Consumption Risk Sharing in East Asia and Economic, Social, and Political Globalization

Joongsan Ko

This study investigates the relationship between economic, social, and political globalization and consumption risk sharing in East Asia by utilizing the 2019 version of the KOF globalization indices. To this end, this study uses the Association of Southeast Asian Nations and the Eurozone as comparison regions. Findings show that economic and social globalization contributed to the improvements in consumption risk sharing among East Asian countries in 1970–2017, but political globalization did not. This result implies that the collapse of economic and social networks resulting from the COVID-19 pandemic might have a negative effect on consumption risk sharing in East Asia. Differences in the effects between de facto and de jure globalization on risk sharing and changes in the effect of globalization on risk sharing before and after the 1997–1998 Asian financial crisis are also discussed.

Keywords: Consumption risk sharing, COVID-19, East Asia, Globalization

JEL Classification: F02, F15, F36, F60

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I. Introduction

Globalization has created networks of connections among countries around the world through the cross-border flow of people, goods, capital, ideas, and information for a long period of time. It has improved the efficiency of world economy. However, the COVID-19 pandemic has resulted in closed borders, travel bans, paralyzed global supply chains, export restrictions, and the rebirth of nationalism, and it is cutting off worldwide interconnectedness. As a result, the post-pandemic world is likely to move toward a new, different, and more limited form of globalization. Accordingly, the influence of deglobalization on East Asian countries needs to be predicted. To lay the groundwork for this forecast, this study analyzes the relationship among economic, social, and political networks created in the globalization era and consumption risk sharing (international risk sharing) in East Asia.[1]

The major idea in international risk sharing is to sustain/smooth consumption when the domestic economy experiences a recession or boom by means of inflows and outflows of money from abroad (Poncela *et al.* 2019). To illustrate, one can imagine two countries, home and foreign. The home country experiences an economic downturn, whereas the foreign country does not. If the consumption risk is not shared, then all output shocks are passed into consumption in the home country. In the opposite case, the domestic output shocks can be mitigated by the income flows that households in the home country receive from the investments held abroad; thus, fluctuations of consumption will be detached from fluctuations of output. As a result, international risk sharing is an effective mechanism at work to minimize the risk of recession and stabilize consumer welfare.[2]

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[1] Consumption risk can be shared at various aggregation levels: household, intranational, or international level. In this study, consumption risk sharing in East Asia denotes international consumption risk sharing or international risk sharing. Thus, those terms are used alternately depending on the context of this study.

[2] In the Euro area, monetary policy cannot be tailored to an individual country's particular output shock because countries in this area had adopted Euro as their common currency. Moreover, the use of the fiscal policy by the Maastricht Treaty in the European Union has several limitations. Thus, international risk sharing has been drawing attention as the stabilization role of the Monetary Union (the Euro area). See Poncela *et al.* (2019) for a well-organized

Economic theory predicts full consumption risk sharing, that is, the possibility of a full diversification of idiosyncratic risk, under the hypothesis of complete markets (see Section II). The empirical literature on consumption risk sharing has uncovered two facts. One is that consumption risk sharing is not perfect in a real economy (Atkeson and Bayoumi 1993, Obstfeld 1993, Canova and Ravn 1996, Lewis 1996). This indicates that the existence of market imperfections makes consumption allocations different from those under complete markets.

The second fact is that the degree of consumption risk sharing among regions within a country (*i.e.*, at the intranational level) is larger than that among countries (*i.e.*, at the international level). In other words, agents seem to be able to cope with idiosyncratic risk better intranationally than internationally. Studies on intranational risk sharing show 75%, about 90%, approximately 80%, and about 92% of output shocks are smoothed among regions within the United States, Australia, Canada, and South Korea, respectively (Asdrubali *et al.* 1996, Kim and Sheen 2007, Balli *et al.* 2012, Ko in press). On the other hand, on the basis of the literature on international risk sharing, the Organization for Economic Cooperation and Development (OECD) and European Community, East Asia, and the Association of Southeast Asian Nations (ASEAN) absorbed about 40%, about 20%, and approximately 24% of shocks to gross domestic product (GDP), respectively (Sørensen and Yosha 1998, Kim *et al.* 2006, Ko 2020). Those empirical results indicate that, for example, when country-specific shocks decrease the output, 25% of shocks are passed into consumption in the United States, whereas 80% of shocks do so in East Asia.

The aforementioned degree differences in consumption risk sharing imply that market imperfections are worse in international markets than in domestic markets. The market imperfections among countries result from economic, social, and political factors (*e.g.*, nontradable goods, low labor mobility, transaction costs, information asymmetry, and inefficiency due to policy differences among countries). Globalization is a process that creates networks among countries through various flows, including people, information, ideas, capital, and goods, and thus integrates national economies, societies, and politics.

review of international risk sharing.

Thus, globalization can be seen as a mechanism to mitigate the above factors and it can help the international economy approach a complete market. Therefore, increased integration in various ways brought about by the progress of globalization is expected to improve international consumption risk sharing.

Imperfections in the international financial market make international borrowing and lending difficult and prevent a risk-sharing mechanism. Therefore, economic globalization, such as financial market integration, improves international risk sharing. However, the progress of social and political globalization might make countries share rules and customs with one another, and their economic structures will then become similar, which will help them share consumption risk (Ostergaad *et al.* 2002, Dejuan and Luengo-Prado 2006, Balli *et al.* 2018). Several studies support these arguments. International capital flow, involving foreign direct investment (FDI), has an important role in the risk-sharing mechanism, and most of FDI consists of cross-border mergers and acquisitions (M&As). Jin and Tian (2007) highlighted cultural integration as a crucial factor in the success of international M&As. Alesina *et al.* (2000) and Spolaore and Wacziarg (2005) reported that political integration among countries may expand the extent of their market and will thus give them the same benefits as economic integration.

However, the empirical literature on international consumption risk sharing has mainly focused on globalization in an economic sense (*i.e.*, financial and trade integration), leaving out the investigation of all other aspects of globalization.[3] Only a few studies are interested in the relationship between social and political factors and international consumption risk sharing. Balli and Pierucci (2020) showed that institutional quality (*e.g.*, political stability, government effectiveness, and rule of law) and risk sharing are significantly interrelated among OECD members, but not for emerging economies. Shin (2006) found that using common language has a positive effect on international risk sharing. The KOF Globalization Index is an ideal proxy for measuring the extent of economic, social, and political aspects of globalization. Pierucci and Ventura (2012) and Balli *et al.* (2018) applied the 2007

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[3] See Pierucci and Ventura (2012) and Balli *et al.* (2018) for details on how the literature has centered on the effect of economic globalization on international risk sharing.

version of the index to the risk-sharing literature.[4] The former shows that although economic and social globalization helps manage idiosyncratic risk, without political globalization, this might lead to a rise in exposure to system (uninsurable) risk. The latter finds that improvements in social and political globalization drive an increased degree of risk sharing for industrialized countries.

On the basis of the above background, this study aims to assess the effects of economic, social, and political globalization on consumption risk sharing in East Asia and contributes to the risk-sharing literature in two ways. First, by using the 2019 version of the KOF Globalization Index, this study analyzes the influence of globalization on international risk sharing in greater detail than Pierucci and Ventura (2012) and Balli *et al.* (2018) did. Gygli *et al.* (2019) introduced the 2019 version, encompassing various information of globalization more precisely than the previous version by increasing the number of underlying variables from 23 to 43 variables. Specifically, the 2019 version distinguishes between de facto and de jure measures along economic, social, and political dimensions of globalization (see Section III, *A*). Second, the literature on consumption risk sharing in East Asia has mainly explored only the influence of economic integration (Kim *et al.* 2004, 2006, Asdrubali and Kim 2011, Hoffmann 2011, Ko 2020). Thus, the relationship between social and political integration and international risk sharing in East Asia is difficult to conjecture. Therefore, this study attempts to fill this gap in the literature using the 2019 version of the index, reaching the result that economic and social globalization had positive effects on consumption risk sharing in East Asia in 1970–2017, but political globalization did not.

The following section explains the theoretical framework and the empirical strategy. Section III presents the data used and introduces the KOF Globalization Index as a measure of economic, social, and political globalization used in the empirical analyses. Section IV discusses the

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[4] To the best of my knowledge, Pierucci and Ventura (2012) is the first attempt in the risk-sharing literature to use the KOF Globalization Index, followed by Balli *et al.* (2018). The two studies differ in the estimation equation used. Pierucci and Ventura (2012) used a test equation based on Mace (1991), similar to Equation (1) in Section II, whereas Balli *et al.* (2018) based theirs on Asdrubali *et al.* (1996), similar to Equation (2). This study follows the approach of Balli *et al.* (2018).

empirical results. Finally, Section V concludes this study.

