THE INFLUENCE OF EGYPTIAN POUND FLOTATION ON CAPITAL STRUCTURE DETERMINANTS FOR LISTED EGYPTIAN COMPANIES

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Abstract

In Egypt, an essential economic transformation program was started in prior years to enhance Egyptian economic progress and the liberalization of the Egyptian pound (EGP) exchange rate (International Monetary Fund [IMF], 2017). By the end of 2016, Egypt had an EGP flotation where significant changes took place in trading volumes, stock issuance, and interest rates (Central Bank of Egypt, 2018). One of the most vital decisions in any company is the capital structure decision. Therefore, this research strengthens the capital structure literature by investigating the influence of Egyptian pound flotation on capital structure determinants for the listed Egyptian companies during the period from 2014 to 2018, which is a research issue, not examined in Egypt before. A sample of 78 non-financial companies listed on the Egyptian Stock Exchange (ESX) over 5 years is used; the research examines the influence of a company's profitability, tangibility, size, growth, liquidity, non-debt tax shields, and flotation on capital structure. Adopting panel data methodology, the findings indicate that the company's profitability, tangibility, size, and liquidity are significant determinants of the capital structure of Egyptian companies whereas growth, non-debt tax shields, and flotation are insignificant. A weak influence of EGP flotation on determinants of capital structure and the variations before and after flotation is in the significance level of the determinants.

Keywords: Capital Structure, Egyptian Pound Flotation, Tangibility, Non-Debt Tax Shields, Egyptian Listed Firms

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1. INTRODUCTION

A company's value and its maximization are usually the main objectives of companies, particularly, in the current business environment. There are decisions made in companies that are important for their success such as investments, financing, and dividends decisions (Rokhayati, Pramuka, & Sudarto, 2019). Moreover, the dynamic business environment and high competition have enhanced the significance of such decisions in maximizing the company's value (Ahmed & Afza, 2019).

One of the most important decisions carried out by companies is the capital structure decision. It is concerned with financing assets and operations (Das & Swain, 2018). The capital structure decision is considered optimal if it enhances the company value and minimizes the costs of financing. However, it is considered inappropriate if companies suffer from financial distress.

Companies have two sources of funds: equity and debt (Muli, 2019). The first source is equity which represents the money invested by the companies' owners. It can be either from internal sources such as reinvested income or external sources such as shares issued to the public. However, issuing shares may create high costs and risk of low market value (Modugu, 2013). The second source is a debt which represents the borrowed money from financial institutions. Debt claims are separate from the companies' profits and are tax-deductible, hence, they provide tax benefits (Sunarto & Rely, 2017). Therefore, Goh, Tai, Rasli, Tan, and Zakuan (2018) defined the capital structure as a "combination of debt and equity that is used to finance the long-term assets and operations of the firm" (p. 225).

How to organize the capital structure is one of the essential decisions that influence the company's value and performance (Nguyen, Ho, & Vo, 2019). In addition, capital structure is one of the most studied topics across the world. Several studies are performed to identify the determinates of capital structure such as profitability, size, liquidity, growth, tangibility, business risk, and non-debt tax shields (Abdulla, 2017; Moradi & Paulet, 2019; Rani, Yadav, & Tripathy, 2020; Vintila, Gherghina, & Toader, 2019). The conflicting results highlight the need for more research to examine how the capital structure is influenced by the companies' characteristics.

A core economic transformation program was initiated by the International Monetary Fund (IMF) in Egypt in previous years. The program aims at improving Egyptian economic growth and the liberalization of the Egyptian pound (EGP) exchange rate (IMF, 2017). Moreover, the EGP was floated in November 2016 recording a 51.5% drop in value compared with the United States Dollar (Central Bank of Egypt, 2018). Additionally, interest rates were greater by 300 basis points at that time (Central Bank of Egypt, 2018). However, the interest rates have been reducing since March 2020 (World Bank, 2020).

Significant variations took place in the Egyptian capital markets at the same time. A documented drop of 77% in the trading value in the bond market in 2017 when compared with 2016 and a 250% drop in 2018 as contrasted to 2017 (The Egyptian Exchange, 2016). Moreover, there was a rise in market liquidity by 56% with regard to 2015 and a 40% improvement in the average daily value of shares traded as documented by The Egyptian Exchange (2017).

The amount of bond trading significantly decreased during this period, which explains that Egyptian companies may swap their capital structure choice. Moreover, various sectors in Egypt documented performance improvement following the flotation (The Egyptian Exchange, 2017). In addition, a reduction of EGP compared to foreign currencies strengthened some companies' international sales and modified the Egyptian companies' characteristics.

Some research has been performed in Egypt which addressed capital structure determinants and the influence of capital structure on performance (Hussein, 2020; Sakr & Bedeir, 2019; Allini, Rakha, McMillan, & Calderelli, 2018; Abdul Hadi, Hamad, & Suryanto, 2016; Eldomiaty, 2007). However, to the researchers' best knowledge, no research has been conducted to test the effect of EGP flotation on capital structure determinants of Egyptian companies. Thus, this novel research will enrich the capital structure literature by examining the influence of EGP flotation on capital structure determinants for the listed Egyptian companies during the period from 2014 to 2018. The aim is fulfilled by answering the following main research questions:

RQ1: What are the Egyptian companies' characteristics that influence capital structure?

