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## Impact of Culture Distance on Stock Market Co-movement: Evidence from BRICS Countries

## Qian Zhang

Lecturer of SHU-UTS SILC Business School, Shanghai University, China Abstract

China, Russia, Brazil, India and South Africa, as five major countries with emerging markets, are collectively referred to as BRIC countries. The rapid development of their economy has gradually been converted to political influence, bringing them into new political and economic powers in the world. To study the relation among the BRIC countries' stock markets helps to understand and control the impact of the financial crisis contagion, but little attention has been paid to whether and how the different cultural dimensions of these countries may impact the stock markets. In light of the six dimensions suggested by Geert Hofstede, the paper studies the stock market indexes of China, Russia, Brazil and South Africa to find out the relation between cultural distances and stock market trends. As is observed, to countries whose cultures do not vary much from each other, the correlation among their stock markets is dynamic and shows some differences in different time periods.

**Introduction:** BRIC refers to five major emerging markets: the People's Republic of China, Russia, Brazil, India, and South Africa, whose populations and land areas occupy an important share in the world and have become main driving forces of the world economic growth. BRIC accounts for 26% of the world land areas, 42% of the world population, 14. 6% of the world production, 12. 8% of the global trade volume, and has an over 50% contribution rate to world economic growth according to purchasing power parity.

The People's Republic of China, whose total economic output ranked second in the world, is the world's most important emerging economy, having closed economic and trade relations with countries of the world. According to the World Bank classification standards, China belongs to upper middle income countries concerning the per capita GDP measure.

Russia, with vast territory and abundant resources, is very rich in natural resources and has a high degree of self-sufficiency. Russia inherited most of the Soviet federal socialist economic system, but after the collapse of the Soviet Union, it suffered a sharp recession due to the social unrest and political instability and distribution of injustice caused by the rapid liberalization reform.

India is one of the world's fastest growing countries, whose economic growth rate is eye-catching. If measured in purchasing power parity, India's GDP in 2011, 4. 457 trillion dollars, ranked third in the world along with Japan, only after the United States and China; but if assessed in dollar exchange rate, India's gross domestic product was only 167. 6 million dollar, ranking 11<sup>th</sup> in the world, almost the same as that of Australia, whose population was only 23 million. Over the past 20 years, India's annual growth rate was 5. 8% and reached 6. 1% between 2011 and 2012.

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However, its wealth distribution is extremely unbalanced: 33% of national income belongs to 10% of the country's population.

Brazil has developed agriculture, mining industry, manufacturing and service industry, and enjoys sufficient labor force. Brazil's GDP (purchasing power parity) ranks 1<sup>st</sup> in Latin America and is exerting growing impact on the world market. Its main export commodities are: coffee, soybeans, iron ore, orange juice, steel, sugar and aircrafts. Brazil GDP average annual growth rate has reached 5. 4%, and its GDP per capita has reached about 12000 U.

South Africa belongs to middle-income developing countries, and is a most economically developed country in Africa. It is rich in resources, developed in financial, legal, communications, energy and transportation industry, and the hardware construction and the stock market are in the global top twenty. In 2007, South Africa's GDP ranked 20th in the world. The Standard Bank is a large bank group originated from South Africa. The most developed areas in South Africa include Cape Town, Fort Johannes, Durban, and Port Elizabeth, but the development degree of other areas outside these regions are very limited, thus brings about the severe domestic wealth disparity in South Africa. In addition, due to the racial disparity in income, the black in South Africa show exclusive theological tendency, have high serious crime rate and commits much corruption. The continuous influx of refugees and the high morbidity of AIDS also restrict its economic development. In this sense, although South Africa ranks 4<sup>th</sup> in per capita GDP in Africa, it is only known as a developing country.

BRIC countries vary in terms of natural resources, industrial structures and developing patterns, and are with space of complementarities and cooperation in economic and trade development. Among them, China can provide a large number of high-quality, cheap industrial products, while India, Brazil and South Africa have the ability to provide rich energy and mineral resources. From the ministerial meeting to the summit, from the share of simple ideas to more substantive cooperation, the BRIC countries have a broad common interest basis to realize steady and rapid international trade. Through signing bilateral and multilateral trade agreements, BRIC countries encourage international trade among member states, improve the level of the national economic and trade cooperation to realize the jointly rise of the BRIC countries.

