iJRASET
International Journal For Research in Applied Science and Engineering Technology



INTERNATIONAL JOURNAL FOR RESEARCH

IN APPLIED SCIENCE & ENGINEERING TECHNOLOGY

Volume: 9 **Issue:** XI **Month of publication:** November 2021

DOI: https://doi.org/10.22214/ijraset.2021.38905

www.ijraset.com

Call: 08813907089 | E-mail ID: ijraset@gmail.com

International Journal for Research in Applied Science & Engineering Technology (IJRASET)
ISSN: 2321-9653; IC Value: 45.98; SJ Impact Factor: 7.429
Volume 9 Issue XI Nov 2021- Available at www.ijraset.com

Cash Dividends as A Signal to Broker-Dealer Firms

Kelly Oniha
Texas A&M International University, USA

Abstract: Using multivariate regression analysis complemented with simple linear regression, I find that not only do current fiscal year brokerage, clearing, and Exchange expenses affect commission and fees (CE) paid to the broker but also prior brokerage, clearing, and Exchange expenses (BCE). Also, I find that Cash dividends are positively correlated with BCE expenses as well as CE fees. This result is particularly interesting because it implies that brokers can influence commission and fees by affecting the BCE expenses. This might also provide further reasons for agency problems to take place. Overall, this paper contributes to the existing literature on the behavior of brokers and dealers and how they influence the stock market.

I. INTRODUCTION

BCE expenses are the expenses incurred by a broker or dealer on brokerage, clearing, and other fees related to the securities. CE represents an income to the broker that results from fees charged for acting as an intermediary. Cash dividends are the return on capital to the stockholder. It is a payout to the stockholder for contributing capital to the firm. Broker incentives have been difficult are to investigate. The reason is that nowadays, brokerage activities are done online and not via stockbrokers. There are different types of stockbrokers, and they include, full-service brokers and discount brokers. Brokers that operate online are called discount brokers, while those that offer a lot of help to the client ranging from advisory to consultancy services.

Discount brokers are more patronized by smaller firms since they command lower fees (Adrian and Etula, 2011). However, full-service brokers command much larger fees but they offer more services than discount brokers. There exists a fiduciary duty for the brokers to act in the best interest of the client. While that is true to some extent, there is an underlying agency problem that may exist. Indeed, Christoffersen, Evans, & Musto, (2016) stated that revenue sharing has exposed the realized returns of their clients to the brokers, and this incentivizes broker behavior that can be of significant impact on any recommended funds.

Hiring a broker requires thorough due diligence on the part of the investor. Most of all are the fees or commission the brokers' charge. This paper looks at the relationship between these three key variables: Cash dividends, brokerage expenses, and commission and fees. Most investors willing to hire a broker, receive some sort of dividends from the capital invested in a company. I believe cash dividends paid sends a signal to brokers that might be enough to influence these brokers to raise the prices of their commission and fees. This would also have a positive effect on the brokerage or clearing expenses due to the commission incentives.

II. PROBLEM STATEMENT

Extant literature has explored the investor – broker relationship in financial markets. It is no secret that there can exist an agency principal problem despite the measures that are in place to protect both parties. However, most, if not all investigated the behavior of main investors and not the brokers. Broker-dealers are very important to the financial economy despite the advent of technology (Farooqui, 2017). An innovation many deemed will result at the end of brokers. Many institutional investors have resulted to hire proxies that would help mediate their interests. One of which is the shareholder proposal that can indicate both a positive and a negative signal in the market. Positive in the sense that these shareholder proposals can act as a mechanism for monitoring control of corporate governance and they can also have a negative effect as it sends a negative signal that shareholder proposals bring to question, the governance strategy of a company. Either way, the influence of the broker-dealer is evident. Indeed, even Adrian and Shin (2009) stated that broker-dealers can affect the economy since they are deemed to be the marginal suppliers of credit and their liabilities indicates constraints of the financial market system.