RQ2: Are there any differences between capital structure determinants before and after flotation?

This research is divided into sections as follows. Section 2 is a thorough review of the theoretical frameworks and empirical studies. Section 3 is a research methodology. Section 4 presents results and discussion, and Section 5 the key conclusion, limitations and suggested future research.

2. LITERATURE REVIEW

2.1. Capital structure theories

Modigliani and Miller (MM) theory

The capital structure theories were initiated by Modigliani and Miller (1958) who focused on capital structure in perfect capital markets with free taxes, bankruptcy costs, and transaction costs (Vo, 2017). Their conclusion was the capital structure decisions have no influence on company value (Aljamaan, 2018; Yousef, 2019). Yet, the MM theory has been criticized by some researchers (e.g., Martinez, Sherger, & Guercio, 2019).

Trade-off theory (TOT)

A trade-off theory was proposed by Kraus and Litzenberger (1973) who provided a trade-off evaluation concerning tax benefits of debts and risks of bankruptcy costs. The optimal capital structure debt level could be determined when the tax benefits of debt are comparable to its risks (Sohrabi & Movaghari, 2019). Thus, taxes and bankruptcy risks are influential factors in companies' financial decisions (Abeywardhana, 2017).

Agency costs theory

Jensen and Meckling (1976) proposed the agency costs theory that classifies the agency problem into two aspects: the first aspect emphasized companies with a large number of shareholders and the necessity for managers to manage the company; this may motivate managers to focus on their private objectives instead of maximizing the companies' value (Hoque, 2019). The second aspect focuses on the willingness of equity holders to enhance company value through risky investing while creditors will not provide debts in case of risky investment (Jensen & Meckling as cited in Obay,

2018). Additionally, high debt obligations may restrict managers from fulfilling their personal objectives (Neves, Serrasqueiro, Dias, & Hermano, 2020).

Pecking-order theory (POT)

Myers (1984) in his theory suggested a sequence for funding the company's operations and assets. The sequence started with internal sources or retained earnings, and if not adequate, then debt, and finally funding through equity (Aljamaan, 2018). This financing order is attributable to information asymmetry which could be explained as the variations in companies' known information between managers and investors. Therefore, the financing decisions depend on information asymmetry and easy-to-use resources. Hence, there is no optimal capital structure.

Growth cycle theory

This theory was proposed by Berger and Udell (1998). It connects the companies financing with its growth cycle as characterized by size and age. It indicates differences between small and large companies as the small ones depend on owner investment with fewer loans while the large ones depend on a higher percentage of debts (Martinez et al., 2019).

2.2. Determinants of capital structure

Numerous studies were conducted to identify the determinants that influence capital structure decisions. The most significant determinants are profitability, tangibility, size, growth, non-debt tax shields, and liquidity (Abdulla, 2017; Chakrabarti & Chakrabarti, 2019; Nguyen et al., 2019; Panda & Nanda, 2020). Moreover, various researchers examined the impact of some events, such as the financial crisis, on these determinants (Moradi & Paulet, 2019; Sakr & Bedeir, 2019).

Company profitability

Rahayu, Suhadak, and Saifi (2020) pointed out that company profitability is the ability of companies to achieve revenues that exceed their expenses. Alarussi and Alhaderi (2018) indicated that company profitability in a dynamic business environment reveals decision-making competence and could attract investors.

There are a number of companies' profitability measures that are classified as accounting measures and market-based measures. The accounting measures are concerned with evaluating companies' past performance. It may include net profit margin (NPM), return on sales (ROS), return on assets (ROA), and return on investment (ROI) (Richard, Devinney, Yip, & Johnson, 2009). On the other hand, market-based measures may include Tobin's Q and beta which are related to future–looking companies' aspects (Samiloglu, Oztop, & Kahraman, 2017).

The TOT indicates that greater debts can improve profits through tax saving (Kraus & Litzenberger, 1973). However, a small number of researches were consistent with TOT including Chadha and Sharma (2016), with a sample of 422 Indian listed companies from 2000–2018; and Rani et al.'s (2020) research using a bigger sample: 3310 Indian companies. Both researches concluded there is a positive association between profitability and companies' capital structure.

Lastly, a number of researches advocate an insignificant relationship between companies' profitability and determinants of capital structure. Ahsan, Wang, and Qureshi (2016) performed research in Pakistan using a sample of 688 companies. Yousef (2019) examined this correlation using a sample of 131 real estate companies in GCC countries for the period 2000–2014. These studies conducted in Pakistan and GCC countries indicated an insignificant correlation between determinants of capital structure and companies' profitability.

Consequently, based on the theoretical framework and researches findings above, this research proposes the following hypothesis:

H1: There is a significant association between a company's capital structure and profitability.

Asset tangibility

Tangibility represents one of the company's asset components as categorized into tangible and intangible assets (Chakrabarti & Chakrabarti, 2019). Tangible assets can either be sold or used as collateral for obtaining debts (Boda & Szucs, 2017). Ahsan et al. (2016) considered tangibility as one of the key determinates that influence capital structure. On the other hand, intangible assets are non-physical items that cannot be easily sold or used as collateral in the circumstances of bankruptcy (Zhang, Skoogh, & Sward, 2015). Nevertheless, the findings regarding the relationship between tangibility and the company's capital structure in prior studies were mixed.

