

Patrycja Chodnicka-Jaworska  
Uniwersytet Warszawski

## Market pricing of European banks' credit rating changes

The basic goal of the article is to analyse the impact of the changes of banks' credit ratings on the rates of return of banks' shares. The following hypotheses have been formulated: first, a downgrade of a credit rating exerts statistically significant negative influence on the rate of return of banks' shares. Secondly, the impact of the changes of credit ratings is greater in developed countries. The analysis has been conducted for European banks for the period of 1980–2015 using an event study method. The sample has been divided into subsamples according to: the downgrade and upgrade of credit ratings, membership in politico-economic institutions, and the development status of countries, on the basis of the data collected from Thomson Reuters. Dependent variables are taken as daily rates of returns and independent variables are the long-term issuer credit ratings proposed by S&P.

Keywords: credit rating, rates of return, banks, default risk

JEL classification: G14, G15, G21

### Rynkowa wycena zmian credit ratingów banków europejskich

Podstawowym celem artykułu jest analiza wpływu zmian credit ratingów banków na stopy zwrotu z akcji. Postawiono następujące hipotezy: po pierwsze, obniżka credit ratingu wpływa istotnie negatywnie na stopy zwrotu z akcji banków. Po drugie, wpływ zmiany ratingu kredytowego jest silniejszy w krajach rozwiniętych. Analizę przeprowadzono na danych dotyczących banków europejskich w okresie pomiędzy 1980 a 2015 rokiem przy użyciu metody *event study*. Próbę podzielono na podpróbki zgodnie z: obniżeniem lub poprawą credit ratingu, podziałami politycznymi oraz poziomem rozwoju gospodarczego na podstawie danych pozyskanych z bazy Thomson Reuters. Jako zmienną zależną przyjęto dzienne stopy zwrotu, natomiast jako zmienne niezależne – długoterminowe noty ratingowe emitenta zaproponowane przez S&P.

Słowa kluczowe: rating kredytowy, stopa zwrotu, banki, ryzyko upadłości

Klasyfikacja JEL: G14, G15, G21

## Introduction

Information published by credit rating agencies has a significant influence on the financial market. The strongest impact comes from the notes proposed by the

three biggest rating agencies: Standard & Poor's, Moody's, and Fitch Investors Service. They publish information about credit rating changes, watch lists, and adjustment. An issued credit rating is an opinion about the creditworthiness of an obligor with respect to a financial obligation. It takes into consideration the creditworthiness of guarantors, insurers, or other forms of credit enhancement on the obligation, as well as the currency in which the obligation is denominated [S&P, 2016]. The opinions published by credit rating agencies verify the obligor's capacity and willingness to meet its financial commitments. Both long- and short-term issuer credit ratings are being published.

The changes of credit ratings published by the above-mentioned institutions have an impact on share prices, exchange rates, bonds, interest rates, and CDS. The basic goal of the paper is to analyse the impact of the changes of banks' credit ratings on the rates of return of banks' shares. Thus, the following hypotheses are put forward: first, a downgrade of credit rating have a statistically significant negative influence on the rate of return of banks' shares. Secondly, banks' shares in highly developed economies can react more strongly to credit rating changes.

The paper is organized as follows: Section 1 presents the results of a broad literature research. Section 2 describes the hypotheses, methodology, and data, followed by the determinants of banks' credit ratings. The differences between the factors considered by particular credit rating agencies are also tested, according to the size of an agency. Section 3 presents the author's findings. The paper is closed by a presentation of conclusions.

## 1. Literature review

The current opinion on the impact of the credit rating changes on the stock market is divided. A certain group of researchers suggest that significant impact on the rates of return only follows a downgrade of credit ratings [Griffin, Sanvicente, 1982; Holthausen, Leftwich, 1986; Glascock, Davidson, Henderson, 1987]. Others pose that credit rating changes have no significant impact, because the share market reacts to the possibility of changes of the mentioned variable before they are published. In other words, abnormal rates of return are received by investors before the change becomes public information [Pinches, Singleton, 1978].

Also, analyses have been performed which confirm the impact of the credit watch, adjustment, and change of credit ratings. Hand, Holthausen and Leftwich [1992] suggested that significant impact of the change and credit watch follows only the downgrade of credit ratings, while information about an increase of the mentioned variable proved insignificant for the share market. Other researches that analyse the mentioned relationship are Goh and Ederington [1993], Followill

and Martell [1997], and Dichev and Piotroski [2001]. Hirsch and Bannier [2007] conducted an analysis to establish whether the watch list has extended the agencies' role towards a monitoring position, as proposed by Boot, Milbourn, and Schmeits [2006]. They find that the overall information content of a rating action has indeed increased due to the introduction of the watch list procedure. They also suggest that rating reviews help to establish contracts between agencies and borrowers and, as such, enable a finer partition of rating information, thereby contributing to a higher information quality.

