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Impacts of Sovereign Credit Rating on European Stock Markets during European Debt Crisis

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Abstract: Sovereign credit rating not only affects the stock markets of rated countries, but also has spillover effects across countries and markets and in a highly integrated economic entity, spillover effects are more significant. During European debt crisis, the big three rating agencies frequently downgraded some European country ratings, which exacerbated the turmoil of stock markets in these countries, and even caused fluctuations in the entire European stock markets through spillover effects. To observe the impacts of downgrades to PIIGS countries on European stock markets, this paper adopts the method of impulse response function and variance decomposition based on VAR model. The empirical results show that downgrades to each country affect major European stock index differently, which is related to the formation and coverage of each stock index. What's more, downgrades usually cause the rising of stock markets during European debt crisis, which indicates that there is a "seesaw" effect between stock markets and bond markets and it means funds flow from bond markets to stock markets, reflecting the volatility of European stock markets.

Keywords: Sovereign credit rating; European stock markets; spillover effects; PIIGS; VAR; IRF; Variance decomposition

INTRODUCTION

Sovereign credit rating is issued by rating agencies and is a public comment about a country's solvency. Generally, sovereign credit rating provides investors with reference information about risks and returns of a country, and it is widely believed that downgrades would affect investor's confidence for the rated country, leading to capital outflows. Therefore, frequent downgrades would cause severe turbulence in the stock markets of rated countries.

During European debt crisis, the big three rating agencies (Standard & Poor's, Moody's and Fitch Ratings) frequently downgraded some Euro countries, followed by continuous decline of long-term bond yields and fluctuations of stock markets in these countries. However, for such a highly integrated market like EU, how would stock markets respond to national sovereign credit rating change? This is exactly what this paper studies.

Generally, changes in sovereign credit rating have asymmetric effects on the flow of equity funds, downgrades lead to the outflow of equity funds, while upgrades have no significant impact[1]. However, the pro-cyclical effects of credit rating mean that each financial variable would be affected, which may exaggerate financial crisis [2], and thereby fatherly influence the international stock markets.

Many studies show that changes in a country's sovereign credit rating would not only affect national financial indicators, but also spread to the financial markets of other countries [3-5]. In fact, the impact spreads across markets and countries [6], and financial markets would influence each other. Kaminsky and Schmukler has a similar point of view [7], and they found that sovereign credit ratings and outlooks not only affect bond markets, but also affect stock markets and cross-border spread. These studies are all related to the spillover effects of sovereign credit ratings.

Treepongkaruna and Wu adopted the data of 9 Asia-Pacific countries from 1997 to 2001, and used flexible panel data methods to study the effects of ratings on rated counties [8]. They also used daily data of money markets and stock markets to calculate the actual rate of cross-market volatility. Their research shows that the spillover effects of a country's credit rating changes on international stock markets really exist, and rating outlooks have more significant impacts on the volatility of stock markets than rating changes.

Conceptually, sovereign credit rating could have spillover effects across countries and markets through a number of potential sources. One example is foreign sovereign debt held by domestic banks, since credit downgrades for specific countries would affect the profitability of banks from other countries that hold its debt. In EU, the situation is that a bank holds large

sovereign debt in their trading and banking accounts sometimes, so for such a highly integrated economy, the spillover effects would be more significant. IMF working paper [9] shows that the downgrades of sovereign rating would have significant cross-country and cross-market spillover effects, and the size of spillover effects depends on the type of ratings, rated countries and source agency. Downgrades would not only affect the stock markets of rated countries but also affect other euro countries.

Under the particular context of debt crisis, the spillover effects of downgrades would be different from steady economic times. In order to study the influence of such spillover effects on European stock markets, this paper establishes a VAR (Vector Auto-Regression) model to observe how European stock markets respond to downgrades by adopting IRF (Impulse Response Function), while variance decomposition is used to analysis the interpretation degree.

DATA AND MODEL

Description of variables and data

'PIIGS' countries such as Portugal, Italy, Ireland, Greece and Spain, experienced most frequent downgrades and were stuck in severest debt crisis. Sovereign credit ratings of these countries are typical and representative, and they have relatively significant spillover effects on European stock markets. The stock indices comprehensively reflect the overall situation of European stock markets are FTSE100, CAC40 and DAX. Therefore, this paper adopts sovereign credit rating data of PIIGS and these three stock indices as variables. The data used are daily data [10].