II. Theoretical Framework and Empirical Strategy

Under the hypothesis of complete markets, economic theory predicts full insurance (*i.e.*, perfect consumption-smoothing across time and states of nature).[5] Consider two endowment economies, namely, a domestic and a foreign country with one homogeneous tradable good, two periods, and two states of nature. Representative agents are identical and can access a complete set of Arrow–Debreu securities. Agents are risk averse and have constant relative risk aversion preferences. The solution of this simple model allows all individuals in domestic and foreign countries to equate their marginal rates of substitution between current consumption and state-contingent future consumption at the same state-contingent security prices. If marginal utility growth were equalized across countries, the correlation between domestic and foreign per capita consumption growth would be perfect. Consumption is then internationally diversified, in the sense that the only type of risk reflected by consumption is due to aggregate uncertainty in world output (*i.e.*, systemic risk and global shock). Hence, domestic consumption growth should not be affected by idiosyncratic risk and country-specific shock.

An initial empirical study on this strong theoretical prediction is based on a simple test regression of the following type, first proposed by Cochrane (1991) and Mace (1991):

$$\Delta\log(c_{it}) = \alpha_1 \Delta\log(y_{it}) + \alpha_2 \Delta\log(c_{at}) + \varepsilon_{it}, \qquad (1)$$

where $\Delta\log(c_{it})$ is the growth rate of domestic consumption for country i at time t, and $\Delta\log(c_{at})$ is the growth rate of aggregate consumption. $\Delta\log(y_{it})$ is the domestic output growth minus the group average output growth. The group average accounts for common (or global) shocks to income; thus, the procedure for subtracting the group average makes $\Delta\log(y_{it})$ the idiosyncratic (or country-specific) shock variable. Under

[5] See Ch. 5 of Obstfeld and Rogoff (1996) for a complete description of the model. Pierucci and Ventura (2012) and Balli *et al.* (2018) summarized the complete description. I modify slightly their summary and present it in this paragraph.

perfect consumption risk sharing, the null hypothesis that α_1 is equal to 0 while α_2 is equal to 1 is rejected (Atkeson and Bayoumi 1993, Obstfeld 1993, Canova and Ravn 1996, Lewis 1996). This result implies that the country-specific shock is not diversified and that it affects domestic consumption. Thus, the strong theoretical prediction (*i.e.*, perfect consumption risk sharing) does not apply in a real economy.

After consumption risk sharing is recognized as incomplete, Asdrubali *et al.* (1996) and Sørensen and Yosha (1998) studied the degree of consumption risk sharing using the following regression:

$$\Delta\log(c_{it}) = v_t + \beta\Delta\log(y_{it}) + \varepsilon_{it}, \tag{2}$$

where $\Delta\log(c_{it})$ and $\Delta\log(y_{it})$ are the growth rate of consumption and GDP for country i at time t, respectively; and v_t represents time fixed effects. This regression is the most common specification of macroeconomic risk sharing. β is the co-movements of idiosyncratic consumption and idiosyncratic income because v_t captures common shocks to income and consumption. Thus, β indicates that the unsmoothed proportion of the risk and $(1 - \beta)$ can be interpreted as the degree of consumption risk sharing achieved by an analytic group. β is equal to 0 in the case of perfect risk sharing.

Country-specific factors (*e.g.*, country size, population, and real interest rate) that are likely to affect the degree of consumption risk sharing are not considered in Equation (2). To compensate for this limitation, Mélitz and Zumer (1999) altered the method of Asdrubali *et al.* (1996) by adding some structure to β, such that $\beta = \beta_0 + \beta_1 z_i$, where z_i is a country-specific factor that is an interaction variable. On the basis of this approach, Kose *et al.* (2007) and Balli and Pierucci (2020) used financial openness and institutional quality, respectively, as country-specific factors to understand the influence of each factor on international risk sharing.

The empirical strategy of this study follows Balli *et al.* (2018), which extends the method of Asdrubali *et al.* (1996) and Mélitz and Zumer (1999), where the test equation is as follows:

$$\Delta\,\widehat{\log(c_{it})} = \beta_0\widehat{\Delta\log(y_{it})} + \beta_\alpha(z_{it} - \overline{z}_t) + \beta_1(z_{it} - \overline{z}_t)\widehat{\Delta\log(y_{it})} + \varepsilon_{it}, \tag{3}$$

with

$$\beta = \beta_0 + \beta_1(z_{it} - \bar{z}_t), \tag{4}$$

where $\widehat{\Delta \log(c_{it})}$ and $\widehat{\Delta \log(y_{it})}$ denote the idiosyncratic part of consumption and output growth, respectively. They are equal to the real per capita consumption and GDP growth rate of country i in time t minus the group average of real per capita consumption and GDP in time t.[6] The process for subtracting the group average is equivalent to removing time fixed effects, as in Equation (2). z_{it} is an interaction variable, and $\bar{z}_t$ represents its mean. This study uses the KOF globalization indices as z_{it} to understand the effect of globalization on international consumption risk sharing because the indices are considered ideal proxies to measure the extent of globalization (see Section III, *A*).[7] Moreover, different from other literature (Mélitz and Zumer 1999, Kose *et al.* 2007, Balli and Pierucci 2020), this study estimates β_α in Equation (3), including $(z_{it} - \bar{z}_t)$ as an explanatory variable, because omitting the interaction term $(z_{it} - \bar{z}_t)$ will result in biased (and inconsistent) estimates of β_0 and β_1 (Brambor *et al.* 2006, Balli and Sørensen 2013).[8]

In Equation (4), β_0 measures the average co-movement of consumption with GDP growth, and $(1 - \beta_0)$ measures the average total consumption risk sharing within the country group for the period. With regard to interaction variables, β_1 denotes the effects of the KOF globalization indices on aggregate consumption risk sharing achieved by country i. $(1 - \beta) = (1 - \beta_0 - \beta_1(z_{it} - \bar{z}_t))$ represents the extent of total risk sharing gained in period t by country i and shows the relationship between consumption risk sharing and globalization for a particular country. On the basis of the relationship, a negative coefficient of β_1 implies that globalization has a positive influence on consumption risk

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[6] $\widehat{\Delta \log(c_{it})} = \Delta \log(c_{it}) - \overline{\Delta \log(c_t)}$, $\widehat{\Delta \log(y_{it})} = \Delta \log(y_{it}) - \overline{\Delta \log(y_t)}$, where $\bar{x}$ denotes its mean.

[7] Different from Balli *et al.* (2018), I do not include other control variables, except the KOF Globalization Index, because it is nearly impossible to include every potential control variable, given the macroeconomic nature of the dataset and the consequent reduction of degrees of freedom.

[8] β_α, which is related to the interaction term $(z_{it} - \bar{z}_t)$, shows the influence of globalization on the idiosyncratic consumption growth. Empirical results show that the absolute value of a coefficient of β_α is less than 0.001 and is statistically insignificant.

sharing or, equivalently, a negative one on co-movements between country-specific shocks and domestic consumption growth. In other words, the co-movements (β) decrease, whereas risk sharing ($1 - \beta$) increases.

Equation (3) is estimated by using the method of feasible generalized least squares (FGLS). In the estimation procedure, panel analysis considers heteroskedasticity across panels and autocorrelation within panels. On the basis of the existing literature (Asdrubali *et al.* 1996, Balli *et al.* 2018, Balli and Pierucci 2020) in solving the autocorrelation problem among residuals, this study assumes that error terms follow a first-order autoregressive process and restricts the autocorrelation parameter to be identical across countries given that the sample time period is limited.[9] Under the existence of heteroskedasticity and autocorrelation of the residuals, the FGLS estimation procedure derives a consistent estimator and improves efficiency.

III. Data

A total of 25 countries are considered for this study, and the sample period is from 1970 to 2017. Data for GDP, consumption, and population are obtained from the United Nations' National Accounts Main Aggregates Database.[10] GDP and consumption are expressed in constant prices in domestic currency; thus, real per capita figures are obtained by normalizing the population data of the corresponding country.