The POT suggests that internal sources are the least costly financing sources for companies due to information asymmetry (Myers, 1984). As tangible assets are easily appraised and sold, so higher tangibility would be related to higher equity as a result of internal sources.

Some researches were in accordance with the POT, such as Ahsan et al. (2016), who investigated the capital structure determinants of 688 companies in Pakistan from the period 1972–2010. On the other hand, Yousef (2019) examined capital structure determinants of 131 real estate firms in GCC countries and London, using panel data models. The conclusion of these studies supported the hypothesis that greater tangibility is correlated with lesser leverage in Pakistan, Korea, and GCC countries. Likewise, Panda and Nanda (2020) investigated the capital structure determinants of 1,211 Indian companies in the machinery and textiles industries and concluded that companies with more tangible assets can have fewer debts.

On the other hand, TOT proposes that tangible assets react as collateral by reducing the cost of debt and letting companies receive more debt. Some studies support this claim, such as Khemiri and Noubbigh (2018), who investigated the relationship between tangibility and capital structure in 206 non-financial companies in South Africa, Ghana, Kenya, Nigeria, and Zimbabwe from 2006 to 2016. In addition, Neves et al. (2020) examined capital structure determinants of 37 firms in Portugal using panel data methods from 2010 to 2016. Both studies

reached the same conclusion that there is a positive relationship between tangibility and capital structure. However, few studies concluded that tangibility is an insignificant determinant of capital structure, such as Chakrabarti and Chakrabarti (2019) who examined 141 companies in India from 2006 to 2016.

Based on the theoretical arguments and empirical literature, this research is proposing the following:

H2: There is a significant association between a company's capital structure and asset tangibility.

Company size

Company size is a measure used in categorizing companies into small, medium, or large. The company size may be determined by total assets, total sales, and the number of employees (Zadeh & Eskandari, 2012). The POT proposes an adverse relationship between capital structure and company size as large companies can have high profits with no requirements for additional debts (Myers, 1984). Some researchers, such as Vintila et al. (2019) in the United States, agree with the POT proposition.

On other hand, the TOT states that large companies have more funds and are capable of borrowing more with lower bankruptcy risks. The same conclusion was reached by some researchers, such as Neves et al. (2020) in Portugal, Abdulla (2017) in the United Arab Emirates (UAE), and Yousef (2019) in GCC countries. Accordingly, the research formulated the following hypothesis:

H3: There is a significant association between a company's capital structure and company size.

Growth opportunities

A company's growth indicates that companies have positive and valuable investments. The TOT and agency cost theories indicate an increase in the agency problems between owners and creditors that may assume substantial costs of debt and great bankruptcy risks. Thus, TOT and agency cost theory proposes a negative influence of a company's growth on capital structure (Kraus & Litzenberger, 1973). Several pieces of research were consistent with this proposition that there is a negative relationship between growth and capital structure, such as Morri and Artegiani (2015) in Europe and Li and Islam (2019) in Australia.

On the other hand, the POT claims that companies having great growth opportunities will have a tendency to obtain debts (Myers, 1984). Definitely, in the circumstance of inadequate equity funds, they will use debt financing (Neves et al., 2020). Several researches comply with this proposition and conclude a positive relationship between firms' growth and capital structure, such as Ahsan et al. (2016) in Pakistan, Rani et al. (2020) in India, Abdulla (2017) in the UAE and Yousef (2019) in GCC countries and London. Therefore, this research hypothesizes the following:

H4: There is a significant association between companies' capital structure and growth opportunities.

Company's liquidity

The company's liquidity indicates the adequacy of current assets to protect current liabilities (Sari & Sedana, 2020). According to the TOT assumption of a positive relationship between liquidity and capital structure, companies with good liquidity are capable of borrowing more (Kraus & Litzenberger, 1973). Yet, limited research by Abdulla (2017) in the UAE advocated this claim. However, POT and agency cost theories contradict TOT and assume that companies with high liquidity will choose internal sources of financing (Chakrabarti & Chakrabarti, 2019; Myers, 1984). Some researches support POT and agency cost theory, such as Shambor (2017) in the United Kingdom and Vintila et al. (2019) in the United States.

Thus, this research proposes the following hypothesis:

H5: There is a significant association between a company's capital structure and liquidity.

Non-debt tax shields (NDTS)

The shielding of the company's income is a result of various types of expenses, such as interest, depreciation, amortization, or research and development are considered tax shields (Chakrabarti & Chakrabarti, 2019). One of the advantages of acquiring debts is interest payments as it reduces the tax value. Conversely, non-debt tax shields (NDTS) denote the expenses that include shields on the company's income instead of debt.

The POT and TOT support that NDTS is correlated with decreasing debts in the capital structure as no tax benefits are required (Danso & Adomako, 2014). Some researches adopted the negative relationship between debt and NDTS, such as Danso and Adomako (2014) in South Africa and Shambor (2017) in the United Kingdom.

However, other researches, for instance, Khemiri and Noubbigh (2018) in Sub-Saharan African countries and Moradi and Paulet (2019) in Austria, Belgium, France, Germany, Luxemburg, and the Netherlands have reached a positive association between NDTS and capital structure. Based on prior research, this research forms the following hypothesis:

H6: There is a significant association between a company's capital structure and non-debt tax shields.