In the research proposed by Vassalou and Xing [2003], attention has been given to the size of the capital market, the level of development of the economy, and the probability of default. They observed that the most important for the abnormal rates of return are the moments before and after the publication of the information about the changes. The division of the sample into subsamples according to the level of economic development may help to explain the differences in the previous researches.

Some studies have verified the importance of credit rating changes on the abnormal returns of the share prices, the exchange rates [Brooks et al., 2004; Wu, Treepongkaruna, 2008], CDS, and bonds [Gantenbein, Harasta, 2012; Kim, Wu, 2008; Hooper, Hume, Kim, 2008].

Researches on companies from 80 countries in the period of 1990–2012 prepared by Almeida et al. [2014] have analysed the effect of sovereign credit rating downgrades on company investment and financial policy. Having taken into consideration the credit ratings proposed by the Big Three, they found that only a small number of companies even receive credit ratings. They have also remarked that sovereign downgrades lead to greater decreases in investment and leverage of firms that are at the sovereign rating bound than of otherwise similar firms below the bound. Consistent with a contraction in capital supply, bond yield spreads of companies at the bound increase relative to companies below the bound.

Jones and Mulet-Marquis [2014] analysed the abnormal rates of return associated with credit rating changes of US banks. They found that short-term abnormal returns are exhibited to both upgrades and downgrades. Cumulative abnormal returns analysed by using the event study method exhibit a positive trajectory following an upgrade announcement, whilst cumulative average abnormal returns to downgrades return almost to zero over the event window. They have presented their results after removal of contaminating effects. The analysis prepared for US banks and banks from other countries suggest that US domestic banks experience significantly larger negative abnormal returns to downgrades than international banks listed in the US.

The literature research led to the formulation of the hypotheses presented in the next section.

## 2. Hypotheses, methodology, and data description

The literature sources presented above suggest that significant impact on the rates of return of banks' shares should derive from a downgrade of credit ratings. The analysis of the influence of the upgrade of credit ratings on the stock prices suggests an insignificant relationship between the mentioned variables. The literature also suggests that previous analysis have not taken into consideration the level of economic development and membership in politico-economic institutions. In the author's opinion, the financial markets may react differently depending on the mentioned division. Banks' shares in highly developed economies can be more sensitive to credit rating changes. Thus, the following hypotheses have been put forward:

- hypothesis 1: the downgrade of credit ratings has a significantly negative influence on the rate of return of banks' shares,
- hypothesis 2: in highly developed economies, the banks' shares can react strongly to credit rating changes.

To verify the above-mentioned hypotheses, event study methods are used. Dependent variables are taken as daily rates of returns and independent variables are the long-term issuer credit ratings proposed by S&P. The financial market is sensitive to the publication of credit ratings changes proposed by S&P. The analysis covers 24 European countries in the period of 1980–2015. The sample has been divided into subsamples according to the upgrade and downgrade of credit ratings, the level of economic development, and membership in politico-economic institutions. The classification of particular countries is presented in Table 1.

To analyse the impact of banks' credit ratings changes on their share prices, an event study method is used. The mentioned model relies on using the abnormal differences for the same variable in each event window. The basic idea is to find the abnormal return attributable to the studied event by adjusting for the return that stems from the price fluctuation of the market as a whole.

The analysis has been conducted for 60 trading days: 30 days before the event and 30 days after the event. The period before the event is described as  $[-31; -2]$ , the event window is  $[-1; +4]$  and the post-event window is  $[+4; +34]$ . The moment of publication of credit rating changes is designated as 0.

In the event study methodology, statistical tests are based on abnormal differences taken as the differences between the actual value of the rate of return for each day in the event windows and the expected value measured as the average of the daily differences for the previous 250 days preceding the event window. As a result, the abnormal rates of return have been identified, for which the statistical distinctiveness from 0 is checked by using the Student's *t*-statistics in the respec-

tive subgroups. Parametric tests attribute an equal chance to both positive and negative deviations from the expected value.