Allen and Usher (2016), believe that brokers have an important role to play in explaining the real output in the US economy because the increase in brokers provides a signal of liquidity and credit availability. A broker gets his revenue primarily from the bid price. Indeed, Battalio, Jennings, and Selway (1998) stated that a fraction of broker revenue is based on the payment for order flow arrangement. Furthermore, they stated that brokers would prefer to drive their trading expenses down. But the most important question here is why? Why should a broker care about driving expenses down when he knows that whatever expenses the broker incurs will be fully imbursed through the payment of commission and fees. This lies in the problem statement. While several factors might have a direct or indirect impact on the behavior of the brokers or dealers, this paper only limits its findings to the influence of Cash Dividends.

©IJRASET: All Rights are Reserved

Dividends are just one of the wealth available to shareholders along with capital gains. Since dividends are risk-averse compared to capital gains, this represents an available means for stockholders to take advantage of (Serletis, et. al 2018). Whole stock dividends might be preferred to cash dividends as a result of its flexible nature in terms of choice, this paper concentrates solely on cash dividend. Moreover, stock dividends, due to its liquid nature, can be turned into cash. Either way, I argue that cash available has a significant relationship with the expenses incurred by stockbrokers and thus, their commissions.

III. LITERATURE REVIEW

This section will consist of the theory motivation, previous studies, and findings, and the definition of the key variables used.

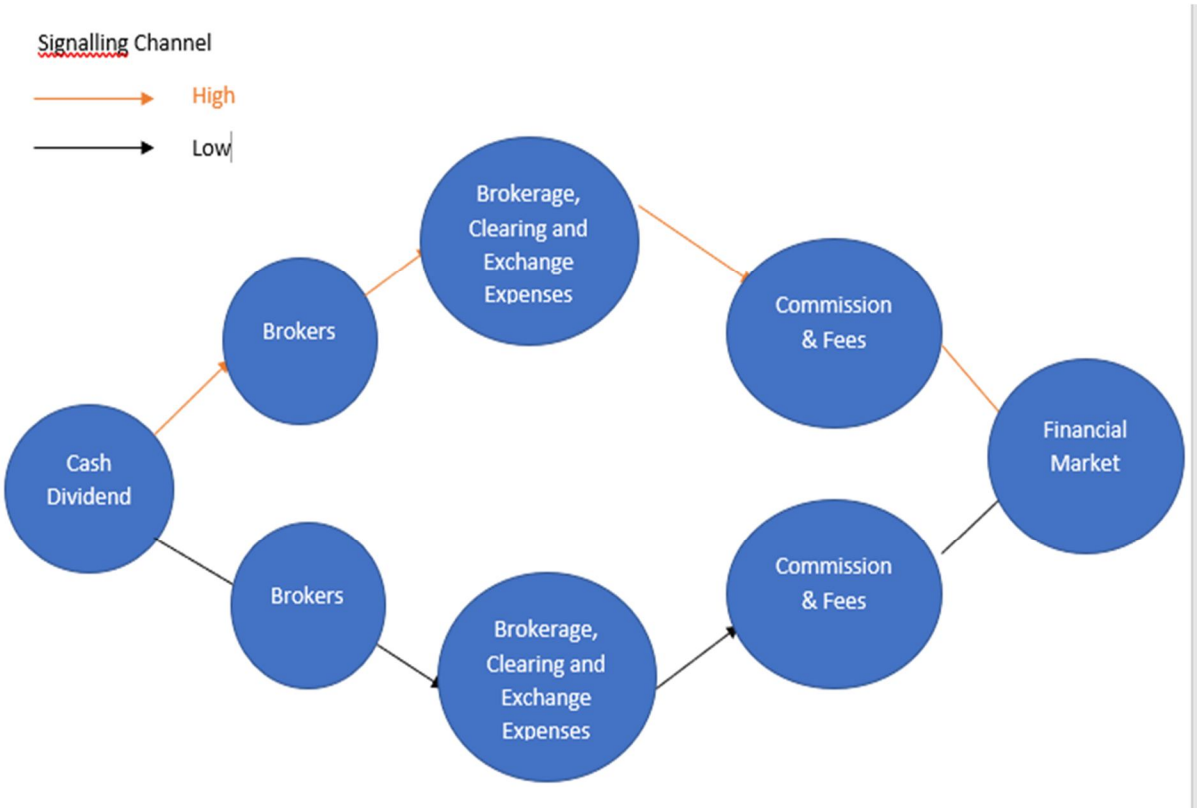
A. Theory Motivation

What is Signal Theory?

