



# Risk aversion and monetary policy in a global context



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## ABSTRACT

We analyze the relationship between the stance of monetary policy and the implicit risk aversion in European Stock market prices in an international open-economy framework. We use a structural vector autoregression (SVAR) model that incorporates the effect of a factor that reflects the global monetary policy stance. We use shocks in the US Fed monetary policy stance as a proxy of this global factor. Our results indicate mixed evidence depending on whether simultaneity between domestic monetary policy stance and the stock market behavior is taken into full account. When this simultaneity is not allowed we confirm previous evidence found in the literature, extended to the international field: a lax monetary policy, both domestic and global, decreases risk aversion. However, when we take this into account, results indicate that a lax monetary policy increase in the short-run the risk aversion of the domestic representative investor.

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## 1. Introduction

In recent decades a great number of changes in financial markets, as outlined, for example, in Rajan (2006), have modified the previous framework of both the domestic and international finance fields. The ability of economic agents to assume and share risks has changed due to the access to new sources of financing and a wider variety of financial instruments. The changes in how financial transactions are made and thus in supporting risks have led monetary policy decision-makers to analyze how their actions affect financial markets in this new environment.

Along with a larger volume of trade, the integration of financial markets is one of these financial changes that causes international asset prices to exhibit higher co-movements as Imbs (2004), Forbes and Chinn (2004) and Portes and Rey (2005) have documented. Thus, monetary policy decisions may affect not only domestic financial markets but also foreign financial markets. Furthermore, as discussed in Caruana (2013), monetary policy may affect prices of foreign financial markets through at least two indirect channels:

the changes in international gross capital flows and the responses of foreign central banks that it induces. In fact, as Ehrmann and Fratzscher (2009) claim, the role of monetary policy as a driver of global asset prices has become a key element of financial markets.

In this context, the aim of this paper is to identify the relationship between monetary policy, both global and domestic, and the risk aversion of financial investors. To achieve this objective, we proxy the monetary policy global factor with the US monetary policy shocks and use the Eurozone as the domestic monetary policy area. In other words, our empirical analysis focuses on changes in risk aversion of the representative investor in the Eurozone stock market due to shocks in the US and Eurozone monetary policies led by the Federal Reserve System (Fed) and the European Central Bank (ECB), respectively.

Our results can particularly enrich the debate about the role that monetary policy played in the origin of the recent economic crisis and, more generally, contribute to the understanding of the ability of monetary policies (and their international coordination) to control speculative bubbles in the global financial markets and to achieve greater financial stability. In this context, an increasing number of authors, such as Gambacorta (2009), Taylor (2007), De Graeve et al. (2008), Mishkin (2011) and Gambacorta and Marqués-Ibañez (2011), suggest that benign economic environments may promote excessive risk taking and may actually make the financial

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system more fragile. This seems to imply that from the beginning of the financial crisis in mid-2007, monetary policy may have promoted financial market instability.

In the spirit of [Patelis \(1997\)](#), we are interested not only in the contemporaneous relation between monetary policy and risk aversion but also in the relation between monetary policy shocks and future expected risk aversion. Therefore, our analysis employs a structural vector autoregression (SVAR) methodology, which allows us to model the long-run dynamic relationship between monetary policy and risk aversion via selected proxy variables, fitting with our research objectives and avoiding the endogeneity problem. In this framework, we measure the stance of monetary policy using the target interest rates determined by the monetary policy authorities. To measure market risk aversion, we use the so-called variance risk premium computed from market volatility indexes that measure the implied volatility from market index options.

We add three factors to conform our five-factor SVAR base model: consumer prices, stock market uncertainty, and the business cycle. The consumer price index (CPI) inter-annual dynamics (inflation) as a target of monetary policy permits us to identify monetary policy shocks. By incorporating market uncertainty we introduce the behavior of the stock price and with it we achieve a better specification of the model. On the other hand, given that the relationship between risk aversion and monetary policy may be reflected in a joint response to a common factor, we incorporate a proxy variable for business cycle movements to control for possible biases in the results due to omitted variables, as [Stock and Watson \(2001\)](#) note.

We then broaden the model to include as sixth variable a proxy of the global monetary policy factor: the Fed monetary policy shocks. To measure the Fed monetary policy shocks we use the residuals of the monetary policy stance equation in the five-factor SVAR base model estimated with data from the US dollar area. Given our main purpose, the enlarged six-factor SVAR model is estimated in the Eurozone and therefore in a smaller monetary area affected by the global monetary policy factor. For comparative purposes we also estimate the five-factor SVAR base-model with Euro Area data. This analysis helps us understand whether the results regarding the effects of domestic monetary policy on risk aversion change when we add the global monetary policy factor in the enlarged model.

This paper is structured as follows. After this introduction, in Section 2, we discuss the related literature and the contributions of this paper. Section 3 presents the factors involved in the models and data used in the estimations. Section 4 describes the models, the SVAR methodology on which they build and the alternative schemes used for their identification. In Section 5, we report and comment on the results. Then, in Section 6, we perform robustness analyses. Finally, Section 7 summarizes the main results and concludes.

