

Credit Rating Changes and the Bond Market – the Impact of Economic Development

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Patrycja Chodnicka-Jaworska*

The aim of the paper is to examine the impact of credit rating changes of a country on bond yields, taking into account this country's level of economic development. The following hypothesis has been formulated following a literature review: Bond yields react more strongly to credit rating changes in developed economies. The impact is greatest in the case of credit rating downgrades both in developed and developing economies; in developing economies, both upgrades and downgrades affect bond yields. Event study methodology has been applied to analyse Thomson Reuters's database of 225 countries, published daily between 1980 and 2016. Research results may be used to analyse the influence of information published by lesser agencies on investors' decisions. The analysis encompasses the impact of credit rating changes published by smaller agencies, which has yet to be subject to scholarly investigation.

Keywords: credit rating, bond market, event study

Zmiana credit ratingu i rynek obligacji – wpływ poziomu rozwoju gospodarczego

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Celem artykułu była analiza wpływu zmian credit ratingów krajów na rentowność obligacji przy uwzględnieniu poziomu rozwoju gospodarczego krajów. Postawiono hipotezę po przeprowadzeniu przeglądu literaturowego, tj.: Rentowności obligacji silniej reagują na zmiany credit ratingów w przypadku krajów rozwiniętych gospodarczo. Wpływ jest największy w przypadku obniżenia ratingu kredytowego zarówno w krajach rozwiniętych, jak i rozwijających się. Metodologia badania zdarzeń została wykorzystana do analizy danych dziennych pochodzących z bazy danych Thomson Reuters dla 225 krajów dla okresu 1980–2016. Rentowności obligacji silniej reagują na zmiany ratingów w gospodarkach rozwiniętych. Wpływ ten jest największy w przypadku obniżenia ratingu, zarówno w rozwiniętych, jak i rozwijających się gospodarkach; w krajach rozwijających się zarówno podwyżki, jak i obniżki ratingów wpływają na rentowność obligacji. Wyniki badań mogą być wykorzystane do analizy wpływu informacji publikowanych przez mniejsze agencje na decyzje inwestorów. Analiza obejmuje wpływ zmian ratingów publikowanych przez mniejsze agencje, które nie podlegały dotychczas badaniom naukowym.

Słowa kluczowe: credit rating, rynek obligacji, metoda analizy zdarzeń.

JEL: G12; G14; G24

* **Patrycja Chodnicka-Jaworska** – PhD, Faculty of Management, University of Warsaw.

Correspondence address: Faculty of Management, University of Warsaw, Szturmowa St. 1/3, 02-678 Warsaw; e-mail: pchodnicka@wz.uw.edu.pl.



1. Introduction

Credit rating agencies play a significant role in financial markets. They are regarded as one of the most reliable sources of information about the default risk of the rated entities. For instance, banks use them to check the creditworthiness of debtors. Ratings published by credit rating agencies are considered important sources of information, in particular for the purpose of assessing the credit risk of large companies and banks. If banks intend to set credit limits, the assessment of creditworthiness presented by credit rating agencies is taken into consideration. These ratings are also referred to in the process of estimating capital requirements for credit risk using the standard method. Investors take credit ratings into account to examine the quality of investments. They have an impact on decisions regarding the buying or selling of stocks, bonds, investing into the currency market or CDS. Pursuant to certain American regulations, investment funds can allocate their capital only to securities with investment grades.

Thus far, researchers have examined stock price fluctuations following changes in credit ratings. The impact of credit ratings on the bond market has been investigated, yet analyses have either focused on particular credit rating agencies, or failed to acknowledge any political and economic differences between countries. Studies have been based on a small number of observations, or limited to a specific group of countries. Due to these limitations, research findings have failed to expound the phenomenon. The aim of the paper is to examine the impact of credit rating changes of individual countries on bond yields, taking into account their level of economic development. Two hypotheses have been formulated: Bond yields react more strongly to credit rating changes in developed economies. The impact is greatest in the case of credit rating downgrades, both in developed and developing economies.

