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The Effect of Accounting Conservatism on Investment Efficiency and Debt Financing: Evidence From Egyptian Listed Companies

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Abstract

This paper examines the effect of accounting conservatism on investment efficiency by examining whether conservatism reduces overinvestment and underinvestment problems. Additionally, examining whether conservatism mitigates underinvestment problem by raising debt financing. The paper sample covers a period of five years from 2012 to 2016, including 57 Egyptian firms. The results show a negative relationship between conservatism and over (under)investment, implying that there is a positive association between conservatism and investment efficiency. Furthermore, there is a positive relationship between conservatism and debt financing in firms suffering from underinvestment problems. Hence, accounting conservatism is crucial for improving the quality of financial information.

Keywords: Accounting conservatism, Investment efficiency, Overinvestment, Underinvestment, Debt financing

1. Introduction

In recent decades, different accounting scandals occurred due to fraud and managerial opportunism. Furthermore, internationalization of capital markets using accounting information focused attention on timeliness and verification of financial reporting ensuring the existence of qualitative financial statements. Accounting conservatism is one of the qualitative characteristics that assure the existence of these needed requirements in financial reporting. Conservatism tends to verify the timely recognition of any losses and the delayed recognition of gains to reduce uncertainties and ensure the credibility of financial reporting. Qualitative financial reporting has a significant role in reducing information asymmetry problem, and in turn, improves investment efficiency. Therefore, accounting conservatism may improve investment efficiency, through conservatism's asymmetric verification requirements.

A stream of prior studies has investigated the role of accounting conservatism in improving firms' investment. There are three main views concerning the effect of conservative financial reporting on investment efficiency. The first view argues that accounting conservatism may help in mitigating overinvestment problem through controlling managerial opportunism (Ball and Shivakumar, 2005; Xu and Lu, 2012; Liu, 2014; Ting, 2015). The second view argues that accounting conservatism may increase risk aversion, thus, rejecting risky projects even if with a positive net present value and increasing underinvestment problem (Guay and Vierrecchia, 2006, Liu, 2014; Ashfaq et al, 2016). In contrast, the third view argues that accounting conservatism may mitigate managers' underinvestment incentives by encouraging prudent investments (Ahmed et al., 2002; Karthik, Watts, and Zuo, 2016; Razzaq, Riu and Donghua, 2016; Hong, Kim and Lobo, 2017).

Thus, accounting literature showed inconsistent results concerning the relationship between accounting conservatism and investment efficiency. Therefore, the main aim of this paper is examining the influence of conservative financial reporting on the investment efficiency of the Egyptian listed firms. The current paper contributes to the literature by extending the rich literature on accounting conservatism and examines accounting conservatism’s effect on investment efficiency. Moreover, this study is applied on the Egyptian stock market as majority of studies are conducted in the U.S., China and Japan. Finally, a few number of prior studies have discussed the association between accounting conservatism, investment efficiency and debt financing. This study is organized as follows. Section 2 presents the theoretical background. Section 3 presents literature reviews and hypotheses development Section 4 clarifies the empirical tests including the sample selection procedures, measurement of variables and results. Finally, the last section presents the conclusions of the study.

2. Theoretical Background

Accounting conservatism is a fundamental feature of accounting information (Ruch and Taylor, 2014, Widyatama and Wirama, 2018). In recent decades, researches on conservatism have flourished and proved that conservatism has a significant effect on different accounting practices (Watts, 2003a; Beaver and Ryan, 2005). Prior literature has introduced various definitions for conservatism. Thus, there is no consistent definition of conservatism. The

most known definition of accounting conservatism is "anticipating no profits, but anticipating all tosses" (Bliss, 1924). Basu (1997) defined conservatism as "the accountant's tendency to require a higher degree of verification to recognize good news as gains than to recognize bad news as losses". Further, Watts (2003a) introduced conservatism as an "asymmetrical verification requirements of gains and losses". Therefore, the difference in the degree of verification between gains and losses affect the degree of conservatism. The greater the difference is, the greater the conservatism level. Accordingly, accounting conservatism involves asymmetrical verifiability that accelerates the recognition of all possible losses than gains and tends to limit uncertainties by choosing less optimistic alternative available.

Although, accounting conservatism has a long and rich literature for decades since 2005 a long debate has been raised concerning the effect of accounting conservatism on financial statement users. IASB and FASB argued that conservatism biases financial information and removed accounting conservatism from the conceptual framework (FASB. 1980). Researchers disagreed with conservatism removal; on one hand, some researchers argued that conservatism is an essential financial reporting property. Accounting conservatism helps in reducing information asymmetry, improving debt contracting efficiency. Therefore, removing conservatism from the conceptual framework may decrease information quality and harm financial reporting (Ahmed et al., 2002; Watts, 20038; Lafond and Watts, 2008; Zhang, 2008; Nikolaev. 2010; Maciuca, Hlaciuc, and Ursache, 2015; Hussain, 2016). On the other hand, opponents of accounting conservatism argued that conservatism verification requirements impose speeding the recognition of all possible losses while delaying possible revenues recognition. This would lead managers to manage earnings and increase information asymmetry regarding fixture prospects of the firm (Guay and Verrecchia, 2006; Gigler, Kanodia and Sapra, 2009; Kothari, Ramanna and Skinner, 2010).

Accounting conservatism can be classified into conditional and unconditional conservatism. Conditional conservatism (CC) is defined as "the timely recognition of bad news and the deferred recognition of good news (Basu, 1997; Qiang, 2007; Ruch and Taylor, 20l4). Unconditional conservatism (UC) is defined as "accounting practices that tend to reduce the reported amount of the entity's net assets" (Watts, 2003a). Differentiating between conditional and unconditional conservatism is important for two reasons. First, the two types of conservatism are negativity associated; UC reduces CC. "Unconditional conservatism creates accounting slack that may reduce the application of conditional conservatism" (Ruch and Taylor, 2014). Second, the two types have different effects on the financial statements. CC affects income statement temporarily due to fluctuation in the timing and content of information involved (Hussein, 2016). On the other side, UC has an almost constant effect on the income statement. Thus, unconditional conservatism is difficult to be identified using the income statement (Ruch and Taylor, 2011; Hussein, 2016). However, concerning the balance sheet, both types of conservatism lead to an understatement in the book value of net assets relative to their market.

The main objective of financial reporting is to provide useful, timely and verifiable information to help the investor to make the right investment decisions. Investment efficiency means how firms' managers utilize the financial resources for the profitability of the firm or

to avoid over or underinvestment problems. However, managers sometimes manipulate financial reporting and tend to invest in inefficient investments to maximize their own interest. Information asymmetry, imperfect contracting and inefficient markets are other factors that would lead managers to make inefficient investment decisions. Inefficient investment decisions may lead to either overinvestment or underinvestment problems which have a destroying effect on firms' value.