However, China and India lie in Asia, Russia between Asia and Europe, Brazil in South America, South Africa in Africa, so these countries are different in both cultural background and social and economic development, and their financial market development also vary. The stock market as a representative of financial market has great impact on the economy of each of the five countries. Stock market investors, however, due to the influence of different levels of culture, have different investment behavior, and the overall investment behavior will affect the development trend of the stock market as a whole. Therefore, to research how cultural distances among China, Russia, India, Brazil and South Africa affect stock market development has important theoretical and practical significance.

**Literature Review:** The relationship between culture and finance is an interest topic, which have been so focused in academic research. Fligstein (1996) develop a conceptual view of social institutions and use the metaphor "markets as politics" to view the action in markets. He discusses a sociological model of action to create stable worlds and find some solutions to competition. With these foundations, he generate propositions about how politics in market work. And in stable markets, he finds that incumbent firms defend their positions against challengers and invaders.

Tesar and Werner (1995) do some research about home bias with the international portfolio investment data in five OECD countries. Despite that there are potential gains from international diversification; they find that strong evidence of a home bias in national investment portfolios. Additionally, the composition of the portfolio of foreign securities is a better explanation other than diversification of risk.

Gleason et al. (2000) use the data from retailers in 14 European countries to find that capital structures are the advantage which will improve its competitive into four cultural clusters. Additionally, they use the financial and operational measures of performance to find the way that how capital structure influences financial performance. They prove the negative relationship between capital structures of them in a purely domestic context.

In order to find the impact of legal systems on financial disclosures, Jaggi and Low (2000) examines the impact of by firms from different countries. They find that, compared to firms from code law countries, firms from common law countries have stronger relationship with financial disclosures. Additionally, they find the insignificant impact of cultural values have on financial disclosures by firms from common law and code law countries. They examine the total sample, and find the same results. However, the cultural values have no impact on financial disclosures of multinationals from common law countries, and mixed signals are found for multinationals from code law countries.

"If, as argued by the practitioners of behavioral finance, individuals have psychological biases that matter for finance, it would be surprising that individuals' view of the world as determined by their culture does not matter for how they view and act in financial markets." (Stulz and Williamson, 2003).

Lucy and Zhang (2003) examine the question that, whether and how cultural distance between countries mitigates financial market linkages. The result suggests that present the effects of cultural distance on unconditional and conditional correlations respectively, adjusting for trading intensity. Barro and McLeay (2003) use international survey data on religiosity for a broad panel of countries to investigate the effects of church attendance and religious beliefs on economic growth. They find that economic growth is positively related to the extent of religious beliefs, but negatively related to church attendance.

Aggarwa et. al (2005) examines the investment allocation choices of actively-managed US mutual funds in emerging market equities after the market crises of the 1990s. They find that US funds invest more in open emerging markets with stronger accounting standards, shareholder rights, and legal frameworks.

Focusing on the distance in stock market decisions, Ji et al. (2008) compare the data from Canadians and Chinese. They find that Canadians were more willing to buy and less willing to sell, when the stock price was rising. But compared with Chinese, Canadians were more willing to sell and less willing to buy falling stock. Another thing, Canadians was strongly influenced by the most recent complex stock price trends, which is different from Chinese. Since the Chinese will take both recent and early trends into consideration, when make decisions and reversal predictions for the dominant trends and made that took.

Following extant literature in behavioral finance, Beugelsdijk and Frijns (2010) examine the foreign bias in international asset allocation; suggest that a society's culture and the cultural distance between two markets are of great importance in explaining the foreign bias. They prove that the

Impact of Culture Distance on Stock Market Co-movement: Evidence from BRICS Countries Qian Zhang degree of a nation's uncertainty avoidance and the degree of a country's individualism affect the foreign bias.

In order to explain the size effect in January with the utilization of some theoretical arguments drawn from behavioral finance, Chen et al. (2011) take the Chinese stock market as sample to find the results. They find that, under Chinese tradition, employees are rewarded with a generous bonus before Lunar New Year, which is analogous to the concept of house money.

