Chapter 2 Challenges for Restoring the Global Economy's Functions

This chapter will show that the current global inflation is due in large part to supply shortages and that in order to ease the inflation, it is important to enhance supply capacity and productivity and increase the resilience of supply chains through capital investment and other measures.

It will also show that, while promoting countries' trade openness leads to their economic growth through a productivity rise, uncertainty concerning trade counterparts have negative effects on their own trade but that, in the case of trade counterparts that have a higher level of respect for basic values, such as freedom, democracy, human rights and the rule of law, increased uncertainty concerning the trade reduction effect is smaller.

In addition to providing an overview of foreign countries' economic security policies, this chapter will show the importance for Japan to rebuild the rules-based international trade order, build reliable supply chains with like-minded countries, and strengthen cooperation with the Global South at the same time with a view to ensuring both a free and fair trade order and economic security.

It will also point out the importance of dealing with climate change risks and human rights issues as activity to ensure sustainable and inclusive economic growth and prosperity and describe foreign countries' and Japan's activities.

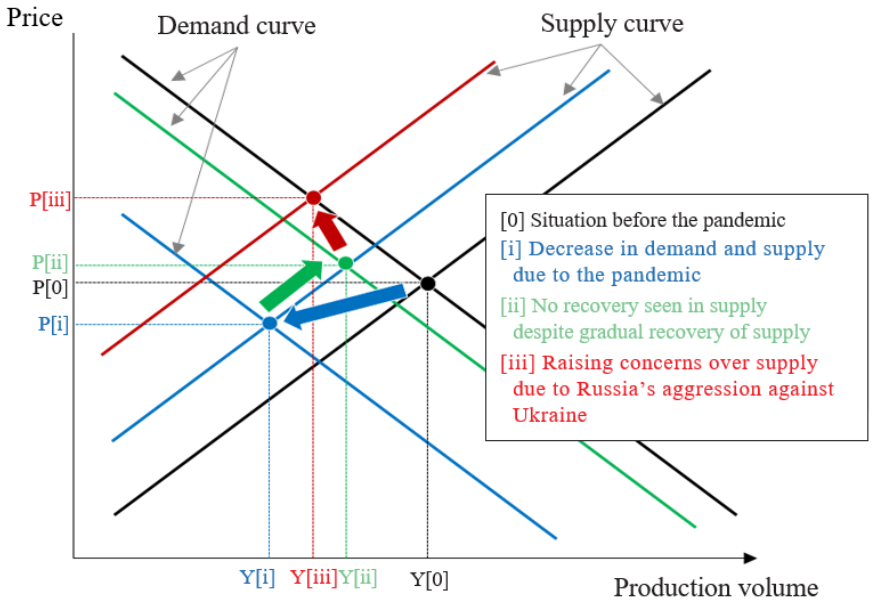
Section 1 Strengthening supply-side measures

1. Easing inflationary pressures by enhancing supply capacity and raising productivity

This section will first briefly explain how the current growing inflationary pressures have arisen from the viewpoint of the supply-demand balance mechanism and show that while monetary tightening policies being currently implemented by central banks represent efforts to ease inflationary pressures by curbing demand, in the medium to long term, it is important to expand production and ease the pressures by expanding supply capacity. It will also show that raising productivity is important for easing inflationary pressures and that promoting trade openness is an important means to do so.

Figure I-2-1-1 shows an image describing price changes in each of the following four periods: (0) the pre-pandemic period (2019), (1) the pandemic period (2020), (2) the period of recovery from the pandemic (2021) and (3) the period since the start of Russia's aggression against Ukraine (2022) from the viewpoint of the supply-demand balance mechanism. The transition from (0) to (1) is represented by the leftward shift of the demand and supply curves due to the stagnancy of economic and social activities. The price level in that period was low compared with the level in the pre-pandemic period because demand decreased more than supply capacity did at that time. As transition from (1) to (2) progressed, while the demand curve shifted rightward, mainly in the United States and European countries, due to the reopening of economic and social activities, people did not return to the labor market. In emerging and developing countries, which are the supply sources of goods, prices rose because supply did not yet return to the pre-pandemic level because of the restrictions imposed on economic and social activities due to the pandemic. In this situation, because of (3) the Russian aggression against Ukraine, energy and food supply risks grew, resulting in a further leftward shift of the supply curve, which caused further price rises. From the above, it can be said that price rises in recent years have been caused by supply-side factors.

