



# Determinants of Sovereign Credit Rating in BRICS, G7 and NEXT11 Countries: A Comparative Analysis

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## Abstract

This paper tries to investigate the determinants of sovereign credit ratings from 2016 to 2020. This has been conducted using S&P, Fitch and Moody's ratings in 23 countries, including G7 (i.e. Canada, France, Germany, Italy, Japan, United Kingdom and United States), BRICS (i.e. Brazil, Russia, India, China, South Africa) and NEXT11 (i.e. Bangladesh, Egypt, Philippines, South Korea, Turkey, Vietnam, Indonesia, Iran, Mexico, Nigeria and Pakistan). Using panel analysis according to GMM technique, results reveal the importance of macroeconomic variables in explaining the sovereign credit rating, where GDP per Capita, GDP Growth, Economic Growth, External Debt, Unemployment Rate, Foreign Reserves and Inflation Rate seem to have significant effects on sovereign credit rating. In addition, robustness checks - using country types as control variables – have supported the significant effects of macroeconomic variables in explaining the sovereign credit rating, with explanation power ranged from 71.1% to 92.5%. Country type seems to have different effects, where including in G7 may have a negative effect on S&P rating, while including in BRICS may have a negative effect on Fitch rating. In addition, including in NEXT11 may have a positive effect on Moody's rating. This needs to be more elaborated using additional analysis for each country, where investors and policymakers may consider the potential changes in credit rating when taking investment decisions and reviewing market regulations.

**Keywords:** BRICS, Credit rating, Fitch, G7, Moody's, NEXT11, S&P

## 1. Introduction

A sovereign credit rating is considered as a proxy of any country's creditworthiness. This is why rating agencies have played a prominent role during the financial global crisis, where in practice, the downgrade periods tend to be shorter and deeper than upgrade periods. As with economic variables, we can call the evolution of a country's credit rating during consecutive

downgrade and upgrade periods a ‘rating cycle’. Thus, a complete ‘cycle’ encompasses the period in which the rating goes from peak to trough and from trough to peak.

Credit rating has been defined by scholars, regulatory bodies, and rating agencies from different perspectives. According to Gonis et al. (2012), credit rating provides an independent appraisal of an entity's capacity to service its debt obligation promptly. In addition, Colquitt (2007) asserted that credit rating acts as a road map in the management of credit risk by appraising the creditworthiness and estimating the probability of default of an entity according to rating categories. In addition, Kronwald (2009) has addressed credit rating as an indicator of credit risk due to its importance in predicting the default probability of the debtor.

The first credit rating was published by John Moody in 1909, which was on railroad bond ratings in the US (White 2010). This was followed by Poor's publishing company in 1916, standard statistics company in 1922 and Fitch publishing company in 1924. In 1941, Poor's publishing company and standard statistics company merged and became standard and poor (S&P). As of 2003, S&P, Fitch and Moody's were approved by National Recognized Statistical Ratings Organization (NRSRO) to assign credit rating (Host et al., 2012).

Standard & Poor's Financial Services (2014, p. 4), defined credit rating as a “forward-looking opinion about the creditworthiness of an obligor”. Likewise, Moody's (2006, p. 1) defined “credit ratings are opinions of the credit quality of individual obligations or an issuer's general creditworthiness”, while Fitch Ratings has asserted that credit ratings “provide an opinion on the relative ability of an entity to meet financial commitments, such as interest, preferred dividends, repayment of principal, insurance claims or counterparty obligations”. These views suggest that the CRAs' definitions of credit rating are opinions and/or estimations about a firm's likelihood of default (Osobajo & Akintunde, 2019, p.143)

This paper aims at investigating the determinants of Sovereign Credit Rating in BRICS, G7 and NEXT11 Countries. These specific country groups have been selected to represent three different categories of countries according to the level of economic growth, where BRICS and NEXT11 countries are emerging, while G7 countries are developed. So, this paper addresses 7 main questions about the determinants of sovereign credit ratings, as follows:

- 1- Does GDP per Capita seem to have a significant effect on sovereign credit rating?
- 2- Does GDP Growth seem to have a significant effect on sovereign credit rating?
- 3- Does Economic Growth seem to have a significant effect on sovereign credit rating?
- 4- Does External Debt seem to have a significant effect on sovereign credit rating?
- 5- Does Unemployment Rate seem to have a significant effect on sovereign credit rating?
- 6- Does Foreign Reserves seem to have a significant effect on sovereign credit rating?
- 7- Does Inflation Rate seem to have a significant effect on sovereign credit rating?