Overinvestment problem results from managerial abuse when investing in overly risky or unprofitable project that damage firms' value. The main source of the overinvestment problem is the separation between ownership and management which leads to conflicts of interests (Cherkasova and Zakharova, 2016). Empire building and risk shifting are the other two factors that cause overinvestment problem (Jensen and Meckling, I976). Empire building occurs because of managers' preference to invest in projects with a negative net present value to increase managers' own profit neglecting the firm. Risk shitting is an agency problem that happened because of conflicts of interest between firms' creditors and shareholders (Hernandez, Minguez and Sanchez. 2015). Overinvestment in highly risky projects allows shareholders to increase the volatility of firm's activities to increase their own wealth. As a result, the firm's share value would increase, while the debt value would decrease. Underinvestment problem results from rejecting a positive net present value project, thus decreasing the firm's value (Jensen and Meckling, 1976). Debt overhang and risk avoidance are the main factors that cause underinvestment problem. Debt overhang occurs when there is a high level of risky debt that became a burden on a firm's balance sheet which may lead the managers to forego investment opportunities with a positive net present value (Occhino, 2010). The other reason for the underinvestment problem is risk avoidance. When a firm has a risky debt and high growth opportunities, sometimes managers choose conservative investment strategies to avoid the risk of losing their control over the firm (Roeca, Catiota and Rocea, 2005).

2.1 Literature Review and Hypotheses Development

A stream of prior studies has examined the association between accounting conservatism and investment efficiency through examining the effect of accounting conservatism on overinvestment and underinvestment. Concerning overinvestment, Ting (2015) examined the effect of accounting conservatism on overinvestment for different kinds of firms' ownership in China. Ting found that accounting conservatism improved the overall efficiency of all enterprises by improving the quality of reporting and mitigating overinvestment problems. Brockman, Liu and Ma (2015) predicted that accounting conservatism might reduce overinvestment problem and would lead to dysfunctional incentives toward positive net present value projects. The results showed that there was a negative association between accounting conservatism and overinvestment. Recognizing possible losses in a timely manner prevented managers from overinvesting in a negative net present value project.

Ashfaq et al., (2016) indicated that there was a positive relationship between conservatism and investment efficiency. This was explained as conservatism refrained managerial opportunism and alleviated overinvestment. Furthermore, Cho (2016) demonstrated that there

was a negative relationship between conditional conservatism and overinvestment and unconditional conservatism was not significantly correlated with overinvestment. Thereby, conditional conservatism was considered an efficient mechanism in controlling and monitoring the opportunistic behavior of managers. Razzaq, Riu and Donghua (2016) indicated that there was a positive cone1ation between accounting conservatism and investment efficiency. Accounting conservatism reduces overinvestment problem through monitoring managers' decisions and decreasing free cash flow available for them. In addition, accounting conservatism reduced underinvestment prob1em through resolving agency problem and decreasing chief executive officer (CEO) duality.

Concerning the association between accounting conservatism and underinvestment prob1em, Karthik, Watts and Zuo (2016) examined the effect of accounting conservatism on firms' investment during the global financial crisis (2007-2008). The results showed that firms with less conservative reporting suffered from a severe decline in investment1eve1 after the financial crisis. Moreover, accounting conservatism helped firms with underinvestment problems by facilitating access to external finance sources and lowering the cost of capital Therefore, conservatism was an effective mechanism to mitigate the underinvestment prob1em. Moreover, Lara, Osma and Penalva (20l6) showed that conservatism mitigated both over and underinvestment problems, in firms with overinvestment problem. Accounting conservatism controlled managerial decisions and led to better investment selection. Firms that suffer from underinvestment problem, conservatism facilitated debt financing and reducing the cost of debt, thus reducing underinvestment problem.

Further, Pan (2017) found that firms with more conservative accounting had better investment decisions. Accounting conservatism helped in monitoring managerial decisions on capital allocation to improve investment efficiency. Additional, conservatism facilitated bank loans resulting in reducing underinvestment problem. Hong; Kim and Lobe (2017) showed that conservatism reduced firms' investment sensitivity to cash flow volatility. In addition, conservatism reduced adverse selection problem and helped in facilitating external financing. Yasir (20l8) demonstrated that accounting conservatism increased managers' caution concerning projects selection and motivated them to avoid negative net present value projects. Therefore, conservatism reduced overinvestment problem. Additionally, conservatism encouraged debt financing in the presence of information asymmetry.

In contrast, Brockman, Liu and Ma (2015) argued that conservatism increased the managers' risk aversion and motivated them to avoid risky projects that led to underinvestment. Ashfaq et al., (2016) also found that there was a positive relationship between conservatism and underinvestment. This conclusion was explained as conservatism might restrict managers to invest in risky projects which resulted in underinvestment.

Thus, based on all of the above discussions, it is concluded that the majority of studies revealed that accounting conservatism improves investment efficiency by mitigating overinvestment. Conservative reporting enhances information environment, restricts managerial opportunistic behaviors and improves managerial prudence regarding investments selection. However, there is a debate concerning the effect of accounting conservatism on

underinvestment problems, some researches posited that there is no relationship between them (e.g. Liu, 20M; Brockman, Liu and Ma, 2015; Ashfaq et al., 20l6). Debt financing is a key factor of firms' growth. Accounting conservatism helps in increasing debt issuance level, increasing firms' access to capital and improving financial flexibility of the firm (Kim, 2013; Lara, Osma and Penalva, 2016; Pan, 2017; Yasir, 2018). The above discussion leads to the following hypotheses:

H1: The degree of accounting conservatism is negatively associated with overinvestment and underinvestment.

H2: The degree of accounting conservatism is positively associated with debt financing to reduce underinvestment problem.

3. Empirical Tests

3.1 Sample Selection

The initial sample of this research includes all firms listed in the EGX 100 index for 2016. The final sample covers all industries except the financial institutions (such as banks, insurance and brokerage firms) and utility firms because these firms have different capital structure and investment decisions. The researcher excludes also firms that prepare the financial statements on the 30th of June because the financial statements of these firms are not homogeneous with the financial statements prepared on the 31th of December. After applying the above criteria, the final sample of the first hypothesis consists of 57 firms and the second hypothesis consists of 27 firms, from 12 different industries during the period from 2012 to 2016. The researcher used secondary data to conduct data analysis. Data is collected from public sources such as the annual reports of the firms which are available on the EGX. Table 1 shows the distribution of the sample.

Table 1. The distribution of the sample

Description	**Number of Firms**	**Number of Observations**
Initial Sample	100	500
Less: Excluded Firms:	(43)	(215)
Final Sample	**57**	**285**
Basic Resources	1	5
Chemicals	3	15
Construction and Materials	9	45
Food and Beverage	8	40

Healthcare and Pharmaceuticals	1	5
Industrial Goods and Services	8	40
Media	2	10
Oil and Gas	1	5
Personal and Household Products	1	5
Real Estate	16	80
Telecommunications	3	15
Travel and Leisure	4	20
Final Sample	**57**	**285**

3.2 Measurements of the Variables

3.2.1 Accounting Conservatism and Investment Efficiency

Accounting conservatism (AC) is considered the independent variable concerning the association between accounting conservatism and over (under)investment. Conservatism level will be measured using "the negative accrual-based measure". The researcher preferred this measure because this method captures the effect of both types of conservatism as managers would not be able to differentiate whether those negative accruals resulted either from recognizing a news event(CC) or consistent policy of measuring accounting values (UC) (Ruch and Taylor, 2014; Xie, 2015). Positive values of (Cons-Accruals) indicate a greater level of conservatism while negative values indicate that the firm is not conservative in financial reporting.

$$\text{Cons-Accruals} = [(\text{NI} - \text{CFO} + \text{DEP}) / \text{AVASS}] * -1 \quad (1)$$

Where:

NI: Income before extraordinary items.