Sovereign credit rating data

The most famous international rating agencies are Standard & Poor's (S&P), Moody's and Fitch Ratings, and they almost monopolize the global rating markets with a share of 92%, so rating announcements released by them greatly influence related countries. These three agencies all publish sovereign credit rating announcements with similar regulatory directions, but their release time is not the same. There is a lead-lag order, so rating announcements from different agencies affect stock markets differently. In fact, the rating announcement released foremost has biggest impact on stock markets [11]. Since rating announcements released by S & P are generally ahead of the other two agencies, this paper adopts sovereign credit ratings from S & P as a variable.

Similar rating announcements and outlooks from S&P are linearly transformed in this paper [12] (see appendex1). During the time period selected in this paper, sovereign credit ratings to each country were essentially downgrades or negative rating outlooks (very few positive rating announcements were only outlook being changed to stable under the same rating or rating being adjusted to normal level after selective default). He, so this paper studies the actual impacts of downgrades to PIIGS on European stock markets [13].

European stock indices

The three European stock indices used in this paper are capitalization-weighted and among them, the FTSE100 covers the 100 stocks with largest market value listed on London Stock Exchange, so it can fully reflect the overall conditions of the stock market. The 45% of CAC40 is held by foreign investors, this proportion is the highest of all major stock indexes in Europe. Since DAX index is formatted by using the "total return method" considering the company's share price as well as expected dividends, it reflects the overall returns of the stock markets rather than the market price changes [14].

Model

In order to study the relationship between variables, this paper introduces a VAR model expressed as follows:

$$y_t = \Pi_1 y_{t-1} + \cdots + \Pi_p y_{t-p} + \lambda \Lambda_t + \varepsilon_t \qquad t = 1,2,\cdots,T \quad \text{---(1)}$$

Where, y_t is a k-dimensional column vector of endogenous variables, Λ_t is a d-dimensional column vector of exogenous variables , p is the lag order, T is the number of samples, $k \times k$-dimensional matrix Π_1 , ...,$\Pi_p$and k×d-dimensional matrix λ are the coefficient matrix to be estimated, and ε_t is a k-dimensional disturbance column vector which can be correlated with each other over the same period but are not related to their lagging value or variables in the right side of the equation.

RESULTS AND DISCUSSION

PIIGS are relatively weak euro country, changes in domestic stock markets of each country cannot reflect the fluctuations of entire European stock markets. Therefore, this research adopts FTSE100, CAC40 and DAX as variables to examine the fluctuations in European stock markets caused by downgrades to PIIGS. Hereinafter, the three stock indexes would be separated to study the impacts of downgrades on each stock index.

Model estimation and equation

The results of ADF test show that all serials of variables are integrated of order 1, namely I (1) sequences. Three VAR models were constructed, representing the estimating equations of FTSE100, CAC40 and DAX respectively, and variables in each equation are stock index data and sovereign credit ratings data of PIIGS.

Lag phase is chosen according to the principle of minimum AIC and SC, and the results of AR root tests find that there is no unit root, which means the models are stable and meet the conditions of using IRF and variance decomposition. Estimated equations for

each VAR model are in Table 1, Table 2 and Table 3 respectively.

Table-1: The coefficients of VAR equations about ratings and FTSSE100

State / Lag	POR	IRE	ITA	GRE	SPA
Rating (-1)	0.568072 (29.1011) [0.01952]	-34.45869 (31.7544) [-1.08516]	5.376993 (46.6059) [0.11537]	9.353514 (15.4491) [0.60544]	-19.82485 (26.0229) [-0.76182]
Rating (-2)	1.670242 (29.2242) [0.05715]	23.49555 (31.8185) [0.73842]	3.295261 (46.6629) [0.07062]	-7.460515 (15.3553) [-0.48586]	14.72658 (26.0591) [0.56512]
R-squared	0.980122				

Table-2:The coefficients of VAR equations about ratings and CAC40

State / Lag	POR	IRE	ITA	GRE	SPA
Rating (-1)	-0.758680 (3.92673) -0.19321]	-6.924509 (2.32437) -2.97909]	8.112179 (3.83376) [2.11598]	4.162871 (1.84127) [2.26087]	3.827242 2.31464) -1.65350]
R-squared	0.972380				

