Decoupled or Not? What Drives Chinese Stock Markets: Domestic or Global Factors?

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A Vector Error Correction Models (VECM) is used in this paper to identify the factors that affect Chinese stock returns. Test results show that Chinese stock performance has long run equilibrium relationships with both its domestic economic fundamentals and foreign national stock indices. Chinese stocks are sensitive to policy driven economic variables such as exchange rate and bank loans and deposits, but not to real economic forces such as the industrial production. Stock performance in China is closely "coupled" with that in India, Russia, the U.S., Germany, Japan, South Korea, and Mexico. The U.S. has the most influence on China.

INTRODUCTION

2012 marks another year of uncertainty in emerging market investment. On one hand, emerging markets, led by the BRICs, produced significant economic growths in 2011 and the trend is expected to continue. On the other, financial investments in these countries have ended the year with gloomy results (Table 1). Predictions for the new years to come are even more unreliable.

Since the Global Financial Crisis started, investors have bet their money in the countries that are considered as new growth engines for global economic recovery but have received little reward. For example, Chinese GDP increased 9.5% in 2011, a sizzling growth envied by the rest of the world. But its financial performance was more than dismal. Shanghai Composite Index dropped nearly 22 percent during the year. Some commented that nothing made sense anymore, "Chinese stock performance has decoupled from its macroeconomic fundamentals" (Bloomberg, 2012). In the beginning of 2012, predictions for Chinese economic growth were robust at around 7 to 8 percent, but forecasts for its stock performance came to a complete split. Some analysts considered that the Chinese stocks have been undervalued since 2008, and it is time for a big rebound (Bloomberg, 2012). But others thought the Chinese stocks have been in a bubble all along, and more correction should be on its way and investors should avoid investing in China at all cost (Lazeaway, 2011). Can we use economic fundamentals in China to forecast its stock variation anymore? Have Chinese financial performance decoupled from its real economy?

Not only were Chinese stock markets considered decoupled from its domestic fundamentals but also from the rest of the world. Chinese financial markets are young and relatively segmented in the 1990s (Liang, 2007). It has become gradually more integrated, or coupled, with the global markets since 2000 (Johansson, 2009). When the Subprime Crisis dragged down the entire US and Europe, China and the rest of the major emerging markets were still booming. Thus, economists have been debating on whether emerging markets, with China as their leader, have become decoupled from developed ones. However,

when the Subprime Crisis worsened and prolonged since the end of 2007, Chinese stocks tanked. 2011 was an especially disastrous year. It seemed China once again recoupled with the developed markets, which made some wonder whether China is truly decoupled, and is able to shelter negative impact from the ongoing global turmoil.

Has the Chinese financial performance decoupled from its domestic macroeconomic fundamentals? Or from economic and financial performance in developed countries? Furthermore, is there a long term relationship between the economic fundamentals and financials in China? Which economic variables are the most significant in determining Chinese stock performance? Can we use economic factors to forecast Chinese stock prices? Is there a long run relationship between stock markets in China and those in other nations? Is there an exaggerated benefit of global diversification? What are the policy implications?

This paper intends to answer these questions raised. The structure of the paper is as follows: Section 2 of the paper reviews literature on emerging market decoupling history and the relationship between domestic economic fundamental and financial market performance. Section 3 hypothesizes testing theories and relationship. Section 4 and 5 explain testing model and results. Section 6 concludes.

LITERATURE REVIEW

Definition of Decoupling

Definition of decoupling has not been clear. In this paper, I define decoupling as discontinuation of relationships. Two types of relationships are tested in this paper: relationship between macroeconomic factors and stock performance within a country and relationship between financial performance in two or more countries/regions.

Relationships Between Domestic Economic Fundamentals and Financial Performance

It is well established that long-run relationships exist between stock prices and economic variables (Chen, Roll, & Ross, 1986). Macroeconomic forces affect corporations' expected future cash flows, dividend payments, and discount rates, therefore, indirectly determine stock prices at the firm level (Fama, 1981).

Initial studies often focus on developed countries where financial markets are well developed and more efficient in responding to economic and financial news. Testing results usually confirm the existence of such relationship in the U.S. and developed European nations (Mun, 2012; Hsing, 2011; Nikiforos, 2011). Results from emerging and developing countries are not so consistent, however. For example, Gay (2008) found nonexistence of long-run relationships between economic factors and BRIC's stock returns as well as among BRIC's stock markets. But others found that economic variables such as interest rates, inflation, exchange rate, money supply, and GDP growth, etc. have significant impact on emerging financial markets regardless of their relative inefficiency (Omran, 2003; Frimpong, 2009). In the Asian Pacific region, Vuyyuri (2005) found the causality relationship between the financial and the real sectors of the Indian economy. Wongbanpo & Sharma (2002) discovered that stock prices are positively related to output growth and negatively to increases in price level for the ASEAN-5 countries of Indonesia, Malaysia, the Philippines, Singapore, and Thailand. Chong and Koh (2003) derived similar results in Malaysia. Singh, Mehta & Varsha (2011) constructed stock portfolios for Taiwan and found that exchange rate and GDP affect returns of all portfolios, but inflation rate, exchange rate, and money supply only have negative impact to the portfolio of big and medium companies.

