Article

Study of the Relationship between Government Expenditure and Economic Growth for China and Korea

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Abstract: On October 18, 2017, Chinese President Xi Jinping presented the blueprint for building a modernized socialist nation through the realization of the Xiao Kang (Every nation enjoys a peaceful and affluent life, it is meaningless to eliminate the poor) social construction at the 19th Congress of China. Subsequent to the 2008 financial crisis, the world has moved on to the new economic status of the New Normal. China has also entered the era of "Xinchang Thai," which is moving from the high-growth to the moderate-growth phase. Therefore, the government of China emphasizes privatization, liberalization, and deregulation. China is also influenced by government policies due to the nature of socialism. This study confirms China's current stage of economic development based on Barro's theory. Thus, we use a quantile regression model and examine the correlation between economic growth and functional classification of government expenditure during Xi Jinping's term of office. Furthermore, we selected Korea as a comparative country as the two countries have common features.

Keywords: XinChang Thai, Quantile regression, Functional classification of government expenditure, Xiao Kang

1. Introduction

This study analyzes the effect of functional classification of government expenditure (FCOGE) on the economic growth of China and Korea using the quantile regression (QR) model. An economic system is a series of systems that produce and distribute economic resources under the interactive control of the society's members. As such, the process of solving an economic problem includes a variety of laws, instruments, and social values that define who makes the decisions related to the choice and how they should be made. In other words, an economic system is a systematic device for the distribution of scarce resources.

An economic system is determined differently depending on the history, culture, interconnection of participants in economic activities, and government planning. Therefore, the economic system cannot be merely identified as a market economy and a planned economy. Such as the U.S. the UK, and Japan, which are market economies, are not completely free from the influence of government planning. On the contrary, Russia and China, which are planned economies, introduce many elements of the market economy.

Since 1986, China has established early socialism theories and routes under the leadership of Deng Xiaoping, which gradually began to blend the planned economy with the market economy based on socialism. Since the 2008 financial crisis, China's economic growth rate has shown an unprecedented

case from the average 10% in the mid-2000s to 6.8% in 2016. However, China has also faced the global trend of low growth and aging. Thus, it entered the Xinchang Tai, unlike the trend of the New Normal. As a temporary measure, the Chinese government is continuing to emphasize openness, privatization, and deregulation. As such, the adjustment of the government is becoming increasingly important. The theory of Barro [2] states that when the main agent of economic activity accumulates real capital, the government puts this into the production process and prevents the marginal productivity of private capital from falling. If government expenditure increases private productivity, one can expect continued economic growth. In addition, before government expenditure reaches a steady state, it has a positive and maximized effect on growth. If the proportion of government expenditure increases over the steady state, then the economic growth rate will decrease due to the crowding-out effect. Based on this, the correlation between government expenditure and economic growth can be confirmed through the two countries. There may be conflicting results due to differences in a system between capitalism and socialism. China is forced to follow the government-led process of economic development as it has the characteristic of a socialist country. It is similar to the development of the Korean economy in the 1960s, which was strongly controlled in terms of the industry, policies, and education. The economic growth process in Korea is easier to compare with China as it has the following differences from the countries of other capitalist market economic systems.

First, both the countries go through a government-led process of economic development. The central government transferred the right of management of state-owned enterprises to the local government in 1978. This action contributed to the improvement of productivity. The average annual economic growth rate was 9.6% from 1978 to 1984.

Korea also promoted rural modernization through the new village movement. It pursued strategies to promote large corporations based on the trickle-down effect. In addition, if Korea is divided based on the "Varieties of Capitalism (VoC) theory," which distinguishes the capitalism of Hall and Soskice [9]. The theory of Hall and Soskice [9] divided the capitalist economic system into three parts, based on the principle of institutional complementation. First, a Liberal Market Economy (LME) has fair competition, contracts, and hierarchical order. Second, the Coordinated Market Economy (CME) is a strategic collaboration on the basis of an agreement. Unlike LME, it considers a firm as a compromise between the management and workforce. Third, the Mediterranean Market Economy (MME) is characterized by a large proportion of agriculture in the whole industry and a strong government intervention through fiscal and monetary policies. For example, France, Italy, and Spain. So, Korea is classified as a Mediterranean Market Economy(MME). The MME characteristics in Korea are suitable as a country of comparison as it shares the same trend with China, which has undergone a government-led economic development process.

Second, they pursued export-oriented growth strategies. One of the main characteristics of China is the shift from closed economy to open economy [14]. China designated Shenzhen, Zhuhai, Shantou, and Xiamen as export-oriented special economic zones in 1980. Subsequent to joining the World Trade Organization in 2001, China's export ratio to gross domestic product (GDP) increased from 21% to 37% in 2006.

