Volume 40, Issue 2

Sustainability and Financial Stability: Evidence from European Banks

Dhafer Saïdane
Skema Business School, Université Nice Côte d'Azur

Sana Ben Abdallah
Univ. Manouba, ESCT, Campus Universitaire Manouba

Abstract

The main objective of this paper is to study the relationship between the sustainability and the stability of 61 European banks in the period extending from 2005 to 2017. To our knowledge, this is the first study that focuses on the banking sector. We have tested this relationship using a panel vector autoregressive (PVAR) with the generalized method of moments (GMM) method and the Granger causality test. The results show the existence of a bidirectional causality between sustainability and bank stability. More precisely, sustainability and all its different dimensions (environmental, social and governance) have a positive and significant impact on bank stability, while banking stability affect negatively sustainability and its environmental, governance dimensions.

1. Introduction

By seeking to improve their economic situations after the crisis, several banks began to think about adopting an alternative approach based on sustainable development. The emergence of sustainable finance highlights the role of banks in supporting sustainable development and CSR. We focus on banks as an actor in sustainable finance to better identify their role in the issue of CSR. We adopt Schumpeter's vision, which highlighted the importance of banks in the functioning of the economic system and their potential beneficial contribution to growth (Schumpeter, 1934, 1961). In fact, banks play a central role in containing deflationary pressures (Minsky, 1986,1992). Moreover, as financial intermediaries, they play an important role in the transmission of shocks. Indeed, banks are more sensitive to interest rate changes which makes them more susceptible to systemic risk than other non-banking firms (Burns, 1969; Minsky, 1982; Aglietta, 2003). Since banks, as multi-product firms, contribute to the financial development of economic sectors, they are always called upon to make more effort. They are able to play a very important role in integrating the sustainable development approach into economic activity. The banking sector can, therefore, contribute decisively to the transmission of positive impulses to achieve sustainable growth. In that regard, some studies introduce the concept of sustainable banking (Saidane and Pauget, 2010; Rebai et al. 2012, 2015; Ben Abdallah et al. 2018).

Although studies on sustainable development and corporate social responsibility (CSR) and on the relationship between sustainability and financial performance are relatively numerous, the debate around the issue of the relationship between sustainability and bank stability has not received enough attention from scholars and remains open to debate even today. Our study aims to extend the analysis of sustainable development and CSR from the perspective of banking stability. In this paper, we focus on the relationship between banking stability and sustainability and its dimensions.

Various authors have dwelt on the issues of sustainability and risk. Their studies have shown mixed results. On the one hand, the implementation of CSR strategies can reduce excessive risk-taking (Harjoto and Laksmana, 2016) and equity risk (Monti et al. 2019) and help better manage risks (Cuesta-González et al., 2006 and Godfrey et al.,2009), which can improve company value and protect it against additional costs. From the stakeholder's perspective theory (Donaldson and Preston 1995), and that of the theory of good management (Waddock and Graves 1997), CSR should reduce the financial risk of the firm. In fact, various authors have shown that a good and strong relationship with the stakeholders can help companies find more investments (Clarkson 1988; Burgstahler and Dichev 1997) and help them access and use resources more efficiently (Hambrick, 1983). According to Rajput et al. (2015), establishing a good relationship with the community can help companies receive local support and attract customers, which positively affect banking stability. On the other hand, based on the neoclassical approach, the implementation of CSR activities generates short and long-term costs to the company that can affect bank stability. According to Nidumolu et al. (2009), companies can risk losing their financial stability if they put too much emphasis on social and environment investments. In this context, Aupperle et al. (1985) and Ullman (1985) indicate that trying to satisfy all stakeholders could adversely affect financial results due to inefficient use of resources.

From another standpoint, Goldsmith et al. (1972) mentioned that sustainability should come from a stable economy or a "stable society". As explained by Endrikat et al. (2014), the availability of

financial resources incites firms to invest in environmental projects. So, financial stability is an important condition to invest in responsible activities (Tregidga et al., 2014). However, García-Benau et al. (2013) show that the economic crisis has positively affected the implementation of CSR reporting strategies in spite of their costs.

