



# Volatility and growth: Governments are key



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## ABSTRACT

There exists a persistent disagreement in the literature over the effect of business cycles on economic growth. This paper offers a solution to this disagreement, suggesting that volatility carries not only a positive direct effect, but also a negative indirect effect, operating through the insurance mechanism of government size. Theoretically, the net growth effect of volatility is then ambiguous. The paper reveals the underlying endogeneity of government size in a balanced panel of 90 countries from 1961 to 2010. In practice, the negative indirect channel dominates in democracies, but with less power to choose public services in autocratic regimes the positive direct effect takes over. Consequently, volatile growth rates are detrimental to growth in democracies, but beneficial to growth in autocracies. The empirical results suggest that a one standard deviation increase of volatility lowers growth by up to 0.52 percentage points in a democracy, but raises growth by 1.66 percentage points in a total autocracy. These findings point to a crucial intermediating role of governments in the relationship between volatility and growth. Both the size of the public sector and the regime form assume key roles.

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## 1. Introduction

The global financial crisis of 2008 has once again magnified the importance of understanding possible connections between business cycles and economic growth. Ever since Ramey and Ramey (1995) proposed a causal relationship between growth volatility and growth itself, researchers have presented evidence for both negative and positive effects from volatility on growth, as summarized in Döpke (2004).<sup>1</sup> Finally, other papers argue that there exists no link at all between output volatility and growth (Solow, 1997; Dawson and Stephenson, 1997; Posch and Wälde, 2011).

This paper provides an explanation for these deep disagreements, uncovering a hidden indirect channel, which needs to be accounted for in order to understand the total net effect. Volatility carries not only a positive direct effect on economic growth, but also a negative indirect effect, operating through the size of the public sector. As both mechanisms push in opposite directions, estimating growth in a standard single equation framework can lead to misleading conclusions.

Theoretical foundations for a positive connection between volatility and growth include creative destruction (Schumpeter and Fels, 1939; Philippe and Peter, 1992), an opportunity-cost effect of conducting research in recessions (Saint-Paul, 1993; Aghion and

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<sup>1</sup> Similar to Ramey and Ramey (1995), Badinger (2010) or Wang and Wen (2011) propose negative growth effects from volatility, whereas Caporale and McKiernan (1998), Canton (2002), or Oikawa (2010) suggest positive growth effects. Imbs (2002, 2007) and Aghion et al. (2010) argue that volatility and growth could be related in various ways.

Saint-Paul, 1998), and precautionary savings (Mirman, 1971; Devereux and Smith, 1994). However, volatility also carries another consequence, which has been neglected in the growth context. In times of increased cyclical fluctuations, people turn to the public sector for security (see Rodrik, 1998; Carmignani et al., 2011). Specifically, people may call for a tighter public safety net and choose to pursue government sector jobs over more volatile private sector employment (see Jetter et al., 2013). This implies bigger governments in volatile times, which can in turn lower growth rates in the short run, as resources are being withdrawn from the private sector (Barro and Lee, 1994; Barro, 2001; Afonso and Furceri, 2010; Bergh and Henrekson, 2011).<sup>2</sup> Theoretically, the sign of the net effect is then ambiguous, as summarized in Fig. 1. Using a balanced panel of annual observations for 90 countries from 1961 to 2010, this paper presents evidence for the existence and the importance of the indirect channel of volatility on growth. Growth rate volatility is never a significant predictor of growth in a single equation framework, even after including the usual control variables found by Levine and Renelt (1992) and Mirestean and Tsangarides (2009). However, after addressing the underlying endogeneity of government size in a simultaneous estimation framework, both the positive direct and the negative indirect effect receive strong statistical support.

