Decoupled Relationship Between CSR Bank Disclosures and SME Financing: A Case Study of Alpha Banks in Lebanon

Submitted 10/01/24, 1st revision 15/02/24, 2nd revision 26/02/24, accepted 15/03/24

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Abstract:

Purpose: Despite Lebanon having a burgeoning banking industry across the MENA region, the banks social impact on the society has largely remained unassessed. Based on institutional theory, this study explores the practice of corporate social responsibility of Alpha banks in Lebanon and investigates its association with their disclosed numbers of small and medium enterprises (SME) financing.

Design/Methodology/Approach: Using qualitative content analysis based on the framework of the Global Reporting Initiative (GRI), CSR and SME scores were inferred and then regressed.

Findings: A negative relationship was established between the two scores suggest that Alpha banks in Lebanon exhibit a decoupling relationship between their policies and practices due mainly to the lack of regulatory coercive pressures while conforming to the mimetic and normative pressures.

Practical Implications: The research results may assist SMEs in this sense by reshaping their considerations of the available financing tools in order to achieve their objectives.

Originality/Value: The use of institutional theory in management research has advanced the understanding of organizational practice of adopting new strategies to sustain organizational development.

Keywords: Corporate Social Responsibility, SME, CSR Score, SME Score, Financing opportunities.

JEL Classification: G30, G340.

Paper type: Research article.

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1. Introduction

The practice of corporate social responsibility (CSR) in organizations has gained a central role in business strategies across all industries (Carvalho and Mota, 2010). The banking sector, in particular, has visibly intensified its CSR efforts (Bolibok, 2021) as they were found to positively affect their visibility (Gamerschlag *et al.*, 2011) and reputation (Abdullah and Abdul Aziz, 2013).

Thus, banks have been dedicated to publicly disclose their CSR activities, among which is the funding of small and medium enterprise (SME) projects that they perceive as contributing to societal development. Gamerschlag *et al.* (2011) perceive it as a tool to leverage their economic costs (Gamerschlag *et al.*, 2011) because it improves profitability and overall performance (Hassanein and Yeşiltaş, 2022).

The disclosure of CSR activities was considered through the lens of the institutional theory (Chedrawi *et al.*, 2020; Campbell, 2007; Cubilla-Montilla *et al.*, 2020; Tolmie *et al.*, 2020; Ng *et al.*, 2022; Brammer *et al.*, 2012; Velinov *et al.*, 2023).

The studies contend that the practice of CSR in organizations is a result of their conformance to the institutional pressures of the environment, namely the normative, mimetic and coercive pressures. DiMaggio and Powell (1983) argue that the organisations' conformance to the institutional pressures can build, support and gain legitimacy for their activities.

The use of institutional theory in management research has advanced the understanding of organizational practice of adopting new strategies to sustain organizational development. The theory proposes that organizations adopt new practices and change in order to conform to three institutional pressures: mimetic, normative and coercive (DiMaggio and Powell, 1983).

The mimetic pressure arises between organizations that are "structurally equivalent, share similar objectives, and compete for the same customers" (Cubilla-Montilla *et al.*, 2020, p. 1184) it can be explained as the force of imitation causing organizations to copy their competitors' practices in order to not be left behind in the eye of the society in general and consumers in particular. The normative pressure arises from the values and expectations of the society.

Thus, disclosure comes as a response to the "public expectations regarding organizational transparency" (Wehmeier and Raaz, 2012, p. 339), which is equated with sharing of information (Albu and Flyverbom, 2019). The coercive pressure refers to "the force of laws and regulations regarding CSR and the dissemination of information" (Cubilla-Montilla *et al.*, 2020, p. 1184); therefore, organizations disclose their information in order to evade control, monitoring, and sanctions (Jabbouri *et al.*, 2019).

By conforming to these pressures, banks show conformance to three entities of interest: the consumer, the government and the society. Nevertheless, the actual practice can decouple from the proclaimed and CSR disclosure becomes symbolic (Schons and Steinmeier, 2016), a process identified as "decoupling" which "enables organizations to seek the legitimacy that adaptation to rationalized myths provides while they engage in technical 'business as usual" (Boxenbaum and Jonsson, 2008; Grima and Thalassinos, 2020).