According to MITlab "Signaling theory is concerned with understanding why certain signals are reliable and others are not. It looks at how the signal is related to the quality it represents and what are the elements of the signal or the surrounding community that keep it reliable. It looks at what happens when signals are not entirely reliable – how much unreliability can be tolerated before the signal simply becomes meaningless?". This implies that signaling theory concerns itself with how individuals communicate within an environment, that is, how an agent can transmit information to the principal (recipient). The signal it transmits conveys some kind of information that has the power to influence the behavior of the recipient. Signaling can apply in a competitive environment where the interests of both parties are in alignment or conflict. For instance, education level or skills gathered from training can send a signal to a prospective employer that a candidate is a viable one.

In this paper, the Cash dividend is viewed as a signal that influences and affects the actions of the brokers. Higher cash dividends paid by the firm would mean more money in the hands of the stockholders that is likely to increase the number of broker-dealer hires, or it can mean that brokers or dealers can have more freedom to incur expenses because of the cash from dividend payout available (cash dividend), and that results in higher commission and fees depending on the trading fees incurred. Therefore, all of these actions can impact the financial market, directly or indirectly.

Figure 1.

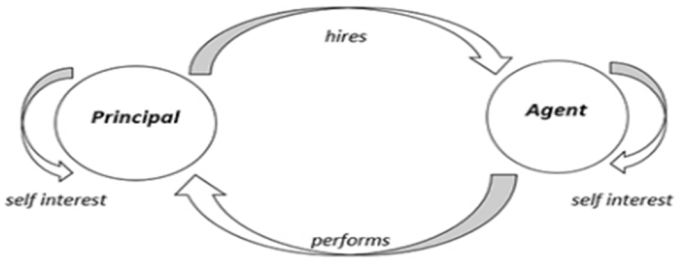


©IJRASET: All Rights are Reserved

B. Agency Problem Theory

Another theoretical motivation is the agency problem theory that stipulates a conflict of interest that can be inherent in any relationship due to the issue of self-interest. In this paper, the agency problem can lie with the broker having a self-interest in influencing the commission and fees paid by the stockholder for work or activities done on behalf of the stockholder. The basic idea here is that the principal, which in this case, is the stockholder hires the broker to perform work on the stockholder's behalf. Self-interest may arise as a result of asymmetry information.

Figure 2



Sourced from Performance Magazine

C. Key Variables

1) Cash Dividend

According to Compustat, the Cash dividends data set derived is any dividend that is not stock dividends, which has been declared based on a company's fiscal year net income. According to Compustat, the item includes:

- Cash paid instead of fractional shares
- Dividends declared by a pooled company before the acquisition (for the year of the merger)
- Dividends on preferred/preference stock of a merged company exchanged for common/ ordinary stock
- The monetary amount of dividends declared on classes of common/ordinary stock (other than the main class)

a) And it excludes.

- Consolidated subsidiary dividends (included in Minority Interest [Income Account] [MII])
- Dividends declared in stock of other companies
- Dividends in kind

2) Brokerage, Clearing, and Other Fees

These are expenses incurred by a broker that deals in securities.

According to Compustat, the Brokerage, Clearing, and Other fees are excluded.

a) Commissions received for security transactions, included in Commissions and Fees (Broker/Dealer) (CFBD)

b) Professional fees, included in Commissions and Fees Paid & Other (CFPDO)

3) Commission and Fees

This is the revenue gotten from stockholders for the activities conducted in the capacity as a dealer in securities.

a) According to Compustat, This includes:

- Brokerage commissions
- Commissions from commodities
- Commissions from money market instruments
- Commissions from mutual funds
- Commissions from options
- Commissions from securities

b) While it Excludes

- Commissions and fees from investment banking, included in Investment Banking Income (IBKI)
- Other commissions and fees attributed to broker/dealer operations, included in Income? Other (Broker/Dealer) (IOBD)