Egyptian pound flotation

In 2016, the foreign currency was deficient; accordingly, the Central Bank of Egypt decided to reduce the need for foreign currency and float the Egyptian pound (Central Bank of Egypt, 2017). Additionally, the decision was required by the IMF before giving the $12bn loan to Egypt.

Critical influences were perceived on the Egyptian economy after 2016. First, there was a great decline in the share prices of companies as a result of the reduction of their dollar value which resulted in increasing foreign direct investments. Second, the exports were greater than before as a result of devaluation (American Chamber of Commerce in Egypt, 2017). Third, there was a big difference in the inflation level before floating between 12% and 23% at the end of 2016 (Abisourour, 2018). Fourth, the cost of local borrowing doubled with an effect on the value of international business loans (Abisourour, 2018). Finally, a number of initial public offerings have been enlarged before the flotation (The Egyptian Exchange, 2018).

Consequently, these critical variations may affect the financing arrangements of Egyptian companies. Thus, the following hypothesis is proposed:

H7: There is a significant influence of EGP flotation on the company's capital structure.

2.3. Prior research in Egypt

A number of researches investigated the factors affecting the capital structure in Egypt. Using a sample of 99 companies and adopting panel data methods, Eldomiaty (2007) studied the relationship between capital structure and some factors such as target debt ratio, tangibility, tax rates, bankruptcy risk, growth opportunities, size, profitability, liquidity, dividends, agency costs, free cash flow, and interest rates. His conclusion pointed out some significant factors such as tax rates, tangibility, target debt ratio, and bankruptcy risk.

Moreover, Abdul Hadi et al. (2016) with a sample of 63 companies from 2008–2012 concluded that tangibility, NDTS, growth, and liquidity have a significant impact on companies' capital structure.

More recent research by Allini et al. (2018) used a sample of 106 companies, and Sakr and Bedeir (2019) used 62 companies. Their conclusion was similar in terms of the significance of company size, tangibility, and profitability with capital structure. However, Allini et al. (2018) indicate the significance of growth while Sakr and Bedeir (2019) highlight the significant impact of liquidity, business risk, and financial flexibility on capital structure.

3. RESEARCH METHODOLOGY

3.1. Research sample and data collection

The research population includes all companies listed on the Egyptian Stock Exchange (EGX100). However, Table 1 shows the convenient research sample of 78 non-financial companies after removing the banks and financial institutions as a result of having different regulations which may affect the research findings and consistency with some research (Neves et al., 2020; Moradi & Paulet 2019; Sakr & Bedeir, 2019)

Table 1. The research sample

Sector	*No. of companies*	*Companies per sector*
Real estate	16	21%
Construction and materials	15	19%
Food and beverages	12	15%
Chemicals	7	9%
Metals	4	5%
Hotels	3	4%
Oil and gas	3	4%
Pharmaceutical	3	4%
Textiles	2	3%
Telecommunications	2	3%
Machinery and tools	2	3%
Transportation	2	3%
Marine and logistics	2	3%
Media	1	1%
Healthcare	1	1%
Automobiles	1	1%
Household goods	1	1%
Packaging	1	1%
Total	**78**	**100%**

Table 1 shows that there are 18 non-financial sectors; it shows also that 40% of the sample are real estate and construction sectors which reveals great construction plans in Egypt.

The research data are collected from the Thomson Reuters database which is considered a valuable and reliable source of financial data. Considering that the EGP flotation happened in November 2016 and the data availability, the data are covering 78 companies for a period of 5 years from 2014 to 2018 with a total of 390 observations.

3.2. Research variables and measurements

3.2.1. Dependent variable: Capital structure

In this research, capital structure is considered the dependent variable. In the literature, a number of measures have been used as proxies for capital structure as long-term debt ratio (Alarussi & Alhaderi, 2018) short-term debt ratio (Hussein, 2020), and total debt ratio (Chakrabarti & Chakrabarti, 2019; Vintila et al., 2019). This research uses the total debt ratio as a proxy for capital structure as it represents the actual company's risk and creditors (Salehi & Biglar, 2009).

3.2.2. Independent variables

This research includes seven independent variables as determinants of capital structure: profitability, tangibility, size, growth, liquidity, and non-debt tax shields and the impact of EGP flotation.

The first variable is *Profitability* which shows the company's capability to make earnings. Different measures have been used as proxies for profitability: this research uses the return on assets (ROA). The second variable is *Tangibility* which represents the company's asset structure and collaterals attached to debts as part of the value of tangible assets (Chakrabarti & Chakrabarti, 2019). In addition, the company's *Size* is the third variable as represented by the natural logarithm of total assets to resolve differences in total assets among the companies' sample.

Moreover, the fourth variable is the company's *Growth* as measured by revenue growth since assets' growth rate might be irrelevant to all companies' samples such as service-providers. *Liquidity* shows the fifth variable that indicates the company's ability to meet its short-term obligations. It could be measured by the current ratio. The sixth variable is *Non-debt tax shields (NDTS)* which represents the amount of reduction of taxable earnings as a result of including depreciation expenses (Chakrabarti & Chakrabarti, 2019).

