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Corporate Social and Financial Performance in Chemical Industry in the United States

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Abstract

The purpose of this study is to investigate the impact of corporation social performance (CSP) on corporate financial performance (CFP). This study uses return on assets (ROA) to measure corporate financial performance. This study uses KLD index and TRI index to measure corporate social performance separately. Using ordinary least squares (OLS) regression to analyze data from the sample of 123 U.S chemical firms from 2009-2018, this paper finds that KLD index has a significantly positive impact on CFP, while TRI index does not have a significantly impact on CFP. Meanwhile, this paper also finds that the seven individual dimensions of CSP have a significantly impact on CFP except for the environment dimension. The result contributes to the effect of CSP measurement methods in a single industry and the impact of various dimensions of CSP, expands the importance of CSP measurement methods from cross-industry research to single industry research.

Keywords: Corporation Financial Performance (CFP), Corporate Social Performance (CSP) , Chemical Industry

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INTRODUCTION

Since the influence of activist groups and the media is growing rapidly, corporate non-market strategies become more important. One important element of these nonmarket strategies is corporate social performance (CSP). Numerous researchers have explored the impact of corporate social performance on corporate financial performance (CFP), and some of them suggest that further research on this topic should be done within a specific industry that actively participates in social programs or activities (Griffin and Mahon 1997; Baird et al. 2012). Sun and Stuebs (2012) suggest that the chemical industry is a good candidate to explore the impact of CSP because during the past decade many chemical firms in the U.S. have participated in global social programs and chemical firms in the U.S. have improved their CSP.

According to Orlitzky et al. (2003), there are differences in the statistical CSP-CFP associations when using different measure methods of CSP under interdisciplinary research. It is not clear whether differences exist under single-industry research. Besides, Lim (2019) point out that further investigating the impact of individual dimensions of CSP could increase the usefulness of industry-specific studies on CSP. In other words, there is a knowledge gap about the impact of different CSP measurement strategies and individual dimensions of CSP in industry-specific studies.

The objective of this study is to examine the impact of corporation social performance (CSP) on corporate financial performance (CFP) in the chemical industry in the United States. Meanwhile, this study explores the impact of individual dimensions of CSP on firm's CFP.

There are five reasons for investigating the impact of CSP on CFP within the chemical industry or a specific industry. First, the chemical industry in the U.S. plays an important role. It accounts for 26 percent of the nation's Gross Domestic Product (GDP) and represents about 19 percent of the output of the global chemical (Sun and Stuebs 2012). Secondly, different stakeholders pay great attention to the chemical industry's social performance since products of this industry have a huge impact on the environment and the quality of human life (Sun and Stuebs, 2012). Third, every industry has special uniqueness, such as governmental regulations, oriented nature of companies, and public familiarity. When one pursues multi-industry studies, it is easy to overlook the impact of an industry's specific context on measuring on CSP and CFP, for example, the

company in internet services or consumer industry tends to a better perception of corporate social performance than those in the chemical industry (Griffin and Mahon 1997). What's more, specific social performance measures could be applied to one or several industries, such as the Toxics Release Inventory (TRI) index, which is only applied to manufacturing, metal mining, electric power generation and chemical industry (Griffin and Mahon 1997). At last, some researchers also suggest that it is inadequate to use the same accounting measures of financial performance when making comparisons across industries (Griffin and Mahon 1997).

Compared with Griffin and Mahon's (1997) CSP-CFP research in chemical industry, this study uses two different kinds of CSP measure methods, (a) KLD index as perceptual CSP measure method (b) TRI index as behavior CSP measure method, to explore the overall impact of CSP on CFP respectively. Griffin and Mahon used a hybrid CSP measure approach. At the same time, this study further investigates impact of performance on seven unique aspects of CSP: (1) corporate governance, (2) community, (3) diversity, (4) employee relations, (5) environment, (6) human rights, and (7) product quality on firm's CFP. But Griffin and Mahon did not explore it. Besides, this study ordinary least squares (OLS) regression to analyze data while Griffin and Mahon did not use regression analysis. Lastly, this paper uses 10-year data, and Griffin and Mahon only used 1-year data.