Table-3: The coefficients of VAR equations about ratings and DAX

State / Lag	POR	IRE	ITA	GRE	SPA
Rating (-1)	-6.685495 (6.23122) [-1.07290]	-9.750410 (3.79944) [-2.56627]	11.96060 (6.21652) [1.92400]	6.206141 (2.83563) [2.18863]	-6.751224 (3.86288) -1.74772]
R-squared	0.989857				

In these estimated equations, the first row is corresponding coefficients to each variable, standard deviation (SD) is on the second row while t-value is on the third row. It can be seen from the R-squared that, the goodness of fit of each equation is very high. The short lag length of each VAR equation indicates that the impacts of ratings on stock markets last in short duration.

Judged from the coefficients of these equations, downgrades to Ireland have the largest impact on FTSE100, followed by Spain's ratings, which may be related to the special relationship between Ireland and Britain as well as the fact that FTSE100 includes important Spanish stock indices. Since half of the stock indices in CAC40 are held by foreign investors, downgrades to each country have a relatively average effect, and the coefficients of equations also show that except for Portugal's rating, there is no great difference between the corresponding coefficients of rating of each country and CAC40.

From the coefficients of equation of DAX, it can be seen that Italy's rating has the biggest positive impact while Ireland's rating has the biggest negative effect, but there is little difference between the coefficients of the other three countries. The possible explanation of this condition is that expected dividend returns rather than just market prices are taken into account in DAX index. As a small economy in EU, downgrades to Portugal have less impact on European stock markets, which can also be seen from the coefficients of the equations of FESE100 and CAC40.

Impulse response functions and variance decompositions of three stock indices

According to VAR equations, IRF can be used to describe how European stock markets respond to downgrades to PIIGS, and variance decomposition is adopted to measure the degree of interpretation.

In E-views, a positive impulse is given for the first period when using IRF. However, this study focuses on the impacts of negative ratings (i.e., rating downgrades) on stock indices, so each impulse diagram would be explained reversely. Here in after, impulse diagrams are on the left, and the horizontal axis represents the impulse periods (days), the vertical axis represents the interpretation degree of downgrades to each country, the curves are impulse response functions which show the dynamic response of each variable. On the left they are variance decomposition diagrams, and the horizontal axis represents the impulse periods (days) while the vertical axis indicates percentage.

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Analysis results of FTSE100

As is seen from Fig.1, giving Greece's rating, an impulse would cause the rising of FTSE100, and it would reach a maximum value at about the 70th period, then continues to fall and the relationship between these two variables changes from positive to negative after the 210th period. That is to say, downgrades to Greece would cause FTSE100 index to fall at the beginning, but as time goes on, this effect would be smaller and smaller with a negative impact appears at later stage. Although the interpretation degree of Greece's rating to FTSE100 shows an upward trend, it is very small, indicating that Greece's credit rating has little influence on FTSE100.

FTSE100 responds to Ireland's rating negatively, though it keeps diminishing until the 50th period and then shows an upward trend later, the two variables are negatively correlated throughout the observation period, which indicates that downgrades to Ireland would lead to the increasing of FTSE100 index. Judging from the variance decomposition, the impact of Ireland's credit rating gradually increases and the interpretation degree keeps more than 20%.

The impulse to Italy's rating causes the fluctuations of FTSE100. It can be seen that FTSE100 rises at early times and peaks at around the 80th period, and then continues to fall and becomes negative at around the 200th period with a minimum value at the 400th period. After that, it gradually rises and converges to 0 at about the 600th period. FTSE100 responds similarly to the rating of Italy and Greece, the positive correlation is in early periods while the negative correlation appears at later times, but downgrades to Italy cause greater turbulences to FTSE100. As it can be seen from the variance decomposition diagram that, the contribute rate of Italy's rating to FTSE100 declines at first and then shows a upward trend, and the interpretation rate becomes higher.

FTSE100 respond indifferently to the credit rating of Portugal, and the correlation between them is negative before the 100th period, and then the impulse value becomes stable at around 0 during the 100th to 200th period with inconspicuous fluctuations down to negative. This phenomenon indicates that downgrades to Portugal have few impacts on FTSE100, and the variance decomposition also shows that, although the interpretation of Italy's rating to FTSE100 is increasing, it is still very small during the entire observation period.