Aggarwala et. al (2012) use panel data from 2001 to 2007 to do regression and estimate the IMF's CPIS survey of foreign debt and equity portfolios across 174 originating and 50 destination countries. Results ensure the role of culture and extend the set of cultural variables that have been investigated in gravity models of foreign portfolio investment (FPI). With Hofstede's cultural dimensions of masculinity, individualism, power distance and uncertainty avoidance, they show how cultural traits in both originating and destination countries. In addition to that, they prove how the cultural distances that separate originating and destination countries; interact with other gravity variables, such as geographic distance, to determine global FPI patterns. They find hitherto unreported effects and show that while gravity always deters FPI, supporting FPI is a good way to aspects of culture and cultural distance offset this.

The study of financing choices has traditionally focused on data in financial statements. Aggarwal and Goodell (2014) explains the need for supplementing traditional financial and economic factors with softer cultural and institutional measures in explaining the determinants of firm financing. Based on the incompleteness of contracts, they find theoretical arguments, and therefore they suggest the important role of ethics and behavioral norms in the need of enforcing contracts, as well as cost of contracts. They add the soft factors to traditional economic factors to examine the theory practically, and provide a better and more complete explanation of firm financing. Although there are demonstrated needs for mainstream finance journals, they also note that there is a lack of such literature. Finally, this paper introduces the contributions in this regard of the other papers in this special issue.

Taking 8 and 4 as lucky and unlucky for many Chinese into account, Anderson et al. (2015) use the high-frequency data (from 1996 to 2009) to document the prevalence of cultural biases in the Chinese equity market. They show that cultural clustering is pervasive across both exchanges and sharing classes but is declining over time. Additionally, Cultural-driven order placement is more prevalent in higher-priced shares.

The literature review has found many discussions and research achievements about culture and finance, but little attention has been paid to different culture dimensions in the stock market development trend. Taking cultural dimension as an important concern in financial study, the paper analyses the stock market development of the countries with different cultural dimensions.

## **Objectives of the Study:**

The study aims to achieve the following objectives

- 1. What are the differences in cultural dimension among China, India, Russia, Brazil and South Africa?
- 2. Are there any similarities in the whole development of the stock market among the countries whose cultures are close to each other?

**Data description:** The data of this paper mainly includes two parts: data of cultural distance dimensions, and data of stock market indexes.

**Cultural Distance:** The cultural distance dimension data is downloaded from website of "geerthofstede" and sorted according to Geert Hofstede. Six cultural distance dimensions are included: Distance Index Uncertainty, Avoidance Index Individualism, versus Collectivism Masculinity, versus Femininity Long, Term Orientation versus Short Term Normative Orientation, and Indulgence versus Restraint.

Power distance means the degree of concentration and dictatorship in an organization, and in what degree can a society accept the organization of the unequal distribution of power. In enterprises it is interpreted as among can be understood as the social distance between employees and managers. Whether a culture is about big or small power distance power distance is reflected in the values of the members of within the society. Therefore, to study the values of the members of a community can help determine the degree to which the society accepts power gap.

When people face a uncertain, vague or uncertain situation, they will find it a threat and always try to prevent it from happening, which can be called as Uncertainty Avoidance. There are lot of methods to prevent, such as to provide greater occupation stability, prescribe more formal doctrines, advocate the pursuit of absolute truth and so on. Different nationalities, countries and regions are different feeling of urgency to avoid uncertainty. Comparatively speaking, in a society with a low level of uncertainty avoidance, people generally have a sense of security, tending to leave a relaxing life and encourage adventures. While in the society with a high degree of uncertainty avoidance, people generally have a high sense of urgency and initiative, so it is easy for them to impulses to work hard.

Individualism refers to a loose social organization structure, each member of which attaches importance to his own values and needs and relies on individual efforts to seek benefits for themselves. Collectivism refers to a close social organization structure, people tend to be distinguished as "within the group" or "outside the group"; they expect the care of people "within the group" and to maintain absolute loyalty to the group in return.