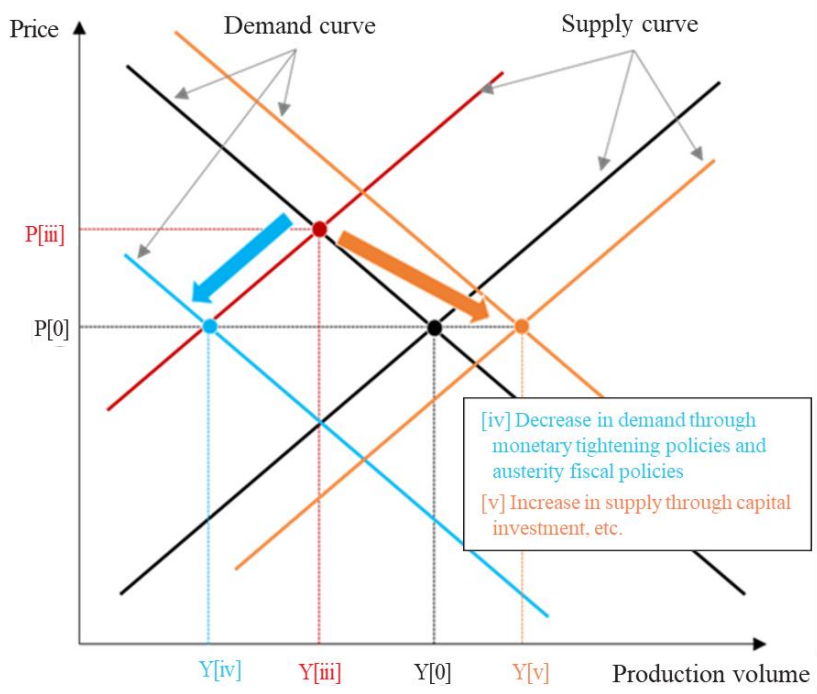
Figure I-2-1-1. Price fluctuation mechanism from the viewpoint of demand and supply curves (conceptual picture)



Source: METI.

Figure I-2-1-2 shows an image describing measures to reduce inflationary pressures from the viewpoint of the supply-demand balance mechanism. Monetary tightening policies being currently implemented by central banks represent efforts to reduce inflationary pressures by shifting the demand curve leftward once again. However, it should be kept in mind that although this approach reduces inflationary pressures, it also decreases production volume by curbing demand. Another measure to reduce inflationary pressures is to shift the supply curve rightward by expanding supply capacity. However, this measure entails a time lag between investment for expanding facility capacity and actual supply capacity expansion. It should be kept in mind that during the time lag period, increased investment will exert inflationary pressures in the short term by expanding demand.

Figure I-2-1-2. Measures for curbing inflation



Source: METI.

From the above, it can be said that even though price rises in recent years are due in large part to supply-side factors, implementing monetary tightening policies could cause economic squeezes by curbing demand, so it is important not only to resolve supply bottlenecks due to a labor force decline and supply chain disruptions at an early time but also to reduce inflationary pressures and promote economic growth at the same time by increasing the resiliency of supply chains and by enhancing supply capacity.

Moreover, in order to ease inflationary pressures, in addition to enhancing supply capacity, it is also important to raise productivity. It has been pointed out that a rise in the unit labor cost, which represents labor cost per unit of production, increases upward price pressure, and it is therefore an important indicator of inflationary pressures. As shown by Figure I-2-1-3, the unit labor cost can be decomposed into two factors, namely wages and labor productivity. A rise in wages raises the unit labor cost, while a rise in labor productivity lowers the unit labor cost. From that, it can be said that a rise in labor productivity eases inflationary pressures.