Other empirical evidence (such as Orlitzky and Benjamin, 2001; Bouslah et al.,2013) have shown a bidirectional causality between sustainability and risk. Chollet and Sandwidi (2018) endorse these findings and conclude that there is a virtuous circle between corporate social performance and risk.

Building on previous literature, our study contributes to the limited repertoire on the relationship between banking stability and sustainability. To our knowledge, this is the first study that focuses on banking sector.

The rest of the article is organized as follows: The "Methodology" section is devoted to the adopted methodology, followed by the next section that represents the "Empirical results and analysis". And the final section concludes the main findings.

2. The Methodology

The main objective of our paper is to study the relationship between sustainability and the stability of European banks using two empirical techniques: the panel vector autoregressive (PVAR) with the generalized method of moments (GMM) and the Granger causality test.

2.1. The sample

In this paper, we study the relationship between the sustainability and the soundness of 61 European banks[1] during the period extending from 2005 to 2017. We use the ESG score to measure the overall sustainable performance and Z-score to measure the stability of banks. ESG data were collected from the Thomson Reuters Asset4 database. As for the financial data, they were collected from the Orbis database and Wordbank.

2.2. Relation between sustainability and banking stability

In this section, we are interested in the link between sustainability and soundness. To this end, we used a panel vector autoregression (PVAR) with the generalized method of moments (GMM) model, which allows us to use lagged regressors as instruments, and a Granger causality test (see Abrigo and Love, 2016). Our data are examined using the PVAR method which makes no assumptions about the exogeneity of the variables. All the dependent variables are considered as endogenous variables. A simple PVAR can be represented as follows:

$$Y_{i,t} = A_1\ Y_{i,t-1} + \cdots + A_p\ Y_{i,t-p} + B\ X_{i,t} + \varepsilon_{i,t} \qquad (1)$$

Where:

---

[1] UK, France, Germany, Switzerland, Italy, Spain, Poland, Sweden, Greece, Denmark, Belgium, Hungary, Norway, Austria, Portugal, Czechia. Netherlands, Ireland

$\mathbf{Y_{i,t}}$ is a vector of endogenous variables (Z-score, ESG score, E score, S score and G score);

$Z - score = \frac{ROA+(\frac{equity}{Total\,assets})}{\sigma ROA}$: measures the degree of insolvency

ESG score: measures the overall sustainable performance
E score: measures the environment performance
S score: measures the social performance
G score: measures the governance performance

$\mathbf{X_{i,t}}$ is a vector of exogenous variables (Bank size, vision and strategy to transparency, revenue to client loyalty, number of board meetings and unemployment rate);

Bank size (BS): measured as the Log of total assets

Vision and strategy to transparency (VStoTrans): reflects the quality of communication and the transparency of information. The measure varies from 0 to 100.

Revenue to client loyalty (RevtoCL): reflects a company's capacity to grow, while maintaining a loyal client base through satisfaction programs and avoiding anti-competitive behaviors and price fixing. The measure varies from 0 to 100.

Number of board meetings (NumBM): indicates the number of board meetings during the year

Unemployment rate (Ump): indicates the percentage of total workforce who are unemployed in a country.

$\mathbf{A_1} \cdots \mathbf{A_p}$ and $\mathbf{B}$ are matrices of coefficients to estimate;

$\mathbf{\varepsilon_t}$ is a vector of random errors.

The results and the data analyses are presented and discussed in the next section.

