“Investigating the effect of corporate governance on audit quality and its impact on investment efficiency”

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INVESTIGATING THE EFFECT OF CORPORATE GOVERNANCE ON AUDIT QUALITY AND ITS IMPACT ON INVESTMENT EFFICIENCY

Abstract

There is an academic discussion about investment efficiency, regarding its determinants and effects. Corporate Governance (CG) and Audit Quality (AQ) are determinants of investment efficiency The main objective of the article is to investigate the effect of CG and AQ on investment efficiency, this objective is divided into sub-objectives: to investigate the direct effect of CG on AQ, AQ on investment efficiency, and CG on investment efficiency. Moreover, the indirect effect of CG on investment efficiency through AQ as a mediator variable. This paper focuses on non-financial listed firms in the Egyptian Stock Exchange (EGX), especially firms recorded in EGX 100 for four years' period (2013–2018), for 103 firms and 412 completed observations. The researcher uses Structural Equation Modeling (SEM) through SmartPLS software. The paper shows evidence that management that has good CG mechanisms obtains a suitable atmosphere to prepare transparent financial statements, which helps enhance the auditor's role and improve AQ. Improving AQ lowering IA, which increases the trust of investors in management decisions, this leads to reduce pressure on management and improve efficiency of investment decisions. Having good CG mechanisms provides management with a good atmosphere to make right investment decisions, and having good CG mechanisms increases AQ, which helps management to have a good environment to make investment decisions with higher efficiency, or in other words, there is a significant and positive effect of integration between CG and AQ on investment efficiency.

Keywords corporate governance mechanisms, audit tenure, audit fees, auditor size, overinvestment, underinvestment

JEL Classification C81, G41, M41

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INTRODUCTION

An investment is an asset or item acquired to generate or obtain other benefits. The level of suitable investment is evaluated using the concept "investment efficiency" (Li & Wang, 2010). There are two cases of investment efficiency: first, underinvestment case, where a firm that missed investment opportunities can bring positive Net Present Value (NPV) or there is a production capacity shortage; second, overinvestment case, where there is negative NPV or the firm will have loads that should not even exist (Islami, 2017; Siregar & Nuryanah, 2019).

Investment efficiency determinants are presented through information asymmetry (IA) (Salin, Nor, & Nawawi, 2018). Since IA prevents efficient investment due to the differential degree of information between related parties, it helps managers select investment opportunities that are not in the best interest of owners but are favorable for managers (Verdi, 2006).

One of the investment efficiency determinants is having good Corporate Governance (CG) mechanisms, which confirm firm management's credibility. Good CG mechanisms may enhance financial statements' transparency, accuracy, and trust (Rahman & Bermer, 2016; Salin, 2017), facilitating the auditors' role to do their jobs reflected on Audit Quality (AQ). In contrast, poor CG mechanisms risk the firm being mismanaged, impair firm reputation, and encourage fraud and unethical practices (Karim, Nawawi, & Salin, 2018; Alhababsah, 2018). These mechanisms are followed by practices of firm scandals due to fraud in inaccurate financial statements, causing loss of trust in financial statements (Rahman & Bermer, 2016).

CG mechanisms have a direct or indirect effect on investment efficiency through AQ and IA. Regarding the direct effect, CG mechanisms limit managerial behavior and control management decisions, which are reflected in the efficiency of investment decisions by providing architecture of accountability. These mechanisms must ensure that the firm's assets are managed efficiently (Chen, Sung, & Yang, 2017; Salin, Nor, & Nawawi, 2018). However, there is an indirect association between CG mechanisms and investment efficiency through AQ. Enhancing AQ, since having good CG mechanisms provides a good atmosphere to increase AQ, and then lowering IA, which gives a management push and trust to make the right decisions, means increasing investment efficiency (Clinch, Stokes, & Zhu, 2012).

Regarding the Egyptian context, the legal environment affects AQ since law enforcement is not enough and does not support auditors' maintenance or improvement (Anis, 2014). Moreover, CG principles in Egypt are going up, since they have increased from 62% in 2001 to 82% in 2004 (Dahawy & Conover, 2007). In 2002, the Cairo and Alexandria Stock Exchange (CASE) had modified rules to encourage good CG practices for Egyptian listed firms. Until preparing this paper, there are continuous changes in legislation in the area of CG, as different users of financial statements are interested in these rules for enhancing the quality of the financial reporting process.

1. LITERATURE REVIEW

1.1. Corporate governance and audit quality

Previous studies that investigated the effect of CG on AQ are divided into three groups. The first group reveals that all CG mechanisms, or at least all tested mechanisms, associate with AQ. Okaro and Okafor (2015) prove a positive impact of board size and board diligence on AQ for Nigerian listed banks. Anafiah, Diyanty, and Wardhani (2017) show evidence that controlling shareholders positively affect AQ for Indonesian listed firms. Suryanto, J. Thalanssinos, and E. Thalanssinos (2017) found that audit committee and board characteristics positively affect AQ for Indonesian listed firms. Haque, Afroze, and Zohra (2019) show that CG has a positive relationship with AQ for listed firms in Dhaka Stock Exchange. Sailendra, Murwaningsari, Mayangsari, and Murtanto (2020) show that CG mechanisms positively affect AQ with a moderating effect of benevolence on this association for the sample of Indonesian listed firms.