CFO: Cash flows from operations.

DEP: Depreciation expense.

AVASS: Average total assets.

Over (under) investment is considered the dependent variable concerning the association between accounting conservatism and over (under) investment. Over (under) investment is measured using the Richardson model (Biddle, 2009; Lara, Osma and Penalva, 2016; Yasir,

2018). This model is used as a measurement of growth opportunities in each firm. The residual of this model is used as a proxy for deviations from the optimal investment.

$$\text{Investment}_{it} = \beta 0 + \beta 1\ \text{Sales Growth}_{it-1} + \varepsilon_{it} \quad (2)$$

where:

Investment $_{it}$: The payments of property, plant and equipment (PPE) from year (t) to (t-1).

Sales Growth $_{it-1}$: The percentage change in sales from year (t-2) to (t-1).

The firms will be classified into overinvestment or underinvestment based on the magnitude of residual (εit) which is the deviation from the predicted investment. Overinvestment would be the most positive residuals in firm-year observations in the sample given, while underinvestment would be the most negative residuals. Both over (under) investment variables would be considered as dummy variables, hence overinvestment is ranked (1) and underinvestment is ranked (0).

The research controls for variables which may affect the firm's investment level. Based on the prior literature (Xu and Lu, 2012; Wang, Zhu and Homeire, 2015; Ting, 2015; Cho, 2016; Lara, Osma and Penalva, 2016), the control variables include firm size, cash flow from operation, dividend payout ratio and return on assets. Firm size is measured by calculating the natural logarithm of the firm's total assets of firm i at year t-l. Cash flow from operations (CFO $_{it-1}$) is calculated as the cash flow from operations scaled by total assets at year t-1. Dividend payout ratio (Div $_{it-1}$) is considered cash dividends that paid by the firms and calculated as cash dividends paid by the firm scaled by total assets at year t-1. Return on assets (ROA $_{it-1}$) represents the firm's profitability and calculated as the net income of firm divided by total assets at year t-1.

Based on the previous discussion, the following empirical model is constructed as follows:

$$\text{Over (under) investment}_{it} = \beta 0 + \beta 1\ AC_{it} + \beta 2\ Size_{it-1} + \beta 3\ CFO_{it-1} + \beta 4\ Div_{it-1} + \beta 5\ ROA_{it-1} + \epsilon_{it} \quad (3)$$

where:

Over(under)investment : Dummy variable that takes the value of (1) if overinvestment and (0) if underinvestment.

AC: Accounting conservatism of firm i at year t.

$Size_{it-1}$: Firm size of firm i at year t-1.

CFO $_{it-1}$: Cash flow from operation of firm i at year t-1.

Div_{it-1}: Dividend payout ratio of firm i at year t-1.

ROA_{it-1}: Return on assets of firm i at year t-1.

3.2.2 Accounting Conservatism, Investment Efficiency and Debt Financing

Accounting conservatism (AC) is the first independent variable concerning the association among conservatism, underinvestment and debt financing. In the present research, conservatism will be measured using “the negative accrual-based measure" which developed by Givoly and Hayn (2000) as shown previously in equation (1).

Underinvestment is the second independent variable in the second hypothesis concerning the association among conservatism, investment efficiency and debt financing. Underinvestment is measured using the Richardson model and would be the most negative residuals in firm-year observations in the sample given, as shown previously in equation (2).

Debt financing is the dependent variable concerning the association among conservatism, underinvestment and debt financing. The change in debt financing (Δ Debt Finit) is used as a measure for debt financing. The change in debt financing is calculated as the difference between debt financing of firm i at year t-1 and t, where debt financing is the firm's total liabilities divided by the total assets. The second empirical model involves control variables that affect debt financing including leverage, cash flow from operations, return on assets and market to book ratio. Leverage (Lev) measures the firm's liquidity and calculated by getting the ratio of the book value of total liabilities to the book value of total assets at year t-l. Cash flow from operations (CFO) is used to control the firm's internal financing capabilities (Cho, 2016). CFO is calculated by dividing the cash flow from operation by total assets at year t-1. Return on assets (ROA) is calculated as the net income of the firm det1ated by total assets at year t-l. Market to book ratio (MB ratio) is used to control the firm's investment opportunities. MTB is computed as the ratio of the market value of equity to the book value of equity at year t-1.

Based on the previous discussion, the following empirical model is constructed as follows:

$$\Delta \text{ Debt Fin}_{it} = \beta 0 + \beta 1 \text{ AC}_{it} + \beta 2 \text{ underinvestment}_{it} + \beta 3 \text{ Lev}_{it-1} + \beta 4 \text{ CFO}_{it-1} + \beta 5 \text{ MB}_{it-1} + \beta 6 \text{ ROA}_{it-1} + \epsilon_{it} \quad (4)$$

Δ Debt Fin $_{it}$: Change in debt financing of firm i at year t.

AC: Accounting conservatism of firm i at year t.

Underinvestment: The most negative residuals in firm-year observations as shown previously in equation (1).

Lev_{it-1}: Leverage of firm i at year t-1.

CFO_{it-1}: Cash flow from operation of firm i at year t-1

MB_{it-1}: Market to book ratio of firm i at year t-1.

ROA_{it-1}: Return on assets of firm i at year t-1.

4. Empirical Study

4.1 Descriptive Statistics

This paper presents the descriptive analysis of the whole variables used in this research. Descriptive statistics are used to describe the properties of the sample and test the normal distribution validity. Descriptive statistics involve the mean, the median, the maximum value, the minimum value, the standard deviation, the skewness, the kurtosis and the Jarque-Bera test of each variable. The results are shown in the Table 2.

Table 2. Descriptive statistics of the variables concerning all variables

	AC	Over(under) Investment	Δ Debt Fin$_{it-1}$	Size $_{it-1}$	Lev $_{it-1}$	CFO $_{it-1}$	Div $_{it-1}$	ROA $_{it-1}$	MB ratio $_{it-1}$
Mean	-0.011150	0.960598	0.024992	20.49060	0.376348	0.045422	0.027482	0.046140	0.802183
Median	-0.004412	0.967008	0.017464	20.58327	0.321588	0.042047	0.022461	0.037173	0.739305
Maximum	0.146181	1.106953	0.166434	23.82834	1.096305	0.194856	0.090631	0.203444	1.949230
Minimum	-0.172555	0.823653	-0.105818	16.93545	0.000000	-0.106540	0.000000	-0.116813	0.000000
Std. Dev.	0.062887	0.054336	0.057503	1.699066	0.250288	0.056981	0.020294	0.057895	0.463183
Skewness	-0.326873	-0.152013	0.170784	-0.185133	0.579642	0.133679	0.804758	0.327784	0.374904
Kurtosis	2.936457	3.101331	2.787442	2.302557	2.869534	3.037105	3.012516	2.999599	2.546568
Jarque-Bera	5.123127	1.219556	1.901735	7.352379	16.16140	0.865179	30.76458	5.103503	9.117760
Probability	0.077184	0.543472	0.386406	0.025319	0.000309	0.648827	0.000000	0.077945	0.010474
Observations	285	285	282	283	285	285	285	285	285

The descriptive statistics of AC shows mean and median values of (-0.011) and (-0.004), indicating that the majority of the Egyptian listed firms are not conservative in their information. The maximum value is (0.146) and the minimum value of AC is (-1.173), the difference between them (the range) is (1.319) meaning that there is a low variation of conservatism levels across the companies with standard deviations of (0.063). The value of skewness and kurtosis are (-0.327) and (2.936) respectively indicating that the values of AC are normally distributed as the skewness value should be between -3 and +3, the kurtosis value should be between -10 and +10. Additionally, "jarque–bera test" is used to measure the normality distribution of all the financial variables in this study with a significance value greater than 0.05. Therefore; AC is normally distributed at (5.123, p-value = 0.077).