The paper is arranged as follows: after this introduction, section 2 reviews related research literature. Section 3 explains how to measure research variables and illustrates how to test the hypotheses. Section 4 is for empirical work, presenting results, discussing how these results answer research questions, while section 5 provides a robustness check. Section 6 summarizes the paper and provides remarks about conclusions.

## **2. Literature Review**

Sovereign Credit Rating (SCR) measures the risk associated with a country's probability of default. This can be analyzed from two perspectives: Firstly, the country's capacity to service its debt, which means its ability to meet its debt obligations as a result of the country's solvency. Secondly, the cost-benefit approach which evaluates the default of a country has a deliberate the unwillingness of the country to fulfill its commitments (Alexe, 2003). This argument is confirmed by Bissoondoyal-Bheenick (2005), Afonso et al. (2011), Montes et al. (2016) and Erdem & Varli (2014). These views and opinions of scholars suggest that sovereign credit rating measures the risk associated with a country and it also estimates the likelihood of default of such country.

Scholars have examined the determinants of SCR from a different viewpoint. From the perspective of those that argued that SCRs analysis should be restricted to only economic variables. Cantor & Packer (1996) has carried out the first investigation on the significance of macroeconomic variables on the SCRs, which were given by S&P and Moody's. This has been conducted on 49 countries in the year 1995. Results have supported the effects of six macroeconomic variables (i.e. GDP growth, default history, per capita income, economic development level, inflation, and external debt) on SCR. However, they did not find any systemic relationship between either external balance (current deficit) or fiscal balance and SCR. Besides, Rowland (2004) has used the same econometric framework as Cantor & Packer (1996) and has found that the growth rate of the economy, external debt ratios, GDP per capita, inflation rate, international reserves level, and debt service ratios are the essential macroeconomic factors that determine SCRs.

While Afonso (2003) investigates the determinants of SCRs for 81 countries using six major macroeconomic factors (GDP per capita, real growth rate, external debt to export ratio, level of economic development, default history, and inflation rate), while Archer et al. (2007) investigates these effects for 50 countries during 1987 and 2003 and indicates that economic variables such as inflation rate, default history, GDP growth rate, and commitment to trade are the major factors that affect sovereign ratings. In addition, Afonso et al. (2011) has argued that government effectiveness has a long-run impact on SCRs. Likewise, Biglaiser & Staats (2012) has investigated 36 countries from 1996 to 2006 and shows that political and institutional variables such as society's obedience to the rule of law, the protection of property rights, and the presence of a strong and independent judicial system play a crucial role in influencing and determining SCRs. Besides, Montes et al. (2016) has investigated the determinants of Credit Ratings for 40 countries from 1994 to 2013. Results indicate that Credit Ratings are affected by inflation rate, GDP growth rate, foreign reserves, per capita income, government budget balance, external debt and unemployment rate.

Regarding GDP per Capita, Cantor & Packer (1996) has indicated that GDP per capita has a positive significant effect on both Moody's and S&P's ratings. This is also supported by Afonso (2003), Rowland (2004), Alex (2003), Erdem & Varli (2014), Afonso et.al (2007) and Montes et al. (2016). In addition, Afonso et al. (2011) has argued that GDP per capita was significant and positive in all the three CRAs. Besides, Biglaiser and Staats (2012) has not supported any significant effects of GDP per capita on the CRAs ratings. Regarding GDP Growth, Cantor & Packer (1996) has used the rating assigned by Moody and S&P in 1995 and found positive significant effects of both CRAs. These findings have been supported by Rowland (2004) and Archer et al. (2007). Besides, this is consistent with Montes et al. (2016). However, Erdem & Varli (2014) has not supported these findings.

Regarding Economic Development Level, Cantor & Packer (1996) has stated that economic development has a positive significant effect on credit ratings. This is also consistent with

Afonso (2003) and Zheng (2012). Besides, Cantor & Packer (1996) has indicated that External Debt has a negative significant effect on sovereign credit ratings. This is also consistent with Afonso (2003), Rowland (2004), Archer et al. (2007), Biglaiser & Staats (2012) and Montes et al. (2016).