Masculinity and Femininity are dominant values in a society. To the male society, it is masculinity that occupies a dominant position, such as pontificate confidently, aggressive, and persistent pursuit for money; to a female society, everything is on the contrary. Interestingly, the higher a society values "manliness", the more different the values are between its men and women. The terms of Long Term Orientation and Short Term Normative Orientation are derived from the studies of 23 countries. The study was conducted using the questionnaires designed by Chinese scholars that focus on virtue rather than truth. Long Term Orientation values conservation and firm; Short Term Normative Orientation values traditions, fulfills social responsibility and care much about "face". These dimensions originated from the works of Kong Zi, who is the most influential Chinese philosopher living in 500 BC. However, this dimension is also applicable to countries without Confucian tradition.

Indulgence means a society that advocates for full enjoyment of life and fulfillment of basic human drives. Restraint means a society that prescribes strict social rules to restrain and govern its members to ensure the regular operation of the society.

**Stock Market Index:** The stock market index data are downloaded from YAHOO finance website: http://finance. yahoo. com/. The data are daily ones dating from 2005 to 2014.

Chinese stock market is in close relationship with the central bank's monetary policy and fiscal policy relationship is a bit far away. In 2005, for example, began to reform, appreciation of RMB

exchange rate, foreign exchange growing, bull run since 998 points and vigorously, through to 6124. In October 2007, China has decided to implement the moderately tight monetary policy, credit management, the Chinese stock market index jumped from 6124 to 1660 deep down immediately. Russian stock market in April 2011, near 2011 economy below the highs of crisis, the Russian stocks will meet the high of 2127. 73, then three years to \$1200 for centerline number triangle oscillation, in February 2014 for the first time the neck line broken, when in fact that Ukraine war already lit, then there is resistance, arm supplanted the thigh, along with the United States and the European Union sanctions, the Russian stock market crash in the end.

Data has shown that the history of the development of securities market in India, traditionally movement is steady, the characteristics of long "cow bear short" is quite obvious. Global stock market because of the Internet bubble burst in 2000, Indian shares also suffered the worst decline in nearly 10 years, but at the time of sensitive index and only 22%, the biggest drop, and then in the bull market for more than 6 years. In this wave of big bull market, the Indian stock market is up 7 times in 6 years. Some analysts said that, compared with other emerging markets, Indian stock market have more perfect company information disclosure system, stronger property rights protection and more friendly to investors of the judicial system, which is its long-term bullish, one of the important reasons.

Sao Paulo, Brazil, the stock market is one of the largest stock market in Latin America, Latin America's capital markets, new hair and issuance of shares about 90% was conducted in Sao Paulo, the stock market. Sao Paulo, the current stock market a total of more than 400 shares traded on the market, of which 63 only the largest stock of Igbo palmer index, become a barometer of Sao Paulo, the stock market up or down. Global stock markets from 2007 to 2008 crazy rising sharply, Brazil on May 20, 2008 climbed to 73516 points, a record high. Later that year, as the financial storm spread, foreign capital fled, of the "strong" Purvis index began last 7 months crazy to fall in October, crash hit bottom, not only point to dip below 30000 points, also many times within a day or as high as 15%, the transaction was forced to suspend.

South Africa belongs to middle income developing countries, also is Africa's biggest economy, abundant resources, financial, legal, communications, energy, transport developed, complete hardware construction and the stock market in the world's top 20. Affected by the European debt crisis, global stock markets are all well, the stock market in South Africa. But the end of August 2012 index is at a record high in South Africa, South Africa is one of the few to the impact of the crisis hit a record new high price market, the key is in South Africa on many investors through the stock market to participate in the African economy booming domestic demand of business opportunities, in recent years, more attractive to international capital flow, according to EPFR, since this year into South Africa equity fund amount is \$1.82 billion, accounted for 3.8% of the total size of the proportion among most of the single market fund.

Due to certain differences among the five countries in daily data, this paper calculates the annual average value of the stock index based on the daily stock index data. Table 1 gives the statistics of the stock market index of five countries.