Also in the initial stage of economic development, the key industry of Korea switched to the heavy chemical industry from the light industry [22]. Gradually, Korea was aiming at export-oriented industrialization. In addition, since 1960, despite the increased intensity of government intervention, it has been effective in economic growth [15]. It is also meaningful to compare the differences between the two countries Both countries have experienced growth through openness, and the role of government has been relatively important. Cultural characteristics are similar because of the same East Asian culture.

Considering the above reasons, we can observe study results through QR. First, we will examine the correlation between FCOGE and economic growth in China and Korea. Second, we can confirm the state of economic development in China and Korea. In general, there is a shortage of basic capital goods in developing countries. In that sense, an increase in government expenditure has a positive impact on growth. However, the increase in government spending has limited effect on economic growth in developing countries which already have sufficient capital goods. The composition of this study is as

follows. In Chapter 2, prior studies are classified into three to review the theoretical backgrounds on government expenditure and economic growth. Chapter 3 describes the model and data. In Chapter 4, an empirical result on China and Korea is provided and analysed through a comparison between the two countries. Finally, Chapter 5 describes conclusion of the study.

2. Literature Review

There are three main types of advanced research on government expenditure and economic growth. First, there are studies on the direction of government expenditure and economic growth by the theory of Wagner [21] and Keynes [12]. The theory of Keynes is as follows: an increase in government expenditure will affect the aggregate demand and supply, which then leads to an increase in the national income. On the other hand, Wagner states that the national income increases as a country's economy grows and then government expenditure increases. In other words, Keynes argues that government expenditure is a leading indicator, and Wagner argues that economic growth is a leading indicator. Loizides and Vamvoukas [16] studies the impact of government spending on economic growth in the UK, Greece, and Ireland using error correction model and trivariate causality testing. As a result, public expenditure in all countries increases economic growth in the long-term. In addition, Wagner's law were valid in Greece and Britain. However, they is not valid in Ireland. Ono [18] use the autoregressive distribution lag test to confirm the threshold co-integration relationship between Japanese government spending and economic growth. He finds that as an economy grows, the share of public expenditure in the GDP tends to increase. It also appears that the long-term equilibrium is asymmetrical. Simultaneously, Wagner's laws are valid. Kolluri et al. [13] use the error correction model for G7 countries from 1960 to 1993 and confirm a long-term equilibrium between economic growth and government expenditure. Further, they have shown that Wagner's law is valid.

Second, there are studies on the correlation between government expenditure and economic growth. Overall, advanced research has shown that the relationship between government expenditure and economic growth has a positive relationship. Saez et al. [20] use panel regression analysis to study the direction of the impact of government size on economic growth for EU countries for the period 1994–2012. As a result of estimating the order of the general government expenditure scale, a positive relationship is confirmed in Portugal and the UK. Austria, Finland, Italy, and Sweden, Belgium, France, Greece, Ireland, Luxembourg, Netherlands, and Spain have a negative relationship. the panel regression analysis of OECD countries that shows a negative relationship. It is revealed that the impact of government expenditure on economic growth can vary depending on the size of the public sector. Hwang. and Lee. [11] use a pooled ordinary least squares (OLS), fixed effect, and random effect models to study the size and volatility of the Korean government's expenditure to influence economic growth. There exists a significant negative relationship between government expenditure size and economic growth, while the impact of government expenditure size on economic fluctuation is statistically insignificant. In addition, they confirmed that government expenditure volatility plays a significant role in increasing economic fluctuation. Fölster and Henrekson [8] use the extreme bounds analysis to find the correlation between government expenditure and growth. The research object is OECD's 23 high-income countries and the period is from 1970 to 1995. When 10% government expenditure (including tax) increases in high-income countries, economic growth falls by 0.7–0.8%. However including low-income countries, the relationship is negative.

The third type is studies on the correlation between FCOGE and economic growth. Research shows that investment expenditure, such as economy, social security, and education have positive effects, while consumer expenditure has negative effects. Piabuo [19] compare five African countries (Botswana, Rwanda, Zambia, Madagascar, Togo) that allocated more than 15% of government expenditure on health spending and the eight Central African Economic and Monetary Community (CEMAC: Cameroon, Equatorial Guinea, Garbon, Chad, Central African Republic, Democratic republic of Congo) countries, which did not. They used Granger causality and panel data co-integration analysis. Studies show that those living in the five countries mentioned above, have a longer lifespan than those living in the CEMAC region. Thus, the recent rapid decline in mortality rates can be explained by the increase in health expenditure. Dao [6] analyse the effects of per capita public spending on economic

149 growth, health, and education in 28 developing countries. The ratio of gross physical capital formation
150 in GDP has a positive effect on economic growth. In addition, he claims that developing countries can
151 grow more rapidly if the government increases their spending on health care and education. Dinca et
152 al. [7] analysed the relationship between economic growth and public spending in 10 countries in
153 Eastern Europe using linear multi-regressive analysis with fixed effects and dummy time variables.
154 There is a positive correlation between government expenditure in education, national defense, public
155 order, and safety, and economic growth. However, general public service expenditure and national
156 defense expenditure have a negative relationship with economic growth.

