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Openness and inflation volatility: Panel data evidence

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ABSTRACT

Trade openness can affect inflation volatility via the incentives faced by policy-makers or the structure of production and consumption, but the sign of this effect, as predicted from economic theory, is ambiguous. This paper provides evidence for a negative effect of openness on inflation volatility using a dynamic panel model that controls for the endogeneity of openness and the effects of both average inflation and the exchange rate regime. Our results offer one explanation for the recent decline in inflation volatility observed in many countries. The relationship is shown to be strongest amongst developing and emerging market economies, and we argue that the mechanisms linking openness and inflation volatility are likely to be strongest amongst this group of countries.

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1. Introduction

A striking feature of recent global macroeconomic performance has been the substantial decline in inflation volatility. In the United States inflation volatility has fallen by two thirds since the mid-1980s and similar trends have been observed in other OECD countries (Blanchard & Simon, 2001). Even developing countries, which continue to experience higher and more volatile inflation than the industrial countries, have seen inflation volatility fall since the early 1990s. Understanding such trends is important because existing research suggests that volatile inflation undermines other aspects of macroeconomic performance, for example Elder (2004) and Byrne and Davis (2004) report negative effects of inflation volatility on investment and growth respectively. In this paper we consider two channels through which openness to international trade may impact upon inflation volatility: (i) openness affects the costs associated with inflation volatility, creating an incentive for governments and central banks to implement policies that imply a different level of volatility; (ii) openness affects the structure of consumption and production, either increasing or decreasing the amount of diversification and hence the scope for individual price shocks to cancel out in the aggregate price index. In Section 2 we review these mechanisms, drawing on papers by Cavelaars (2009) and Badinger (2009). The main message from the theory is that the effect of openness on inflation volatility is ambiguous. Our contribution is to then undertake a detailed empirical investigation of the relationship between openness and inflation volatility. We provide robust evidence for a negative effect of openness on inflation volatility using a dynamic panel model fitted using a large cross-country dataset. The effect is strongest amongst emerging market and developing economies, and we relate this finding to the theoretical mechanisms that may link openness and volatility.

The link between openness and inflation volatility has been explored by only a small number of papers. The relationship is briefly considered by Bleaney and Fielding (2002), Gruben and McLeod (2004) and Aisen and Veiga (2008a). A more

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detailed analysis of the openness effect is provided by [Lo, Wong, and Granato \(2007\)](#), who present cross-country regressions indicating a negative correlation between openness and inflation volatility. In related literature, [Bowdler and Nunziata \(2006\)](#) show that greater openness reduces the probability of an upturn in inflation in OECD countries, consistent with reduced volatility, whilst [Aisen and Veiga \(2008a\)](#) present panel data evidence indicating that higher degrees of political instability and social polarisation, less democracy, and lower *de facto* central bank independence are associated with more volatile inflation rates.¹ In this paper we implement three important extensions of the literature on the openness-inflation volatility relationship. Firstly, we control for the possible endogeneity of openness in this context. Secondly, we focus on the temporal relationship between openness and inflation volatility, which has not been evaluated previously.² This aspect of the relationship is important in understanding the reasons for the recent moderation of inflation fluctuations. Thirdly, we investigate ‘common cause’ explanations for the relationship, for example institutional structures promoting both trade openness and stable inflation, which have not been examined in past work. In this paper we address each of these issues through instrumenting a dynamic panel model using data spanning 96 countries and more than four decades. Our results indicate a negative effect of openness on inflation volatility that is robust to a range of controls that capture many potential common cause interpretations of the openness-inflation volatility relationship.

The evidence that we present parallels the negative relationship between openness and average inflation described by, *inter alia*, [Romer \(1993\)](#) and [Chen, Imbs, and Scott \(2009\)](#).³ However, we show that openness has a negative and statistically significant effect on inflation volatility even after controlling for mean inflation. Furthermore, our results are not affected by cross-country differences in the exchange rate regime, the use of inflation targets, data quality, or participation in IMF structural adjustment programmes. The relationship is, however, much stronger amongst developing and emerging market countries than amongst OECD countries, and we argue that this is because the channels linking openness and inflation volatility are more likely to apply amongst low income countries.

The remainder of the paper expands on these points and is organised as follows. Section 2 describes the channels through which openness may affect inflation volatility. Section 3 sets out the econometric approach and describes the data used in testing for a negative effect of openness on inflation volatility. Section 4 presents the basic empirical results and various robustness tests, and Section 5 concludes.

2. Openness and inflation volatility

A useful starting point in thinking about the determinants of inflation volatility is the conduct of macroeconomic policy. A regime in which there are regular changes in the stance of fiscal and monetary policy, for example due to political business cycle effects, will likely be characterised by relatively volatile inflation. The conduct of policy will depend on policy-makers’ attitudes to deviations of inflation from target. One possibility is that openness to trade increases the perceived costs of inflation fluctuations, creating an incentive for disciplined monetary policy. In relatively open economies, if home producers of tradables are forced to vary prices frequently, their market share will quickly be eroded because domestic and foreign consumers can substitute towards foreign produced goods for which the price quoted is more stable. Policy-makers in open economies can avoid this adverse outcome through adopting more disciplined macroeconomic policies, leading to lower inflation volatility. In a recent contribution, [Cavelaars \(2009\)](#) shows that the effect of increased openness on policy-maker incentives is more complicated than this example suggests. When openness is driven by reductions in technologically determined iceberg trade costs, greater policy discipline can arise. In contrast, rises in openness driven by decreases in import tariffs can undermine policy discipline. The reason is that declines in revenues from import tariffs (from the expenditure switching effect of currency depreciations) serve as a deterrent to monetary policy expansions. If greater openness is associated with the elimination of tariffs, this deterrent to discretionary policy interventions is weakened, such that the conduct of monetary policy is less disciplined and inflation volatility rises.⁴ A different mechanism through which openness to trade may influence policy-maker incentives and inflation volatility outcomes is the slope of the output-inflation trade-off. [Romer \(1993\)](#) famously demonstrated that greater openness can reduce the trade-off (steepen the short-run Phillips curve) such that the incentive for surprise policy expansions is mitigated. As noted by [Badinger \(2009\)](#), recent theoretical contributions demonstrate that this effect can operate in the opposite direction in micro-founded models. The key idea is that openness negates incentives for price adjustment, inducing aggregate price stickiness and a larger output-inflation trade-off, see [Razin and Yuen \(2002\)](#) and [Daniels and VanHoose \(2006\)](#). Empirical evidence on the relationship between openness and the output-inflation is mixed. [Badinger \(2009\)](#) and [Daniels, Nourzad, and VanHoose \(2005\)](#) find that openness raises the trade-off (pointing to less policy discipline) whilst [Bowdler \(2009\)](#) reports evidence of a negative openness effect on the trade-off, consistent with the original Romer hypothesis.

¹ In a separate and related literature, [Krause and Mendez \(2008\)](#) consider determinants of the inflation aversion parameter in a policy-maker loss function, but do not explore the impact of openness to trade in this context.

² The paper by Gruben and McLeod offers very brief evidence on the temporal link between openness and inflation volatility, but does not analyse the relationship in any detail and instead focuses mainly on the impact of openness on the level of inflation.

³ The Romer evidence has been challenged, see for example [Terra \(1998\)](#), [Bleaney \(1999\)](#) and [Alfaro \(2005\)](#).

⁴ Cavelaars also shows that when increasing openness to trade is characterised by greater product market competition, the expenditure switching effect of exchange rate adjustment is amplified, and that this causes welfare outcomes to shift such that policy-making is less disciplined.

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