The second group shows evidence that some CG mechanisms have a significant effect on AQ, but other CG mechanisms do not significantly affect AQ. Soliman and Abd Elsalam (2012) reveal an effect of board independence, CEO duality, and audit committees on AQ. However, there is no effect of institutional investor and managerial ownership on AQ for a sample of the listed Egyptian firms. Dwekat, Mardawi, and Abdeljawad (2018) show evidence that firms with high ownership concentration, larger board size, and audit committee's existence increase AQ. However, director ownership, board independence, CEO duality do not affect AQ for the sample of Palestinian listed firms.

The third group reveals that CG mechanisms affect AQ. Kasim, Hashim, and Salman (2016) approve that there is no consistent association between good CG mechanisms and AQ for the sample of Malaysian listed firms.

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1.2. Audit quality and investment efficiency

Previous studies that investigated the effect of AQ on investment efficiency are divided into two groups. The first group confirms this association. Saghafi and Motamedi (2011) reveal that firms with high investment opportunities use high AQ for a sample of Iranian listed firms. Dashtbayaz and Mohammadi (2016) show a positive association between AQ and investment efficiency for a sample of Iranian listed firms. Elaoud and Jarboui (2017) show evidence that auditor specialization is one mechanism to enhance investment efficiency for underinvestment cases. Park, I. Kim, and W. Kim (2017) indicate that depending on one of the Big 4 audit firms increases investment efficiency. Chen, Jaing, and Zhang (2019) confirm AQ's positive effect on investment efficiency using financial statements quality. Masrouki and Houcine (2019) find that auditor knowledge positively affects investment efficiency for a sample of Tunisian listed firms. Siregar and Nuryanah (2019) confirm AQ's positive effect on investment efficiency for a sample of Indonesian listed firms. Finally, Shahzad and Rehman (2019) confirm this association for a sample of listed firms in Pakistan.

The second group does not confirm a full association between AQ and investment efficiency. Moeinadin, Khaneghah, and Mazraehno (2013) confirm an inverse association between auditor specialization and overinvestment. However, there is no association between overinvestment and auditors' tenure for a sample of Iranian listed firms. Islami (2017) confirms that investments in firms with industry specialization auditors have no effect on investment efficiency for a sample of Indonesian listed firms. Boubaker, Houcine, Ftiti, and Masri (2018) show that auditor knowledge reduces investment, with overinvestment case, for a sample of French listed firms.

1.3. Corporate governance and investment efficiency

Salami (2011) proves a positive association between ownership concentration, governance structure, and investment efficiency for a sample of listed firms in Ghana. Chen, Cheng, Gong, and Tan (2014) confirm that firms with strong CG mitigate investment efficiency for a sample of Chinese listed firms. Chen, Sung, and Yang (2017) confirm a negative association between ownership concentration and investment efficiency. Besides, incentive-based compensation improves investment efficiency for a sample of Chinese listed firms. Felix (2018) reveals that the increasing percentage of outside directors leads to a higher investment efficiency level. Salin, Nor, and Nawawi (2018) find that board size, board independence, and managerial ownership affect the investment level for the top 200 Malaysian listed firms. Rashed, Abd El-Rahman, Isamil, and Abd El-Samea (2018) confirm that most Egyptian listed firms rely on institutional ownership to reduce IA and facilitate investment decisions monitoring. Lai, Liu, and Chen (2020) find that managers in firms with weak internal control over financial reporting are more likely to make efficient investments.

The last studies interested in the relationship between CG mechanisms and investment efficiency show evidence that there is a positive effect of CG mechanisms on investment efficiency. However, to the best of the researcher's knowledge, no study tested AQ's influence as a mediator in this association.

Finally, the literature adequately identifies some determinants of investment efficiency, but there are some shortcomings. First, there is less knowledge about the effect of these determinants in emerging or underdeveloped markets. Second, the existing literature does not link CG and AQ in emerging markets before. Therefore, this paper's main question is testing the effect of both CG and AQ on investment efficiency.

2. RESEARCH OBJECTIVES AND HYPOTHESES DEVELOPMENT

According to the literature review, this paper's main objective is to investigate the effect of CG and AQ on investment efficiency as determinants of investment efficiency. This main objective is divided into four sub-objectives: first, investigating the effect of CG on AQ, second, investigating the

effect of AQ on investment efficiency, third, investigating the direct effect of CG on investment efficiency, and fourth, investigating the integration the effect of CG and AQ on investment efficiency.

Based on the objective and literature review groups, the hypotheses are as follows:

H1: Corporate Governance has a significant association with Audit Quality.

H2: Audit Quality has a significant association with investment efficiency.

H3: Corporate Governance has a significant effect on investment efficiency through Audit Quality as a mediator variable.

3. RESEARCH METHODS

3.1. The model

The AQ's mediating role on the association between CG mechanisms and investment efficiency is represented in Figure 1.

3.2. Research variable

3.2.1. First: Measuring the dependent variable (investment efficiency (Inv. Eff.))

Biddle and Hilary (2006) express investment efficiency as a deviation from the optimal investment. A positive residual represents overinvestment, whereas a negative residual represents underinvestment. This model uses panel data methodologies. The researcher reports coefficients estimated using standard errors adjusted. The main equation to compute investment is as follows:

$$Invest_{it} = \mu + \beta_1 CFO_{it-1} + \beta_2 MTB_{it} + \varepsilon_{it}, \quad (1)$$

where $Invest_{it}$ – Capital expenditures, scaled by net PPE at the beginning of the year; CFO_{it-1} – Operating cash flow, scaled by net PPE at the beginning of the year; MTB_{it-1} – Market to book ratio, measured as the ratio of the market value of equity plus the book value of total assets minus the book value of equity, which is divided by the book value of total assets.

