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Culture and R^2 ☆

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ABSTRACT

Consistent with predictions from the psychology literature, we find that stock prices co-move more (less) in culturally tight (loose) and collectivistic (individualistic) countries. Culture influences stock price synchronicity by affecting correlations in investors' trading activities and a country's information environment. Both market-wide and firm-specific variations are lower in tighter cultures. Individualism is mostly associated with higher firm-specific variations. Trade and financial openness weakens the effect of domestic culture on stock price comovements. These results hold for various robustness checks. Our study suggests that culture is an important omitted variable in the literature that investigates cross-country differences in stock price comovements.

1. Introduction

The extent to which stock prices move together is an important issue in portfolio analysis and asset pricing. Understanding stock price synchronicity is also essential to the study of market efficiency and resource allocation efficiency in general (e.g., Wurgler, 2000; Morck, Yeung, and Yu, 2013). A good number of studies have examined cross-country differences in stock price synchronicity. They focus on using a country's economic fundamentals, such as Gross Domestic Product (GDP) per capita, institutional development, and the quality of the information environment, to explain stock price comovement.[3] Another important but neglected factor that differentiates one country from another is culture, which imposes informal constraints on human behavior.

In his seminal work on institutions, North (1990, p. 6) states that "Although formal rules may change overnight as the result of political or judicial decisions, informal constraints embodied in customs, traditions and codes of conduct are much more impervious to deliberate policies." The effect of culture on the behavior of individuals is well documented in the management and psychology literature.[4] And the

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[3] For example, see Morck, Yeung, and Yu (2000), Li, Morck, Yang, and Yeung (2004), Jin and Myers (2006), and Bris, Goetzmann, and Zhu (2007).

[4] For example, see Kroeber and Kluckhohn (1952), Hofstede (1980, 2001), Gelfand, Nishii, and Raver (2006), Hofstede, Hofstede, and Minkov (2010), Gelfand et al. (2011), and Norenzayan (2011).

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behavioral finance literature shows that behavioral biases can affect stock price comovements.[5] Combining both strands of literature, it stands to reason that cultural dimensions that introduce systematic biases into investor behavior can also affect stock price comovement.

To examine the effect of culture on stock price comovement, we focus on two cultural dimensions that are likely to generate correlations between investors' trading behaviors. The first dimension, tightness versus looseness, focuses on *external* constraints on human behavior and measures the strength of a country's social norms and the society's tolerance for deviant behavior (Gelfand, Raver, Nishii, Leslie, and Lun, 2011). Gelfand, Nishii, and Raver (2006) argue that individual behaviors tend to be more homogeneous and exhibit a lower degree of variation in culturally tight countries. The convergence in investor behaviors would likely cause positive correlations in investors' stock selections and buy/sell decisions, which can induce comovements in stock returns (e.g., Barberis, Shleifer, and Wurgler, 2005; Kumar, Page, and Spalt, 2009). Based on these arguments, we expect higher stock return comovements in culturally tight countries.

While cultural tightness/looseness captures external constraints on individual behaviors, the second dimension, individualism versus collectivism, focuses on *internal* attributes that guide an individual to differentiate his or her behavior from that of others (e.g., Hofstede, 1980, 2001; Schwartz, 1994; Gelfand, Nishii, and Raver, 2006). The literature suggests that individualistic investors are likely to be more confident in their ability to acquire and analyze information and less concerned about having different opinions from others (Markus and Kitayama, 1991; Heine, Lehman, Markus, and Kitayama, 1999; Chui, Titman, and Wei, 2010). Therefore, one would expect to observe less herding behavior and more firm-specific information being incorporated in stock prices, which would be likely to lead to lower stock price comovements in individualistic countries.

Using the tightness measure of Gelfand, Raver, Nishii, Leslie, and Lun (2011) and the individualism measure of Hofstede (2001), we examine the influence of culture on stock price comovements for a sample of 47 countries from 1990 to 2010. We use R^2 from an expanded market model to measure stock price comovement in a country. As expected, we find that countries that are culturally tighter and less individualistic have higher stock price comovements. The influence of culture on stock price comovements is economically significant. A one standard deviation increase in tightness (individualism) is associated with a 12.9% increase (18.2% decrease) in stock price comovements (R^2) from the mean. The marginal effects of these two cultural variables on R^2 are comparable to those of previously documented determinants of stock price synchronicity, such as GDP per capita (−12.4%), country size (−9.3%), good government index (−15.0%), and the diversity of analyst forecasts (6.1%). These results are robust to controlling for a variety of country-level characteristics that have been shown to affect stock price synchronicity, such as GDP per capita, GDP growth volatility, good government index, informational opaqueness, industry and firm concentrations, country size, and earnings comovements.

We next examine the possible mechanisms through which the two cultural variables affect stock price synchronicity. Evidence from the finance literature suggests that correlated trading and information opacity are likely to lead to higher stock price comovements (e.g., Barberis, Shleifer, and Wurgler, 2005; Jin and Myers, 2006; Kumar, Page, and Spalt, 2009). Consistent with higher stock price comovements in culturally tight countries, we find that the fraction of stocks moving in the same direction is higher and the information environment is more opaque in these countries. In individualistic countries, information transparency is higher and the fraction of stocks moving in the same direction is lower, which is consistent with our observation of lower stock price comovements in these countries. Taken together, these results suggest that differences in stock trading correlations and information environments in different cultures are the likely mechanisms through which the cultural variables influence stock price comovements.

A higher (lower) R^2 could be an outcome of higher (lower) market-wide variations and lower (higher) firm-specific variations. If investors tend to make similar trading decisions and the overall information environment is less transparent in tight cultures, less firm-specific information would be imputed into the stock prices. Further, if investors are reluctant to deviate from aggregate beliefs in the market, that is, prevailing market prices, one would expect lower market-wide variations in stock returns. Consistent with these arguments, we find that both market-wide and firm-specific variations are lower in tighter cultures, but the negative effect of cultural tightness on firm-specific variations is much stronger than that on market-wide variations, leading to higher R^2 in tighter cultures. On the other hand, individualistic investors are more likely to gather and process information on individual firms, allowing more firm-specific information to be incorporated into stock prices. Supporting this view, we find higher firm-specific return variations in individualistic countries. There is no significant relation between individualism and market-wide return variations. These results suggest that individualism leads to a lower R^2 primarily through higher firm-specific variations.

We next examine whether trade or capital market openness mitigates the influence of domestic culture on stock price synchronicity. Trade openness exposes people to different ideas and values and could potentially weaken the effect of a country's own culture on people's behavior. Capital market openness allows foreign investors to participate in domestic markets, mitigating the influence of domestic culture on stock price behavior as well. Consistent with these arguments, we find a weaker influence of a country's cultural tightness and individualism on stock price comovement when the country is more open to international trade, receives more foreign portfolio investments, and is more integrated with the global stock market.

We conduct several robustness checks on our results. First, we repeat our analysis in a joint sample of 28 countries for which both cultural measures are available and confirm that our results are not driven by sample differences. Second, we verify the robustness of our results with a balanced panel of countries that have data available for the entire sample period.

[5] See Hirshleifer (2001) and Shiller (2003) for surveys on the behavioral finance literature. Barberis, Shleifer, and Wurgler (2005) discuss sentiment-based views of stock return comovements.