The last variable is a dummy variable representing the EGP flotation (FL) which is used to capture the impact of flotation on the capital structure determinants for the full period (from 2014 to 2018) by assigning (0) to observations before flotation (years 2014–2016) and assigning (1) to observations after flotation (the year 2017–2018). In addition, this research captures the differences in capital structure determinants between the two periods before and after flotation. Table 2 shows all the research variables and their measurements.

Table 2. Research variables and measurements

Variables	*Measurements*	*Studied supported*
Dependent variable		
Total debt ratio (TDR)	$\frac{Total\ debts}{Total\ assets}$	Chakrabarti and Chakrabarti (2019), Panda and Nanda (2019), Sohrabi and Movaghari (2019)
Independent variables		
Profitability (PROF)	$\frac{EBIT}{Total\ assets}$	Khemiri and Noubbigh (2018)
Tangibility (TANG)	$\frac{Net\ fixed\ assets}{Total\ assets}$	Khemiri and Noubbigh (2018), Moradi and Paulet (2019)
Size (SIZE)	$\ln(total\ assets)$	Sohrabi and Movaghari (2019), Vintila et al., (2019)
Growth (GRO)	$\frac{Revenues_t - Revenues_{t-1}}{Revenues_{t-1}}$	Chakrabarti and Chakrabarti (2019)
Liquidity (LIQ)	$\frac{Current\ assets}{Current\ liabilities}$	Rani et al. (2020), Vintila et al. (2019)
Non-debt tax shield (NDTS)	$\frac{Depreciation\ expense}{Total\ assets}$	Danso and Adomako (2014), Shambor (2017)
Flotation (FL)	*0 for period 2014–2016* *1 for period 2017–2018*	Moradi and Paulet (2019), Neves et al. (2019)

Panel data is an appropriate methodology for this research as data are collected for 78 companies over 5 years containing observations on 2 dimensions: cross-sectional and time series (Pillai, 2016). Several advantages of panel data are a much larger data set with more variability and less collinearity among the variables than pure cross-section or pure time-series data. Through more informative data, one can get more reliable estimates and test more complex models with less restricted assumptions. Another advantage of panel data sets is their ability to control for individual heterogeneity. Biased resulting estimates occurred in case of not controlling unobserved individual specific effects. Moreover, panel data sets are able to know and estimate effects that are clearly not obvious in pure cross-sections or pure time-series data (Baltagi, 1998). The balanced panel does not have any missing values whereas this research panel data has an unbalanced one.

To ensure the validity of using parametric methods of analysis, the data must be normally distributed. Although the sample is large, comprising 78 companies and 390 observations which assumes that it is normally distributed, as supported by the "central limit theorem" (Das & Imon, 2016), a normality test is conducted. Moreover, to ensure the model's reliability and explanatory power, it is tested for multi-collinearity. This is examined using several techniques such as the Pearson correlation matrix and variance inflation factor (VIF) (Daoud, 2017).

Furthermore, to apply the suitable type of panel models, "Hausman and Breusch–Pagan tests" are conducted to choose between the panel data models: "fixed-effects and random-effects" (Baltagi, 2005). Hausman (1978) suggests a test to check if the individual effects are correlated with the explanatory variables. Under the null hypothesis, there is no correlation between individual effects and explanatory variables as both random-effects and fixed-effects estimators are consistent. However, the random-effects estimator is efficient while fixed-effects are not. Under the alternative hypothesis, the individual effects are correlated with the explanatory variables: the random-effects estimator is inconsistent while the fixed-effects estimator is consistent and efficient. The F-test is used to choose between the pooled ordinary least squares (OLS) and fixed-effects models; if the F-test is significant, this indicates that the fixed-effects method is better than the OLS. The Breusch–Pagan Lagrange multiplier (LM) test is used to choose between the pooled OLS and random-effects models; if the LM test is significant, the random-effects method is preferred to the OLS. The Hausman test is used to choose between the fixed- and random-effects models.

The panel data equation is estimated as below:

$$TDR_{it} = \alpha + \beta_1 PROF_{it} + \beta_2 TANG_{it} + \beta_3 SIZE_{it} + \beta_4 GRO_{it} + \beta_5 LIQ_{it} + \beta_6 NDTS_{it} + \beta_7 FL_{it} + \mu_{it} \quad (1)$$

where,
$i = 1, \ldots N$ is the number of the companies in the sample;
$t = 1, \ldots T$ is the number of the years;
TDR represents the company's total debt ratio;
PROF represents the company's profitability;
TANG represents the company's tangibility;
SIZE represents the company's size;
GRO represents the company's growth;
LIQ represents the company's liquidity;
NDTS represents the non-debt tax shields;
FL represents the flotation;
μ_{it} = error term.

4. RESULTS AND DISCUSSIONS

4.1. Descriptive statistics

This section is concerned with describing and analysing the research variables.