Based on the previous discussion and with the underpinning of the institutional theory, this study aims to explore and evaluate the relationship between the disclosed Lebanese banking sector CSR activities and their level of small and medium enterprises (SME) project funding. The research question is:

RQ1: Do Lebanese banks disclosed SME project funding truly reflect their disclosed CSR policy?

The next section introduces the Lebanese banking sector and the state of CSR and SME project funding.

2. Context of the Study

The banking sector in Lebanon comprises 42 commercial banks, 11 foreign banks, and 17 investment banks. It constitutes a powerful actor in the economy, with a contribution of 6%-7% to Lebanon's GDP estimated at 21.8 billion USD (The World Bank, 2021). In 2016, the banks consolidated assets showed an annual growth of 6.9% (amounting to \$257.8 B). This led to it being positioned 5th amongst the MENA member states.

Lebanese banks employ more than 22,000 employees, 72% of them are university graduates, with an important representation of Lebanese women reaching 46%, well above the country's average of 25%. The Alpha group banks comprises 16 banks each having customer deposits exceeding \$2 billion and constitutes more than 80% of the market share.

CSR reviews and publications of the banking sector in Lebanon began in 2012. The disclosures were presented in a variety of ways: Annual reports, stand-alone releases and website reviews. In 2014, ten Alfa ranked banks, disclosed their yearly CSR exercises. The banks have disclosed their contribution to funding small and intermediate enterprises which represent 90% of businesses and employ 50% of the country (Joseph, 2020).

Over the last twenty years, there has been increased monitoring of corporate social responsibility from various institutions, including the media, businesses, researchers, and the general society (Malik, 2014). The banks corporate financial reports point to the fact that they have not been left behind in corporate social responsibility, and that

they had socially responsible investments way before the financial crisis of 2008 (Baker and Nofsinger, 2012).

Over-Banked? Relative to the economy, Lebanon's banking system is the Middle East's biggest -- and one of the biggest in the world ■ Deposit bank assets as share of GDP 150% 100 50 Jordan Qatar Lebanon Libya World Iran Israel Turkey UAE Iraq Average Arabia Source: World Bank data for latest available year (2017 for most countries) **Bloomberg**

Figure 1. Lebanon Banking Sector - Bar chart comparing to Other MENA states

Source: Bloomberg 2020.

Based on the above highlighted factors, critics argued that banks had lost societal ethos in the aftermath of the financial crisis (Friedman, 2009). They held the view that banks required financial help as well as an "ethical help" in correcting the decay that had taken root in their dealings. Bank managers overlooked societal gains as they pursued opportunistic gains.

Notwithstanding the CSR engagement challenges, banks are highly expected to do more of societal engagements to acquire more societal confidence and trust. As a longitudinal study utilizing data covering the aftermath of the 2008 financial crisis, the current study provides a perfect case study to evaluate the soundness of Lebanese banks societal ethos as orchestrated through CSR activity.

However, in Lebanon, there is scarcity of research considering whether the disclosure of SME funding is congruent with the extent of CSR disclosure. To fill this research gap, the present study will explore the relationship between CSR disclosure and SME funding, thus, investigating the authenticity of the actual figures these banks report to the public in their financial reports.

3. Research Methodology

Sample and data collection:

To answer the research question, publicly available financial statements were used to collect the financial data (in absolute values) of the 10 Alpha category banks used in this study; CSR disclosure data was collected from reports on banks financial reports

which were readily available in the websites of various banks. For authenticity's sake, financial reports were gathered from Bilan Banques where the figures are already published so that no modification could be done by the banks later.

Data collected included various financial reports for the years 2008-2017. As such 100 bank-year observations constituted the overall sample; with each bank having 10 of its financial reports analysed across the span covered. A total of 10 out of 12 Alpha banks were included (sample size is 83% of the population).

Measurement:

Specific CSR terms were used as the unit of analysis. The study inferred the keywords for the qualitative content analysis from the framework of the Global Reporting Initiative (GRI) in accordance with past studies (Gamerschlag et al., 2011). The GRI rules cover all parts of CSR, as they consider all that is socially, environmental, and economically relevant.

The study consolidates the social and environmental viewpoints in the coding structure since the GRI rules oblige organizations to uncover financial information and, consequently, economic data. In measuring the overall level of CSR, and in line with the GRI framework the following 45 keywords were considered: Environment, Human resources, Community Involvement, Products and Customers. Table 1 presents a summary of the keywords.