By doing regression analysis about KLD data, TRI data and ROA data from Bloomberg of 123 sample firm for the period 2009–2018, this paper finds that different measurement methods lead to CSP have different impact on CFP when focus on a single industry and seven individual dimensions of CSP have significantly impact on CFP except for environment dimension. Based on stakeholder mismatching theory (Brower and Mahajan 2013), this result suggests the suitability of the stakeholder of CSP and CFP measures affect CSP's impact on CFP, and there could be a different temporal association between the environmental dimension of CFP and CSP.

This study fills the knowledge gap about the effect of CSP measurement methods in a single industry and the impact of various dimensions of CSP. What's more, it also contributes to developing a specific pattern of social performance that is specific to the chemical industry and increases awareness of chemical corporations towards social performance and sustainable development.

The following paper mainly contains: (a) literature review, which develops research hypothesis based on findings and theories of other scholars, and gives an overview of how CSP have been measured in the past; (b) methodology, which talks about data collection, sample selection, and data analysis techniques; (c) results and discussion, which presents and interprets research results, limitation and reliability; (d) conclusion, which gives a research summary and recommendations. .

LITERATURE REVIEW

Corporate social performance (CSP) are defined as a business organization's behavior to assume social responsibility, implement processes of social responsiveness, achieve outcomes to meet the demands of multiple stakeholders (Tyagi and Sharma 2013). The operationalization of CSP can be categorized into two broad measurement strategies: (a) perceptual CSP measure; (b) behavioral CSP measure (Orlitzky et al. 2003).

CSP Measurement Strategy

Based on the assumption that assessments of third-party are good reflections of underlying CSP values and behaviors, perceptual CSP measurement strategy uses systematic third-party effort to assess a firm's CSP behaviors, such as reputational index and KLD Index. A widely used reputational index is Fortune magazine ratings of corporate social responsibility to the community (Griffin and Mahon 1997; Orlitzky et al. 2003; Tyagi and Sharma 2013).

On the other hand, behavioral CSP measurement strategy accesses CSP based on objective behaviors or information, such as charitable contribution amounts. The corporate world is increasingly inclined to view social responsibility as including social and environmental performance (Crossman 2011). Therefore, the objective behavior of the company on environmental issues is also included in the behavioral CSP measurement strategy. Previous research often uses charitable contribution amounts or the percentage change in waste produced by the corporation (TRI index) as behavioral CSP measurement (Crossman 2011; Griffin and Mahon 1997).

CSP- CFP Relationship

Harrison and Wicks (2013) suggest there is a positive relationship between CSP and CFP based on instrumental stakeholder theory. The instrumental stakeholder theory proposes that an important factor affecting the

financial performance of an organization is the degree of satisfaction of the organization with different stakeholder groups. Also, Bridoux and Stoelhorst (2014) points out that the negotiation and contracting processes between stakeholder and corporation managers help monitor manager behavior and prevent managers from distracting from the organization's economic goals, which also indicates that different stakeholder groups' satisfaction has an impact on corporation financial outcome. In addition, by meeting and balancing the different needs of multiple stakeholder groups, the organization's ability to adapt to external needs can attract the attention of more external stakeholder groups, increase the source of capital of the organization, and thereby improve the financial performance of the organization (Freeman et al. 2010).

Harrison and Wicks (2013) also proposes that in the process of facing different needs of multiple stakeholder groups, companies could coordinate or prioritize these interests and their needs simultaneously. By coordinating and prioritizing the interests of stakeholders, the company could reduce the possibility of becoming a subordinate or compromiser, which saves the company valuable corporate resources such as time, labor and capital. Based on the above theoretical support, it is not difficult to see that CPS, as an enterprise's social responsibility, meeting the needs of different stakeholders, and practicing the corresponding social process, could have a positive effect on corporate financial performance. As a result, we predict that:

Even though a number of narrative reviews and theories have proposed conceptual explanations for the existence of a causal relationship between CSP and CFP, but past researchers failed to provide clear answers. Some researchers have found a positive relationship (Ekatah et al. 2011; Orlitzky et al. 2003), and the others have found an inconclusive relationship (Chetty et al. 2015; Griffin and Mahon 1997; Baird et al. 2012). Previous researches have used sampling error and measurement error to explain inconsistent findings and differences in correlations across variable measurement subsets.