**Table 1 Statistics of the Stock Market Indexes** 

	Maximum	Minimum	Mean	Standard. de
China	6092.06	99. 98	1773. 798	1048. 773
Russia	2487. 92	38. 53	880. 3955	647. 8749

India	29681.77	956. 11	9645. 052	7716. 17
Brazil	73516. 8	8370. 88	42209. 59	19249. 99
South Africa	5550	761. 2	2651. 204	1355. 076

From Table 1, China stock index highs of 6092. 06, the minimum point was only 99. 98; Russian maximum index is 2487. 92, the lowest was 38. 53; the lowest point of India stock index is 956. 11, its highest was close to 30000; base point of Brazil index is larger, the lowest point was 8370. 88, and the highest point was close to 74000; the minimum stock index of South Africa is 761. 2, relatively close to India stock market index is, but the peak point is 5550, relatively low to other countries' stock indexes.

**Empirical Results:** In different cultural dimensions, there are obvious differences in the level of each country. In order to clearly see the cultural distances, this paper makes a radar map according to the five levels of 0, 20,40,60,80,100, and the five countries are located according to different levels, as shown in Figure 1.

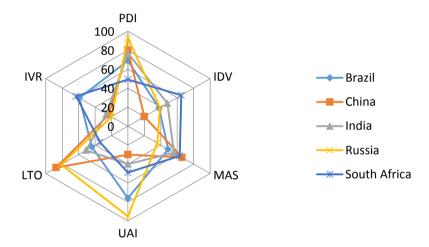


Figure 1 Comparisons of the cultural distance dimensions among the five countries

According to figure 1, we can find that the different dimensions of cultural differences exist in different countries. The average Distance Index Power of the five countries is 74, with the PDI value of Russia as the highest (close to 100), the PDI value of South Africa as the lowest (only 49), and those of India and Brazil close to the mean. This shows that the degree of authoritarian leadership of Russia is higher, and South Africa is not apt to accept unequal distribution of rights.

The Avoidance Index Uncertainty (UAI) of the five countries is 58, with the UAI value of Russia as the highest (close to 100), the UAI value in China as the lowest (only 30), and a close UAI value of India and South Africa. This shows that Russia has a higher degree of urgency, thus ignoring the uncertainty of avoidance, while China is more sensitive to uncertainty and tend to avoid uncertainty.

Versus Collectivism Individualism (IDV) of five countries is 42. South Africa enjoys the highest IDV value of 65; China's IDV value is the lowest, only 20; India and Russia's IDV values are basically in the middle. This shows that South Africa's individualism is stronger, and the Chinese collectivism is stronger.

The Masculinity versus femininity (MAS) mean for the five countries is 54. Chinese MAS value is the highest, 66; Russian MAS value is the lowest, 36; India and South Africa MAS values are close to each other. That is to say, China is a female society, paying more attention to harmonious and moral ethics and advocating the spirit of active accession; Russian society is more masculine, aggressive and persistent in money claim.

Among the Term Orientation Short Normative Orientation Long versus Term LTO (LTO) means of the five countries, China has the highest LTO value, more than 85; Brazil and South Africa's LTO values are relatively low, 44 and 34 respectively. This shows that China is more inclined to long-term orientation values, but also pays attention to conservation and stabilization; Brazil and South Africa are in favor of short term values in respect for tradition and to fulfill social responsibility.

The Versus Restraint Indulgence (IVR) of the five countries is 38. South Africa and Brazil's IVR values are relatively high, 63 and 59 respectively; India, Russia and China's IVR values are relatively low, 26, 24 and 20 respectively. That is to say, South Africa and Brazil are more inclined to indulgence, while India, Russia and China tend to restriction.

According to the analysis results of different cultural dimensions, it can be clearly seen that China, Russia and India are similar in PDI, IDV and IVR, while Brazil and South Africa are similar in the PDI, LTO and IVR. So this paper divides the five BRIC countries in terms of cultural distance into two groups: China, Russia and India as one; Brazil and South Africa as the other. To analyze the similarities and differences of stock market development between the two groups, the trend chart of stock market index annual average from 2005 to 2014 are given. To avoid stock index base difference, this paper did log processing on the stock index of each country. The stock market index annual average trend of China, Russia and India is shown in Figure 2, and that of Brazil and South Africa is shown in Figure 3.