2. Literature review

The majority of studies focus on examining the impact of credit ratings changes on stock prices. Such analyses have been performed in particular with regard to the financial instruments of companies. Among the most cited studies exploring the impact of credit rating changes on treasury bonds, the earliest is the work of Cantor and Packer (1996). The impact of credit rating changes on the above-mentioned instruments has been researched by numerous scholars; the summary of the literature review is presented in Table 1.

Event study methodology has been applied to the majority of analyzed cases. Authors of previous studies have suggested statistically significant impact of credit rating downgrades. Reactions tend to be stronger in the case of downgrades compared to upgrades (Larrain et al., 1997; Reisen, von

Maltzan, 1999; Hill, Faff, 2010). Some scholars examined the impact of credit rating changes also on financial instruments other than bonds (Brooks et al., 2004 – the stock market and the exchange rate of the country’s currency versus the US dollar; Hooper et al., 2008 – the stock market). ‘Cross-border spillover effect’ within a region has also been subject to analysis. De Santis (2012) analyses this phenomenon in the PIGS countries. In his opinion, the downgrade of Greek treasury bonds had a strong impact on the crisis of the other countries’ treasury bonds and on their CDS spreads. An analysis of the phenomenon in the context of other financial instruments was performed by Baum et al. (2013), and by Kaminsky and Schmukler (1999). Their results cannot be compared, as only some of them take into account the financial crisis. Analyses have been performed with regard to different countries and several credit rating agencies. For example, the impact on emerging markets (e.g., Kaminsky, Schmukler, 2002; Ismailescu, Kazemi, 2010) or developed economies (Gande, Parsley, 2005) has been examined.

Authors	Findings
Hand, Holthausen, Leftwich (1992)	1977–82/1981–83, Moody’s, S&P, 1,100 credit ratings changes and 250 Credit Watch S&P, changes in the event window of stock prices and bonds; statistically significant negative abnormal returns on stock prices and bonds in the case of decrease of credit ratings and unexpected additional changes as a result of S&P’s Credit Watch changes; abnormal rates of return in the case of credit rating increase has not been observed
Katz (1974)	1966–72, S&P, 115 treasury bonds, changes of monthly profitability, event window (-12;5), absence of any significant relationship, abnormal rates of return during 6-10 weeks following credit rating downgrade.
Grier, Katz (1976)	1966–72, S&P, 96 treasury and commercial bonds, monthly rates of return, event window (-4;3), insignificant impact of credit rating changes on commercial bond yields; stronger significant impact in the case of credit rating decreases.
Hettenhouse, Sartoris (1976)	1963–73, S&P, Moody’s, 46 treasury bonds, monthly yields, event window (-6;6), small impact prior to a decrease, absence of reaction in the case of rating upgrades.
Weinstein (1977)	1962-74, Moody, 412 corporate and treasury bonds, abnormal monthly rates of return, event window (-6;7), significant early impact, no yet abnormal rates of return during 6 months prior to the event have been observed; absence of reaction following the publication of information about credit rating changes.
Wansley, Glascock, Claurette (1992)	1982–84, S&P, 351 bonds, abnormal weekly rates of return, event window (-12;12), statistically significant impact of credit rating decrease during a week, absence of reaction in the case of rating upgrades.
Cantor, Parker (1996)	Statistically significant credit rating increase.