3. Empirical results and analysis

3.1. Descriptive statistics and correlations

Table I : Descriptive statistics

Variables	Observations	Mean	Std.Div	Min	Max
Z-score	736	3.808	12.665	-18.585	99.803
ESG score	735	41.900	19.289	0.925	95.634
E score	733	68.409	30.925	8.44	97.08
S score	733	71.045	29.117	3.66	99.2
G score	733	54.192	29.257	1.83	97.97
BS	736	8.235	0.713	6.374	9.58
VStoTrans	733	65.721	29.649	12.17	99.33
RevtoCL	733	73.037	28.366	1.97	98.38

NumBM	616	12.886	6.664	2	43
Ump	793	9.333	5.227	2.493	27.466

Table 1 reports the descriptive statistics of the dataset. On the one hand, we observe that Z-score has a mean value four times less than its standard deviation. This shows that Z-score is quite varied. On the other hand, all other variables (i.e., ESG, E, S and G scores, bank size, vision and strategy to transparency, revenue to client loyalty, number of board meetings and unemployment rate) have a moderate standard deviation. This shows a certain homogeneity in terms of these variables for the selected sample.

Table II: Correlation between all variables

		1	2	3	4	5	6	7	8	9	10
Z-score	**1**	1.00									
ESG score	**2**	0.63	1.00								
E score	**3**	0.74	0.88	1.00							
S score	**4**	0.41	0.83	0.90	1.00						
G score	**5**	0.52	0.88	0.65	0.66	1.00					
BS	**6**	0.35	0.64	0.63	0.56	0.54	1.00				
VStoTrans	**7**	0.44	0.64	0.72	0.67	0.49	0.37	1.00			
RevtoCL	**8**	0.38	0.51	0.50	0.62	0.44	0.23	0.42	1.00		
NumBM	**9**	-0.11	-0.09	-0.03	-0.04	-0.09	-0.14	-0.07	-0.13	1.00	
Ump	**10**	-0.14	0.05	0.13	0.08	0.04	-0.09	0.10	0.14	0.34	1.00

Table II summarizes the correlation results of the Pearson test for Z-score, ESG scores, and control variables. Results indicate that the majority of variables have high correlations. The Z-score strongly correlates with the global sustainability score (ESG score) and its different environmental, social, and governance dimensions (E, S and G scores). All the ESG scores also strongly correlate with each other. We risk having a multicollinearity problem if we integrate all the scores in a single multivariate PVAR equation. For this reason, we opted for bivariate PVAR models, which allows us to examine interactions between stability and sustainability and its different dimensions.

3.2. Relationship between sustainability and banking soundness

In this analysis, we used a bivariate PVAR with a GMM model to test the link between stability and sustainability. But, before proceeding with estimating the bivariate PVAR model, it is first necessary to select the optimal number of lags to be included in the dynamic system. We used the selection criteria of Andrews and Lu (2001) for this purpose. The results are shown in the table below.

Table III. Bivariate PVAR order selection criteria

lag	CD	J	J pvalue	MBIC	MAIC	MQIC
1	0.9995723	10.85483	0.5413992	-58.13789	-13.14517	-31.12343
2	0.9995099	5.498894	0.7031625	-40.49625	-10.50111	-22.48661

| 3 | 0.9994794 | 2.914496 | 0.5722347 | -20.08308 | -5.085504 | -11.07826 |
| 4 | 0.999683 | . | . | . | . | . |

<u>Notes:</u> This table reports the value of the optimum lag length using Andrews and Lu's (2001) criteria.

According to the table III, the optimal lag number is p=1. All other bivariate PVAR models between stability and the environmental, social and governance dimensions of sustainability indicate the same optimal lag (i.e. p=1)

Before proceeding with the application of the bivariate PVAR model, a series of tests to verify the reliability of the variables used is of crucial importance:

3.2.1. Unit root test

In the context of the use of the bivariate Panel VAR model, it is necessary to study their stationarity in order to avoid the problems of fallacious regressions. For this purpose, we use the ADF and PP unit root tests. The results of the stationarity test of the variables are shown in the table below:

Table IV. Unit root test

| Variables	Test	Stationarity
Z-score	ADF	I(0)
	Philips Perron (PP)	I(0)
ESG score	ADF	I(0)
	Philips Perron (PP)	I(0)
G score	ADF	I(0)
	Philips Perron (PP)	I(0)
E score	ADF	I(0)
	Philips Perron (PP)	I(0)
S score	ADF	I(0)
	Philips Perron (PP)	I(0)

<u>Notes:</u> This table reports Augmented Dickey-Fuller (ADF) and Philips Perron (PP) unit root tests for Z-score, ESG, E, S, and G scores.