The 25 countries comprise four regions, namely, East Asia, the ASEAN, ASEAN+3, and the Eurozone. For the deep analysis of consumption risk sharing in East Asia, the others are used as comparison regions. East Asia denotes China, Hong Kong, Indonesia, Japan, Malaysia, Singapore, South Korea, Thailand, and the Philippines, as in previous studies on consumption risk sharing in East Asia. The ASEAN has 10 official member countries: five in East Asia (*i.e.*, Indonesia, Malaysia, Singapore, Thailand, and the Philippines) and Brunei, Cambodia, Laos, Myanmar, and Vietnam. The ASEAN members

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[9] I use Stata, a statistical software, practically. I estimate Equation (3) by using *xtgls*, a Stata command, with *panels*(*heteroskedastic*) and *corr*(*ar1*) options.

[10] National Accounts Main Aggregates Database (http://unstats.un.org/unsd/snaama/).

officially launched the ASEAN Economic Community in 2015 for regional economic integration. ASEAN+3 covers all countries belonging to East Asia and the ASEAN. The Eurozone includes the 11 countries that first adopted the Euro in 1999.[11] It serves as a benchmark for the most institutionally advanced example of monetary and economic integration.

A. KOF Globalization Index

The main research question of this study is whether economic, social, and political globalization have exerted an influence in shaping risk-sharing opportunities in East Asian countries. To explore this issue, the KOF Globalization Index (the 2019 version) provided by the KOF Swiss Economic Institute at ETH Zurich is used as a proxy variable to measure the extent of globalization.[12] The index, having a value between 1 and 100, is a composite indicator that measures globalization along economic, social, and political dimensions for 137 countries from 1970 to 2017 and is based on the following definition of globalization:

> Globalization describes the process of creating networks of connections among actors at intra- or multi-continental distances, mediated through a variety of flows including people, information and ideas, capital, and goods. Globalization is a process that erodes national boundaries, integrates national economies, culture, technologies and governance, and produces complex relations of mutual interdependence (Gygli et al. 2019).

The KOF Globalization Index was originally introduced by Dreher (2006) and updated by Dreher *et al.* (2008). It is commonly referred to as the 2007 version.[13] Previous studies on the relationship between international consumption risk sharing and globalization have used the 2007 version (Pierucci and Ventura 2012, Balli *et al.* 2018). Gygli *et*

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[11] These are Austria, Belgium, Finland, France, Germany, Ireland, Italy, Luxembourg, Netherlands, Portugal, and Spain.

[12] KOF Swiss Economic Institute at ETH Zurich (http://globalization.kof.ethz. ch/).

[13] The 2007 version has become the most widely used globalization index in the academic literature. Potrafke (2015) organized 120 empirical studies well using the 2007 version.

TABLE 1

2019 KOF GLOBALIZATION INDEX: STRUCTURE AND VARIABLES

0. Globalization	F0. Globalization, de facto	J0. Globalization, de jure
01. Economic	F01. Economic Globalization, de facto	J01. Economic Globalization, de jure
011. Trade	F011. Trade Globalization, de facto	J011. Trade Globalization, de jure
	F0111. Trade in goods*	J0111. Trade regulations*
	F0112. Trade in services*	J0112. Trade taxes*
	F0113. Trade partner diversity	J0113. Tariffs*
		J0114. Trade agreements
012. Financial	F012. Financial Globalization, de facto	J012. Financial Globalization, de jure
	F0121. Foreign direct investment*	J0121. Investment restrictions
	F0122. Portfolio investment*	J0122. Capital account openness*
	F0123. Int'l debt	J0123. Int'l investment agreements
	F0124. Int'l reserves	
	F0125. Int'l income payments*	
02. Social	F02. Social Globalization, de facto	J02. Social Globalization, de jure
021. Interpersonal	F021. Interpersonal Globalization, de facto	J021. Interpersonal Globalization, de jure
	F0211. Int'l voice traffic*	J0211. Telephone subscriptions*
	F0212. Transfers	J0212. Freedom to visit
	F0213. Int'l tourism*	J0213. Int'l airports
	F0214. Int'l students	
	F0215. Migration*	
022. Informational	F022. Informational Globalization, de facto	J022. Informational Globalization, de jure.
	F0221. Used internet bandwidth*	J0221. Television access*
	F0222. Int'l patents	J0222. Internet access*
	F0223. High technology exports	J0223. Press freedom
023. Cultural	F023. Cultural Globalization, de facto	J023. Cultural Globalization, de jure
	F0231. Trade in cultural goods*	J0231. Gender parity
	F0232. Trade in personal services	J0232. Human capital
	F0233. Int'l trademarks	J0233. Civil liberties
	F0234. McDonald's restaurant*	
	F0235. IKEA stores*	
03. Political	F03. Political Globalization, de facto	J03. Political Globalization, de jure
	F0301. Embassies*	J0301. Int'l organizations*
	F0302. UN peace keeping missions*	J0302. Int'l treaties*
	F0303. Int'l NGOs	J0303. Treaty partner diversity

Note: This table is a modified version of Table 1 of Gygli *et al.* (2019). The variables with asterisks are the same or similar to those in the 2007 version of the KOF Globalization Index.

al. (2019) introduced the second revision of the index, called the 2019 version, to address the shortcomings of the 2007 version.[14]

The 2019 revision differs from the earlier version in three ways. First, in the 2007 version, economic globalization is divided into two sub-indices, namely, economic international flows and restrictions to trade. However, the 2019 version separates trade and financial globalization within the economic dimension of globalization. Second, the 2019 version distinguishes between de facto and de jure measures along the different dimensions of globalization. In Table 1, F and J in front of a variable name refer to de facto and de jure, respectively. De facto globalization measures actual international flows and activities, whereas de jure globalization measures policies and conditions that, in principle, enable, facilitate, and foster flows and activities (Gygli *et al.* 2019).

Third, the 2007 version is based on 23 variables, and the variables with asterisks in Table 1 are the same or similar to those in the 2007 version. By contrast, the 2019 version is based on 43 variables, which are five-digit codes (*e.g.*, F0111) in Table 1. As a result, the 2019 version encompasses the concept of globalization more precisely than the 2007 version. Specifically, the underlying variables (43 variables) are divided into and aggregated to 12 basic indices, the lowest aggregation level of the KOF Globalization Index.[15] The lowest aggregation level indices are de facto and de jure indices of trade, financial, interpersonal, informational, cultural, and political globalization (*i.e.*, F/J011, F/J012, F/J021, F/J022, F/J023, and F/J03 in Table 1).

Gygli *et al.* (2019) introduced the definitions of economic, social, and political globalization as follows. Economic globalization characterizes long-distance flows of goods, capital, and services, as well as information and perceptions that accompany market exchanges. Social globalization expresses the spread of ideas, information, images, and people. Specifically, interpersonal globalization refers to the direct interactions among citizens living in different countries. For informational globalization, a de facto index measures the actual flow of ideas, knowledge, and images, whereas a de jure index refers to the

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[14] See Balli *et al.* (2018) for the limitations and criticisms of the 2007 version.

[15] The underlying variables are aggregated to the lowest aggregation level based on the weight determined by principal component analysis (Gygli *et al.* 2019).

capability to share information across countries. A de jure index of cultural globalization refers to openness toward and the capability to understand and adopt foreign cultural influences. Lastly, for political globalization, a de facto index captures the diffusion of government policies, whereas a de jure index refers to the capability to engage in international political cooperation.

In addition to those differences between the two versions, the 2019 KOF Globalization Index is characterized by a multilayered structure. In Table 1, overall indices for each aggregation level are calculated by the average of the respective de facto and de jure indices (*e.g.*, the average of F011 and J011 is 011.). The lowest aggregation level indices are aggregated to three dimensions (*i.e.*, economic, social, and political globalization) and one total index. Economic globalization is the average of trade and financial globalization. Social globalization includes interpersonal, informational, and cultural globalization and is the average of those three indices. Economic, social, and political globalization are aggregated to globalization using equal weights. Information on various dimensions of globalization becomes entangled in the higher aggregation level indices due to the multilayered structural features, making the interpretation of empirical results difficult. Therefore, this study uses, not the higher aggregation level indices, but the lowest aggregation level indices of the KOF Globalization Index (*i.e.*, 12 basic indices) to evaluate the effect of each dimension of globalization on risk-sharing opportunities precisely.

The KOF globalization indices of Country A are interpreted as the degree of integration between Country A and the rest of the countries in the world by the definition of globalization. Thus, the indices cannot be interpreted as the degree of integration between Country A and a specific region. Even if the value of the indices increases, it does not indicate with which countries or regions Country A has more integration. For example, the increase in the indices of South Korea indicates the rise in the degree of integration among South Korea and various countries within and outside of East Asia. As a result, the inherent downside of the KOF Globalization Index is the inability to break down the effect of globalization into relationships between countries in a particular region.

