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Countries' Credit Ratings and Exchange Rates – The Impact of Economic Development

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Abstract

The aim of this paper is to verify the impact of countries' credit rating changes on the rates of return of exchange rates, taking into account the level of economic development. A literature review has been made, as a result of which the following hypothesis is proposed: Exchange rates have stronger reaction to the countries' credit rating changes in developed economies. The strongest impact of the credit rating changes is observed for a downgrade, both in developed and developing economies. In order to prepare the analysis daily data from the Thomson Reuters Database from 1980 to 2015 for 225 countries have been collected by using event study methodology. Daily differences between the logarithmized rates of return of exchange rates are taken into consideration as a dependent variable, and long-term issuer credit rating changes proposed by smaller and larger credit rating agencies are treated as independent variables.

Keywords: credit rating, rates of return, economy development, exchange rates.

JEL Classification Codes: G14, G15, G21

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Introduction

Credit rating agencies and their decisions influence significantly the financial market. The changes of the mentioned notes have significant influence on the prices of securities, for example, stocks or bonds. As a result,it is important to analyse the impact of the credit rating changes on the financial market. Most of the analysis concern the stock market. A strong impact of the mentioned changes on the abnormal stock returns has been observed. The strongest impact has been observed for the downgrade of them. Previous literature review suggests that a different reaction of banks' and productive companies' stock prices can be observed. In the case of banks' notes both the downgrades and upgrades influence significantly the abnormal stock returns (Chodnicka – Jaworska, 2016).

The presented findings evoke the following research question: how countries' credit rating changes influence exchange rates. As a result, the aim of the paper is to verify the impact of countries' credit rating changes on the rates of return of exchange rates, taking into account the level of economic development. The following hypotheses have been put: Exchange rates have stronger reaction to countries' credit rating changes in developed economies. The strongest impact of the credit rating changes is observed for a downgrade, both in developed and developing economies. The mentioned hypotheses have been verified by using event study methodology. The analysis has been prepared based on daily data collected from the Thomson Reuters Database from the years 1980 to 2015 given for all the countries rated by both smaller and larger CRAs. To the Author's best knowledge, the mentioned researches have not been presented before.

The paper is organized as follows: Section 2 presents the literature review of the impact of credit rating changes on currency rates. Section 3 contains the methodology and data description. Next results concerning the impact of credit rating changes on exchange rates have been presented. The last part concludes the findings.

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Literature Review

The previous studies relate mainly to the impact of credit rating on the fluctuations in stocks, bonds or CDS spreads and interest rates. There is a lack of researches about the impact of changes of credit ratings on exchange rates. In the Author's opinion particular countries or groups of countries can characterize asimilar business cycle, as a result of which exchange rates in those countries can react in the same way. Consequently, the following hypotheses have been put: Exchange rates have stronger reaction to countries' credit rating changes in developed economies. The strongest impact of credit rating changes is observed for a downgrade, both in developed and developing economies. Most of the analysis concerns acomparison of the behaviour of the currency market to other instruments. In **Table 1** a literature review has been presented.

Table 1. Literature Review

Authors	Findings
Brooks Faff, Hillier, Hillier (2004)	shares and exchange rates; credit ratings downgrade adversely affects the rate of return on the stock market, and the national exchange rate per USD depreciates
Kraussl (2005)	exchange rates, interest rates, share prices; rates of return reduction as an effect of downgrades of credit ratings; credit ratings changes increase market speculation expressed in nominal changes in exchange rates, daily interest rates prices; improving credit ratings or announcements has not effecton rates of return or has got a limited influence.
Kim, Wu (2008)	exchange rates, stock prices, bonds; the upgrade of long-term issuer credit ratings influence the financial markets in developing countries.

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Hooper, Hume, Kim (2008)	exchange rates, stock prices, bonds; 1995-2003, 42 countries, credit ratings upgrades significantly influence currency appreciation; stronger reaction as an effect of credit ratings downgrades.
Wu, Treepongkaruna (2008)	exchange rates, stock market; The impact of credit ratings changes on the stock market volatility and exchange rates in the Asian market; stronger reaction to the currency market.
Alsakkaa, Gwilym (2011)	exchange rates; 1994-2010, Fitch, Moody, S&P, the impact of credit ratings changes on both appreciation and depreciation of the currency; markets react to Fitch credit rating changes exactly at the time of publication; downgrades of S&P notes have stronger influence on the financial markets. The impact of political divisions and geographical conditions.
Brooks Faff, Treepongkaruna, Wu (2015)	exchange rates, stock prices; 1996 - 2010, 76 countries, the stock market and foreign exchange react differently to credit ratings changes; the stock market is more sensitive.
Baum Karpava, Schafer (2014)	bonds, exchange rates; 2011 - 2012, S&P, Moody, Fitch, credit rating and announcements changes; GARCH, exchange rates from 17 European countries; French, Italian, German, Spanish bonds; credit ratings downgrades have a negative impact on the exchange rate and increase its volatility; notes downgrades increase the yields of French, Italian and Spanish bonds, and decrease the German ones.
Asonuma (2016)	credit rating changes influence the currency depreciation

