Estimating the Relationship Between Cultural Trade and Cultural GDP in Japan*

Haruka YANE ※

ABSTRACT

The main aim of this study is to examine the relationship between Japan's cultural trade and cultural GDP. Cultural trade is measured in three ways: as a sum of cultural imports and exports, as cultural exports and as cultural imports. Using annual data from 2015 to 2019, estimation results from a panel vector autoregression (VAR) model suggests that the relationship between cultural trade and cultural GDP may be consistent with the growth-driven exports hypothesis rather than the export-led growth hypothesis. A panel Granger causality test and a system generalized method of moments (GMM) estimation are also utilized in this study.

JEL: F63; O53; Z11

KEYWORDS: Cultural exports; cultural imports; cultural GDP

※ Associate Professor, College of International Relations, Ritsumeikan University

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Measurements of Japan's cultural exports, cultural imports and cultural GDP are part of the research project led by Japan's Agency for Cultural Affairs to quantitively evaluate the economic and social impacts of arts and culture; and conducted by committee consisting of Communication Design Institute (CDI), Professor Kiyoshi Fujikawa (Aichi Gakuin University), Professor Tadashi Yagi (Doshisha University) and myself.

1. INTRODUCTION

The production and consumption of cultural goods and services are a source of creative skills with strong backward and forward linkages in the economy, and often help push growth in sectors such as tourism. The impacts they have are not only economic but also social, "from supporting health and well-being, to promoting social inclusion and local social capital" (OECD, 2021). However, the absence of statistics, let alone those that can be compared internationally among countries, indicate that their full economic and social impacts remain greatly undervalued in the policy debate.

As part of a project led by Japan's Agency for Cultural Affairs, we have calculated Japan's cultural exports, imports and gross domestic product (GDP). The Japanese government has specifically set its key performance indicator (KPI) "to expand the cultural GDP to 18 trillion yen by 2025 (about 3% of GDP)" (Cabinet Secretariat, 2018). In September 2015, Japan's former prime minister Abe announced that the government's economic goal is to boost its GDP to 600 trillion yen by 2020.[1] The (in)feasibility of the numerical figures aside, the crucial question remains: How do we boost cultural GDP?

One way GDP is calculated is by (more or less) summing up household spending (consumption), business expenditures (investment), spending by governments (government purchases) and net exports (exports minus imports). Also known as the expenditure approach, these components make up the national income identity. According to this identity, increasing net exports generates greater economic growth. This is called the export-led growth hypothesis. An increase in a country's exports means that there is an increase in demand for this country's goods and services, thereby increasing its GDP.

The aim of this paper is thus to uncover whether this relationship is also applicable to cultural GDP and exports. To do so, this study applies a panel vector autoregression (VAR) model in a generalized method of moments (GMM) framework. Impulse response functions (IRF) and forecast error variance decomposition (FEVD) reveal that the relationship between cultural trade and cultural GDP may be consistent with the growth-driven exports hypothesis rather than the export-led growth hypothesis.

The remainder of this paper is organized as follows. Section 2 gives a brief overview of the development in culture, international trade and economic growth

1. The Government of Japan, *Abenomics* (https://www.japan.go.jp/abenomics/index.html).

literature. Section 3 will then explain the data and methodology. Estimation results are discussed in Section 4. Section 5 concludes.

2. LITERATURE REVIEW

This section will first briefly review past work on international trade and economic growth. There are four theories: 1) export-led growth hypothesis, 2) growth-driven exports hypothesis, 3) import-led growth hypothesis and 4) growth-driven imports hypothesis. The first hypothesis is probably the most intuitive due to the national income identity. Reviewing more than 150 articles published until the end of the 1990s, Giles and Williams (2000) found that early cross-sectional studies generally supported the growth-led exports hypothesis, but support was not so strong in time series and panel data studies. Dreger and Herzer (2013) applied panel cointegration techniques to a production function with non-export GDP as the dependent variable, and showed that although exports have a positive short-run effect on non-export GDP and vice versa, the long-run effect of exports on non-export output is negative on average.

