respondent has the corresponding educational background and 0, otherwise. We use "Bachelor" as the reference category.
Associate Degree	
Bachelor	
Master/Doctor	
Music Instruments	Dummies for cultural activities in childhood. Takes the value of 1 if the respondent participates in a corresponding activity and 0, otherwise.
Sado/Kado/Japanese Calligraphy	
Tutoring school/Abacus	
Sports	
No Cultural Facility	No cultural facility dummy. Takes value 1 if the respondent cannot travel to some cultural facility (Hall, Theater, Museum, etc...) within 1.5 hours and 0, otherwise.

The summary statistics are provided in Table 2.

Table 2. Summary Statistics

Variables	Mean	Std. dev.	Min	Max
ALP	0.911	0.998	0	5

CAM	1.858	1.577	0	5
Gender	0.481	0.500	0	1
Age	52.674	17.280	18	92
Large City	0.331	0.471	0	1
Mid City	0.298	0.457	0	1
Small City	0.258	0.437	0	1
Very Small City	0.114	0.318	0	1
Temporary	0.167	0.373	0	1
Self-employed	0.064	0.245	0	1
Homemaker	0.163	0.369	0	1
Student	0.029	0.169	0	1
Retired/unemployed	0.175	0.380	0	1
Regular	0.402	0.490	0	1
Income-less1	0.041	0.198	0	1
Income1-2	0.085	0.278	0	1
Income2-3	0.128	0.334	0	1
Income3-4	0.154	0.361	0	1
Income4-5	0.132	0.338	0	1
Income5-6	0.098	0.297	0	1
Income6-7	0.082	0.274	0	1
Income7-8	0.084	0.278	0	1
Income8-9	0.050	0.218	0	1
Income9-10	0.041	0.199	0	1
Income-more10	0.105	0.306	0	1
High School	0.332	0.471	0	1
Associate Degree	0.203	0.402	0	1
Master/Doctor	0.047	0.213	0	1
Bachelor	0.418	0.493	0	1
Music Instruments	0.272	0.445	0	1
Sado/Kado/Japanese Calligraphy	0.350	0.477	0	1
Tutoring school/Abacus	0.493	0.500	0	1
Sports	0.289	0.453	0	1
No Cultural Facility	0.106	0.308	0	1

3. Model

As our dependent variables are ordered and contain many zero records, it is not appropriate to use standard OLS regression models. Following existing studies, we employed the Zero Inflated Ordered Probit (ZIOP) model. This model is suitable for ordered variable data that contains many zeros. This section briefly introduces the ZIOP model[4].

In the ZIOP model, individuals are separated into "participants" and "non-participants." Participants indicate people who are considering, or are participating in cultural activities; non-participants indicate people with no interest in cultural activities.

Let us introduce the variable w_i which is 1 if individual i is a "participant" and 0, if not. The value of w_i is determined using the latent variable w_i^* as follows:

$$w_i = \begin{cases} 1 & \text{if } w_i^* > 0 \\ 0 & \text{otherwise} \end{cases}$$

Then, the latent variable w_i^* is modeled as follows:

$$w_i^* = z_i'\gamma + u_i,$$

where z_i is a characteristics vector of individual i, γ is a coefficient vector, and u_i is an error term. Suppose that the error term u_i follows standard normal distribution, the probability that an individual i is a "participant" is described as

$$\begin{aligned} \Pr(w_i = 1|z_i) &= \Pr(w_i^* > 0|z_i) \\ &= \Phi(z_i'\gamma), \end{aligned}$$

where $\Phi(\cdot)$ is a cumulative distribution function (c.d.f) of standard normal distribution. This equation is used in the typical selection model.