Source: own elaboration.

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Previous studies indicate the impact of countries' credit ratings changes on the real exchange rates (Bissoondoyal-Bheenick, 2005; Chodnicka-Jaworska, 2015). As a result, it can create a spiral phenomenon between these variables. According to the previous researches and analyses of the methodologies presented by CRAs, currency depreciation lowers countries' credit ratings. Alower credit rating causes deepening of the phenomenon of depreciation. As a result, the currency market crises influence notes, which deepens the crisis and causes contagion effects on financial institutions (Reinhard, 2002; Gadanecz, Miyajima, Shu, 2014). El-Shagi (2010) uses exchange rates in addition to stock indexes as the primary indicator of the crisis by analysing a case study on five Asian countries mostly hit by the Asian financial crisis. He found that exchange rates changes usually precede credit rating downgrades. On the other hand, he points out that there is no empirical evidence that the changes do not contribute significantly to the acceleration of the Asian financial crisis. However, credit ratings may generate short-term currency fluctuations.

What could pose an important research problem is the impact of credit ratings changes from the investment in speculative notes and vice versa. A stronger influence is observed in the case of the stock market for the credit ratings downgrades than upgrades. In this situation, after the literature review the following hypotheses have been put: The exchange rates have stronger reaction to the countries' credit rating changes in developed economies. The strongest impact of the credit rating changes is observed for a downgrade, both in developed and developing economies.

In the next section the methodology and data description taken into consideration during the verification of the mentioned hypothesis are presented.

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Methodology

The aim of the paper is to verify the influence of countries' credit ratings changes on the rates of return of exchange rates, taking into account the level of the economic development. The verification of the mentioned goal has been made on daily data from Thomson Reuters Database from 1980 to 2015 for 225 countries. Long-term issuer credit ratings published by both smaller and bigger CRAs[3] are treated as observed variables. The larger credit rating agencies include Fitch, Moody and S&P. The remaining ones are classified as the smaller ones. Daily differences between the logarithmized rates of return of exchange rates are taken into consideration as a dependent variable.

The sample has been divided into subsamples according to the level of the economic development proposed by the World Bank. The grouping of countries has been presented in **Table 2**.

Table 2. Country groups singled out according to financial development criterion.

The level of the economic development	**Country**
High Income OECD Members	Australia, Austria, Belgium, Canada, Switzerland, Czech Republic, Germany, Denmark, Spain, Estonia, Finland, France, United Kingdom, Greece, Hungary, Ireland, Iceland, Israel, Italy, Japan, Korea, Luxembourg, Netherlands, Norway, New Zealand, Poland, Portugal, Slovak Republic, Slovenia, Sweden, United States

[3]Dagong Long-term Issuer Credit Rating, Dominion Bond Rating Service (DBRS) - Long-term Issuer, Fitch Long-term Issuer Rating, JCR Long-term Issuer Rating, Moody's Long-term Issuer Rating, NRA Long-term Issuer International Scale Rating, R&I Long-term Issuer Rating, S&P Long-term Issuer Rating.