Authors	Findings
Larrain, et al. (1997)	1988–95, S&P, 26 countries, event window (-40;40), statistically significant reaction in the case of credit rating downgrades.
Hite, Warga (1997)	1985-95, S&P, Moody's, 1,200 credit ratings changes, abnormal monthly rates of return, event window (-12;12), statistically significant impact of credit rating decrease during 6 months prior to the event.
Reisen, von Maltzan (1999)	1989–97, 29 countries, 152 credit ratings, impact of credit ratings changes on treasury bond yields compared to their benchmark; statistically significant impact of credit rating decreases, particularly in the case of speculative notes.
Kraussl (2000)	1990, VAR model, impact of credit rating changes on treasury bond yields, unexpected credit ratings changes do not trigger immediate changes to treasury bond yields in developing countries.
Steiner, Heinke (2001)	1985-96, S&P, Moody's, 546 credit ratings, 182 watch lists, abnormal daily rates of return, event window (-180; 180), statistically significant impact of credit rating decreases during 90 days prior to a decrease, also in the case of watch list changes; reaction following the publication of information.
Baum, Karpava, Schafer (2013)	2011–2012, S&P, Moody's, Fitch, credit watches, outlooks and credit rating changes; GARCH, 17 European countries; statistically significant reactions to credit ratings changes in France, Italy, Germany and Spain. French, Italian and Spanish credit rating yields increased, while German bond yields decreased.
Gantenbein, Harasta (2012)	Abnormal rates of return following the publication of information about watch lists and negative credit watches in the case of bonds and CDS; no reaction of the stock market, changes following publication.
Kim, Wu (2008)	Long-term credit rating increases have a statistically significant impact on the development of the financial market in emerging economies.
Hooper, Hume, Kim (2008)	1995–2003, 42 countries, rating upgrades have a statically significant impact on currency appreciation, stronger reaction observed following rating downgrades.
Böninghausen, Zabel (2015)	1994–2011, 73 developed and emerging countries, S&P, Moody's, Fitch, daily sovereign; differentiated reaction; strong evidence of negative spill-over effects in response to downgrades, positive spill-overs following upgrades are much more limited at best; negative spill-over effects are more pronounced in countries within a region.

Tab. 1. Literature review regarding the impact of credit rating changes on bond yields. Source: own study.

To the best of the author's knowledge, the impact of economic development differences has not been accounted for in previous analyses through taking into account the three largest credit rating agencies. In the majority of cases, only a number of agencies have been subject to analysis. The following hypotheses have been formulated: Bond yields react more strongly

to credit rating changes in developed economies. The impact is greatest in the case of credit rating downgrades, both in developed and developing economies.

3. Research methodology

The aim of the paper is to examine the impact of credit rating changes of a country on bond yields, taking into account this country's level of economic development. Thomson Reuters' Database was the source of data for the analysis. Daily rates of return of 5-year bond yields in a foreign currency are a dependent variable in the analysis in which bonds denominated in US dollars have been examined. Long-term foreign sovereign issuer credit rating changes of three major credit rating agencies, i.e. Fitch, S&P, Moody's are the independent variable.

The choice of agencies has been dictated exclusively by their market share: in Europe, these agencies account for 90% of the financial market. The analysis was carried out using the event study methodology and data from 1980–2016 relating to 225 countries.

The sample was divided into subsamples pursuant to the following criteria: type of credit rating agency, credit rating change, and economic development level. Countries whose credit ratings had changed at least twice in the analyzed period were taken into account. Countries were organized into groups depending on their level of economic development pursuant to the World Bank's classification.

The analysis was carried out using event study methods; the main objective was to investigate the reaction of bond yields in particular countries to credit rating changes within short periods of time. The author looked for any abnormal return attributable to the studied event by adjusting for returns that stems from price fluctuations on the market as a whole.

Research focused on three periods of times and cumulative rates of return were taken into account. It is important to note that short-horizon event studies are more reliable than long-horizon event studies, which are burdened with many limitations. The analysis relies on the evaluation of the event window prior to the analysed event. The method requires the estimation of normal stock returns of the affected companies on the day of event, as well as several days prior to and following the event (pre-event window and post-event window respectively). The 'normal return' is compared to the 'actual return' in order to discern any 'abnormal return' that could be attributed to the event. First, any abnormal rates of return observed during the pre-event window were analysed. This window encompasses abnormal changes in rates of return in the period from 21 to 2 days prior to the event. The event period consists of five days: it begins one day before the event and ends on the third day following the event. This time is necessary to fully 'absorb' the news, as many credit rating changes are

unprecedented. The post-event window is the period of 20 days following the event. Event study methodology requires the aggregation of abnormal differences in variables within each event window in order to construct cumulative abnormal differences (CAD); it is assumed that no other factors affect the data during that period. The analysis focused on bond yield rates.