©IJRASET: All Rights are Reserved

D. Previous Literature

On June 5th, 2019, The Securities and Exchange Commission, which governs the stock market operations as well as the activities of dealers and brokers, stipulated a rule, after a deciding vote of 3-1. The rule addressed the relationships between investors and broker-dealers. Under the new rule (Regulation Best Interest), the broker-dealer as well as an associated natural person determined by the broker must be present during the recommendation and investment strategy process to act according to the interest of the customer above any financial interests (Weiss, P. 2019). The reason for this is to ensure there are no conflicts of interest in the broker-dealer not doing their jobs adequately. Indeed, a broker-dealer must satisfy obligations where their disclosure has been substantially designed to relate important communication about compensation, conflicts, and ways to address any conflicts during the relationship (Ahmed and Farah, 2020). This implies that investors are aware of the fees stated by the broker-dealer, which in turn might send different signals to the investor during the pre-hire stage. For instance, a high fee schedule might send a signal of the high competency level of the broker-dealer, while a low fee schedule might send a signal of low competency.

Brokerage fees are charged yearly on the balance of the investor. It is usually a small percentage of the investor's balance that must be paid even if the account of the investor goes dormant. However, the commission fees vary from firm to firm, and also depends on the work performed on behalf of the investor (Rosengren E (2014). Why these fees vary from firm to firm raises more questions. Could it because of the dividends these firms pay? Could it be because of the value of the firm, or could it be because of the size of the firm? One commonality that influences these questions is incentives to the stockholders, particularly dividends. Dividends also affect the value of the firm, and since large firms tend to pay larger dividends, then dividends and size are related, thus, the reason why this paper focuses on dividends. Furthermore, most broker-dealers are aware of the cash dividends to be received by the investor because they offer recommendations of "accepting the cash dividends or reinvesting it" to the investors after the dividend has been declared. Moreover, cash dividends may even be received through the broker-dealer depending on the company's policy. This is proof that the level of significance of broker-dealers in the market is ever on the rise. Adrian and Shin [2009a] posited that in the United States, the broker-dealer creates a market for securitized products and this step has overtaken the traditional role of commercial banks in the supply of credit.

The National Association of Securities Dealers implied that broker-dealers also share in the investor's revenue, arguing that "when an investment adviser agrees to pay a broker-dealer cash compensation not otherwise disclosed in the prospectus fee table". Christoffersen, Evans, and Musto (2013) argued that revenue sharing can disclose a clients' realized returns to the brokers and that can be significant to the incentives it imparts in the recommendation of funds process by the broker. Battalio, Jennings, and Selway (2014) argued that bid price is the most significant revenue source, however, to determine this bid price, several factors need to be considered. One pre-assumed notion in previous literature has had to do with the influence of the number of representatives or clients which the broker-dealer industry serves. So I derived the dataset of the number of representatives in which U.S. broker firms represent, as well as the total revenue and cost derived in the last five calendar years. This dataset was sourced from investment news.

Figure 3

Data Derived from Investment News							
Year	Number of Reps	Revenue	Cost	Cost per representative	Inc/decr in revenue	Inc/decr in cost	increase in reps
2015	2097	422,000,000	412,100,000	196,519	0%	0%	0%
2016	2026	417,700,000	407,700,000	201,234	-1%	-1%	-3%
2017	2227	469,800,000	460,100,000	206,601	12%	13%	10%
2018	2290	545,000,000	529,000,000	231,004	16%	15%	3%
2019	2294	587,800,000	567,400,000	247,341	8%	7%	0%

As you can see from Figure 3, the number of representatives has a weak, but positive relationship with cost and revenue. This is evident in the latest years, 2018 and 2019, in which the number of reps increased by only 3% and 0.17% respectively, the revenue and cost increased by 16% and 8% for revenue and 15% and 7% for cost. Given that these values are in millions, this is a significant increase. The weakness in this relationship suggests that other factors might signal to these broker-dealers to want to increase their cost, to subsequently increase their revenue. Thus, this paper would help provide a generalized view of the activities and motives of the broker-dealer.