Table 1. Keywords used for the Qualitative Content Analysis (QCA) of CSR practice across 10 Alpha Lebanon Banks.

Keywords Environmental	Keywords Human Resources	Keywords Community	Keywords Products and Customers	
Environment	Employment	Donations	Transparency	
Recycled	Employee turnover	Scholarships	Product responsibility	
Energy consumption	Collective bargaining	Sports (Support)	Customer health	
Biodiversity	Collective agreements	Art (Support)	Customer safety	
Emissions	Occupational health	Culture (Support)	Customer satisfaction	
Effluents	Occupational safety	Public health (Support)	Customer data	
Waste	Training	Local events/activities (Support)	Customer privacy	
Spills	Diversity	Corruption	Customer service	
Pollution	Equal opportunities	Public policy	Marginalized groups	
Sustainability Natural habitats	Human rights Disabled employee	Compliance	Aged customer Disabled customer	

Green products	Minorities	Non-profit organization
	Discrimination	
	Child labour	
	Forced labour	
	Compulsory	
	labour	

Source: Own study.

Each bank's CSR index is calculated by counting the number of hits (CSR keywords/Matchwords) and dividing the total by the number of pages of the annual report of that year. Along these lines, the files reflect the quantity of hits while looking for all keywords in every classification.

The total amount of CSR disclosure (CSRTOT) is a composite total bringing together average scores of the environmental (CSRENV), Human Resources (CSRHR), products and customers variables (CSRPC), and Community involvement (CSRCI) as derived from the content analysis of the bank financial reports. For a given i^{th} bank, the aggregated CSRTOT is given by:

CSRTOT is the total amount of CSR disclosure, CSRENV is the measure of environmental disclosure, and CSRHR is the measure of human resources, CSRPC is a measure of products and customer's disclosure, CSRC is the measure of community involvement disclosure all of which are the absolute number of keywords found in the examined reports.

The research will evaluate the percentage of SME portfolio contributed to each bank's loan book across the entire study period, that is, 2008-2017. The SME index for a given i^{th} bank is calculated using the formula

$$Score_{SME} = \frac{\textit{Loans to SMES}}{\textit{Corporate Loans} + \textit{Secured Loans} + \textit{Other Loans}}$$

Having evaluated the CSR disclosure by the banks and SME index, the relationship between CSR scores and SME score was investigated through ANOVA. To ensure the robustness of the obtained results the time series panel regression and a linear regression fixed for years effect was used. The below model is set to test the influence of CSR disclosure score on the level of SME financing in the Lebanese alpha banks:

Model (1) SMEscore_t =
$$\alpha + \beta_1 CSRTOTscore_t + \epsilon_t$$

Where:

 α is the intercept,

 β 's is the regression coefficients, t, is the time period, and $\hat{\epsilon}$ the error term

4. Empirical Results

The descriptive statistics of the date set (Table 2) reveals that the CSR disclosure score of the Lebanese Alpha banks ranges between 0.06 and 1.66 with an average of 0.49. This reflects the banks' commitment to disclose in their annual reports information related to their environmental, governance, and social obligations. The deviation of the observations from the sample mean is 0.37.

The SME score has a minimum of zero, indicating that some of the Lebanese Alpha banks opt not to allocate funds to invest in small and medium enterprises. These banks are more inclined to conventional lending such as mortgages, large corporate lending, and personal retail loans. In contrast, other banks have relatively higher SME score (2.19) compared to the sample mean (0.48).

Table 2. Descriptive statistics.

Stats	CSR disclosure score	SME score
Mean	0.49	0.48
Max	1.66	2.19
Min	0.06	0
Standard deviation	0.37	0.38

Source: Own study.

Next, the annual mean of CSR disclosure score (Table 3) from 2008-2017 are examined to establish the evolution of CSR disclosure. In the first three years of the examined sample the score was stagnant with slight changes. Starting the year 2010 the score witnessed a steady increase to move from 0.383 in 2010 to 0.639 in 2016, a growth of 67%.

The score then dropped in 2017, which might be the result of political instability that affected the funds allocation in the Lebanese banking sector in general. Table 3 and the Figure 1 provide evidence of the evolution of CSR practices in the Lebanese banks.

