Reexamining the relationship between inflation and growth: Do institutions matter in developing countries?☆

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ABSTRACT

Using a large panel of countries during the period 1950–2009, we estimate the inflation thresholds above which its association with economic growth is expected to be negative, taking into account differences in institutions across countries. First, in line with previous literature, we find that the estimated threshold is substantially higher for developing countries compared to that of developed countries. However, we further show that the inflation threshold in developing economies falls when we consider reduced groups that exceed certain levels of institutional quality. We also find that the cost of inflation increases with the quality of institutions.

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1. Introduction

A crucial objective of monetary policy is to achieve high and sustainable rates of economic growth along with low and stable rates of inflation. Therefore, the debate about the relationship between inflation and economic growth is important for the conduct of monetary policy. According to the studies by Barro (1991); Fischer (1983, 1993) and Bruno and Easterly (1998), inflation has a negative effect on economic growth, thus the monetary authority should aim at achieving a low level of inflation. In the past years, indeed, central banks in several countries have adopted an inflation targeting regime. An important question is what should be the inflation target. To answer this question, it would be useful to understand from what level inflation has a negative relationship with economic growth. The appropriate level of the inflation target, especially for developing economies, is still under debate.

Given the relevance of this topic, an important number of theoretic models in the macroeconomic literature analyze the impact of inflation on growth in the long run. Sidrauski (1967) finds that there are no effects of inflation on growth (money is superneutral). However, Tobin (1965) finds that inflation has a positive effect on growth, assuming that money is a substitute for capital. Stockman (1981) proposes a model in which money is a complement to capital, so inflation generates negative effects on growth. Finally, more recent models find threshold effects in the relationship between inflation and growth (Huybens and Smith, 1998). In these models, high inflation rates exacerbate the frictions on financial markets, as they reduce the real returns to savings. Such financial frictions may cause credit rationing, limiting investment level, reducing investment efficiency and hence decreasing economic growth.

The primary goal of this paper is to highlight the importance of taking account of institutions for the understanding of the inflation–growth nexus, especially for developing countries. Most of the related literature on institutions has either examined the relationship between institutions and growth (Glaeser et al., 2004; Knack and Keefer, 1995) or the relationship between institutions and inflation (Aisen and Veiga, 2006; Narayan et al., 2011a). To examine the role of institutions in the inflation–growth relationship, we first estimate for both developed and developing countries the inflation thresholds above which its nexus with economic growth is expected to be negative, allowing for a smooth transition between the low and the high inflation regimes. Then, we focus on the (highly heterogeneous) group of developing countries and control for differences in the quality of their institutions. In particular, we work sequentially with reduced groups of developing economies whose compositions depend on identifiable

levels of a measure for institutional quality. For these groups of countries, we estimate the inflation thresholds in order to provide useful information regarding the appropriate location of the targeting bands, and assess how quicky inflation appears to affect growth around the threshold.

We consider three proxies for institutions. First, we use the Polity IV dataset which contains information on the level of democracy on an annual basis (Jaggers and Marshall, 2000). Second, based on Acemoglu et al. (2001) we consider a proxy related to the mortality rates faced by European settlers in the colonial origins, which in turn appeared to determine the colonization policies and the institutions created. Third, we construct an indicator from the International Country Risk Guide (ICRG) database based on several components of political risk. We use a panel data of over 130 countries, during the period 1950–2009. As it is standard in the empirical literature on economic growth, we work with non-overlapping five-year averages of the data.

The paper by Fischer (1993) is one of the first studies examining the possibility of nonlinearities, i.e., threshold effects, in the relationship between inflation and growth. Using panel data for a set of developed and developing countries, Fisher finds a non-linear negative relationship between inflation and growth. Bullard and Keating (1995) apply structural VAR models to estimate the response of real output to permanent inflation shocks in each economy, for a sample containing 16 countries. They find that increases in long run inflation have positive (negative) effects on growth if the initial level of inflation is sufficiently low (high).

Additionally, Khan and Senhadji (2001) estimate threshold levels of annual inflation between 1 and 3% for industrialized countries, and between 11 and 12% for developing countries – the groups defined according to the IMF classification. They find that inflation significantly reduces growth above these thresholds. The high threshold for non-industrialized countries can be to some extent explained by the adoption of indexation systems which reduce the variations in relative prices and, thus, the negative effects of inflation on growth.