Table 1. Classification of particular countries according to the level of economic development and membership in politico-economic institutions

| Classification                               | Country   |
|--|---|
| Membership in politico-economic institutions |   |
| European Union countries                     | Austria, Belgium, Bulgaria, Croatia, Czech Republic, Denmark, France, Germany, Greece, Hungary, Ireland, Netherlands, Poland, Portugal, Slovakia, Spain, Sweden, United Kingdom   |
| non-European Union countries                 | Norway, Russia, Switzerland, Turkey, Ukraine  |
| eurozone countries                           | Austria, Belgium, France, Germany, Greece, Hungary, Ireland, Netherlands, Portugal, Slovakia, Spain   |
| non-eurozone countries                       | Bulgaria, Croatia, Czech Republic, Denmark, Norway, Poland, Russia, Sweden, Switzerland, Turkey, Ukraine, United Kingdom  |
| Central and Eastern Europe                   | Bulgaria, Croatia, Czech Republic, Hungary, Ireland, Poland, Russia, Slovakia, Ukraine  |
| Economic development                         |   |
| high-income OECD members                     | Austria, Belgium, Czech Republic, Denmark, France, Germany, Greece, Hungary, Ireland, Netherlands, Norway, Poland, Portugal, Slovakia, Spain, Sweden, Switzerland, United Kingdom |
| high-income non-OECD members                 | Croatia   |
| lower-middle-income economies                | Bulgaria, Russia, Turkey  |
| low-income economies                         | Ukraine   |

Source: Own elaboration.

### 3. Findings

The impact of credit rating changes – both upgrades and downgrades – on the rates of return of banks' shares is verified by using the event study method. The first analysis concerned the influence of the mentioned variable published by S&P for the banks that operate in the European Union and those that do not. The results for the EU subsample suggest that an upgrade does not influence significantly the abnormal rates of return of banks' shares. On the other hand, the mentioned change is important for banks operating outside the European Union. The differences between the rates of return of banks' shares increase during the event window by 25.1% and after the publication of credit ratings by 119.2%. This moment of reaction of the share market can be an effect of the prudence of the in-

vestors in the decision-making process. In the case of a downgrade, the analysed relationship develops differently, as it causes the strongest decrease of the abnormal rates of returns before the moment of publication by 193.9%, during the event window by 33.6%, and after the publication by 159.9%. This situation confirms the sensitivity of investors to risk. The rates of return of the shares of banks that operate outside the European Union decrease during the post-event window.

Table 2. The event study method for the banks' credit rating changes on the differences of logarithmized rates of return of their shares in the EU and non-EU subsamples

| Variables              | EU countries | non-EU countries | EU countries | non-EU countries |
|------------------------|--------------|------------------|--------------|------------------|
|                        | upgrade      |                  | downgrade    |                  |
| number of observations | 96           | 32               | 231          | 37               |
| Pre-event window       |              |                  |              |                  |
| credit rating changes  | 0.147        | 1.395            | -1.939***    | 1.409            |
| t-student              | -0.77        | -1.79            | (-6.30)      | -1.04            |
| Event window           |              |                  |              |                  |
| credit rating changes  | 0.0492       | 0.251*           | -0.336***    | 0.322            |
| t-student              | -1.12        | -2.21            | (-5.49)      | -1.43            |
| Post-event window      |              |                  |              |                  |
| credit rating changes  | 0.108        | 1.192**          | -1.599***    | -2.179*          |
| t-student              | -0.48        | -2.78            | (-4.98)      | -2.05            |

\* Symbols \*\*\*, \*\*, and \* denote significance at 1%, 5%, and 10%, respectively

Source: Own calculations.

The analysis of banks that operate in the eurozone gives different results. While their share prices do not react to an upgrade of the S&P credit rating, a significant influence of an upgrade has been observed for the non-eurozone subsample. The differences between rates of return of banks' shares increases by 84.2% before, by 17.9% during, and by 66.6% after the moment of publication. In the case of a downgrade, a stronger reaction of the share market to the mentioned changes is observed. The abnormal rates of return fall by 191.6% before, by 32.5% during, and by 157.8% after the moment of publication. This relationship is insignificant for the non-eurozone subsample.

The last analysis that concerned the influence of the membership in politico-economic institutions on the reaction of the rates of return of banks' shares to the S&P bank credit rating changes has been conducted for Central and Eastern European banks. While the reaction of the abnormal rates of return in the CEE subsample to an upgrade of the S&P credit rating during the event window is significant, it proves insignificant in the non-CEE subsample. The reaction to a downgrade is also insignificant in the CEE subsample. The strongest influence of a downgrade

of the S&P bank credit rating on the abnormal rates of return is observed in the case of banks operating in the non-CEE countries. The mentioned dependent variable decrease by 155.6% before, by 27.7% during, and by 139.6% after the moment of publication.