The IRF of FTSE100 responds to Spain's credit rating is a downward curve with a negative impact, and the impact keeps increasing to reach its bottom at about the 120th period, and then increases and gets smaller and smaller. Downgrades to Spain would cause the rising of FTSE100 index, but this effect becomes smaller and smaller over the long term. Variance decomposition explains that the contribution rate of Spain's rating to FTSE100 is rising to nearly 25% at its highest level, and it maintains a high rate of more than 20% even after the 400th period.

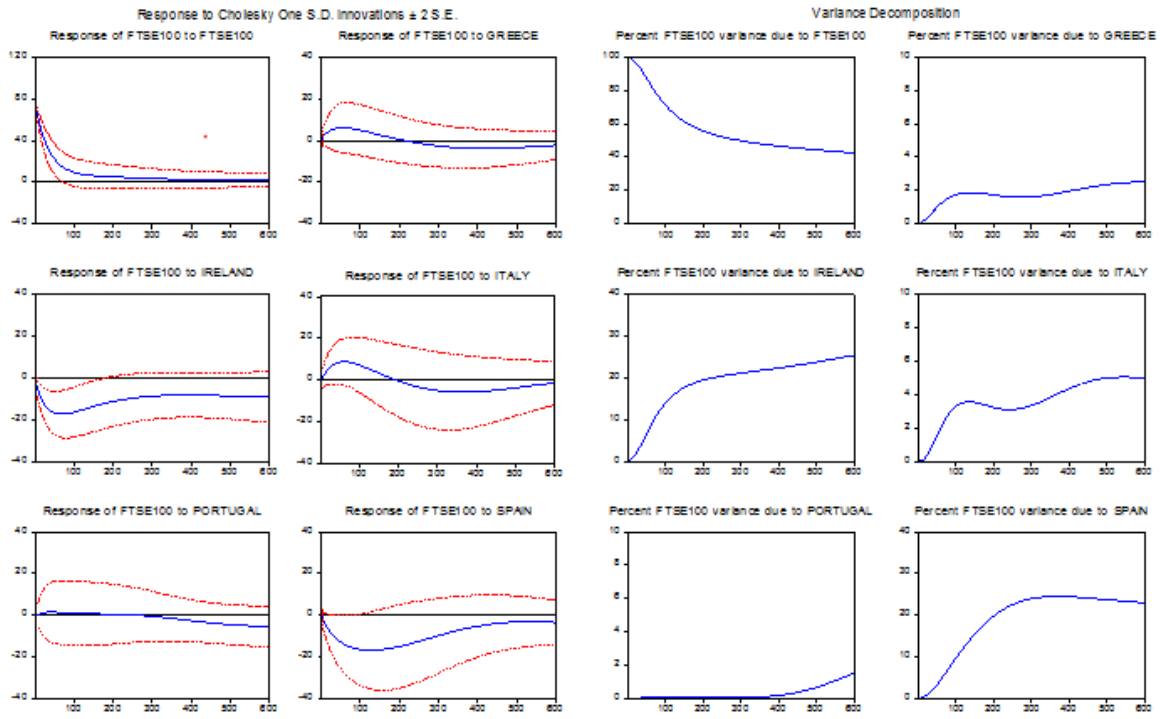

Fig-1: Impulse and Variance decomposition diagrams about FTSE100 to Sovereign credit ratings of PIIGS

In general, sovereign credit rating of Ireland or Spain has negative effects on FTSE100, which means that downgrades to each or these two countries would cause the increasing of FTSE100 index. Rating of Greece or Italy has similar impacts on FTSE100, that is, positive effects at early times, and downgrades would cause the stock index to fall; negative effects appear at late periods, but as time goes on, this impact gradually disappears, and downgrades would not lead to obvious turbulence of FTSE100. The credit rating of Portugal has small effects on FTSE100, and basically wouldn't cause fluctuations of the index at prior periods. Although negative correlation appears at latter periods, the impact is small. The variance decomposition diagrams indicate that downgrades to Ireland or Spain highly explain the volatiles of FTSE100, and the contribution rates are both about 25% in the long run. The contribution of Greece and Italy is around 3% and 5% at late periods, respectively. Portugal's rating has the minimum contribution rate, which does not exceed 2%.