Table 3a. Descriptive statistics for the pre-flotation period (2014–2016)

Variable	*N*	*Mean*	*Standard deviation*	*Minimum*	*Maximum*
Debt to assets	233	0.51	0.24	0.05	1.17
Profitability	233	0.06	0.10	-0.17	0.30
Tangibility	233	0.30	0.25	0.00	0.98
Size	233	7.35	1.62	3.62	11.06
Growth	223	0.14	0.33	-0.64	0.87
Liquidity	233	1.67	0.99	0.03	3.76
NDTS	226	0.02	0.02	0.00	0.00

Table 3b. Descriptive statistics for the post-flotation period (2017–2018)

Variable	*N*	*Mean*	*Standard deviation*	*Minimum*	*Maximum*
Debt to assets	157	0.52	0.24	0.02	1.17
Profitability	156	0.08	0.10	-0.17	0.30
Tangibility	156	0.29	0.26	0.00	0.95
Size	156	7.68	1.70	3.62	11.43
Growth	154	0.25	0.34	-0.54	0.87
Liquidity	156	1.61	0.97	0.07	3.76
NDTS	155	0.02	0.02	0.00	0.06

Table 4. Descriptive analysis for the full period (2014–2018)

Variable	*N*	*Mean*	*Standard deviation*	*Minimum*	*Maximum*
Debt to assets	390	0.51	0.24	0.02	1.17
Profitability	389	0.07	0.10	-0.17	0.30
Tangibility	389	0.29	0.25	0.00	0.98
Size	389	7.48	1.66	3.62	11.43
Growth	377	0.18	0.34	-0.64	0.87
Liquidity	389	1.65	0.98	0.03	3.76
NDTS	381	0.02	0.02	0.00	0.06
Flotation	395	0.40	0.49	0.00	1.00

As shown in Tables 3a and 3b, the capital structure variable indicates a mean debt of 51% during the pre-flotation for the Egyptian companies and a minor improvement after flotation to 52%. Thus, there were no major variations as a result of the EGP flotation. However, Table 4 shows that for the full period, 51% is the mean debt level for Egyptian companies indicating that Egyptian companies have a minor preference for debt.

The profitability increased from 6% to 8% as a result of flotation. The maximum profitability was 30%, on the other hand, the maximum loss was 17% before and after flotation. Shokry and Bouaddi (2018) pointed out that the marine and transportation industries run into an unexpected increase in prices post-flotation and end up suffering a great loss. While Table 4 shows that the mean profitability for the full period is 7%, between the profitability levels before and after flotation. The such net effect can be attributable to the companies' international sales and the decline in the number of companies whose profitability levels dropped below the average profitability after the flotation.

Moreover, there are insignificant changes in the asset structure of Egyptian companies from 30% to 29%. Yet, the standard deviation indicates significant variances among industries. Furthermore, Egyptian companies' size pointed out no changes throughout the two periods. Nevertheless, its discrepancies are very high: 170% similar to differences across industries. For the revenue growth, it improved from 14% before flotation to 25% after flotation. Real estate and construction industries were positively influenced whereas marine and transportation industries were negatively influenced after flotation. The mean growth for Egyptian companies is 18% for the full period of 2014–2018 as shown in Table 4.

Furthermore, the Egyptian companies' liquidity is so close before and after flotation while the mean liquidity level for the full period is 1.65. Finally, NDTS data indicated that there is an insignificant difference before and after flotation. The variations among companies are shown by the 17% standard deviation. Therefore, NDTS is high in companies that have high tangibility and vice versa.

4.2. Correlation matrix analysis

The correlation matrix and VIF were used to test for multi-collinearity. If the independent variables are highly correlated with each other, the model will be inaccurate (Senaviratna & Cooray, 2019).

Correlation for sub-periods

Tables 5a and 5b show no concern for the multi-collinearity problem since the maximum correlation between the total debt ratio and liquidity is -0.6440 which is smaller than 0.7, which indicates the nonexistence of a multi-collinearity problem (Pallant, 2010). The relationship between capital structure and profitability, size, growth, and liquidity were significant prior to the EGP flotation. The majority of the relationships between the independent variables were higher after the flotation with no change in direction except for growth with tangibility and NDTS with profitability.

Table 5a. Correlation matrix for the pre-flotation period (2014–2016)

Variable	*TDR*	*PROF*	*TANG*	*SIZE*	*GROW*	*LIQ*	*NDTS*
TDR	1						
PROF	**-0.3038***	1					
TANG	-0.1051	-0.0461	1				
SIZE	**0.1416***	**0.1520***	0.1177	1			
GROW	**0.1551***	**0.2013***	**-0.1346***	0.1309	1		
LIQ	**-0.6440***	**0.1976***	**-0.3782***	**-0.3558***	-0.0836	1	
NDTS	-0.047	**0.1989***	**0.4468***	0.0960	-0.0691	**-0.2784***	1

*Note: * significant at the 95% confidence level.*

Table 5b. Correlation matrix for the post-flotation period (2017–2018)

Variable	*TDR*	*PROF*	*TANG*	*SIZE*	*GROW*	*LIQ*	*NDTS*
TDR	1						
PROF	**-0.2515***	1					
TANG	**-0.1881***	-0.0897	1				
SIZE	**0.2468***	**0.2434***	0.0181	1			
GROW	-0.0699	**0.3307***	0.0751	0.1430	1		
LIQ	**-0.5445***	**0.1751***	**-0.3750***	**-0.2637***	0.0325	1	
NDTS	-0.0571	0.0406	**0.6079***	0.1392	0.0015	**-0.3796***	1

*Note: * significant at the 95% confidence level.*

Moreover, VIF values were around 1 and 1.29 which indicates no multi-collinearity problem exists since VIF is less than 10 consistent with Pallant (2010) who indicated that if the VIF values are above 10, there would be multi-collinearity concerns.

