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Global Government Debt Enters Explosive Phase due to High Inflations

—Domar's condition has not been met in Japan, and achieving a fiscal surplus is essential —

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Summary -

- Against the backdrop of high inflation, long-term interest rates are soaring worldwide. The rise has been particularly steep in southern European countries, and in the background to this are mounting concerns that an increase in the burden of government interest payments could worsen public finances. If high inflation persists in the future, Domar's condition (long-term interest rate < nominal economic growth rate) will not be met in many countries, increasing the likelihood of an explosion in government debt. Two pathways can lead to Domar's condition not being met.</p>
- The first is increases in the jurisdiction's policy rate. If the current high inflation were to be checked only by raising interest rates to suppress demand, rates would have to be raised by 8% in the U.S. and 7% in the eurozone. If supply constraints are not resolved, central banks will be forced to hike their policy interest rates significantly to curb demand, which could lead to higher long-term interest rates and lower economic growth.
- The second is greater uncertainty surrounding inflation. Prices are known to be more volatile and uncertain during periods of high inflation. This pushes up long-term interest rates and reduces the rate of economic growth through such factors as a reluctance to invest. If uncertainty about inflation volatility were to expand to the level of the 1980s, it is estimated that long-term interest rates would exceed economic growth rates by 2-4% in southern European countries and elsewhere.
- In Japan, too, monetary policy could be normalized depending on price and wage trends,

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and a phase in which long-term interest rates exceed the growth rate could take hold. In Japan, spells during which Domar's condition has not been met over the past 20 years have been longer than in other countries, and have been a factor in the expansion of government debt. Given the possibility of further expansion of government debt due to inflation becoming chronic, there is an urgent need to set out a path toward achieving a surplus in the primary balance.

 ● This is an English version of "物価高で世界の政府債務は発散局面へ —わが国でもドーマ 一条件不成立、財政黒字化が必須—" in JRI Research Focus (The original version is available at https://www.jri.co.jp/MediaLibrary/file/report/researchfocus/pdf/13635.pdf)

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1. Long-term interest rates are soaring worldwide

Across the globe, long-term interest rates are skyrocketing. Median long-term interest rates in the OECD countries have reached nearly 3%, up sharply from 0.4% at the end of last year (Figure 1). The steep ascent of long-term interest rates is occurring against a backdrop of policy rates being hiked at a rapid pace due to rising inflation. The year-on-year change in consumer prices has reached a median of about 9% in the OECD countries, the highest level since 1992 (Figure 2). To curb inflation, central banks have been raising interest rates, with the median policy rate having been hiked to around 1.5%. Further rate increases are expected to be seen in many countries going forward. The market is dominated by the view that the U.S. policy rate will reach the mid-3% range by the end of this year. In Europe, too, policy rates are widely predicted to be raised to the mid-1% range in the eurozone and around 3% in the U.K.

In countries with shaky fiscal foundations, such as those in southern Europe, there is concern that higher interest rates will increase the burden of interest payments on government debt, and this is leading to even higher rates. In Italy in particular, the yield spread with Germany has widened to over two percentage points (Figure 3). To curb disorderly interest rate rises, the European Central Bank (ECB) has introduced the Transmission Protection Instrument (TPI), which allows it to purchase an unlimited number of government bonds of eurozone countries if yields on the bonds spike. However, the government bond purchases are subject to conditions such as adherence to fiscal discipline by the government of the country activating the TPI, and so the move has not fully allayed concerns about rising interest rates. If a far-right party with an aggressive fiscal policy comes to power in Italy, the TPI may not function and long-term interest rates could rise further.



Note: Medians for OECD member countries. Long-term interest rates are 10-year government bond yields (same below).







2. High inflation may become entrenched and government debt may explode

Going forward, persistently high inflation in many countries, not just Italy, could push up interest rates and heighten concerns about fiscal deterioration. Price increases have the effect of both reducing and increasing the debt burden. They can reduce the debt burden by causing the principal to diminish in real terms. On the other hand, they can increase the debt burden through higher interest rates, which push up interest payments. Whether the debt burden is reduced or increased overall hinges on whether long-term interest rates are below or above the nominal economic growth rate. This is called "Domar's condition¹."