Moreover, the mean value of over (under)investment is (0.961) and the median is (0.967). The maximum value is (1.107) and the minimum value of over (under)investment is (0.824) with a standard deviation (0.054) revealing that on average the companies in the sample make more investment decisions. The value of skewness and kurtosis are (-0.152) and (3.101) respectively indicating that the values of investment are normally distributed. The value of jarque-bera test is normally distributed at (1.220, P-value =0.543).

The change in debt financing shows mean and median values of (0.025) and (0.017). The maximum and the minimum values are (0.166) and (-0.106) respectively. The range is (0.272) indicating that there is a variation among firms concerning debt financing decisions. The standard deviation is (0.058), the skewness and kurtosis values are (0.171) and (2.787) respectively indicating that the change in debt financing is normally distributed. In addition, the value of jarque-bera test is (1.902, P-value = 0.386) indicating that the change in debt financing is also normally distributed.

Concerning control variables; the results show that all control variables are normally distributed. However, jarque-bera (P values) of firm size, leverage, dividend payout ratio, MB ratio, are 0.03, 0.00, 0.00 and 0.01, indicating that they are not normally distributed. However, Kline (2015) mentioned that in social science it is common to violate the normality assumption; therefore, there is no series problem to apply the parametric analyses to test the hypotheses if the skewness and kurtosis of each item within the range ±3 and Kurtosis within range ±10.

4.2 Diagnostic Statistics

Five diagnostic tests are conducted on all data before running the regression analysis to assess the validity of all variables of the current research and assure that the results will not be biased. These tests include group unit root test, Phillips–ouliaris co-integration test, serial correlation test and heterogeneity test and omitted variable test.

4.2.1 Group Unit Root Test

A stationary time series enables the researcher to generalize the results to future time periods. Table 3 presents the group unit root test for all variables.

Table 3. Group unit root test concerning all variables

Method	**Statistic**	**Prob.****	**Cross sections**	**Obs**
Levin, Lin & Chu (LLC)	-28.6666	0.0000	14	3959
Im, Pesaran and Shin W-stat (IPSW)	-28.7616	0.0000	14	3959
Fisher Chi-square (ADF)	763.553	0.0000	14	3959
Fisher Chi-square (PP)	777.124	0.0000	14	3970

Table 3 shows that the P-values of LLC, IPSW, ADF and PP tests are (P-value = 0%) which are less than (0.05). This means that all variables in the current research have stationary time series. Thus, the present research's results can be generalized to future time periods (2012-2016).

4.2.2 Phillips Ouliaris Co-integration Test

"Phillips ouliaris co-integration test" is used for the existence of long-run equilibrium relationships among time series variables with a significance rate less than (0.05). Table 4 presents Phillips–ouliaris co-integration test.

Table 4. Phillips ouliaris co-integration test concerning all variables

Dependent	tau-statistic	Prob	z-statistic	Probability
AC	-11.56048	0.0000	-181.6116	0.0000
Over(under)investment	-7.722140	0.0004	-98.49617	0.0004
Δ Debt Fin	-13.13128	0.0000	-214.2262	0.0000
Size	-5.994395	0.0895	-62.28840	0.1028
Leverage	-9.800027	0.0000	-143.2999	0.0000
CFO	-12.05104	0.0000	-191.9689	0.0000
Dividend payout	-7.052442	0.0047	-84.75251	0.0042
ROA	-10.34001	0.0000	-155.3051	0.0000
MB ratio	-8.458668	0.0000	-115.6222	0.0000

Table 4 shows that almost all the variables (AC, over (under)investment, debt financing, leverage, CFO, dividend payout ratio, ROA and MB ratio) are significant as the P-values are less than (0.05). Thus, there are long-term equilibrium relationships among variables in both the first and second model. However, the results show also that firm size's value of Tau-statistics is (0.090) which is greater than (0.05). Thus, firm size does not have long-term equilibrium relationships with other variables.

4.2.3 Breusch-Godfrey Serial Correlation Test

This test is used to test for the presence of serial correlation. Breusch-Godfrey serial correlation test uses F-statistic and chi-square value at a significance level (P- value > 0.05). Table 5 presents Breusch-Godfrey serial correlation test.

Table 5. Breusch-Godfrey serial correlation test for all variables

F-statistic	2.485363	Prob. F (2,279)	0.0851
Obs*R-squared	4.971239	Prob. Chi-Square (2)	0.0833

As shown in Table 5, the probability of F-test (0.085) and the probability of chi-square (0.083) which are greater than (0.05). Thus, there is no serial correlation between independent and

dependent variables in both empirical models. This means that the results of the current research will be correct, and conclusions will not be biased.

4.2.4 Heteroskedasticity Test: Breusch-Pagan-Godfrey

Heteroskedasticity means that the standard deviation of variables is not constant which may lead to biased results or misspecification of other tests. Breusch-Pagan test measures heteroskedasticity in the model using F-statistic and chi-square test at a significance value greater than (0.05). Table 6 presents the heteroskedasticity test.

Table 6. Heteroskedasticity test: Breusch-Pagan-Godfrey concerning all variables

F-statistic	0.011032	Prob. F (2,281)	0.9890
Obs*R-squared	0.022297	Prob. Chi-Square(2)	0.9889
Scaled explained SS	0.059302	Prob. Chi-Square(2)	0.9708

Table 6 shows that the probability of F-statistic is (0.989) and the probability of chi-square is (0.989, 0.971). As long as, the values are greater than (0.05) therefore there is homoscedasticity (constant variance) among all variables in the current research.

4.2.5 Omitted Variable Test: Ramsey RESET Test

This test examines the relationship between errors and independent variable using Ramsey RESET test powers of the fitted values of over (under)investment.

Table 7. Omitted variable test: Ramsey RESET test

F(3, 275)= 3.46
Prob > F= 0.1068

Table 7 shows that the probability of F-statistic is (3.46) and the probability of chi-square is (0.106) so, the values are greater than (0.05) therefore there is no omitted variable between error and independent variable.

In summary, based on the previous diagnostic tests, the results clarified that the current research variables have a stationary time series, thus the current research results can be generalized to future periods. Additionally, the variables have a long-term equilibrium relationship except for firm size. Finally, there is no serial correlation and heteroskedasticity and omitted variable among the variables, indicating that the results of the current study will not be biased.