Regarding Unemployment Rate, Afonso et al. (2007) has indicated that unemployment rate has a negatively significant effect on Moody's rating, whereas, it has a positively significant effect on S&P's rating. This is consistent with Afonso et.al (2011) assertion. However, Erdem & Varli (2014) has not supported any significant effect of unemployment level on credit ratings. Regarding Foreign Reserves, Rowland (2004) has indicated that foreign reserves have a positive significant effect on the CRAs. This has been affirmed by Altenkirch (2005), Afonso (2007), Afonso et.al (2011), Erdem & Varli (2014) and Montes et al. (2016).

Regarding Inflation Rate, Cantor & Packer (1996) has indicated that inflation has a negative significant effect on credit rating, while Rowland (2004) has argued that inflation doesn't significantly affect Moody's ratings and a negatively significant effect on S&P ratings. However, Altenkirch (2005) has claimed that inflation seems to have negative and significant effect on Moody's ratings. In contrary to the previous findings, Biglaiser and Staats (2012) has stated that inflation has a positive impact on the rating.

Compared with related literature, this paper tries to investigate the determinants of sovereign credit ratings using S&P, Fitch and Moody's ratings, while some papers concern with one or two of these CRAs. In addition, this paper covers 23 countries, including G7, BRICS and NEXT11 countries, which – to our knowledge - has not been conducted yet.

It is important to pinpoint that conducting such a research on these three different categories of countries may support results' generalization. Of course, like the rest of the emerging countries, the BRICS have faced a severe crisis in the last decade. Besides, the NEXT11 emerging economies that are worthy of being considered as strong as the BRICS countries. In addition, the G7 stands for Group of 7. It is an intergovernmental organization of the 7 largest industrialized economies in the world.

### 3. Data Description and Hypotheses Developing

Table (1) illustrates the research variables, as follows:

*Table 1: The research variables*

| Variable               | Sign | Type        | Source                     |
|------------------------|------|-------------|----------------------------|
| Standard & Poor Rating | S&P  | Dependent   | Standard & Poor Statistics |
| Fitch Rating           | FIT  | Dependent   | Fitch Statistics           |
| Moody's Rating         | MOO  | Dependent   | Moody's Statistics         |
| GDP per Capita         | X1   | Independent | World Bank Database        |
| GDP Growth             | X2   | Independent | World Bank Database        |
| Economic Growth        | X3   | Independent | World Bank Database        |
| External Debt          | X4   | Independent | World Bank Database        |
| Unemployment Rate      | X5   | Independent | World Bank Database        |
| Foreign Reserves       | X6   | Independent | World Bank Database        |
| Inflation Rate         | X7   | Independent | World Bank Database        |

This paper tries to investigate the determinants of sovereign credit ratings from 2016 to 2020. This has been conducted using S&P, Fitch and Moody's ratings in 23 countries, including G7

(i.e. Canada, France, Germany, Italy, Japan, United Kingdom and United States), BRICS (i.e. Brazil, Russia, India, China, South Africa) and NEXT11 (i.e. Bangladesh, Egypt, Philippines, South Korea, Turkey, Vietnam, Indonesia, Iran, Mexico, Nigeria and Pakistan). Rating scale has been ranged from 1 (the highest probability of default) to 23 is (the lowest probability of default), as shown in table (2) as follows:

Table 2: Grades of Credit Rating according to S&P, Fitch and Moody's

| Score | S&P  | Fitch | Moody's | Meaning                                      |
|-------|------|-------|---------|----------------------------------------------|
| 23    | AAA  | AAA   | Aaa     | Prime                                        |
| 22    | AA+  | AA+   | Aa1     | High Grade                                   |
| 21    | AA   | AA    | Aa2     |                                              |
| 20    | AA-  | AA-   | Aa3     |                                              |
| 19    | A+   | A+    | A1      | Upper Medium Grade                           |
| 18    | A    | A     | A2      |                                              |
| 17    | A-   | A-    | A3      |                                              |
| 16    | BBB+ | BBB+  | Baa1    | Lower Medium Grade                           |
| 15    | BBB  | BBB   | Baa2    |                                              |
| 14    | BBB- | BBB-  | Baa3    |                                              |
| 13    | BB+  | BB+   | Ba1     | Non-Investment Grade Speculative             |
| 12    | BB   | BB    | Ba2     |                                              |
| 11    | BB-  | BB-   | Ba3     |                                              |
| 10    | B+   | B+    | B1      | Highly Speculative                           |
| 9     | B    | B     | B2      |                                              |
| 8     | B-   | B-    | B3      |                                              |
| 7     | CCC+ | CCC+  | Caa1    | Substantial Risks                            |
| 6     | CCC  | CCC   | Caa2    | Extremely Speculative                        |
| 5     | CCC- | CCC-  | Caa3    | In Default with little prospect for recovery |
| 4     | CC   | CC+   | Ca      |                                              |
| 3     | C    | CC    |         | In Default                                   |
| 2     |      | CC-   |         |                                              |
| 1     | D    | D     | D       |                                              |

