Industry returns, market returns and economic fundamentals: Evidence for the United States

Nikiforos T. Laopodis *

The American College of Greece, Gravias 6, Athens, 153 42, Greece

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ABSTRACT

Seventeen industry returns, the stock market and several fundamental variables are simultaneously examined for the United States from 1957 to 2013. The results point to significant explanatory power of industry returns to many predictors of economic activity including the stock market. Detailed analyses of the industries — stock market returns linkages revealed that certain industries (*Oil* and *Financials*) provided consistent information leadership to other industries. Finally, when examining the industries' returns behavior during expansions/bull markets and contractions/bear markets, it was discovered that there are no consistent response patterns across and within each expansion/bull or contraction/bear market.

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1. Introduction

There exists ample evidence on the interactions between the fundamentals and the stock market but its conclusions are mixed. Early studies by Keim and Stambaugh (1986), Fama and French (1989), Balvers et al. (1990), Chen (1991) and Lee (1992) showed that macroeconomic magnitudes such as industrial production, default and term spreads, and dividend yields helped predict future returns. Subsequent research by Fama (1990), Schwert (1990) and Barro (1990) reported that the stock market and several economic variables such as expected cash flows, discount rates and real investment helped explain future movements in stock returns in the United States. Finally, other studies were conducted for major international stock markets as well and found that real economic activity and the stock market are closely linked (see Chan et al., 1991 for Japan).

Recent research, however, by Campbell and Shiller (1988), Carlson and Sargent (1997), and Shiller (2000) showed that since the mid-nineties, other factors such as speculation and irrational exuberance were responsible for the sharp swings in major stock markets. Lee (1996) additionally, reported that since the 1990s discount rates, earnings, dividends, and industrial production did not help explain stock price movements. Furthermore, Chan et al. (1998) argued that macroeconomic fundamentals could not adequately explain equity returns. Choi et al. (1999) further examined the stock market's (in- and out-of-sample) predictive accuracy over industrial production and noted the latter's absence in many industrial countries. Flannery and Protopapadakis (2002) found only six out of seventeen macro

announcements to be strong equity risk factor candidates for the period from 1980 to 1996. Binswanger (2004) reported that real activity explained only a small fraction of the variation in real stock returns in the US, Japan, and the European economy during the 1990s relative to the 1960s and 1970s. Finally, Laopodis (2011) showed that there was a disconnection between the stock markets and real economic activity in several countries including the US since the 1990s.

Unfortunately, most of the extant literature focused on *firm* information flows or lead–lag relationships among firms' stock returns and the stock market. Some important studies on such relationships are those by Lo and MacKinlay (1990), Brennan et al. (1993), Boudoukh et al. (1994), Hong and Stein (1999), Chordia and Swaminathan (2000), Hirshleifer and Teoh (2003), Hou (2007), and Cohen and Dong (2012). These studies found evidence of cross-firm return predictability and that firm stock-return information disseminates gradually into the market. Research on the dynamics of information diffusion between industry returns, fundamentals and/or the stock market, however, is scarce. Thus, the purpose of this paper is to fill this void in the literature. Specifically, the main goal of the paper is to test the magnitude and speed of the information propagation mechanism within the economy (stock market and real economy) by focusing on *industry returns* rather than on individual firms' stock returns. The specific objectives of this paper are four.

First, the dynamic interactions among several industry portfolios, the aggregate stock market and macroeconomic magnitudes are examined for the period from 1957 to 2013. More specifically, I investigate the predictive ability of seventeen industries, representing important sectors of the US economy such as *Consumer* durables, *Energy*, *Construction*, *Retail* trade and *Financials*, on economic fundamentals, the general stock market and the industries themselves. The fundamental variables

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* Tel.: +30 210 6009800.

(industrial production, interest-rate spreads, inflation, and the market dividend yield) used in the paper are well-known in the financial literature. To those I add the unemployment rate and several yield/rate spreads which have never been used. Thus, I study the ability of these industries' returns to provide valuable information about future stock market movements as reflected in the movements of the fundamental variables, the stock market and the industries' own lagged returns. In addition, these linkages are examined decade by decade in order to identify recurrent industry information leaders. The idea is to see which industries lead or follow other industries and the stock market given that information diffusion across markets is not always fast, complete and/or efficient. In sum, I hypothesize that an industry's ability to predict the stock market might be, in turn, contingent upon the industry's ability to absorb, process, and efficiently disseminate information from economic fundamentals.

The second objective is the investigation of whether industries are able to explain economic fundamentals. In general, information about the fundamentals is reflected in stock prices either through a re-assessment of stock prices following the release of information or through the information-gathering activities of smart traders. I test all seventeen industries and gauge their capacity to predict important predictors of economic activity over the entire fifty-seven year period. Moreover, I simultaneously examine the industries, stock market and fundamentals in an effort to determine if there are important and reciprocal interactions among all of them. If these exist, it can be concluded that there are significant, mutual linkages among industries and the stock market, manifesting through the industries' ability to explain movements in economic magnitudes. The paper by Hong et al. (2007), which examined nine major industrial economies (including the US) and found that economic information from certain industries gradually spreads into the market, is related to this objective.