Figure I-2-1-3. Decomposition of unit labor costs

If total compensation of employees is W, production volume is Y, and the number of employees is L, then a unit labor cost, which is the labor cost per unit of production, can be expressed as follows.

$$\text{Unit labor cost} = \frac{\text{Total compensation of employees}}{\text{Production volume}} = \frac{\text{Total compensation of employees/Number of employees}}{\text{Production volume/Number of employees}} = \frac{\text{Wages per employee}}{\text{Labor productivity}}$$

$$\frac{W}{Y} = \frac{\frac{W}{L}}{\frac{Y}{L}}$$

Taking the natural logarithm (ln) on both sides, we can obtain the following result.

$$\ln\frac{W}{Y} = \ln\frac{W}{L} - \ln\frac{Y}{L}$$

$$\text{Unit labor cost (log)} = \text{Wages per employee (log)} - \text{Labor productivity (log)}$$

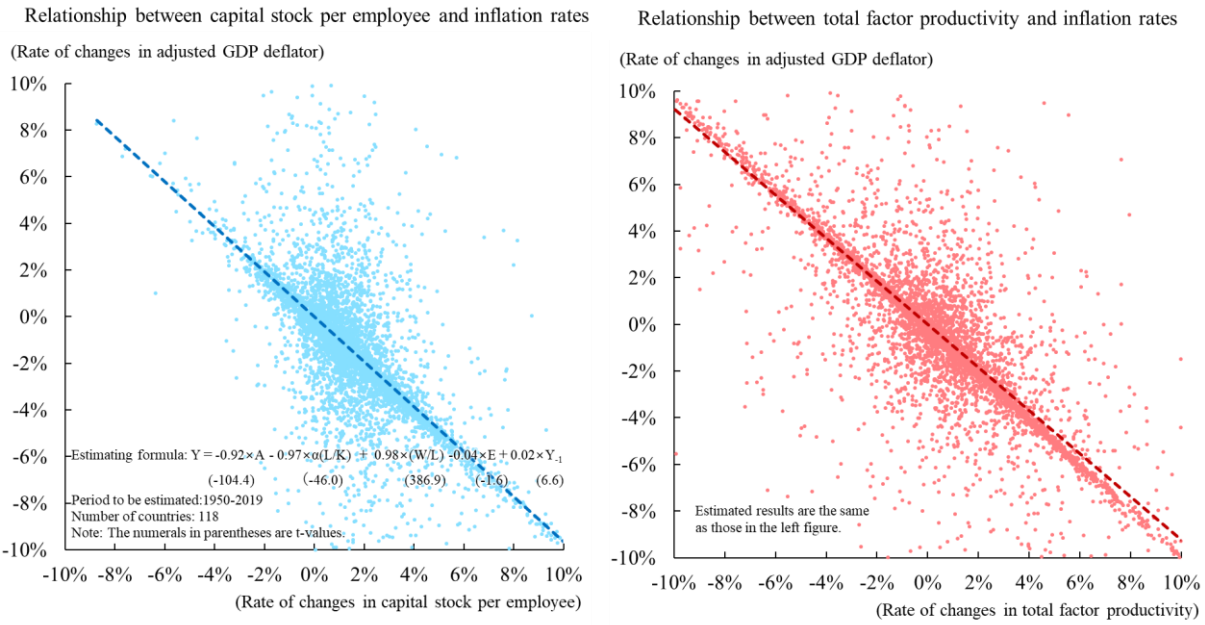
Based on the result above, we can find that an increase in wages per employee causes an increase in unit labor costs, while an increase in labor productivity causes a decrease in unit labor costs.

Source: METI.

Figure I-2-1-4 describes that relationship. This analysis, using long-term data for the period from 1950 to 2019 in 118 countries, describes the relationship between inflation and productivity and estimates the impact on inflation of labor productivity decomposed into total factor productivity and the capital equipment ratio (Figure I-2-1-5). In the estimation, the population aging rate is added as an independent variable because it has been pointed out that a rise in the population aging rate raises the inflation rate[53] (for the details of the analysis, see Note 1). From this figure, we can see that each of total factor productivity and the capital equipment ratio has a significant negative effect on the inflation rate controlled for other factors, so it can be said that raising the levels of those indicators contributes to easing inflationary pressures.

[53] Goodhart, C., Pradhan, M., (2020), *The Great Demographic Reversal: Ageing Societies, Waning Inequality, and an Inflation Revival* (Trans. Shiuya, H., (2022), *JINKOU DAIGYAKUTEN KOUREIKA, INFURE NO SAIRAI, FUBYOUDOU NO SHUKUSHOU*, NIKKEI BP Nikkei Publishing.)