Since Chinese financial markets are newly established, research in China is limited. Among the few, Chen & Jin (2010) revealed that factors such as inflation, exchange rate, money supply, and loans and deposits by commercial banks influence Chinese stock returns. Hosseini, Ahmad & Lai (2011) found that there are both long and short run causality from crude oil price, money supply, industrial production, and inflation rate to the stock indices in China and India.

Relationship among Global Financial Markets and Instruments

One often finds discussions of such relationship appeared as decoupling debates in recent economic literature. In global context, decoupling means to break the relationship between "environmental bad" and "economic good" between two or more nations or regions. More specifically, it means "to have rates of increasing wealth greater than the rates of increasing impacts" (OECD, 2002). In general, decoupling means emerging markets have their own internal source of growth and will not depend on the developed nations for economic expansion. Therefore, negative economic impacts, like the current European Debt Crisis and economic stagnation in the US, will have no effect, or minimal effect on emerging nations, in particular, big ones like the BRICs.

Decoupling debate has appeared and disappeared several times on the global economic stage, with timing exactly in sync with outperformance of emerging economies. The first appearance of decoupling was in the 1980s when "strong domestic demand and confident consumer became hallmarks of Asian countries" (Liang & Qiao, 2007). However, the 1997-1998 Asian Financial Crisis wiped this concept out of investors' minds quickly. The buzzword reappeared after September 11, 2001 when the US and Europe sank into recession but emerging countries like India and China continued to grow at mid to high single digits. Emerging nations sustained high growth from 2002 to 2007. The rally continued in spite of deepening of the Subprime Crisis in the US during 2007, which made many start to believe that emerging markets finally decoupled from the US and other developed countries. Nonetheless, the entire global financial system came down after Lehman Brothers collapsed in fall 2008. Emerging economies, in particularly, Emerging Asian, got caught in the downfall, selling of China and India led the way. The triumph of decoupling disappeared again when the BRIC index dropped 57% in 10 months (Hawser, 2008). Yet starting in 2009, when Europe and the US still showed signs of contraction, China and India quickly rebounded and were growing strong. Decoupling was, once again, a hot topic. Decoupling vs. recoupling is still an ongoing dialogue, especially now that the Chinese economy showed signs of slow growth in 2012.

To add complexity to the decoupling study, there are two branches of decoupling theory - decoupling of economic growth and decoupling of financials, including financial markets and financial assets (Willett, Liang, & Zhang, 2011). Some argue that regardless of emerging nations having accelerated economic growth and increasing consumption, decoupling of emerging financial markets from the developed ones is almost impossible (Felices & Wieladek, 2012). Increased globalization has created a common international investor base that is subjected to leveraged investing and cross-border market sentiment (Yeyati & Williams, 2012). Thus, negative impact of a systemic crisis can spread global wide quickly. For example, many believed the selling of emerging assets in the beginning of 2008 was partially a deleveraging process by global funds.

ECONOMIC THEORIES AND HYPOTHESIZED RELATIONSHIPS

Data

I selected nine economic variables to test the impact of domestic economic factors to stock markets in China. They are: exchange, rates, Consumer Price Index, domestic credit and deposits of Chinese banks, short and long term interest rates, export, Industrial Production Index, and M2 money supply. I used Shanghai Composite Index to proxy overall stock market performance in China. Chinese stock markets have only been established since 1990 and are relatively new. I assumed they become more efficient in later time and more responsive to macroeconomic shocks. Thus I used monthly data from January 2000 to December 2011 to capture the robust long term relationship between economic fundamentals and stock market performance in China.

I used a total of eleven national stock indices to study the integrated relationship between Chinese stock markets and those of other nations. I selected national stock indices of the U.S., Japan, South Korea, Germany, Australia, Malaysia, Brazil, and India. These countries are significant trading partners of China. Volatilities in their financial markets may spillover to China and "couple" them together. I added Russia and United Kingdom to the list since the former is a main raw material supplier to China

and the latter is its main exporter in non-EU region. In addition, study shows that "Chinese macroeconomic variables granger causes Mexican and Chilean stock market indices" (Garza-García & Vera-Juárez, 2010), indicating Latin American markets are now more influenced by Chinese economic development, therefore, I also added Mexican index as one of the independent variables to see if causality effect can be the other way around.

Table 2 describes variables used. All variables are transformed into natural logarithms and their first differences are taken for testing purpose.