The logic of the second hypothesis is that growth of an economy generates increased exports. Greater economic growth brings more investment in infrastructure and technology that should have a positive effect on the country's productivity, allowing it to increase its exports. Konya (2004) tested for Granger causality between the logarithms of real exports and real GDP in 25 OECD countries and found evidence of growth causing exports in Canada, Japan and Korea, and a two-way causality between exports and growth in Sweden and the UK.

The third theory supports the idea that imports generate greater capacity for a country to increase its production. In particular, for emerging countries that are not known for producing technology, imports of technology may be fundamental to increased productivity and thus GDP (Grossman and Helpman, 1991). There is also the possibility of the fourth theory, where an increase in GDP may stimulate imports through consumption (Chang, Simo-Kengne and Gupta, 2014). In a study of Latin American countries, Kristjanpoller and Olson (2014)'s support for the hypotheses varies depending on the country.

Other studies have examined the role of cultural or creative industries in the process of economic development. Potts (2009) found that creative industries play a key role in the innovation process by encouraging the demand for new goods and services, the technological advancement for interactions between producers and consumers, and the institutional incorporation of new technologies. Using per

capita GDP and expenditure levels of arts and culture production by not-for-profit organizations in US metropolitan areas, Pedroni and Sheppard (2013) investigated the effects of arts and culture production on economic growth. Their analysis suggests that a positive shock to local arts and culture production leads to a permanent increase in the area's GDP per capita. Incorporating mechanisms such as cost discovery and knowledge externality in their model, Hausmann, Hwang and Rodrik (2007) showed that exporting goods of higher productivity, or sophistication, lead to higher economic growth.

If cultural goods and services are subject to economies of scale, exporting them can increase their output and reduce their unit costs, stimulating economic growth according to the first hypothesis. As an economy grows, its exports of cultural goods and services may also increase as suggested in the second hypothesis. According to the third hypothesis, imports of cultural goods and services could facilitate innovation and thus economic growth. Finally, the fourth hypothesis suggests that cultural goods and services are luxury consumer goods that should be in greater demand with economic growth.

Constructing an aggregate production function, Scavia et al. (2021) addresses the relationship between international trade in cultural goods and economic growth for 31 countries in Europe for the period 2004–2017, through a vector error correction model (VECM). Their results indicate that there is a long-run equilibrium relationship between GDP, total exports, capital formation and labor force. Cultural exports and imports have a positive effect on GDP in the long run. In the short run, there is Granger causality of cultural imports on economic growth, total exports, total imports and capital formation.

3. DATA AND METHODOLOGY

The data used in this study is collected from CDI (2023), which was constructed by the committee formed by Japan's Agency for Cultural Affairs. The methodology used to calculate these statistics are detailed in CDI (2023). In short, we mainly apply the 2009 UNESCO Framework for Cultural Statistics (UIS, 2009) and an updated auxiliary guideline regarding cultural services (UIS, 2016) to available Japanese statistics. The period is from 2015 to 2019. The seven domains used are listed in Table 1.