Figure I-2-1-4. Inflation-suppressing effect of capital stock and total factor productivity per employee



Note: These are the panel data consisting of 118 countries for the period 1950-2019. METI conducted a regression analysis with random effect model by using the rate of change in the GDP deflator (Y) as a dependent variable and by using the total factor productivity (A), capital stock per employee (α (K/L)), compensation per employee (W/L), the population aging rate (E), and GDP deflator (Y-1) in the previous period (all of which are rates of change) as independent variables. The vertical axis of the graphs shows the results obtained by subtracting from the dependent variable the influence of the independent variables other than the variable used for the horizontal axis by using regression results.

Source: *Penn World Table 10.01* (University of Groningen), *World Population Prospects* (UN).

Figure I-2-1-5. Decomposition of labor productivity

Assuming two goods, i.e., capital stock amount K and number of workers L as production factors, and also assuming total factor productivity A, capital share α, and labor share 1-α, in using the Cobb-Douglas production function, the production function for good Y is the one shown in (1) below, and (1) can be organized as the one shown in (2).

$$Y = A \cdot K^{\alpha} L^{1-\alpha} \quad \cdots (1)$$

$$\frac{Y}{K} = A \cdot \left(\frac{K}{L}\right)^{-(1-\alpha)} \quad \cdots (2)$$

In addition, labor productivity Y/L can be decomposed using the capital equipment ratio K/L as shown in (3) below.

$$\text{Labor productivity} = \frac{\text{Production volume}}{\text{Number of employees}} = \frac{\text{Capital stock amount}}{\text{Number of employees}} \times \frac{\text{Production volume}}{\text{Capital stock amount}}$$

$$\frac{Y}{L} = \frac{K}{L} \cdot \frac{Y}{K} \quad \cdots (3)$$

Substituting (2) for (3) and taking the natural logarithm, we can obtain the following result.

$$\frac{Y}{L} = A \cdot \left(\frac{K}{L}\right)^{\alpha}$$

$$\ln\left(\frac{Y}{L}\right) = \ln A + \alpha \cdot \ln\left(\frac{K}{L}\right)$$

(log) labor productivity = (log) total factor productivity + capital share × (log) capital equipment ratio

As seen from the above, the labor productivity can be decomposed into the product of the total factor productivity and the capital equipment rate and capital share.

Source: METI.

Above, the following points have been made: that the current inflation is due in large part to supply-side factors; that in order to ease the inflation, it is important to enhance supply capacity; and that raising productivity is also an effective measure from the viewpoint of easing inflationary pressures. The next subsection will show that promoting trade openness is important for raising productivity and also that the productivity-raising effect has turned out to be stronger in countries that pursue free trade under the multilateral, rules-based trade system. The next subsection will also point out the negative impact of increased uncertainty on trade and show that the negative impact is smaller in countries that are rated high in terms of governance, including the rule of law.

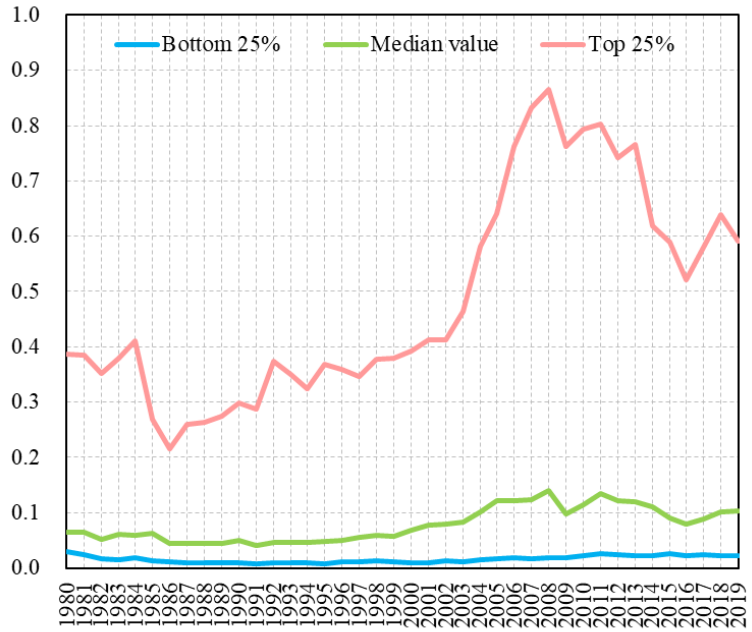
2. Raising productivity by promoting trade openness

While the previous subsection showed the importance of raising productivity for easing inflationary pressures, raising the productivity levels of countries participating in trade by increasing the trade openness is an effective measure from the viewpoint of enabling the global economy to overcome the ongoing difficulty. This subsection will analyze not only the positive effects of countries' trade openness on their productivity but also the negative impact of uncertainty concerning trade counterparts on their own trade. By doing so, the subsection will describe how partnerships that enable the benefits of free trade to be enjoyed while increasing the resiliency of trade may be developed.