Hypothesized Relationships

Exchange rate. The popular argument reasons that appreciation of the Chinese Yuan will make Chinese goods more expensive in the global markets, reduce competitiveness of its exports and lower Chinese companies' earnings and their stock returns. But I hypothesize that exchange rate changes may have both positive and negative effects on stock prices. On a positive note, Yuan appreciation may reduce the price of imported goods. China is one of the largest process exporters in the world. Approximately eighty percent of the values of goods that are said to be "Made in China" are actually imported to China from other countries (Koopman, Wang, & Ii, 2008). For this reason, I am uncertain about the balancing effect between benefit of import price reduction and cost of export price hike in the country. In addition, China still has the largest pool of low cost labors and such significant competitive advantage is not easily offset by a very slow crawling Yuan.

Interest rate. In general, increase of benchmark interest rates will have three negative effects on stock prices. First, it will increase firms' discount rates and decrease their stock prices. Second, it will increase firms' cost of borrowing and reduce their capital investment and growth. Third, it will reduce overall activities of stock markets since investors tend to invest in less risky debt instruments when they offer higher returns. I expect increase of interest rates will have a negative effect on stock prices. However, the Chinese government has maintained tight control on interest rates by setting a ceiling on deposit rates and a floor on lending rates. I suspect the impact of interest rate changes on Chinese stock performance may not be as strong as that in a free market.

Inflation. Inflation drives up overall prices of the economy and reduces stock market activities. Increase of inflation also increases interest rates and costs of capital at the firms' level. I expect increase of inflation will have a negative effect on stock prices.

Money supply. Changes of money supply may have mixed effects on stock prices. On one hand, expansion of money will drive up inflation and drive down stock prices. On the other, increasing of money supply will stimulate the economy and increase cash flows of the firms and their stock returns.

Export. Export has been a significant driving force of Chinese economy. China has pursued export-led growth since its economic reform in 1976. During 2000-2010, export as a percentage of GDP averaged approximately 34 percent in China. I foresee export growth will have a positive effect on stock returns.

Deposits of banks. I theorize a negative relationship between deposits of banks and stock returns. Increasing of bank deposits indicates investors are more risk averse and less willing to invest in risky financial assets such as stocks. Thus supply of funds in stock markets goes down and so does the stock performance.

Loans of banks. Expansions of loans from banks have just the opposite effect. It will increase supply of funds to stock markets and drive up stock prices. In addition, an increase of credit supplies will increase capital injections to companies; therefore, stimulate expenditures and overall economic growth.

Industrial production. Fama (1981) found that industrial production has a positive relationship with stock returns. I hypothesize the same. Rise in industrial production represents increase of real economic growth, which will lead to higher expected stock performance in general.

Global stock indices. Since all eleven national stock indices I selected are of nations that have significant economic and financial relationships with China, I expect statistically significant relationships between the Chinese stock index and the rest of the indices being tested.

METHODOLOGY

I intend to conduct two tests in this paper. One, to test the relationships between domestic macroeconomic factors and stock market performance in China; and two, to test the relationships between the Chinese stock index and indices from other countries that have significant economic and financial relationships with China. A variety of methodologies are available to exam these dynamic relationships. Commonly used methods include different variations of Vector Autoregression (VAR), Granger Causality test, asset pricing model, correlation models, common factor models, and event study, etc.

I used the Vector Error Correction Model (VECM) in this paper. Johansen & Juselius (1990)'s VECM serves the purposes of both my testing agendas and has several advantages compared to other econometric methods. VECM is a system of equations estimated in one step without carrying over the error term. It does not make a priori assumptions of arbitrary exogeneity or endogeneity. VECM is a special type of restricted VAR. It helps capture both the dynamic and interdependent relationships among tested variables, and also corrects short term distortions that may cause the system to deviate from its long run equilibria.

I followed these three steps to estimate the VECM:

Test Stationarity

Only stationary variables or a linear combination of variables that are stationary will ensure that long run equilibrium exists. Since most of the time series variables are nonstationary and will derive spurious regression results, I used Augmented Dickey-Fuller (ADF) and Phillips-Peron (PP) tests to perform unit roots test for stationarity. Akaike Information Criterion (AIC) and Newey-West are used to choose lag length and automatically select bandwidth for testing.

Estimate the Cointegration Vectors

When variables are cointegrated and share a common stochastic trend, there exists a long term equilibrium relationship among them. Variables are cointegrated if they are integrated of the same order and a linear combination of them is stationary. Only linear cointegrating relations can be modeled with the standard VECM framework. Johansen-Juselius Multivariate Co-integration model is given as equation 1.

$$\Delta X_t = \sum_j^{k-1} \Gamma_j \, \Delta X_{t-j} + \Pi X_{t-k} + \mu + \epsilon_t \qquad (1)$$

Where X_t represent p x 1 vector of I(1) variables. $\sum_j^{k-1} \Gamma_j \, \Delta X_{t-j}$ and ΠX_{t-k} are the vector autoregressive component and error-correction components which represent short and long run adjustment to changes in X_t. μ is a p x 1 vector of constants. ϵ_t is a p x 1 vector of error terms. Γ_j is a p x p matrix that represents short run adjustments among variables across p equations at the jth lag. K is a lag structure. ΠX_{t-k} is the error correction term. Π is two separate matrices such that $\Pi = \alpha\beta'$, where β' denotes a p x r matrix of cointegrating parameters, and α is a p x r matrix of speed of adjustment parameters, measuring the speed of convergence to the long run equilibrium.