3.2.2. Second: Measuring mediation variables (Audit Quality (AQ))

AQ proxies are used in this research are:

1. **Audit tenure (Aud. Ten.):** According to Chen, C.-J. Lin, and Y-C. Lin (2008), the longer the audit tenure, the better auditors' understanding of the client's activities with time, increasing their ability to do auditing jobs efficiently. Besides, auditors' long-term period pushes auditors to make more efforts to maintain their reputation. This leads to improved AQ. Almutairi, Dunn, and Skantz (2009) mention that longer tenure enhances the auditor and client's economic association, which considers audit tenure one of AQ proxies. Besides, Dashtbayaz and Mohammadi (2016) and Li (2018) confirm that audit tenure positively affects investment efficiency. This proxy is measured by the natural logarithm of the audit tenure.

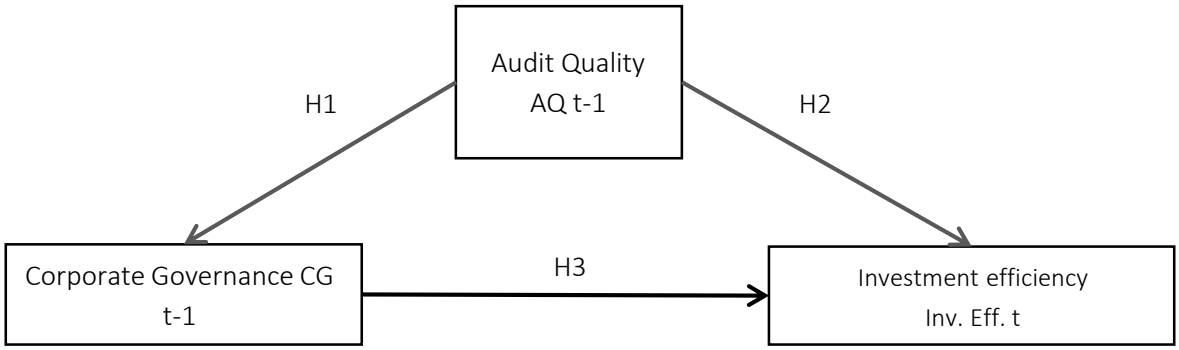

Figure 1. Research model to test hypotheses

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2. **Auditor size (Big 4):** Chan and Liu (2018) argue that larger auditors reduce AQ opportunistically since many literature reviews show that the auditor size is one of AQ proxies. Besides, Park, I. Kim, and W. Kim (2017), Masrouki and Houcine (2019), and Shahzad and Rehman (2019) confirm that depending on auditing one, Big 4 increases investment efficiency. Auditor size gets a value of one when the auditor is one of Big 4 auditors; otherwise, zero for non-Big 4 auditors.

3. **Audit fees (Aud. Fees):** Clinch, Stokes, and Zhu (2012) argue that higher audit fees indicate higher audit effort then greater AQ. This proxy is measured by the natural logarithm of auditors' fees.

3.2.3. Third: Measuring the independent variable (Corporate Governance (CG))

CG mechanisms are used in this research together are:

1. **Ownership concentration (Ownership Conc.):** Salami (2011) and Rashed, Abd El-Rahman, Isamil, and Abd El-Samea (2018) measured it using total shares of owners who hold more than 5% of outstanding shares.

2. **Board size:** Chen, Sung, and Yang (2017) and Salin, Nor, and Nawawi (2018) presented it as the number of directors serving on the board.

3. **Board independence (Board Ind.):** Chen, Sung, and Yang (2017), Felix (2018), Salin, Nor, and Nawawi (2018) and Rashed, Abd El-Rahman, Isamil, and Abd El-Samea (2018) measured it as a natural logarithm of the number of outside directors not related to an executive.

4. **Number of audit committee members (Aud. Comm. Mem.):** Chen, Sung, and Yang (2017) presented it as a natural logarithm of the number of audit committee members.

5. **Number of audit committee meetings (Aud. Comm. Meet.):** Chen, Sung, and Yang (2017) presented it as a natural logarithm of the number of audit committee meetings.

3.3. Data description

Published annual reports in the Thomson Reuters Eiko database were used. The sample lasts from 2015 to 2018. The researcher excluded data until 2014 due to the 2011 Egyptian revaluation and the subsequent events, which affected Egyptian stock market stability. Moreover, the researcher excluded all banks and financial institutions because this sector is affected by additional rules related to auditing and CG mechanisms issued by the Central Bank of Egypt that could significantly affect research results.

3.4. Descriptive statistics

Table 1 introduces descriptive statistics for all study variables.

The main sample is divided into two sub-samples since the first sub-sample is related to overinvestment cases, which has 186 yearly observations. The second sub-sample is related to underinvestment cases, which has 226 yearly observations. The observations that are suffering from overinvestment problems are higher than underinvestment problems. Moreover, Table 1 indicates that Skewness ranges are between –3 and +3, and Kurtosis ranges are between –10 and +10 for all variables, which means the deviations are normal and do not have any significant effect on the following results.

Table 1. Descriptive statistics of the variables

Source: Data processed (2020).