If the long-term interest rate is lower than the growth rate (i.e., Domar's condition is met), interest payments will be less than the incremental value added, and if the primary balance (i.e., the fiscal balance excluding interest payments) is zero, government debt will not expand as much as GDP, and fiscal stability will be achieved. Furthermore, even if the primary balance is in deficit, as long as the deficit is within the range of the difference between incremental value added and interest payments, government debt will not explode (Figure 4). Conversely, if the long-term interest rate is higher than the growth rate (i.e., Domar's condition is not met), government debt will explode if the primary balance is in deficit. So, to prevent government debt from exploding, the primary balance must be maintained at a certain level of surplus.









In many countries, long-term interest rates are currently below nominal growth rates, creating an economic environment in which government debt relative to the size of the economy is easily contained. In the OECD countries, Domar's condition has been met in most periods since the 2000s, and the same trend has continued even during the COVID pandemic (Figure 5). However, if high inflation becomes established, long-term interest rates will rise and economic growth will decline, and the economic environment may shift to one in which

$$\frac{B_t}{Y_t} - \frac{B_{t-1}}{Y_{t-1}} = \frac{G_t - T_t}{Y_t} + (r_t - g_t)\frac{B_{t-1}}{Y_{t-1}}$$

¹ If the government debt for the period t is B_t , the government's budget constraint equation can be written as $B_t - B_{t-1} = G_t - T_t + r_t B_{t-1}$. Where G is expenditures other than interest payments, T is revenue, and r is the interest rate. This budget constraint equation means that the increase in government debt is the sum of the primary budget deficit (G - T) and interest payments (rB). If nominal GDP is Y_t and the nominal GDP growth rate is g, the degree of change in the government debt/GDP ratio is given by the following formula:

If the interest rate exceeds the growth rate (Domar's condition is not met) and the primary balance is in deficit, the change in the government debt/GDP ratio will be positive and government debt will explode. Conversely, if the interest rate is below the growth rate (Domar's condition is met), the government debt/GDP ratio will be negative and government debt will not explode, even if the primary balance is slightly in deficit.



Domar's condition is less likely to hold. Pathways to this include (1) policy rate increases and (2) greater uncertainty surrounding inflation volatility.

(1) Policy rate increases

If supply constraints persist, policy rates are likely to be raised by more than expected. This current phase of high inflation is a result of the coupling of the recovery of demand following the pandemic with wide-ranging supply shortages in areas such as resources and labor. To calm high inflation without causing economic pain, it will be essential to resolve supply constraints. Conversely, if inflation were to be assuaged only by suppressing demand, policy rates would have to be raised substantially, increasing the degree of economic deterioration.

Applying the "Taylor rule" (i.e., setting policy rates in response to inflation and unemployment rates) to capture the interest rate level corresponding to inflation with demand suppression alone, the policy rates corresponding to recent inflation rates would be estimated to be around 8% in the U.S. and 7% in the eurozone² (Figure 6). In contrast, the future policy rates expected by the market are, as noted earlier, only in the mid-3% range in the U.S. and the mid-1% range in the eurozone, well below the Taylor rule policy rates. The market can be interpreted as assuming that the calming of inflation will involve not only the suppression of demand through higher interest rates but also the resolution of supply constraints and the cooling of resource prices. However, it is highly likely that the



various supply constraints will not all be swiftly resolved going forward. If this turns out to be the case, policy rates could be raised much higher than market expectations, resulting in a sharp spike in long-term interest rates and a significant decline in economic growth.

² The results of policy rate estimation using the Taylor rule are as follows (the explained variable is the policy rate):

| Explanatory variable | Constant term | Potential economic growth rate | Inflation rate minus 2% | Unemployment rate gap | Coefficient of determination | Standard error |
|-------------------------|---------------------|--------------------------------------|----------------------------|--------------------------|------------------------------------|-------------------|
| U.S. | -1.032** (0.434) | 1.718 ^{***} (0.155) | 1.769*** (0.111) | 0.265*** (0.076) | 0.843 | 1.063 |
| Eurozone | 2.633*** (0.265) | 0.186 (0.166) | 2.329*** (0.202) | 0.543*** (0.169) | 0.709 | 0.721 |

The potential economic growth rate for the U.S. is estimated by the Congressional Budget Office; for the eurozone, the trend is based on the HP filter for real GDP. The inflation rate for the U.S. is the PCE core deflator YoY; for the eurozone, it is the HICP core YoY. The unemployment rate gap is the natural unemployment rate minus the unemployment rate. The natural unemployment rate for the U.S. is estimated by the Congressional Budget Office; for the eurozone, the trend is based on the HP filter for the unemployment rate. Figures in parentheses are the standard deviations, with ** denoting statistical significance at the 5% level and *** at the 1% level. The estimation period for the U.S. is January-March 1987 to October-December 2019, and for the eurozone it is January-March 2002 to October-December 2019.