More recent literature has found similar results regarding the ranges of the inflation thresholds for both industrialized and developing countries. In particular, Drukker et al. (2005) solve some of the limitations of Khan and Senhadji (2001) using the econometric methods developed by Hansen (1999, 2000) and Gonzalo and Pitarakis (2002) in order to estimate the number of thresholds, their values and the model coefficients. They find two inflation thresholds in industrialized countries, 2.6% and 12.6%, and one threshold of 19.2% in non-industrialized economies. On the other hand, Vaona and Schiavo (2007) provide evidence about the nonlinear relationship between inflation and growth using nonparametric methods. They find the existence of an inflation threshold of 12% in the full sample that includes both industrialized and non-industrialized countries. Splitting the sample between developed and developing countries, they show that the inflation threshold for developed countries sticks at 12% while there is no clear inflation threshold for developing countries.

In a recent paper, Kremer et al. (2013) introduce a dynamic panel model with threshold effects, finding results that are consistent with the existing literature. The study finds an inflation threshold of 2% for industrialized countries, which represents the inflation target set by several of these countries. An inflation threshold of 17% is estimated for non-industrialized countries. On the other hand, López-Villavicencio and Mignon (2011) estimate the inflation–growth nexus using a smooth transition regression model, finding an inflation threshold of 2.7% for industrialized countries and 17.5% for non-industrialized countries. Espinoza et al. (2010) also find that the threshold for advanced economies is much lower than the one for developing countries. Similarly, Omay and Kan (2010) find a threshold for industrialized countries between 2.4% and 3.2%, depending on the estimation method, which in turn controls for cross section dependency in a non-linear model. For

the case of the Southern African Development Community, Seleteng et al. (2013) find a threshold level of 18.9%, using a smooth transition regression model.

Although the inflation thresholds found in the literature for industrialized countries seem consistent with the targets that have been implemented, the evidence for developing countries indicates inflation thresholds that are higher than the inflation targets that have been adopted by those countries. In particular, the estimated thresholds are in the range of 12–19%, while the inflation targets in many developing countries are usually in the range from 1 to 5%. A possible reason for this gap, indeed, might be the high level of heterogeneity in the sample used in most empirical studies. Our contribution is important because it addresses this issue by taking into account the highly different levels of institutional development across countries. For comparison with the previous empirical literature, we also estimate the model using the entire available sample of developing and developed economies.

Our empirical results confirm the importance of including a measure of institutional quality from an economic perspective. In particular, we find that the inflation threshold falls from 19.1% for the entire sample of *developing countries*, to levels well below the two-digit figures for reduced groups that satisfy certain degrees of institutional development. We also find that the estimated (negative) association between inflation and growth becomes higher with the level of institutional quality. Moreover, we find that such association is relatively higher after reaching the two digit levels.

Economies with weaker institutions could have high inflation rates without experiencing negative effects of growth. Narayan et al. (2011a) examine the relationship between inflation and institutional particularly government stability, military in politics, law and order and democratic accountability using a dataset of 54 developing countries during the 1995–2004 period. They find that improvements in democracy and in reductions in the level of participation of military in politics reduce inflation rates in the long run. Similarly, Aisen and Veiga (2006) find that lower levels of political instability result in lower inflation levels using a panel of 75 developing countries. Economies with weak institutions tend to have inefficient tax systems and use seigniorage as a source of revenues (Cukierman et al., 1992). Fatton (1992) argues that non-democratic leaders tend to use repression to maintain themselves in power and spend public revenues to build patronage networks, which results in higher levels of inflation. In addition, weak institutions could be associated with lower levels of central bank independence (de Haan and Kooi, 2000; Loungani and Sheets, 1997), lower probability of having inflation targeting regimes (Bernanke et al., 1999; Capistrán and Ramos-Francia, 2009) and lower levels of central bank transparency (Faust and Svensson, 2001; Walsh, 1995), which results in higher levels of inflation.

Regarding the sample of *developed countries*, the estimation results obtained are in line with the previous literature. In particular, the estimated threshold for that group is 4.5%. For both developed and developing economies, once the thresholds are reached, the association between inflation and growth is negative and statistically significant. However, if the inflation level is below the threshold, inflation has no significant relationship with growth. The speed of transition is relatively smooth for the group of industrialized countries while, for the full group of non-industrialized countries, inflation quickly appears to affect growth when it exceeds the threshold. For those groups of non-industrialized countries which are identified by the proxies as having relatively "good" institutions, however, the speed of transition falls to the levels found for industrialized countries.

The paper is organized in the following way. Section 2 describes the data. Section 3 introduces the econometric model. Section 4 discusses the set of baseline results, including the linearity tests, the estimation results for both the developed and the entire sample of developing countries, and a number of robustness checks. Section 5 shows the