3. Model and Data

158 QR, as introduced by Koenker and Bassett [3,4], has increasingly been a very important empirical
159 tool and very popular in applied econometrics. Moreover, QR is viewed as an extension of classical OLS
160 of the conditional mean specification. A significant difference between the OLS and QR is merely that
161 the OLS is an estimation based on the conditional mean specification and QR is an estimation based on
162 the conditional median specification.

163 In general, any real-valued random variable, Y, may be characterized by

$$F(y) = \Pr(Y \le y) \tag{1}$$

164 Thus, for any $0 < \tau < 1$, the conditional τ^{th} quantile function of Y may be defined as the smallest
165 y satisfying $F_y(y|X) \ge \tau$

$$Q_\tau(Y|X) = \inf(y : F_y(y|X) \ge \tau) \tag{2}$$

166 where $F_y(Y|X)$ is the conditional distribution function for a random variable Y condition on X, τ
167 is the τ th quantile of a random variable Y. Thus, the quantile function provides a complete
168 characterization of the random variable, Y. Moreover, the quantile function can also be defined as the
169 solution to the following minimization problem.

$$Q_\tau(\xi, Y, X) = Q_\tau(Y|X)$$

$$= argmin \frac{1}{n} \{ \sum_{i:Y_i > X_i\xi} \tau|Y_i - X_i\xi| + \sum_{i:Y_i < X_i\xi} (1-\tau)|Y_i - X_i\xi| \}$$

$$= argmin \frac{1}{n} \{ \sum_{i:Y_i > X_i\xi} \tau|Y_i - X_i\xi| + \sum_{i:Y_i < X_i\xi} (1-\tau)|Y_i - X_i\xi| \} \tag{3}$$

$$= argmin E[\rho_t(Y - X_i\xi)]$$

$$= argmin \frac{1}{n} \sum_{i:Y_i \ge X_i\xi} \rho_\tau(u_{\tau i})$$

170 where $\rho_\tau(u) = u(\tau - 1(u \le 0))$ is a linear check function and $u_{\tau i}$ is the residual for observation
171 "i" and quantile τ. A check function $(\rho_\tau(u))$ indicates the minimization problem. Thus, if
172 $u > 0$, then the check function provides τ_u, which is merely $\tau|Y_i - X_i\xi|$ due to positive residual,
173 and if $u < 0$, then the check function provides $(1 - \tau)(-u) = (\tau - 1)u$ due to negative residual. We
174 consider a simple case $\tau = 0.5$, which is a median regression. The optimization problem becomes

$$argmin \frac{1}{n} \{ \sum_i |Y_i - X_i\xi| \} = argmin E(Y - X_i\xi) \tag{4}$$

175 A median regression is a useful alternative to least squares where the error distribution follows a
176 normal distribution, but outliers in the data are a problem (Koenker and Hallock, 2001).

177 A linear specification for the conditional quantile of a $n \times 1$ vector of dependent variable Y is

$$Q(\tau|X_i, \xi(\tau)) = X_i'\xi(\tau) \tag{5}$$

178 where X_i' is the $n \times k$ vector of independent variables, $\xi(\tau)$ is the $k \times 1$ vector of the coefficient
179 associated with the τth quantile. In addition, the $k \times 1$ vector conditional QR estimator or least
180 absolute deviation is

$$\widehat{\xi_n}(\tau) = argmin[\sum_i \rho_\tau(Y_i - X_i'\xi(\tau))] \tag{6}$$

181   The QR provides estimates of the relationship between the $n \times k$ vector of independent variables
182   X and a $n \times 1$ vector of specified quantile of dependent variable Y. As the QR does not require strong
183   distributional assumption, it offers a distributionally robust method of modelling these relationships.
184   In this study, the ratio of government expenditure by function to government expenditure in Korea
185   from 1970 to 2015 was created by the Bank of Korea. Furthermore, the government expenditure to GDP
186   ratio is created by the Strategy and Finance Ministry. We used the final expenditure data from the
187   general government (real, yearly), except data on the social security fund and GDP of Korea which were
188   downloaded from OECD data. Unlike other government expenditure, Korea does not follow the
189   COFOG system; thus, economic expenditure includes fuel and energy, agriculture, forestry, fisheries,
190   hunting, mining, construction, transportation, telecommunications, and other economic projects. The
191   Chinese data used in the study are quarterly data from 2007 to 2016. We downloaded this data from
192   one of China's financial data analysis company (Wind). As each time series is an unstable time series
193   following I(1), we use the first log difference to ensure stability. Due to the limit of available data, the
194   period can not be met perfectly. However, in the case of China data, it is consistent with the duration of
195   the Xi Jinping. Korea is a comparative subject, so We think it is possible to do research.