ANOVA is used to test the association between CSR Disclosure scores and SME score. Table 4 shows the ANOVA results: CSR disclosure score is statistically significant at p < 0.01 and negatively associated with SME score. Table 4 also shows that CSR disclosure score explains 8.19% of the variation in SME financing. The negative coefficient (-0.268) indicates that there is an inverse relationship between banks CSR disclosure score and SME financing. Hence, banks that communicate higher CSR disclosure score involve less in financing SMEs.

Figure 1. The evolution of CSR disclosure score (sample CSR disclosure Year mean) score 0,7 2008 0.407 2009 0.403 0,6 2010 0.383 0,5 2011 0.431 0.4 2012 0.452 0,3 2013 0.469 2014 0.491 0,2 2015 0.635 0,1 2016 0.639 2017 0.587 0 Overall 0.490 2006 2008 2010 2012 2014 2016 2018

Table 3. CSR disclosure score trend

Source: Own study.

Table 4. ANOVA between SME score and CSR disclosure score.

	SME score		
Independent variable	Coefficient	P-Value	
CSR disclosure score	-0.268***	0.000	
Constant	0.623***	0.000	
R-squared	0.0819		

Note: *P<0.1, **P<0.05, ***P<0.01

Source: Own study.

The degree of association between variables in a regression model is best measured using correlation analysis. The linear correlation the current study provided an estimated relationship between SME funding and CSR. Using SPSS version 25, the statistical relationship between SME funding and CSR disclosure at 5% level of significance was established.

The above process was followed by conducting a correlation matrix so that the multi-collinearity between the variables was determined. In the event that there was a strong correlation between any two predictor variables, that is, two predictor variables having a correlation coefficient of 1.0, then either of the variables ought to be dropped from the model.

As can be seen in Table 5, no pair of variables was strongly correlated.

Table 5. Cor	relation	Matrices	tor	SME	and	CSR
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Correlations	S		
'		CSR score	SME score
CSR score	Pearson Correlation		
	N	100	
SME score	Pearson Correlation	265**	
	Sig. (2-tailed)	.008	
	N	100	100

Note: **Correlation is significant at the 0.01 level (2-tailed).

Source: Own study.

The linear regression model provides results similar to the ANOVA. CSR disclosure score remains statistically significant and inversely influencing the level of SME financing (Table 6). CSR disclosure score explains 8.2% of the variation in SME financing score, which is very similar to the result obtained in the ANOVA.

Table 6. Linear regression estimating the relationship between CSR disclosure score and SME financing score

Independent variable	SME score Coefficient Model (1)	P-Value
CSR disclosure score	-0.268	0.000***
Constant	0.623	0.000***
R-squared	0.082	

Note: *P<0.1, **P<0.05, ***P<0.01.

Source: Own study.

Given that a data set covering 10 years is under examination, longitudinal panel regression was utilized. This helped provide additional check to ensure the significance level and direction of the estimated relationships.

Table 7 shows Panel regression clustered by year estimating the relationship between CSR disclosure score and SME financing score. The period of the examination starts in 2008 and ends in 2017. CSR disclosure score is the explanatory variable. Robust standard errors are computed following White (1980) to account for any possible heteroskedasticity.

Table 7. Linear regression the longitudinal panel regression.

Independent variable	SME score Coefficient Model (1)	P-Value
CSR disclosure score	-0.257	0.000***
Constant	0.609	0.000***
R-squared	0.064	

Note: *P<0.1, **P<0.05, ***P<0.01

Source: Own study.

The results of Table 7 reconcile with the results reported by the ANOVA test and the linear regression. The CSR disclosure score remains negatively associated with the level of SME financing score, while CSR disclosure score has no effect of the bank profitability. The explanation power of model (1) is 6.4%. This indicates that 6.4% of the variation in the SME financing score is explained by the level of CSR disclosure. The Longitudinal Panel regression provides further evidence supporting the negative relationship between CSR disclosure and SME financing.

5. Discussion of Results and Conclusion

Institutional theory posits that organizations conform to forces in their institutional environment in order to gain legitimacy, improve their social image and improve their competitive position. Nevertheless, their internal policies and practices may not be actually observed- a phenomenon identified as policy-practice decoupling (Jabbouri *et al.*, 2019).