©IJRASET: All Rights are Reserved

E. Hypotheses

Christoffersen, Evans, and Musto (2013) argued that the motivations behind N-SAR reporting requirements are a result of the brokers' incentive. The incentives to these broker-dealers hurt investors to the extent that most times, institutional investors would want to do all activities themselves rather than employing the services of the broker-dealers. The hypothesis has been divided into 3. First, to test whether there is any relationship between cash dividends and broker and BCE & CE. Second, to test the relationship between BCE and CFE. Third, to test whether previous year expenses affect subsequent year commission and fees. The hypotheses are stated below: Fourth, test whether dividends (not just cash dividends) relate positively to future Commission and Fees paid and brokerage, clearing, and Exchange expenses.

1) *Hypothesis 1a:* Cash Dividends have a positive relationship with a brokerage, clearing, and Exchange expenses.
2) *Hypothesis 1b:* Cash Dividends has a positive relationship with the Commission and Fees paid.
3) *Hypothesis 2:* Brokerage, clearing, and Exchange expenses relate positively with Commission and Fees paid.
4) *Hypothesis 3:* Prior year Brokerage, clearing, and Exchange expenses relate positively with subsequent Commission and Fees paid.
5) *Hypothesis 4:* Prior dividends relate positively with subsequent Commission and Fees paid and brokerage, clearing, and Exchange expenses.

IV. METHODOLOGY

This paper employed multiple research quantitative methods. First, it employed one-way multivariate regression analysis to measure where Cash dividend paid is the independent variable; and both Commission and Fees paid and brokerage, clearing, and Exchange expenses are the dependent variables.: $y = \beta\ 0 + \beta\ 1\ x\ 1 + \beta\ 2\ x\ 2 + \varepsilon$. Next, a linear regression variable was used to test the one-way relationships for hypotheses 1b, 2, and 3. $Y = a + bX$.

The basic idea here is to investigate the motives behind the actions of the broker-dealers in setting their commission and fees and the signal in which cash dividends provide. Hypothesis 4 regresses total dividends against the dependent variables. The rationale or logic behind this to indirectly investigate if cash dividends are not only the type of dividend that sends a signal to broker-dealers but instead, prior dividends (that is, the cumulation of stock dividends, cash dividends, liquidating dividends) as a whole sends signals to the broker-dealers.

V. DATA AND SUMMARY STATISTICS

The data sources are mainly from investment news as well as Compustat. It includes all firms excluding financial firms from Compustat. Financial firms were excluded due to the differences in the fiscal year common to this industry. The sample period, based on the judgment, of the researcher, is from 1999 to 2019, which sums up to 20 years. The summary statistics are attached below. Dvpd – Cash dividends paid; Cfbd – Commission and Fees paid; Bcef – Brokerage, Clearing and Fees expenses; Dvt: Total dividends.

Figure 4

Variable	Obs	Mean	Std. Dev.	Min	Max
dvpd	9,652	179.1011	1151.466	-.861	82452
cfbd	1,776	484.0365	1716.431	0	23187
bcef	1,656	91.85181	336.5361	0	3252
dvt	217,574	91.45357	626.7613	-665.655	85419

VI. RESULTS AND ANALYSES

Figure 5 shows the result of the one-way multivariate regression. The result confirms my suspicion that the independent variable, Cash dividends Paid, is positive and significant to both independent variables as expected. This implies that an increase in the cash dividend paid might mean that investors have more money in hand to hire broker-dealers to perform work on their behalf. It also indicates that since broker-dealers can recommend what to do with cash dividends, the increase in cash dividends to be paid to these investors, provides an incentive to employ broker-dealers because they benefit from the recommendation are expected to be larger. Figure 5 supports hypotheses 1a and 1b. However, there is a weaker relationship but positively significant relationship between cash dividends and brokerage, clearing, and fees expenses.

