

Inflation and economic growth: A dynamic panel threshold analysis for Asian economies

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Introduction

A sustained high growth rate of output and low inflation are the two main goals of the majority of macroeconomic policies. In recent decades, there has been substantial theoretical and empirical research that investigates the inflation/growth trade-off. The results of existing research have been mixed and studies can be categorized as making one of four possible predictions, based on their findings. The first of these is that inflation has no effect on economic growth (e.g., Dorrance 1963, Sidrauski 1967). The second is that there is positive relationship between inflation and economic growth (e.g., Tobin 1965, Shi 1999). The third is that inflation has a negative effect on growth (e.g., Friedman 1956, Stockman 1981, Barro 1996, Saeed 2007). The last of the four types of studies suggests that the correlation between inflation and growth is nonlinear, and that interaction between these two variables is positive or nonexistent below some critical level, but affects the economy when it exceeds that level (Fischer 1993, Sarel 1996, Khan and Senhadji 2001, Bick 2010).

Objectives

This study investigates whether there is non-linear relationship between inflation and economic growth. To that aim we ask the following research question: (i) Is there a threshold level of inflation above which inflation significantly hurts economic growth in Asian countries, (ii) if there is one, how does this threshold affect Asian growth, and (iii) is the threshold value statistically significant?

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Data and Variables

We use balanced panel data for 32 Asian countries covering the period from 1980 to 2009². This paper uses two year averages of data to smooth out business cycle fluctuations. Since distribution of inflation is asymmetric in level and our sample includes some negative inflation observations we use a semi-log transformation³, following Khan and Senhadji (2001).

Methodology

We apply the dynamic panel threshold model, as shown by Kremer et al. (2009), where the dependent variable is the GDP per capita growth rate and the explanatory variables are inflation (threshold variable, which is exogenous and partitioned into two: (i) slope with β_1 when inflation is below threshold and (ii) slope with β_2 when inflation exceeds threshold. Other exogenous variables are investment ratio, population growth, trade openness, terms of trade, standard deviation of the trade openness and standard deviation of the terms of trade. The endogenous variable (predetermined) is the initial income. We assume the error term has zero mean and is not serially correlated.

Estimation method

We employ forward orthogonal deviation transformation, as suggested by Arellano and Bover (1995), to eliminate the country-specific fixed effect. All available lags of the predetermined variables, as shown in Roodman (2009) collapsed form instruments method, are used as instruments for them. We use the instrumental variable estimator (two-step procedure) to overcome the endogeneity issue. Next, we estimate the threshold level of inflation using conditional least square method. Finally, the threshold value is selected as the value associated with the smallest residual sum of squares (RSS). Once the threshold value is determined, we then estimate the slope coefficients using the generalized method of moments (GMM). Finally, we test whether the threshold level is significant by linear combination test.

² Since we want to have a balanced dataset and data in some countries is produced with a lag, we only cover the period until 2009.

³ We subtract 1 from the initial inflation when inflation ≤ 1 and take logarithmic for inflation > 1 .

Findings

We observe a nonlinear relationship between inflation and economic growth for 32 Asian countries over the period 1980–2009. We detect an inflation threshold of approximately 5.43 percent, at a 1 percent level of significance. Inflation hurts growth when it exceeds 5.43 percent but has no effect below this level. In addition, several other interesting findings emerge. First, the coefficient of initial income is negative and significant at the 5 percent level which strongly supports the concept of conditional convergence in income. Second, the coefficient of investment has a plausible (positive) sign and is significant at the 1 percent level. Third, a positive relationship exists between the level of openness and the growth rate of GDP per capita. Overall, we find the effect of inflation on growth to be robust to variation in estimation methods.

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