In this step, I used Johansen's cointegration method to test the number of cointegrating relationships. λtrace and λmax are used to determine maximum cointegrating relationships, or the ranks of cointegration.

Estimate the Long Term and Short Term Coefficients

If the cointegrating relationship exists and long run equilibrium condition is satisfied, I can estimate short and long term coefficients in step 3. I also used F statistics and Chi-square results of Wald statistics to test for statistical significance of joint coefficients. Even if an individual coefficient is not significant, if their joint coefficients across k lags are statistically significant, the combined power of independent variables still explain variations in the dependent variable meaningfully.

TESTING RESULTS

Stationarity Test

In order to derive long run cointegrating relationships among variables, the time series data I used have to be stationary and integrated of the same order. ADF/PP test results for stationarity are reported in Table 3. Except export (EX), all other variables are nonstationary at the level but stationary at the first difference. At order 1, EX has a probability of Chi-square statistic that is greater than 5 percent, which means one cannot reject the null hypothesis that EX still has a unit root and is nonstationary, therefore, it cannot be cointegrated with other testing variables.

At the first differences, these are the variables that are stationary at the 5 percent significance level, hence, will be included in the next step of cointegration test: Macroeconomic Variables - ER, CPI, CR, DP, LR, SR, IP, M2, and a dummy variable to proxy the Subprime Financial Crisis; Global Stock Indices- BR, DE, IN, JP, KR, MX, RU, UK, US, MY, AU. I used Shanghai Composite Index (CN) as the dependent variable in both sets of tests.

Cointegration Ranks

I used Johansen method to determine the number of cointegrating ranks. Testing results are shown in Table 4. At 5 percent significant level, macroeconomic Variables yield 4 cointegration vectors and global stock indices yield 11 cointegration vectors.

Long Term and Short Term Coefficients

VECM model provides valid testing results for both tests. Probabilities of F statistics are 0.6485 percent and 0.0499 percent respectively, at less than 5 percent significance level. Both equations have R-squared at 0.64, confirming that independent variables combined explain the variations of the Chinese stock performance well.

Test results show that speed of adjustment parameters are statistically significant, indicating that there may be short run deviations, but corrections toward long run equilibria process exist in both models. Table 5 reports Wald statistics results of combined effect of error correction coefficients. Both F-statistics and Chi-squares are statistically significant at the 1 percent level, proving that long run equilibrium relationships exist among the variables tested. Thus, the Chinese stock market is decoupled from neither its domestic economic factors nor global financial factors. On the contrary, both set of factors have significant explanatory powers to the fluctuations of Chinese stocks in the long run.

Some interesting short term relationships are revealed in Table 6. Among the Macroeconomic variables tested, exchange rate, bank deposits and loans explain Chinese stock performance at the 5 percent significant level, while inflation and long term interest rates have a lesser explanatory power at the 10 percent level. Industrial production, money supply, and the Subprime dummy do not influence Chinese stock prices.

Exchange rate has the largest negative coefficients, which means when Chinese Yuan appreciates, stock prices increase in China. This finding is counter-intuitive since appreciations of an exchange rate often hurt export and decreases stock market performance. However, with its massive volume of process trade, Chinese companies seem to benefit more from import price reduction since Yuan depegged in 2005. In addition, the slowness of Yuan adjustment, a more diversified trade, and robustness of economic growth in China may have reduced negative appreciation effect. Investors may see a stronger Yuan as an image of a stronger China, therefore, causing them to be more confident of their investments in China.

Domestic credits provided by Chinese Banks have the largest positive coefficients. This impact is consistent and lagged. Bank lending has an immediate positive effect on stock performance, and such effect can be felt in a 6-month length (5 percent significance at lag 1, 3, 4, 5, and 6). This confirms my theory that increases of bank loans increase companies' capital expenditures and potential earning. Further, I suspect that part of increased bank loans have been channeled to the Chinese stock markets and driven up speculative trading and caused excess demand for stocks.

Bank deposits have a negative effect on stock price. There is less capital supplied to the stock market when more deposits are made at banks. However, one only observes such negative effect 3 months later (5 percent significance at lag 3, 4, 5). This shows that poor performance in Chinese stock markets was not due to immediate panic selling, but rather built up gradually over a certain time period.

It is well known that the Chinese government is determined and has made a great effort to keep inflation under control in recent years. Average Consumer Price Index (CPI) in China was 0.32 percent during 2000-2011. CPI influences stock performance at month 4 with a 7 percent significance, which means investors waited for the Chinese government to take action to control inflation first instead of responding to the negative CPI news immediately. Similar results can be found in interest rate changes. Due to tight interest rate controls, the short term interest rates have no influence on Chinese stock prices at all, and the long term rates only have a one month lagged impact at the 8 percent significance.

