CHINA'S MARKET AND GLOBAL ECONOMIC FACTORS

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Abstract: The aim of this paper is to analyze the causal relation between the Chinese stock market and the US market. We investigate the dependence structures between two Chinese stock markets (Shanghai Stock Exchange Composite Index (SHCOMP) and Hong Kong Hang Seng Index (HSCEI) markets) and global economic factors such as SP 500 stock markets, volatility index VIX, crude oil and gold. We have used data based on a period from January 2000 to June 2017. The aim of this paper is to explore the causal link between the Chinese market and global economic factors. We have discovered asymmetric causal relations between stock returns and global risk factors based on a quantile regression.

Introduction

China has gone through a long journey in the last 25 years that has been accompanied by a great economic growth. Its stock markets have opened up to the world and the Chinese government is also interested in attracting many foreign investors. However, the investment climate in China is often referred to as unstable. Worldwide, the Chinese stock market is one of the few markets that depend on its citizens, especially individual retail investors instead of institutional investors (Morrison, 2018). In other words, the Chinese stock market is heavily dependent on its consumer economy, which depends on the overall state of the country, including the level of employment, agronomic production, consumer spending and the housing market. These and other factors, such as overstatement of giant Chinese state-owned companies then contribute to the formation of bubbles in the Chinese stock markets. In recent years, the influence of China has intensified due to their participation in the gold price fix, their participation in setting the silver price, the renminbi being in the IMF basket, Chinese gold production slowing down, etc.

The aim of this paper is to find a link between selected China stock markets and global risk factors. The paper gives answers to these questions in our empirical study: Is there an asymmetric or symmetric dependence? Which market is influenced by the global factors?

The paper contributes to existing literature by assessing the impact of China on the US market and the commodity market. However, the emergence of China as a major economic power has raised concern among many U.S. policymakers. Our findings may have implications for portfolio risk managers, policymakers, international investors in terms of risk management which should vary according to changes in economic and financial global factors.

Literature review

How to quantify and detect interdependence between different stock markets is a major concern of academic researchers, portfolio managers, policy makers, etc. As it is written in Shen (2018), due to a great recession in 2007–2009 that arose in the United States, there has been an increased need for research that evaluates the transmission of the extraordinary market risk mechanism. Understanding international risk transfer mechanisms helps improve portfolio allocation strategies for market participants who are seeking investment opportunities. Moreover, it gives a possibility to manage cross-border market risk to preserve financial stability due to better policy responses of regulators and local governments. There are many academic studies that analyze the relationship between national equity markets. The paper of Beirne et al. (2010) examines global and regional spillovers in Asia, Europe, Latin America and the Middle East stock markets. The authors have used tri-variate VARGARCH(1,1)-in-mean models. They found spillover effect in mean returns in emerging Asia and Latin America and spillover in variance in emerging Europe. Singh et al. (2010) focused their research on price and volatility spillovers across North American, European and Asian stock markets. They found existence of a greater regional influence among Asian and European stock markets. Shen (2018) investigated the time-varying pattern of the risk interdependency structure and showed a rising trend of cross-country risk linkages over time. Shen (2018) discovered considerable asymmetric patterns in international transmission mechanism of stock market movements. Rejeb and Arfaoui (2016) used

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both a standard GARCH model and a quantile regression approach to find evidence of significant interdependence between financial markets. When they used the analysis of upper and lower quantiles, they could observe that the interdependence increases during bullish markets and decreases during bearish markets. They concluded that the structure of interdependence was asymmetric for both Asian and Latin American emerging markets. It is important to know asymmetric dependence in lower quantiles for market risk managers because losses are important for risk measurement.

The aim of this paper is to analyze the existence of asymmetric dependency between Asian stock markets and global risks factors. Our paper is organized as follows: The next section describes the data and methodology. Then the section after that presents our results. Finally, conclusions are given in the last section.

Data and Methodology

For the examination of interdependence structures between Chinese stock markets and global economic factors we used the daily close price data during the period of January 5, 2000 to July 20, 2017. Bloomberg was the data provider. In this paper, we have shown the effect of the bilateral relationship between Shanghai (SHCOMP) or Hong Kong (HSCEI) markets and selected global factors. Global factors are represented by two major global commodity markets: gold (XAU/USD) and crude oil price (CO/USD), US S&P500 composite index and volatility index VIX. For example, the paper by Piñeiro-Chousa (2018) contains interesting results that indicate that gold returns influence the volatility of S&P500 returns. Another interesting research paper by Nakamura et al. (2018) discusses crude oil and volatility returns in relation to the Granger causality.

Our paper analyzes daily returns r_t of selected time series that are expressed as

$$r_t = \ln(P_t/P_{t-1}),$$

where P_t is the closing price in time t.

Table 1 shows descriptive statistics of daily returns of the analyzed data. We see that only VIX returns had negative average return during the analyzed period. Table 1 also reports the smallest standard deviation of 1.206 for S&P500 index returns. This market index is more stable compared with the standard deviation of Chinese markets. All return series are leptokurtic. Positive skewness shows HSCEI index, gold and volatility index return VIX. All return series do not show normal distribution, the Jarque-Bera test statistics are highly significant.