First, Aras et al. (2010) believe that the one factor that could cause these inconclusive results is sampling error. Random sampling errors tend to occur in studies where the sample size of the measurement group or measurement subgroup is relatively small. Since some CFP or CSP measurement methods used in CSP-CFP studies limit the sample size to a

relatively small range, it is reasonable to use sampling errors to explain CSP-CFP correlational differences in primary studies.

In addition to sampling errors, Baird et al. (2012) add that measurement errors may also be one of the important factors. For example, when some scholars survey business professionals and students to measure corporate social performance, this situation is prone to measurement errors. When using data with large measurement errors, CSP-CFP correlations could be different from more reliable measures of CSP.

However, when Orlitzky et al. (2003) conducted cross-sectional research that focuses on multiple industries, they found differences in the statistical associations between different measure methods of CSP still exist after excluding sampling error and measurement error. Specifically, while perceptual CSP measure such as KLD index has correlations with CFP, behavior measure such as TRI index lacks correlations with CFP.

Development of Hypotheses

In order to find out whether CSP have different impact on CFP between different CFP measurement strategies when research focuses on a single industry. This study uses perceptual CSP measure strategy and behavioral CSP measure strategy respectively. Based on Orlitzky et al. (2003)'s finding in cross-industry research, this study predicts that:

- H1: Corporate social performance does not have significantly impact on financial performance using behavioral CSP measure
- H2: Corporate social performance has significantly impact on financial performance using perceptual CSP measure

Besides, Barnett and Salomon (2012) and Lim (2019) suggest that CSP-related studies should pay attention to the impact of individual dimensions of a firm's CSP as well. Different dimensions represent different stakeholders, further research on individual dimensions of CSP could promote awareness about how variables such as product quality and environmental performance might influence CFP (Lioui and Sharma 2012).

Research firms like KLD measure CSP via seven variables of stakeholders' interactions, including (a) corporate governance, (b) community, (c) diversity, (d) employee relations, (e) environment, (f) human rights, and (g) product quality (Sun and Stuebs 2012).

Lioui and Sharma (2012) agreed to measure CSP from seven dimensions by proposing CSP should be evaluated based on (1) culture and

management within the organization, (2)human rights and employee relations within the organization, (3)organizations' relations and behavior towards environment, (4)partnerships with different stakeholders such as customers,(5) transparency in communication and financial reporting, and (6)business process and outcome such as product.

Based on the instrumental stakeholder theory mention above, a firm should meet the need of not only shareholders but also stakeholders including customers, employees, suppliers and society (Lioui and Sharma 2012). Meanwhile, all the stakeholders interact with the organization must be treated equitably to achieve excellent financial performance (Freeman et al. 2010). This study predicts that:

H3: All seven individual dimensions of corporate social performance have significantly impact on corporate financial performance.

METHODS

This study chose 123 sample U.S. chemical firms because data needed is accessible. Since this study used data from 2009 to 2018. The total observations for each variable were 1,230.

In this study, the dependent variable is corporate financial performance (CFP). Following Lim (2019) and Griffin and Mahon (1997), this study used return on assets (ROA)to measure the financial performance of a firm. As an accounting-based metric, ROA is a good predictor of the current and short-term financial performance of the firm. And it is the most popular ratio to measure CFP in CFP-CSP research (Griffin and Mahon 1997). ROA data were obtained from Bloomberg.

In this study, the independent variable is corporate social performance (CSP).As discussed earlier, this paper used (a) perceptual CSP measure and (b) behavioral CSP measure, to measure CSP. KLD index was used as a perceptual CSP measurement strategy, and TRI index was used as a behavioral CSP measurement strategy. KLD index was obtained from Bloomberg, and TRI index was obtained from the Environmental Protection Agency (EPA).

Created by a well-known financial analysis firm, Klinder, Lydenberg Domini (KLD), KLD social Index is widely cited in the academic literature on the CSP investments because of its long track record. KLD index is validated to be more objective and comprehensive as compared with other sources (Sun and Stuebs 2012).

KLD index assesses CSP from seven dimensions, including community, corporate governance, diversity, employee relations,

environment, human rights, and product. For each dimension, the company is accessed based on the positive indicators and negative indicators. For example, if one company has great volunteer programs (a positive indicator for community dimension) during this year, this company would get one point for positive indicators, which indicates they have strengths in the community dimension. However, if this company has tax disputes (a negative indicator for community dimension) during this year, this company would get one point for negative indicators, which indicates they have concerns in this community dimension.