We then considered the participation frequency, which is given as an ordered variable. Suppose the ordered variable $\tilde{y}_i$ for individual i is described as follows:

[4] See Harris and Zhao (2007) for a detailed discussion.

$$\tilde{y}_i = \begin{cases} 0 \text{ if } \tilde{y}_i^* \leq 0 \\ 1 \text{ if } 0 < \tilde{y}_i^* \leq \mu_1 \\ 2 \text{ if } \mu_1 < \tilde{y}_i^* \leq \mu_2 \\ \vdots \\ J \text{ if } \mu_{J-1} \leq \tilde{y}_i^* \end{cases}$$

where $\tilde{y}_i^*$ is a latent variable for participation frequency and $\mu_1, \mu_2, \cdots, \mu_{J-1}$ are boundary parameters. The latent variable $\tilde{y}_i^*$ is modeled as follows:

$$\tilde{y}_i^* = x_i'\beta + \varepsilon_i$$

where x_i is a characteristics vector of individual i, β is a coefficient vector, and ε_i is an error term. Suppose that ε_i follows standard normal distribution, the probability of participation frequency is given by:

$$P_i = \begin{cases} \Pr(\tilde{y}_i = 0|x_i) = \Phi(\mu_0 - x_i'\beta) \\ \Pr(\tilde{y}_i = 1|x_i) = \Phi(\mu_1 - x_i'\beta) - \Phi(-x_i'\beta) \\ \vdots \\ \Pr(\tilde{y}_i = J|x_i) = 1 - \Phi\left(\mu_{J-1} - x_i'\beta\right) \end{cases}$$

In the ZIOP model, the observed variable of participation frequency y_i, is represented as

$$y_i = w_i \times \tilde{y}_i^*$$

Then, each probability of participation frequency is described as follows:

$$P_i = \begin{cases} \Pr(y_i = 0|z_i, x_i) = \{1 - \Phi(z_i'\gamma)\} + \Phi(z_i'\gamma) \cdot \Phi(\mu_0 - x_i'\beta) \\ \Pr(y_i = 1|z_i, x_i) = \Phi(z_i'\gamma) \cdot \{\Phi(\mu_1 - x_i'\beta) - \Phi(\mu_0 - x_i'\beta)\} \\ \vdots \\ \Pr(y_i = J|z_i, x_i) = \Phi(z_i'\gamma) \cdot \{1 - \Phi\left(\mu_{J-1} - x_i'\beta\right)\} \end{cases}$$

To estimate the parameter vectors γ and β, it is better not to choose $z_i \equiv x_i$ (exclusion restriction). In our context, we should exclude at least one variable from z_i, which exerts significant effect on whether the individual becomes a "participant" or "non-participant," but does not have significant effect on the participation frequency.

We estimated each of the four models that excluded (1) no variable, (2) time restriction-related, (3) geographic restriction-related, and (4) income-related variables.

For Model 1, we include all the explanatory variables in both equations. For Model 2, we referred to the discussion in Borowiecki and Prieto-Rodriguez (2015), that whether individuals become "participant" or "non-participant" depends on their time constraints, such as individual disposal time but it could not have significant effect on the frequency. They used occupational status, marital status, and family structure as proxy variables for time constraints. Following their discussions, we excluded "dummies for employment status and forms" as a proxy for time constraints. For Model 3, we excluded "No Cultural-facility" because 30.1% of non-participating respondents answered that they did not participate in cultural activities due to geographical constraints[5]. For Model 4, we excluded the "annual household income dummies" because our estimation results for Models 1, 2, and 3 confirm that income has a limited or almost no effect on participation frequency. This result is consistent with the hypothesis that frequency depends on time constraints.

4. Estimation Results and Interpretation

Tables 3 (ALP) and 4 (CAM) present the estimation results attained from the four models. The column "Frequency" represents the estimated values of β, which determines the individual's participation frequency in cultural activities. The column "Participation" represents the estimated values of γ, which determine the individual's decision to become the "participant" or "non-participant." Our estimation results contain significant information; therefore, we interpret the estimation results by focusing on each explanatory variable.

Gender

For ALP, being female did not have a significant effect on the participation probability in any model. These results indicate that there are no gender gaps when individuals decide whether to participate or not. However, in Model 1, being female had a significant positive effect on the frequency of cultural activities and had a weakly significant effect in Models 2 and 3.

These positive effects on cultural activities have been consistently reported in many existing studies. In the case of CAM, being female did not have a significant effect on either participation probability or frequency in any model. During the sampling period, the effects of COVID-19 on consumption styles persisted. "Stay-at-home consumption," people stay at home and consume goods and services that can be consumed within their home. Due to this drastic change in consumption style, all individuals increase their CAM, and the gender gap in art consumption

[5] "No performance or exhibitions is being held in the neighborhood" (13.5%), "The cost of admission and transportation is too high" (11.2 %), and "There are few attractive performances or exhibitions" (5.4%).