Analysis results of FTSE100

As it can be seen from Fig. 2, Greece's sovereign credit rating would cause positive fluctuations of CAC40 index, and the rate of change increases and reaches its maximum at about the 100th period, and then falls slowly, reducing to 0 at the 250th period, and becomes negative and continuously converges after bottoming out at about the 350th period. Before the 250th period, there is a positive correlation between CAC40 index and the rating of Greece, so downgrades to Greece would cause the falling of CAC40 index. After the 250th period, the correlation becomes negative, but the impact of Greece's rating is increasingly smaller. Variance decomposition shows that the interpretation of Greece's rating to CAC40 increases during the former 100 periods, but after that, it explains for around 13%.

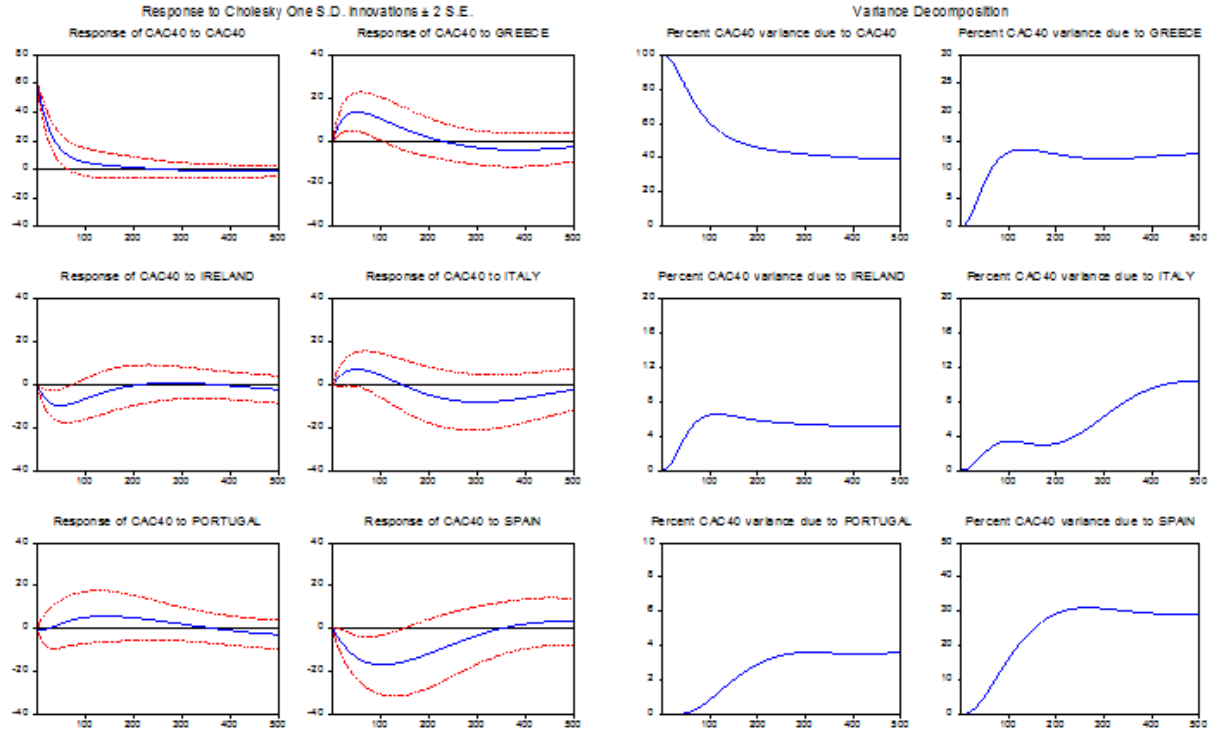

Fig-2: Impulse and Variance decomposition diagrams about CAC40 to Sovereign credit ratings of PIIGS

CAC40 responds to the impact of Ireland's rating negatively at the beginning, and the negative impact is increasing, reaching its bottom at the 50th period. After that, a rising trend emerges at about the 200th period with a very small positive effect. This influence continues to the 370th period or so, and then becomes negative again. In other words, downgrades to Ireland would cause the rising of CAC40 index during the early and the later period, while CAC40 index experiences minor declines during the middle observation period. The interpretation of Ireland's rating to CAC40 index rises before the 100th period with its maximum of 7%, and then falls during the subsequent period of positive effect, but it still maintains about 6%.