This divide between the proclaimed and the practiced occurs because it serves the interests of powerful executives and leaders and preserves their discretion over the allocation of resources (Westphal and Zajac, 2001, p. 206); it may also be the result of avoiding compliance costs (Kingston and Caballero, 2009). In the case of Lebanese banks, the absence of regulatory laws may also be added to these reasons.

As this research did not investigate the extent of the banks executives' pressures and the costs of compliance and cannot ascertain the validity of the first two reasons in the Lebanese Alpha banks, it can presume that the absence of regulatory coercive pressures-whether by the government or other relevant bodies- contributes majorly to the banks reluctance to abide by their disclosed CSR policies of funding SMEs.

Nonetheless, their financial success and booming is evidence to their success to comply to the mimetic and normative pressures through a ceremonial display of socially responsive strategies.

The banks restrictions of cash withdrawals from accounts and their unwillingness to negotiate a satisfying solution for the customers, disregarding their negative effects, dilutes their claim of being socially responsible (Ghanem and Ray, 2023). Thus, the banks have failed to meet their socio-economic function, and Alpha banks disclosure of CSR is regarded as a good marketing strategy.

The results of the research showing statistically significant negative relationship between CSR disclosure and SME financing, argues that CSR disclosure score does not provide a tool to find project financing opportunities, thus calls for a review of the banks policies and practices. Banks remain a significant source of funding for the SMEs. Nevertheless, it is essential to widen the range of financing tools and offerings that are accessible to SMEs in order to enhance their roles in innovation, employment, investment, and growth.

The Lebanese government has tried to promote the development of SMEs as one of the ways of solving unemployment among the youth. The development is achieved through a series of reforms in the legal and regulatory framework within the business environment, a move that is aimed at complementing the delivery of both business and financial services to SMEs.

Kafalat, a Lebanese financial firm, provides loans guarantees to SMEs after they approve their business plans and feasibility of the ideas. It is a good case study of firms that have over the years been implementing the social function of financial institutions.

Thus, diversified alternatives for SME financing could sustain long-standing investments and lower the susceptibility of the sector to dynamics in the credit market for SMEs. The research results may assist SMEs in this sense by reshaping their considerations of the available financing tools in order to achieve their objectives.

References:

- Abdullah, Z., Abdul Aziz, Y. 2013. Institutionalizing corporate social responsibility: effects on corporate reputation, culture, and legitimacy in Malaysia. Social Responsibility Journal, 9(3), 344-361. https://doi.org/10.1108/SRJ-05-2011-0110.
- Albu, O.B., Flyverbom, M. 2019. Organizational Transparency: Conceptualizations, Conditions, and Consequences. Business and Society, Vol. 58, Issue 2. https://doi.org/10.1177/0007650316659851.
- Baker, H.K., Nofsinger, J.R. 2012. Socially responsible finance and investing: Financial institutions, corporations, investors, and activists. Hoboken, N.J., Wiley.
- Bolibok, P. 2021. The impact of social responsibility performance on the value relevance of financial data in the banking sector: Evidence from Poland. Sustainability, 13(21). https://doi.org/10.3390/su132112006.
- Boxenbaum, E., Jonsson, S. 2008. Isomorphism, Diffusion and Decoupling. In: The SAGE Handbook of Organizational Institutionalism, pp. 78-98. https://doi.org/10.4135/9781849200387.n3.
- Brammer, S., Jackson, G., Matten, D. 2012. Corporate social responsibility and institutional theory: New perspectives on private governance. Socio-Economic Review, 10(1), 3-28. https://doi.org/10.1093/ser/mwr030.
- Campbell, J.L. 2007. Why would corporations behave in socially responsible ways? An institutional theory of corporate social responsibility. Academy of Management Review, 32(3), 946-967. https://doi.org/10.5465/AMR.2007.25275684.
- Carvalho, S.W., Mota, M. 2010. Consumer Reactions to CSR: A Brazilian Perspective. Journal of Business Ethics, 91, 291-310. https://doi.org/10.1007/s10551-010-0620-0.
- Chedrawi, C., Osta, A., Osta, S. 2020. CSR in the Lebanese banking sector: a neo-institutional approach to stakeholders' legitimacy. Journal of Asia Business Studies, 14(2), 143-157. https://doi.org/10.1108/JABS-03-2018-0093.
- Cubilla-Montilla, M.I., Galindo-Villardón, P., Nieto-Librero, A.B., Vicente Galindo, M.P., García-Sánchez, I.M. 2020. What companies do not disclose about their environmental policy and what institutional pressures may do to respect. Corporate

