Stock prices and macroeconomic factors:
Some European evidence

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A R T I C L E   I N F O

A B S T R A C T

This paper analyses the dependence of stock prices on macroeconomic variables in the three largest European economies: France, Germany and the United Kingdom. In recent decades, industrial production and long-term interest rates have been important significant variables accounting for approximately one half of annual movements in stock prices. Both factors seem to be equally important, but a closer examination reveals that the weight of these factors has clearly moved from interest rates to production. This evidence is common to all three of these European countries and is in sharp contrast with the results for the US.

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1. Introduction

   Just as the market value of a company depends heavily on its current economic situation and future perspectives, the value of all the companies listed on the stock market of a given country will depend on the global economic situation and future perspectives in that country. This implies that changes in stock prices will be related to economic changes occurring or being anticipated by the market. Empirical facts seem to support this view; international stock markets have generally evolved in close relationship with domestic economies. Nevertheless, there are exceptions to this general rule. A conspicuous example was the October 1987 crash that affected virtually all world markets and most of the companies in those markets, but was not linked to clearly identifiable economic factors. The marked movements that have taken place recently have heightened the interest in the relationships between stock markets and economic performance.

   To analyze this issue, measures of both stock prices and economic activity are needed. Stock prices can be measured accurately and instantaneously through stock price indexes. Measurement of economic activity is much more complex, and several economic variables should be used: production, employment, prices, interest rates, or exchange rates, to mention only a few. Stock prices will maintain a close and well-defined relationship with some of these variables, but the relationship with other variables will be less clear-cut. A typical example of the first type of relationship would be that between stock prices in developed countries and the price of oil. International stock markets were clearly and dramatically affected by oil shocks in the seventies. Conversely, the relationship between some economic variables, such as employment, and stock prices is much more complex or ambiguous. An increase in employment, as a reflection of improving economic conditions, might be expected to be associated with stock price increases. However, the contrary may also happen; an employment increase may generate associated increases in inflation or interest rates and,

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subsequently, lower stock prices. An explanation for this paradox would entail the consideration of more complex relationships and models, such as non-linear or state-dependent models (see, for example, McQueen & Roley, 1993 or Boyd, Jagannathan, & Hu, 2001).

Given the importance of this topic linking finance and macroeconomics, numerous theoretical models have tackled the question of the relationship between stock prices and several economic variables. The APT model is probably the most frequently used. In this framework, financial returns are explained through different unknown but identifiable factors with various studies proposing several possible macroeconomic factors. In parallel, many other studies take a present value model as a starting point, where stock prices are the present value of expected future dividends,

$$P_t = \sum_{i=1}^{\infty} \frac{1}{(1+\rho)^i} E(d_{t+i}|\Omega_t) \qquad (1)$$

where P_t is the price of a stock in t, ρ is the discount rate, d_t is the dividend paid in t, and Ω_t is the set of available information in t. If we bear in mind that ρ includes a risk premium, the preceding equation contains the three primary factors, highlighted by Boyd et al. (2001), which shape stock prices: the evolution of future dividends, the risk-free discount rate and the risk premium.

Of course, future dividends are unknown, and the discount rate is not observable. Due to their hypothetical relationship with stock prices, when using this present value model, the two most-used macroeconomic variables have been production and interest rates, as representative of the first two primary factors. Changes in production would cause changes of the same sign in stock prices through expected future dividends. On the contrary, there would be an opposite stock price reaction to changes in interest rates. Increases in interest rates would imply higher discount rates and, therefore, lower stock prices. In addition, there could well exist relationships between interest rates and production; increases in interest rates may cause decreases in investment and, thus, in future production. Hence, interest rates may affect stock prices in two different ways: i) directly, through changes in discount rates; ii) indirectly, through changes in future production. Both effects have the same sign and, subsequently, stock prices will decrease in response to rising interest rates, and conversely they will rise in response to declining interest rates.

In the light of these hypothetical connections, this paper aims to explore the links between stock prices and these two macroeconomic variables, production and interest rates, in the three main European economies: France, Germany and the United Kingdom. Additionally, it compares the results obtained for these European countries with the empirical evidence for the United States. Over the last few decades, abundant empirical literature has tried to quantify these relationships, particularly with regards the US market, but the results are not consistent. While some researchers do not find any clear and significant relationship between macroeconomic factors and equity returns (see, for example, Chan, Karcesky, & Lakonishok, 1998; Flannery & Protopapadakis, 2002, or Maio & Philip, 2015), other researchers find definite relationships. Fischer and Merton (1984) pointed out that stock returns forecast future production. Fama (1981, 1990), using annual data, shows that real stock returns hold a strong relationship with production growth rates. Schwert (1990) confirms these results with data from a whole century, 1889–1988. Ang and Bekaert (2007) find that the most robust predictive variable for future excess returns is the short rate. Finally, Humpe and Macmillan (2009) find that US stock prices are influenced positively by industrial production and negatively by long-term interest rates.

In sharp contrast with the research for the US market, the studies for Europe have been much sparser. Wasserfallen (1989), when analyzing the response of European stock markets to unexpected components of several economic variables, finds very weak relationships. Canova and De Nicolo (1995) find significant relationships between stock returns and growth rates in industrial production. Peiró (1996) shows that stock returns depend positively on future variations in industrial production and negatively on current changes in interest rates. Nasseh and Strauss (2000) also find significant responses of stock prices in six European countries to innovations in industrial production and interest rates. Rapach, Wohar, and Rangvid (2005) find that interest rates are the most consistent and reliable predictors of stock returns in several European countries. Barro and Ursúa (2009) show that stock-market crashes in several countries, including some in Europe, have substantial predictive power for depressions. Jareño and Navarro (2010) confirm a negative relationship between Spanish stock returns and movements in interest rates with a very high degree of significance (see also Fernandez-Perez, Fernández Rodríguez, & Sosvilla-Rivero, 2014). Recently, Kuosmanen, Nabulsi, and Vataja (2015) address the predictive association between financial markets and the real economy in four Nordic countries; they find that the relationship between financial variables and economic activity is stronger in Finland and Sweden than in Denmark and Norway. In addition to the scarcity of studies on the relationships between macroeconomic factors and equity prices in European markets, the evolution of these possible relationships over time and the relative importance of the different economic factors have not been addressed at all. An interesting exception is Binswanger (2004), which provides evidence suggesting a breakdown in the early 1980s in the relationship between real stock returns and growth rates of economic activity.

To cast some light on all these questions, the rest of the paper is organized as follows. Section 2 presents the data used from the three largest European economies: France, Germany and the UK. Section 3 examines the relationships in these countries between stock returns, production and interest rates, paying special attention to their dynamics over time and to the relative importance of these variables. Finally, Section 4 summarizes the main results and conclusions.

2. Data

To analyze the relationship between macroeconomic activity and stock markets in France, Germany and the United Kingdom, production, prices and interest rates will be used. With regard to production, industrial production was used in preference to GDP as it maintained a more definite relationship with stock returns. This is certainly due to the fact that GDP is a very broad variable with