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High-Income Non-OECD Countries	Aruba, Andorra, United Arab Emirates, Bahrain, Bahamas, Bermuda, Barbados, Cyprus, Hong Kong, Croatia, Isle of Man, Kuwait, Macao, Monaco, Malta, Oman, Qatar, Saudi Arabia, Singapore, San Marino, Trinidad and Tobago
Upper Middle-Income Economies	Angola, Argentina, Azerbaijan, Bulgaria, Bosnia and Herzegovina, Belarus, Brazil, Botswana, Chile, China, Colombia, Costa Rica, Cuba, Dominican Republic, Ecuador, Gabon, Grenada, Iran, Jamaica, Jordan, Kazakhstan, Lebanon, Lithuania, Latvia, Mexico, Macedonia, Montenegro, Mauritius, Malaysia, Namibia, Panama, Peru, Romania, Russian Federation, Serbia, Suriname, Thailand, Tunisia, Turkey, Uruguay, St. Vincent and the Grenadines, Venezuela, South Africa
Lower Middle-Income Economies	Albania, Armenia, Belize, Bolivia, Cote d'Ivoire, Cameroon, Congo, Egypt, Fiji, Georgia, Ghana, Guatemala, Indonesia, India, Iraq, Sri Lanka, Morocco, Moldova, Mongolia, Nigeria, Nicaragua, Pakistan, Philippines, Papua New Guinea, Senegal, Solomon Islands, El Salvador, Ukraine, Vietnam.
Low-Income Economies	Benin, Burkina Faso, Bangladesh, Ethiopia, Kenya, Cambodia, Mali, Mozambique, Malawi, Rwanda, Uganda, Congo.

Source: own elaboration.

The analysis has been prepared by using event study methods, the goal of which is to verify the response of the rates of return of exchange rates on the countries' notes in the short-term period. The research has been performed for three periods of time by using cumulative rates of returns. The first period relies on the verification of abnormal rates during a pre-event window. This window consists of abnormal rates of return changes from 11 to 2 days before the event. The event

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period can last four days starting from one day before the event date and ending on the second day after it. Ten days after the event constitute the post-event window. The methodology of event study requires aggregation of abnormal differences in a variable within each event window to construct cumulative abnormal differences (CAD), taking an assumption that no other factors occurred in that time.

For each level of the economy subsamples upgrades and downgrades of credit rating assessments are tested separately. The significance of the impact of the mentioned credit rating changes is verified by using a Student's t-test. A small number of observations may weaken the power of statistical tests, suggesting the need to consider both the economic and statistical significance of results.

Findings

The aim of the paper is to analyse how credit ratings changes impact exchange rates. To verify the mentioned aim an analysis according to the direction of the change has been prepared. The results have been presented in **Table 3**. The upgrade of notes influences insignificantly the rates of return of the exchange rates. In the case of a downgrade, exchange rates statistically react significantly before the moment of publication of information about the change of credit ratings. Depreciation of currency rates of return of 0.2 p.p. has been observed. Another situation has been noticed for differences between rates of return. They are sensitive to upgrades. The reaction of the currency market has been stated during the moment of publication. An increase of credit ratings causes appreciation of notes. The difference between the rates of return is 139 p.p. lower. The differentiated results can stem from a large sample of the credit rating agencies and the level of the economic development. As a result, at first the relationship between the credit ratings changes and the type of agencies has been verified.

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Table 3. Impact of Credit Ratings Changes on The Rates of Return of Exchange Rates and Differences Between Rates of Return.

Variable	*Rates of Return*		*Differences between Rates of Return*	
	Upgrade	*Downgrade*	*Upgrade*	*Downgrade*
Pre-event Window				
_cons	-0,000202	0,00263*	0,0305	12,64
	(-0.32)	-1,77	-0,02	-1,59
N	667	765	667	765
Event Window				
_cons	-0,00012	0,0011	-1,39*	-6,088
	(-0.28)	-0,74	(-1.68)	(-0.81)
N	667	765	667	765
Post-event Window				
_cons	0,000773	-0,00203	0,731	-5,568
	-1,26	(-1.01)	-1,05	(-0.85)
N	667	765	667	765

Source: own calculations.

An analysis has been prepared for notes given by Dominion, Fitch, JCR, Moody, R&I and S&P. Different reactions of exchange rates on notes given by particular CRAs have been observed. The Dominion credit ratings influence the rates of return during the event window. During the mentioned period, in the case of an upgrade an appreciation of 0.6p.p. of the currency and a depreciation of 0.5 p.p. have been noticed during publication of the information about the decrease of notes. The reaction of the exchange rates has been weaker in the case of S&P notes (for upgrades of 0.15 p.p. and downgrades of 0.4 p.p.). The financial market reacts in this case before the moment of publication information about the credit ratings changes.

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Changes proposed by Moody are insignificant for the currency market. In some cases a sensitivity of exchange rates has been observed for downgrades of notes. The mentioned situation has been presented for Fitch and JCR notes. The currency market reacts toa decrease of credit ratings before and during the moment of publication of the information. In both cases a depreciationon0.39 p.p of the currency has been noticed. Exchange rates are less sensitive to JCR notes. During the event window rates are lower by 1.2 p.p. and the post-event window by 1.7 p.p. respectively.