Table 3. Estimation Result (ALP)

	Model 1		Model 2		Model 3		Model 4	
	Frequency	Participation	Frequency	Participation	Frequency	Participation	Frequency	Participation
VARIABLES								
Gender	0.171**	0.249	0.138*	0.314	0.154*	0.279	0.138	0.330
	(0.0726)	(0.202)	(0.082)	(0.219)	(0.089)	(0.231)	(0.0963)	(0.230)
Age	-0.054***	-0.022	-0.055***	-0.031	-0.051**	-0.026	-0.044**	-0.040
	(0.020)	(0.045)	(0.017)	(0.032)	(0.023)	(0.038)	(0.019)	(0.030)
Age^2	0.051**	0.010	0.050***	0.024	0.048*	0.017	0.041**	0.031
	(0.020)	(0.048)	(0.015)	(0.032)	(0.026)	(0.049)	(0.019)	(0.030)
Large City	0.457***	-1.370**	0.506***	-1.194**	0.489***	-1.168	0.569***	-1.362***
	(0.101)	(0.622)	(0.105)	(0.465)	(0.125)	(0.892)	(0.120)	(0.415)
Mid City	0.570***	-1.485*	0.630***	-1.320***	0.624*	-1.304***	0.730***	-1.548***
	(0.182)	(0.791)	(0.201)	(0.453)	(0.346)	(0.447)	(0.152)	(0.456)
Small City	0.360***	-1.228**	0.428***	-1.121***	0.409*	-1.092***	0.513***	-1.342***
	(0.125)	(0.590)	(0.146)	(0.364)	(0.237)	(0.343)	(0.124)	(0.349)
Temporary	-0.101	0.430		0.208	-0.114	0.396	-0.102	0.259
	(0.104)	(0.359)		(0.238)	(0.122)	(0.305)	(0.116)	(0.300)
Self-employed	-0.188	1.738		0.575	-0.158	1.050	-0.094	0.461
	(0.119)	(1.545)		(0.487)	(0.317)	(2.592)	(0.180)	(0.498)
Homemaker	-0.102	-0.245		-0.495*	-0.045	-0.370	0.041	-0.535*
	(0.218)	(0.596)		(0.295)	(0.528)	(1.154)	(0.135)	(0.305)
Student	0.155	0.761		0.958	0.088	0.936	0.123	1.020

	(0.220)	(0.574)		(0.767)	(0.431)	(1.085)	(0.228)	(0.906)
Retired/unemployed	0.092	0.116		0.102	0.104	0.036	-0.034	0.204
	(0.217)	(0.566)		(0.259)	(0.412)	(0.922)	(0.165)	(0.308)
Income-less1	0.086	-0.894*	0.144	-0.823*	0.157	-0.905**		-0.746**
	(0.330)	(0.512)	(0.310)	(0.452)	(0.585)	(0.452)		(0.377)
Income1-2	-0.413*	-0.788*	-0.425*	-0.615	-0.402*	-0.702**		-1.087***
	(0.211)	(0.456)	(0.255)	(0.414)	(0.224)	(0.348)		(0.195)
Income2-3	0.203	-1.046**	0.123	-0.666*	0.177	-0.856		-0.518*
	(0.185)	(0.530)	(0.236)	(0.371)	(0.228)	(0.665)		(0.281)
Income3-4	-0.101	-0.403	-0.111	-0.280	-0.097	-0.333		-0.382**
	(0.160)	(0.369)	(0.194)	(0.317)	(0.182)	(0.377)		(0.194)
Income4-5	-0.001	-0.431	-0.054	-0.174	0.013	-0.363		-0.245
	(0.168)	(0.364)	(0.210)	(0.408)	(0.241)	(0.386)		(0.235)
Income5-6	0.147	-0.654	0.060	-0.323	0.137	-0.508		-0.308
	(0.260)	(0.609)	(0.283)	(0.517)	(0.292)	(0.359)		(0.245)
Income6-7	-0.175	0.316	-0.203	0.293	-0.155	0.155		-0.058
	(0.185)	(0.804)	(0.268)	(1.036)	(0.483)	(2.206)		(0.397)
Income7-8	-0.014	-0.538	-0.044	-0.326	-0.009	-0.450		-0.402
	(0.158)	(0.474)	(0.156)	(0.341)	(0.164)	(0.353)		(0.274)
Income8-9	0.216	-0.570*	0.160	-0.292	0.214	-0.462*		-0.195
	(0.185)	(0.314)	(0.220)	(0.365)	(0.198)	(0.261)		(0.281)
Income9-10	0.219	-0.366	0.151	-0.049	0.215	-0.237		0.161
	(0.209)	(0.615)	(0.251)	(0.540)	(0.325)	(0.539)		(0.429)