All methods, in Table IV, suggest that all variables are stationary in level. Based on these results, we conclude that the order of integration is similar for all variables. Therefore, it is not necessary to proceed to the cointegration analysis.

3.2.2. Validation of the model

In order to interpret the different results resulting from the bivariate PVAR (1) model, it is necessary to test its econometric robustness. To do this, we will apply the stability condition of the eigenvalue. From figure 1 below, we note that all eigenvalues lie within the unit circle. So the bivariate PVAR (1) model is stationary and stable. Thus we can, econometrically, say that our bivariate PVAR (1) model is a valid model. The same results are obtained in each dynamic model of the bivariate analysis between stability and the three dimensions of sustainability

Figure 1. Stability test of the bivariate PVAR (1) model

Roots of the companion matrix
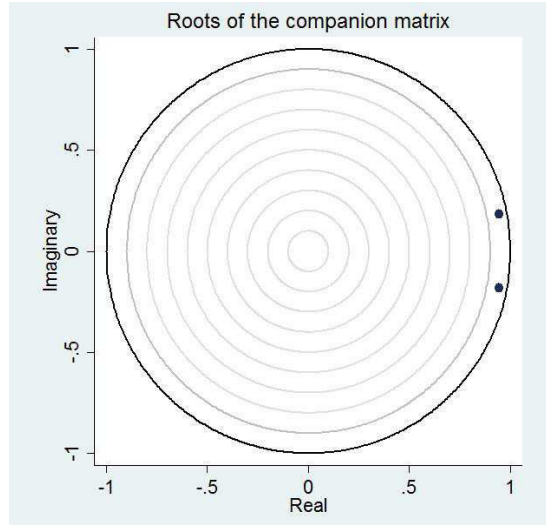
3.2.3. Estimation of the bivariate PVAR (1) models

The results of the bivariate panel VAR (1) models are summarized in Table V.

Table V. Bivariate Panel VAR (1) estimations and Granger causality tests

	Z-score	ESG score	E score	S score	G score
Model 1 :					
Z-score (-1)	1.32***	-0.99*			
	(5.93)	(-1.92)			
ESG score (-1)	0.06***	0.69***			
	(3.67)	(9.45)			
Granger causality test	13.45***	3.68*			
Type of causality		*Bidirectional*			
Model 2 :					
Z-score (-1)	1.22***		-2.73**		
	(5.58)		(-2.16)		
E score (-1)	0.02**		0.75***		
	(2.33)		(6.88)		
Granger causality test	5.41**		4.68**		
Type of causality			*Bidirectional*		
Model 3 :					
Z-score (-1)	1.07***			-2.21	
	(4.79)			(-1.55)	
S score (-1)	0.02***			0.81***	
	(2.72)			(6.61)	
Granger causality test	7.38***			2.41	
Type of causality				*Unidirectional*	
Model 4 :					

Z-score (-1)	1.27***		-2.02*
	(5.45)		(-1.81)
G score (-1)	0.03***		0.56***
	(3.45)		(7.02)
Granger causality test	11.87***		3.27*
Type of causality		*Bidirectional*	

Notes: This table exposes the structure of the correlation between banking stability, ESG, E, S and G scores within the framework of bivariate panel VAR (1). The table shows the coefficients while the t-statistics are in-between parentheses.
*, **, and *** denote statistical significance at 10%, 5%, and 1% levels, respectively.