- Social Responsibility and Environmental Management, 27(3), 1181-1197. https://doi.org/10.1002/csr.1874.
- DiMaggio, P.J., Powell, W.W. 1983. The Iron Cage revisited: Institutional isomprphism and collective rationality in organizational fields. American Sociological Review, 48(2), 147-160.
- Friedman, J. 2009. A crisis of politics, not economics: Complexity, ignorance, and policy failure. Critical Review, Vol. 21, Issues 2-3. https://doi.org/10.1080/08913810903030980.
- Gamerschlag, R., Möller, K., Verbeeten, F. 2011. Determinants of voluntary CSR disclosure: Empirical evidence from Germany. Review of Managerial Science, 5(2), 233-262. https://doi.org/10.1007/s11846-010-0052-3.
- Ghanem, N., Ray, A. 2022. Lebanon bank holdups: Who is the real criminal? https://www.aljazeera.com/opinions/2022/11/18/lebanon-bank-holdups-who-is-the-real-criminal.
- Grima, S., Thalassinos, E.I. 2020. A Thematic Analysis and a Revisit to Literature on Cases of Improper Use of Derivatives. In Financial Derivatives: A Blessing or a Curse? (pp. 65-162). Emerald Publishing Limited.
- Hassanein, Z., Yeşiltaş, M. 2022. The influence of csr practices on lebanese banking performance: the mediating effects of customers' expectations. Sustainability, 14(1). https://doi.org/10.3390/su14010268.
- Jabbouri, R., Truong, Y., Schneckenberg, D., Palmer, M. 2019. Organizational Decoupling: A Systematic Literature Review and Directions for Future Research. EURAM Proceedings.
- Joseph, J. 2020. SMEs in Lebanon: An untapped force for recovery. https://www.aub.edu.lb/osb/news/Pages/SMEs-in-Lebanon.aspx.
- Kingston, C., Caballero, G. 2009. Comparing Theories of Institutional Change. Journal of Institutional Economics, 151-180. https://doi.org/10.1017/S1744137409001283.
- Malik, M. 2014. Corporate Social Responsibility: A Brief Review of Contemporary Literature. Journal of Business Ethics. https://doi.org/10.2139/ssrn.2276803.
- Ng, P.M.L., Wut, T.M., Lit, K.K., Cheung, C.T.Y. 2022. Drivers of corporate social responsibility and firm performance for sustainable development An institutional theory approach. Corporate Social Responsibility and Environmental Management, 29(4), 871-886. https://doi.org/10.1002/csr.2241.
- Schons, L., Steinmeier, M. 2016. Walk the Talk? How Symbolic and Substantive CSR Actions Affect Firm Performance Depending on Stakeholder Proximity. Corporate Social Responsibility and Environmental Management, 23(6), 358-372. https://doi.org/10.1002/csr.1381.
- Tolmie, C.R., Lehnert, K., Zhao, H. 2020. Formal and informal institutional pressures on corporate social responsibility: A cross-country analysis. Corporate Social Responsibility and Environmental Management, 27(2), 786-802. https://doi.org/10.1002/csr.1844.
- Velinov, E., Kadłubek, M., Thalassinos, E.I., Grima, S., Maditinos, D. 2023. Digital Transformation and Data Governance: Top Management Teams Perspectives.
 In: Digital Transformation, Strategic Resilience, Cyber Security and Risk Management (Vol. 111, pp. 147-158). Emerald Publishing Limited.
- Wehmeier, S., Raaz, O. 2012. Transparency matters: The concept of organizational transparency in the academic discourse. Public Relations Inquiry, 1(3), 337-366. https://doi.org/10.1177/2046147x12448580.
- Westphal, J.D., Zajac, E.J. 2001. Decoupling policy from practice: The case of stock

repurchase programs. Administrative Science Quarterly, 46(2), 202-228. https://doi.org/10.2307/2667086.

White, H. 1980. A heteroskedasticity-consistent covariance matrix estimator and a direct test for heteroskedasticity. Econometrica, Vol. 48, No. 4, pp. 817-838.