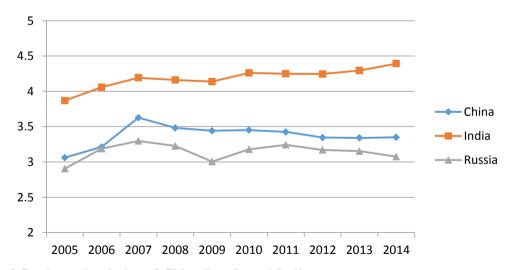


Figure 2 Stock market index of China Russia and India

According to Figure 2, the Chinese stock market in 2005 stock index of annual average was only 1154, started to rise from 2005, reached the highest in 2007 with the annual average as about 4238; Since 2007, China's stock market was affected by the U. S. subprime crisis and began to fall before became steady at 2009; From 2012 to 2014, the overall development of Chinese stock market is Volume-II, Issue-IV

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relatively stable. The Russian stock market index kept rising from 2005 to 2005, but the speed of rising gradually slowed down; in 2007, the international financial crisis also caused negative influence to the Russian stock market, whose stock index began to fall gradually since 2007, and annual average index reached the bottom in 2009 as 1012. In comparison, the Indian stock market development is different from that of China and Russia. Although a fall occurred after the peak in 2007 after the, the country's financial crisis did not cause lasting negative impact to India, and the Indian stock market as a whole has been rising since 2009. From 2012 to 2012, the Chinese and Russian stock markets did not experience great fluctuation, and Indian stock market index still kept rising.

Overall, China is more inclined to the values of long-term orientation, and this cultural characteristic has made China's stock market relatively stable compared to Russia and India. To the masculine country of Russia, the stock market development is more aggressive and is with relatively large fluctuations. To China and India, the degree of uncertainty avoidance is higher, so the overall development of the two countries stock market did not fall significantly. Because India, Russia and China are three countries tending to be restrictive, their situations of the stock market crash are less.

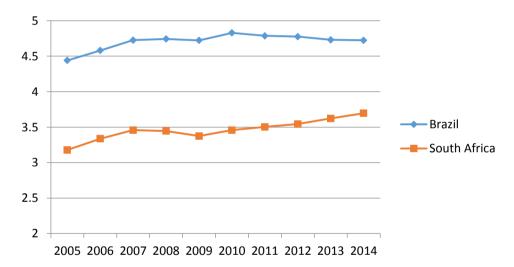


Figure 3 Stock market index of Brazil and South Africa

According to Figure 3, the Brazil stock market has kept rising since 2005, and began to a slight decline from 2007 to 2008. This suggests that the international financial crisis in 2008 did not exert much impact on the Brazilian stock market. Though Brazil's stock market index fell to 2009 to 52750, it rose to more than 10000 points in 2010 and reached a peak of about 67258. The Brazilian stocks have kept decreasing since 2011, but not to a large extent. The stock markets in South Africa was relatively more affected by the international financial crisis in 2008, whose stock index reached a high of about 2872 in 2007, and then kept falling until 2009. Beginning in 2010, the stock market of South Africa continued to rise at a high level and reached 4960 in 2014.

Overall, Brazil and South Africa' stock market trends are similar to those in 2010, and the possible reason is that the two cultures tend to be indulgent and are both in favor of the short-term orientation of values. After 2010 the two countries' stock market trends are just on the opposite, the possible reason being that the South African culture is with strong individualism and is not apt to accept the unequal distribution of rights.

Conclusion: Based on the comparison of different cultural dimension values, it is found that there exist obvious differences in the BRICS countries concerning cultural dimensions. Russia is with higher arbitrary degree, and South Africa does not tend to accept the unequal distribution of rights. Russia has highly urgent initiative, therefore neglects the uncertainty avoidance. China is more sensitive to uncertainty, so it tries to avoid uncertainty as much as possible. South Africa's individualism is stronger, and Chinese's more collectivism. China's female degree is higher, paying attention to the harmonious and moral ethics; while Russia's men degree is higher, obsessed with the pursuit of money. China prefers long-term orientation values, while Brazil and South Africa prefers short-term. South Africa and Brazil are with more indulgence, while India, Russia and China tend to be with more constraints. Overall, China, Russia and India are close to each other in PDI, IDV and IVR, while Brazil and South Africa are relatively similar in PDI, LTO and IVR. China's stock market development is more stable compared with Russia and India. Brazil and South Africa's stock market development trends are similar before 2010 while in the opposite directions after 2010.

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