Table 3. The event study method for the banks' credit rating changes on the differences of logarithmized rates of return of their shares in the eurozone and non-eurozone subsample

| Variables              | eurozone countries | non-eurozone countries | eurozone countries | non-eurozone countries |
|------------------------|--------------------|------------------------|--------------------|------------------------|
|                        | upgrade            |                        | downgrade          |                        |
| number of observations | 59                 | 69                     | 171                | 97                     |
| Pre-event window       |                    |                        |                    |                        |
| credit rating changes  | 0.0116             | 0.842*                 | -1.916***          | -0.702                 |
| t-student              | -0.05              | -2.14                  | (-5.17)            | (-1.11)                |
| Event window           |                    |                        |                    |                        |
| credit rating changes  | 0.00639            | 0.179**                | -0.325***          | -0.104                 |
| t-student              | -0.1               | -3.03                  | (-4.38)            | (-0.92)                |
| Post-event window      |                    |                        |                    |                        |
| credit rating changes  | 0.0436             | 0.666*                 | -1.578***          | -0.195                 |
| t-student              | -0.17              | -2.21                  | (-4.43)            | (-0.31)                |

\* Symbols \*\*\*, \*\*, and \* denote significance at 1%, 5%, and 10%, respectively

Source: Own calculations.

Table 4. The event study method for the banks' credit rating changes on the differences of logarithmized rates of return of their shares in the CEE and non-CEE subsamples

| Variables              | CEE countries | non-CEE countries | CEE countries | non-CEE countries |
|------------------------|---------------|-------------------|---------------|-------------------|
|                        | upgrade       |                   | downgrade     |                   |
| number of observations | 38            | 90                | 56            | 212               |
| Pre-event window       |               |                   |               |                   |
| credit rating changes  | 0.887         | 0.278             | -1.174        | -1.556***         |
| t-student              | -1.36         | -1.29             | (-1.05)       | (-5.21)           |
| Event window           |               |                   |               |                   |
| credit rating changes  | 0.225*        | 0.0466            | -0.125        | -0.277***         |
| t-student              | -2.25         | -1.03             | (-0.63)       | (-4.65)           |
| Post-event window      |               |                   |               |                   |
| credit rating changes  | 0.4           | 0.37              | 0.125         | -1.396***         |
| t-student              | -0.79         | -1.89             | -0.13         | (-4.43)           |

\* Symbols \*\*\*, \*\*, and \* denote significance at 1%, 5%, and 10%, respectively

Source: Own calculations.

Table 5. The event study method for the banks' credit rating changes on the differences of logarithmized rates of return of their shares in the economic development subsample

| Variables              | high OECD | middle | low     | high OECD | high non-OECD | middle | low   |
|------------------------|-----------|--------|---------|-----------|---------------|--------|-------|
|                        | upgrade   |        |         | downgrade |               |        |       |
| number of observations | 106       | 19     | 2       | 243       | 3             | 19     | 3     |
| Pre-event window       |           |        |         |           |               |        |       |
| credit rating changes  | 0.13      | 2.38   | -0.398  | -1.952*** | 0.479         | 0.552  | 22.24 |
| t-student              | -0.72     | -1.93  | (-1.00) | (-6.56)   | -0.99         | -0.53  | -2.64 |
| Event window           |           |        |         |           |               |        |       |
| credit rating changes  | 0.0701    | 0.316  | -0.257  | -0.325*** | 0.0992        | 0.131  | 3.466 |
| t-student              | -1.72     | -1.72  | (-1.00) | (-5.50)   | -0.63         | -0.54  | -2.75 |
| Post-event window      |           |        |         |           |               |        |       |
| credit rating changes  | 0.322     | 1.068  | -3.011  | -1.516*** | 0.988         | 1.78   | 14.28 |
| t-student              | -1.9      | -1.15  | (-1.00) | (-4.84)   | -0.7          | -1.71  | -1.84 |

\* Symbols \*\*\*, \*\*, and \* denote significance at 1%, 5%, and 10%, respectively

Source: Own calculations.

The second part of the analysis aims to verify the impact of credit rating changes on the differences between the logarithmized rates of return in relation to the level of economic development based on the division proposed by the World Bank. The results are presented in Table 5. The presented estimation results suggest that the level of economic development is insignificant in the case of an upgrade of credit ratings. A downgrade, however, significantly influences the rates of return of the shares of banks operating in high-income OECD countries, which decrease by 195.2% in the pre-event window, by 32.5% in the event window, and by 151.6% after the publication of credit rating changes by S&P.