Source: preparing by the researcher using the original grades of credit rating agencies

This paper tries to investigate the determinants of sovereign credit ratings. This has been conducted using S&P, Fitch and Moody's ratings in 23 countries" So, it aims at testing the following hypotheses:

- 1- There is a significant effect of GDP per Capita on sovereign credit rating.
- 2- There is a significant effect of GDP Growth on sovereign credit rating.
- 3- There is a significant effect of Economic Growth on sovereign credit rating.
- 4- There is a significant effect of External Debt on sovereign credit rating?
- 5- There is a significant effect of Unemployment Rate on sovereign credit rating.
- 6- There is a significant effect of Foreign Reserves on sovereign credit rating.
- 7- There is a significant effect of Inflation on sovereign credit rating.

#### 4. Descriptive Statistics and Testing Hypotheses

The following tables illustrate the descriptive statistics of the research variables, as follows:

*Table 3: Descriptive statistics of independent variables*

|                     | X1       | X2       | X3        | X4        | X5        | X6        | X7        |
|---------------------|----------|----------|-----------|-----------|-----------|-----------|-----------|
| <b>Mean</b>         | 20207.53 | 3132.698 | 2.982292  | 2.089583  | 8.804167  | 10.90625  | 1057.984  |
| <b>Median</b>       | 9986.000 | 1661.500 | 2.250000  | 2.550000  | 3.450000  | 4.850000  | 8.150000  |
| <b>Maximum</b>      | 65076.00 | 21428.00 | 13.40000  | 10.20000  | 102.0000  | 42.70000  | 37743.00  |
| <b>Minimum</b>      | 1426.000 | 191.0000 | -3.500000 | -13.90000 | -57.30000 | -10.20000 | -3.600000 |
| <b>Std. Dev.</b>    | 18147.64 | 4752.281 | 2.782728  | 4.282067  | 19.82375  | 13.22417  | 5874.167  |
| <b>Skewness</b>     | 0.656706 | 2.638487 | 0.628032  | -1.362652 | 2.109972  | 0.923062  | 5.469479  |
| <b>Kurtosis</b>     | 2.114265 | 9.036322 | 3.957769  | 6.245523  | 10.64744  | 2.851304  | 31.23645  |
| <b>Jarque-Bera</b>  | 10.03830 | 257.1345 | 9.980079  | 71.84281  | 305.1651  | 13.72115  | 3667.833  |
| <b>Probability</b>  | 0.006610 | 0.000000 | 0.006805  | 0.000000  | 0.000000  | 0.001048  | 0.000000  |
| <b>Sum</b>          | 1939923. | 300739.0 | 286.3000  | 200.6000  | 845.2000  | 1047.000  | 101566.5  |
| <b>Sum Sq. Dev.</b> | 3.13E+10 | 2.15E+09 | 735.6399  | 1741.930  | 37333.22  | 16613.48  | 3.28E+09  |
| <b>Observations</b> | 96       | 96       | 96        | 96        | 96        | 96        | 96        |

Source: Outputs of data processing using EViews 13

*Table 4: Correlation coefficients between independent variables*

|           | X1       | X2       | X3      | X4       | X5      | X6       | X7      |
|-----------|----------|----------|---------|----------|---------|----------|---------|
| <b>X1</b> | 1.00000  |          |         |          |         |          |         |
| <b>X2</b> | 0.53009  | 1.00000  |         |          |         |          |         |
| <b>X3</b> | -0.39965 | 0.02497  | 1.00000 |          |         |          |         |
| <b>X4</b> | -0.07094 | 0.12948  | 0.62920 | 1.00000  |         |          |         |
| <b>X5</b> | -0.28887 | -0.09183 | 0.42481 | 0.13507  | 1.00000 |          |         |
| <b>X6</b> | -0.32782 | -0.17842 | 0.43981 | 0.24710  | 0.06436 | 1.00000  |         |
| <b>X7</b> | -0.13478 | -0.09543 | 0.14619 | -0.16389 | 0.29685 | -0.03655 | 1.00000 |