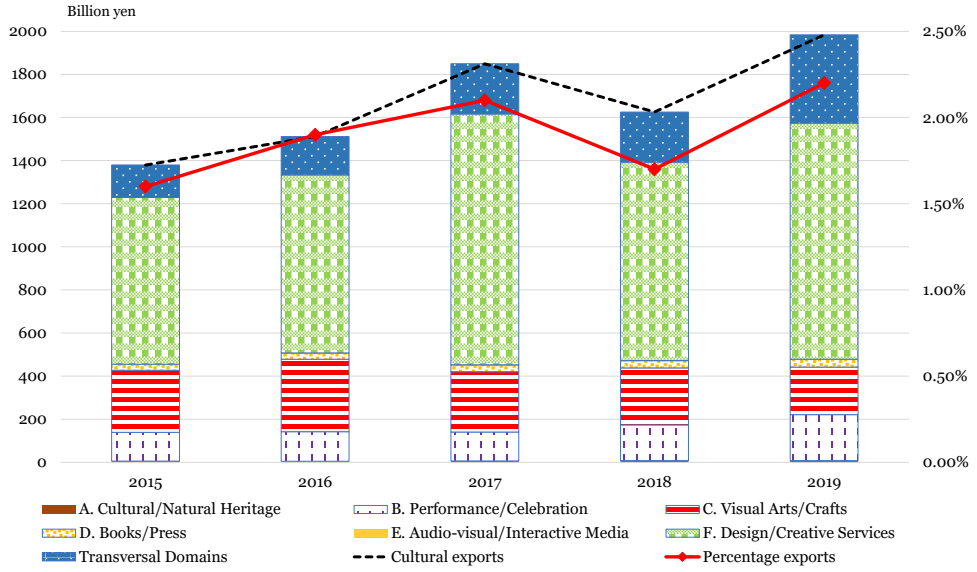
Table 1: List of Domains

Domain Name
A. Cultural/Natural Heritage
B. Performance/Celebration
C. Visual Arts/Crafts
D. Books/Press
E. Audio-visual/Interactive Media
F. Design/Creative Services
Transversal Domains

Source: CDI (2023)

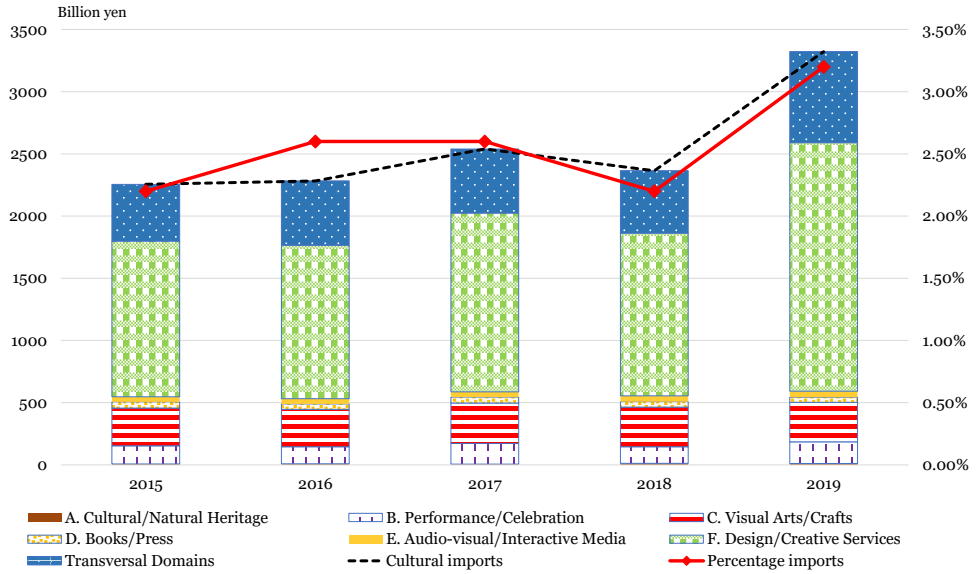
Figure 1 shows cultural exports by domain as well as its share in total exports as a percentage on the secondary axis. The trends in cultural imports are depicted in Figure 2. We can see that cultural imports exceed cultural exports, and the cultural trade deficit has increased. For both cultural exports and imports, design and creative services play a prominent role, followed by transversal domains. Transversal domains also include domains A to F and cannot be further disaggregated; for example, copyright-related services is a big contributor in this category.

Figure 1: Japan's Cultural Exports



Sources: Japan Agency for Cultural Affairs and Input-Output Tables of Japan

Figure 2: Japan's Cultural Imports



Sources: Japan Agency for Cultural Affairs and Input-Output Tables of Japan

This study follows the Toda and Yamamoto (1995) procedure to test for Granger causality between cultural trade and cultural GDP *(lnCGDP)*. Specifically, three models are analyzed. Model 1 analyzes the effects of trade in general, using the sum of cultural imports and exports *(lnCT)* as the trade variable. Model 2 analyzes the effects of exports of cultural goods and services *(lnCX)*, while Model 3 uses imports of cultural goods and services *(lnCM)* for the trade variable.