4. Empirical results

197   According to Bailey [1], government spending can be divided into consumption expenditure and
198   investment expenditure. Consumption expenditure leads to an increase in welfare of the private sector,
199   and investment expenditure increases the future production of the private sector. Therefore, investment
200   expenditure and consumption expenditure used in this study are as follows. Economics, education, and
201   social security expenditure are classified as investment expenditure, while the rest of culture,
202   environment, general public services, culture and health expenditure are classified as consumption
203   expenditure.

Table 1. Estimation of QR in Korea

	OLS	τ =0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9
Intercept	0.021	-0.021	-0.015	-0.010	-0.010	-0.009	0.000	0.037	0.075***	0.092***
	(1.42)	(-1.17)	(-0.87)	(-0.57)	(-0.55)	(-0.48)	(-0.02)	(0.66)	(3.00)	(3.46)
Culture	0.067	0.152*	0.181**	0.101	0.105	0.105	0.139	0.055	-0.041	-0.157
	(1.08)	(1.99)	(2.31)	(1.41)	(1.37)	(1.19)	(1.38)	(0.25)	(-0.30)	(-1.22)
Economic	0.059	0.039	-0.011	-0.023	-0.026	-0.030	-0.024	0.040	0.121*	0.089
	(1.32)	(0.70)	(-0.21)	(-0.45)	(-0.49)	(-0.52)	(-0.41)	(0.29)	(1.75)	(1.18)
Education	-0.136	0.096	0.244	0.230	0.271	0.187	0.172	-0.205	-0.551*	-0.504
	(-0.80)	(0.40)	(1.06)	(1.14)	(1.26)	(0.77)	(0.65)	(-0.26)	(-1.72)	(-1.62)
Environment	0.079	0.115	0.080	0.067	0.131	0.161	0.206*	0.109	0.052	0.102
	(1.23)	(1.56)	(1.12)	(0.59)	(1.11)	(1.25)	(1.78)	(0.83)	(0.45)	(0.90)
General Public Service	0.137	-0.070	-0.060	0.052	0.027	0.089	-0.027	0.140	0.309	0.363*
	(1.20)	(-0.46)	(-0.40)	(0.37)	(0.19)	(0.59)	(-0.18)	(0.45)	(1.65)	(1.92)
Health	0.044	-0.141	-0.152	-0.035	0.025	0.028	0.086	0.101	0.152	0.198
	(0.52)	(-1.30)	(-1.27)	(-0.27)	(0.22)	(0.26)	(0.88)	(0.80)	(0.89)	(1.18)
Social Security	0.060	0.021	0.013	0.043	0.034	0.072	0.043	0.009	-0.017	-0.123
	(0.81)	(0.22)	(0.15)	(0.58)	(0.47)	(0.92)	(0.55)	(0.10)	(-0.13)	(-0.89)

205   [1] The parentheses present the t values, and *, **, and *** are significant at 10%, 5%, and 1% confidence intervals,
206   respectively.

208   Table 1 shows the estimates of the QR. The interpretation of the quantile estimates is similar to the
209   OLS estimates, and it is more important to observe at the trends of each quantile than to determine the
210   significance of the estimates. Additionally, the estimate of the QR indicates a change in the dependent
211   variable for one unit change of the independent variable at each level of the quantile.