Variable	N	Mean	Median	Min.	Max.	Std. dev.	Kurtosis	Skewness
Overall sample								
Inv. Eff.	412	–0.009	–0.024	–0.382	0.553	0.261	–0.844	0.415
Ownership Conc.	412	0.576	0.616	0.000	1.000	0.245	–0.193	–0.601
Board Size	412	0.871	0.845	0.301	1.230	0.164	–0.043	–0.306
Board Ind.	412	0.721	0.750	0.000	1.000	0.193	1.482	–1.090
Aud. Comm. Mem.	412	0.520	0.477	0.000	0.845	0.126	5.768	–0.933

Table 1 (cont.). Descriptive statistics of the variables

Variable	N	Mean	Median	Min.	Max.	Std. dev.	Kurtosis	Skewness
Aud. Comm. Meet.	412	0.648	0.602	0.000	1.681	0.253	2.942	0.159
Aud. Fees	412	4.940	4.954	4.079	5.778	0.400	–0.379	–0.012
Big 4	412	0.333	0.000	0.000	1.000	0.471	–1.498	0.714
Aud. Ten.	412	0.884	0.903	0.000	1.398	0.391	–0.627	–0.546
Overinvestment sample								
OVERINV.	186	0.233	0.224	0.001	0.553	0.165	–0.907	0.404
Ownership Conc.	186	0.603	0.644	0.000	0.997	0.230	0.206	–0.758
Board Size	186	0.873	0.845	0.477	1.176	0.198	–0.675	–0.263
Board Ind.	186	0.688	0.778	0.000	1.000	0.260	–0.059	–0.996
Aud. Comm. Mem.	186	0.526	0.477	0.477	0.699	0.081	0.006	1.269
Aud. Comm. Meet.	186	0.666	0.602	0.000	1.681	0.279	2.823	0.474
Aud. Fees	186	5.041	5.057	4.079	5.778	0.393	–0.495	–0.141
Big 4	186	0.452	0.000	0.000	1.000	0.498	–1.983	0.196
Aud. Ten.	186	0.956	1.041	0.000	1.398	0.395	–0.395	–0.767
Underinvestment sample								
UNDERINV.	226	–0.207	–0.238	–0.382	0.000	0.119	–1.405	0.275
Ownership Conc.	226	–0.562	0.556	0.000	1.000	0.251	–0.377	–0.464
Board Size	226	0,861	0.845	0.477	1.146	0.147	–0.044	–0.451
Board Ind.	226	0.714	0.714	0.000	1.000	0.191	2.016	–1.088
Aud. Comm. Mem.	226	0.517	0.477	0.000	0.845	0.149	4.310	–1.060
Aud. Comm. Meet.	226	0.630	0.602	0.000	1.146	0.231	2.230	–0.456
Aud. Fees	226	4.798	4.845	4.079	5.778	0.451	–0.532	0.054
Big 4	226	0.265	0.000	0.000	1.000	0.442	–0.864	1.069
Aud. Ten.	226	0.850	0.903	0.000	1.398	0.381	–0.521	–0.550

3.5. Data analysis

Structural Equation Modeling (SEM) method based on Partial Least Squares (PLS) is used to process data based on running SmartPLS software. To test the model and proxies validity, the researcher presented the following tests:

3.5.1. Model goodness of fit

The model makes sure that models have trusted and generalized results (see Table 2).

Table 2. Model goodness of fit

Source: Data processed (2020).

Test of model fit	Accepted level	Default model		Decision
		OVERINV model	UNDERINV model	
SRMR	SRMR < 0.08	0.028	0.037	The results of the model are easy to interpret
NFI	NFI ≥ 0.95	0.975	0.952	The models improve the fit

Table 2 indicates that both research models are fit and easy to interpret. Moreover, OVERINV model is fit more than UNDERINV model.

3.5.2. Inner model assessment (structural model)

R-squares are presented in Table 3 to judge the model's relevance.

Table 3. R-squares value

Source: Data processed (2020).

Constructs	OVERINV model	UNDERINV model
AQ	0.298	0.192
OVERINV	0.555	–
UNDERINV	–	0.463
Q^2 value	0.688	0.566

The models used three variables influenced by others since CG mechanisms influenced AQ variable. Similarly, the *OVERINV/UNDERINV* variables were also influenced by both CG mechanisms and

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AQ. Q^2 represents predictive relevance, since the higher Q^2, the more fit is the model with the data. The value of Q^2 is calculated from the following equation:

$$Q^2 = 1 - \left[\left(1 - R^2\right) \cdot \left(1 - R^2\right)\right]. \quad (2)$$

Based on Table 3, the amount of variability of data, which was explained by the structural model, was 68.8% for OVERINV model and 56.6% for UNDERINV model. The structural models for *OVERINV* and *INDERINV* in the study have a good fit.

3.5.3. Discriminant validity

Discriminant validity assures the association between proxies and latent variables. The results obtained from the discriminant validity test are as follows (see Table 4).

Table 4 indicates that all proxies make up each variable (the values in bold) that meets the discriminant validity since it has the largest outer loading value for the variable formed.

3.5.4. Outer model assessment (structure model)

The convergent validity tests are presented in Table 5.

Table 5 shows the value of each proxy's loading factor (convergent validity), since having a statistical t-value of > 1.96 means valid proxies and all t-values in this table, so all proxies are valid.

Table 4. Values of discriminant validity (cross-loading)

Source: Data processed (2020).

