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Expected inflation, expected stock returns, and money illusion: What can we learn from survey expectations?

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ABSTRACT

We show empirically that survey-based measures of expected inflation are significant and strong predictors of future aggregate stock returns in several industrialized countries both in-sample and out-of-sample. Empirically discriminating between competing sources of this return predictability by virtue of a comprehensive set of expectations data, we find that money illusion seems to be the driving force behind our results. Another popular hypothesis – inflation as a proxy for aggregate risk aversion – is not supported by the data.

1. Introduction

It is empirically well documented that the correlation of inflation and stock returns is negative or non-existent (Fama and Schwert, 1977; Fama, 1981; Amihud, 1996). This puzzling piece of evidence stands in sharp contrast to widely accepted economic principles, such as Fisher Parity, and gives rise to the impression that something seems "wrong" with inflation and the stock market. However, the stock return–inflation relationship is of crucial importance, since it quantifies the degree to which equities are a hedge against inflation risk. Furthermore, central banks aiming at targeting inflation or controlling inflation expectations have to take into account spillovers from inflation to asset returns, which again feed back into real economic activity (see, e.g. Barro, 1990; Stock and Watson, 2003).

We contribute to the strand of literature that analyzes the relation of inflation and stock returns by examining survey expectation data on inflation for several industrialized countries. This seems to represent a novel approach for the literature and produces some fresh insights into the relation of expected inflation and equity returns which have not been shown before. Our main results are, first, that expected inflation does indeed strongly and positively forecast stock returns in- and out-of-sample for several industrialized countries. Second, we discriminate between competing economic rationales for this predictive power and find that the relationship seems to stem from money illusion (Modigliani and Cohn, 1979; Campbell and Vuolteenaho, 2004; Cohen et al., 2005) rather than inflation being a proxy for an omitted macrofactor (Fama, 1981) or risk aversion (Brandt and Wang, 2003). Finally, our paper also contributes towards a better

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understanding of the role that monetary factors play for stock markets—a topic which has been largely neglected in earlier papers (Cochrane, 2007, p. 76).

Despite the early evidence on an anomalous relation between inflation and asset returns, there is a good reason to believe that expected inflation should be positively related to future stock returns, both in nominal and real terms.[1] First, under investor rationality, expected inflation is often considered as being positively correlated with some unobserved macrovariable or risk aversion (Fama, 1981; Brandt and Wang, 2003) in such a way that higher inflation expectations are associated with a higher equity premium and thus, expected stock returns. A second – but behavioral – channel through which inflation might affect stock returns is money illusion (Fisher, 1928). Modigliani and Cohn (1979) argue that investors discount real stock cash flows with nominal discount factors, thereby undervaluing equities in times of high inflation and vice versa. Since this undervaluation will be eliminated once actual cash flows are revealed, high inflation today will forecast subsequent price increases and will generate a positive relation between inflation and expected stock returns. Despite the fact that stakes are high in the stock market, so that money illusion should quickly be arbitraged away, several papers show that even a small amount of money illusion in the market is sufficient to generate large effects (Fehr and Tyran, 2001; Basak and Yan, 2010). Noussair et al. (2008) show in an experiment that purely nominal shocks can have large effects on real asset markets. Likewise, the leading practitioner model of equity valuation, the so-called "Fed model", falls prey to the "pedestrian mistake" of money illusion but seems to be widely used by professional investors (Cohen et al., 2005, p. 641).[2] Therefore, money illusion may be expected to be an important factor in determining the time variation of aggregate stock market returns.

A crucial ingredient for an analysis of expected inflation and asset returns is the choice of a proxy for expected inflation.[3] We choose a new route to investigate this seemingly anomalous relation and rely on proxies for near-term expected inflation derived from a comprehensive survey of professional forecasters covering the U.S., U.K., Germany, France, Italy, and Japan, which allows for an international investigation of inflation and asset returns. Up to now, the use of survey data is still relatively unexplored in the literature on the relation between inflation and the stock market and allows us to circumvent joint hypotheses problems induced by imposing models when determining inflation expectations.

By utilizing the richness of the expectation data, we first document that expected inflation significantly forecasts stock returns in- and out-of-sample, even when controlling for other factors, such as expectations about output movements, lagged dividend yields, and lagged term spreads. To the best of our knowledge, this positive forecasting relation has not been shown before.[4] We then move on to discriminate between competing hypotheses to explain this predictive power. We make use of subjective investor expectations about future stock returns, output movements, and inflation movements to investigate whether the rational (proxy hypothesis, risk aversion) or behavioral (money illusion) view is a more likely candidate to explain the positive correlation between expected inflation and expected stock returns. We find that subjective expectations about stock returns are negatively affected by inflation expectations—a result that sharply contradicts the risk aversion explanation. However, as we will argue below, this finding is well in line with money illusion.

The rest of the paper is structured as follows. The next section details competing hypotheses about the relation between inflation and expected stock returns and describes our approach to make a distinction between these competing hypotheses. Section 3 details our data and provides descriptive statistics, Section 4 discusses the econometric approach and reports forecasting regression results, Section 5 discriminates between competing hypotheses. Finally, Section 6 concludes.

2. Competing hypotheses

This section discusses possible explanations for the predictive power of expected inflation for future stock returns. To provide a better grasp of ideas, we cast our discussion in terms of the well-known framework of Campbell and Shiller (1988a,b).

Starting from the accounting identity of returns

$$R_{t+1} = \frac{P_{t+1} + D_{t+1}}{P_t} \tag{1}$$

where R, P, and D denote gross stock returns, stock prices, and dividends, respectively, the Campbell–Shiller-approximation log-linearizes the non-linear expression on the right-hand side around the average price-dividend ratio $\overline{P/D}$ to obtain a linear expression for the log price-dividend ratio

$$p_t - d_t = \rho(p_{t+1} - d_{t+1}) + d_{t+1} - d_t - r_{t+1} \tag{2}$$

[1] We stress that our findings relate to *expected* inflation and stock returns. Therefore, our results do not corroborate or refute many earlier studies that focus on actual or unexpected inflation.

[2] The Fed model is based on the presumption that stocks and bonds are "competing" assets and that equity earnings yields follow bond yields in the long run.

[3] Earlier papers employed different approaches to proxy for expected or unexpected inflation, including, e.g. measures derived from short-term interest rates (Fama and Schwert, 1977), time-series methods (e.g. Gultekin, 1983), macronews announcements (Flannery and Protopapadakis, 2002), projections of actual inflation rates on instrumental variables considered to predict inflation (e.g. Pilotte, 2003), past and current realized inflation rates (Barnes et al., 1999) and survey data on very long-term inflation expectations (Sharpe, 2002). More recently, Bekaert and Engström (2010) use VAR-models based on inflation and stock valuation measures to shed light on the workings of the "Fed model".

[4] Campbell and Vuolteenaho (2004) and Boucher (2006) also investigate forecasts based on inflation but not for stock returns per se.