212 **Table 2** Estimation of QR in China

	OLS	τ =0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9
Intercept	0.033***	0.003	0.018***	0.022***	0.026***	0.029***	0.034***	0.039***	0.054***	0.062***
	(6.59)	(0.35)	(3.00)	(3.50)	(4.08)	(4.65)	(4.66)	(4.04)	(6.31)	(7.63)
Culture	0.114**	0.126	0.168**	0.134*	0.098	0.088	0.091	0.087	0.047	0.038
	(2.35)	(1.68)	(2.39)	(1.83)	(1.35)	(1.29)	(1.16)	(0.90)	(0.43)	(0.54)
Economic	0.050***	0.050**	0.039**	0.038**	0.045**	0.031	0.044**	0.046**	0.040	0.019
	(2.93)	(2.20)	(2.30)	(2.09)	(2.22)	(1.59)	(2.18)	(2.05)	(1.60)	(0.62)
Education	-0.191***	-0.149	-0.203**	-0.163*	-0.108	-0.128	-0.130	-0.140	-0.134	-0.073
	(-2.95)	(-1.52)	(-2.45)	(-1.90)	(-1.23)	(-1.52)	(-1.30)	(-1.09)	(-0.98)	(-0.80)
Environment	0.033**	0.032	0.018	0.027	0.038*	0.039*	0.037	0.033	0.027	0.048
	(1.89)	(1.22)	(0.97)	(1.32)	(1.75)	(1.76)	(1.37)	(1.30)	(1.15)	(1.61)
General Public Service	-0.139***	-0.124**	-0.131***	-0.123***	-0.106**	-0.114**	-0.130**	-0.155	-0.276**	-0.217**
	(-4.42)	(-2.35)	(-3.24)	(-2.83)	(-2.14)	(-2.71)	(-2.09)	(-1.40)	(-2.73)	(-2.38)
Health	0.081**	0.102*	0.042	0.044	0.048	0.064	0.063	0.064	0.104	0.070
	(2.47)	(1.82)	(1.21)	(1.16)	(1.21)	(1.69)	(1.65)	(1.44)	(1.52)	(1.29)
Social Security	-0.155***	-0.194***	-0.146***	-0.146***	-0.146***	-0.143***	-0.145***	-0.129**	-0.136**	-0.155***
	(-5.85)	(-3.98)	(-4.96)	(-4.51)	(-4.38)	(-4.31)	(-3.79)	(-2.40)	(-2.44)	(-4.67)

213   [1] The parentheses present the t values, and *, **, and *** are significant at 10%, 5%, and 1%
214 confidence intervals, respectively.
215
216   Table 2 shows the QR estimates based on the conditional quantile of China's economic growth.
217 The deviation of the quantile coefficient is small at τ = 0.1 ~ 0.9. This shows that China's relationship
218 between economic development and government expenditure appears in a different form from the case
219 of Korea. In particular, the coefficient of general public service expenditure is decreasing as the tau
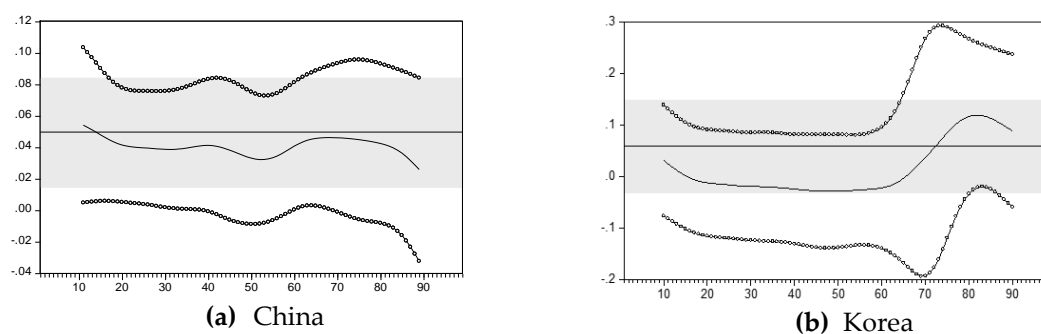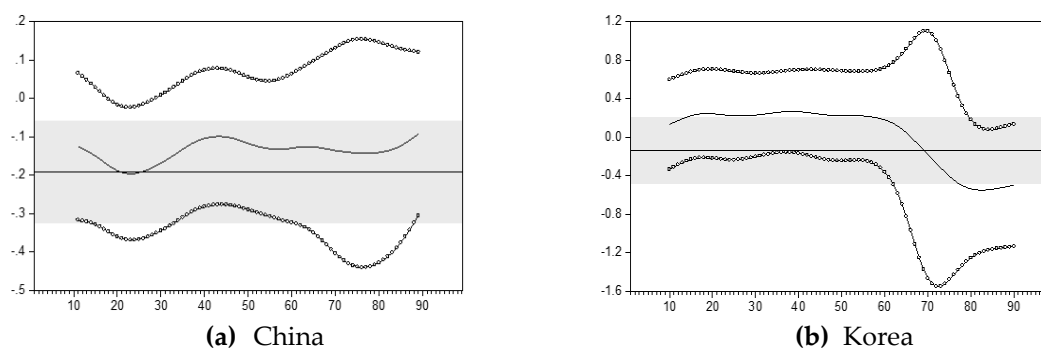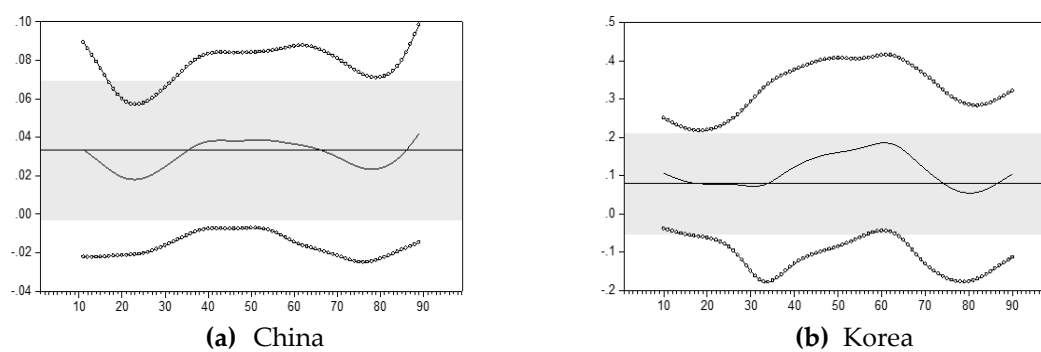220 value increases.
221