First, let us look at how the openness of global trade has changed over time. While there are various yardsticks of trade openness, this analysis uses the Composite Trade Share (hereinafter "CTS"), which

was conceived by Squalli and Wilson (2011).[54] For example, if trade openness is measured in terms of the ratio of the value of trade to GDP, smaller countries tend to be rated higher, while if it is measured in terms of the share of global trade, countries with a large economic size tend to be rated high. However, the CTS is a superior indicator in that it takes into consideration countries' economic size when measuring trade openness while incorporating information on both the ratio of the value of trade to GDP and global share. Figure I-2-1-6 shows the first quantile value (the bottom 25%), the median value, and the third quantile value (the top 25%) of the CTS of countries around the world. According to this figure, the third quantile value is far higher than the median value. The presence of a high level of trade openness is limited to a small group of countries that are rated high by this measure. In those highly rated countries, the CTS rose steeply in the 2000s in line with the advance of globalization but has been declining as a trend since the 2010s. Figure I-2-1-7 represents a mapping of individual countries' CTS in 2019. According to this figure, in addition to European countries and the United States, Japan, the Republic of Korea, Australia, China, Russia, some Central and South American countries, and East Asian countries are rated high.

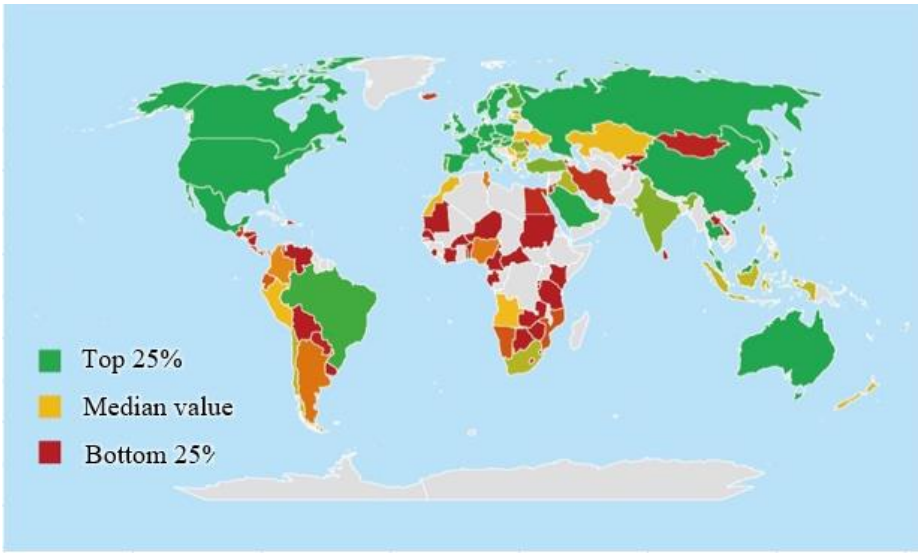
Figure I-2-1-6. Distribution of Composite Trade Share (CTS)



Source: *Penn World Table 10.01* (University of Groningen).

[54] Squalli, J., and Wilson, K. (2011), "A new measure of trade openness," *The World Economy, 34 (10), 1745-1770.*

Figure I-2-1-7. World distribution of CTS (2019)