In the case of two time-series variables, X (e.g., cultural trade) and Y (e.g., cultural GDP), X is said to Granger-cause Y if Y can be better predicted using the histories of both X and Y than it can by using the history of Y alone. We consider a k-variate homogeneous panel VAR of order p with panel-specific fixed effects represented by the following system of linear equations:

$$Z_{it} = \Phi_0 + \Phi_1 Z_{it\text{-}1} + \Phi_2 Z_{it\text{-}2} + \cdots + \Phi_{p\text{-}1} Z_{it\text{-}p+1} + \Phi_p Z_{it\text{-}p} + u_i + \varepsilon_{it} \quad (1)$$

where $Z_{it} = (X_{it}, Y_{it})$ is a $(1 \times k)$ vector of dependent variables; u_i and $\varepsilon_{\mathrm{it}}$ are $(1 \times k)$ vectors of dependent variable-specific panel fixed-effects and white noise errors, respectively; $i \in \{1, 2, \ldots, N\}$; and $t \in \{1, 2, \ldots, T_t\}$. The $(k \times k)$ matrices Φ_1, Φ_2, …, $\Phi_{p\text{-}1}$, Φ_p are parameters to be estimated. We assume $E[\varepsilon_{it}] = 0$; $\mathrm{E}[\varepsilon'_{it}\varepsilon_{it}] = \Sigma$; and $\mathrm{E}[\varepsilon'_{it}\varepsilon_{is}] = 0$ for all $t > s$.

In the first step, the Augmented Dickey Fuller (ADF) test is conducted to examine the possibility of a unit-root among these variables, and the results of the unit-root test are presented in Table 2. We cannot reject the null hypothesis that any of the variables exhibit a unit root, even at the 10% significance level.

Table 2: Results of the ADF Unit-root Tests

Variable	Modified Inverse Chi-squared
lnCGDP	-2.6458
lnCT	-2.8284
lnCX	-2.8284
lnCM	-2.8284

Notes: ***, ** and * indicate rejection of the null hypothesis at significance levels of 1%, 5% and 10%, respectively.

4. ESTIMATION RESULTS

The results of GMM estimations are presented in Table 3. It fails to reject the null hypothesis of non-causality in all estimations. Next, FEVDs are estimated. Table 4 shows the results for Models 1-3. Based on the FEVD estimates for Model 1, we see that as much as 99.6% of variation in cultural trade can be explained by cultural GDP. On the other hand, cultural trade explains merely 0.3% of variation in cultural GDP. In Model 2, as much as 99.4% of variation in cultural exports can be explained by cultural GDP, whereas cultural exports account for only 0.6% of variation in cultural GDP. Estimation results for Model 3 with cultural imports are very similar to those for Model 1 with cultural trade.

Table 3: Granger Causality Test Results based on GMM Estimations

	lnCGDP Granger causes lnCT/lnCX/lnCM	lnCT Granger causes lnCGDP	lnCX Granger causes lnCGDP	lnCM Granger causes lnCGDP
Model 1	3.784116	0.0128695		
Model 2	0.4837715		-0.0745192	
Model 3	6.689973			0.0437712

Notes: ***, ** and * indicate rejection of the null hypothesis at significance levels of 1%, 5% and 10%, respectively.

Table 4: Forecast Error Variance Decompositions (FEVD) Results

Response variable and Forecast horizon	Impulse variable	
	lnCGDP	**lnCT**
lnCGDP		
0	0	0
1	1	0
2	0.9997952	0.0002048
3	0.999376	0.000624
4	0.9988869	0.0011131
5	0.9984335	0.0015665
6	0.9980628	0.0019372
7	0.9977813	0.0022187
8	0.9975768	0.0024232
9	0.9974325	0.0025675
10	0.9973324	0.0026676
lnCT		
0	0	0
1	0.2542426	0.7457575
2	0.6841084	0.3158916
3	0.8749754	0.1250245
4	0.945127	0.054873
5	0.9726523	0.0273477
6	0.9845698	0.0154302
7	0.9902182	0.0097818
8	0.9931116	0.0068884
9	0.9946935	0.0053065
10	0.9956055	0.0043945