Economic development classification	Countries
High-income economies	Andorra, Antigua and Barbuda, Aruba, Australia, Austria, Bahamas, Bahrain, Barbados, Belgium, Bermuda, British Virgin Islands, Brunei Darussalam, Canada, Cayman Islands, Channel Islands, Chile, Croatia, Curacao, Cyprus, Czech Republic, Denmark, Estonia, Faroe Islands, Finland, France, French Polynesia, Germany, Gibraltar, Greece, Greenland, Guam, Hong Kong, Hungary, Iceland, Ireland, Isle of Man, Israel, Italy, Japan, Korea, Kuwait, Latvia, Liechtenstein, Lithuania, Luxembourg, Macao, Malta, Monaco, Nauru, Netherlands, New Caledonia, New Zealand, Northern Mariana Islands, Norway, Oman, Poland, Portugal, Puerto Rico, Qatar, San Marino, Saudi Arabia, Seychelles, Singapore, Sint Maarten, Slovak Republic, Slovenia, Spain, St. Kitts and Nevis, St. Martin, Sweden, Switzerland, Taiwan, Trinidad and Tobago, Turks and Caicos Islands, United Arab Emirates, United Kingdom, United States, Uruguay, Virgin Islands.
Middle-income economies	Albania, Algeria, American Samoa, Angola, Argentina, Armenia, Azerbaijan, Bangladesh, Belarus, Belize, Bhutan, Bolivia, Bosnia and Herzegovina, Botswana, Brazil, Bulgaria, Cabo Verde, Cambodia, Cameroon, China, Colombia, Congo, Costa Rica, Cote d'Ivoire, Cuba, Djibouti, Dominica, Dominican Republic, Ecuador, Egypt, El Salvador, Equatorial Guinea, Fiji, Gabon, Georgia, Ghana, Grenada, Guatemala, Guyana, Honduras, India, Indonesia, Iran, Iraq, Jamaica, Jordan, Kazakhstan, Kenya, Kiribati, Kosovo, Kyrgyz Republic, Lao PDR, Lebanon, Lesotho, Libya, Macedonia, Malaysia, Maldives, Marshall Islands, Mauritania, Mauritius, Mexico, Micronesia, Moldova, Mongolia, Montenegro, Morocco, Myanmar, Namibia, Nicaragua, Nigeria, Pakistan, Palau, Panama, Papua New Guinea, Paraguay, Peru, Philippines, Romania, Russian Federation, Samoa, Sao Tome and Principe, Serbia, Solomon Islands, South Africa, Sri Lanka, St. Lucia, St. Vincent and the Grenadines, Sudan, Suriname, Swaziland, Syrian Arab Republic, Tajikistan, Thailand, Timor-Leste, Tonga, Tunisia, Turkey, Turkmenistan, Tuvalu, Ukraine, Uzbekistan, Vanuatu, Venezuela, Vietnam, West Bank and Gaza, Yemen, Zambia
Low-income economies	Afghanistan, Benin, Burkina Faso, Burundi, Central African Republic, Chad, Comoros, Dem. Rep. Congo, Eritrea, Ethiopia, Gambia, Guinea, Guinea-Bissau, Haiti, Dem. People's Rep. Korea, Liberia, Madagascar, Malawi, Mali, Mozambique, Nepal, Niger, Rwanda, Senegal, Sierra Leone, Somalia, South Sudan, Tanzania, Togo, Uganda

Tab. 2. Classification of countries based on their level of economic development. Source: World Bank.

