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Assessing macroeconomic forecasts for Japan under an asymmetric loss function

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ABSTRACT

This paper examines the asymmetry of the loss functions of the Japanese government, the International Monetary Fund (IMF), and private forecasters for Japanese output growth and inflation forecasts. It tests the rationality of the forecasts, assuming a possibly asymmetric loss function. The results indicate considerable evidence of asymmetry. The 15-month forecasts are overpredicted, irrespective of forecaster identity or the target variable. However, the biases in the three-month forecasts vary among forecasters: the IMF provides prudent short-term forecasts for output growth and inflation, while private forecasters provide unbiased inflation forecasts. The government uses the information provided in the IMF and consensus forecasts efficiently when making its own forecasts. A comparison with the projections for the German economy indicates that the biases of the Japanese government may be attributable to its debt-to-GDP ratio, which is the highest among advanced economies.

1. Introduction

Recent studies on budget forecasting have attracted considerable attention (e.g., Chatagny & Soguel, 2012; Frankel, 2011) because many countries, both advanced and developing, face large outstanding debts. In particular, several European Union (EU) member states have an urgent need to resolve serious sovereign debt issues. Tackling these problems is crucial not only for the country facing the debt, but also for the rest of the EU member states, so as to ensure the stability of the currency union.

Japan's debt-to-GDP ratio is a serious concern for the country, being the highest among the advanced economies. Although Japan is not a member of any currency union, the Japanese sovereign debt crisis could have a much greater impact than the recent crises in Greece and other peripheral countries. Currently, Japan is facing large government deficits, and its public debt is growing rapidly. In the fiscal year 2011, the deficit was −8.9% of the GDP, and the debt-to-GDP ratio was 210.6%.[1] The corresponding figures for Germany, which is one of the handful of countries that have maintained sustainable levels, were −0.8% and 86.3%, respectively. Many observers worry that Japan's debt-to-GDP ratio is unsustainable; thus, a considerable amount of effort has been devoted to the examination of Japan's fiscal issues. These efforts have focused mainly on fiscal sustainability (Broda & Weinstein, 2005; Hubbard & Ito, 2006), increases in the fiscal deficit, and the accumulation of government debt (Asako, Ito, & Sakamoto, 1991; Doi & Ihori, 2002; Ihori, 2006; Ihori, Doi, & Kondo, 2001; Ihori, Nakazato, & Kawade, 2003).

Fig. 1 illustrates Japan's debt-to-GDP ratio and the Japanese government's forecast errors (actual value − forecast value) for real and nominal GDP growth,

[1] For example, other countries' deficit ratios were −9.6% for Greece, −4.1% for the EU, and −6.4% for all members of the Organization for Economic Co-operation and Development (OECD). The debt-to-GDP ratios were 178.9% for Greece, 95.6% for the EU, and 103.5% for all OECD members (OECD Economic Outlook No. 93).

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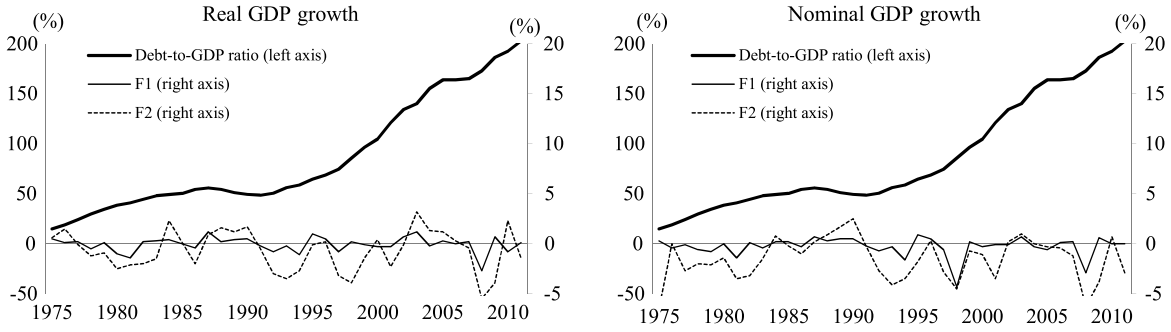