A variation/extension of the above two objectives is to explore the extent to which a given industry's returns – this paper's measure of information flow – is explained by all other industries' lagged returns simultaneously, absent of the fundamentals and the stock market. This would offer insights as to how general, inter-industry information is dispersed across industries, after controlling for the influence of the stock market and the fundamentals. Specifically, the following question is asked: do a particular industry's returns contain more or less information that would be relevant to another industry? If so, what is the economic significance of such information?

The third aim of the paper is to examine the linkages between the industries and the stock market bull and bear markets. It is well-known that the behavior of stock returns (and other financial and economic magnitudes) differs during good economic times (or market advances) and bad economic times (or market declines). I also provide new evidence on whether an industry's behavior is asymmetric during selected bull and bear stock markets, which are inferred (identified) by a dating algorithm. In general, when there are informational disadvantages among market participants, firms and other investors behave as if they are financially constrained (see Kiyotaki and Moore, 1997). Such behavior may become more pronounced during bear markets, due to deterioration in the firms' balance sheets, thus adversely impacting the firms' stock returns.

The fourth and final goal of this study is to determine the extent to which an industry 'Granger-causes' another industry and the stock market. Such a finding would provide additional evidence on whether a given industry's lagged returns help explain another industry's returns as well as the stock market's. I also examine the reverse. The intention is to identify information leader industries as well as recurrent industry leaders that influence the stock market's returns using an alternative methodology.

The findings of the paper are succinctly the following. First, most industry portfolios offered significant explanatory power for many of the predictors of economic activity and some of them provided valuable information to the stock market as early as one month ahead. In addition,

it was revealed that certain industries' returns (such as *Oil* and *Financials*) constituted a significant source of information to many other industries. Second, using alternative methodologies it was discovered that certain industries notably *Oil* and *Financials* emerged as recurrent leaders of information for other industries. Third, upon examining the dynamic interactions among industries and the stock market, it was shown that stock market shocks affected many industries' returns and the shock was absorbed within 1 or 2 months. Overall, the paper's two main contributions to the literature are first, that certain industries can be regarded as information leaders to other industries, with the new investment implications as described below, and second, that industries behave differently to shocks from the stock market both *within* and *across* different bull and bear markets, which suggests that industries evolve along the economy's structure and thus standard assumptions about industry information flows must be revised over time.

The importance of this paper's findings can be summarized as follows. First, it would be more efficient and less costly for firms' investment and corporate managers within an industry to exploit leader industry returns (macro view) rather than (large) individual firms (micro view) when seeking own price setting guidance. Second, firm-specific stock price movements may reflect noise trading, perhaps in the spirit of DeLong et al. (1990) and Shleifer and Vishny (1997), because they are not always associated with identifiable and relevant public news releases, as Roll (1988) contends. Third, institutional investors can mitigate the effects (and costs) of market segmentation and investor specialization, both of which give rise to the slow information dissemination across markets, when building portfolios based on leader industries instead of large firms, which may not always be information leaders.

The rest of the paper proceeds as follows. Section 2 lays out some theoretical considerations and the four main testable hypotheses and concludes with the data sources and variable construction. Section 3 contains some preliminary statistical results on the main series, while Section 4 presents and discusses the main empirical findings as well as the causality tests. Section 5 extends the analysis by investigating the lead–lag relationships between industries and the stock market during economic expansions and contractions, bull and bear markets and offers additional robustness tests. Section 6 summarizes the findings and concludes the study.

2. Methodology and data

2.1. Economic motivation

It is assumed that investors in various sectors possess information about their own market(s) and rationally exploit it (them). But what about information on the markets these investors do not participate in, including the macro economy and the stock market? Three potential answers exist. First, investors can simply obtain the relevant information and profitably exploit it, which would happen only if investors believed that those other markets possessed pertinent information about the real economy and market fundamentals. Second, investors cannot process the information emanating from other markets, which might happen because investors have limited capabilities in processing the information (Shiller, 2000) or because there is too much information to be processed. As a result, such investors participate in a limited number of markets, as first noted by Merton (1987), and this generated a huge literature on segmented markets and limited investor participation.[1] Third, investors simply choose to ignore news from other markets perhaps because they believe that it is irrelevant or think that it does not influence their own industries and/or the general economy.

The overarching hypothesis of the paper is this: to the extent that the stock market pays attention to economic fundamentals, the ability

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[1] See for instance, Badrinath et al. (1995), Barber and Odean (2008), and DellaVigna and Pollet (2006).