B. Descriptive Statistics

Table 2 reports the descriptive statistics of mean value and standard deviation with respect to the consumption growth rate, GDP growth rate, and 12 basic indices of the KOF Globalization Index for the periods of 1970–2017, 1970–1996, and 1999–2017.[16] This subsection not only discusses the statistics in the entire period (1970–2017) but also compares between two sub-periods (1970–1996 and 1999–2017) to analyze the changes in the statistics. The period of 1970–2017 is divided into 1970–1996 and 1999–2017, omitting the 1997–1998 Asian financial crisis, because the crisis had a significant macroeconomic-level effect on the economic and social systems in Asian countries. In Table 2, boldface numbers denote that they are greater than the mean of 12 basic indices in each region for the given period, and the last column is the mean difference between periods of 1970–1996 and 1999–2017.

The statistics reveal interesting findings regarding the economy and globalization in East Asia and ASEAN. First, the comparison between the periods of 1970–1996 and 1999–2017 shows that the mean value of the consumption and GDP growth rates in East Asia decreases; however, the opposite is true in ASEAN, that is, their mean value increases. This finding reflects the rapid growth of ASEAN members since the 2000s.

Second, the mean value of 12 basic indices in 1970–2017 reports that the level of globalization in ASEAN (45.3) and East Asia (56.0) is considerably lower than that of the Eurozone (75.5). Cross-period comparisons show that the value increases from 35.5 (1970–1996) to 57.6 (1999–2017) in ASEAN and from 46.5 to 68.6 in East Asia for the same sub-periods. Those figures are still below the level of globalization in the Eurozone for each sub-period. In addition, the last

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[16] The descriptive statistics in ASEAN+3 is similar to the median of those in East Asia and ASEAN because ASEAN+3 includes all countries in both regions. Moreover, the KOF Globalization Index is based on the 12 basic indices, which are aggregated to five sub-dimensions (*i.e.*, trade, financial, interpersonal, informational, and cultural globalization), three dimensions (*i.e.*, economic, social, and political globalization), and one total index. Given this feature, information about the upper-level indices can be inferred from the 12 basic indices. Thus, for the sake of concision, Table 2 does not report the statistics for ASEAN+3 and the upper-level indices. The statistics are available upon request from the author.

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TABLE 2

DESCRIPTIVE STATISTICS

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				Period 1970–2017	①: 1970–1996	②: 1999–2017	Mean difference
		Variables		Mean (SD)	Mean (SD)	Mean (SD)	(②-①)
East Asia		Consumption growth rate		0.038 (0.034)	0.044 (0.033)	0.035 (0.027)	−0.009
		GDP growth rate		0.041 (0.038)	0.050 (0.037)	0.036 (0.029)	−0.014
	Economic	Trade	df	**56.8 (27.9)**	**50.1 (28.4)**	64.9 (25.0)	14.8
			dj	52.7 (22.3)	40.5 (20.0)	**69.3 (13.1)**	**28.8**
		Financial	df	56.0 (24.5)	**48.2 (24.9)**	65.9 (20.0)	17.7
			dj	**59.1 (18.0)**	**53.6 (18.8)**	65.8 (14.2)	12.2
	Social	Interpersonal	df	44.4 (27.9)	37.4 (27.0)	53.9 (26.3)	16.5
			dj	50.4 (21.1)	40.6 (19.9)	63.7 (14.8)	**23.1**
		Informational	df	**58.5 (26.6)**	44.2 (22.9)	**78.3 (18.0)**	**34.1**
			dj	53.2 (24.0)	37.7 (18.7)	**73.5 (13.2)**	**35.8**
		Cultural	df	54.6 (25.0)	46.0 (24.6)	66.1 (20.8)	20.1
			dj	**59.7 (19.3)**	**52.5 (20.0)**	69.1 (13.7)	16.6
		Political	df	**68.4 (17.9)**	**61.5 (14.6)**	77.6 (17.9)	16.1
			dj	**58.5 (22.6)**	46.1 (18.2)	**74.7 (17.8)**	**28.6**
		12 basic indices		56.0 (23.1)	46.5 (21.5)	68.6 (17.9)	22.1
ASEAN		Consumption growth rate		0.030 (0.048)	0.024 (0.054)	0.042 (0.034)	0.018
		GDP growth rate		0.032 (0.047)	0.028 (0.053)	0.041 (0.033)	0.013
	Economic	Trade	df	**55.5 (26.5)**	**46.4 (26.1)**	65.6 (23.3)	19.2
			dj	**47.4 (19.8)**	**35.6 (15.7)**	62.1 (14.0)	**26.5**
		Financial	df	**53.2 (21.9)**	**43.2 (21.3)**	65.1 (16.1)	21.9
			dj	**47.6 (23.1)**	**41.1 (25.0)**	55.4 (17.6)	14.3
	Social	Interpersonal	df	34.9 (28.0)	27.1 (26.1)	44.9 (27.0)	17.8
			dj	39.0 (24.5)	28.0 (21.3)	53.3 (21.1)	**25.3**
		Informational	df	**46.2 (28.5)**	29.3 (22.3)	**68.0 (20.4)**	**38.7**
			dj	39.5 (22.0)	25.9 (14.2)	57.0 (17.7)	**31.1**
		Cultural	df	36.1 (26.3)	29.8 (23.9)	44.2 (27.0)	14.4
			dj	42.8 (18.0)	**35.9 (16.5)**	51.7 (15.8)	15.8
		Political	df	**52.7 (22.2)**	**46.9 (19.1)**	60.5 (23.4)	13.6
			dj	**48.4 (22.0)**	**36.3 (17.5)**	**63.9 (17.1)**	**27.6**
		12 basic indices		45.3 (23.6)	35.5 (20.8)	57.6 (20.0)	22.1
Eurozone		Consumption growth rate		0.018 (0.020)	0.024 (0.020)	0.010 (0.018)	−0.014
		GDP growth rate		0.020 (0.027)	0.024 (0.024)	0.013 (0.029)	−0.011
	Economic	Trade	df	54.9 (20.6)	49.2 (21.0)	62.5 (17.3)	13.3
			dj	**85.2 (8.3)**	**79.9 (7.3)**	**91.7 (3.2)**	11.8
		Financial	df	69.2 (23.4)	55.6 (22.6)	**87.3 (7.6)**	**31.7**
			dj	75.5 (14.5)	69.2 (15.7)	82.8 (7.3)	13.6
	Social	Interpersonal	df	74.2 (13.3)	68.4 (13.7)	81.8 (7.9)	13.4
			dj	70.8 (8.4)	65.7 (6.3)	77.9 (5.6)	12.2
		Informational	df	73.6 (9.9)	**71.4 (8.3)**	77.5 (10.5)	6.1
			dj	75.2 (15.1)	63.5 (8.8)	**90.7 (5.0)**	**27.2**
		Cultural	df	**76.9 (11.5)**	**70.8 (11.5)**	**84.7 (5.1)**	13.9
			dj	**79.3 (11.0)**	**76.2 (12.1)**	83.6 (7.8)	7.4
		Political	df	**84.9 (13.5)**	**81.6 (13.8)**	**89.3 (11.7)**	7.7
			dj	**86.8 (13.1)**	**81.0 (12.8)**	**94.1 (9.4)**	13.1
		12 basic indices		75.5 (13.5)	69.4 (12.8)	83.6 (8.2)	14.2

Note: SD stands for standard deviation. Df and dj denote de facto and de jure, respectively. Boldface numbers denote that they are greater than the mean of 12 basic indices in each region for the given period.

column of Table 2 shows that de jure trade, interpersonal, and political globalization and (de facto and de jure) informational globalization increase by a large margin in East Asia and ASEAN. Thus, the pace of globalization is different for each facet of globalization.

Third, the standard deviation of the globalization indices in East Asia and ASEAN is larger than that in the Eurozone. Hence, compared to the Eurozone, the level of globalization in each country of East Asia and ASEAN is not similar, and wide differences exist among countries.

Finally, two factors need to be noted in the Eurozone. One is that although the level of globalization in the Eurozone is considerably higher than that in East Asia and ASEAN, the mean value of the de facto trade globalization is similar to that in East Asia and ASEAN. The other is that the de facto financial globalization increases by a large margin (see the last column in Table 2). This finding might be related to the fact that the Eurozone adopted the Euro as its common currency in 1999.