On the other hand, the rates of return of exchange rates are sensitive to credit ratings changes only for upgrades. The mentioned phenomenon has been observed only during the moment of publication about an increase of notes. The appreciation of the currency is on 0.36 p.p.

The presented findings suggest that the currency market is more sensitive both in the case of the upgrades and downgrades of notes. On the other hand, the reaction is not as strong as in the case of the stock market. The differences between the received results according to the type of credit rating agencies are also smaller. The mentioned situation can result from a few things. One of them can be the size of the economy that has been verified in **Tables 6** and **7**.

The analysis of the impact of the credit ratings changes on the exchange rates depending on the level of the economic development has been prepared in five subsamples: highly developed countries being members of the OCED, highly developed countries out of the OECD, upper developed economies, less developed economies and undeveloped countries. In the whole of the mentioned subsamples a reaction to the decrease of credit ratings has been observed, but the moment and strength of the reaction differs. In groups of high-income economies the currency market is sensitive to the mentioned changes before the moment of publication. A downgrade of notes causes a depreciation of the currency to 0.52 and 0.22 p.p.

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respectively for high-income OECD and high income non-OECD countries. In the case of the upper developed economies a statistically significant impact of the credit ratings changes on the currency market during the event window has been observed.A depreciation of exchange rates to 0.55 p.p. occurs. The strongest reaction has been noticed for the less developed economies. A depreciation of the currency has been higher by0.79 p.p. The less developed economies react during the event window (0.56 p.p.).

The prepared analysis suggests that the reaction of the currency market is faster in the developed economies than in the developing ones. On the other hand, the strength of the change of the rates of return of exchange rates increases with decreasing levels of economic development. It can be connected with investors' confidence.

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Table 4. Impact of Credit Ratings Changes on The Rates of Return of Exchange Rates According to The Type of Credit Rating Agency.

Agency	Dominion		Fitch		JCR		Moody		R&I		S&P	
u	U	D	U	D	U	D	U	D	U	D	U	D
Pre-event Window												
_cons	0,00092	0,00373	0,00169	0,00392*	0,00739	-0,0079	0,00075	-0,0022	-0,0005	0,00618	-0,0015*	0,00441*
	-0,17	-0,3	-0,92	-1,86	-1,3	(-0.98)	-0,56	(-0.69)	(-0.25)	-1,46	(-1.79)	-1,85
N	15	14	85	117	9	15	178	191	74	90	306	338
Event Window												
_cons	0.00636**	-0,005*	-1E-05	0.00392*	0,00019	0.0122**	-0,001	3,5E-05	0.00366**	0,00444	-0,0009	-0,0004
	-2,54	(-1.65)	(-0.01)	-1,99	-0,11	-2,49	(-1.26)	-0,01	-2,85	-0,9	(-1.30)	(-0.16)
N	15	14	85	117	9	15	178	191	74	90	306	338
Post-event Window												
_cons	0,00211	-0,0046	-0,0009	-0,0049	0,00024	0.0167**	0,00138	0,00206	-0,0006	-0,0033	0,00116	-0,0038
	-0,55	(-0.93)	(-0.39)	(-1.55)	-0,03	-2,31	-1,49	-0,39	(-0.30)	(-1.02)	-1,28	(-1.21)
N	15	14	85	117	9	15	178	191	74	90	306	338

Source: own calculations.

Table 5. Impact of Credit Ratings Changes on The Differences Between Rates of Return of Exchange Rates According to The Type of Credit Rating Agency.

Agency	Dominion		Fitch		JCR		Moody		R&I		S&P	
u	U	D	U	D	U	D	U	D	U	D	U	D
Pre-event Window												
_cons	0,0259	-0,0323	-2,576	-0,374	0,0288	-0,0162	1,985	-5,319	3,904	15,89	-1,319	27,52
	-0,84	(-0.62)	(-1.37)	(-0.77)	-0,53	(-0.03)	-0,69	(-0.98)	-1,11	-1,17	(-0.63)	-1,59
N	15	14	85	117	9	15	178	191	74	90	306	338
Event Window												
_cons	0,0677	-0,012	-0,971	1,127*	0,0351	0,608	-0,617	-2,369	-1,284	-6,218	-2,095*	-11,2
	-1,21	(-1.21)	(-0.74)	-1,97	-0,75	-1,24	(-0.32)	(-1.09)	(-0.59)	(-1.21)	(-1.65)	(-0.66)
N	15	14	85	117	9	15	178	191	74	90	306	338
Post-event Window												
_cons	0,0261	-0,0158	0,823	0,592	-0,104	0,567	0,38	-5,23	0,33	-5,248	1,066	-8,479
	-0,81	(-0.91)	-0,95	-0,76	(-0.48)	-1,23	-0,62	(-0.97)	-0,08	(-1.34)	-0,96	(-0.58)
N	15	14	85	117	9	15	178	191	74	90	306	338

Source: own calculations.