High School	-0.253*	-0.099	-0.170	-0.265	-0.245*	-0.118	-0.216	-0.171
	(0.134)	(0.213)	(0.161)	(0.249)	(0.147)	(0.206)	(0.166)	(0.246)
Associate Degree	-0.142*	-0.138	-0.109	-0.228	-0.131	-0.156	-0.098	-0.221
	(0.086)	(0.226)	(0.103)	(0.224)	(0.092)	(0.267)	(0.103)	(0.190)
Master/Doctor	0.248*	-0.165	0.261	-0.201	0.276	-0.189	0.326	-0.274
	(0.147)	(0.281)	(0.227)	(0.431)	(0.339)	(0.487)	(0.222)	(0.437)
Music Instruments	-0.032	0.241	-0.042	0.216	-0.037	0.216	0.014	0.060
	(0.110)	(0.319)	(0.122)	(0.380)	(0.166)	(0.324)	(0.121)	(0.269)
Sado/Kado/Japanese Calligraphy	0.029	0.439**	-0.023	0.517*	-0.007	0.475*	-0.011	0.419***
	(0.076)	(0.217)	(0.070)	(0.314)	(0.086)	(0.270)	(0.051)	(0.160)
Tutoring school/Abacus	-0.039	0.597*	-0.094	0.641	-0.053	0.563	-0.077	0.568**
	(0.136)	(0.319)	(0.141)	(0.409)	(0.151)	(0.634)	(0.146)	(0.289)
Sports	0.028	0.291	0.032	0.232	0.035	0.234	0.030	0.240
	(0.110)	(0.418)	(0.106)	(0.311)	(0.148)	(0.654)	(0.103)	(0.211)
No Cultural-facility	-0.342	-1.601***	-0.217	-1.518***		-1.682**	-0.128	-1.556***
	(0.367)	(0.349)	(0.255)	(0.305)		(0.691)	(0.257)	(0.223)
Observations	2,255	2,255	2,255	2,255	2,255	2,255	2,255	2,255

Each model contains prefecture fixed effects. Cluster-robust (prefecture level) standard errors in parenthesis. *** p<0.01, ** p<0.05, * p<0.1.

Table 4. Estimation Result (CAM)

	Model 1		Model 2		Model 3		Model 4	
	Frequency	Participation	Frequency	Participation	Frequency	Participation	Frequency	Participation
VARIABLES								
Gender	0.107	0.002	0.104	0.046	0.107	0.003	0.121	-0.029
	(0.078)	(0.129)	(0.069)	(0.140)	(0.077)	(0.129)	(0.082)	(0.190)
Age	-0.006	-0.010	-0.006	-0.005	-0.006	-0.010	-0.004	-0.013
	(0.012)	(0.026)	(0.017)	(0.025)	(0.012)	(0.026)	(0.013)	(0.034)
Age^2	0.010	0.016	0.011	0.011	0.010	0.016	0.008	0.018
	(0.011)	(0.024)	(0.015)	(0.024)	(0.011)	(0.024)	(0.011)	(0.030)
Large City	0.291**	-0.410	0.261*	-0.214	0.298**	-0.403	0.297*	-0.534
	(0.135)	(0.379)	(0.141)	(0.385)	(0.132)	(0.355)	(0.161)	(0.643)
Mid City	0.307***	-0.317	0.293*	-0.151	0.314***	-0.312	0.301**	-0.405
	(0.113)	(0.354)	(0.150)	(0.410)	(0.112)	(0.337)	(0.131)	(0.591)
Small City	0.334***	-0.359	0.315*	-0.176	0.340***	-0.354	0.339***	-0.463
	(0.117)	(0.302)	(0.164)	(0.397)	(0.115)	(0.283)	(0.127)	(0.529)
Temporary	0.220**	0.005		0.138	0.221**	0.007	0.230***	-0.024
	(0.0925)	(0.146)		(0.107)	(0.092)	(0.144)	(0.086)	(0.192)
Self-employed	0.173	0.476		0.506	0.175	0.467	0.173	0.475
	(0.130)	(0.359)		(0.393)	(0.127)	(0.340)	(0.130)	(0.381)
Homemaker	0.041	-0.053		-0.064	0.038	-0.049	0.031	-0.029
	(0.121)	(0.160)		(0.127)	(0.122)	(0.161)	(0.129)	(0.181)
Student	-0.019	1.062		0.730	-0.018	1.034	0.091	0.987