In each subsample, upgrades and downgrades of credit ratings were tested separately. The actual impact of credit rating changes was examined using the Student's t-test. A small number of observations may undermine the validity of statistical tests, suggesting the need to consider both economic and statistical significance of results.

Given the qualitative nature of credit ratings, the division of credit rating agencies was linear and performed using methods proposed by Ferri, Liu and Stiglitz (1999). The results of the decomposition are presented in the table below. The non-linear method did not influence results, as only directions of change – classified as upgrades and downgrades – were taken into account.

Moody's Long-term Issuer Rating (Foreign)		S&P Long-term Issuer Rating (Foreign)		Fitch Long-term Issuer Rating	
Rating	Code	Rating	Code	Rating	Code
Aaa	100	AAA	100	AAA	100
Aa1	95	AA+	95	AA+	94.74
Aa2	90	AA	90	AA	89.47
Aa3	85	AA-	85	AA-	84.21
A1	80	A+	80	A+	78.95
A2	75	A	75	A	73.68
A3	70	A-	70	A-	68.42
Baa1	65	BBB+	65	BBB+	63.16
Baa2	60	BBB	60	BBB	57.89
Baa3	55	BBB-	55	BBB-	52.63
Ba1	50	BB+	50	BB+	47.37
Ba2	45	BB	45	BB	42.11
Ba3	40	BB-	40	BB-	36.84
B1	35	B+	35	B+	31.58
B2	30	B	30	B	26.32
B3	25	B-	25	B-	21.05
Caa1	20	CCC+	20	CCC	15.79
Caa2	15	CCC	15	CC	10.53
Caa3	10	CCC-	10	C	5.26
Ca	5	CC	5	RD	-5
C	0	NR	0	D	-5
WR	-5	SD	-5	WD	-5
NULL	0	NULL	0	NR	0
		D	-5		
		C	0		
		R	0		

Tab. 3. Linear division of long-term issuer credit ratings of Fitch, S&P and Moody's. Source: own study.

4. Research findings

The analysis of the impact of credit rating changes of individual countries on bond yields, taking into account their level of economic development, involved the examination of the relationship and the direction of change. Estimates are presented in Table 4. Credit ratings have been collected for 225 countries, yet only 62 of them issue treasury bonds. They are classified as high-income and middle-income economies. Consequently, research findings presented below are limited to these countries.

Direction	upgrade	downgrade
pre-event window		
_cons	-0.0393	3.659***
	(-0.09)	-5.29
N	201	216
event window		
_cons	-0.164	1.541***
	(-1.25)	-4.15
N	201	216
post-event window		
_cons	-0.481	3.912***
	(-1.43)	-3.96
N	201	216

N – number of observations, not the number of countries.

*, **, *** – denote significance at 10%, 5% and 1% respectively.

Table 4. Impact of credit rating changes on treasury bond yield spreads. Source: own calculations.

Research results confirm the earlier opinion that a significant impact of credit rating changes on treasury bonds is only observed in the case of a downgrade. An upgrade – without taking into account the type of credit rating agency and the level of economic development – is statistically unimportant. It suggests that investors are attentive to rating downgrades, fearing the loss of the invested capital. Consequently, in the subsequent part of the research, bond yields changes were examined; the type of agency publishing information was also taken into account. Estimates are presented in Table 5.

Direction	upgrade	downgrade	upgrade	downgrade	upgrade	downgrade
Agency	Fitch		Moody's		S&P	
pre-event window						
_cons	-0.943*	0.884*	-0.624	3.868**	0.666	4.625***
	(-1.84)	-1.68	(-1.42)	-2.93	-0.86	-4.25
N	32	41	70	73	99	102
event window						
_cons	-0.291	0.144	-0.196	1.409*	-0.101	2.196***
	(-1.45)	-0.83	(-1.06)	-1.78	(-0.45)	-4.11
N	32	41	70	73	99	102
post-event window						
_cons	-1.017**	0.144	-0.266	4.568**	-0.46	4.957**
	(-2.43)	-0.41	(-0.58)	-2.29	(-0.78)	-3.29
N	32	41	70	73	99	102

N – number of observations, not the number of countries.