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Table 6. Impact of Credit Ratings Changes on The Rates of Return of Exchange Rates Depending on The Level of Development of The Economy.

Country Group	Highly Developed OECD		Highly Developed non-OECD		Upper		Lower		Undeveloped	
u	U	D	U	D	U	D	U	D	U	D
Pre-event Window										
_cons	0,00041	0,00521**	-8E-05	0,0022*	-5E-05	3,5E-05	-0,0016	0,00721	-0,0008	0,00364
	-0,28	-1,96	(-0.09)	(-1.81)	(-0.05)	-0,01	(-1.21)	-1,55	(-0.06)	-0,81
N	170	224	72	89	310	273	109	146	4	21
Event Window										
_cons	0,00044	-0,001	0,00042	-0,0006	-0,0006	0.00547**	-2E-05	-0,0033	-0,0061	0.00559**
	-0,49	(-0.37)	-0,57	(-0.82)	(-0.81)	-2,34	(-0.02)	(-0.66)	(-0.49)	-2,49
N	170	224	72	89	310	273	109	146	4	21
Post-event Window										
_cons	0,00114	0,00206	-0,0008	0,00034	0,00095	-0,0029	0,00097	0,0079*	0,00348	-0,0036
	-0,75	-0,69	(-0.68)	-0,28	-1	(-0.65)	-1,19	(-1.84)	-1,11	(-1.01)
N	170	224	72	89	310	273	109	146	4	21

Source: own calculations.

Table 7. Impact of Credit Ratings Changes on The Differences Between Rates of Return of Exchange Rates Depending onThe Level of Development of The Economy.

CountryGroup	Highly Developed OECD		Highly Developed non-OECD		Upper		Lower		Undeveloped	
u	U	D	U	D	U	D	U	D	U	D
Pre-event Window										
_cons	-0,137	2,879*	0,00063	-0,0072*	-0,123	-3,83	0,503	69,28*	6,718	-1,98
	(-0.26)	-1,69	-0,14	(-1.82)	(-0.45)	(-1.01)	-0,06	-1,7	-0,92	(-1.61)
N	170	224	72	89	310	273	109	146	4	21
Event Window										
_cons	0,0935	1,655	0,0012	-0,0023	0,104	-1,334	-8,68*	-32,09	-7,339	1,064
	-0,2	-1,17	-0,87	(-1.33)	-0,31	(-0.88)	(-1.78)	(-0.82)	(-0.97)	-0,51
N	170	224	72	89	310	273	109	146	4	21
Post-event Window										
_cons	-0,196	0,396	-0,0008	0,00142	0,342	-3,902	3,8	-22,21	0,151	-1,95
	(-0.30)	-0,14	(-0.15)	-0,5	-0,87	(-1.03)	-0,95	(-0.66)	-1,52	(-1.05)
N	170	224	72	89	310	273	109	146	4	21

Source: own calculations.

Conclusions

The aim of this paper has been to verify the impact of countries' credit rating changes on the rates of return of exchange rates, taking into account the level of the economic development and the type of credit rating agencies. The following hypothesis has been put: Exchange rates show stronger reaction to countries' credit rating changes in developed economies. The strongest impact of credit rating changes is observed for a downgrade, both in developed and developing economies. The presented hypotheses have been verified by using the event study methodology. The received results suggest that the currency market is more

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sensitive both in the case of the upgrades and downgrades of notes, but the reaction is not as strong as in the case of the stock market. The differences between the received results depending on the type of credit rating agencies are also lower. The reaction of the currency market is faster in the developed economies than in the developing ones. On the other hand, the strength of change of the rates of return of the exchange rates increases with decreasing levels of economic development. It can be connected with investors' confidence.

The received results suggest that in the case of the currency market the size of the credit rating agency is unimportant, but the level of the economy division has got a significant impact. A weaker reaction of the currency market can be connected with the higher volatility of the currency market. The abnormal rates of return can also be connected with the information about the changes of watch lists and outlooks. Finally, the reaction of the exchange rates can be the confirmation of Fama's Theory.

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