IV. Empirical Results

This section analyzes the relationship between economic, social, and political globalization and consumption risk sharing in East Asia by utilizing ASEAN and the Eurozone as comparison regions. In the first step of the analysis (Table 3), the degree of consumption risk sharing in each region is investigated. As a second step (Tables 4–6), the effects of economic, social, and political globalization on consumption risk sharing is discussed. In addition, all tables (Tables 3–6) report the estimates not only for the entire period (1970–2017) but also for the two sub-periods (1970–1996 and 1999–2017). The sub-period analysis is performed to identify possible dynamic changes before and after the 1997–1998 Asian financial crisis. The empirical results for ASEAN+3 are presented in the appendix for the brevity of the discussion (see Tables A.1 and A.2).

A. Consumption Risk Sharing in East Asia, ASEAN, and the Eurozone[17]

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[17] See Ko (2020) for a more detailed analysis on this subject. Ko (2020) analyzed risk-sharing channels and changes on risk-sharing patterns in ASEAN, East Asia, the OECD, and the Eurozone.

	Period	East Asia	ASEAN	Eurozone
β_0	1970–2017	0.6893*** (0.0298)	0.7345*** (0.0343)	0.4370*** (0.0316)
	1970–1996	0.6082*** (0.0369)	0.7534*** (0.0388)	0.5031*** (0.0438)
	1999–2017	0.7950*** (0.0492)	0.6055*** (0.0676)	0.3341*** (0.0447)

Note: The standard errors are in parentheses. The point estimates with asterisks are statistically significant at the 1% level. The estimated coefficients are derived from Equation (3) without an interaction variable: $\widehat{\Delta \log(c_{it})} = \beta_0 \widehat{\Delta \log(y_{it})} + \varepsilon_{it}$. They are estimated based on FGLS and performed for East Asia, ASEAN, and the Eurozone for different periods above. On the basis of the theoretical assumptions, β_0 is the unsmoothed proportion of consumption risk for the regions for the given period.

This subsection compares the level of unsmoothed consumption risk (β_0) among country groups. The estimated coefficients in Table 3 are derived from the regression of $\widehat{\Delta \log(c_{it})}$ on $\widehat{\Delta \log(y_{it})}$ by using the methodology described in Section II, as same as estimating Equation (3) without an interaction variable (z_{it}).

On the basis of the estimates for the entire period (1970–2017) in Table 3, the unsmoothed proportion (β_0) among shocks to GDP is 68.93% in East Asia, 73.45% in ASEAN, and 43.70% in the Eurozone.[18] Given those results, 31.07% of shocks to GDP are shared in East Asia, 26.55% in ASEAN, and 56.30% in the Eurozone.[19] Consumption risk sharing can be considered a measure of financial integration because the measurements of the degree of consumption risk sharing are given by comparison with the benchmark case of fully integrated markets (Pierucci and Ventura 2012). Furthermore, the Eurozone is the most institutionally advanced example of economic integration. Thus, those results reveal that financial integration among countries in East Asia and ASEAN is limited compared to that of the Eurozone.

In addition, cross-period comparisons show that in East Asia, the degree of consumption risk sharing ($1 − \beta_0$) decreases from 39.18% (1970–1996) to 20.50% (1999–2017); however, in ASEAN and the

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[18] For convenience, these figures are expressed in percentage by multiplying the results of Table 3 by 100.

[19] These figures are the same as the degree of consumption risk sharing ($1 − \beta_0$).

Eurozone, the degree increases from 24.66% to 39.45% and from 49.69% to 66.59%, respectively. Those rises are possibly related to the fact that ASEAN member countries have continually enforced policies for regional economic integration to establish the ASEAN Economic Community after the 1997–1998 Asian financial crisis and the Eurozone adopted a common currency (*i.e.*, Euro) in 1999.

B. Influences of Economic, Social, and Political Globalization on International Risk Sharing[20]

The influences of economic, social, and political globalization on international risk sharing are estimated using Equation (3). In the estimation process, the lowest aggregation level of the KOF globalization indices, de facto and de jure indices of trade, financial, interpersonal, informational, cultural, and political globalization, are used as interaction variables, and I run the regression for all 12 indices. The empirical results are presented in Tables 4–6.[21] A negative sign on the 12 indices interacting with idiosyncratic income (*i.e.*, a negative sign on β_1) implies a reduction in the co-movement between idiosyncratic consumption and GDP and thus an increase in the degree of consumption risk sharing (see Section II).

a) For the Whole Period: 1970–2017

Table 4 reports the main results. That is, economic and social globalization has a positive effect on consumption risk sharing in East Asia, whereas political globalization does not. The first step of the

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[20] In Tables 4–6, the level of unsmoothed consumption risk (β_0) in each region for the periods of 1970–2017, 1970–1996, and 1999–2017 is similar to the estimates in Table 3. Moreover, the changing patterns of the degree of consumption risk sharing between the sub-periods is the same as those in Table 3. For this reason, discussing the level of unsmoothed consumption risk (β_0) in Tables 4–6 is only a repetition of Section IV, *A*. Thus, this subsection does not discuss the coefficient of β_0.

[21] An endogeneity problem might exist. An enhancement of international risk sharing can also affect the integration of the region (and proxy variables of globalization). Thus, the estimated coefficients would be affected by a positive endogeneity bias due to reverse causality, in which case they would overstate the influence of globalization on international risk sharing (Eppinger and Potrafke 2016, Balli *et al.* 2018).

analysis considers the role played by economic and social aspects of globalization. The estimates for East Asia in Table 4 show that a de facto index of trade, financial, interpersonal, and cultural globalization and a de jure index of trade globalization appear to be negative and statistically significant coefficients. However, although the mean of globalization indices in ASEAN is lower than in East Asia (Table 2), except for de facto and de jure indices of trade globalization, all sub-indices of economic and social globalization have negative and statistically significant coefficients in ASEAN.

The examples of de facto and de jure indices of trade globalization in East Asia have coefficients (standard deviation) of −0.0029 (0.0012) and −0.0046 (0.0020), respectively. All negative and statistically significant coefficients tend to represent that a higher level of economic and social globalization for country i decreases the co-movement of consumption and GDP (β_0) and thus increases the level of consumption risk sharing (1 − β_0). The rest of the indices have negative but statistically insignificant coefficients in East Asia. This indicates that those indices do not have a direct effect on consumption risk sharing.

Moreover, comparing statistically significant results for sub-indices of economic and social globalization among East Asia, ASEAN, and the Eurozone reveals two points; one of which is the difference in coefficient size among those regions, and the other is the similarity in coefficients of economic and social globalization. The first point shows that the coefficient size in East Asia is smaller than that in ASEAN, and the coefficient size in ASEAN is roughly half that in the Eurozone. Thus, the progress of economic and social globalization affects the degree of consumption risk sharing differently by region. For example, with a 10-point increase in a de facto index of financial globalization for country i, if the country belongs to East Asia, then the level of consumption risk sharing for country i increases by 3.2% (based on Table 4); if the country belongs to ASEAN, then the level increases by 5.6%; finally, if the country belongs to the Eurozone, then the level increases 8.5%. In relation to the second point, in East Asia and ASEAN, the coefficients of social globalization are similar to those of economic globalization; even in the Eurozone, those of social globalization are larger than those of economic globalization. Although the empirical literature on international consumption risk sharing has focused on globalization in an economic sense (*i.e.*, financial and trade integration), this result indicates that social globalization—such as