4.3 Results Concerning the Association Between Accounting Conservatism and Investment Efficiency

This section presents the regression results of the first hypothesis. Firstly, the results present the analysis to divide firms into overinvestment and underinvestment. Then the Pearson's Correlation Test and the regression analysis are presented.

4.3.1 Ordinary Least Squares Test

To be able to test the effect of accounting conservatism on over (under) investment, the researcher has to test firstly the association between investment (measured by PPE_t/PPE_{t-1}) and sales growth (SG). Table 8 introduces the ordinary least squares test.

Table 8. Ordinary least squares test concerning the first empirical model

Variable	**Coefficient**	**Std. Error**	**t-Statistic**	**Prob.**	**VIF**
SG	0.027787	0.011504	2.415309	0.0164	1.009
Investment	0.702079	0.041536	16.90294	0.0000	1.009
C	0.285031	0.039912	7.141425	0.0000	---
R-squared	0.517820	Mean dependent var		0.96078	
Adjusted R-squared	0.514388	S.D. dependent var		0.05433	
S.E. of regression	0.037866	Akaike info criterion		-3.69903	
Sum squared resid	0.402902	Schwarz criterion		-3.66048	
Log likelihood	528.2627	Hannan-Quinn criter.		-3.68357	
F-statistic	150.8851	Durbin-Watson stat		1.81493	
Prob(F-statistic)	0.000000				

Table 8 illustrates the association between sales growth and Investment. The coefficient of SG is positive (0.028) and statistically significant at 1.6% level. This means that the greater the degree of SG the more investment decisions the firm make. Moreover, the F-test value is (150.885, P-value= 0%) which shows the overall significance of the model. Accordingly, the model is significant because the significant value is less than (0.05). The value of R square is 51.8%, which means that sales growth can explain 51.8% of the variation in investment. The other 48.2% is explained due to either random error in the regression model or other explanatory variables that need to be included in the model.

This table illustrates also the Durbin-Watson test that used to test the presence of autocorrelation in the residuals. The Durbin-Watson value is between 0 and 4. In the model, the value equals (1.814) meaning that there is no autocorrelation in the model. The variance inflation factor (VIF) is used to measure the amount of multicollinearity in a set of multiple regression variables. VIF should be less than 10, above that indicate a multicollinearity problem. As shown in the table, VIF value is (1.009), therefore there is no multicollinearity problem between the independent variables.

Hence, after examining the association between investment and sales growth, the results reveal that there is a positive relationship between them across all the listed firms. The Richardson model (2006) will be used to determine the overinvestment and underinvestment firms. Table 9 presents the division of over (under) investment.

Table 9. Results of over (under) investment concerning the first empirical model

Variable		**Frequency**	**Percent**	**Valid Percent**	**Cumulative Percent**
Valid	**Underinvestment**	138	48.4	48.6	48.6
	Overinvestment	146	51.2	51.4	100.0
	Total	284	99.6	100.0	
Missing	**System**	1	.4		
Total		285	100.0		

Table 9 shows that after applying the Richardson model on all the listed firms the overinvestment companies represent 51.4%, while the underinvestment companies represent 48.6%. This means that there are no firms have efficient investment decisions.

4.3.2 Pearson's Correlation Test

Pearson's correlation measures the strength and direction of the linear association between every two variables. In addition, this test measures the validity of the multicollinearity assumption of the regression analysis. Table 10 presents the Pearson correlation coefficients for the first empirical model.

Table 10. Pearson's correlation matrix concerning the first empirical model

Variables	**Over (under)investment**	**AC**	**Size**	**CFO**	**Dividend**	**ROA**
Over (under)investment	1.000000					

AC	-0.213857	1.000000				
	0.0003	-----				
Size$_{it-1}$	0.131029	0.089196	1.000000			
	0.0278	0.1351	-----			
CFO$_{it-1}$	0.278005	0.06059	0.115571	1.00000		
	0.0000	0.3106	0.0525	-----		
Div$_{it-1}$	0.092623	-0.0873	0.013108	0.176088	1.000000	
	0.1207	0.1434	0.8265	0.0030	-----	
ROA$_{it-1}$	0.142210	-0.44059	0.031063	0.373240	0.379987	1.000000
	0.0169	0.0000	0.6034	0.0000	0.0000	-----

Table 10 shows that there is a significant negative correlation between over (under) investment and accounting conservatism (r=-0.213) and the P-value < 0.05. This means that accounting conservatism improves investment efficiency by reducing both over (under)investment. Concerning the control variables; the results show that there is a positive and significant correlation between over (under) investment and firm size, CFO and ROA. However, there is an insignificant correlation between over (under) investment and dividend payout ratio because (P-value>0.05). Additionally, the highest correlation exists between dividend payout ratio and ROA (r=0.380). Therefore, there are no multicollinearity problems because there is no correlation higher than (0.9) between variables.

4.3.3 Regression Analysis

A multiple regression analysis is used to test the first hypothesis concerning the association between accounting conservatism and investment efficiency. This section presents the results of the first empirical model. Table 11 presents the fixed panel effect test which assesses how well the model fits for predicting the over (under) investment.

Table 11. The fixed panel effect test concerning the first empirical model

Variable	**Coefficient**	**Std. Error**	**t-Statistic**	**Prob.**
AC	-0.100323	0.005956	-7.582954	0.0085
Size$_{it-1}$	-0.003999	0.037753	-2.657361	0.0367
CFO$_{it-1}$	0.046514	0.102447	2.101891	0.6503

Div_{it-1}	-0.243612	0.035332	0.454035	0.0000
ROA_{it-1}	0.017158	0.037174	-6.895000	0.6449
C	0.881401	0.035518	24.81544	0.0000
R-squared	0.766566	Mean dependent var		0.960636
Adjusted R-squared	0.696644	S.D. dependent var		0.032545
S.E. of regression	0.017925	Akaike info criterion		-5.004359
Sum squared resid	0.069723	Schwarz criterion		-4.154184
Log likelihood	774.1168	Hannan-Quinn criter.		-4.663468
F-statistic	10.96307	Durbin-Watson stat		1.606530
Prob(F-statistic)	0.00000			

As shown in Table 11, the results show that the coefficient of AC is negative (-0.10) and statistically significant at 0% level. This means that firms with a higher degree of conservative reporting enjoy more efficient investment decisions. Hence, the first hypothesis H_1 is accepted. Moreover, the results show that there is a significant negative relationship between both firm size and dividend payout ratio with over (under) investment. Unexpectedly, the regression results show there is an insignificant relationship between ROA, CFO and over (under) investment, as P value are greater than (0.05).

Furthermore, the value of F-test is (10.963), thus the model is significant because of the significant value (p=0.000) is less than (0.05). The value of R square is 76.6% which means that the independent variables (AC and control variables included) explain 76.6% of the variation in the over (under)investment. The other 23.4% is explained due to either random error. Finally, the value of Durbin-Watson is (1.6) indicating that there is no serial correlation in the residuals.