Fig. 1. Debt-to-GDP ratio and forecast errors.

respectively. It provides a rough picture of the relationship between periods with large negative forecast errors and those with large increases in the debt-to-GDP ratio.[2] For certain periods between 1990 and early 2000, large negative forecast errors are associated with rapid increases in the debt-to-GDP ratio. This suggests that the overprediction of output growth might result in an increase in the debt-to-GDP ratio. In contrast, there are periods between the mid-1980s and 1990 that show positive forecast errors being associated with stagnant or decreasing debt-to-GDP ratios. This underscores the significance of the government's behavior in making output forecasts. Note that there is a large difference in forecast errors (for the 15-month forecast, F2, seen in Fig. 1) between real and nominal GDP growth in 2003; the forecast error for real GDP growth is a large positive value, while that for nominal GDP growth is around zero. This suggests that there may be a closer relationship between the debt-to-GDP ratio and nominal GDP, because underprediction did not lead to a decrease in the former.

Therefore, this paper examines the asymmetry of the loss functions of the Japanese government, the International Monetary Fund (IMF), and private forecasters for the forecasts of Japanese output growth and inflation, and aims to draw implications regarding macroeconomic forecasts of Japan's debt-to-GDP ratio. First, in line with the method developed by Elliott, Komunjer, and Timmermann (2005), I evaluate the loss functions in macroeconomic forecasts for the Japanese economy, because these forecasts are crucial inputs for fiscal forecasting. Moreover, as there are differences in forecast errors (namely overprediction and underprediction), the forecast estimates could be biased either upward or downward, based on an asymmetric loss function. Second, I compare the biases in the Japanese government's forecasts with those of the IMF and private forecasters. Previous studies have focused on only one forecaster at a time, whether intergovernmental agencies, central banks, or private forecasters. Döpke, Fritsche, and Siliverstovs (2010) evaluated the inflation and real growth forecasts of various forecasters for Germany, including the German government, the IMF, and private forecasters. Furthermore, the nominal GDP growth, which was not examined by Döpke et al. (2010) and has been relatively overlooked in the forecast evaluation literature, is investigated in this paper as well, because it is one of the simplest indicators of income for a given country, and can serve as a proxy for tax revenues.[3] Indeed, it is one of the main variables examined in sovereign debt sustainability analyses (e.g., Leal, Perez, Tujula, & Vidal, 2008).

Third, I investigate whether the Japanese government incorporates the forecast information provided by the IMF and private forecasters into its forecasts; if these forecasts are not used efficiently by the government when it is making its own forecasts, this implies that there is room for improvement in the Japanese government's forecasts.

Finally, by comparing these results with those of the German forecasts,[4] I examine the relationships between the biases in the economic and deficit forecasts for Germany and Japan. Although this appears to be a mere comparison of two countries, these differences could help explain the factors that caused Japan's rapid accumulation of debt. Although a few studies – such as that of Maekawa and Fukushige (2012) – have analyzed the relationship between the Japanese government's economic and budget forecasts, a comparison of the cases of Japan and Germany enables us to clarify these differences and uncover the principal drivers of Japan's unexpected and rapid accumulation of debt.

The results show considerable evidence of asymmetry. The 15-month forecasts are all overpredicted, irrespective of the forecasting identities and target variables. However, the biases in the three-month forecasts vary among the forecasters. The IMF provides prudent short-term forecasts for output growth and inflation, and private forecasters provide unbiased inflation forecasts. Conversely, the biases in the government's real GDP growth output forecasts are mixed, while those in the inflation forecasts are

[2] However, further investigation along these lines is outside the scope of this paper.

[3] It has been observed widely that tax revenues respond to both growth in income and economic growth. However, tax outlays are tied closely to administrative and legislative systems, and thus, the relationship with macroeconomic variables seems weaker. Because we examine inflation as well as the nominal GDP, some aspects of tax outlays can be inferred, given that government spending is tied to inflation to some extent. Therefore, the approach used in this paper can be considered as a first approximation for obtaining information on budget forecasts. Tsuri (2005) indicated that two-thirds of Japan's deficit in the 1990s was caused by factors on the revenue side.

[4] The German and Japanese economies appear to share the characteristic of being export-led.