*, **, *** – denote significance at 10%, 5% and 1% respectively.

Table 5. Impact of credit rating changes on treasury bond yield spreads, taking into account the type of credit rating agency. Source: own calculations.

Results are different when the type of credit rating is taken into account. Downgrades trigger an increase of bond yield spreads. The strongest reaction was observed in S&P's ratings, which can be explained by this agency's market share. In the case of Fitch's ratings, significant reactions were observed prior to the publication of information about change. In the case of remaining agencies, significant impact was observed throughout the period of analysis. The reaction of bond yield spreads is greatest following the publication of information about credit rating changes. Daily changes as a result of publication were similar throughout the period of analysis. Bond yield spreads seemed sensitive to rating upgrades only in the case of Fitch's ratings. Statistically significant reactions were observed in pre- and post-event windows. Rating upgrades lead to lower treasury bond yield spreads. Strongest reactions were observed in the post-event window. This can be explained by the fact that investors rely on positive information after it is published. They do not want to make decisions before an upgrade of ratings, as they are not sure of the changes. In the case of downgrades, they wish to withdraw from investments or receive an additional risk premium.

The following stage of the analysis involved the examination of the impact of credit rating changes on treasury bond yield spreads, taking into account the level of economic development. Results are presented in Table 6.

Direction	upgrade	downgrade	upgrade	downgrade
Economic development	High-income		Middle-income	
pre-event window				
_cons	-0.0595	4.314***	-0.0201	2.319*
	(-0.08)	-5.22	(-0.04)	-1.83
<i>N</i>	98	149	103	66
event window				
_cons	-0.289	1.825***	-0.0455	0.961*
	(-1.50)	-3.79	(-0.25)	-1.79
<i>N</i>	98	149	103	66
post-event window				
_cons	-0.823	4.694***	-0.156	2.293*
	(-1.60)	-3.61	(-0.35)	-1.73
<i>N</i>	98	149	103	66

N – number of observations, not the number of countries.

*, **, *** – denote significance at 10%, 5% and 1% respectively.

Table 6. Impact of credit rating changes on treasury bond yield spreads taking into account the level of economic development. Source: own calculations.

Research findings suggest that credit rating changes strongly impact bond yield spreads in high-income countries. This correlation may indicate that investors tend to take such publications into account in particular when investing in developed economies. An insufficient number of observations prevents us from analysing the situation in lower-income countries (in this group, only Uganda issues treasury bonds). Rating upgrades are not significant.

In the last phase of the research, the impact of credit rating changes was examined through taking into account both the level of economic development and the type of credit rating agency. Estimates are presented in Tables 7 and 8. Among high-income countries, reactions of the above-mentioned financial instrument vary. Upgrades seem significant if information about changes is published by Moody's. This correlation has not been observed in the case of the remaining agencies. An upgrade of rating evidently causes

a reduction of treasury bond yield spreads. In the case of downgrades, the moment of reaction varies. A significant reaction in the case of Fitch's rating has been observed prior to publication. Changes in Moody's ratings are important in the pre- and post-event window. The significance of the mentioned changes during the entire period has been observed in the case of S&P's ratings. Treasury bond yield spreads seem most sensitive to credit rating changes when they are announced by S&P. As mentioned above, this can be accounted for by the agency's market share.