Italy's credit rating brings immediately and positively fluctuations to CAC40, the impact continues to decline after it peaks at around the 50th period, and becomes negative at the 150th period, reaching its bottom at the 300th period. It is obviously that downgrades to Italy would cause the continuous decreasing of CAC40 before the 150th period, especially before the 50th. The interpretation of Italy's rating to CAC40 keeps

increasing, and the contribution rate maintains around 10% during the later period.

Before the 350th period, CAC40 responds to Portugal's rating positively, and the positive effect is increasing to reach its maximum at around the 150th period, and then keeps falling and becomes negative after the 350th period. Downgrades to Portugal would cause the decline of CAC40 before the 350th period, and CAC40 would increase after that. However, whether the impact is positive or negative, it would gradually diminish as time goes on. The interpretation of Portugal's rating to CAC40 index is increasing before the 300th period, and it continues to increase at the 400th period after a slightly decline, explaining for 4% of the fluctuations of CAC40.

When given Spain's rating a positive impulse at initial period, negative fluctuations immediately appear in CAC40. The IRF bottoms out at the 100th period, and then keeps rising, and small positive effects emerge at the 350th period. During the entire observation period, downgrades to Spain would cause the increasing of CAC40 index through a long time, while the index would fall during the later period. The interpretation of Spain's rating to CAC40 keeps rising before the 250th period with a slight decline later, and maintains around 30% after the 400th period.

Sovereign credit rating of Greece, Italy and Portugal has positive impacts on CAC40 at first, and negative effects would appear in the middle period, but positive fluctuation are more pronounced in general. Mostly, CAC40 index responds to the rating of Ireland or Spain negatively, but downgrades to these two countries would cause the rising of it, and the fluctuations what they cause are alike. Judging from the variance decomposition diagram, Spain's rating mainly explains the volatility of CAC40, and the contribution rate is stable at around 30%. Greece's rating accounts for 12% while the interpretation of Italy's rating is also high, explaining for 10%. Contribution rates of Ireland and Portugal are relatively small, and the long-term contribution rate of each is around 6% and 4%, respectively.

Analysis results of DAX

As it can be seen from Fig. 3 that, Greece's sovereign credit rating has a positive impact on DAX index, which increases constantly and peaks at around the 60th period, and then it continues to weaken and becomes negative after the 200th period, gradually constrains to 0 in the end of the observation period. Downgrades to Greece would cause the falling of DAX index during the early stage, while the index would increase at later period, and the impact diminishes as time goes on. The interpretation of Greece's rating to DAX is increasing before the 100th period, and it slightly declines during the 100th to the 300th period. After that, the contribution rate is stable at around 7%.

The IRF of the effect of Spain's rating on DAX is a downward curve, and it bottoms out at about the 50th period, and then there is a slight upward trend, and it gradually converges in the later period, maintaining a stable impact. Spain's rating has negative effects on DAX during the entire observation period, and downgrades to the former would cause the rising of the latter. The contribution rate of Spain to DAX gradually increases with a prominent rising trend before the 100th period, and it maintains a high level of around 16% during the later period.

Italy's rating causes slightly positive fluctuations of DAX, and negative turbulence begins after the 100th period, bottoming out at the 30th period after that, and it continuously increases while still keeps a negative trend. The interpretation of Italy's rating to DAX is 0 before the 100th period, so it cannot be one of the explaining factors. However, it gradually increases after the 100th period and reaches its maximum of 12%.

The correlation between Portugal's rating and DAX index shows negative in the beginning, and the IRF reaches its bottom at around the 30th period, and then it gradually converges to 0. However, a downward trend appears after the 180th period, and it maintains stable effects during the later period. The interpretation of Portugal's rating is rising before the 80th period, and it starts to increase again at the 300th period after a slight decline. Generally speaking, the contribute rate of Portugal's rating is very small, and it explains no more than 4% even at its highest.