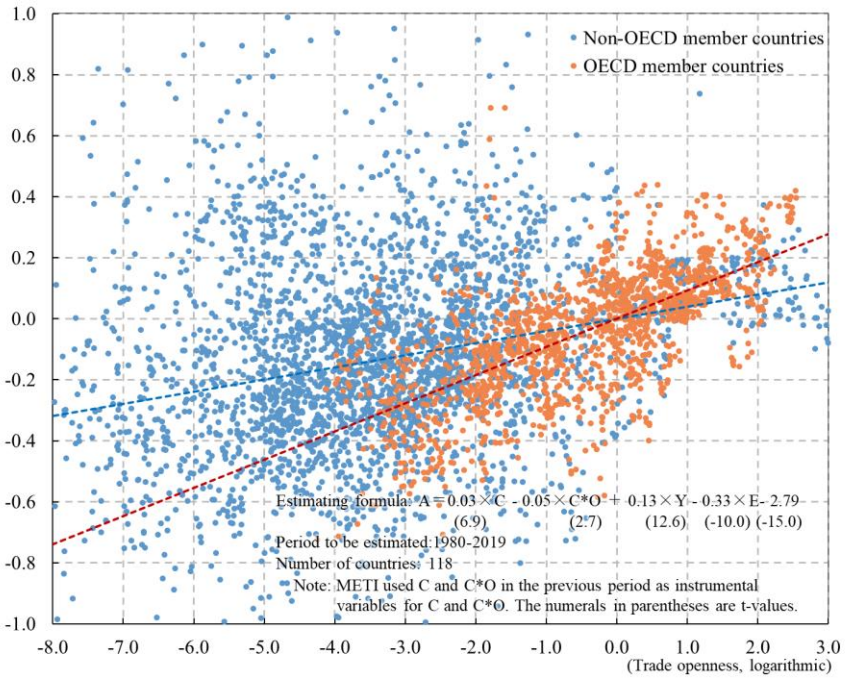


Source: *Penn World Table 10.01* (University of Groningen).

Next, let us examine the impact that trade openness may have on productivity. Specifically, we examine the impact of the CTS on total factor productivity using each country's total factor productivity as an indicator of productivity while looking at the Japan Center for Economic Research (2019)[55] as a reference. In doing that, in addition to using the population aging rate, which is another indicator that could affect total factor productivity, as an independent variable, we also include real GDP among the independent variables used from the viewpoint of controlling the economic size. Moreover, in order to control reverse causality, which refers to the possibility that total factor productivity may affect the CTS, we conducted estimation by using the total factor productivity as of one year before as an instrumental variable (for the details of the analysis, see Note 2). Figure I-2-1-8 shows the relationship between total factor productivity and the CTS after being controlled for the impact of factors other than the CTS (the population aging rate and real GDP in this analysis) on total factor productivity. This figure shows that the higher the CTS is, the higher total factor productivity is. One notable point here is that when the samples are divided into OECD member countries and other countries, total factor productivity's positive correlation with the CTS is pronounced in OECD member countries. We can also see that the variance across samples is smaller in OECD countries. The OECD is a group of countries that pursue free trade under the multilateral, rules-based trade system, and this is an example indicating that in countries that place emphasis on the pursuit of free trade under that kind of trade system, promoting trade openness is highly effective in raising total factor productivity.

[55] Japan Center for Economic Research (2019), "BOUEKI TORIHIKI NO TEITAI, SEKAITEKI NA SEISANSEI TEIKA NO OSORE—JIYUBOUEKI NO WAKUGUMI HIROGERU TORIKUMI JYUUYOUNI," KEIZAI HYAKUYOU BAKO Vol. 137.