Focusing on the direction from the ESG scores to the Z-score, our estimates of the bivariate PVAR models reveal that sustainability and its different dimensions (environmental, social and governance) have a positive and significant impact on financial stability variable (Z-score). These results support previous research on the relationship between CSR and risk in several respects. First, our findings are in line with those of Berman et al. (1999) and Salama et al. (2011) that showed firms with higher environment performance are less risky. The positive relationship between environmental performance and stability can be explained with the effectiveness of environmental projects and the incorporation of environmental principles into financing activities. Second, several studies (such as, Rajput et al.,2015; Plumlee et al.,2015 and; Verwijmeren and Derwall, 2010) have also shown a positive impact of the social dimension on bank stability. This positive effect could be due to the result of several factors such as stakeholders' loyalty towards socially responsible banks, good reputation, etc. This makes the bank more stable. Third, the positive relationship between governance performance and stability could be explained by the good management of stakeholders that can influence bank stability. Finally, we confirm the positive impact of sustainability on bank stability. Our results support the hypothesis developed by stakeholder theory (Donaldson and Preston 1995; Jones 1995; Freeman, 2010) and theory of good management (Waddock and Graves 1997; Godfrey 2005), that expect sustainability to reduce financial risk of the firm.

However, looking at the direction from the Z-score to the ESG scores, we note a significant negative relationship between stability and sustainability and its environmental governance dimensions. In contrast, the social dimension is not significant. These results are compliant with those of García-Benau et al. (2013) and can be explained by the positive effect of the financial crisis on the implementation of CSR initiatives. To improve their reputation, European banks, have become more conscious of the importance of responsible practices, especially during the crisis period. Furthermore, stability can have a comforting and reassuring impact Therefore, in this case the bank makes less effort to get out of its comfort zone and invest in responsible practices.

Regarding the control variables, only three variables (bank size, vision and strategy to transparency and revenue to client loyalty) do significantly affect the link between stability and sustainability and its dimensions.

Our analysis thus has examined the causal relationship between stability and sustainability and its different dimensions. In light of Granger causality test results, we detect a bidirectional causality between banking stability and sustainability and its environmental, governance dimensions. On

the other hand, we highlight a unidirectional causality between banking stability and social performance.

The PVAR approach allows us to generate the impulse response function (IRF). According to figure 2 below, first, we observe that a positive shock of a standard deviation on bank stability has a negative effect on sustainability, environment and governance dimensions in the short term. However, this effect is not significant in social dimension. Second, we note that a positive shock of a standard deviation on sustainability and its different dimensions slightly increases banking stability (its impact is short-lived), and then stabilizes in the long term.

Figure 2. Impulse response functions (IRF).
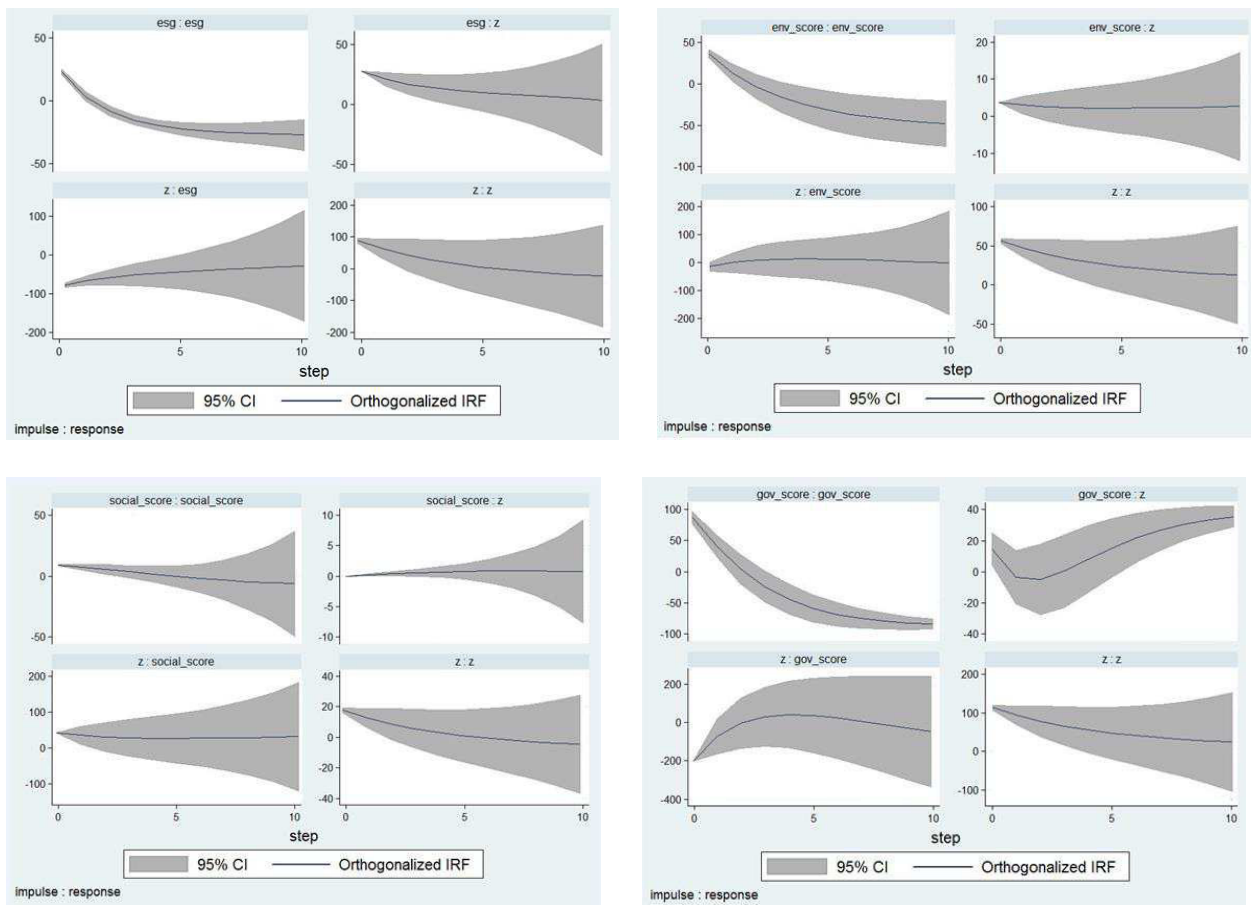
4. Conclusion