Consistent with prior research (Baird et al. 2012; Sun and Stuebs 2012; Lim 2019), this paper calculates KLD index by subtracting total concerns from total strengths of seven dimensions. KLD index score is computed as follows:

KLD Index = COM Index (Total strengths of Community – Total concerns of Community)
+ CGOV Index (Total strengths of Corporate Governance – Total concerns of Corporate Governance)
+ DIV Index (Total strengths of Diversity – Total concerns of Diversity)
+ EMP Index (Total strengths of Employee Relations – Total concerns of Employee Relations)
+ ENV Index (Total strengths of Environment – Total concerns of Environment)
+ HUM Index (Total strengths of Human Rights – Total concerns of Human Rights)
+ PRO Index (Total strengths of Product – Total concerns of Product)

Percentage change in waste produced by the corporation could reflect the corporation's treatment of toxic wastes, so it is an objective fact about corporate performance with regards to environmental issues (Griffin and Mahon 1997). It is referred to as TRI index because it is calculated by data in the annual Toxics Release Inventory (TRI) published by Environmental Protection Agency (EPA). Toxics Release Inventory (TRI) is used by the government to tabulate relative amounts of corporation's discharges into the environment. The United States Environmental Protection Agency (EPA) requires that a plant must report its emissions if it has more than ten employees or manufactures, produces, or discharges chemicals on the list. In addition to the discharge of chemical substances, other environmental emissions such as disposal of hazardous wastes and environmental discharges related to landfills are also included. Specifically, TRI index is assessed by calculating the differences in the corporation's total release to the environment between the prior year and the current year.

Following Lim (2019) and Sun and Marty (2012), This study used the seven individual indexes that make up the KLD index to represent the

performance of different aspects of CSP. These seven indexes include COM index (contributions on community), HUM index (approach to human rights), CGOV index (performance in the area of governance), PRO index (efforts to improve product quality), DIV index (openness to diversity) and ENV index (impact on the environment).

Empirical Specification

Following Lim (2019), this study used ordinary least squares (OLS) regression and the following three models to test H1, H2, and H3, respectively.

$$CFP = \beta_0 + \beta_1 TRI \quad (1)$$

$$CFP = \beta_0 + \beta_1 KLD \quad (2)$$

$$CFP = \beta_0 + \beta_1 HUM + \beta_2 EMP + \beta_3 CGOV + \beta_4 PRO + \beta_5 COM + \beta_6 DIV + \beta_7 ENV \quad (3)$$

Where:

CFP= return on assets ratio, which is used to measure corporate financial performance

KLD= KLD index, which is created by KLD firm to assess overall corporate social performance

TRI= percentage change in waste produced by the corporation, a behavior measure to assess overall corporate social performance

HUM= HUM index, used to assess a firm's approach to human rights

EMP= EMP index, used to assess a firm's treatment of employees

CGOV= CGOV index, used to assess a firm's performance in the area of governance

PRO= PRO index, used to assess a firm's efforts to improve product quality

COM= COM index, used to assess a firm's contributions on community

DIV= DIV index, used to assess a firm's openness to diversity

ENV= ENV index, used to assess a firm's impact on the environment

The first model above tested the impact of a behavioral CSP measure (TRI index) on CFP. The second model above tested the impact of a perceptual CSP measure (KLD index) on CFP, while the third model above tested the impact of seven individual dimensions of CSP on CFP.

RESULTS AND DISCUSSION

Descriptive Statistics

Table 1 shows mean value, minimum value and maximum value of CFP (measured by ROA), TRI index, KLD index, and seven CSP dimensions indexes. TRI index has the largest maximum value of 1228. KLD index has the largest mean value of 6.746, and PRO has the smallest mean value of -0.0463. Among the seven dimensions of CFP, the diversity dimension has the highest mean value of 2.622

Table 1. Descriptive Statistics of Sample Firms in Chemical Industry

Variable	Observations	Mean	Min	Max
TRI	1,230	1.473	-1	1228
CFP	1,230	0.139	0.0484	0.679
KLD	1,230	6.746	3	19
HUM	1,230	1.439	-3	6
EMP	1,230	1.659	-3	9
CGOV	1,230	0.0626	-3	2
PRO	1,230	-0.0463	-4	3
COM	1,230	0.963	-1	4
DIV	1,230	2.622	-1	7
ENV	1,230	0.0463	-2	2

Source: Results of data processing using SPSS

Table 2 shows the correlations among the selected variables. KLD index is highly correlated with CFP; however, the correlation between TRI index and CFP is low. Among individual dimensions of CSP, the correlations between CFP and community dimension, and the correlations between CFP and diversity dimension are the highest.