Among the global stock indices tested, indices of India, Russia, the U.S., Germany, and Japan explain variations of Chinese stocks at the 5% significant level. Four countries' (India, Russia, Mexico, and the U.S.) financial performance are positively correlated with that in China. The U.S. has the largest positive impact on the Chinese market, indicating China is more integrated to the U.S. compared to other nations. Stock returns in Germany and Japan negatively influence returns in China. Even though Japan is close to China both geographically and economically, the impact from Japan to China is lagged. It is also interesting to see that stocks in Germany instead of those in the UK affect China. It may be explained that Germany is part of the EU, and China is more sensitive to changes in EU since it is China's largest trading partner.

Wald Statistics results in Table 5 show that joint lagged coefficients of South Korea is statistically significant at the 7 percent level, indicating variation of Chinese stocks can also be partially explained by changes of KOSPI Composite Index.

Robustness tests were conducted using different lags and results are consistent.

CONCLUSION

In this paper, I intend to investigate whether stock market performance in China is decoupled from its domestic economic fundamentals or from financial performance in other countries. The test results show that instead of "decoupled," financial performance in China is closely "coupled" with both domestic economic factors and financial markets worldwide. Chinese stock markets are closely integrated with 7 global stock indices. The S&P 500 Index of the U.S. is the most influential one. The study validates the increasingly important role of China on the global stage. China is not only closely related to its Asian Pacific neighbors, but also to its Latin American counterparts.

Financial market performance in China is determined by domestic economic factors, not by the growth of its real economy, however, but rather by economic and financial policies. Test results show that Chinese stocks are insensitive to changes of real factors such as the industrial production. This partially explains the underperformance of Chinese stocks regardless of its amazing economic growth in the beginning of the twenty-first century. This study confirms that Chinese financial performance is policy driven (Li & Zou, 2009). Economic variables that have significant impact on Chinese stocks are policy related and managed by the government. For example, changes of deposits and loans by Chinese banks are the direct results of changes of deposit rate ceilings and government stimulus. Chinese financial markets are dominated by State controlled banks. These banks help implement national economic strategies and have strong presence in determining the stock market performance. Changes of other economic factors, such as exchange rate, inflation, and long term interest rate, are consequences of supply and demand in a free market, but are products of Chinese government policies. Announcement of these key economic factors could potentially pose serious policy shocks to Chinese financial markets, which make policy decision making extremely important in China.

Chinese financial markets are unique. They are new but evolving quickly. The majority of investors are domestic residents instead of international institutional investors. Lacking of investment alternatives also increase the attractiveness of Chinese stocks, making them vehicles of speculation and sensitive to

policy changes and market sentiment shifts. Sound financial and economic policy making and a well-constructed regulatory framework will help Chinese financial markets to be better protected from shocks originated elsewhere in the world and to make Chinese stock performance more reflective of its real domestic economic growth.

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APPENDICES

TABLE 1
ECONOMIC AND FINANCIAL PERFORMANCE OF THE U.S. AND THE BRICS IN 2011(%)

	Real GDP Growth	National Stock Index Return
United States	1.5	-2.2
Brazil	2.8	-14.8
Russia	4.3	-26.1
India	7.8	-15.7
China	9.5	-21.2

Source: CIA World Factbook

TABLE 2
DEFINITIONS OF VARIABLES

Variables	Definitions of Variables	Sources of Data
LER	Natural logarithm of the month-end exchange rate of China	IFS
LCPI	Natural logarithm of the month-end Consumer Price Index of China	IFS
LCR	Natural logarithm of the month-end domestic credit of Chinese banks	IFS
LDP	Natural logarithm of the month-end deposit of Chinese banks	IFS
LLR	Natural logarithm of the month-end rate on working capital loans to Chinese state industrial enterprises of one-year maturity	IFS
LSR	Natural logarithm of the month-end Bank Rate: Rate charged by the People's Bank of China on 20-day loans to financial institutions.	IFS
LEX	Natural logarithm of the month-end export of China	IFS
LIP	Natural logarithm of the month-end Industrial Production Index of China	World Bank
LM2	Natural logarithm of the month-end M2 supply of China	IFS
LCN	Natural logarithm of the month-end Shanghai Composite Index of China	Yahoo. Finance
LRU	Natural logarithm of the month-end RTS Index of Russia	Yahoo. Finance
LUS	Natural logarithm of the month-end S&P 500 Index of the U.S.	Yahoo. Finance
LUK	Natural logarithm of the month-end FTSE100 Index of the U.K.	Yahoo. Finance
LIN	Natural logarithm of the month-end Bovespa Index of Brazil	Yahoo. Finance
LBR	Natural logarithm of the month-end BSE SENSEX 30 of India	Yahoo. Finance
LAU	Natural logarithm of the month-end All Ordinaries of Australia	Yahoo. Finance
LJP	Natural logarithm of the month-end Nikkei 225 of Japan	Yahoo. Finance
LMX	Natural logarithm of the month-end Bolsa IPC Index of Mexico	Yahoo. Finance
LDE	Natural logarithm of the month-end DAX Index of Germany	Yahoo. Finance
LKR	Natural logarithm of the month-end KOSPI Index of Korea	Yahoo. Finance
LMY	Natural logarithm of the month-end FTSE Bursa Malaysia KLCI of Malaysia	Yahoo. Finance