	(0.259)	(0.716)		(0.657)	(0.259)	(0.677)	(0.225)	(0.724)
Retired/unemployed	0.176	0.231		0.288	0.180	0.223	0.199	0.219
	(0.156)	(0.215)		(0.175)	(0.156)	(0.210)	(0.132)	(0.228)
Income-less1	0.252	-1.109***	0.276	-0.861	0.242	-1.079***		-1.027**
	(0.194)	(0.381)	(0.198)	(0.712)	(0.198)	(0.371)		(0.431)
Income1-2	0.204	-1.010***	0.291**	-0.868	0.203	-0.992***		-0.914***
	(0.167)	(0.271)	(0.138)	(0.563)	(0.165)	(0.281)		(0.289)
Income2-3	0.236	-0.504	0.332***	-0.446	0.228	-0.483		-0.333
	(0.149)	(0.332)	(0.125)	(0.407)	(0.154)	(0.340)		(0.298)
Income3-4	-0.004	-0.297	0.098	-0.352	-0.006	-0.286		-0.316
	(0.112)	(0.352)	(0.101)	(0.369)	(0.114)	(0.360)		(0.306)
Income4-5	0.168*	-0.580***	0.194*	-0.455	0.172*	-0.570***		-0.477**
	(0.100)	(0.214)	(0.099)	(0.413)	(0.099)	(0.218)		(0.189)
Income5-6	0.125	-0.422	0.145	-0.317	0.126	-0.412		-0.343
	(0.105)	(0.326)	(0.115)	(0.431)	(0.107)	(0.327)		(0.318)
Income6-7	0.124	-0.399*	0.138	-0.290	0.130	-0.398*		-0.359
	(0.110)	(0.227)	(0.090)	(0.383)	(0.105)	(0.222)		(0.260)
Income7-8	0.162	-0.461	0.156	-0.300	0.159	-0.445		-0.369
	(0.107)	(0.293)	(0.112)	(0.480)	(0.105)	(0.282)		(0.283)
Income8-9	0.322**	-0.806**	0.369**	-0.690	0.321**	-0.789**		-0.646*
	(0.148)	(0.334)	(0.168)	(0.487)	(0.149)	(0.333)		(0.341)
Income9-10	0.274*	-0.615**	0.322**	-0.522	0.270*	-0.595**		-0.402
	(0.155)	(0.285)	(0.130)	(0.515)	(0.151)	(0.286)		(0.346)