	OVERINV model			UNDERINV model		
	CG	**AQ**	**OVERINV**	**CG**	**AQ**	**UNDERINV**
Ownership Conc.	0.606	0.384	–0.325	0.602	0.217	0.377
Board Size	0.831	0.427	–0.534	0.686	0.289	0.398
Board Ind.	0.719	0.436	–0.403	0.592	0.220	0.366
Aud. Comm. Mem.	0.610	0.292	–0.411	0.822	0.349	0.474
Aud. Comm. Meet.	0.597	0.303	–0.388	0.718	0.397	0.343
Aud. Fees	0.524	0.924	–0.620	0.414	0.922	0.533
Big 4	0.473	0.885	–0.617	0.384	0.885	0.522
Aud. Ten.	0.478	0.903	–0.633	0.349	0.810	0.479
Biddle and Hilary model	–0.615	–0.688	1.000	0.567	0.586	1.000

Table 5. Outer weights

Source: Data processed (2020).

	OVERINV model					UNDERINV model				
	Original sample (O)	**Sample mean (M)**	**Std. dev.**	**T-statistics (O/Std. dev.)**	**P-value**	**Original sample (O)**	**Sample mean (M)**	**Std. dev.**	**T-statistics (O/Std. dev.)**	**P-value**
Ownership Cons. → CG	0.262***	0.254	0.092	2.833	0.005	0.266**	0.270	0.104	2.554	0.011
Board Size → CG	0.411***	0.405	0.127	3.245	0.001	0.283***	0.280	0.102	2.786	0.005
Board Ind. → CG	0.274**	0.272	0.109	2.521	0.012	0.265***	0.257	0.098	2.706	0.007
Aud. Comm. Mem. → CG	0.202**	0.202	0.100	2.021	0.043	0.286**	0.278	0.129	2.224	0.026
Aud. Comm. Meet. → CG	0.301***	0.293	0.112	2.680	0.007	0.353***	0.348	0.116	3.034	0.002
Aud. Fees → AQ	0.430***	0.407	0.153	2.804	0.005	0.350**	0.343	0.173	2.019	0.044
Big 4 → AQ	0.352**	0.360	0.142	2.477	0.013	0.469***	0.461	0.119	3.930	0.000
Aud. Ten. → AQ	0.323**	0.330	0.147	2.195	0.028	0.324**	0.328	0.155	2.091	0.037
Biddle model → OVERINV	1.000***	1.000	0.000	–	–	–	–	–	–	–
Biddle model → UNDERINV	–	–	–	–	–	1.000***	1.000	0.000	–	–

Note: *** significance at 1%; ** significance at 5%.