During the entire observation period, the correlation between Spain's rating and DAX index is negative, and the negative impact is increasing before the 100th period, and then it gradually decreases and converges to 0. Downgrades to Portugal would cause the rising of DAX index, but this is more obvious during early periods, and the rate of increase gets smaller and smaller over time. In the variance decomposition diagram, the interpretation increases significantly before the 100th period, but the rate of rise becomes slight with a downward trend appearing after the 300th period. Spain's rating largely explains the volatility of DAX index, and the contribution rate exceeds 30% for a long time.

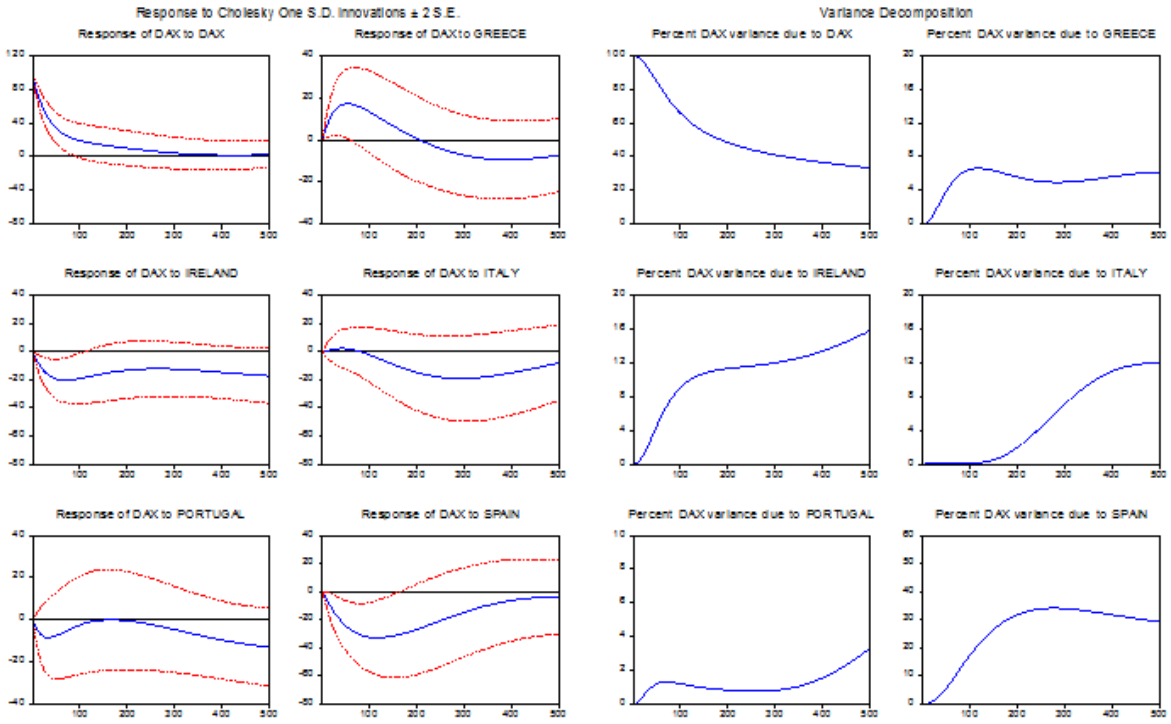

Fig-**3: Impulse and Variance decomposition diagrams about DAX to Sovereign credit ratings of PIIGS**

Through the analysis above, it can be seen that the rating of Ireland, Portugal and Spain has negative impacts on DAX, and downgrades to these countries would cause the rising of DAX index. Spain's rating affects DAX mostly, and the contribution rate exceeds 30% at its highest. Followed by Ireland's rating, and it explains for over 12% for a long time, while the interpretation of Portugal's rating is very small. The rating of Greece or Italy would cause positive fluctuations of DAX during early periods, and downgrades to each country would lead to the increasing of it, but turbulence caused by Greece's rating is more significant with a greater contribution rate.