Figure I-2-1-8. CTS and total factor productivity



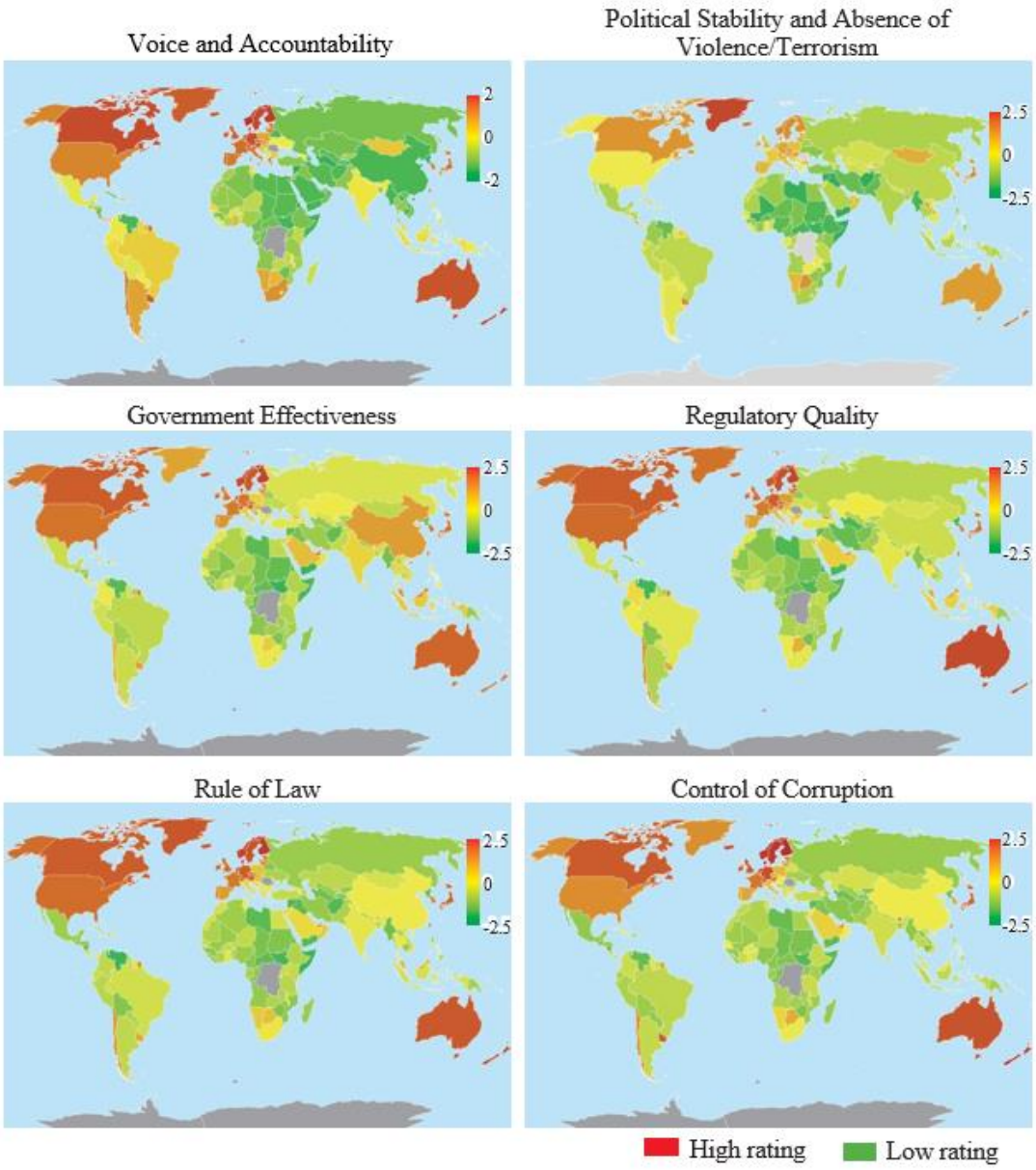
Note: METI conducted a regression analysis with a fixed-effect model by using total factor productivity (A) as a dependent variable and by using the CTS (C), a cross term (C*O) between the CTS and a dummy variable that takes 1 if the given country is an OECD member as of 2022, the population aging rate (E), and real GDP (Y) as independent variables. In doing so, METI estimated this by a two-stage least squares method using the CTS in the previous period as an instrumental variable for the CTS. The vertical axis of the graphs shows the results obtained by subtracting from the dependent variable the influence of the independent variables other than the variable used for the horizontal axis by using regression results.

Source: *Penn World Table10.01* (University of Groningen), *World Population Prospects* (UN).

As described above, enhancing trade openness raises productivity, but it should be kept in mind that enhancing trade openness also involves some risks. Here, we will show that if countries face increased uncertainty concerning trade counterparts, it could reduce their own trade. Below, we will explain our analytical approach. The basic model for the analysis is based on the approach of the gravity model, which assumes that the volume of a subject country's trade with a trade counterpart is proportional to the physical distance between the two countries and to their economic size. The value of trade between the two countries is used as a dependent variable, while the distance between the two countries, nominal GDP, and World Trade Uncertainty Index included in the dataset of the World Uncertainty index are used as independent variables. Using those variables, we conduct estimation under a fixed-effect model to measure the impact of increased uncertainty concerning the counterpart on the value of the subject country's trade, after controlling for the distance and GDP. When doing that, we use the Worldwide Governance Indicators (WGIs), published by the World Bank, as an instrumental variable in order to measure the impact that the trade counterpart's governance situation has through trade uncertainty. The results obtained have implications as to how countries should control trade uncertainty. The WGIs are indicators developed by the World Bank for the purpose of assessing the governance situation of countries around the world. Specifically, the WGIs are comprised of the following six indicators: "Voice