Source: Outputs of data processing using EViews 13

Testing hypotheses has been conducted using GMM technique, where Z-moments are projected into the column space of instrumental variables. This technique minimizes variance and enhances parameter estimate precision by focusing on Z-moments and applying GLS techniques. The following tables illustrate the determinants of Credit Ratings, as follows:

Table 5: Determinants of S&P using Panel Regression according to GMM technique

| Variable           | Coefficient | Std. Error         | t-Statistic | Prob.    |
|--------------------|-------------|--------------------|-------------|----------|
| C(1)               | 9.097018    | 1.335352           | 6.812451    | 0.0000   |
| X1                 | 0.000232    | 2.33E-05           | 9.950586    | 0.0000   |
| X2                 | 0.000494    | 0.000146           | 3.379898    | 0.0028   |
| X3                 | 0.010476    | 0.318612           | 0.032879    | 0.9741   |
| X4                 | 0.124606    | 0.063109           | 1.974451    | 0.0616   |
| X5                 | 0.051160    | 0.029850           | 1.713946    | 0.1013   |
| X6                 | 0.115247    | 0.025719           | 4.481029    | 0.0002   |
| X7                 | 0.026097    | 0.021784           | 1.197958    | 0.2443   |
| R-squared          | 0.925267    | Mean dependent var |             | 13.88235 |
| Adjusted R-squared | 0.882562    | S.D. dependent var |             | 4.318843 |
| S.E. of regression | 1.480033    | Sum squared resid  |             | 46.00048 |
| Durbin-Watson stat | 1.280125    | J-statistic        |             | 1.68E-44 |

Source: Outputs of data processing using EViews 13

This means that S&P is affected by each of X1, X2, X4 and X6 at p-value of 0.10 and explanation power of 92.527%. This means that each of GDP per Capita, GDP Growth, External Debt and Foreign Reserves may have a significant effect on credit rating according to S&P.

Table 6: Determinants of FIT using Panel Regression according to GMM technique

| Variable           | Coefficient |  | Std. Error         | t-Statistic | Prob.    |
|--------------------|-------------|--|--------------------|-------------|----------|
| C(1)               | -7.654001   |  | 3.350234           | -2.284617   | 0.0298   |
| X1                 | 0.000681    |  | 0.000123           | 5.549184    | 0.0000   |
| X2                 | -0.001142   |  | 0.000248           | -4.602110   | 0.0001   |
| X3                 | 0.813840    |  | 1.045519           | 0.778408    | 0.4426   |
| X4                 | -0.324366   |  | 0.120815           | -2.684819   | 0.0119   |
| X5                 | -0.025576   |  | 0.014589           | -1.753160   | 0.0901   |
| X6                 | -0.003914   |  | 0.097295           | -0.040229   | 0.9682   |
| X7                 | 0.590135    |  | 0.244852           | 2.410173    | 0.0225   |
| R-squared          | 0.799956    |  | Mean dependent var |             | 6.404762 |
| Adjusted R-squared | 0.717179    |  | S.D. dependent var |             | 5.868725 |
| S.E. of regression | 3.121043    |  | Sum squared resid  |             | 282.4864 |
| Durbin-Watson stat | 0.851128    |  | J-statistic        |             | 1.23E-42 |

Source: Outputs of data processing using EViews 13

This means that FIT is affected by each of X1, X2, X4, X5 and X7 at p-value of 0.10 and explanation power of 79.996%. This means that each of GDP per Capita, GDP Growth, External Debt, Unemployment Rate and Inflation Rate may have a significant effect on credit rating according to FIT.

Table 7: Determinants of MOO using Panel Regression according to GMM technique

| Variable           | Coefficient | Std. Error         | t-Statistic | Prob.    |
|--------------------|-------------|--------------------|-------------|----------|
| C(1)               | 0.179745    | 5.666169           | 0.031723    | 0.9750   |
| X1                 | 0.000119    | 0.000142           | 0.843290    | 0.4090   |
| X2                 | -0.000845   | 0.000263           | -3.215780   | 0.0043   |
| X3                 | 2.471018    | 1.076532           | 2.295351    | 0.0327   |
| X4                 | -0.278000   | 0.287976           | -0.965356   | 0.3459   |
| X5                 | -0.132200   | 0.098182           | -1.346475   | 0.1932   |
| X6                 | 0.015595    | 0.168003           | 0.092825    | 0.9270   |
| X7                 | 0.241779    | 0.139765           | 1.729895    | 0.0991   |
| R-squared          | 0.791035    | Mean dependent var |             | 7.696970 |
| Adjusted R-squared | 0.665657    | S.D. dependent var |             | 4.933843 |
| S.E. of regression | 2.852868    | Sum squared resid  |             | 162.7772 |
| Durbin-Watson stat | 0.850262    | J-statistic        |             | 0.000000 |

Source: Outputs of data processing using EViews 13.