TABLE 4

CONSUMPTION RISK SHARING AND ECONOMIC, SOCIAL,
AND POLITICAL GLOBALIZATION IN 1970–2017

Region		East Asia		ASEAN		Eurozone	
Variable		$\widehat{\Delta \log(c_{it})}$	$\widehat{\Delta \log(c_{it})}$	$\widehat{\Delta \log(c_{it})}$	$\widehat{\Delta \log(c_{it})}$	$\widehat{\Delta \log(c_{it})}$	$\widehat{\Delta \log(c_{it})}$
Economic — Trade	β_0	0.6565*** (0.0329)	0.6641*** (0.0313)	0.7477*** (0.0329)	0.7530*** (0.0328)	0.4767*** (0.0310)	0.4359** (0.0315)
	de facto (β_1)	−0.0029** (0.0012)		−0.0023 (0.0015)		−0.0075*** (0.0016)	
	de jure (β_1)		−0.0046** (0.0020)		0.0006 (0.0024)		−0.0107 (0.0073)
Economic — Financial	β_0	0.6662*** (0.0313)	0.6829*** (0.0321)	0.7445*** (0.0322)	0.7355*** (0.0327)	0.4658*** (0.0308)	0.4416*** (0.0314)
	de facto (β_1)	−0.0032** (0.0015)		−0.0056*** (0.0017)		−0.0085*** (0.0018)	
	de jure (β_1)		0.0000 (0.0019)		−0.0048*** (0.0015)		−0.0077** (0.0034)
Social — Interpersonal	β_0	0.6615*** (0.0321)	0.6802*** (0.0301)	0.7405*** (0.0325)	0.7367*** (0.0325)	0.4604*** (0.0312)	0.4798*** (0.0329)
	de facto (β_1)	−0.0029** (0.0014)		−0.0040*** (0.0013)		−0.0105*** (0.0025)	
	de jure (β_1)		−0.0012 (0.0018)		−0.0060*** (0.0016)		−0.0190*** (0.0053)
Social — Informational	β_0	0.6830*** (0.0298)	0.6822*** (0.0298)	0.7360*** (0.0321)	0.7571*** (0.0329)	0.4646*** (0.0329)	0.4347*** (0.0320)
	de facto (β_1)	−0.0022 (0.0016)		−0.0065*** (0.0017)		−0.0156*** (0.0050)	
	de jure (β_1)		−0.0021 (0.0017)		−0.0060*** (0.0021)		−0.0006 (0.0053)
Social — Cultural	β_0	0.6724*** (0.0304)	0.6728*** (0.0304)	0.7452*** (0.0323)	0.7525*** (0.0324)	0.4211*** (0.0309)	0.4401*** (0.0319)
	de facto (β_1)	−0.0031** (0.0015)		−0.0041*** (0.0014)		−0.0098** (0.0039)	
	de jure (β_1)		−0.0007 (0.0015)		−0.0058*** (0.0019)		−0.0062 (0.0040)
Political	β_0	0.6694*** (0.0319)	0.6563*** (0.0311)	0.7527*** (0.0331)	0.7488*** (0.0331)	0.4649*** (0.0312)	0.4759*** (0.0324)
	de facto (β_1)	0.0049* (0.0029)		−0.0010 (0.0017)		0.0100*** (0.0021)	
	de jure (β_1)		0.0074*** (0.0023)		−0.0030 (0.0020)		0.0067*** (0.0023)
Observations		423	423	457	457	517	517
Number of countries		9	9	10	10	11	11

Note: The standard errors are in parentheses. The statistical significance at 1%, 5%, and 10% is expressed by ***, **, and *, respectively. The estimated coefficients are derived from Equation (3): $\widehat{\Delta \log(c_{it})} = \beta_0 \widehat{\Delta \log(y_{it})} + \beta_a(z_{it} - \bar{z}_t) + \beta_1(z_{it} - \bar{z}_t)\widehat{\Delta \log(y_{it})} + \varepsilon_{it}$. β_0 is the unsmoothed proportion of consumption risk for the regions for the given period. z_{it} is the interaction variable that includes de facto and de jure indices of trade, financial, interpersonal, informational, cultural, and political globalization. The absolute value of β_a is less than 0.001 and is not statistically significant; thus, this table does not report the estimates of β_a. The statistics are available upon request from the author.

direct interactions among citizens, exchanging ideas and knowledge, and understanding foreign culture—has a positive role in the risk-sharing mechanism, the same as economic globalization does.

As a second step of the analysis, the role of political globalization is explored. Table 4 reports that de facto and de jure indices of political globalization in East Asia and the Eurozone appear to be positive and statistically significant coefficients, different from economic and social globalization. Thus, a higher level of political globalization for country i increases the co-movement of consumption and GDP (β_0), thereby decreasing the level of consumption risk sharing ($1 - \beta_0$). This result is inconsistent with Balli *et al.* (2018), who reported that for groups of industrialized countries, political globalization is positively correlated with consumption risk sharing. The difference in the effect of political globalization between the present work and the study of Balli *et al.* (2018) might result from the difference in the version of the KOF Globalization Index used (see Section III, *A*).

De Facto Effects versus De Jure Effects of Globalization[22]

The de facto and de jure effects of globalization on international risk sharing are distinguished using the 2019 version of the KOF Globalization Index. Table 4 shows that nearly all the de facto measures have negative and statistically significant coefficients in East Asia, ASEAN, and the Eurozone. De facto globalization improves consumption risk sharing by exchanging goods, capital, knowledge, and information across borders. De jure measures are also positively related to international risk sharing (*e.g.*, in trade globalization in East Asia, financial and social in ASEAN, and financial and interpersonal in the Eurozone). A meaningful implication is that setting policies and creating infrastructure that facilitate actual international flows and activities can promote international risk sharing. However, if de facto and de jure measures are included in the same specification (Equation (3)), despite potential multicollinearity problems, the de facto coefficient remains statistically significant, whereas the de jure coefficient lacks statistical significance (see Table A.3 in the appendix). Therefore, this result

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[22] Gygli *et al.* (2019) found that the relative importance of de facto over de jure measures in economic growth is related to the international knowledge spillover theory.

implies that de facto measures drive the positive relationship between globalization and international risk sharing.

b) For the Sub-periods: 1970–1996 and 1999–2017

A sub-period analysis is provided to identify possible dynamic changes before and after the 1997–1998 Asian financial crisis. Tables 5 and 6 report the empirical results estimated using Equation (3) for the periods of 1970–1996 and 1999–2017, respectively. Cross-period comparisons show that in East Asia and ASEAN, economic and social globalization seems to play no role in the degree of consumption risk sharing after the 1997–1998 Asian financial crisis.

On the basis of the estimates for East Asia and ASEAN in Tables 5 and 6, statistically significant indices of economic and social globalization in 1970–1996 lack statistical significance in 1999–2017. In East Asia and ASEAN, more sub-indices of economic and social globalization have negative and statistically significant coefficients in 1970–1996 than in 1970–2017 (Table 5). Contrary to the estimates in 1970–1996, all sub-indices of economic and social globalization lack statistical significance in East Asia and ASEAN for the period of 1999-2017, except for a de jure index of trade globalization in East Asia (Table 6). In addition, in the Eurozone, although certain differences exist in the types of statistically significant index of economic and social globalization between the two sub-periods (1970–1996 and 1999–2017), economic and social globalization are positively correlated with consumption risk sharing for both sub-periods (Tables 5 and 6).

The disappearance of the effect of globalization on international risk sharing in East Asia and ASEAN is possibly related to the changes in Asian countries' economic and social systems caused by the 1997–1998 Asian financial crisis because the phenomenon only occurred in Asian regions, unlike the Eurozone, which was not greatly involved in the crisis. The other possibility is that improved economic and social integration does not guarantee *per se* a rise in the degree of consumption risk sharing. The level of economic and social globalization was higher in 1999–2017 than in 1970–1996 (Table 2). Nevertheless, the effect of globalization on risk sharing in East Asia and ASEAN vanished in 1999–2017.

Specifically, when the level of economic and social globalization is low (*e.g.*, East Asia and ASEAN in 1970–1996) or high (*e.g.*, the Eurozone in 1970–1996 and 1999–2017), the economic and social