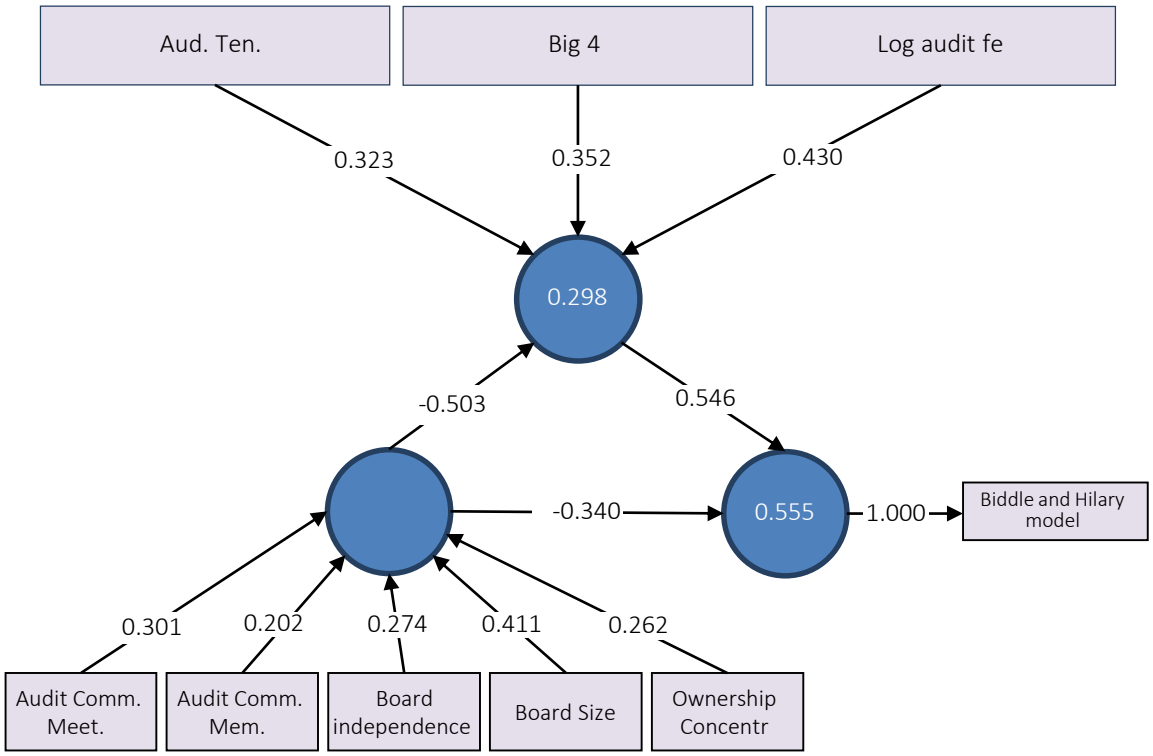

Figure 2. Structural model (outer model), OVERINV model

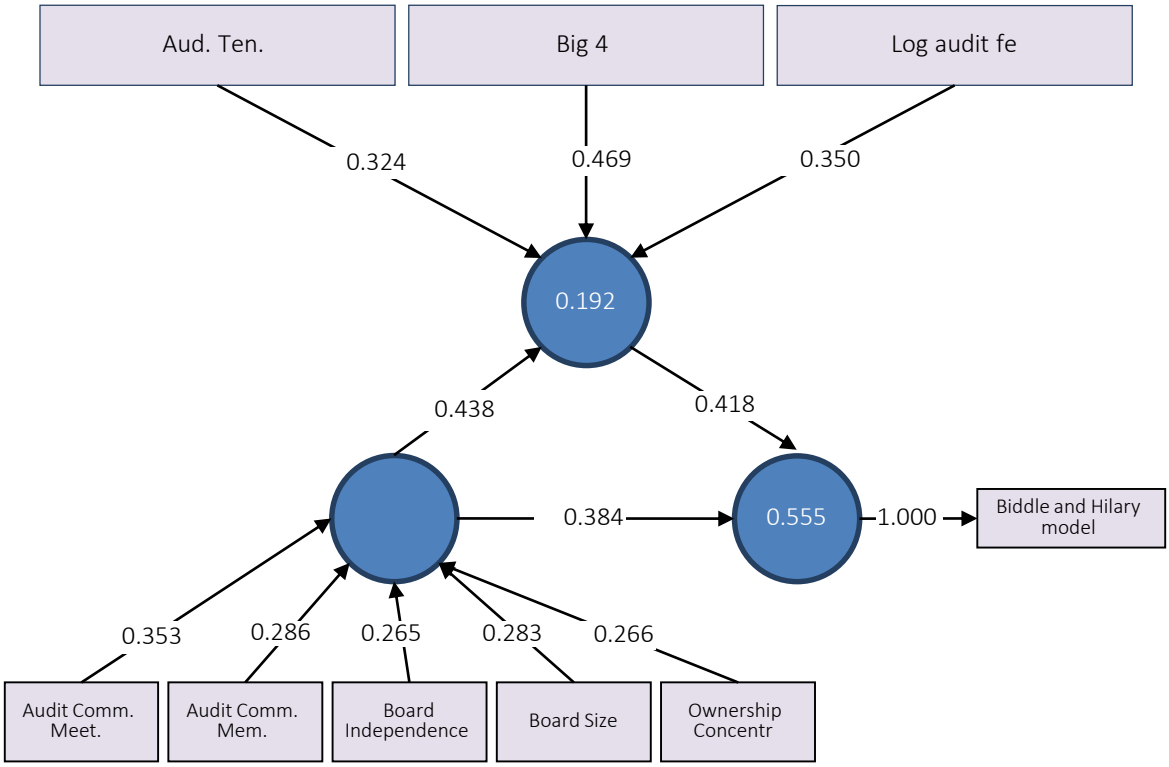

Figure 3. Structural model (outer model), UNDERINV model

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4. RESULTS

Using bootstrapping of the PLS analysis, the results are presented in Table 6.

The results of Table 6 are presented as follows:

1. The association between CG and AQ is obtained from line 1. The path coefficient is 0.546 with a t-value of 13.458 for OVERINV model and 0.438 with a t-value of 10.237 for UNDERINV model, which is higher than 1.96. This means that there is a positive and significant association between CG and AQ at a 1% significance level. So the first hypothesis (*H1*) is accepted. The result supports Okaro and Okafor (2015), Anafiah, Diyanty, and Wardhani (2017), Suryanto, J. Thalanssinos, and E. Thalanssinos (2017), Haque, Afroze, and Zohra (2019), Sailendra, Murwaningsari, Mayangsari, and Murtanto (2020). However, this result is not consistent with Soliman and Abd Elsalam (2012), Kasim, Hashim, and Salman (2016), Dwekat, Mardawi, and Abdeljawad (2018).

2. The association between AQ and INV. EFF. is obtained from lines 2 and 3. The path coefficient is –0.503 with a t-value of 10.000 for OVERINV model and 0.418 with a t-value of 7.971 for UNDERINV model, which is higher than 1.96, which means that there is a positive and significant association between AQ and INV. EFF. at a 1% significance level. So the second hypothesis (*H2*) is accepted. The result supports Saghafi and Motamedi (2011), Dashtbayaz and Mohammadi (2016), Elaoud and Jarboui (2017), Park, I. Kim, and W. Kim (2017), Chen, Jaing, and Zhang (2019), Masrouki and Houcine (2019), Siregar and Nuryanah (2019), Shahzad and Rehman (2019). However, this result is not consistent with Moeinadin, Khaneghah, and Mazraehno (2013), *Islami (2017),* Boubaker, Houcine, Ftiti, and Masri (2018).

3. The association between CG and INV. EFF. can be discussed through the following points:

- The direct association between CG and INV. EFF. is presented in lines 4 and 5. The path coefficient is –0.340 with a t-value of 5.796 for OVERINV model and 0.384 with a t-value of 8.977 for UNDERINV model. This means that there is a direct, positive, and significant effect of CG and INV. EFF. at a 1% significance level. The result supports Salami (2011), Chen, Cheng, Gong, and Tan (2014), Chen, Sung, and Yang (2017), Felix (2018), Salin, Nor, and Nawawi (2018), Lai et al. (2020).