Greater uncertainty surrounding inflation volatility could also lead to Domar's condition not holding. As noted earlier, if supply constraints are not resolved, central banks will be forced to hike their interest rates significantly. But if central banks implement policies that prioritize the economy over curbing inflation, interest rate hikes will be avoided, while high inflation will persist. Sustained high inflation exacerbates uncertainty.

As Nishioka [2022] points out, prices tend to fluctuate wildly during periods of high inflation. When prices fluctuate wildly, forward-looking inflation expectations become unstable and interest rates become more volatile. The term premium demanded by bond investors also increases as interest rate volatility increases, causing longterm interest rates to rise. In the U.S., for example, the term premium reached 4% in the early 1980s, when inflation volatility intensified. Today the premium is close to zero, a starkly different situation (Figure 7). Greater uncertainty not only pushes up long-term interest rates but also encourages people to hold off on investment, thereby reducing the rate of economic growth. Nishioka [2022], using data from 183 countries around the world, shows that an increase in the standard deviation of the inflation rate significantly reduces the real economic growth rate, and argues that the effect is particularly large in advanced countries.

Therefore, growing uncertainty over inflation volatility alters the economic environment, moving it in a direction where Domar's condition no longer holds, in terms of both interest rates and growth rates. In fact, in the OECD countries, the difference between long-term interest rates and growth rates tends to be closely linked to the standard deviation of the inflation rate (Figure 8). Given this relationship, if the standard deviation of the inflation rate were to increase to the level of the 1980s, Domar's condition would fail to hold not only in southern European countries such as Portugal, Greece, Italy, and Spain, but also in Japan

Figure 7. U.S. Long-term Interest Rates









Source: Estimates by the author based on data from the OECD and IMF Note: Major countries from among OECD countries. Grow th rates are the rate of grow th in nominal GDP compared with three years earlier. Refer to footnote 3 for the estimation method.

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and South Korea, and long-term interest rates would exceed economic growth rates by 2-4%³ (Figure 9). Even in large countries such as the U.S. and Germany, which have met Domar's condition so far, the difference between long-term interest rates and growth rates is estimated to be zero or thereabouts.

3. Expansion of government debt will lead to further increases in interest rates

If Domar's condition is not met, government debt is more likely to grow, destabilizing public finances. In fact, in OECD countries, there is a clear relationship between failure to meet Domar's condition and larger government debt levels in countries where long-term interest rates have exceeded growth rates (Figure 10). This may reflect a vicious cycle in which rising interest payments swell government debt and, as a result of concerns about worsening public finances, this expansion of government debt then pushes interest rates even higher.

In an economic environment in which Domar's condition is not met, a certain level of surplus in the primary balance is necessary to prevent an explosion in government debt. However, the OECD countries' primary budget balances have fallen into the largest deficits since 1980 (Figure 11), reflecting increased spending on COVID-related measures to control the spread of the disease, boost the economy, and so on. According to IMF projections, more than half of the countries are expected to continue to have deficits even in 2025, though the deficits will gradually narrow from here on. Attention needs to be paid to the possibility that government debt



Figure 10. Government Debt and Domar's

(Long-term Interest Rate - Economic Growth Rate, % points) Sources: OECD, IMF Note: 37 OECD countries. Government debt/GDP ratios are for 2021. Differences between long-term interest rates and economic growth rates are averages from 1980 to 2021. Economic growth rates are the annualized rates of growth in nominal GDP compared with three years earlier.



Figure 11. Primary Balance of OECD Countries

will swell if progress fails to be made in improving fiscal health in the face of rising long-term interest rates. If this happens, long-term rates could be propelled even higher.