©IJRASET: All Rights are Reserved

Figure 5

Equation	Obs	Parms	RMSE	"R-sq"	F	P
bcef	2,031	2	274.0389	0.0749	164.2422	0.0000
cfbd	2,031	2	1317.302	0.0334	70.09761	0.0000

	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
bcef						
dvpd	.1298573	.0101327	12.82	0.000	.1099858	.1497288
_cons	47.96633	6.401047	7.49	0.000	35.41302	60.51964
cfbd						
dvpd	.4078016	.0487077	8.37	0.000	.3122794	.5033239
_cons	328.8369	30.76978	10.69	0.000	268.4933	389.1806

Next, Table 6 tests the relationship between the Commission and Fees expenses and brokerage, clearing, and fees expenses. I found a strong and positive relationship between these two variables which helps explain the weak relationship between cash dividend paid and BCE. Table 6 result suggests that there might be an indirect relationship between cash dividend and BCE. This is interesting because it implies that brokers tend to look at cash dividends as a signal before reevaluating commission and fees and this influences their motivation to incur reasonable expenses that would aid them in achieving that commission and any additional fees. This provides further proof to figure 3, that cost and revenue of investor brokers increase at almost the same rate. This supports hypothesis 2.

Table 6

Source	SS	df	MS		
				Number of obs	= 2,065
				F(1, 2063)	= 1403.49
Model	1.4768e+09	1	1.4768e+09	Prob > F	= 0.0000
Residual	2.1708e+09	2,063	1052270.7	R-squared	= 0.4049
				Adj R-squared	= 0.4046
Total	3.6477e+09	2,064	1767288.01	Root MSE	= 1025.8

cfbd	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
bcef	2.992192	.0798703	37.46	0.000	2.835558	3.148827
_cons	185.5829	23.30757	7.96	0.000	139.8741	231.2918

After observing the strong and positive relationship between commission and fees, and brokerage, clearing, and fees. It is important to test if prior year expenses are being considered when setting future charges that will be disclosed to investors. The dependent variable is the current year commission and fees, while the independent variable is the previous year brokerage, clearing, and fees incurred. Table 7 shows a positive and significant relationship. However, this result cannot be relied upon as Stata only related 9 observations.

Table 7

Source	SS	df	MS		
				Number of obs	= 9
				F(1, 7)	= 206.17
Model	5401793.58	1	5401793.58	Prob > F	= 0.0000
Residual	183400.329	7	26200.0471	R-squared	= 0.9672
				Adj R-squared	= 0.9625
Total	5585193.91	8	698149.238	Root MSE	= 161.86

cfbd	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
lag_bcef	14.30919	.9965456	14.36	0.000	11.95274	16.66565
_cons	7.243906	72.32645	0.10	0.923	-163.781	178.2688

©IJRASET: All Rights are Reserved

Finally, It is fair to include all dividends to investigate how it compares to the independent variables (Cfbd and bcef). Specifically, whether prior dividends might be a consideration brokers explore when setting charges. This is the ultimate signal test because it signals the strength and value of the investment in the eyes of the broker-dealer. Figure 8 shows a positive and significant relationship, which provides support to hypothesis 4. Coupled with previous findings, this suggests that broker-dealer firms will be very much like to get a higher commission than the previous year, whether they add more clients to their books or not. This is also consistent to figure 4, where the revenue has been on the increase since 2017.

Figure 8

```
. reg cfbd lag_dvt
```

Source	SS	df	MS	Number of obs	=	1,741
				F(1, 1739)	=	51.78
Model	121984911	1	121984911	Prob > F	=	0.0000
Residual	4.0967e+09	1,739	2355750.6	R-squared	=	0.0289
				Adj R-squared	=	0.0284
Total	4.2186e+09	1,740	2424502.99	Root MSE	=	1534.8

cfbd	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
lag_dvt	.4581498	.0636677	7.20	0.000	.3332765	.5830231
_cons	351.1094	39.04091	8.99	0.000	274.5373	427.6815

```
. reg bcef lag_dvt
```

Source	SS	df	MS	Number of obs	=	1,625
				F(1, 1623)	=	176.29
Model	17386623.1	1	17386623.1	Prob > F	=	0.0000
Residual	160069298	1,623	98625.5689	R-squared	=	0.0980
				Adj R-squared	=	0.0974
Total	177455921	1,624	109270.888	Root MSE	=	314.05

bcef	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
lag_dvt	.1776898	.0133829	13.28	0.000	.1514402	.2039393
_cons	51.16624	8.255249	6.20	0.000	34.97418	67.35831