Table 2. Correlations among Selected Variables

	TRI	CFP	KLD	ENV	EMP	CGOV	PRO	COM	DIV	HUM
TRI	1									
CFP	0.00250	1								
KLD	-0.0286	0.546	1							
HUM	0.0270	0.225	0.688	1						
EMP	-0.0223	0.0948	0.481	0.195	1					
CGOV	0.0340	0.0595	0.219	0.122	-0.0694	1				
PRO	0.00140	0.0850	0.162	0.0728	0.100	0.0083	1			
COM	-0.0340	0.357	0.381	0.166	-0.140	0.0156	-0.269	1		
DIV	-0.0438	0.375	0.135	-0.0958	-0.468	-0.153	-0.294	0.255	1	
ENV	-0.00400	0.0164	0.235	0.122	0.138	0.0432	0.104	-0.0372	-0.175	1

Source: Results of data processing using SPSS

Main Results

Table 3 shows the impact of independent variables (CSP) on dependent variable (CFP). The first column shows all the independent variables. The second column shows that TRI index does not have a significantly impact on CFP, while the third column shows that KLD index has a positive impact on CFP ($p < .001$). The fourth column shows that six dimensions of CSP has a positive and significant ($p < .001$) impact on CFP. These six dimensions include community, corporate governance, diversity, employee relations, human rights and product. However, the environment dimension does not have a significant impact on CFP.

Table 3. Ordinary Least Squares Regression Analysis Result

VARIABLES	CFP	CFP	CFP
HUM			0.00553*** (0.00115)
EMP			0.0133*** (0.00105)
CGOV			0.0131*** (0.00196)
PRO			0.0236*** (0.00213)
COM			0.0228*** (0.00204)
DIV			0.0250*** (0.00126)
ENV			0.00462 (0.00343)
TRI	5.09e-06 (5.10e-06)		
KLD		0.0130*** (0.000650)	
Constant	0.139*** (0.00204)	0.0520*** (0.00349)	0.0221*** (0.00445)
Observations	1,230	1,230	1,230
R-squared	0.000	0.298	0.432
Robust standard errors in parentheses			
*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$			

Impact of Perceptual CSP Measures on CFP

Based on the main results, this paper finds that perceptual CSP measures used (KLD index) have a significantly positive impact on CFP measure used (ROA) in the chemical industry, which might indicate that corporate social performance and corporate financial performance are positively related. This finding supports H2.

In 2003, Orlitzky et al. (2003) have conducted cross-industry research about CSP-CFP correlation. In their research, Orlitzky et al. (2003) find that CSP reputation indices (a perceptual CSP measure) are positively correlated with CFP, which is similar to what this paper find. Hiller (2013) support this view by stating that CSP could be organizational resources

that provide enterprises with internal or external benefits, or both. According to them, when an organization communicates or shows its CSP level with external parties, a company with good social performance can easily establish a good image among customers, investors, bankers and suppliers (Hiller 2013).

Besides, companies with higher CSP can use corporate social responsibility disclosure as one of the evidences of their excellent social performance. Stakeholders' assessment of their corporate reputation and future development in the absence of complete information is likely to be based on this (Ekatah et al. 2011). The signs that these companies are doing well can also attract better employees or increase the credibility of current employees, which can improve financial results as well (Harrison and Wicks 2013)

Impact of Behavior CSP Measures on CFP

In contrast, this paper finds that behavior CSP measures used (TRI index) does not have a significant impact on CFP measures used, which might further implies that the corporation's social performance might not be related to their financial performance under behavior CSP measurement strategy. This finding supports H1.