This means that MOO is affected by each of X2, X3 and X7 at p-value of 0.10 and explanation power of 79.104%. This means that each of GDP Growth, Economic Growth and Inflation Rate may have a significant effect on credit rating according to MOO.

## 5. Robustness Checks

Robustness checks have been conducted, controlling for the country type (G7, BRICS and NEXT11). The following outputs illustrate the determinants of S&P, Fitch and Moody's, according to GMM technique, after controlling for country type, as follows:

Table 8: Determinants of S&amp;P after controlling for country type

| Variable           | Coefficient | Std. Error         | t-Statistic | Prob.    |
|--------------------|-------------|--------------------|-------------|----------|
| C(1)               | 8.997243    | 1.114596           | 8.072197    | 0.0000   |
| X1                 | 0.000214    | 2.65E-05           | 8.059099    | 0.0000   |
| X2                 | 0.000567    | 9.67E-05           | 5.859524    | 0.0000   |
| X3                 | -0.257859   | 0.179062           | -1.440050   | 0.1602   |
| X4                 | 0.113218    | 0.085917           | 1.317760    | 0.1976   |
| X5                 | 0.062674    | 0.023804           | 2.632936    | 0.0132   |
| X6                 | 0.063094    | 0.035615           | 1.771584    | 0.0866   |
| X7                 | 0.129809    | 0.066056           | 1.965155    | 0.0587   |
| G7                 | -3.640876   | 1.384536           | -2.629673   | 0.0127   |
| BRICS              | 0.291756    | 0.312980           | 0.946701    | 0.3712   |
| NEXT11             | 0.111257    | 0.099871           | 1.278203    | 0.1890   |
| R-squared          | 0.907272    | Mean dependent var |             | 13.30769 |
| Adjusted R-squared | 0.890908    | S.D. dependent var |             | 4.305161 |
| S.E. of regression | 1.395884    | Sum squared resid  |             | 72.52771 |
| Durbin-Watson stat | 0.793125    | J-statistic        |             | 0.000000 |

Source: Outputs of data processing using EViews 13

This means that S&P is affected by each of X1, X2, X5, X6, X7 and G7 at p-value of 0.10 and explanation power of 90.702%. This means that each of GDP per Capita, GDP Growth, External Debt and Foreign Reserves may have a significant effect on credit rating according to S&P.

The following outputs illustrate the determinants of FIT, according to GMM technique, after controlling for country type (G7, BRICS and NEXT11), as follows:

Table 9: Determinants of FIT after controlling for country type

| Variable           | Coefficient | Std. Error         | t-Statistic | Prob.    |
|--------------------|-------------|--------------------|-------------|----------|
| C(1)               | -3.372614   | 2.200733           | -1.532496   | 0.1331   |
| X1                 | 0.000532    | 0.000100           | 5.304507    | 0.0000   |
| X2                 | -0.000990   | 0.000245           | -4.039405   | 0.0002   |
| X3                 | 1.543067    | 0.364853           | 4.229288    | 0.0001   |
| X4                 | -0.371840   | 0.134974           | -2.754899   | 0.0087   |
| X5                 | -0.015379   | 0.012027           | -1.278690   | 0.2082   |
| X6                 | -0.058681   | 0.063659           | -0.921798   | 0.3620   |
| X7                 | 0.292497    | 0.087335           | 3.349130    | 0.0017   |
| G7                 | -0.012345   | 0.011243           | -1.264221   | 0.2319   |
| BRICS              | 0.263458    | 0.292365           | 0.932890    | 0.3514   |
| NEXT11             | 0.129841    | 0.106543           | 1.298760    | 0.2098   |
| R-squared          | 0.739413    | Mean dependent var |             | 6.000000 |
| Adjusted R-squared | 0.688566    | S.D. dependent var |             | 5.653245 |
| S.E. of regression | 3.154863    | Sum squared resid  |             | 408.0797 |
| Durbin-Watson stat | 0.662636    | J-statistic        |             | 5.89E-44 |

Source: Outputs of data processing using EViews 13

This means that FIT is affected by each of X1, X2, X3, X4 and X7 at p-value of 0.01 and explanation power of 73.041%, without any significant effects of country type. This means that each of GDP per Capita, GDP Growth, Unemployment Rate, Foreign Reserves and Inflation Rate may have a significant effect on credit rating according to FIT.