The main objective of our paper is to study the relationship between sustainability and the stability of European banks during the period from 2005 to 2017. To our knowledge, this is the first study in this field that focuses on banking sector, which plays a very important role in the transmission of shocks. The results of bivariate PVAR modeling and of the Granger causality test show that there is a bidirectional relationship between sustainability and stability. Our findings conclude that

sustainability in all its different dimensions (environmental, social and governance) has a positive and significant impact on financial stability. These results confirm that the implementation of sustainable development activities contributes to banking stability. So, with this new status of sustainability, banks are better able to absorb shocks and reduce the risk of insolvency. However, looking at the effect of financial stability on the overall sustainability and its different dimensions, we note a significant negative relationship between stability and sustainability and its environmental governance dimensions. In contrast, the social dimension is not significant. This suggests firstly, that in a stable situation, banks prefer not to leave their financial comfort zone and investing in responsible practices Secondly, that fragility encourages banks to engage in sustainable development activities. To improve their reputation, European banks, have become more conscious of the importance of the responsible practices, especially during the crisis period.

References

Aglietta M. (2003) « Le risque systémique dans la finance libéralisée », Revue *d'économie financière*, n° 70

Aupperle, K. E., Carroll, A. B., Hatfield, J. D. (1985) "An empirical examination of the relationship between corporate social responsibility and profitability", *Academy of Management Journal*, 28 (2): 446-463.

Bouslah, K., Kryzanowski, L., M'Zali, B. (2013) "The impact of the dimensions of social performance on firm risk", *Journal of Banking and Finance* 37 (4), 1258–1273.

Burgstahler, D., Dichev, I., (1997) "Earnings management to avoid earnings decreases and losses". *Journal of Accounting and Economics* 24: 99–126.

Burns, A. (1969) *"The Business Cycle in a Changing World"*, National Bureau of Economic Research, chapter 1, Book Series Studies in Business Cycles.

Chollet, P., Sandwidi, B.W. (2018) "CSR engagement and financial risk: A virtuous circle? International evidence", *Global Finance Journal*: 1044-0283

Clarkson, M. B. E. (1988) "Corporate social performance in Canada, 1976-86". In L. E. Preston (Ed.), *Research in corporate social performance and policy*, vol. 10: 241-265. Greenwich, CT: JAI Press.