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TABLE 5

CONSUMPTION RISK SHARING AND ECONOMIC, SOCIAL,

AND POLITICAL GLOBALIZATION IN 1970–1996

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Region			East Asia		ASEAN		Eurozone	
Variable			$\Delta \widehat{\log(c_{it})}$	$\Delta \widehat{\log(c_{it})}$	$\Delta \widehat{\log(c_{it})}$	$\Delta \widehat{\log(c_{it})}$	$\Delta \widehat{\log(c_{it})}$	$\Delta \widehat{\log(c_{it})}$
Economic	Trade	β_0	0.5833*** (0.0402)	0.5727*** (0.0399)	0.7798*** (0.0392)	0.8070*** (0.0370)	0.5431*** (0.0418)	0.4997*** (0.0435)
		de facto (β_1)	−0.0028* (0.0016)		−0.0037** (0.0016)		−0.0092*** (0.0019)	
		de jure (β_1)		−0.0042* (0.0022)		−0.0008 (0.0029)		−0.0109 (0.0077)
	Financial	β_0	0.5978*** (0.0380)	0.6090*** (0.0403)	0.7561*** (0.0368)	0.7401*** (0.0375)	0.5349*** (0.0419)	0.4985*** (0.0441)
		de facto (β_1)	−0.0022 (0.0019)		−0.0062*** (0.0017)		−0.0093*** (0.0018)	
		de jure (β_1)		0.0002 (0.0024)		−0.0067*** (0.0016)		−0.0007 (0.0040)
Social	Interpersonal	β_0	0.5756*** (0.0397)	0.6070*** (0.0368)	0.7720*** (0.0365)	0.7444*** (0.0353)	0.5285*** (0.0425)	0.5527*** (0.0463)
		de facto (β_1)	−0.0036** (0.0017)		−0.0065*** (0.0015)		−0.0122*** (0.0027)	
		de jure (β_1)		−0.0017 (0.0022)		−0.0093*** (0.0018)		−0.0208*** (0.0067)
	Informational	β_0	0.6009*** (0.0366)	0.6035*** (0.0363)	0.7502*** (0.0356)	0.7894*** (0.0354)	0.5389*** (0.0456)	0.5001*** (0.0450)
		de facto (β_1)	−0.0043** (0.0018)		−0.0087*** (0.0017)		−0.0182*** (0.0064)	
		de jure (β_1)		−0.0040* (0.0022)		−0.0120*** (0.0028)		−0.0012 (0.0063)
	Cultural	β_0	0.5873*** (0.0371)	0.6034*** (0.0379)	0.7502*** (0.0362)	0.7701*** (0.0347)	0.4657*** (0.0428)	0.5016*** (0.0444)
		de facto (β_1)	−0.0045** (0.0018)		−0.0082*** (0.0016)		−0.0105** (0.0045)	
		de jure (β_1)		−0.0003 (0.0020)		−0.0080*** (0.0019)		−0.0058 (0.0048)
Political		β_0	0.5963*** (0.0382)	0.5781*** (0.0387)	0.7610*** (0.0386)	0.7709*** (0.0382)	0.5590*** (0.0429)	0.5173*** (0.0444)
		de facto (β_1)	0.0046 (0.0039)		−0.0048** (0.0021)		0.0111*** (0.0024)	
		de jure (β_1)		0.0052* (0.0029)		−0.0068*** (0.0024)		0.0035 (0.0037)
Observations			234	234	247	247	286	286
Number of countries			9	9	10	10	11	11

Note: The standard errors are in parentheses. The statistical significance at 1%, 5%, and 10% is expressed by ***, **, and *, respectively. The estimated coefficients are derived from Equation (3): $\Delta \widehat{\log(c_{it})} = \beta_0 \widehat{\Delta \log(y_{it})} + \beta_a(z_{it} - \bar{z}_t) + \beta_1(z_{it} - \bar{z}_t)\widehat{\Delta \log(y_{it})} + \varepsilon_{it}$. β_0 is the unsmoothed proportion of consumption risk for the regions for the given period. z_{it} is the interaction variable that includes de facto and de jure indices of trade, financial, interpersonal, informational, cultural, and political globalization. The absolute value of β_a is less than 0.001 and is not statistically significant; thus, this table does not report the estimates of β_a. The statistics are available upon request from the author.

CONSUMPTION RISK SHARING AND ECONOMIC, SOCIAL,
AND POLITICAL GLOBALIZATION IN 1999–2017

Region			East Asia		ASEAN		Eurozone	
Variable			$\widehat{\Delta \log(c_{it})}$	$\widehat{\Delta \log(c_{it})}$	$\widehat{\Delta \log(c_{it})}$	$\widehat{\Delta \log(c_{it})}$	$\widehat{\Delta \log(c_{it})}$	$\widehat{\Delta \log(c_{it})}$
Economic	Trade	β_0	0.7753*** (0.0583)	0.7576*** (0.0524)	0.6079*** (0.0711)	0.5597*** (0.0723)	0.3570*** (0.0454)	0.3266*** (0.0453)
		de facto (β_1)	−0.0016 (0.0022)		0.0010 (0.0029)		−0.0042 (0.0028)	
		de jure (β_1)		−0.0090* (0.0047)		0.0066 (0.0057)		0.0136 (0.0321)
	Financial	β_0	0.7646*** (0.0578)	0.7576*** (0.0537)	0.6111*** (0.0730)	0.5732*** (0.0731)	0.3686*** (0.0458)	0.4225*** (0.0474)
		de facto (β_1)	−0.0027 (0.0030)		0.0010 (0.0045)		−0.0148** (0.0066)	
		de jure (β_1)		0.0001 (0.0033)		−0.0020 (0.0033)		−0.0310*** (0.0079)
Social	Interpersonal	β_0	0.7772*** (0.0558)	0.7836*** (0.0539)	0.6355*** (0.0721)	0.6451*** (0.0777)	0.3614*** (0.0450)	0.3902*** (0.0454)
		de facto (β_1)	−0.0021 (0.0023)		−0.0011 (0.0025)		−0.0138** (0.0057)	
		de jure (β_1)		−0.0023 (0.0033)		−0.0019 (0.0031)		−0.0239** (0.0096)
	Informational	β_0	0.7917*** (0.0511)	0.7822*** (0.0516)	0.6147*** (0.0716)	0.5963*** (0.0801)	0.3694*** (0.0458)	0.3353*** (0.0452)
		de facto (β_1)	−0.0003 (0.0033)		0.0041 (0.0042)		−0.0239*** (0.0083)	
		de jure (β_1)		−0.0008 (0.0033)		−0.0009 (0.0036)		−0.0174 (0.0128)
	Cultural	β_0	0.7902*** (0.0524)	0.7641*** (0.0521)	0.6117*** (0.0737)	0.5652*** (0.0760)	0.3565*** (0.0455)	0.3657*** (0.0459)
		de facto (β_1)	−0.0020 (0.0029)		0.0011 (0.0026)		−0.0170 (0.0106)	
		de jure (β_1)		−0.0014 (0.0027)		0.0032 (0.0048)		−0.0282*** (0.0088)
Political		β_0	0.7831*** (0.0550)	0.7768*** (0.0560)	0.5832*** (0.0706)	0.5734*** (0.0706)	0.3385*** (0.0446)	0.4072*** (0.0463)
		de facto (β_1)	0.0021 (0.0045)		0.0021 (0.0029)		0.0101** (0.0044)	
		de jure (β_1)		0.0031 (0.0044)		−0.0025 (0.0039)		0.0095*** (0.0032)
Observations			171	171	190	190	209	209
Number of countries			9	9	10	10	11	11

Note: The standard errors are in parentheses. The statistical significance at 1%, 5%, and
10% is expressed by ***, **, and *, respectively. The estimated coefficients are derived
from Equation (3): $\widehat{\Delta \log(c_{it})} = \beta_0 \widehat{\Delta \log(y_{it})} + \beta_a(z_{it} - \bar{z}_t) + \beta_1(z_{it} - \bar{z}_t)\widehat{\Delta \log(y_{it})} + \varepsilon_{it}$. β_0 is the
unsmoothed proportion of consumption risk for the regions for the given period. z_{it} is
the interaction variable that includes de facto and de jure indices of trade, financial,
interpersonal, informational, cultural, and political globalization. The absolute value of β_a
is less than 0.001 and is not statistically significant; thus, this table does not report the
estimates of β_a. The statistics are available upon request from the author.

indices are positively correlated with the degree of consumption risk sharing, whereas they are not when the level is middle (*e.g.*, East Asia and ASEAN in 1999–2017; Tables 2, 5, and 6). Thus, the progress of economic and social globalization probably tends to affect the degree of consumption risk sharing nonlinearly.[23]

V. Concluding Remarks

This study investigates the relationship between economic, social, and political globalization and consumption risk sharing in East Asia through comparative analysis using ASEAN and the Eurozone. It contributes to the empirical studies on consumption risk sharing in East Asia in two ways. First, it adds the influences of social and political globalization to the empirical studies that have focused on the effect of economic globalization. Second, it reexamines the effect of globalization on international risk sharing using the 2019 version of the KOF Globalization Index.

The estimation results show that economic and social globalization contributed to improvements in risk sharing among East Asian countries in 1970–2017, whereas political globalization did not. Specifically, the degree of consumption risk sharing increases when de facto trade, financial, interpersonal, and cultural globalization, and de jure trade globalization are highly pronounced. Moreover, the positive effect of globalization on risk sharing disappeared after the 1997–1998 Asian financial crisis.

These empirical findings imply that the closed borders, travel bans, paralyzed global supply chains, export restrictions, and rebirth of nationalism resulting from the COVID-19 pandemic might have a negative effect on international risk sharing in East Asia. The negative effect results from the collapse of economic and social networks. However, the limitation of this study is clear. As mentioned in Section III, *A*, the KOF Globalization Index used in the empirical analyses measures the relationship between one country and all other countries worldwide. Thus, even if the progress of globalization is accompanied by a rise in the degree of consumption risk sharing in East Asia, whether

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[23] This argument is related to the existence of a threshold mechanism between financial integration and risk sharing (Kose *et al.* 2003, Bai and Zhang 2012, Malik 2015).

the effect results from relations with countries within East Asia or with countries outside of that region remains unclear. Thus, decomposing the effect of globalization on international risk sharing into regional parts might be worthy of further studies. Moreover, the changes in the effect of globalization on international risk sharing in East Asia after the 1997–1998 Asian financial crisis should be further investigated (see Section IV, *B*, b).