When controlling for BRICS, the following outputs illustrate the determinants of Y3, according to GMM technique, as follows:

Table 10: Determinants of MOO after controlling for country type

| Variable           | Coefficient | Std. Error         | t-Statistic | Prob.    |
|--------------------|-------------|--------------------|-------------|----------|
| C(1)               | 7.692156    | 1.020052           | 7.540945    | 0.0000   |
| X1                 | 0.000657    | 0.000154           | 5.456317    | 0.0002   |
| X2                 | 0.000208    | 0.000132           | 1.580205    | 0.1221   |
| X3                 | 0.223010    | 0.166251           | 1.341405    | 0.1875   |
| X4                 | -0.413847   | 0.145778           | -2.812399   | 0.0089   |
| X5                 | -0.014139   | 0.014254           | -0.991951   | 0.3273   |
| X6                 | -0.067491   | 0.073661           | -0.891708   | 0.3123   |
| X7                 | 0.106795    | 0.029482           | 3.622442    | 0.0008   |
| G7                 | -0.014675   | 0.013245           | -1.236481   | 0.2109   |
| BRICS              | -7.816004   | 0.997609           | -7.834738   | 0.0000   |
| NEXT11             | 6.117327    | 1.849817           | 3.306990    | 0.0020   |
| R-squared          | 0.891516    | Mean dependent var |             | 7.644444 |
| Adjusted R-squared | 0.877608    | S.D. dependent var |             | 4.488144 |
| S.E. of regression | 1.570156    | Sum squared resid  |             | 96.15024 |
| Durbin-Watson stat | 0.253055    | J-statistic        |             | 1.68E-44 |

Source: Outputs of data processing using EViews 13

This means that MOO is affected by each of X1, X4, X7, BRICS and NEXT11 at p-value of 0.01 and explanation power of 89.15%. This means that each of GDP per Capita, External Debt and Inflation Rate may have a significant effect on credit rating according to MOO.

So, results indicate the significance of the effects each of X1, X2, X3, X4, X5, X6 and X7 on each of S&P, FIT and MOO. So, for all of these independent variables, we reject the null hypothesis and accept the alternative one. Besides, when controlling for the country type (G7, BRICS and NEXT11), the results support their effects, where 1) S&P is affected by G7 and 2) FIT is affected by both of BRICS and NEXT11.

Results of this paper may shed lights for investors and policymakers to consider the potential changes in credit rating when taking investment decisions and reviewing market regulations.

## **6. Results and Concluded Remarks**

This paper tries to investigate the determinants of sovereign credit ratings from 2016 to 2020. This has been conducted using S&P, Fitch and Moody's ratings in 23 countries, including G7 (i.e. Canada, France, Germany, Italy, Japan, United Kingdom and United States), BRICS (i.e. Brazil, Russia, India, China, South Africa) and NEXT11 (i.e. Bangladesh, Egypt, Philippines, South Korea, Turkey, Vietnam, Indonesia, Iran, Mexico, Nigeria and Pakistan).

Using panel analysis according to GMM technique, results reveal the importance of macroeconomic variables in explaining the sovereign credit rating, where GDP per Capita, GDP Growth, Economic Growth, External Debt, Unemployment Rate, Foreign Reserves and Inflation Rate seem to have significant effects on sovereign credit rating. In addition, robustness checks - using country types as control variables – have supported the significant effects of macroeconomic variables in explaining the sovereign credit rating, with explanation power ranged from 71.1% to 92.5%.

Country type seems to have different effects, where including in G7 may have a negative effect on S&P rating, while including in BRICS may have a negative effect on Fitch rating. In addition, including in NEXT11 may have a positive effect on Moody's rating. This needs to be more elaborated using additional analysis for each country, where investors and policymakers may consider the potential changes in credit rating when taking investment decisions and reviewing market regulations.

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