VII. IMPLICATIONS

There have been many calls within the financial industry to reform regulatory policies in the financial service industry. The industry has become overly complex, specifically, as a result of the many roles in which broker-dealers play. Since the late 20th Century, the demands from the market have impacted the shape of firms and caused several regulatory reforms to take place due to the difficulty for institutional investors to understand brokers-dealers and their fees. Despite this, the broker-dealer's role importance is there for all to see. They offer extensive information on finances at a cost. To some extreme, many investors do not understand the duties, titles, services, and fees charged by these broker-dealers (Hung, Clancy, Dominitz, Talley, Berrebi, and Suvankulov, 2008). The most interesting thought to this is that even though broker-dealers are legally required to explain all charges and compensations, the understanding of these fees is still ambiguous to the institutional investors. Thus, the implication of this study is to broaden the understanding of what influences these fees, and especially, the signal of cash dividends might influence actions from the broker-dealers in setting fees.

VIII. LIMITATIONS

One limitation of the study is that cash dividends might not just be the only signal to brokers-dealers. One other signal that comes to mind is the role in which education and experience play in setting prices. Bognanno and Melero (2015) posited that in job assignment, asymmetric information sends a signal of worker's ability to potential employers. Broker-dealers with advanced education might feel their worth is more than those with a higher degree, thus affecting prices. Another is experienced, the experience of the broker-dealers within the financial service industry might influence fees charged. Therefore, there is a gap in the literature that needs to be further explored in this area. Further study needs to be done on the impact of education and experience on broker-dealer behavior concerning fees set.

