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# Are fiscal deficits inflationary?

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A B S T R A C T

This paper applies the dynamic panel quantile regression (DPQR) model under the autoregressive distributional lag (ARDL) specification, and examines the deficit–inflation relationship in 91 countries from 1960 to 2006. The DPQR model estimates the impact of deficits on inflation at various inflation levels and allows for a dynamic adjustment with the ARDL specification. The empirical results show that the fiscal deficit has a strong impact on inflation in high-inflation episodes, and has a weak impact in low-inflation episodes. The results imply that fiscal consolidation would be more effective in price stabilization the higher the inflation rate is, and are consistent with the theoretical model of Catão and Terrones (2005).



## 1. Introduction

This paper seeks to investigate whether fiscal deficits are inflationary. In a monetarist economy, the monetary authority independently determines seigniorage and can control inflation. However, Sargent and Wallace (1981) argue that the monetary authority's control over inflation is limited. Namely, if the fiscal authority dominates the monetary authority, then the fiscal authority independently announces all current and future deficits, such that the monetary authority is constrained by the demand of government bonds and monetizes the deficit. Accordingly, the government runs persistent deficits with seigniorage and produces inflation, and fiscal deficits and inflation are dynamically correlated. In a recent article by Catão and Terrones (2005), they propose an intertemporal optimization model to show that equilibrium inflation is proportional to the fiscal deficit scaled by narrow money. In high-inflation episodes, the average real money holdings are lower and the stock of transaction money is

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narrower (Barro, 1970), and the impact of fiscal deficits on inflation is therefore large, with inflation heterogeneously related to fiscal deficits.[1]

Despite the theoretical view that fiscal deficits are inflationary, empirical studies have yet to provide a strong and statistically significant connection between fiscal deficits and inflation across a broad range of countries and inflation rates (Blanchard and Fischer, 1989; Catão and Terrones, 2005). For example, empirical studies of the United States (Hamburger and Zwick, 1981; Dwyer, 1982; Darrat, 1985; Ahking and Miller, 1985; King and Plosser, 1985), and those of other industrial or developed countries (King and Plosser, 1985; Giannaros and Kolluri, 1986; Protopapadakis and Siegel, 1987; Barnhart and Darrat, 1988) have not yielded conclusive results on the deficit–inflation relationship. Meanwhile, empirical studies of developing countries, such as those of De Haan and Zelhorst (1990), Metin (1998), Loungani and Swagel (2003), and Domaç and Yücel (2005), generally indicate that the inflationary effect of deficit financing is insignificant, but do find a significant causality of fiscal deficits on inflation in high-inflation countries.

Several studies have exploited both the time and cross-sectional dimensions of data to examine the relationship between fiscal deficits and inflation. Karras (1994) investigates the relationship using the panel estimation and finds that deficits are not inflationary in 32 countries. Cottarelli et al. (1998) note a significant impact of fiscal deficits on inflation in industrial and transition economies by using the dynamic panel data model. Fischer et al. (2002), using the data set of 94 developing and developed countries from 1960 to 1995, find that the relationship between fiscal deficits and inflation is only strong in high-inflation countries during high-inflation episodes, and weak in low-inflation countries and in high-inflation countries during low-inflation episodes. Catão and Terrones (2005) apply the pooled mean group estimation method to a data set spanning 107 countries over the 1960–2001 period. It is shown that, empirically, deficits have an impact on inflation and such an impact is stronger in high-inflation or developing countries. As mentioned by Catão and Terrones (2005), developing countries with less efficient tax collection, political instability, and limited access to external borrowing tend to have a lower relative cost of seigniorage and thus a higher inflation tax.

The existing empirical literature divides a sample into sub-groups of countries based on long-run average annual inflation, to learn about the deficit–inflation relationship. As Catão and Terrones (2005, p. 540–541) argue: "*since the overlapping between such groups is far from perfect, and given that other studies have considered high- and low-inflation countries as relevant sub-groups in their own right, it seems important to consider such a breakdown of the panel.*" However, it is known that the heterogeneous relationship between deficits and inflation is sensitive to the selection of an unconditional division of the sample. Therefore, it is important and desirable to have an econometric method to accommodate key features of the theory and to describe the heterogeneous relationship across different levels of inflation without sample selection. Accordingly, this paper suggests a quantile regression technique for a dynamic panel data model, henceforth the dynamic panel quantile regression (DPQR) model that estimates the impact of fiscal deficits on inflation at different quantiles of inflation, in order to expose multiple forms of the conditional heterogeneity of inflation. It is noted that quantile regression ideally uncovers the relationship between fiscal deficits and inflation without slicing the data into sub-groups; rather, it investigates the deficit–inflation relationship at various inflation levels. By using the DPQR model, the impact of deficits on inflation in high-, middle-, and low-inflation episodes can be estimated without sample selection bias.

This paper applied the DPQR model under an autoregressive distributed lag (ARDL) specification. The ARDL specification allows for lags of the dependent and explanatory variables to affect the dependent variable of interest and permits for intrinsic dynamic adjustment. However, the lagged dependent variable in the dynamic panel data model is endogenous due to the existence of fixed effects. Thus, a two-stage estimation procedure of the DPQR model is proposed in Lin (2011) to reduce the dynamic bias in the DPQR model. In the estimation, the fitted value of the lagged dependent variable is obtained in the first step. This fitted value is used to replace the endogenous variable in the

[1] One other theory of the deficit–inflation relationship is the fiscal theory of the price level (Leeper, 1991; Sim, 1994; Woodford, 1994, 1995, 2001; McCallum, 2001; Cochrane, 2005).