³ The following estimation equation is used to calculate Domar's condition if the standard deviation of the inflation rate widens to the level of the 1980s (the explained variable is the difference between the long-term interest rate and the annualized rate of growth in nominal GDP compared with three years earlier). Panel estimates using data from 35 OECD countries (fixed effects model).

| Explanatory variable | Constant term | Policy rate | Inflation rate standard deviation | Government debt/GDP ratio | Coefficient of determination | Standard error |
|-----------------------|----------------------|---------------------|---|---------------------------------|------------------------------|-------------------|
| Estimated value, etc. | -5.815*** (0.509) | 0.139*** (0.042) | 1.376*** (0.165) | 0.050 ^{***} (0.006) | 0.299 | 3.215 |

The source of the government debt/GDP ratio is the IMF; the source of all the other figures is the OECD. The inflation rate is calculated as the year-on-year change in consumer prices; standard deviations are calculated using monthly data for the past three years. The estimation period is 1980-2021, and annual data is used. Figures in parentheses are the standard deviations, with *** denoting statistical significance at the 1% level. The degree of increase in standard deviation (difference between the 1980s average and 2021) multiplied by the above coefficient is added to the 2021 Domar's condition.





4. Long-term interest rates could also rise in Japan

Japan may also enter a phase where government debt is apt to expand due to the failure to meet Domar's condition. Among advanced countries, Japan has long been one where Domar's condition proves challenging to meet. In Japan, Domar's condition has been met in only 29% of the 89 quarters since 2000 (Figure 12). This is well below the average of 67% for OECD countries and is second only to Italy's 15%.

Looking at this situation in more detail, we find that Domar's condition has basically not held since 2000, the only exception having been the period of the "Abenomics" economy (Figure 13). In Japan, the policy rate has fallen to zero percent, essentially the lower limit, with the economic growth rate trending downward, and that has made it difficult for long-term interest rates to decline and for Domar's condition to be met. In addition to this, the heightened fiscal risk posed by the cumulative increase in government debt may have lifted long-term interest rates. In the second half of the 2010s, the Bank of Japan's large purchases of government bonds and the adoption of yield-curve control brought long-term interest rates down to near zero, and Domar's condition was met, but since the COVID pandemic, Domar's condition has failed to hold once again. One of the reasons that Domar's condition is not being met, despite long-term interest rates being held near zero, is that the nominal growth rate has dropped into negative territory. While inflation in many countries increases economic growth in nominal terms, Japan's inability to fully transfer higher import prices to domestic prices is compressing margins across the economy and pushing down nominal economic growth. Japan is the only OECD country where the GDP deflator, which represents margins for the economy as a whole, is negative (Figure 14).













Note: Figure for Norway is +30.1%. Major countries from among OECD countries.





Going forward, depending on developments in prices and wages, Japan's monetary policy may begin to normalize. Consumer prices in Japan are now rising 2% year over year as energy and food become more expensive. Prices other than energy and food are stable, but should wages increase in the future, the possibility of sustained and widespread rising prices cannot be ruled out. As the economy continues to normalize, labor shortages are becoming more apparent, and there are plans to increase minimum wages. The *shunto* spring wage negotiations from next year onward may see mounting pressure on companies to boost wages to reflect higher consumer prices. Part-time wages will accelerate again, and wages for regular employees may also edge up (Figure 15).

If prices and wages were to rise continuously and monetary policy were to normalize, long-term interest rates could soar. As in many previous phases, the failure to meet Domar's condition is likely to take hold and push up government debt (Figure 16). To prevent government debt from exploding, it is essential to achieve a surplus in the primary balance. According to the Cabinet Office's Economic and Fiscal Projections for Medium to Long Term Analysis released in July of this year, in the "baseline case," which reflects realistic assumptions for the economic environment, the primary balance is expected to remain in the red from FY2023 to FY2031. This is because social security costs, such as pension and medical expenses, are expanding while tax revenues are stagnant (Figure 17). Although the Cabinet Office's estimates assume that fiscal expenditures other than social security and tax transferred to local governments ("other") will be held down, given that they have increased with each economic downturn and natural disaster, it is highly likely that spending will continue to grow more than expected.

In addition, the government's Basic Policy on Economic and Fiscal Management and Reform 2022 also includes a wide range of expenditures in what are

Figure 15. Wage in Japan (YoY Change)



Source: Ministry of Health, Labour and Welfare Note: Per person for general workers and per hour for part-time workers.











positioned as important areas, such as human investment, digital investment, environmental investment, and start-up investment, as well as defense-related and disaster prevention spending, but little has been devised in the way of concrete measures for financing these outlays. Given the possibility of a shift to a phase of high inflation, discussions must take place on ranking expenditures in order of priority and ways of securing revenue to pave the way toward a primary balance surplus.

References

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