4.3.4 Redundant Fixed Effects Test

In order to evaluate whether the fixed panel effect model is well specified, the researcher runs the redundant fixed effects test. The redundant fixed effect test includes three sets of tests; the first test measures the joint significance of the cross-section effects using (F-test) and the likelihood function (Chi-square test). The second test measures the effect of variables on the sector periodically using period F and period Chi-square tests and the last test measures the joint significance of all of the effects respectively with a significance rate (p-value < 0.05). Table 12 presents the redundant fixed effects tests.

Table 12. Redundant fixed effects tests concerning the first empirical model

Test	Statistic	d.f.	Prob.
Cross-section F	10.228610	(56,217)	0.0000
Cross-section Chi-square	365.603483	56	0.0000
Period F	0.099347	(4,217)	0.9826
Period Chi-square	0.517779	4	0.9717
Cross-Section/Period F	9.550453	(60,217)	0.0000
Cross-Section/Period Chi-square	365.684119	60	0.0000

Table 12 shows that the P-value of the cross-section F-test, chi-square test, cross-section/period-F and cross-section/period chi-square less than (0.05) indicating the applicability of the cross-section fixed effects model. However, the P-value of the period F and period chi-square revealed insignificant as the (P-value > 0.05).

4.4. Results Concerning the Association Among Accounting Conservatism, Underinvestment and Debt Financing

This section presents the regression results of the second and the third empirical model and includes the Pearson's correlation test and the regression analysis.

4.4.1 Pearson's Correlation Test

Pearson's correlation test is employed to measure the strength and direction of the linear relation between every two variables. Table 13 presents the Pearson correlation coefficients for the second empirical model.

Table 13. Pearson correlation matrix concerning the second and the third models

Variables	Δ Debt Fin	AC	Lev $_{it-1}$	CFO $_{it-1}$	ROA $_{it-1}$	MB ratio $_{it-1}$	Underinv
Δ Debt Fin	1.0000						

AC	0.2462	1.0000					
	0.0036	-----					

Lev $_{it-1}$	0.0900	0.1486	1.0000				
	0.2936	0.0819	-----				
CFO $_{it-1}$	-0.2184	0.1402	0.1585	1.0000			
	0.0101	0.1009	0.0632	-----			
ROA $_{it-1}$	-0.1525	-0.30	-0.199	0.3563	1.0000		
	0.0741	0.0002	0.0190	0.0000	-----		
MB ratio $_{it-1}$	-0.1869	-0.040	0.222	-0.1192	-0.0208	1.000	
	0.0281	0.6403	0.0087	0.1637	0.8081	-----	
Underinvestment	-0.2463	-0.100	-0.046	0.4410	0.09603	-0.1854	1.000
	0.003	0.2431	0.5878	0.0000	0.2625	0.0295	-----

As shown in Table 13, there is a significant positive correlation between debt financing and accounting conservatism because the value of r is (0.246) and the (P-value < 0.05). The correlation between debt financing and underinvestment is negative as the r value is (-0.246) and significant as (P-value < 0.05). Concerning the control variables; there is a significant negative correlation between CFO, MB ratio and debt financing. However, there is an insignificant correlation between firm leverage, ROA and debt financing because (P-value > 0.05). The highest correlation exists between CFO and underinvestment (r = 0.441), indicating that there are no multicollinearity problems as there is no correlation higher than (0.9) between variables.

4.4.2 Regression Analysis

A multiple regression analysis is used to test the second hypothesis. The fixed panel effect test is shown in Table 14.

Table 14. The fixed panel effect test concerning the third empirical model

Variable	**Coefficient**	**Std. Error**	**t-Statistic**	**Prob.**
AC	0.222021	0.041868	5.302861	0.0000
Underinvestment	- 0.165485	0.047977	-3.449232	0.0008

Lev_{it-1}	0.093735	0.011898	7.878294	0.0000
CFO_{it-1}	0.034337	0.008578	4.003047	0.0001
ROA_{it-1}	0.058237	0.019054	3.056351	0.0027
$MBratio_{it-1}$	- 0.028986	0.002662	-10.89050	0.0000
C	0.225922	0.057081	3.957930	0.0001
R-squared	0.224849	Mean dependent var		0.026401
Adjusted R-squared	0.170347	S.D. dependent var		0.036217
S.E. of regression	0.032989	Akaike info criterion		-3.915600
Sum squared resid	0.139296	Schwarz criterion		-3.703480
Log likelihood	280.1764	Hannan-Quinn criter.		-3.829399
F-statistic	4.125465	Durbin-Watson stat		1.746192
Prob(F-statistic)	0.000011			

As shown in Table 14, the results show that the coefficient of AC is positive (0.222) and statistically significant at 0% level. This reveals that firms with a higher degree of conservative reporting make more debt financing decisions in firms with underinvestment problems. Thus, the second hypothesis (H_2) is accepted which stated that the degree of accounting conservatism is positively associated with debt financing in underinvestment firms. The results show also that there is significant negative relationship between underinvestment and debt financing (r= -0.164). Concerning control variables; the results show that there is a significant positive association between leverage, CFO, ROA and debt financing, while there is a significant negative relationship between MB ratio and debt financing. Furthermore, the value of F-test is (4.125) which show the overall significance of the model. The model is significant because of the significant value (p= 0.000) is less than (0.05). The value of R square is 22.4% which means that the independent variables (AC and control variables included) explain 22.4% of the variation in debt financing. The other 77.6% is explained due to either random error. Finally, the Durbin-Watson value is (1.746) indicating that there is no serial correlation in the residuals.

4.4.3 Redundant Fixed Effects Test

In order to evaluate whether the fixed panel effect model is well specified, the researcher runs the redundant fixed effects test. Table 15 presents the redundant fixed effect test.

Table 15. The redundant fixed effect test concerning the third empirical model

Test	Statistic	d.f.	Prob.
Cross-section F	3.001524	(45,83)	0.0000
Cross-section Chi-square	133.303731	445	0.0000
Period F	0.768075	(2,83)	0.4672
Period Chi-square	2.530733	2	0.2821
Cross-Section/Period F	2.914976	(47,38)	0.0000
Cross-Section/Period Chi-square	134.523029	47	0.0000

Table 15 shows that the P-value of the cross-section F-test, chi-square test, cross-section/period-F and cross-section/period chi-square less than (0.05), indicating the significance and the applicability of the cross-section fixed effects model. However, the P-value of the period F and period chi-square revealed insignificant at (P-value > 0.05).

5. Discussion of the Findings

This section discusses the main findings of the current research. First, the results show that the level of accounting conservatism in the Egyptian listed firms is low. This is because the descriptive statistics revealed negative mean and median values over the entire sample. Hence, according to the negative accruals measure the majority of listed firms are not conservative in financial reporting. Second, the results show that the percentage of firms with overinvestment problems are more than the percentage of firms with underinvestment companies, while there are no firms with efficient investment decisions.

Third, the OLS regression shows that there is a significant negative relationship between accounting conservatism and both overinvestment and underinvestment. In other words, there is a positive relationship between accounting conservatism and investment efficiency. Hence, the first and the second hypotheses are accepted. The positive association between accounting conservatism and investment efficiency is explained through conservatism's effect of overinvestment and underinvestment. Accounting conservatism improves financial reporting quality of conservatism's asymmetric verification feature which encourages managers to select projects carefully to reduce poor investment abandonment.