- The indirect association between CG and INV. EFF. is presented in lines 6 and 7. The path coefficient is –0.274 with a t-value of 7.602 for OVERINV model and 0.183 with a t-value of 6.317 for UNDERINV model, which is higher than 1.96 at a 1% significance level. So the third hypothesis (*H3*) is accepted.

Table 6. Path coefficient

Source: Data processed (2020).

	OVERINV model					UNDERINV model				
	Original sample (O)	Sample mean (M)	Std. dev.	T-statistics (O/Std. dev.)	P-value	Original sample (O)	Sample mean (M)	Std. dev.	T-statistics (O/Std. dev.)	P-value
CG → AQ	0.546***	0.561	0.041	13.458	0.000	0.438***	0.455	0.043	10.237	0.000
AQ → OVERINV	–0.503***	–0.499	0.050	10.000	0.000	–	–	–	–	–
AQ → UNDERINV	–	–	–	–	–	0.418***	0.413	0.052	7.971	0.000
CG → OVERINV	–0.340***	–0.346	0.059	5.796	0.000	–	–	–	–	–
CG → UNDERINV	–	–	–	–	–	0.384***	0.388	0.043	8.977	0.000
CG → AQ → OVERINV	–0.274***	–0.280	0.036	7.602	0.000	–	–	–	–	–
CG → AQ → UNDERINV	–	–	–	–	–	0.183***	0.188	0.029	6.317	0.000

Note: *** significance at 1%; ** significance at 5%.