In reality, the relative strength of the two effects varies substantially across countries. Especially the indirect channel of people being able to influence the extent of the public sector relies on the citizen's option to engage in the political process. People can only actively influence public goods provision if they have a say in politics.<sup>3</sup> Indeed, the positive direct effect dominates in autocratic regimes, whereas the negative indirect effect is absent. Once a country evolves into a democratic society the indirect channel gains importance. Regarding growth, this translates to a positive net effect from volatility in autocratic societies, but a negative net effect in democracies.

These findings provide a coherent explanation why previous analyses could not agree on the net effect from volatility on growth. Depending on the mix of regimes in a specific sample, a single estimation framework can produce positive, negative, or no net effects on growth. Thus, taking into account both the indirect channel through government size and the political regime form is important when evaluating potential growth consequences from policies affecting the business cycle. This explains why some papers (Ramey and Ramey, 1995; Martin and Ann Rogers, 2000) find strong negative growth effects from volatility in OECD economies, as these countries are mostly democratic.

In general, these results emphasize the importance of heterogeneity within the determinants of growth, in this case along the lines of political regime form for the effects from volatility.<sup>4</sup> The surrounding conditions of a country can change sign and magnitudes of growth determinants. In a related context, the political regime form has been found to play an important role in the relationship between trade openness and government size (see Sáenz et al., 2013).

The paper proceeds with the methodological setup, followed by a description of the data in Section 3. Section 4 presents the empirical findings and Section 5 concludes.

## 2. Methodology

In order to test the effect of growth rate volatility on growth, I first estimate growth in a single estimation framework, including volatility as a regressor. Throughout the paper I use information for 90 countries with yearly data from 1961 to 2010. As there exists an open-ended list of potential growth determinants (see Brock and Durlauf, 2001), I use two main reference papers to set up the growth regression: The variables from Levine and Renelt (1992) and Mirestean and Tsangarides (2009). In order to address the latent reverse causality problem of the growth literature, growth determinants are lagged by one year, following suggestions by Temple (1999) and Durlauf et al. (2005). In addition, the empirical analysis includes country fixed effects and country specific time trends, accounting for unique characteristics in terms of history, geography, climate, and development paths of every country. After showing the endogeneity of government size, the paper moves to the suggested three-stage least squares (3SLS) framework, estimating growth and government size simultaneously. Finally, the empirical section also incorporates a GMM system estimation, which has been proposed to be a useful alternative to 3SLS (see Carmignani et al., 2011). Throughout the paper, variables starting with *ln* imply the application of the natural logarithm.

### 2.1. OLS estimation

The empirical section starts by estimating growth for country *i* at year *t*, including the volatility of economic growth as a regressor:

$$gr_{i,t} = \alpha_1 + \alpha_2 vol_{i,t-1} + \alpha_3 \ln gov_{i,t} + \alpha_4 gr_{i,t-1} + \alpha_5 \mathbf{X}_{i,t-1} + \alpha_6 \lambda_i + \alpha_7 \phi_{i,t} + \delta_{i,t}, \quad (1)$$

where  $vol_{i,t-1}$  stands for growth rate volatility, lagged by one year (calculation explained below in Section 2.2). Recently, Baker and Bloom (2011) provide evidence that volatility tends to affect growth and not vice versa, using an instrumental variables approach

<sup>2</sup> In a seminal paper, Rodrik (1998) introduces the thought of citizens demanding stronger public safety nets in the light of uncertainty. There exists an extensive discussion surrounding this theory, as Rodrik (1998) first relates trade openness to volatility, which then raises the demand for public goods. In this chain of arguments, the first link of openness leading causing volatility is heavily debated. The present paper only builds on the second effect of volatility causing people to demand more security from the public sector.

<sup>3</sup> Adam et al. (2011) find a positive and statistically significant relationship between democracy and public sector efficiency.

<sup>4</sup> See Masanjala and Papageorgiou (2008) for differences across regions, specifically Africa. Recently, several nonlinearities have been pointed out in the growth literature, e.g. Reinhart and Rogoff (2010) considering public debt or Henderson et al. (2013) in the context of financial development.

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