**(a)** China   **(b)** Korea
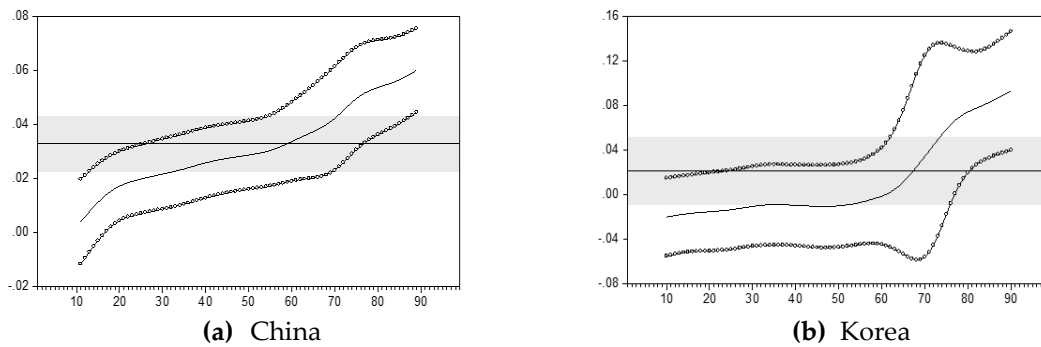
222   **Figure 1.** Quantile coefficient graph (intercept)

223

(a) China   **(b)** Korea
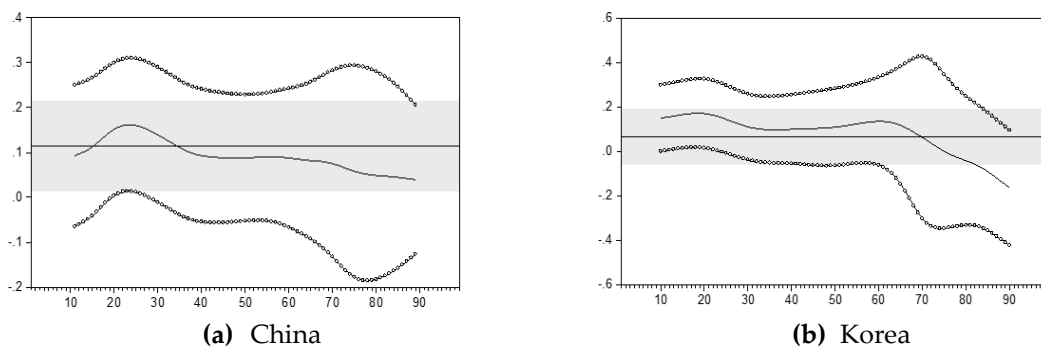
224   **Figure 2.** Quantile coefficient graph (culture)

(a) China   **(b)** Korea

225   **Figure 3.** Quantile coefficient graph (economic)

(a) China   **(b)** Korea

226   **Figure 4.** Quantile coefficient graph (education)

(a) China   **(b)** Korea

227   **Figure 5.** Quantile coefficient graph (environment)

(a) China   **(b)** Korea
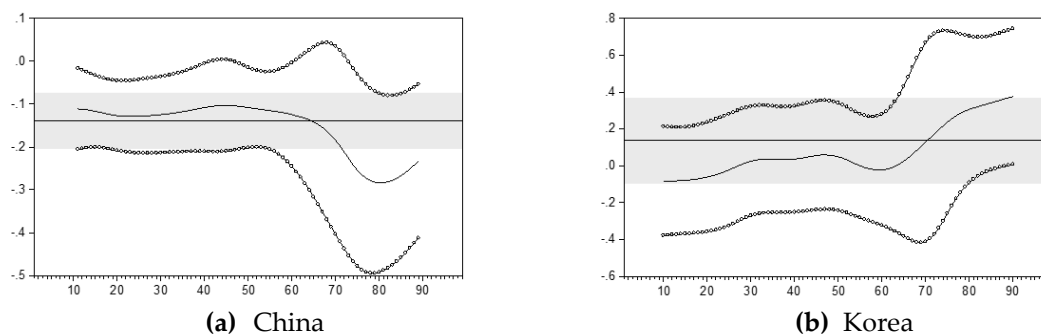
228   **Figure 6.** Quantile coefficient graph (general public service)