©IJRASET: All Rights are Reserved

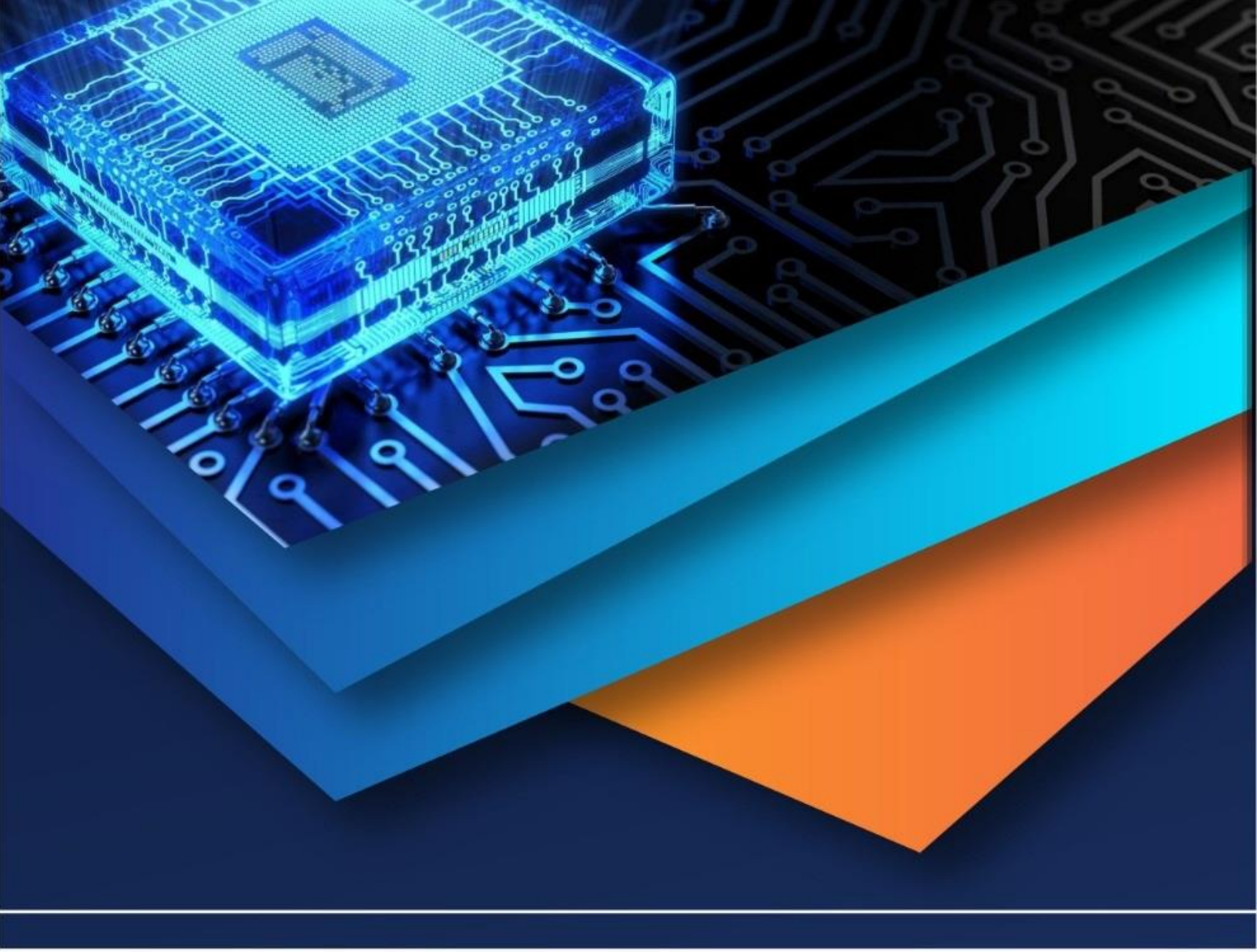
IX. SUGGESTIONS AND CONCLUSIONS

Since it is important for customers to understand the prices and compare prices on similar products to derive the maximum satisfaction, utility, or value for their money, then it should be important for institutional investors to compare value on their investments when searching for the right broker-dealer firms. The disclosure of fees channel needs to be clarified and explicit because many of the broker-dealers have different methods or channels to disclose these fees. Misunderstanding the channels might prevent investors from being privy to salient information which is a risk to the investor. Furthermore, an appropriate fee disclosure channel can protect the broker-dealers from any complaints from institutional investors that could negatively affect their reviews since complaints are filed with the securities regulators, as most broker-dealers must be lawfully registered. In conclusion, dividends, particularly all types of dividends send a signal to the broker-dealer firms in setting fees. There is also a positive and significant correlation between brokerage clearing and fees and commission and fees.

REFERENCES

[1] Adrian, T. and Etula, E. (2011) Broker-Dealer Leverage and the Cross-Section of Stock Returns.
[2] Adrian, T. and Shin, H. (2009) Money, Liquidity, and Monetary Policy. American Economic Review. Vol. 99, No. 2.
[3] Ahmed, M. and Farah, Q (2020) Adjustment dynamics between broker-dealer leverage and stock market: a threshold cointegration analysis. Empirical Economics.
[4] Allen, J. and Usher, A. (2016) Investment dealer collateral and leverage procyclicality. Empirical Economics (2020) 58:489–505.
[5] Battalio, R., Jennings, R., and Selway, J. (1998) The Relationship between Market-making Revenue, Payment for Order Flow, and Trading Costs for Market Orders.
[6] Bognanno, M., and Melero, E. (2015) Promotion Signals, Experience, and Education. Journal of Economics & Management Strategy. Volume 25, Issue 1
[7] Brudan, A (2010) Agency theory and its link to pay for performance arrangements.
[8] Christoffersen, S., Evans, R., & Musto, D. (2016) What Do Consumers' Fund Flows Maximize? Evidence from Their Brokers' Incentives. The Journal of Finance Volume 68, Issue 1.
[9] Farooqui, A. (2017) Three Measures of Broker-Dealer Risk Appetite and the Cross-Section of Stock Returns.
[10] Hung, A., Clancy, N., Dominitz, J., Talley, E., Berrebi, C., and Suvankulov, F. (2008) Investor and Industry Perspectives on Investment Advisers and Broker-Dealers. Journal Storage.
[11] Rosengren E (2014) Broker-dealer finance and financial stability. In: Keynote remarks conference on the risks of wholesale funding sponsor.
[12] Serletis A, Istiak K (2018) Broker–dealer leverage and the stock market. Open Econ Rev 29(2):215–222.

©IJRASET: All Rights are Reserved



10.22214/IJRASET

45.98

IMPACT FACTOR: 7.129

IMPACT FACTOR: 7.429

INTERNATIONAL JOURNAL FOR RESEARCH

IN APPLIED SCIENCE & ENGINEERING TECHNOLOGY

Call : 08813907089 (24*7 Support on Whatsapp)