High School	-0.041	-0.268	-0.055	-0.195	-0.039	-0.268	-0.054	-0.234
	(0.090)	(0.168)	(0.076)	(0.162)	(0.088)	(0.163)	(0.096)	(0.201)
Associate Degree	-0.105	-0.187	-0.110	-0.146	-0.105	-0.188	-0.102	-0.190
	(0.076)	(0.144)	(0.069)	(0.115)	(0.077)	(0.141)	(0.083)	(0.167)
Master/Doctor	0.209*	-0.303	0.182	-0.194	0.215*	-0.305	0.213*	-0.318
	(0.123)	(0.233)	(0.124)	(0.283)	(0.121)	(0.227)	(0.117)	(0.263)
Music Instruments	0.093	0.164	0.108	0.125	0.097	0.156	0.104	0.149
	(0.104)	(0.170)	(0.105)	(0.136)	(0.102)	(0.164)	(0.103)	(0.199)
Sado/Kado/Japanese Calligraphy	0.034	0.246*	0.027	0.197*	0.033	0.247*	0.027	0.296
	(0.066)	(0.139)	(0.063)	(0.116)	(0.066)	(0.139)	(0.066)	(0.191)
Tutoring school/Abacus	0.056	0.243**	0.027	0.248***	0.059	0.241**	0.070	0.223*
	(0.071)	(0.097)	(0.078)	(0.073)	(0.070)	(0.094)	(0.088)	(0.128)
Sports	0.047	0.339**	0.003	0.353**	0.049	0.334**	0.065	0.324*
	(0.072)	(0.168)	(0.081)	(0.140)	(0.070)	(0.156)	(0.081)	(0.180)
No Cultural-facility	-0.092	-1.255***	-0.109	-1.080***		-1.279***	-0.073	-1.342***
	(0.145)	(0.186)	(0.137)	(0.280)		(0.187)	(0.156)	(0.266)
Observations	2,255	2,255	2,255	2,255	2,255	2,255	2,255	2,255

Each model contains prefecture fixed effects. Cluster-robust (prefecture level) standard errors in parenthesis. *** p<0.01, ** p<0.05, * p<0.1.

vanishes.

Age

For ALP, age and its squared term did not have a significant effect on the participation probability in any model, but they had significant effects on participation frequency in models 2, 3, and 4, which can be confirmed as a U-shape. Many studies have demonstrated the U-shaped effect of age on cultural activities. Our estimation results provide supplementary findings that age can affect participation frequency only, and does not affect participation probability.

In the case of CAM, unlike the results of ALP and other existing studies, age and its squared term did not significantly affect either participation probability or frequency in any model. As with gender, these results reflect changes in the consumption style of all individuals. The validity of our interpretations should be verified using surveys conducted in different years.

City-Group

For the case of ALP, compared to the smallest city group "Very Small City" almost all City-Group dummies have a significant negative effect on participation probability. However, these dummies have a significant positive effect on participation frequency. These results represent that, other things being equal, individuals who live in large cities tend not to be "participants" in cultural activity, but once they do, they participate in cultural activities to a higher degree. This result could be explained as follows: individuals living in large cities have various consumption options, including cultural activities; therefore, the probability of choosing cultural activities relatively decreases. However, once they become "participants," there are significantly higher opportunities for cultural activities compared to small cities; therefore the participation frequency increases in large cities. This interpretation is consistent with the market structure of cultural activities, wherein a small number of enthusiastic people consume many cultural goods and services.

In the case of CAM, the City-Group dummies do not significantly affect participation probability but have a significant effect on frequency. The insignificant effect on participation probability could be explained by the "stay-at-home consumption," that is, the change in consumption style of cultural goods could affect all consumers, hence the difference between large and small cities. However, the significant positive effect of City-Group dummies on frequency indicates a possible disparity in cultural activities between large and small cities, even in the case of CAM, which does not require cultural facilities, unlike the case of ALP.

As represented by Agency for Cultural Affairs (2024), a positive correlation may exist between

ALP and CAM, indicating a complementary relationship. This could cause a situation wherein an increase in ALP in a large city could promote people's CAM activities; that is, people who attend a classical music concert also enjoy it again through a streaming service. This disparity of cultural participation frequency even in CAM, which has a relatively low entry cost, is a noteworthy finding.

Employment Status and Forms

The dummies for employment status and forms can be interpreted as proxies for (1) disposal time, (2) social status, and (3) other differences in employment forms. We used "Regular" as the reference category.

For ALP, no significant effect of employment status on participation probability and frequency could be confirmed, except for the weakly significant negative effect of "Homemaker" on the former in Models 2 and 4. Especially for participation frequency, the insignificant effect of employment status is consistent with the hypothesis that disposal time does not affect the frequency of cultural activities, as mentioned by Borowiecki and Prieto-Rodriguez (2015).

For CAM, except for the significant positive effect of "Temporary" on participation frequency in Models 1, 3, and 4, all the other dummies for employment had insignificant effects on participation probability and frequency. These results are similar to those obtained for ALP. However, note that all the significant effects of the employment dummies are on participation frequency. This result could suggest that, for the case of CAM, the hypothesis, disposal time could not have a significant effect on the frequency of cultural activity, could not be satisfied.