Furthermore, the correlation matrix for the full period indicated that all correlations are below 0.7 and the nonexistence of multi-collinearity. For the independent variables, the highest correlation (0.5124) is between tangibility and non-debt tax shields As for the flotation variable, it is weakly correlated 0.1603 only with growth.

4.3. Research models

Panel data methodology is applied in this research to determine the significant capital structure determinants for the Egyptian companies and how the determinates were influenced by EGP flotation. Some models were run to decide on the most suitable type of panel model.

4.3.1. Model 1: Full period (2014–2018)

To ensure the accuracy of the results, certain tests for normality such as histogram plotted for the residuals and normal p–p standardized plot was conducted and its results indicated that the data are normally distributed. In order to decide between the fixed-effects and random-effects models, the Hausman specification test is applied. Table 6 shows that there is evidence to reject the null hypothesis since the F-test is highly significant at 5% with a p-value which is less than 0.05, thus, the fixed-effects model is the most suitable type of the panel in model one and there is no need to conduct the Breusch–Pagan test.

The fixed-effects (FE) model includes all seven independent variables:

$$\hat{y}_{it} = b_0 + b_{it}PROF_{it} + b_{it}TANG_{it} + b_{it}SIZE_{it} + b_{it}GROW_{it} + b_{it}LIQ_{it} + b_{it}NDTS_{it} + b_{it}FL_{it} \quad (2)$$

As shown in Table 6, the estimated fixed-effects model is:

$$\widehat{y_{it}} = 0.225 - 0.408PROF_{it} - 0.174TANG_{it} + 0.069SIZE_{it} + 0.231GROW_{it} - 0.881LIQ_{it} - 0.671NDTS_{it} - 0.010FL_{it} \quad (3)$$

Table 6. Model 1 for the full period (2014–2018)

Variable (x_{it})	*B_{it}*	*Standard error*	*t*	*P-value*
Constant	0.225	0.153	1.47	0.142
Profitability	-0.408	0.112	-3.65	0.000***
Tangibility	-0.174	0.080	-2.18	0.030**
Size	0.069	0.019	3.56	0.000***
Growth	0.231	0.015	1.51	0.132
Liquidity	-0.881	0.011	-7.98	0.000***
NDTS	-0.671	0.745	-0.90	0.369
Flotation	-0.010	0.011	-0.94	0.349
R^2	27.0%			
F-test (7.281)	14.87			
P-value of the F-test	0.0000			

Note: significant at 0.1 level, ** significant at 0.05 level, *** significant at 0.01 level.*

Table 6 shows the results of the independent variables. The intercept is insignificant with a value of 0.225 representing the average of the constant debt level for all Egyptian companies and unobserved individual effects. Moreover, the table shows that there are four significant capital structure determinants of Egyptian companies namely profitability, tangibility, size, and liquidity.

The results indicated a negative significant relationship between profitability and companies' capital structure (B = -0.408). While the company's profitability increases by 1, the level of capital

structure as represented by the total debt ratio decreases by 0.408 assuming all other covariates are constant. The Abdulla (2017) study was consistent with these results and supported the pecking-order theory that high-profit companies depend more on internal resources rather than debts. This finding implies accepting the first hypothesis (*H1*).

Moreover, the results reveal a negative significant relationship between the tangibility and the company's capital structure which is *B* = -0.174. The finding indicates that when the company's tangibility increases by 1, the level of debt decreases by 0.174 assuming all other covariates are constant. These results are consistent with Ahsan et al. (2016). Moreover, the results agree with Sakr and Bedeir (2019) who pointed out that Egyptian companies do not use fixed assets as collateral for debts thereby accepting the research's second hypothesis (*H2*).

A positive significant relationship exists between size and capital structure (*B* = 0.069). This indicates that bigger companies convey a message of trust and less risky of bankruptcy to banks. It could be concluded that bigger Egyptian companies can decide to take more debt. Accordingly, this finding is in line with Khemiri and Noubbigh (2018) and consistent with the assumptions of the trade-off theory. Thus, accepting the third hypothesis (*H3*).

Furthermore, a negative significant relationship is shown between the company's liquidity and capital structure (*B* = -0.881). This finding denotes that Egyptian companies can meet short-term obligations. This result is in line with a number of studies (Ahsan et al., 2016; Khemiri & Noubbigh, 2018; Chakrabarti & Chakrabarti, 2019). This supports the pecking-order theory and accepts the fifth hypothesis (*H5*).

Finally, the flotation as represented by the dummy variable reveals an insignificant impact on the Egyptian companies' capital structure. This finding may be justified by two reasons: firstly, only specific industries experienced substantial changes. Secondly, the changes in interest rates affected short-term or variable-interest loans only whereas long-term debts did not face such changes. In addition, long-term debts represent a high weight in the total debts of the sample companies. Thus, the seventh hypothesis (*H7*) is rejected.

To do more analyses on the impact of flotation on capital structure determinates, two models were developed: the first model includes the pre-flotation period while the second model includes the after-flotation period as in the following subsections.

4.3.2. Model 2: Pre-flotation period (2014–2016)

Normality tests, histogram plotted for the residuals, and normal p–p standardized plot were conducted to check the normality of the data and indicated the fulfilment of the normality assumption. The Hausman specification test compares a random-effects model to its fixed-effects model. For the first model, the Hausman test shows a p-value that is less than 0.05, supporting that the fixed-effects model is more appropriate to apply.