Concerning underinvestment, accounting conservatism helps firms that face financing difficulties and insolvency risk. More specifically, conservatism facilitates access to additional debt and reduces the cost of debt through ensuring verifiable and reliable financial reporting. These results are considered consistent with prior studies that addressed the association between conservatism and investment over (under)investment (Kim, 2013; Ting, 2015; Lara, Osma and Penalva, 2016; Pan, 2017; Yasir, 2018). The results also agree with prior studies which concluded that conservatism enhances transparency through increasing quality of financial reporting and improving managerial decision making (Makhlouf and Alsufy, 2018). However, this result contradicts with prior studies which argued that conservatism affected investment efficiency negatively through increasing the underinvestment problem (Liu, 2014; Brockman, Liu and Ma, 2015; Ashfaq et al., 2016).

Furthermore, the regression results of the current research reveal that there is a positive relationship between accounting conservatism and debt financing and this result is more pronounced in firms with underinvestment problems. In addition, the results show that there is a negative relationship between debt financing and underinvestment. This means that underinvestment problem may result from lack of financing sources and availability of such financing would decrease the underinvestment problem. Thus, accounting conservatism helps firms that have insolvency risk and suffering from underinvestment problems through increasing debt financing level in firms. This may encourage managers to invest in new projects and increase investment level. Hence, the second hypothesis is accepted.

This result agrees with the findings of prior literature that found that accounting conservatism reduced cost of debt and facilitated debt contracting process (Karthik, Watts and Zuo, 2016; Razzaq, Riu and Donghua, 2016; Lara, Osma and Penalva, 2016; Hong, Kim and Lobo, 2017, Yasir, 2018). However, this result contradicts with other studies which found that conservatism might discourage managers to invest in high risk projects even with a positive net present value (Liu, 2014; Brockman, Liu and Ma, 2015; Ashfaq et al., 2016).

6. Conclusion

This paper aims at improving and enhancing firms' investment efficiency. Thus this paper investigates the effect of accounting conservatism on investment efficiency by examining whether conservatism mitigates overinvestment and overinvestment problems. Additionally, finding out the effect of conservative reporting on debt financing as a method to reduce underinvestment problem. Prior Literature showed a mixed result concerning the effect of conservatism on overinvestment and underinvestment. Most of the studies revealed that there is a positive association between accounting conservatism and investment efficiency via reducing overinvestment and underinvestment problems (Kim, 2013; Lara, Osma and Penalva, 2016; Pan, 2017; Yasir, 2018). Other studies revealed that conservatism increased underinvestment by distorting managerial decisions and prevented managers to invest in high risk projects even with a positive net present value (Guay and Vierrecchia, 2006, Liu, 2014; Ashfaq et al., 2016).

For a sample of 57 Egyptian listed firms over the period from 2012 to 2016, we analyze the association between the paper variables. Accounting conservatism is measured using “the

negative accrual-based measure" to reflect the overall conservatism degree. Overinvestment and underinvestment were measured using the Richardson model where overinvestment would be the most positive residuals in firm-year observations in the sample given, while underinvestment would be the most negative residuals. Finally, change in debt financing is measured as the difference between debt financing at year t-1 and debt financing at year t, where debt financing is the firm's total liabilities divided by the total assets.

The results revealed that majority of the Egyptian listed firms are not conservative in their information as the descriptive statistics of conservatism shows mean and median with negative values. Richardson model indicated that the overinvestment companies represent 51.4%, while the underinvestment companies represent 48.6% of the entire sample. This means that there are no firms have efficient investment decisions. The result shows also that: first, there is a significant negative relationship between accounting conservatism and both overinvestment and underinvestment. Implying that conservatism has a positive impact on investment efficiency. This result is explained through conservatism asymmetric verification requirements constrained managerial acts and prevented them from investing in unprofitable projects which reduced overinvestment problem. Second, there is a positive relationship between accounting conservatism and debt financing in firms with underinvestment problem. conservative financial reporting encouraged investors to provide capital to firms with underinvestment problems. Thus conservatism facilitated debt financing and reduced underinvestment problem.

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Appendix

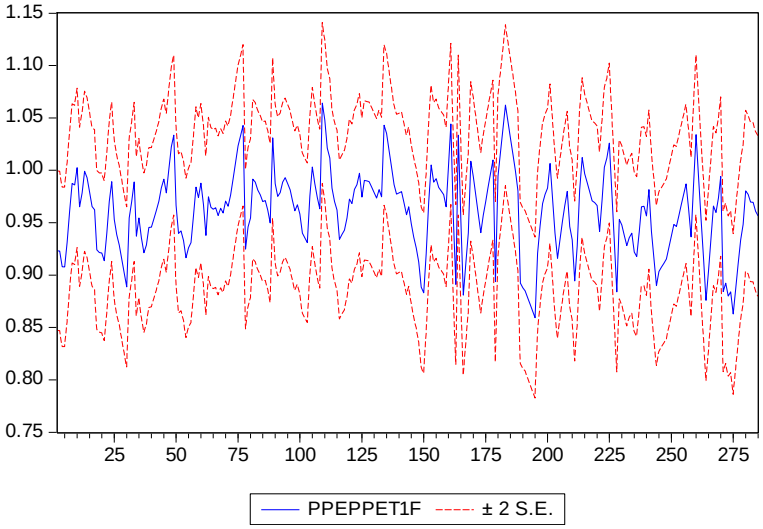
Appendix 1. Results of Model (1), Over (Under) Investment Firms

No.	COMPANY	Effect
1	Ezz Steel	-0.011892
2	Egyptians Financial and Industrial	0.004495
3	Samad Misr –EGYFERT	0.015653
4	Sidi Kerir Petrochemicals	-0.006713
5	Arabian Cement Company	-0.001907
6	Egyptian for Developing Building Materials	-0.010473
7	El Ezz Porcelain (Gemma)	-0.011651
8	Rubex International for Plastic and Acrylic Manufacturing	-0.009423
9	South Valley Cement	0.008936
10	Giza General Contracting	0.001486
11	Misr Cement (Qena)	-0.011192
12	Orascom Hotels And Development	0.001581
13	Suez Cement	0.002969
14	AJWA for Food Industries company Egypt	0.002465
15	Arabian Food Industries DOMTY	0.014856
16	Cairo Poultry	-0.000915
17	Edita Food Industries S.A.E	-0.005682
18	Ismailia Misr Poultry	0.006009
19	Juhayna Food Industries	0.008240
20	Mansourah Poultry	-0.012890
21	Northern Upper Egypt Development & Agricultural Production	0.001936
22	Egyptian International Pharmaceuticals (EIPICO)	0.019162
23	Egyptian Transport (EGYTRANS)	0.003584
24	El Nasr Transformers (El Maco)	0.001419