## Conclusions

The basic goal of the article was to analyse the impact of Standard & Poor's Investor Service credit rating changes on the rates of return of banks' shares. The following hypotheses have been put forward: first, a downgrade of credit rating has a statistically significant negative influence on the rates of return of banks' shares. The impact of credit rating changes is greater in developed countries. The pre-

sented research suggests that membership in politico-economic institutions also has a significant impact on the mentioned relationship. An upgrade of banks' credit ratings increases significantly the abnormal rates of return of the shares of banks that operate in the non-EU, non-eurozone, and Central and Eastern European countries. The mentioned impact is statistically significant during and after the moment of publication. The impact of a downgrade of credit ratings is significant for the shares of banks that operate in the EU, eurozone, and non-CEE countries. The mentioned relationship can be an effect of the sensitivity of the investors to risk in their decision-making process.

The second analysis takes into consideration the level of economic development. The achieved results suggest that a significant impact of the banks' credit rating changes on the rates of return of their shares is observed only in the case of a downgrade and the banks operating in the high-income OECD countries.

## References

- Boot A., Milbourn T., Schmeits A., 2006, *Credit Ratings as Coordination Mechanism*, Review of Financial Studies, no. 19.
- Brooks R., Faff R.W., Hillier D., Hillier J., 2004, *The National Market Impact of Sovereign Rating Changes*, Journal of Banking and Finance, no. 28.
- Dichev I.D., Piotroski J.D., 2001, *The Long-Run Stock Returns Following Bond Ratings Changes*, Journal of Finance, no. 56.
- Ederington L.H., Goh J.C., 1993, *Is a Bond Rating Downgrade Bad News, Good News, or No News for Stockholders?*, Journal of Finance, no. 48.
- Followill R.A., Martell T., 1997, *Bond Review and Rating Change Announcements: An Examination of Informational Value and Market Efficiency*, Journal of Economics and Finance, no. 21.
- Gantenbein P., Harasta B., 2012, *Cross-Market Analysis: The Effect of Rating Events on Bonds, CDS and Equities*, revised draft, Univeristy of Basel, <http://regconf.hse.ru/uploads/0ac895f9d463e22d3dab378328d38c21bf19fb24.pdf> [access: 26.07.2016].
- Glascok J.L., Davidson W.N., Henderson G.V., 1987, *Announcement Effects of Moody's Bond Rating Changes on Equity Returns*, Quarterly Journal of Business and Economic, no. 26.
- Griffin P.A., Sanvicente A.Z., 1982, *Common Stock Returns and Rating Changes: A Methodological Comparison*, Journal of Finance, no. 37.
- Hand J.R., Holthausen R.W., Leftwich R.W., 1992, *The Effect of Bond Rating Agency Announcements on Bond and Stock Prices*, Journal of Finance, no. 47.
- Hirsch C., Bannier C., 2007, *The Economics of Rating Watchlists: Evidence from Rating Changes*, Working Paper Series from Frankfurt School of Finance and Management, no 88.
- Holthausen R.W., Leftwich R.W., 1986, *The Effect of Bond Rating Changes on Common Stock Prices*, Journal of Financial Economics, no. 17.
- Hooper V., Hume T., Kim S.-J., 2008, *Sovereign Rating Changes: Do They Provide New Information for Stock Markets?*, Economic Systems, no. 32.
- Jones E., Mulet-Marquis Q., 2014, *The Stock Market Reaction to Changes to Credit Ratings of US-Listed Banks*, Centre for Finance and Investment Discussion Paper Series DP2013-

- AEF03, British Accounting and Finance Association (BAFA) Scottish Area Group Conference.
- Kim S.-J., Wu E., 2008, *Sovereign Credit Ratings, Capital Flows and Financial Sector Development in Emerging Markets*, *Emerging Markets Review*, no. 9.
- Pinches G.E., Singleton J.C., 1978, *The Adjustment of Stock Prices to Bond Rating Changes*, *Journal of Finance*, no. 33.
- S&P, 2016, Standard & Poor's, S&P Global Ratings Definitions, [https://www.standardandpoors.com/en\\_US/web/guest/article/-/view/sourceId/504352](https://www.standardandpoors.com/en_US/web/guest/article/-/view/sourceId/504352) [access: 12.08.2016].
- Vassalou M., Xing Y., 2003, *Equity Returns Following Changes in Default Risk: New Insights into the Informational Content of Credit Ratings*, Working Paper, Columbia University, <http://www.ruf.rice.edu/~yxing/changeDLI2.pdf> [access: 26.07.2016].
- Wu E., Treepongkaruna S., 2008, *Realizing the Impacts of Sovereign Ratings on Stock and Currency Markets*, post-conference materials, The European Financial Management Association.