## 2. Related literature and contributions of the paper

### 2.1. Domestic monetary policy and stock markets

Reviewing the previous literature, we find a large set of papers that analyze the relationship between monetary policy and stock markets that include those of [Thorbecke \(1997\)](#), [Ehrmann and Fratzscher \(2004\)](#), [Rigobon and Sack \(2004\)](#), [Gürkaynak et al. \(2005\)](#), and [Bernanke and Kuttner \(2005\)](#), among others.<sup>1</sup>

<sup>1</sup> More recently, [Fiordelisi et al. \(2014\)](#) analyze, from a global perspective, the effect of monetary policy on equity indices and other financial markets during the recent financial crisis. They review the literature that assesses the impact of monetary policy on financial markets beyond stock markets.

Generally, these studies focus on the impact of US monetary policy on US equity markets and conclude that expansive (contractive) monetary policies have a positive (negative) impact on stock markets.<sup>2</sup>

We also find papers that address the relation between Fed monetary policy and stock market volatilities, e.g., [Bomfim \(2003\)](#), [Chulià et al. \(2010\)](#), [Rosa \(2011\)](#) and [Jubinski and Tomljanovich \(2013\)](#). However, the empirical relationship between monetary policy and the risk aversion implicit in financial market prices has been scarcely analyzed.<sup>3</sup> Beyond informal presentations such as those by [Rajan \(2006\)](#), [Adrian and Shin \(2008\)](#) and [Borio and Zhu \(2012\)](#), we only find the paper of [Bekaert et al. \(2013\)](#), which analyzes the US dollar area. Their results indicate that a lax monetary policy conducted by the Fed decreases both risk aversion and uncertainty in the US stock markets, the former being the stronger of the two effects.

In this strand of the literature, to the best of our knowledge, this paper conducts the first empirical domestic analysis of the relationship between ECB monetary policy and risk aversion in Eurozone financial markets.<sup>4</sup> By analyzing a different currency area than [Bekaert et al. \(2013\)](#), we also provide a robustness check of their qualitative results, which may be important given the small number of papers studying this issue. However, in the context of this paper, this result is useful for testing the misspecification of the domestic model outside the US dollar area.

### 2.2. Foreign monetary policy and stock markets

Previous studies in an international finance context, such as [Andersen et al. \(2007\)](#), [Ammer and Wongswan \(2007\)](#), [Craine and Martin \(2008\)](#) and [Albuquerque and Vega \(2009\)](#), suggest that national equity markets are positively correlated to macroeconomic global factors. Others, such as [Wongswan \(2006\)](#), [Ammer et al. \(2010\)](#), [Laeven and Tong \(2012\)](#) and [Jinjarak \(2013\)](#), use the Fed monetary policy stance as a global macroeconomic factor or examine the effect of Fed monetary policy shocks on foreign equity indexes.

We also find a vast literature, reviewed in [Gagnon and Karolyi \(2006\)](#), that explores the transmission of volatility across stock markets since the October 1987 US stock market crash impacted the other stock markets around the world. Among them, we find some studies that have documented the transmission of implied volatility across international markets, such as [Skiadopoulos \(2004\)](#) and [Konstantinidi et al. \(2008\)](#). However, we only find two papers that focus on the relation between Fed and/or ECB monetary policy shocks and reported spillovers, [Jiang et al. \(2012\)](#) and [Krieger et al. \(2015\)](#).

Moreover, to the best of our knowledge, there is no paper that examines the empirical relation between foreign monetary policy and the risk aversion implicit in financial market prices. Thus, the central contribution of this paper is to fill this gap in the previous literature providing evidence of the international transmission of monetary policy shocks to measures of risk aversion. This is a

<sup>2</sup> Others, such as [Bloom \(2009\)](#) and [Bloom et al. \(2012\)](#), analyze the effects of changes in economic “uncertainty” on the real economy, which, according to the analyses performed by [Rigobon and Sack \(2003\)](#) for the US market and by [Papadamou and Siriopoulos \(2008\)](#) for the Eurozone, would induce monetary policy decision-makers to act to correct them.

<sup>3</sup> Also related to the economic agents behavior, we find several papers that empirically analyze the relationship between monetary policy and bank risk taking, such as those by [Altunbas et al. \(2010\)](#), [Maddaloni and Peydró \(2011\)](#), [Jiménez et al. \(2014\)](#), [Buch et al. \(2014\)](#), [Guerello \(2014\)](#), [Ioannidou et al. \(2015\)](#) and [Angeloni et al. \(2015\)](#).

<sup>4</sup> [Bredin et al. \(2007, 2009\)](#), [Bohl et al. \(2008\)](#), [Napolitano \(2009\)](#), [Kholodilin et al. \(2009\)](#), [Gregoriou et al. \(2009\)](#) and [Ruiz \(2015\)](#) are some of the fewer papers in the literature that analyze the relationship between monetary policies of European currency areas and stock market returns.

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