Cuesta-González, M., Muñoz-Torres, M. J., Fernández-Izquierdo, M. Á. (2006) "Analysis of social performance in the Spanish financial industry through public data. A proposal", *Journal of Business Ethics*, 69(3), 289-304.

Donaldson, T., Preston, L. E. (1995) "The Stakeholder Theory of the Corporation: Concepts, Evidence, and Implications", *Academy of Management Review* 20(1), 65–91

Endrikat, J., Guenther, E., Hoppe, H. (2014) "Making sense of conflicting empirical indings: a meta-analytic review of the relationship between corporate environmental and financial performance", *European Management Journal* 32(5): 735–751.

García-Benau, A., Sierra-Garcia, L., Zorio, A. (2013) "Financial crisis impact on sustainability reporting". *Management Decision* 51(7): 1528–1542.

Goldsmith, E., Allen, R., Allaby, M., Davoll, J., Lawrence, S. (1972) "A blueprint for survival", *The Ecologist*, Vol.2, no.1, 1-44.

Godfrey, Paul, C., Merrill, Craig, B., Hansen, Jared M. (2009) "The Relationship Between Corporate Social Responsibility and Shareholder Value: An Empirical Test of the Risk Management Hypothesis", *Strategic Management Journal* 30(4): 425–445.

Godfrey, P. C. (2005). The relationship between corporate philanthropy and shareholder wealth: A risk management perspective. *Academy of Management Review*, *30*(4), 777–798.

Hambrick, D.C. (1983) "Some Tests of the Effectiveness and Functional Attributes of Miles and Snow's Strategic Types", *Academy of Management Journal*, 26 No. 1, pp. 5-26.

Harjoto, M. A., Laksmana, I. (2016) "The Impact of Corporate Social Responsibility on Risk Taking and Firm Value", *Journal of Business Ethics*, 151(2), 353-373.

Jones, T. M. (1995) "Instrumental stakeholder theory: A synthesis of ethics and economics", *Academy of Management Review*, 20, 404–437.

Michael R.M. Abrigo, Inessa Love (2016) "Estimation of Panel Vector Autoregression in Stata: a Package of Programs," *Working Papers 201602*, University of Hawaii at Manoa, Department of Economics.

Minsky, H. (1982) *"Can "It" Happen Again? Essays in Instability and Finance"*, Armonk, New York: M. E. Sharpe.

Minsky, Hyman P. (1986) *"Stabilizing an Unstable Economy"*.

Minsky, Hyman P. (1992) "The Financial Instability Hypothesis", *working paper*, Levy Institute, n° 74.

Monti, A., Pattitoni, P., Petracci, B., and Randl, O. (2019). Does Corporate Social Responsibility Impact Equity Risk? International Evidence. International Evidence. (January 31, 2019).

Nidumolu, R., Prahalad, C. K., Rangaswami, M. R. (2009) "Why sustainability is now the key driver of innovation", *Harvard Business Review*, 87(9), 56-64.

Rajput, N., Oberoi, S. (2015) "Does corporate social responsibility give long term sustainability and stability? An empirical validation", *The Journal of Indian Management & Strategy* 20 (2), 36-40

Schumpeter, J. A. (1934). *"The Theory of Economic Development"*. Cambridge: Harvard University Press.

Schumpeter, J.A. (1961) *"The theory of economic development: an inquiry into profits, capital, credit, interest, and the business cycle"* translated from the German by Redvers Opie New York: OUP

Tregidga, H., Milne, M., Kearins, K. (2014) "(Re) presenting 'sustainable organizations", *Accounting, Organizations and Society* 39(6): 477–494.

Ullman, A. A. (1985) "Data in search of a theory: A critical examination of the relationships among social performance, social disclosure, and economic performance of U.S. firms", *Academy of Management Review* 10(3):540-557.

Waddock, S.A., Graves, S.B. (1997) "The Corporate Social Performance-Financial Prerformance Link", *Strategic Management Journal*, Vol. 18, No. 4 pp. 303-319.