and Accountability," "Political Stability and Absence of Violence," "Government Effectiveness," "Regulatory Quality," "Rule of Law" and "Control of Corruption" (Figure I-2-1-9). In the estimation, an indicator integrating those six indicators through principal component analysis is developed and is used as an instrumental variable (for the details of the analysis, see Note 3).

Figure I-2-1-9. Worldwide Governance Indicators (2021)

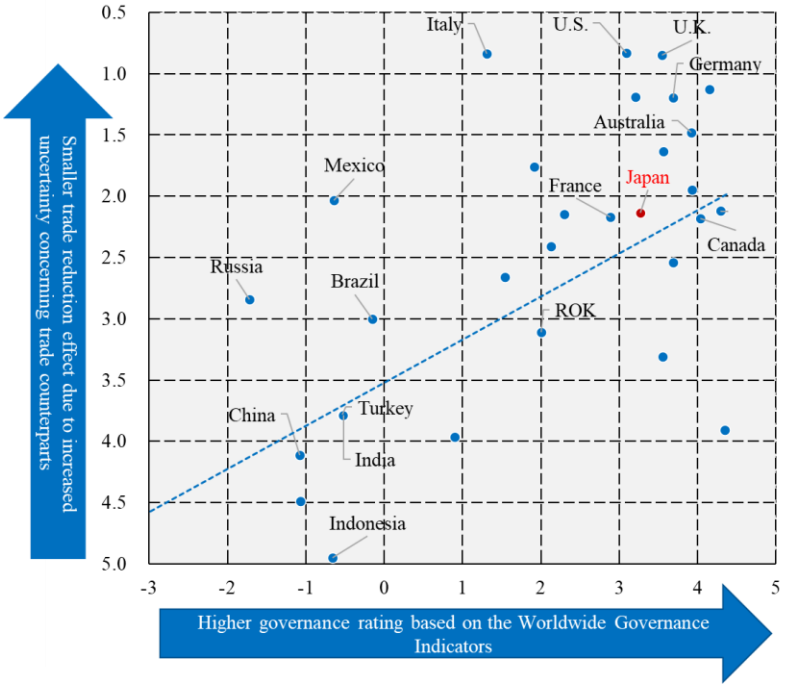


Source: *Worldwide Governance Indicators (WGI)* (World Bank).

Figure I-2-1-10 shows the relationship between the governance rating and the trade reduction effect due to increased uncertainty concerning trade counterparts since 2000 based on the above estimation, with attention focused on countries with a high level of trade openness. The figure indicates that the higher the governance ratings of a subject country's trade counterparts are, the smaller the trade reduction effect of increased uncertainty concerning the counterparts on the subject country tends to be.

This result suggests that trade counterparts' governance ratings may serve as an important signal when developing trade partnerships.

Figure I-2-1-10. Relationship between global governance indicators and trade reduction effects due to increased uncertainty



Note: METI conducted a regression analysis, in which, using the export values (E) from an exporter to an importer as a dependent variable, and the GDP of the importer and exporter(YI and YE, respectively), the trade uncertainty indices of the importer and exporter (TI and TE, respectively), and a dummy variable (R) for the existence of an economic partnership agreement as independent variables, fixed effects (F) per importer, those per exporter, and those per a pair of an importer and an exporter were considered. In doing so, METI used the Worldwide Governance Indicators as an instrumental variable for the trade uncertainty indices and estimated the data by using a two-stage least squares method. The vertical axis of the graph shows the expected value of the reduction in trade that a country would suffer from the effects of the governance indicators of the plotted countries if the country were to trade with each of the plotted countries.

Source: Gravity Dataset (CEPII), Economic Policy Uncertainty Index, Worldwide Governance Indicators (WGI) (World Bank).

To sum up the above, if countries are to realize economic growth by raising productivity through free trade while increasing the resiliency of their trade, it is important for them to deepen partnerships with countries that respect such values as trade liberalization, freedom, democracy, basic human rights, and the rule of law.