Griffin and Mahon (1997) have also found a similar result that charitable contributions amount (a behavior CSP measure) lacks correlations with CFP. Brower and Mahajan's (2013) mismatching thesis could explain this finding. The correlation between CSP and CFP may vary depending on the evaluation indicators of CSP, which represent the expectations of stakeholders on the company. Therefore, if the stakeholders of CSP and CFP evaluation indicators are different, in theory, positive correlation might not exist (Brower and Mahajan 2013). Furthermore, there would be positive results if perceptual CSP measurement strategies and accounting-based CFP measures are used to investigate the relationship because both stakeholders of perceptual CSP measurement strategies and accounting-based CFP measures are market-oriented (Brower and Mahajan 2013). In contrast, when behavioral CSP measurement strategies and accounting-based CFP measure are used, there are no positive CSP-CFP correlations because stakeholder of behavioral CSP measurement strategies is not market-oriented, which is a mismatch with the stakeholder of accounting-based CFP measure.

Impact of CSP Individual Dimensions on CFP

At last, this paper finds that individual dimensions of CSP have a significant impact on CFP except for environment dimension, which does not support H3.

This finding is similar to Lim's (2019) finding in cross-industry research, he finds that environment dimension of CSP and CFP are not significantly related. An explanation is mentioned by Ducassy (2013), corporate virtue in the form of environmental responsibility might be rewarding in a different way than social responsibility, and the rewarding might take a longer time to have an impact on corporate operations and resources. Orlitzky et al. (2003) also agree on this point by stating there could be a different temporal association between corporate environmental performance and CFP, for example, current environmental performance has an impact on subsequent CFP rather than current CFP.

In sum, a study's operationalization of CSP is an important moderator when investigating CSP's impact on CFP. Different measurement strategies of CSP could lead to different results about CSP's impact on CFP in both single-industry study and multiple-industry study. Also, the result suggests that corporate environmental performance could have different temporal associations with CFP.

Limitations

While this study contributes to the findings of the CSP-CFP relationship, it is not deniable that this study has some limitations. First, CFP measurement approaches (KLD index, TRI index) chosen by this study limit study sample size. Since most companies that have reported their discharges to the TRI and are included in the KLD index from 2009-2018 are large and well-known chemical companies in the United States, some small and medium-sized chemical companies are excluded from this study. Besides, the availability of data makes this study only choose ROA, TRI index and KLD index to measure corporate social performance and financial performance. Other performance indicators, such as price per share, share price appreciation and CSP disclosure are not used (Barnett and Salomon 2012; Griffin and Mahon 1997).

Finally, this study only considers the simultaneous correlation between CSP and CFP, that is, this study focuses on the impact of current CSP on current CFP. CSP may represent a large extent on the availability of excess funds. Only by obtaining these excess resources required to

undertake corporate social responsibility and responsiveness, companies are more likely to improve their social performance, so there may be a link between the previous CFP and the subsequent CSP (Chetty et al. 2015; Orlitzky et al. 2003).

Theoretical contributions

This study makes several contributions. First of all, this paper expands the importance of CSP measurement methods from cross-industry research to single industry research. Although many studies examine the relationship between CSP and CFP, very few studies examine the impact of individual dimensions of CSP and different CSP measure methods. Thus, this paper contributes to the CSP literature. Also, the chemical industry is an important engine of wealth creation, whose products are often key to how human society meets its needs and can offer solutions to other sectors of industry. However, many chemical corporation companies consider social issues as nonrelated to their corebusiness. Particularly, chemical corporations from developing countries, often focus mainly on achieving economic growth, leaving environmental and social performance aside (Sunand Stuebs 2012). By focusing on the chemical industry, this paper presents empirical evidence about the importance of social performance and sustainable development in the chemical industry and improves managers' understanding of why CSP matters.

Reliability

Table 4 shows variance inflation factor (VIF) statistics of variables used in the study. Each variable's VIF is below 10, which could support the validity and reliability of the study.