TABLE 3
RESULTS OF UNIT ROOT TESTS

Economic Variables	PP	ADF	*National Stock Indices*	PP	ADF
	Levels			Levels	
LCPI	0.2109	0.3702	LAU	0.4723	0.5422
LCR	0.9919	0.9919	LBR	0.826	0.8494
LDP	0.9335	0.9335	LCN	0.341	0.592
LER	0.999	0.9828	LDE	0.4073	0.4794
LEX	0.6139	0.6609	LIN	0.8481	0.8836
LIP	0.9702	0.9723	LJP	0.2508	0.2294
LLR	0.3656	0.3815	LKR	0.7948	0.8344
LM2	0.999	0.9986	LMX	0.8923	0.9045
LCN	0.341	0.592	LMY	0.8439	0.8721
LSR	0.1532	0.2345	LRU	0.464	0.3625
			LUK	0.2735	0.3768
			LUS	0.1862	0.227
	First Difference			First Difference	
D(LCPI)	0	0	D(LAU)	0	0
D(LCR)	0	0	D(LBR)	0	0
D(LDP)	0	0	D(LCN)	0	0
D(LER)	0	0.0308	D(LDE)	0	0
D(LEX)	0	0.2254	D(LIN)	0	0
D(LIP)	0	0	D(LJP)	0	0
D(LLR)	0	0	D(LKR)	0	0
D(LM2)	0	0	D(LMX)	0	0
D(LSHCI)	0	0	D(LMY)	0	0
D(LSR)	0	0	D(LRU)	0.0001	0.0001
			D(LUK)	0	0
			D(LUS)	0	0

TABLE 4A
JOHANSEN COINTEGRATION RANKS FOR CHINESE DOMESTIC MACROECONOMIC VARIABLES

Hypothesized		Trace	0.05		Hypothesized		Max-Eigen	0.05	
No. of CE(s)	Eigenvalue	Statistic	Critical Value	Prob.**	No. of CE(s)	Eigenvalue	Statistic	Critical Value	Prob.**
None *	0.393278	253.3905	197.3709	0	None *	0.393278	63.46004	58.43354	0.0149
At most 1 *	0.312547	189.9304	159.5297	0.0004	At most 1	0.312547	47.59467	52.36261	0.142
At most 2 *	0.284613	142.3358	125.6154	0.0032	At most 2	0.284613	42.53633	46.23142	0.1182
At most 3 *	0.271388	99.79942	95.75366	0.0256	At most 3 *	0.271388	40.21	40.07757	0.0483
At most 4	0.153567	59.58942	69.81889	0.2482	At most 4	0.153567	21.17391	33.87687	0.6711
At most 5	0.140939	38.41551	47.85613	0.2842	At most 5	0.140939	19.29329	27.58434	0.3922
At most 6	0.087119	19.12222	29.79707	0.4841	At most 6	0.087119	11.57598	21.13162	0.5898
At most 7	0.05052	7.546246	15.49471	0.5151	At most 7	0.05052	6.583797	14.2646	0.5395
At most 8	0.00755	0.962449	3.841466	0.3266	At most 8	0.00755	0.962449	3.841466	0.3266

TABLE 4B
JOHANSEN COINTEGRATION RANKS FOR GLOBAL STOCK INDICES

Hypothesized		Trace	0.05		Hypothesized		Max-Eigen	0.05	
No. of CE(s)	Eigenvalue	Statistic	Critical Value	Prob.**	No. of CE(s)	Eigenvalue	Statistic	Critical Value	Prob.**
None *	0.882744	853.9319	334.9837	0	None *	0.882744	184.3318	76.57843	0
At most 1 *	0.781893	669.6001	285.1425	0	At most 1 *	0.781893	130.9581	70.53513	0
At most 2 *	0.74296	538.6419	239.2354	0	At most 2 *	0.74296	116.8329	64.50472	0
At most 3 *	0.699	421.809	197.3709	0	At most 3 *	0.699	103.2553	58.43354	0
At most 4 *	0.582003	318.5537	159.5297	0	At most 4 *	0.582003	75.0162	52.36261	0.0001
At most 5 *	0.523029	243.5375	125.6154	0	At most 5 *	0.523029	63.66571	46.23142	0.0003
At most 6 *	0.482287	179.8718	95.75366	0	At most 6 *	0.482287	56.61679	40.07757	0.0003
At most 7 *	0.39944	123.255	69.81889	0	At most 7 *	0.39944	43.85085	33.87687	0.0024
At most 8 *	0.295313	79.40416	47.85613	0	At most 8 *	0.295313	30.10018	27.58434	0.0233
At most 9 *	0.267856	49.30398	29.79707	0.0001	At most 9 *	0.267856	26.81292	21.13162	0.0071
At most 10 *	0.229837	22.49105	15.49471	0.0038	At most 10 *	0.229837	22.45914	14.2646	0.0021
At most 11	0.000371	0.031912	3.841466	0.8582	At most 11	0.000371	0.031912	3.841466	0.8582