(a) China   **(b)** Korea
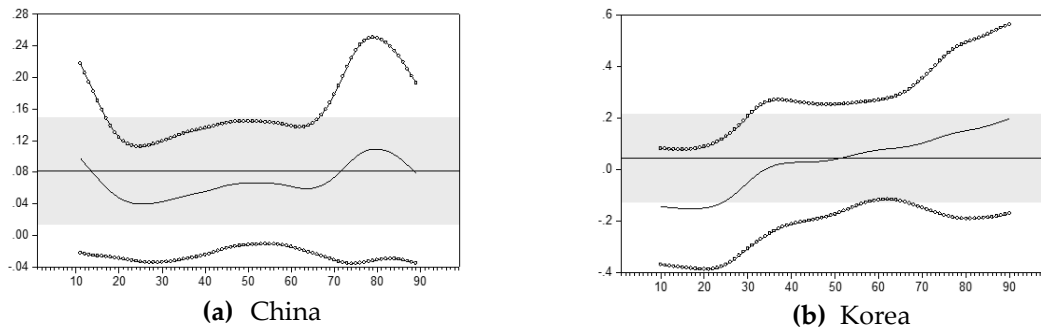
Figure 7. Quantile coefficient graph (health)

(a) China   **(b)** Korea
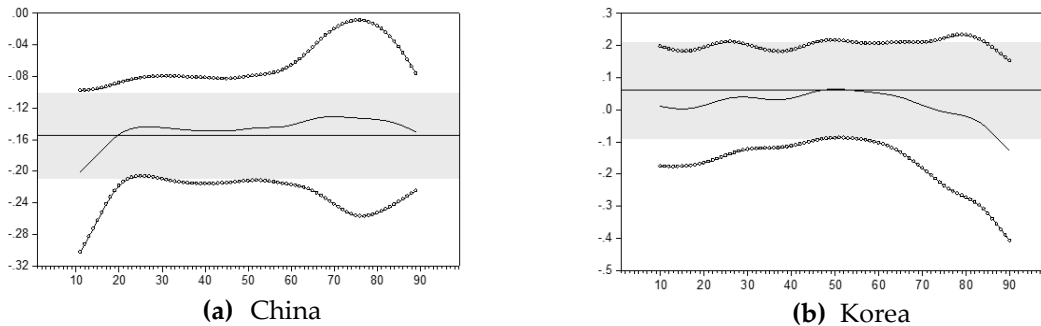
Figure 8. Quantile coefficient graph (social security)

Figures 1, 2, 3, 4, 5, 6, 7 and 8 show the smoothing of the graph using a Hodrick-Prescott filler. The left figure is China, and the right shows Korea. The Y-axis represents the quantile coefficients. The horizontal line to the X-axis is the OLS estimate, and the gray shaded area is the 95% confidence interval for OLS estimates. The central QR line is an estimate of each tau value, and the remaining line represents the 95% confidence interval of the quantile estimate. One of the characteristics is that the confidence intervals are extended at extremely high and low levels of quantile.

In addition, each coefficient can be interpreted as elasticity as the log value is taken for the dependent variable and independent variable. In Korea, culture, social security and environment expenditure are generally positive in relation to economic growth, while economic (τ=0.2~0.6), education (τ=0.7~0.9), general public service (τ=0.1~0.2, 0.6), health expenditure (τ=0.1~0.3) have a negative effect on economic growth. China has a small coefficient, but its education, general public service and social security expenditure has a negative relationship. While statistically significant compared to Korea, China has relatively uniform effects on economic growth when fiscal spending increases.

In China's investment expenditures, the economy has a positive relationship, and education and social security have a negative relationship. In the case of economic expenditure, it is confirmed that China has a positive value due to 'The Beijing-Tianjin-Hebei Urban Agglomeration', 'The development of the western region in China', and 'the Yangtze River Economic Zone'. On the other hand, education expenditure is more focused on basic education than higher education. China's export industry has changed from light industry to capital-intensive industry. Social security expenditure is a solid social security system due to the nature of the socialist state. Therefore, after the retirement age, the living base is equipped. But recently, China abolished birth control due to aging. For these reasons, it has a negative relationship with economic growth.

Korea's economic spending has a negative value at τ= 0.2 ~ 0.6 and a positive value at τ= 0.7. In other words, when the growth of economic expenditure is high, it has a great influence on economic growth. Educational and social security expenditure are negatively correlated only in the high quantile. Educational expenditure is caused by high education of Korea, and social security expenditure is the burden of social security has adversely affected the Korean economy due to the rapid aging of the population.