Table 1: Descriptive statistics of daily returns						
	HSCEI	**SHCOMP**	**SP500**	**Gold**	**VIX**	**CO**
Mean	0.037	0.023	0.012	0.032	-0.022	0.016
Median	0.053	0.066	0.043	0.037	-0.390	0.065
Mode	-15.100	-10.900	0.000	0.000	0.000	0.000
Std. Deviation	1.906	1.577	1.206	13.281	6.521	3.405
Skewness	8.475	-42.680	-21.366	86.077	65.885	-62.879
Kurtosis	601.532	526.091	883.658	59565.764	438.941	34056.845
Minimum	-15.095	-10.925	-9.470	-346.327	-35.059	-103.506
Maximum	15.604	9.403	10.957	352.945	49.601	88.479
Source: Author						

We study dependence using a quantile regression (QR) approach. The QR approach (Baur, 2013) allows us to examine the conditional dependence of specific quantiles of the analyzed stock returns with respect to the conditioning variables. QR is a semiparametric alternative to OLS because financial data do not follow the test of normality. The QR approach provides specific insights to the impacts of China on the stock and commodity market returns under different market circumstances, including bearish (lower quantile), bullish (upper quantile) markets and normal (median) markets.

We have used the quantile regression model presented as

$$Q_Y(q) = \alpha(q) + \beta(q)X + \varepsilon,$$

with $Y = XAU$ or CO or $SP500$ or VIX,

X = SHCOMP or *HSCEI.*

We evaluate the QR coefficients across nine quantiles $q = \{0.01, 0.05, 0.1, 0.25, 0.5, 0.75, 0.90, 0.95, 0.99\}$. We present the estimates for quantile regression coefficients with intercept α.
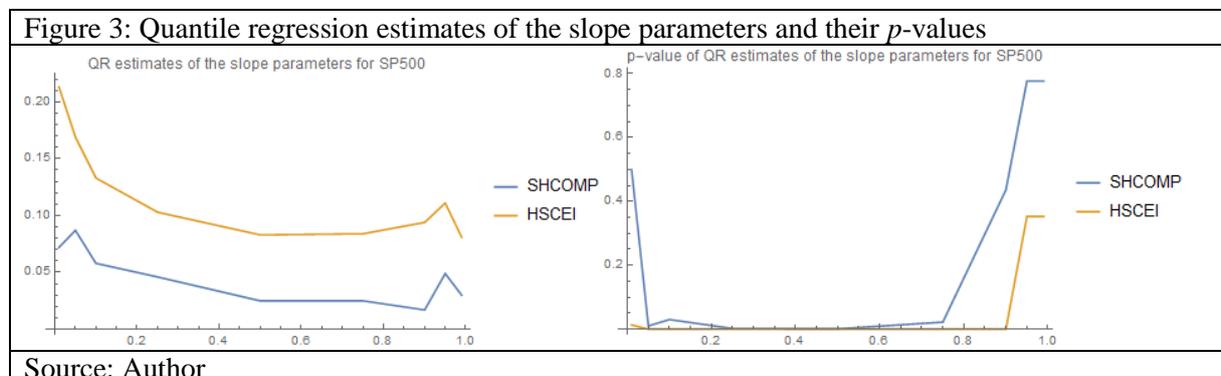
Results and Discussion

Figures 1–4 show quantile regression results for slope parameters and nine quantiles from 0.01 to 0.99. We have found a significant positive effect of both indices on gold returns from 5% quantile to 80%. The Hong Kong market had a slightly stronger effect than the Shanghai market. The positive effect is descending and after the 80-th percentile this effect diminishes, see Figure 1 on the left side. We see *p*-values of the slope estimations in the same figure on the right side.

Figure 1: Quantile regression estimates of the slope parameters and their *p*-values

Source: Author
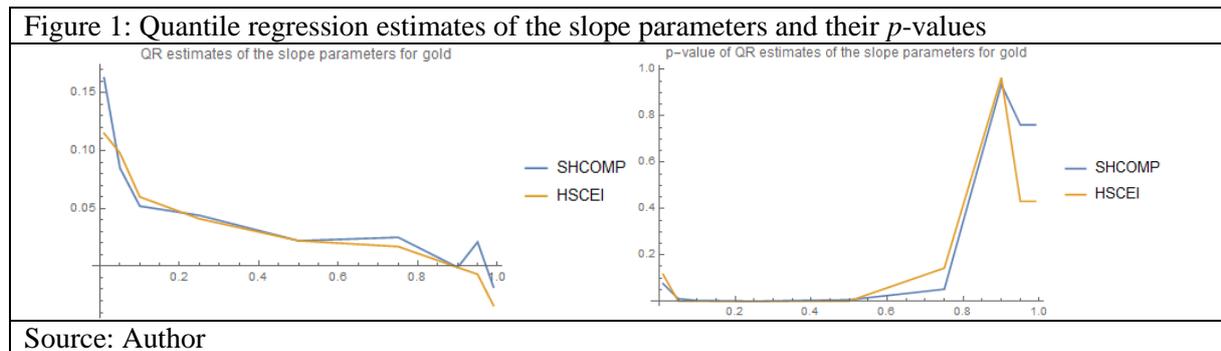
The effect of the Shanghai market on crude oil returns is positive and significant for quantiles up until the 75% quantile. We see the strongest significant effect for the 1% quantile for both markets. The effect of the HSCEI market on crude oil returns is positive and significant from the 5% quantiles till the 90% quantiles and we see the strongest effect for the 5% quantile.