TABLE 5
WALD TEST RESULTS OF JOINT EFFECTS OF VECM COEFFICIENTS

	F-statistic	Probability	Chi-square	Probability
Long Run Speed Adjustment Coefficients				
Domestic Macroeconomic Variables	7.335404**	0.0001	29.34162**	0
Global Stock Indices	3.699634**	0.0006	40.69597**	0
Short Run Macroeconomic Coefficients				
LCPI	1.644984	0.1496	9.869903	0.1302
LCR	3.500063**	0.0047	21.00038**	0.0018
LDP	3.433953**	0.0054	20.60372**	0.0022
LLR	0.628373	0.7069	3.77024	0.7077
LSR	0.593945	0.734	3.563673	0.7355
LIP	1.076389	0.3862	6.458333	0.3738
LM2	0.734339	0.6238	4.406033	0.6219
LER	2.811491**	0.0173	16.86895**	0.0098
Short Run Stock Index Coefficients				
LAU	0.346766	0.7086	0.693532	0.707
LBR	0.439848	0.6465	0.879697	0.6441
LDE	2.375834	0.103	4.751667*	0.0929
LIN	3.330547**	0.0435	6.661093**	0.0358
LJP	2.297702	0.1106	4.595405	0.1005
LKR	2.632934*	0.0814	5.265869*	0.0719
LMX	3.400952**	0.0409	6.801905**	0.0333
LMY	1.158078	0.3221	2.316156	0.3141
LRU	6.206271**	0.0038	12.41254**	0.002
LUK	0.609397	0.5475	1.218795	0.5437
LUS	3.590238**	0.0346	7.180475**	0.0276

The coefficients with ** and * are statistically significant at the 5% and 10% respectively

