Business cycle variation in positive feedback trading: Evidence from the G-7 economies

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ABSTRACT

Using the business cycle indicators and the aggregate stock market data, this paper examines the degree of positive feedback trading in the G-7 economies and the extent to which such behaviour varies across business cycle. The evidence suggests that there is a significant positive feedback trading in the major stock exchanges of G-7 countries and its intensity is linked to the overall macroeconomic conditions. Specifically, our investigation reveals that in expansions there is more active positive feedback trading than in recessions. Overall, our results yield an important insight into the effect of business cycle on investors' behaviour and market dynamics and bear important implications for the investment professions and market regulators.

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1. Introduction

It is well known that stock return displays time-varying serial correlation.[1] However, less is known about the dynamics and economic sources of its variations. Starting with the seminal work of Fama (1971), a large number of studies have analysed this issue using a wide range of variables and techniques (see, e.g., Lo and MacKinlay, 1990; McKenzie and Faff, 2003, 2005). In spite of the growing research, empirical evidence suggests that fundamental factors such as time-varying risk premia and nonsynchronous trading are not sufficiently large to explain autocorrelation observed in stock returns. Recent research has taken a different approach and argued that return autocorrelation can be, at least in part, attributed to the existence of 'feedback' traders who base their investment decisions on past price movements.[2]

For instance, building on the 'fads' model of Shiller (1984), Sentana and Wadhwani (1992; hereafter, SW) develops a heterogeneous trader model carrying important implications for the serial correlation properties of stock index returns. Specifically, SW extends the intertemporal capital asset pricing model (ICAPM) to integrate the heterogeneous trading behaviour of two groups of investors, (i) rational utility maximisers whose demand for shares depends on the risk-adjusted expected return, and (ii) positive feedback traders whose demand for shares depends on the previous price movements. Within this model setting, it can be argued that the level and sign of autocorrelation may reflect the relative market dominance of these two groups of investors, and that the return itself can be characterised as an autoregressive process in which

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  [1] See, for example, Atchison et al. (1987), Ogden (1997), and Säfvenblad (2000). The terms autocorrelation and serial correlation are used interchangeably in the paper.
  [2] These so-called 'feedback' or 'trend-following' traders pursue a positive (negative) feedback trading strategy of buying (selling) after price rises and of selling (buying) following price falls.

the parameter on lagged returns is a function of the conditional variance, i.e., the existence of a relationship between volatility and serial correlation. Using the U.S. stock market data, SW finds some statistical support for their model. Moreover, they find an interesting result that returns switch from being positively autocorrelated to negatively autocorrelated as volatility increases. SW interprets this result as an indication that positive feedback trading is higher in periods of high volatility, but negative feedback trading dominates in periods of low volatility.[3]

However, previous investigations have assumed that the behaviour of feedback traders is invariant to the business cycle regime. In this paper, we relax this assumption and consider the behaviour of feedback traders over business cycle. Numerous studies have investigated links between macroeconomic variables and stock market returns (Fama and French, 1989; Ferson and Harvey, 1993; Pesaran and Timmermann, 2000),[4] and there have been a number of empirical investigations concerned with the behaviour of feedback traders (Kurov, 2008; Salm and Schuppli, 2010). Nevertheless, to our knowledge there has been no investigation of feedback trading that allows for time-varying behaviour over the business cycle.[5] As it is widely recognised that business cycle indicators have a predictive power for stock returns (Paye, 2012) and that stock market fluctuations to some extent lead business cycle turning-points (Hamilton and Lin, 1996), it seems overly restrictive to assume that the behaviour of feedback traders is unaffected by macroeconomic conditions.[6,7] Furthermore, a number of previous studies have yielded results that suggest the predictability of stock returns varies over time (Pesaran and Timmermann, 2000; McMillan and Wohar, 2013). Extending the standard feedback trading model to allow feedback traders to react to business cycle indicators can predict a link between serial correlation and the business cycle, and thus provide a plausible explanation for the time-varying predictability.[8]