25	Electro Cable Egypt	0.011081
26	ELSWEDY ELECTRIC	0.008416
27	Engineering Industries (ICON)	0.022865
28	GB AUTO	0.008464
29	Maridive & oil services	-0.004088
30	Modern Company for water proofing (Bitumode)	-0.015391
31	Egyptian Media Production City	0.003140
32	Orascom Telecom Media And Technology Holding	0.013148
33	Asek Company for Mining - Ascom	-0.008423
34	Oriental Weavers	-0.000414
35	Arab Moltaka Investments Co	0.008708
36	Arab Real Estate Investment CO.-ALICO	0.015768
37	Arabia Investments,Development,Fin. Inv. Holding Comp.-Cash	0.028918
38	Atlas For Land Reclamation and Agricultural Proccssing	-0.010779
39	Cairo Development and Investment	-0.020010
40	Egyptians For Investment & Urban Development	0.003700
41	Egyptians Housing Development & Reconstruction	-0.003266
42	El Shams Housing & Urbanization	-0.013883
43	Elsaeed Contracting& Real Estate Investment Company SCCD	0.004973
44	Emaar Misr for Development	0.001867
45	Medinet Nasr Housing	0.010866
46	Palm Hills Development Company	-0.001194
47	Six of October Development & Investment (SODIC)	-0.010861
48	T M G Holding	0.001520
49	United Housing & Development	-0.014688
50	Gulf Canadian Real Estate Investment Co.	-0.014589

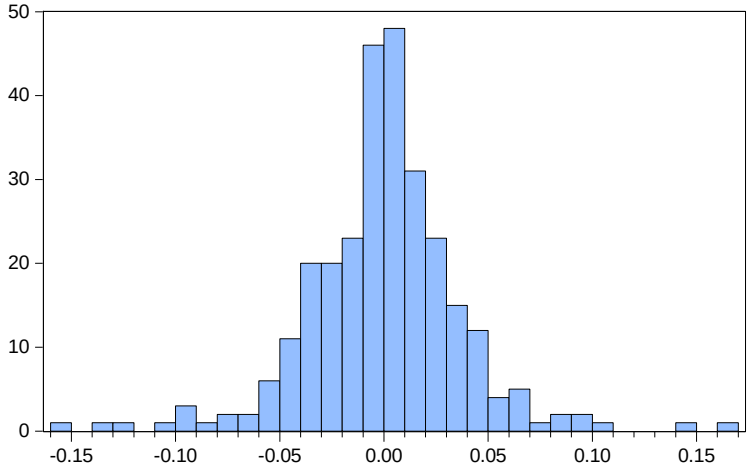
51	Global Telecom Holding	-0.001216
52	Telecom Egypt	0.007264
53	Raya Holding For Technology And Communications	-0.010567
54	Egyptian for Tourism Resorts	-0.005817
55	Mena Touristic & Real Estate Investment	-0.025843
56	Remco for Touristic Villages Construction	-0.004611
57	Sharm Dreams Co. for Tourism Investment	0.002779

Appendix 2. Descriptive Statistics of the First Empirical Model



Forecast: PPEPPET1F
Actual: PPEPPET1
Forecast sample: 1 285
Adjusted sample: 2 285
Included observations: 284

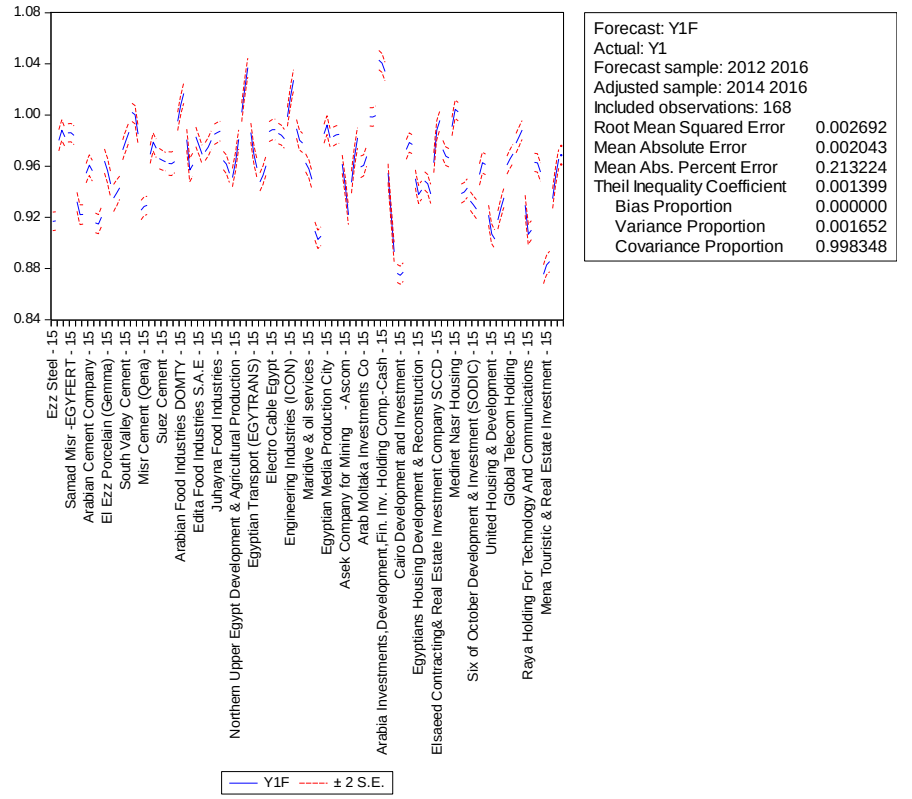
Root Mean Squared Error	0.037665
Mean Absolute Error	0.026176
Mean Abs. Percent Error	2.747687
Theil Inequality Coefficient	0.019578
Bias Proportion	0.000000
Variance Proportion	0.163063
Covariance Proportion	0.836937

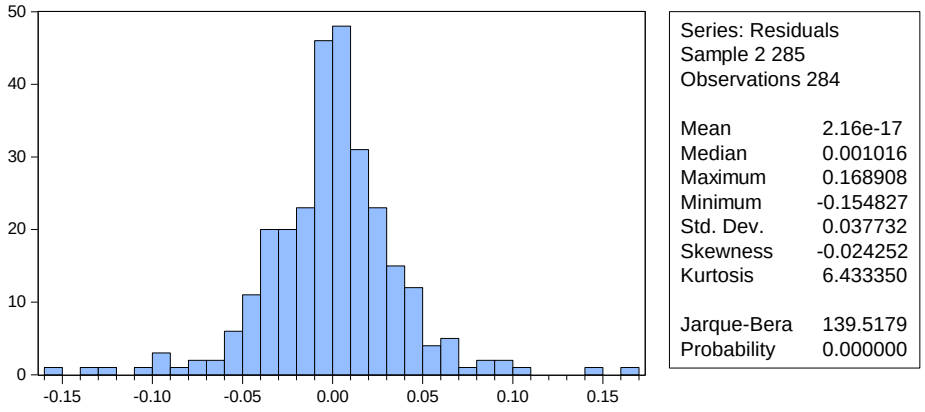


Series: Residuals
Sample 2 285
Observations 284

Mean	2.16e-17
Median	0.001016
Maximum	0.168908
Minimum	-0.154827
Std. Dev.	0.037732
Skewness	-0.024252
Kurtosis	6.433350
Jarque-Bera	139.5179
Probability	0.000000

Appendix 3. Descriptive Statistics of the Second Empirical Model





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