Response variable and Forecast horizon	Impulse variable	
	lnCGDP	**lnCX**
lnCGDP		
0	0	0
1	1	0
2	0.9982642	0.0017358
3	0.996259	0.003741
4	0.9950045	0.0049956
5	0.9943652	0.0056348
6	0.9940667	0.0059333
7	0.9939327	0.0060673
8	0.9938736	0.0061265
9	0.9938477	0.0061523
10	0.9938365	0.0061636
lnCX		
0	0	0
1	0.0256562	0.9743437
2	0.1061543	0.8938457
3	0.3628929	0.6371071
4	0.7480578	0.2519422
5	0.9467484	0.0532516
6	0.9919072	0.0080928
7	0.99703	0.00297
8	0.9960322	0.0039677
9	0.9949461	0.005054
10	0.9943449	0.0056551

Response variable and Forecast Horizon	Impulse variable	
	lnCGDP	**lnCM**
lnCGDP		
0	0	0
1	1	0
2	0.9997952	0.0002048
3	0.999376	0.000624
4	0.9988869	0.0011131
5	0.9984335	0.0015665
6	0.9980628	0.0019372
7	0.9977813	0.0022187
8	0.9975768	0.0024232
9	0.9974325	0.0025675
10	0.9973324	0.0026676
lnCM		
0	0	0
1	0.2542426	0.7457575
2	0.6841084	0.3158916
3	0.8749754	0.1250245
4	0.945127	0.054873
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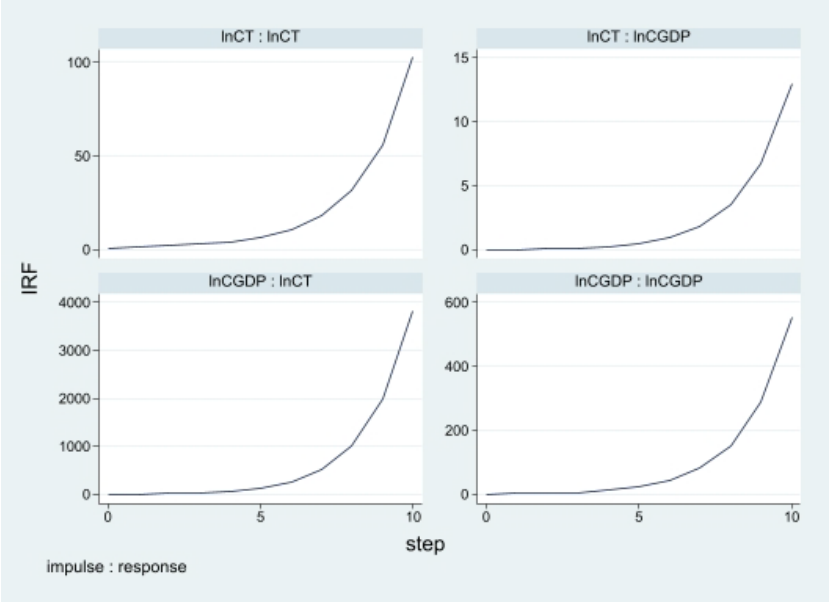
Source: Author's calculations

