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News on inflation and the epidemiology of inflation expectations in China

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ABSTRACT

Inflation expectations are important elements in monetary policy analysis. This paper examines how inflation expectations of Chinese consumers and professional forecasters are affected by media sentiments based on the epidemiological foundations of the sticky information model. Rather than assuming professional forecasts are identical to newspaper forecasts, we assume news media are a common source for the transmission of typical people's inflation expectations. We collect media data from 30 leading newspapers and magazines in China and code news reports into three types of inflation: rising, falling, and unchanged. More importantly, we categorize the media pool into comprehensive, economic, and politically oriented media sources. We find a fundamental connection between news media and inflation expectations. However, there are significantly different impacts of news reports in different media sources on expectations. The difference is mainly concentrated in politically oriented media sources, and may be a reflection of China's unique media administration system.

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1. Introduction

The importance of inflation expectations in macroeconomic analysis can be traced back to Keynes (1936). Since then, both Keynesian and New Keynesian frameworks have highlighted the inclusion of expectations. The rational expectations revolution, which prevailed in the 1970s has further shaped macroeconomic modeling. The exuberance of rational expectations was promoted by its micro foundation as in Calvo (1983) and the emergence of analytical foundation (mathematical algorithms) for macro models with rational expectations as in Fair and Taylor (1983) and Anderson and Moore (1985).

Although rational expectations are still important components in macroeconomic modeling, especially in inflation dynamics modeling, their dominant role is questionable because of their inadequacy in accounting for a realistic process of economic agents' forecasting. In particular, there is a growing trend toward the acceptance of the importance of alternative psychological, sociological, and epidemiological factors affecting agents' expectations (Shiller, 2014). In response to this question, a number of important studies have emphasized the use of survey-based inflation expectations instead of rational expectations approximation in the relevant analyses since the 1990s (e.g. Roberts, 1995; Thomas, 1999; Rudebusch, 2002; Orphanides, 2003; Ang et al., 2007).

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Of course, the use of survey data itself only provides an alternative expectation approximation for empirical studies, and it is by no means an alternative theory of the expectation formation process. Carroll (2003) perceptively put forward an epidemiological mechanism of expectation formation, according to which economic agents update their expectations from the media. This framework is consistent with the spirit of the sticky information model proposed by Mankiw and Reis (2001) and applied to analyze the impact of macroeconomic news and central bank communication on economic variables (Égert and Kočenda, 2014).

However, the sticky information model does not provide an explicit micro foundation that could lead to the exact aggregate equation they use. Carroll (2003) therefore provides an explicit micro foundation for an aggregate expectations equation which is grounded in mathematically precise models from theoretical epidemiology of the Kermack-McKendrick (1927, hereafter KM) model.

Note that Carroll (2003) and other recently published studies (e.g. Lamla and Maag, 2012; Pfajfar and Santoro, 2013) assume that professional forecasts are the forecasts of news media, which corresponds to a standard assumption in the KM model that a healthy individual must have contact with an already-infected person during the transmission of disease in a population. However, the KM model is intriguing in other aspects such as when the disease is not spread person-to-person but through contact with a common source of infection (Carroll, 2001). This case may be more pertinent to the formation of people's inflation expectations since professional forecasters are also consumers and only a very small proportion of news media reports about inflation are based on professional forecasts. News reports of prices and inflation in China, for example, comes from a variety of sources, including news reporters' observations on inflation and statistical data released by government agencies.

Therefore, this paper specifies an alternative epidemiology framework to Carroll's (2003) for the formation of a person's typical expectations. We assume people, both consumers and professional economists, typically obtain their views about future inflation from the news media, which are a common source for the transmission of people's inflation expectations. Indeed, expectations affected by news media are like an illness caused by common exposure to air pollution. We can also compare the heterogenic responses between consumers and professional forecasters to news media.

To preview our results, we find that both consumers and professional forecasters update their inflation expectations on the basis of relevant news reports. However, their responses to different media sentiments differ strikingly. In particular, neutrally toned news has a non-neutral (i.e. positive) impact on consumers' expectations, whereas neutral news has no influence on professional forecasters. Moreover, when we categorize the news media into comprehensive, economic, and politically oriented groups, we find that news reports of falling prices in politically oriented media have a trivial impact on consumers' inflation expectations, whereas neutrally toned news reports are interpreted as rising inflation news when they are printed in political news media.

The organization of this paper is as follows: Section 2 develops the epidemiology model of inflation expectations with news media as a common source of infection for all people in the economy; Section 3 describes the data used in empirical investigations, followed by Section 4 which presents and discusses empirical results; Section 5 concludes the paper.

2. The epidemiology model of inflation expectations

The rationale of our model is in the spirit of Carroll's (2003) model of epidemiology of inflation expectations, which suggests that consumers update their inflation forecasts from news media. The expectations formation process is analogous to the transmission of disease through contact with a "common source" of infection in a population. The common source of infection for consumers' inflation expectations is news media. Similarly to the spread of infectious diseases, news spreads slowly across agents, reaching only a fraction θ of the population in each period. Individuals who do not encounter news media contents of inflation at time t continue to believe previous forecasts. Eventually however, all individuals in the population will update their expectations from news media.

A small but potentially important point is that Carroll (2003) assumes consumers update their expectations from the media through the transmission of professional forecasters' projections. This is somehow a shift from the original micro model of an epidemiological mechanism with a "common source" of infection. The epidemiology model for the transmission of disease in a population with a "common source" of infection does not single out a certain group of people (such as professionals) and assume that they will catch the disease first and transmit it to others. In fact, any healthy individual is simply assumed to have a constant probability per period of becoming infected by the common source (Carroll, 2001).

Analogously, it is difficult to single out a particular group of professional forecasters from consumers. In fact, professional forecasters are also consumers, so it may be more reasonable to assume that consumers projections of the inflation rate are directly affected or driven by relevant news reports about inflation as a common source of infection, rather than being indirectly transmitted from a certain small group of professional forecasters. Therefore, in the baseline model, we allow all consumers to update their inflation expectations directly from the news media and do not divide the population into professional forecasters and general consumers. Sticking to the prototypical assumption in the epidemiology model, we simply assume any individual has a constant probability per period of becoming "infected" by the news media, since news reports represent a "common source" of information available to all members of the population.

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