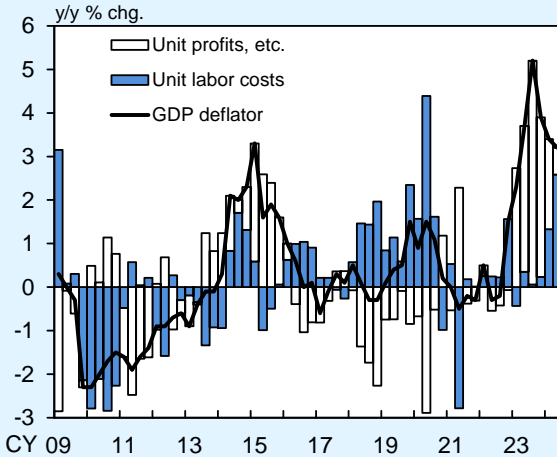


(Box 3) Relationship between Wages and Prices in Japan

This box reviews recent developments in the relationship between wages and prices in Japan. First, the GDP deflator, which indicates domestic inflationary pressure, grew at a fast pace in 2023, mainly in unit profits, as firms passed on cost increases (Chart B3-1). On the other hand, since the start of 2024, the driver of price increases has shifted to one led by a rise in unit labor costs. With wages and prices rising moderately, growth rates of unit profits and unit labor costs are likely to become balanced.

Next, with regard to wages, looking at developments in the minimum wage in detail, this year saw the largest increase on record, at 5.1 percent year-on-year, as the reference CPI rate for determining the minimum wage rose (Chart B3-2[1]). There were also larger increases in some regions where the minimum wage level is relatively low. Developments in the minimum wage and services prices in the CPI by region suggest that the impact of minimum wage hikes on services prices is estimated to be positive and statistically significant (Chart B3-2[2]). If hikes in the minimum wage continue, they are likely to push up prices, especially of services.

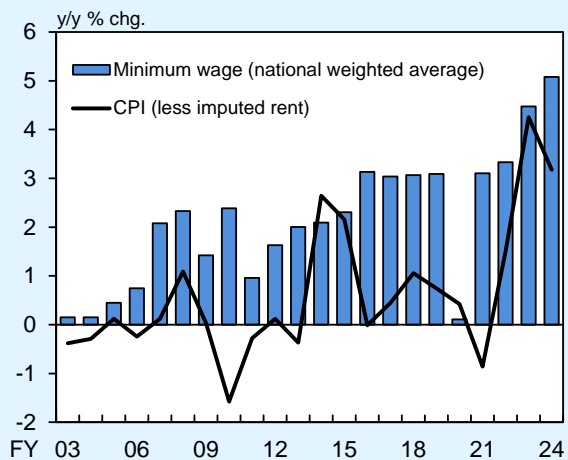
Chart B3-1: GDP Deflator



Source: Cabinet Office.
Note: Unit labor costs = Nominal compensation of employees / Real GDP

Chart B3-2: Impact of Hikes in the Minimum Wage

1. Developments in the Minimum Wage



2. Estimation Results

	General services prices (y/y % chg.)	
Minimum wage (y/y % chg.)	0.07 ***	(0.01)
Constant	-0.13	(0.44)
Adjusted R-squared	0.89	
Sample size	125,189	

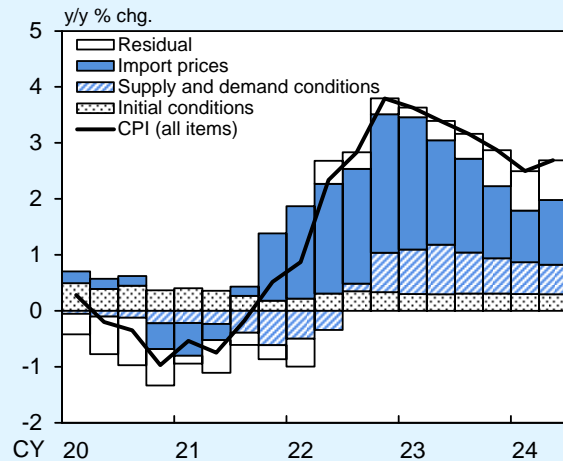
Sources: Ministry of Health, Labour and Welfare; Ministry of Internal Affairs and Communications; Bank of Japan.