Motivated by the above arguments and findings, in this paper we make several extensions to SW model to allow the behaviour of feedback traders to vary depending on whether the economy is in recession or expansion. This not only provides a robustness check to the previous studies that rely on the assumption of fixed behaviour over different stages of business cycle but also is relevant to our understanding of the question why feedback trading might take place.[9] We investigate the statistical support for our 'augmented' models using the aggregate stock market data of seven industrialised nations (G-7) and the Economic Cycle Research Institute (ECRI) business cycle indicators. Our results show that, consistent with the existence of positive feedback traders, there is a negative relationship between volatility and autocorrelation in G-7 stock markets (with the only exception of France). More importantly, we also find that in expansions there is a stronger negative relationship between volatility and autocorrelation than in recessions, suggesting that positive feedback trading is stronger during the economic upturns. Our investigation also reveals that the base level of autocorrelation is higher during the expansion cycle. These results survive an array of robustness checks and are consistent with the view that positive feedback trading is linked, at least partly, to macroeconomic conditions.

The rest of this paper is organised as follows. In the next section we briefly discuss the Sentana and Wadhwani (1992) model of feedback trading and introduce our extended versions of this model incorporating the impact of business cycle. Section 3 presents our data and the empirical results. Section 4 concludes the paper.

2. Feedback trading models

A growing number of academic studies have found significant evidence on the link between autocorrelation and the volatility of stock returns (LeBaron, 1992). There has also been an increased attention devoted to asset pricing models that recognise the existence of heterogeneous investors (Koutmos, 2012). For instance, Cutler et al. (1990) argue that the autocorrelation properties of a large number of assets can be explained by simple models which allow for the existence of both rational investors and feedback traders. A noticeable example is the model developed by SW (1992) which predicts

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[3] Dean and Faff (2008) test this hypothesis directly using a Markov-switching model for the Australian market returns, and find that positive feedback traders are responsible for the observed increase in negative autocorrelation during periods of high and increasing volatility.

[4] In general, these papers find a significant relationship between stock market returns and changes in macroeconomic variables, such as inflation, interest rates, industrial production and the yield curve. It is also found that the economic factors explain stock market volatility e.g., Binder and Merges (2001).

[5] In a study directly related to this paper, Chau et al. (2011) examine whether positive feedback trading is related to investor sentiment in the U.S. exchange-traded fund (ETF) markets, and find that feedback trading increases in periods of optimistic market sentiment. Antoniou et al. (2007) investigate whether business cycle variables can explain the profitability of momentum trading, and find momentum profits can be largely attributable to asset mispricing that systematically varies with business conditions.

[6] If such an assumption is made but is not true, then econometric results may be subject to bias. Thus relaxing the assumption of fixed behaviour over the business cycle is warranted.

[7] A noticeable exception is the work of Antoniou and Koutmos (2014) which examines the impact of monetary policy on stock return dynamics in the U.K. and finds that there is a linkage between the cost of credit and positive feedback trading. Given the important role of monetary policy in countering the business cycle, it seems natural for this paper to further investigate the influence (if any) of business cycle on feedback trading strategies.

[8] McMillan and Wohar (2013) investigate the predictive power of six business cycle variables for the U.K. stock market. Their empirical findings suggest that dividend yield, price-earnings ratio and bond-equity yield ratio all have significant in-sample predictive power. Moreover, they also uncover an interesting evidence of time variation within predictive power for all variables and such time variation is directly linked to the state of the macroeconomy.

[9] Although a number of reasons (both rational and irrational) have been put forward in explaining the presence of feedback trading, such strategies are usually associated with noise or uninformed traders. However, positive feedback trading may well be the result of 'rational' motivations such as trading on extrapolative expectations, activation of stop-loss orders, and portfolio insurance strategies. These strategies are very likely to be influenced by the macroeconomic conditions.