The dummies for employment status and forms are proxy variables and include not only disposal time, but also various other factors. A limitation of this study could be that the survey did not consider individual disposal times.

Income

We employed income class dummies and set "Income-more10" as the reference category. For ALP, in almost all models, the estimation results indicated that (1) the probability of participation for individuals with lower income decreases significantly, and (2) almost all income class have no significant effect on participation frequency. Especially for the participation probability of ALP, individuals with incomes lower than 4 million yen tend not to become "participants." This result is consistent with the findings of several previous studies. However, except for the "Income 1-2," all the dummies for income class had a significant effect on participation frequency. This result indicates that individuals with higher incomes tend to become "participants" in cultural activities,

however, the frequency of their cultural activities does not depend on their income, which is highly related to budget constraints. This finding provides an important perspective for policymakers when considering efficient cultural promotion policies.

For CAM, the participation probability decreased in the lower-income groups in all models. In Model 2, the participation frequency tended to increase among the lower-income groups. This result in the CAM can be interpreted as follows: individuals with higher incomes have higher cultural capital and, therefore, they tend to become "participants." However, once they become "participants," the frequency of cultural activities depends on their budget and time constraints, and other factors. Compared with ALP, CAM is less costly, in terms of money, time and other factors. Therefore, the "participants" with lower income tend to choose such a casual consumption style.

While many existing studies highlight the importance of income, more attention should be paid to the fact that the effects of income may differ depending on the consumption style of cultural goods and services.

Educational Background

We used "Bachelor" as a reference category of educational dummies. For ALP, except for the weakly significant negative effect of "High School" and "Associate Degree" and positive effect of "Master/Doctor" on participation probability in Model 1 and the significant negative effect of "High School" on participation frequency in Model 3, no significant effect of educational dummies was observed. These results indicate that there is little to no disparity in cultural activities across educational backgrounds in Japan.

The same results were obtained for CAM. No significant effects of educational dummies were observed on participation probability. Additionally, "Master/Doctor" exerted significant positive effects on participation frequency in Models 1, 3 and 4.

These results are not consistent with the theory in cultural economics and existing empirical studies. Educational background is usually utilized as the proxy variable of cultural capital, and therefore, it affects the consumption of cultural goods and services. However, our estimation results indicate that educational background has a limited effect on cultural consumption. Especially in the participation decision, no educational dummies have a significant effect in all models.

One possible reason for this is the enrichment of cultural education programs in compulsory education in Japan. Such educational programs might increase all individuals' cultural capital, filling the gap in the attitude toward cultural activities among different educational backgrounds. The other possible reason is the effects of COVID-19 on consumption styles, explained above. In

the sampling period, consumers were forced to stay-at-home consumption and this compulsion highly affected consumer's participation decision.

It is noteworthy that the effect of educational background on cultural participation was revealed. These results are meaningful for policymakers when considering cultural policies and education. However, the effects of educational dummies differed from those reported in many existing studies. Therefore, we must carefully verify the factors that may cause this difference.

Cultural Activities in Childhood

We employed four "cultural activities in childhood" dummies: "Music Instruments," "Sado/Kado/Japanese Calligraphy," "Tutoring school/Abacus," and "Sports." These activities are popular in Japan, and many Japanese people have experienced at least one of them. Each dummy variable takes the value of 1 if the individual has experienced the corresponding cultural activity in childhood. These dummies include the positive effects of (1) education and (2) parents' income on cultural capital. The effect of (2) was controlled through income dummies to avoid correlation between individuals' and their parents' income. Therefore, we interpreted that dummies for cultural activities measured the effect of education on cultural capital in our model.

For the case of ALP, apart from the positive significant effects of "Sado/Kado/Japanese Calligraphy" in all Models and "Tutoring school/Abacus" in Model 1 and 4, there was no significant effect of other dummies on participation probability. Moreover, none of the cultural activities in the childhood dummies had a significant effect on participation frequency. For the case of CAM, all the dummies, except for "Music Instruments," had a significant effect on participation probability, while none had a significant effect on the frequency.