260   As we analyse government expenditure by function, cultural expenditure is used for preservation
261 of cultural heritage and traditional arts and culture. In particular, the development of culture and
262 tourism industry can be expected to have positive effects on economic growth. However, the tourism
263 industry in Korea is led by the private sector rather than the public sector. Considering this reason,
264 cultural expenditure of the Korean government cannot have a positive effect on economic growth.

265   Environmental expenditure is divided into detailed items, such as air pollution, water and sewage,
266 water quality, nature, and waste. China's quantile coefficient is very small. However, China and Korea
267 have a similar pattern. In the Korean and Chinese graphs, environmental expenditure is a necessary
268 expense for everyday life, thus excessive spending has a negative impact on economic growth.

269   When general public service expenditure increases, Korea has a relatively positive relationship
270 than China. Due to the nature of socialism, China has a large public sector. This can be explained by
271 'large department system' implemented in 2008. China has been pushing for 'large department system'
272 reform to consolidate government departments since 2008, and aimed at improving the efficiency of the
273 government, reducing administrative costs, eliminating managerial loopholes, and completing a
274 rational management system. Thus, an increase in general public service expenditure is not always
275 accompanied by efficiency.

276   Health expenditure is used for public health work, operation of the disease management
277 headquarters, safety evaluation, and the expansion of public health care. An increase in health spending
278 can lead to the rise in the stability of life and contribute to the increase of individual productivity by
279 reducing the burden of individual treatment expenses. An increase in income enables the demand for
280 healthcare to become more sophisticated and diversified. Furthermore, there are many public hospitals
281 in China. Thus, it has increased health spending accompanied economic growth. However, public
282 hospitals in China often forget public responsibility and operate on a high-cost, low-effective structure
283 [10,17]. There are inconsistent issues in the formulation and implementation of policies due to the
284 diversity of management structure, which is separated ownership and management. This is the reason
285 why the right tail falls on the quantile graph.

286   In 2011, the percentage of government expenditure by function in Korea was ranked first, second,
287 and third in the order of economy (20.1%), education (15.5%), and health expenditure (15.2%),
288 respectively. In the same period, China's government expenditure ranked 11.4%, 9.2%, and 8.3% in the
289 order of education, social security, and general public expenditure, respectively. As China and Korea
290 are still in the stage of growth, economic expenditure is higher than another spending. In general,
291 economic, educational, and social security expenditures have a strong redistributive effect. Education
292 and social security spending can help economic growth by mitigating inequalities through the
293 accumulation of human capital and expanding long-term growth potential.

5. Conclusions

295   After the rapid economic growth, Korea choose a growth strategy through trade opening. Then,
296 the economy has grown together. Since the Asian Financial Crisis in 1997, the Korean government has
297 endeavored to remove the economic peculiarities of Korea, reduce the government intervention in the
298 market, and increase the flexibility of the labor market in accordance with the recommendations of the
299 IMF. Therefore, the intervention of the government in Korea was eased more than before. Since
300 government intervention is small, the elasticity of economic growth on government expenditure is high.

301   China, on the other hand, still maintains a socialist system, and the government has been
302 influential in the market through state-owned enterprises. In addition, government intervention is very
303 active through various tax incentives and subsidies. Under this system, the impact of government
304 expenditure on economic growth was low. In other words, because the government actively intervenes
305 in the market and provides the factors for economic growth, the government expenditure seems not to
306 have a great influence on economic growth. This can be said to be less elastic of economic growth on
307 government expenditure and seems to be a key characteristic of China, which maintains socialism.

308   Second, according to Barro's theory, government expenditure energizes economic growth as it
309 maximizes the efficiency of the private sector in the early stage of economic growth. However, it is
310 reached at local maxima, the increase in government expenditure worsens the efficiency of the private

311 sector. In the above analysis, we have confirmed that Korea has a positive and negative correlation
312 between functional government expenditure and economic growth, respectively.
313   On the other hand, China has a strong correlation in general public service, social security,
314 economic spending, but has a uniform effect on economic growth as fiscal spending increases. The first
315 reason is that China's President Xi Jinping has set a goal of building a society centered on Xiao Kang.
316 Thus, the Chinese government expenditure can be seen as consumption expenditure in the short-term,
317 but it can be turned into investment expenditure in the long-term. Moreover, the current stage of
318 economic growth in China is considered as the transitional period of shifting from low-income to high-
319 income countries. In other words, during the Xinchang Tai, it appears that China has chosen a model
320 considering growth and distribution simultaneously, rather than selecting a model of growth-oriented.

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