4.3.3. Model 3: Post-flotation period (2017–2018)

For the third model, the post-flotation period (2017–2018), the Hausman test results show that the p-value is larger than 0.05; therefore, it suggests that the random-effects are more appropriate to apply. Accordingly, the Breusch–Pagan test is applied to choose among the random-effects and OLS models. The results imply a p-value that is lower than 0.05, supporting the use of the random-effects model.

Table 7a. Model 2: Fixed-effects pre-flotation period (2014–2016)

Variable	*B*	*Standard error*	*T*	*P-value*	*Significance*
Constant	**0.522**	0.200	2.62	**0.010**	**
Profitability	**-0.646**	0.149	-4.32	**0.000**	***
Tangibility	-0.070	0.107	-0.66	0.513	
Size	0.024	0.025	0.99	0.324	
Growth	0.019	0.017	1.12	0.265	
Liquidity	**-0.089**	0.016	-5.58	**0.000**	***
NDTS	0.280	1.017	0.28	0.784	
R^2	38%				
F-test	11.759				
P-value of the F-test	0.0000				

*Note: * significant at 0.1 level, ** significant at 0.05 level, *** significant at 0.01 level.*

Table 7b. Model 3: Random-effects post-flotation period (2017–2018)

Variable	*B*	*Standard error*	*T*	*P-value*	*Significance*
Constant	**0.671**	0.200	2.62	**0.000**	***
Profitability	**-0.530**	0.149	-4.32	**0.002**	***
Tangibility	**-0.375**	0.107	-0.66	**0.000**	**
Size	**0.029**	0.025	0.99	**0.015**	***
Growth	0.012	0.017	1.12	0.637	
Liquidity	-0.132	0.016	-5.58	0.668	
NDTS	**0.610**	1.017	0.28	**0.000**	***
R^2	51%				
Chi^2	89.691				
P-value of Chi^2	0.0000				

*Note: * significant at 0.1 level, ** significant at 0.05 level, *** significant at 0.01 level.*

Tables 7a and 7b reveal some variables which are turned into significant variables after the flotation as tangibility variables. This was due to high-interest rates after flotation (Central Bank of Egypt, 2017).

Moreover, a positive significant association was revealed between company size and capital structure after flotation. The interest rates were increased considerably as a result of flotation. Accordingly, the big companies were the ones that handle the increased interest rates (Central Bank of Egypt, 2017).

Finally, NDTS was a significant determinant. This may be interpreted as a large number of the companies in the sample using the new dollar exchange rate in their international business and reporting higher taxable income than actually earned. Accordingly, the Egyptian companies' NDTS were not sufficient to provide tax benefits.

Thus, Models 2 and 3 pointed out the weak influence of EGP flotation on determinants of capital structure and the variations were in the significance level of the determinants.

Therefore, this research concludes that capital structure is consistent with profitable, high liquidity, and more tangible assets that the Egyptian companies are complying with the pecking-order theory while big Egyptian companies are likely to have a high percentage of consistent debts consistent with the trade-off theory. Thus, the financing decisions of Egyptian companies do not adhere to certain capital structure theories.

5. CONCLUSION

Companies' value and success are based on proper financing decisions. Prior research addressed capital structure as one of the essential financing decisions. The results of these studies indicate that determinants of capital structure differ among countries. Egypt is one of the most important countries in the Middle East. Near the end of the year 2016, Egypt had an EGP flotation where the capital markets encountered changes in trading volumes, interest rates, and stock issuance. Hence, it is vital to investigate the effect of EGP flotation on capital structure and its determinants. This research provides a noteworthy contribution to literature as to the researchers' best knowledge this is the first research to investigate the influence of EGP flotation on capital structure determinants of Egyptian companies.

The main research findings can be summarized as follows: first, it shows that debt financing has a minor preference as measured by a debt level of 51% for Egyptian companies. Second, there are no significant variations in the determinants of the capital structure of Egyptian companies as a result of the EGP flotation. Yet, there are slight variations in the significance of some determinants such as company size and tangibility after the flotation. This could be interpreted as a great worry of banks toward providing loans to small companies at that period. Third, before the flotation, Egyptian companies were facing a large cost of debt and high information asymmetry that prevented companies from taking on extra loans. In addition, it never used assets as collateral even if it had extra fixed assets.

This research has important implications in the practical field; it supports managers in identifying which significant determinants enhance their financing decisions. Moreover, studying the influence of currency flotation will let managers adopt policies based on essential determinants of currency flotation or changes in exchange rates. In addition, lenders may reduce bankruptcy risks by emphasizing the determinants such as size and tangibility.

As with any other research, this research has some constraints. This research examined companies from different industries without considering the variances in the financing decisions among industries. Thus, for future research, a sample should be classified per industry taking into consideration differences among industries.

Moreover, this research uses more years before flotation covering 2014–2016; however, using the only year 2017–2018 after-flotation as a result of the availability of financial data of the companies' sample. Hence, for future research, it is recommended to increase the number of years in the sample. Furthermore, a total debt ratio is used as a proxy for the capital structure that did not reflect the influence of a short-term loan.

Finally, future research can focus on the relationship between capital structure and company value. Examining the impact of COVID-19 on the capital structure could be another future research area.

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