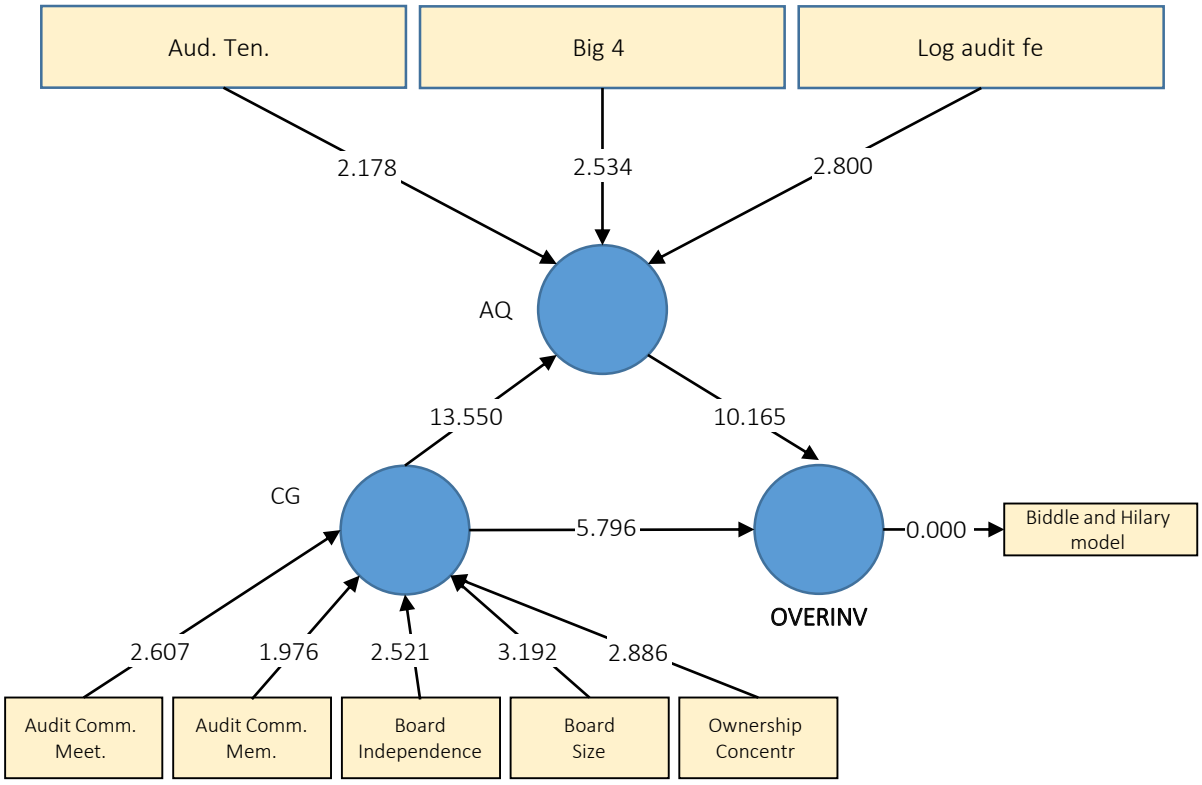

Figure 4. Measurement model (inner model), OVERINV model

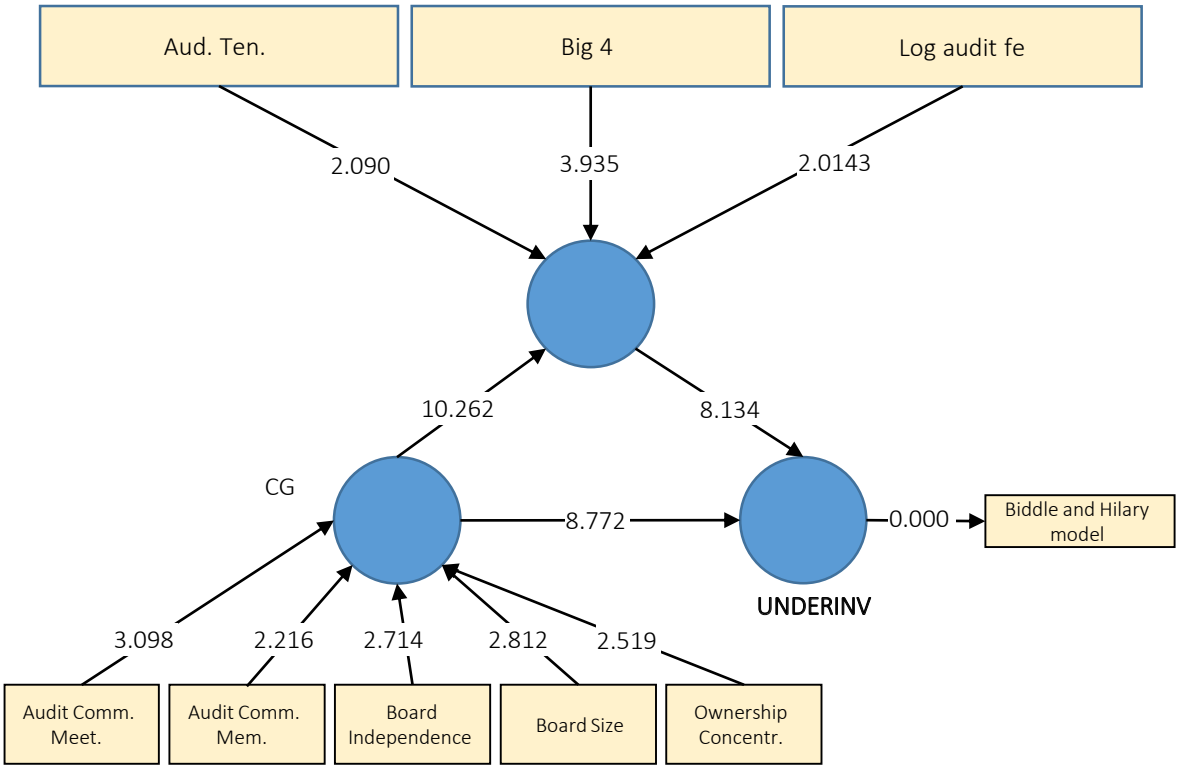

Figure 5. Measurement model (inner model), UNDERINV model

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5. DISCUSSION

Regarding the discussion about investment efficiency determinants, this paper aims to analyze CG and AQ's effect on investment efficiency. This objective is divided into four sub-objectives: the first is testing the effect of CG on AQ, the second is testing the effect of AQ on investment efficiency, the third is testing the direct effect of CG investment efficiency, the fourth concerns with the indirect association between them through AQ as a mediator variable.

Regarding sub-objective (1), Table 6 shows evidence that CG mechanism has a positive effect on AQ, since having good CG mechanisms enhance the transparency of financial statements, which facilitates the auditors' role to do their jobs. Therefore, AQ is higher, and vice versa.

Regarding sub-objective (2), Table 6 shows that AQ has a positive effect on investment efficiency. A good AQ means providing investors can fine-tune their decisions based on the audit opinion since this opinion has informativeness value, and its insurance value can lead to lower IA, then improve investment efficiency.

Regarding sub-objective (3), Table 6 reveals that CG has a positive and direct effect on investment efficiency since having good CG mechanisms helps management have the right vision, improving the efficiency of their investment decisions.

Regarding sub-objective (4), Table 6 confirms that there is a positive and indirect effect of CG on investment efficiency through AQ as a mediator variable, since having good CG mechanisms provides a good atmosphere to increase AQ then lower IA, which gives a management push and trust to make right decisions, means increasing investment efficiency.

Finally, there are determinants to control investment efficiency. This paper introduces CG and AQ as investment efficiency determinants. CG and AQ have a significant and positive effect on investment efficiency. Moreover, there is a mediation role of AQ in the association between CG and investment efficiency.

CONCLUSION

Many literature reviews are interested in investment efficiency. This paper is interested in investigating some determinants of investment efficiency, such as CG and AQ. Besides, this paper concerns with the mediation effect of AQ on the association between CG mechanisms and investment efficiency, or in other words, investigating the integration between CG and AQ on investment efficiency.

For 103 Egyptian listed firms in EGX 100 from 2015 to 2018, which include 412 observations, the finding indicates that: (1) management that has good CG mechanisms has a suitable atmosphere to prepare transparent financial statements, which helps to enhance auditor role and improve AQ; (2) improving AQ helps to reduce IA since a good AQ means investors can fine-tune their decisions based on the audit opinion since this opinion has informativeness value and its insurance value can lead to lower IA, which increases the trust of investors in management decisions and leads to reduced pressure on management; therefore, it improves the efficiency of investment decisions; (3) having good CG mechanisms provides management with a good atmosphere to make the right investment decisions since having good CG mechanisms helps management to have the right vision; (4)having good CG mechanisms leads to increased AQ, which helps management have a good environment to make investment decisions with higher efficiency; or in other words, the integration between CG and AQ has a significant and positive association on investment efficiency.

The paper introduces three contributions: 1) management uses CG mechanisms to improve AQ; 2) AQ helps management improve investment efficiency;3) there is a mediation effect of AQ in the association between CG and investment efficiency.

For future research, the researcher suggests expanding the other determinants of investment efficiency, such as financial reporting quality, adopting International Financial Reports Standards (IFRS), and discussing the accounting roles of investment efficiency.

AUTHOR CONTRIBUTIONS

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