Figure 2: Quantile regression estimates of the slope parameters and their *p*-values
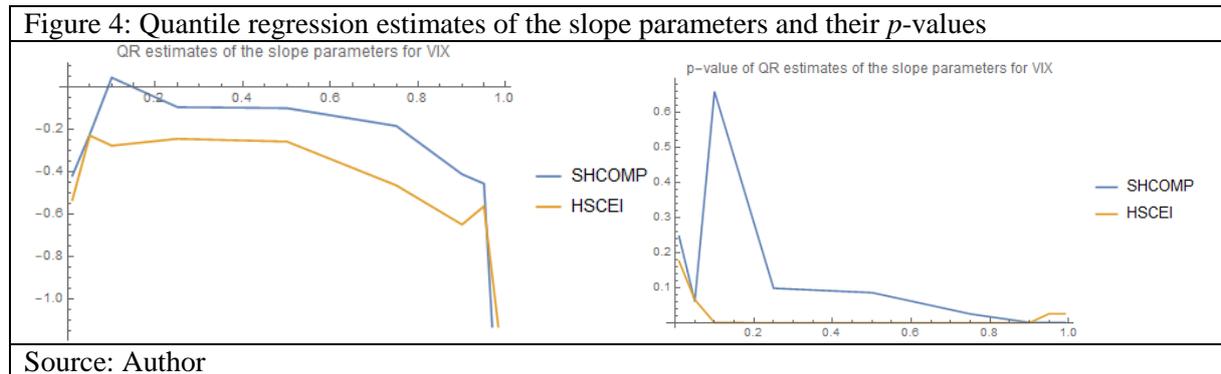

Source: Author
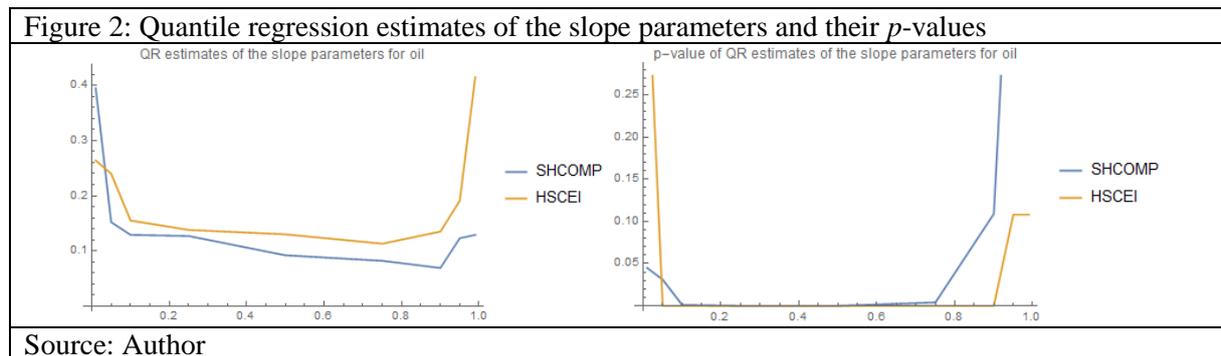
The effect of Shanghai market on SP500 returns is positive and significant from the 5% quantile till the 75% quantile. We see the strongest effect for the 1% quantile. The effect of the HSCEI market on SP500 returns is positive and significant from the 1% quantiles till the 90% quantiles. We see the strongest effect for the 1% quantile.

Figure 3: Quantile regression estimates of the slope parameters and their *p*-values

Source: Author

The dependency of the VIX that play an important role in asset allocation on Shanghai market is negative and significant from the 75% quantile to the 99% quantile. The highest impact of Shanghai

market has appeared in the 99% quantile. The dependency of the VIX on the Hong Kong market has been negative, slightly decreasing from the 10% quantile to median and growing to the 99% quantile. The highest impact is in bull markets (99% quantile).

Figure 4: Quantile regression estimates of the slope parameters and their *p*-values

Source: Author

Conclusion

Our empirical evidence for the daily data from January, 2000 to July, 2017 indicates positive significant dependence between Chinese stock markets mainly during bearish markets (lower quantiles) and normal markets (median). The Chinese market has had an asymmetric influence on individual global factors. It had more influence during bear rather than bull markets. Our study can help understand interdependence in returns across global risk factors and Chinese markets add to insights on diversification and hedging strategies.

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