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# Option-implied asymmetries in bond market expectations around monetary policy actions of the ECB

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## Abstract

This paper examines the behaviour of option-implied asymmetries in bond market expectations around monetary policy actions of the European Central Bank. The results indicate that market expectations are systematically asymmetric around monetary policy actions. Around policy tightening, market participants attach higher probabilities for sharp yield increases than for sharp decreases. Correspondingly, around loosening of the policy, markets assign higher probabilities for sharp yield decreases than for increases. Furthermore, the results demonstrate that market expectations are significantly altered around monetary policy actions, as asymmetries in market expectations tend to increase before changes in the monetary policy stance, and to decrease afterwards.

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## 1. Introduction

Considerable advances in extracting market expectations from financial-asset prices have occurred during the last 10 years (see Söderlind & Svensson, 1997 for a survey). Traditionally, market expectations of future interest rates, for instance, have been extracted

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from the term structure of interest rates or from futures contracts on money-market instruments and bonds. A severe limitation of these measures is that they reflect only central expectations, and hence provide no indication about the dispersion of market expectations. Consequently, the focus has recently started to shift to information contained in option prices.

Volatility implied by option prices is now widely considered to be a useful forward-looking measure of market uncertainty, and is therefore used extensively among market participants and central banks to assess the uncertainty surrounding central expectations. Option prices, however, may reveal considerable information beyond implied volatility. For instance, a call option has a positive payoff only if the price of the underlying asset at the maturity of the option exceeds the strike price of the option. The call option price should therefore reflect market expectations about the probability of the underlying asset price exceeding the strike price of the option. Hence, a set of option prices with the same maturity but with different strike prices can be used to extract the entire probability distribution of the underlying asset price at the maturity of the option.

Option-implied probability distributions have gained a lot of attention over recent years. Central banks, in particular, are now increasingly using option-implied distributions to evaluate market expectations of future interest rates and exchange rates, and using these expectations as complementary information for the purposes of formulating monetary policy.<sup>1</sup> Several alternative methods for extracting probability distributions from option prices have been proposed in the literature. These methods can be broadly classified as parametric (e.g., Corrado and Su, 1996; Melick & Thomas, 1997) and nonparametric (e.g., Jackwerth & Rubinstein, 1996; Shimko, 1993) methods. Reviews of different techniques are provided in Bahra (1997), Jackwerth (1999), and Bliss and Panigirtzoglou (2002), while Campa, Chang, and Reider (1998) and Jondau and Rockinger (2000) provide comparisons of alternative methods.

A number of papers have used option-implied probability distributions to examine the behaviour of market expectations around specific events, such as macroeconomic news announcements (e.g., Beber & Brandt, 2003), financial crises (e.g., Gemmill & Saflekos, 2000; Melick & Thomas, 1997; Söderlind, 2000), elections (e.g., Coutant, Jondau, & Rockinger, 2001; Gemmill & Saflekos, 2000), and central bank interventions (e.g., Cooper & Talbot, 1999; Galati & Melick, 2002). These studies show that option-implied distributions are useful for assessing market expectations around economic events.<sup>2</sup> Moreover, implied distributions can be used to gauge changes in market expectations and, additionally, to reveal possible asymmetries in expectations.

This paper uses data on German government bond futures options to examine the behaviour of market expectations around monetary policy actions of the European Central Bank (ECB). In particular, this paper focuses on the asymmetries in bond market expect-

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<sup>1</sup> A substantial proportion of the research on option-implied distributions has been conducted in central banks. Recent examples of central bank research include Bahra (1997), Melick and Thomas (1997), Nakamura and Shiratsuka (1999), Hördahl (2000), Bliss and Panigirtzoglou (2002), Glatzer and Scheicher (2003), Bliss and Panigirtzoglou (2004), Hördahl and Vestin (in press), and Panigirtzoglou and Skiadopoulos (2004).

<sup>2</sup> Gemmill and Saflekos (2000), however, conclude that although implied distributions are useful for revealing the market sentiment, they do not have much power for forecasting future events.

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