Taking FTSE100, CAC40 and DAX together, the rating of Greece or Italy causes positive fluctuations at early stage, and during European debt crisis, this impact means European stock markets represented by these three stock indices would decline after downgrades to these 2 countries. The rating of Ireland or Spain mainly brings negative impacts to stock indices, and downgrades to them would affect the rising of European stock markets. The effects of downgrades to Portugal on FTSE100 is insignificant, which could be related to the fact that Portugal is a weak euro country while the UK is an economically strong non-euro country (Although the UK is a non-euro country, FTSE100 can still be used as a comprehensive stock index because of the close financial and economic exchanges between Britain and euro countries). Portugal's rating has positive and negative impacts on CAC40 and DAX respectively, but the contribution rate are both very small.

CONCLUSION

This paper employs IRF and variance decomposition based on VAR to study the impacts of downgrades to the most severely affected countries (PIIGS) during European debt crisis on FTSE100, CAC40 and DAX. The empirical results prove that during European debt crisis, downgrades to some countries would affect the entire European stock market through spillover effects.

From the study to the stock market, it can be found that downgrades to each country have different effects on European stock markets. Overall, downgrades to Portugal have less impact while downgrades to the other four countries would cause the rising of European stock markets, which is related to the "seesaw" effect between stock markets and bond markets. "Seesaw" effect usually happens when the stock market is experiencing severe volatility. In fact, a large amount of funds flew from bond markets to stock markets after downgrading. Of course, it is also related to the issue that international capital would outflow from countries suffering from severe debt crisis to stable countries. All these phenomena indicate that, downgrades have enormous impacts on European stock markets.

REFERENCES

1. Gande A, Parsley DC; News spillovers in the sovereign debt market. Journal of Financial Economics, 2005; 75(3): 691-734.
2. Ferri G, Liu LG, Stiglitz JE ; The procyclical role of rating agencies: Evidence from the East Asian crisis. Economic Notes, 1999; 28(3):335-355.

3. Ferreira MA, Gama PM; Does sovereign debt ratings news spill over to international stock markets?. Journal of Banking & Finance, 2007;31(10): 3162-3182.
4. Hooper V, Hume T, Kim SJ; Sovereign rating changes—Do they provide new information for stock markets?. Economic Systems, 2008; 32(2):142-166.
5. Li H, Jeon BN, Cho SY, Chiang TC; The impact of sovereign rating changes and financial contagion on stock market returns: Evidence from five Asian countries. Global Finance Journal, 2008; 19(1):46-55.
6. Ehrmann M, Fratzscher M, Rigobon R; Stocks, bonds, money markets and exchange rates: measuring international financial transmission .Journal of Applied Econometrics, 2011; 26(6):948-974.
7. Kaminsky G, Schmukler SL; Emerging market instability: do sovereign ratings affect country risk and stock returns?. The World Bank Economic Review, 2002; 16(2):171-195.
8. Treepongkaruna S, Wu E; Realizing the volatility impacts of sovereign credit ratings information on equity and currency markets: Evidence from the Asian Financial Crisis. Research in International Business and Finance, 2012; 26(3):335-352.
9. Arezki R, Candelon B, Sy A; Sovereign rating news and financial markets spillovers: Evidence from the European debt crisis. IMF working papers, 2011; 1-27.
10. Datastream;,Explore/Interest Rates, 2013. Available online at https:// www.thomsonone.com
11. Micu M, Remolona EM, Wooldridge PD; The price impact of rating announcements: which announcements matter?. BIS working Paper. 2006.
12. Abad P, Díaz A, Robles MD; Determinants of abnormal liquidity after rating actions in the Corporate Debt Market. International Review of Applied Financial Issues and Economics. 2010.
13. He Y, Dou X; An Empirical Examination of Correlation between European Sovereign Debt Crisis and Credit Ratings. Wulfenia Journal, 2014; 21(6):106-121.
14. Stock Q; 2013, Available online at http://stockq.cn/stock/history/

Appendix 1
Standard & Poor's sovereign credit rating and rating outlook numerical linear transformation

Rating				Rating outlook	
Rating	Trans. value	Rating	Trans. value	Rating	Trans. value
AAA	17	BB +	7	Positive	0.5
AA +	16	BB	6	Watch Positive	0.25
AA	15	BB-	5	Stable 0	0
AA-	14	B +	4	Watch Negative -	0.5
A +	13	B	3	Negative -	0.25
A	12	B-	2	NM (Not Meaning)	0
A +	11	CCC + to CCC-	1		
BBB +	10	Below CCC-	0		
BBB	9	SD -	1		
BBB-	8				