TABLE 6A
SHORT TERM COEFFICIENTS FOR CHINESE DOMESTIC MACROECONOMIC VARIABLES

	Coefficient	Std. Error	t-Statistic	Prob.
$\Delta lnCPI_{t-1}$	2.119484	1.353133	1.566353	0.1223
$\Delta lnCPI_{t-2}$	1.249731	1.409567	0.886606	0.3787
$\Delta lnCPI_{t-3}$	1.041559	1.440596	0.723006	0.4724
$\Delta lnCPI_{t-4}$	-2.43718*	1.350552	-1.804578	0.0759
$\Delta lnCPI_{t-5}$	-1.00673	1.275536	-0.789263	0.4329
$\Delta lnCPI_{t-6}$	0.038598	1.236259	0.031222	0.9752
$\Delta lnCR_{t-1}$	3.569818**	1.234373	2.89201	0.0052
$\Delta lnCR_{t-2}$	1.609395	1.089416	1.477301	0.1446
$\Delta lnCR_{t-3}$	2.463599**	1.090335	2.259489	0.0273
$\Delta lnCR_{t-4}$	2.778421**	1.052536	2.63974	0.0104
$\Delta lnCR_{t-5}$	2.899505**	1.056531	2.744363	0.0079
$\Delta lnCR_{t-6}$	2.357845**	0.920855	2.560495	0.0129
$\Delta lnDP_{t-1}$	-1.44781	1.428116	-1.013792	0.3146
$\Delta lnDP_{t-2}$	-0.6909	1.252729	-0.551514	0.5832
$\Delta lnDP_{t-3}$	-1.21255	1.29995	-0.932764	0.3545
$\Delta lnDP_{t-4}$	-2.88646**	1.200837	-2.403704	0.0192
$\Delta lnDP_{t-5}$	-2.45056**	1.082371	-2.264071	0.027
$\Delta lnDP_{t-6}$	-3.25995**	0.91674	-3.556026	0.0007
$\Delta lnLR_{t-1}$	-0.37669	0.651672	-0.578032	0.5653
$\Delta lnLR_{t-2}$	-1.25828*	0.724982	-1.7356	0.0875
$\Delta lnLR_{t-3}$	-0.73972	0.778855	-0.949758	0.3459
$\Delta lnLR_{t-4}$	-0.149	0.704723	-0.211435	0.8332
$\Delta lnLR_{t-5}$	-0.07129	0.732436	-0.09733	0.9228
$\Delta lnLR_{t-6}$	0.152032	0.673458	0.225748	0.8221
$\Delta lnSR_{t-1}$	0.621787	0.515803	1.205474	0.2325
$\Delta lnSR_{t-2}$	0.735101	0.517065	1.421679	0.1601
$\Delta lnSR_{t-3}$	0.234576	0.481199	0.487481	0.6276
$\Delta lnSR_{t-4}$	-0.05323	0.444673	-0.119696	0.9051
$\Delta lnSR_{t-5}$	0.01614	0.402704	0.040078	0.9682
$\Delta lnSR_{t-6}$	0.032405	0.324433	0.099882	0.9208
$\Delta lnIP_{t-1}$	-0.63762	1.182585	-0.539171	0.5917
$\Delta lnIP_{t-2}$	-0.25857	1.092092	-0.236768	0.8136
$\Delta lnIP_{t-3}$	-0.66461	1.114928	-0.596103	0.5532
$\Delta lnIP_{t-4}$	1.466441	1.181776	1.240879	0.2193
$\Delta lnIP_{t-5}$	-1.26103	1.10276	-1.143518	0.2572
$\Delta lnIP_{t-6}$	-0.97116	1.043436	-0.93073	0.3555
$\Delta lnM2_{t-1}$	-0.45597	1.12855	-0.404034	0.6876
$\Delta lnM2_{t-2}$	0.473603	1.095154	0.432453	0.6669
$\Delta lnM2_{t-3}$	-0.47734	1.175961	-0.405915	0.6862
$\Delta lnM2_{t-4}$	-0.97728	1.155831	-0.845525	0.401
$\Delta lnM2_{t-5}$	-0.15825	1.180467	-0.134053	0.8938
$\Delta lnM2_{t-6}$	1.631682	1.111257	1.468322	0.147
$\Delta lnER_{t-1}$	-7.5814**	3.530015	-2.147696	0.0356
$\Delta lnER_{t-2}$	-0.95522	3.562855	-0.268106	0.7895
$\Delta lnER_{t-3}$	-8.15146**	3.589665	-2.270812	0.0266
$\Delta lnER_{t-4}$	8.607757**	3.503684	2.456773	0.0168
$\Delta lnER_{t-5}$	-9.15977**	3.608909	-2.5381	0.0136
$\Delta lnER_{t-6}$	3.182305	3.858952	0.824655	0.4127
Constant	0.007633	0.049207	0.155121	0.8772
Subprime Dummy	-0.06438	0.064144	-1.003702	0.3194

The coefficients with ** and * are statistically significant at the 5% and 10% respectively

TABLE 6B
SHORT TERM COEFFICIENTS FOR GLOBAL STOCK INDICES

	Coefficient	Std. Error	t-Statistic	Prob.
$\Delta lnAU_{t-1}$	0.201669	0.677126	0.297831	0.767
$\Delta lnAU_{t-2}$	-0.418347	0.63967	-0.654005	0.516
$\Delta lnBR_{t-1}$	-0.28879	0.317418	-0.909811	0.3671
$\Delta lnBR_{t-2}$	0.003581	0.298577	0.011994	0.9905
$\Delta lnDE_{t-1}$	-1.050452**	0.483839	-2.171076	0.0345
$\Delta lnDE_{t-2}$	-0.590047	0.463534	-1.27293	0.2087
$\Delta lnIN_{t-1}$	0.597024**	0.236391	2.525581	0.0146
$\Delta lnIN_{t-2}$	0.316151	0.244162	1.29484	0.2011
$\Delta lnJP_{t-1}$	-0.286946	0.27064	-1.060249	0.2939
$\Delta lnJP_{t-2}$	-0.546473**	0.266239	-2.052564	0.0452
$\Delta lnKR_{t-1}$	-0.398477	0.299461	-1.330649	0.1891
$\Delta lnKR_{t-2}$	0.35405	0.283782	1.247611	0.2178
$\Delta lnMX_{t-1}$	-0.35206	0.334422	-1.052741	0.2973
$\Delta lnMX_{t-2}$	0.577641*	0.321016	1.799416	0.0778
$\Delta lnMY_{t-1}$	0.35004	0.502816	0.69616	0.4894
$\Delta lnMY_{t-2}$	-0.321673	0.396754	-0.810762	0.4212
$\Delta lnRU_{t-1}$	0.560289**	0.199225	2.812333	0.0069
$\Delta lnRU_{t-2}$	0.060581*	0.031683	1.912103	0.0614
$\Delta lnUK_{t-1}$	-0.7466	0.720558	-1.036141	0.3049
$\Delta lnUK_{t-2}$	-0.049351	0.631061	-0.078203	0.938
$\Delta lnUS_{t-1}$	1.681609**	0.656095	2.563057	0.0133
$\Delta lnUS_{t-2}$	0.317523	0.626342	0.506948	0.6143
Constant	-0.009468	0.010935	-0.865871	0.3905

The coefficients with ** and * are statistically significant at the 5% and 10% respectively