Direction	upgrade	downgrade	upgrade	downgrade	upgrade	downgrade
Agency	Fitch		Moody's		S&P	
Economic development	high-income					
pre-event window						
_cons	-0.232	1.164***	-1.363***	5.417**	0.685	4.823***
	(-0.35)	-2.69	(-2.65)	-3.43	-0.55	-3.65
N	17	29	28	51	53	69
event window						
_cons	-0.0382	0.165	-0.553***	1.829	-0.23	2.519***
	(-0.15)	-1.1	(-2.59)	-1.83	(-0.70)	-3.48
N	17	29	28	51	53	69
post-event window						
_cons	-0.602	0.24	-0.904*	5.218**	-0.851	6.179**
	(-1.12)	-0.68	(-1.76)	-2.11	(-0.95)	-2.93
N	17	29	28	51	53	69

N – number of observations, not the number of countries.

*, **, *** – denote significance at 10%, 5% and 1% respectively.

Table 7. Impact of credit ratings changes on treasury bond yield spreads in high income countries, taking into account the type of credit rating agency. Source: own calculations.

In the case of middle-income economies, statistically significant impact of credit rating changes presented by Moody has not been observed. In the case of Fitch's ratings, bonds yield spreads react statistically significantly to upgrades of notes in the pre- and post-event window. Downgrades seem unimportant. The opposite reaction has been noted in the case of S&P's ratings. Bonds' reaction to changes, in particular prior to publication, is statistically significant. This suggests that investors taking decisions regar-

ding investment in middle-income economies rarely pay attention to credit rating changes. They are interested in additional profits and, consequently, they take notes into consideration. In the event of a decrease of notes, they react before the official publication, as they fear loss in the capital market.

Direction	upgrade	downgrade	upgrade	downgrade	upgrade	downgrade
Agency	Fitch		Moody's		S&P	
Economic development	middle income					
pre-event window						
_cons	-1.749*	0.206	-0.131	0.279	0.645	4.515*
	(-2.31)	-0.14	(-0.21)	-0.12	-0.76	-2.27
N	15	12	42	22	46	32
event window						
_cons	-0.577	0.0916	0.0416	0.436	0.0485	1.648*
	(-1.87)	-0.19	-0.15	-0.35	-0.16	-2.46
N	15	12	42	22	46	32
post-event window						
_cons	-1.487*	-0.0887	0.159	3.062	-0.0104	2.657
	(-2.29)	(-0.10)	-0.23	-0.91	(-0.01)	-1.81
N	15	12	42	22	46	32

N – number of observations, not the number of countries.

*, **, *** – denote significance at 10%, 5% and 1% respectively.

Table 8. Impact of credit ratings changes on the treasury bond yield spreads for middle income countries, taking into account the type of credit rating agency. Source: own calculations.

5. Conclusions

The aim of the paper is to examine the impact of credit rating changes of a country on bonds yield spreads, taking into account this country's level of economic development. Bond yields react more strongly to credit rating changes of developed economies. This correlation can be accounted for with two facts: firstly, treasury bonds are issued mostly by developed countries; secondly, the type of investors is of the essence. In the US money market, funds are expected to invest in well-known and recognizable securities with an investment grade rating. This also applies to debt security funds. Banks

have adopted a similar policy. As a result, changes in ratings of more developed countries – which tend to have higher investment ratings – can trigger a stronger reaction of bond yields. The second hypothesis – credit rating downgrades have the strongest impact in both developed and developing economies – has also been examined. Research results suggest that ratings published by S&P trigger the strongest reaction to credit ratings changes. It can be explained by the agency's market share and its renown. Investors tend to be more interested in these ratings, as this CRA tends to publish ratings for more developed countries, as well as those with a stable economic position. Furthermore, investors pay more attention to downgrades: consequently, a statistically significant impact of these changes has been observed. A greater risk aversion of investors has been noted, in particular in middle-income economies; consequently, they react prior to the publication of information about changes. In developing economies, upgrades seem to have a significant impact, as they induce investors to consider additional profits. Research results have proven helpful for the process of taking investment decisions. They may also be of use to issuers when they choose a credit rating agency.

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