Notes: 1. Figures for the CPI (less imputed rent) are the averages of year-on-year percentage changes from October of the previous year to June of each year.
2. The table shows staff estimates using item-level microdata from the *Retail Price Survey*. The estimation period is from January 2018 to December 2023. Independent variables consist of the minimum wage (year-on-year percentage change), item dummies, and control variables. The minimum wage is the prefectural minimum wage in the previous year. The item dummies represent fixed effects for each of the items in the *Retail Price Survey*. The control variables consist of the 1-month lagged value of general services prices (year-on-year percentage change) and the 1- and 2-month lagged values of import prices (year-on-year percentage changes). *** denotes statistical significance at the 1 percent level. Figures in parentheses are standard errors.

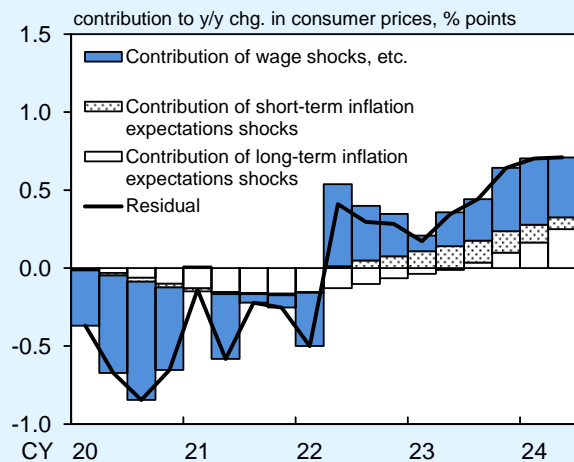
In addition, a model based on Bernanke and Blanchard (2024),²⁶ which decomposes changes in the CPI into exogenous factors -- such as changes in energy and food prices -- and other factors, is used to examine what explains price increases since the pandemic. Looking at the historical decomposition of changes in the CPI (Chart B3-3[1]) shows that, whereas the increase in inflation shortly after the pandemic can be explained mainly by the rise in import prices, such as energy and food prices, the recent upward pressure on prices cannot be fully explained by the aforementioned exogenous factors and supply and demand conditions. A closer look at the residual of the decomposition in Chart B3-3(1) suggests that firms' positive wage-setting behavior is pushing up prices, as positive wage shocks are pushing up the CPI (Chart B3-3[2]). It is likely that wage shocks will serve as a more significant catalyst for price increases than the average relationship observed during the low inflation period and will push up prices.

Chart B3-3: Inflation Mechanism

1. Historical Decomposition of CPI Changes



2. Decomposition of Residual



Sources: Ministry of Internal Affairs and Communications; Ministry of Health, Labour and Welfare; Cabinet Office; Bank of Japan; QUICK, "QUICK Monthly Market Survey <Bonds>"; Consensus Economics Inc., "Consensus Forecasts"; Bloomberg; Google Trends.

Notes: 1. The charts show the decomposition results obtained by Nakamura et al. (2024) applying the Bernanke-Blanchard model to Japan.
2. In the upper chart, "import prices" refers to the contribution of energy prices and food prices. "Supply and demand conditions" refers to the contribution of productivity growth, supply shortages, and labor market slack. In the lower chart, "contribution of wage shocks, etc." refers to the contribution of wage shocks and price inflation shocks.

²⁶ Bernanke and Blanchard (2024) construct a simple model of prices and wages for the United States to examine the direct and indirect effects of product-market and labor-market shocks on prices and nominal wage increases. Nakamura et al. (2024) apply this model to Japan.

Bernanke, B., and O. Blanchard (2024), "What Caused the U.S. Pandemic-Era Inflation?" *American Economic Journal: Macroeconomics*, forthcoming.

Nakamura, K., S. Nakano, M. Osada, and H. Yamamoto (2024), "What Caused the Pandemic-Era Inflation?: Application of the Bernanke-Blanchard Model to Japan," *Bank of Japan Working Paper Series*, No.24-E-1.