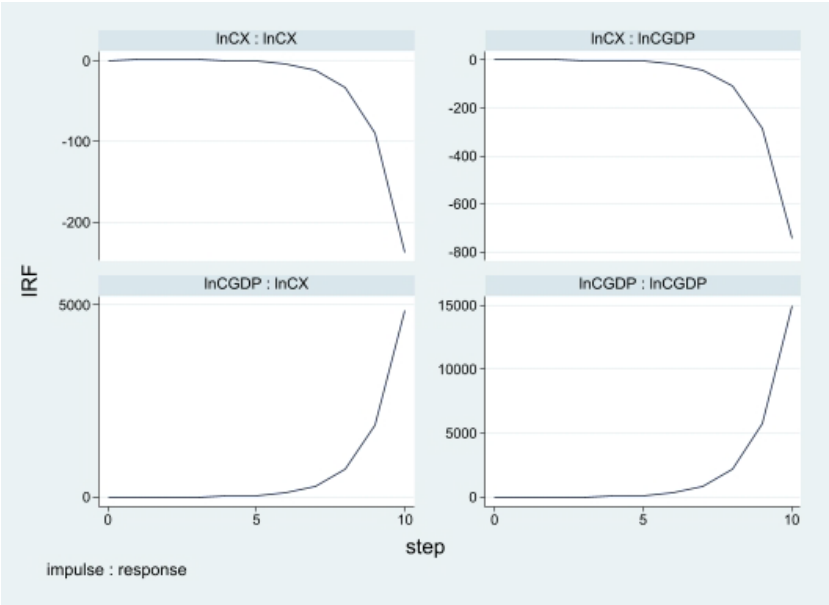
The visualizations of impulse responses are presented as Figures 3, 4 and 5, depicting the relationship between cultural GDP and cultural trade, exports and imports, respectively. The IRF plots for cultural GDP with cultural trade and cultural imports in Figures 3 and 5 show that a positive shock on these cultural trade variables leads to increased cultural GDP. The effect of a current shock on cultural GDP also has a persistent and positive impact on future trade and imports of cultural goods and services. From Figure 4, we can also see there is a spike in cultural exports when cultural GDP increases. Figure 4 also reveals that a positive shock to cultural exports leads to decreased cultural GDP.

Figure 3: Impulse Response Functions for Cultural GDP and Cultural Trade



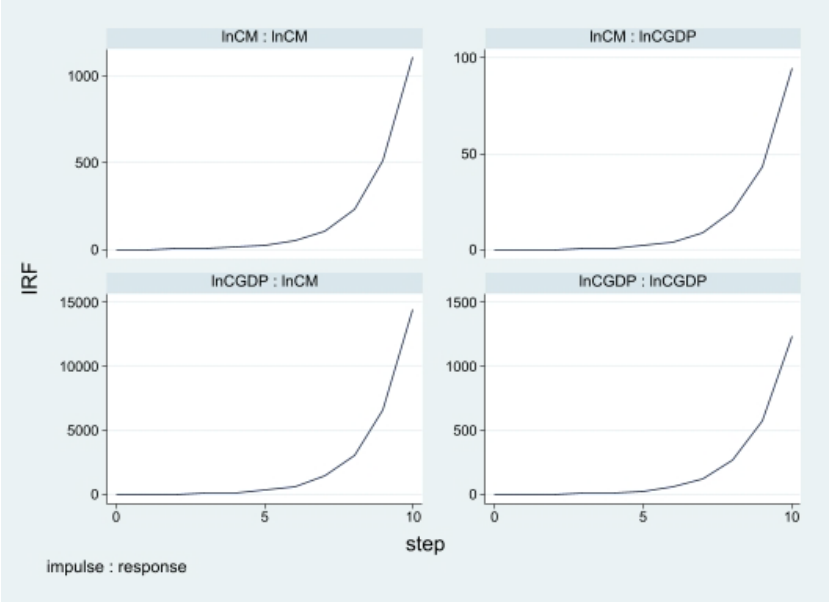
Source: Author's calculations

Figure 4: Impulse Response Functions for Cultural GDP and Cultural Exports



Source: Author's calculations

Figure 5: Impulse Response Functions for Cultural GDP and Cultural Imports



Source: Author's calculations

5. CONCLUSION

The purpose of this study is to examine causality between Japan's cultural trade and cultural GDP. Cultural trade is measured in three ways: as a sum of cultural imports and exports, as cultural exports and as cultural imports. Estimation results from a panel VAR model suggests that the relationship between cultural trade and cultural GDP may be consistent with the growth-driven exports hypothesis rather than the export-led growth hypothesis.

An important caveat of this study is the small number of observations, as data is only available for five years from 2015 to 2019. We will need to collect and calculate more observations in order to attain more statistically sound results. Nonetheless, this study attempts to investigate how Japan can attain its goals of increasing cultural GDP, and whether increasing net cultural exports will contribute, and if so, by how much. The current results, however, suggest that increasing cultural GDP will increase cultural exports. Therefore, we need to continue delving into the optimal and effective measures to increase cultural GDP.

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