Appendix

TABLE A.1

UNSMOOTHED PROPORTION OF CONSUMPTION RISK FOR ASEAN+3

Period	1970–2017	1970–1996	1999–2017
β_0	0.7252*** (0.0256)	0.6874*** (0.0290)	0.7275*** (0.0488)

Note: The standard errors are in parentheses. The point estimates with asterisks are statistically significant at the 1% level. The estimated coefficients are derived from Equation (3) without an interaction variable: $\widehat{\Delta \log(c_{it})} = \beta_0 \widehat{\Delta \log(y_{it})} + \varepsilon_{it}$. They are estimated based on FGLS and performed for ASEAN+3 for different periods above. On the basis of the theoretical assumptions, β_0 is the unsmoothed proportion of consumption risk for the regions for the given period.

TABLE A.2

CONSUMPTION RISK SHARING FOR ASEAN+3 AND ECONOMIC, SOCIAL, AND POLITICAL GLOBALIZATION

Period			1970–2017		1970–1996		1999–2017	
Variable			$\widehat{\Delta \log(c_{it})}$	$\widehat{\Delta \log(c_{it})}$	$\widehat{\Delta \log(c_{it})}$	$\widehat{\Delta \log(c_{it})}$	$\widehat{\Delta \log(c_{it})}$	$\widehat{\Delta \log(c_{it})}$
Economic	Trade	β_0	0.7256*** (0.0253)	0.7346*** (0.0250)	0.7119*** (0.0297)	0.7239*** (0.0298)	0.7205*** (0.0517)	0.6903*** (0.0524)
		de facto (β_1)	−0.0023** (0.0010)		−0.0032** (0.0013)		−0.0019 (0.0020)	
		de jure (β_1)		−0.0010 (0.0018)		−0.0023 (0.0022)		−0.0004 (0.0043)
	Financial	β_0	0.7259*** (0.0249)	0.7289*** (0.0252)	0.7090*** (0.0289)	0.6900*** (0.0296)	0.7217*** (0.0511)	0.6768*** (0.0534)
		de facto (β_1)	−0.0036*** (0.0013)		−0.0043*** (0.0014)		−0.0030 (0.0028)	
		de jure (β_1)		−0.0032*** (0.0012)		−0.0052*** (0.0014)		−0.0012 (0.0026)
Social	Interpersonal	β_0	0.7239*** (0.0249)	0.7336*** (0.0246)	0.6966*** (0.0288)	0.7004*** (0.0269)	0.7283*** (0.0520)	0.7221*** (0.0552)
		de facto (β_1)	−0.0035*** (0.0010)		−0.0060*** (0.0012)		−0.0017 (0.0020)	
		de jure (β_1)		−0.0040*** (0.0012)		−0.0077*** (0.0013)		−0.0003 (0.0026)
	Informational	β_0	0.7345*** (0.0245)	0.7417*** (0.0250)	0.6970*** (0.0273)	0.7177*** (0.0274)	0.7084*** (0.0527)	0.6861*** (0.0557)
		de facto (β_1)	−0.0041*** (0.0011)		−0.0071*** (0.0011)		0.0042 (0.0032)	
		de jure (β_1)		−0.0022* (0.0012)		−0.0074*** (0.0016)		0.0017 (0.0022)
	Cultural	β_0	0.7348*** (0.0246)	0.7406*** (0.0248)	0.6887*** (0.0275)	0.7201*** (0.0268)	0.7136*** (0.0524)	0.6760*** (0.0537)
		de facto (β_1)	−0.0028*** (0.0010)		−0.0069*** (0.0012)		0.0018 (0.0021)	
		de jure (β_1)		−0.0021* (0.0011)		−0.0054*** (0.0012)		0.0035 (0.0024)
Political		β_0	0.7389*** (0.0250)	0.7362*** (0.0251)	0.7084*** (0.0280)	0.7233*** (0.0289)	0.7075*** (0.0509)	0.7242*** (0.0491)
		de facto (β_1)	−0.0008 (0.0012)		−0.0057*** (0.0015)		0.0039 (0.0021)	
		de jure (β_1)		−0.0005 (0.0014)		−0.0050*** (0.0017)		0.0030 (0.0025)
Observations			645	645	351	351	266	266
Number of countries			14	14	14	14	14	14

Note: The standard errors are in parentheses. The statistical significance at 1%, 5%, and 10% is expressed by ***, **, and *, respectively. The estimated coefficients are derived from Equation (3): $\widehat{\Delta \log(c_{it})} = \beta_0 \widehat{\Delta \log(y_{it})} + \beta_a(z_{it} - \bar{z}_t) + \beta_1(z_{it} - \bar{z}_t) \widehat{\Delta \log(y_{it})} + \varepsilon_{it}$. β_0 is the unsmoothed proportion of consumption risk for the regions for the given period. z_{it} is the interaction variable that includes de facto and de jure indices of trade, financial, interpersonal, informational, cultural, and political globalization. The absolute value of β_a is less than 0.001 and is not statistically significant; thus, this table does not report the estimates of β_a. The statistics are available upon request from the author.

Region		East Asia	ASEAN	Eurozone
Variable		$\widehat{\Delta \log(c_{it})}$	$\widehat{\Delta \log(c_{it})}$	$\widehat{\Delta \log(c_{it})}$
Economic — Trade	β_0	0.6501*** (0.0333)	0.7434*** (0.0329)	0.4760*** (0.0310)
	de facto (β_1)	−0.0022 (0.0014)	−0.0041** (0.0019)	−0.0074*** (0.0016)
	de jure (β_1)	−0.0029 (0.0023)	0.0044 (0.0030)	−0.0036 (0.0073)
Economic — Financial	β_0	0.6748*** (0.0325)	0.7358*** (0.0324)	0.4673*** (0.0310)
	de facto (β_1)	−0.0059*** (0.0022)	−0.0037 (0.0023)	−0.0081*** (0.0019)
	de jure (β_1)	0.0050* (0.0026)	−0.0027 (0.0019)	−0.0021 (0.0035)
Social — Interpersonal	β_0	0.6444*** (0.0330)	0.7427*** (0.0329)	0.4826*** (0.0330)
	de facto (β_1)	−0.0056** (0.0024)	−0.0015 (0.0027)	−0.0089*** (0.0026)
	de jure (β_1)	0.0047 (0.0031)	−0.0043 (0.0033)	−0.0099* (0.0053)
Social — Informational	β_0	0.6781*** (0.0317)	0.7456*** (0.0342)	0.4704*** (0.0330)
	de facto (β_1)	−0.0033 (0.0036)	−0.0055** (0.0022)	−0.0228*** (0.0061)
	de jure (β_1)	0.0013 (0.0039)	−0.0017 (0.0027)	0.0140** (0.0063)
Social — Cultural	β_0	0.6432*** (0.0324)	0.7491*** (0.0324)	0.4256*** (0.0315)
	de facto (β_1)	−0.0045** (0.0019)	−0.0022 (0.0019)	−0.0086* (0.0045)
	de jure (β_1)	0.0020 (0.0019)	−0.0038 (0.0027)	−0.0021 (0.0046)
Political	β_0	0.6610*** (0.0321)	0.7545*** (0.0330)	0.4915*** (0.0318)
	de facto (β_1)	−0.0041 (0.0042)	0.0058 (0.0037)	0.0097*** (0.0022)
	de jure (β_1)	0.0101*** (0.0034)	−0.0091* (0.0043)	0.0046** (0.0023)
Observations		423	457	517
Number of countries		9	10	11

Note: The standard errors are in parentheses. The statistical significance at 1%, 5%, and
10% is expressed by ***, **, and *, respectively. The estimated coefficients are derived
from Equation (3): $\widehat{\Delta \log(c_{it})} = \beta_0 \widehat{\Delta \log(y_{it})} + \beta_a(z_{it} - \bar{z}_t) + \beta_1(z_{it} - \bar{z}_t)\widehat{\Delta \log(y_{it})} + \varepsilon_{it}$. β_0 is the
unsmoothed proportion of consumption risk for the regions for the given period. z_{it} is
a vector of the interaction variables that includes de facto and de jure indices of trade,
financial, interpersonal, informational, cultural, and political globalization. The absolute
value of β_a is less than 0.001 and is not statistically significant; thus, this table does not
report the estimates of β_a. The statistics are available upon request from the author.

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