After controlling for the effect of income, the experience of "Music Instruments" in childhood did not have a statistically significant effect on cultural activities. This may indicate that such cultural activities during childhood do not sufficiently contribute to cultural capital. The experience of "Sado/Kado/Japanese Calligraphy," "Tutoring school/Abacus," and "Sports" in childhood might contribute to accumulation of cultural capital. However, not all cultural activities during childhood have a significant effect on the frequency of cultural activities. This indicates that the educational effect of cultural experiences is limited, and policymakers should not place too much confidence in such activities.

Our results demonstrated the relationship between cultural experiences in childhood and cultural activities in adulthood. In both ALP and CAM, cultural experiences in childhood tend to have significant effects on participation probability, but not on frequency. This result implies that cultural policies enhancing opportunities of cultural activities for children might increase the number of "participants," but do not affect the total number of cultural activities.

Cultural Facility

For both ALP and CAM, the lack of cultural facilities in living areas had significant negative effects on the participation probability in all models, but not on frequency. It seems obvious that the lack of cultural facilities decreases the number of "participants" for ALP because its consumption style requires physical cultural facilities (e.g., museum, theatre, musical hall, etc.). However, we could also confirm the surprising result that the lack of cultural facilities could also decrease the number of "participants" for CAM, which does not require physical cultural facilities. This result implies that cultural facilities can accumulate the cultural capital of people living nearby but do not affect participation frequency. One possible reason is that the frequency of cultural activities might depend highly on an individual's preferences, budget constraints, and the amount of disposal time. Therefore, the existence of cultural facilities that are highly related to geographical constraints does not determine the frequency of cultural activities.

In the context of cultural policy, the expansion of cultural facilities might increase the number of new "participants," however, the cost-effectiveness is unclear or low if policymakers set the goal of cultural policy to increase the frequency of cultural activities. We could confirm the consistent positive effect of cultural facilities on the participation probability of both ALP and CAM in all models. This is a noteworthy finding, and we hope that this result provides an important perspective on cultural policymaking. Future research should conduct a detailed analysis of the relationship between cultural facilities and cultural participation.

5. Conclusion

This study analyzed the effects of socioeconomic status on participation in cultural activities. We employed the ZIOP model to address excess zero problems. The model consists of two parts: one explains participation probability, and the other explains participation frequency. The unique aspect of our study was to distinguish the mode of cultural activities between ALP and CAM and conduct separate regression analyses.

The estimation results showed that income and educational background, which appear in many existing studies, tend to have a significant effect on participation probability, but not on participation frequency.

The experiences of cultural activities in childhood have no significant effect on participation frequency, but "Sado/Kado/Japanese Calligraphy" and "Tutoring school/Abacus" have a positive effect on participation probability of ALP, while "Sado/Kado/Japanese Calligraphy," "Tutoring school/Abacus," and "Sports" positively affect participation probability of CAM.

Cultural facilities had a significant positive effect on participation probability in all models but not on frequency. Although a detailed analysis of the role of cultural facilities in cultural consumption is required, our results shed light on their importance.

While many independent variables have significant effects on participation probability, few variables, e.g., "City Group," significantly affect participation frequency. Our results are consistent with many existing studies, but we found that many socioeconomic factors that are considered important in cultural participation might affect only the number of "participants" in cultural activities. We could not ascertain what socioeconomic factors determine the frequency of cultural activities. In the context of cultural policymaking, these factors could increase the number of new participants in cultural activities but may not contribute to promoting the total frequency of cultural activities.

An important contribution of our study is that it employs the ZIOP model and confirms the effect of socioeconomic factors on participation probability and frequency separately. Moreover, our data distinguished cultural activities based on direct and indirect modes of participation.

This may be useful for discussing the efficiency of cultural policies. For example, our results indicate the type of program that might be effective in increasing the number of participants.

These data may have been affected by the special circumstances of the COVID-19 pandemic. Therefore, it is necessary to carefully verify whether the results of this study can be generalized and continue to analyze the data in the same manner in the following years. Further, the results indicate that individuals' time constraints might play an important role in determining cultural participation, especially in terms of frequency.

In future research, data on individuals' disposal times should be collected and the effect on cultural participation must be confirmed.

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