Table 4. Variance Inflation Factor Statistics

Variable	VIF	1/VIF
Intercept	8.03	0.12448
DIV	5.12	0.195463
EMP	2.33	0.429283
COM	2.29	0.437113
ENV	2.23	0.448299
PRO	1.17	0.85481
CGOV	1.08	0.923864
HUM	1.06	0.943418
KLD	6.04	0.165486
TRI	1	0.997477
Mean VIF	3.035	

Source: Results of data processing using SPSS

Besides, there are other reasons why this study reliable and valid. First, data in this study is obtained from reliable databases, such as Bloomberg. Furthermore, this paper uses regression analysis to analyze the relationship between different variables, which is a common and effective method used by many CSP studies (For example, Lim 2019). Lastly, this paper produces similar study results with the previous researcher (For example, Griffin and Mahon 1997; Lim 2019). Meanwhile, the study results are also supported by the theory and findings of other scholars (for example, Bridoux and Stoelhorst 2014). As for validity, the initial hypothesis of this paper is developed based on other researchers' theory (for example, Harrison and Wicks 2013) or their finding in (for example Orlitzky et al. 2003) in the cross-industry study. It is reasonable to predict that cross-industry and sing industry study would produce similar results. Also, by focusing on the chemical industry and including all samples that meet the data availability restrictions, the result of this study could be generalized across chemical industry in the United States.

CONCLUSION

Motivated by the intensifying interest in, but insufficient evidence of, CSP's overall impact on CFP and different CSP dimensions' impact on CFP, this paper investigates this issue within the context of the chemical industry by measuring CSP using two different methods and using seven indexes to represent seven aspects of CSP. Based on a sample of 123 chemical firm-year observations from 2009 to 2018, this paper documents an important finding, that is, different measurement strategies of CSP could lead to different results about the impact of CSP on CFP in the sing-industry study and most CSP aspects have positive impact on CFP. These results imply that chemical firms shall further optimize each aspect of CSR performance and researchers shall choose CSP measures carefully.

Even though this study has limitations about sample size, data types, and temporal associations. This study finding is still important because it furthers our understanding of corporate social performance and financial performance in a specific industry context, offers more relevant insights to practitioners, and emphasizes the importance of CSP measurement methods.

Further investigation should be conducted into other industries as well as comparisons across the industry. Also, further study should have consistency in measurement criteria to increase internal validity. Besides,

further research could pay attention to different temporal associations(a) prior CSP related to subsequent CFP; (b) prior CFP related to subsequent CSP

REFERENCES

- Ducassy, I. (2013). Does corporate social responsibility pay off in times of crisis? An alternate perspective on the relationship between financial and corporate social performance. *Corporate Social Responsibility and Environmental Management*, 20(3), 157-167.
- Ekatah, I., Samy, M., Bampton, R., & Halabi, A. (2011). The relationship between corporate social responsibility and profitability: The case of Royal Dutch Shell Plc. *Corporate Reputation Review*, 14(4), 249-261.
- Freeman, R. E., Harrison, J. S., Wicks, A. C., Parmar, B. L., & Colle, S. (2010). *Stakeholder theory: The state of the art*. Cambridge, NY: Cambridge University Press.
- Griffin, J. J., Mahon, J. F. (1997). The corporate social performance and corporate financial performance debate: Twenty-five years of incomparable research. *Business & Society* 36: 5-31.
- Harrison, S. J., & Wicks, C. A. (2013). Stakeholder theory, value, and firm performance. *Business Ethics Quarterly*, 23(1), 97-124
- Hiller, J. S. (2013). The benefit corporation and corporate social responsibility. *Journal of Business Ethics*, 118(2), 287-301.
- Lim, Christopher. (2019). The Impact of Social Variables on Financial Performance RAIS Conference on Social Sciences and Humanities. 11-19.
- Lioui, A., & Sharma, Z. (2012). Environmental corporate social responsibility and financial performance: Disentangling direct and indirect effects. *Ecological Economics*, 78(5), 100-111.
- Orlitzky, M., Schmidt, F. L., Rynes, S. L. (2003). Corporate social and financial performance: A meta-analysis. *Organization Studies* 24: 403-441.
- Sun, L. and Stuebs, M. J *Bus Ethics*. (2012). Corporate social responsibility and firm productivity: evidence from the chemical industry in the United States. *Journal of Business Ethics* 118(2): 251-263.
- Tyagi, R., & Sharma, A. K. (2013). Corporate social performance and corporate financial performance: A link for the Indian firms. *Issues in Social & Environmental Accounting*, 7(1), 4-29.