The Relationship Between Firm-Level Factors and Capital Structure: The Moderating Effect of the Arab Spring and 2016 Currency Floatation

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The Relationship Between Firm-Level Factors and Capital Structure: The Moderating Effect of the Arab Spring and 2016 Currency Floatation

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Abstract

Purpose: Despite the significant impact of the Arab Spring (AS) and the 2016 Egyptian pound (EGP) floatation on Egyptian firms, scholars paid less attention to their impact, particularly on the Capital Structure (CS) decision and their possible moderating impact on its determinants. This makes their influence on CS vague in the Egyptian context. Accordingly, this study aims to fill the literature gap by examining their influences on CS decisions to help firms' decision-makers adjust their financing policies to cope with the different periods of instability.

Design/Methodology/Approach: This study uses a quantitative approach to examine the impact of the AS and 2016 EGP floatation on CS and their moderating impact on the association between tangibility, firm size, liquidity, profitability, business risk, asset growth, tax effect, and non-tax shield and CS in 128 listed companies in the Egyptian stock market from 2007 to 2019 using System-Generalized Method of Moments (SYS-GMM).

Results: The study's findings revealed that first, Egyptian-listed firms increased their dependency on Short-Term Debt (STD) during the AS while they decreased their Long-Term Debt (LTD) during and after the AS and after the 2016 EGP floatation. Second, the determinants of STD and LTD changed across periods, and both instabilities had different effects on debt maturity determinants. Third, the major difference between the two periods is that the AS mainly affected the determinants of LTD, whereas the 2016 EGP floatation predominantly affected the determinants of STD. Profitable firms with high liquidity and the non-debt tax shield increased their LTD during the AS, while after the AS, the only reason for acquiring LTD was that the firms had growth assets. Furthermore, profitable Egyptian firms did not depend on STD, and that negative association was even stronger during the AS. In contrast, the 2016 EGP floatation had a minimal impact on LTD determinants; it mainly affected the STD determinants. Negative associations developed between firm size, liquidity, and STD, while a positive association developed between asset growth and STD.

Keywords: Capital Structure; Arab Spring; Currency Floatation**.**

Introduction

Research into Capital Structure (CS) has been an era of persuasive arguments, both theoretically and empirically, to identify the best financing decision by examining different dimensions, proxies, periods, countries, and modelling techniques (Tripathy & Asija, 2017). Moreover, the different crises (such as the global financial crisis, the 1997 Asian crisis, the Euro crisis, and the COVID-19 health pandemic) that overspread the international and national markets and their subsequent impact on countries' economies and investment environments highlighted the importance of the CS decision (Bajaj et al., 2021). This is because some firms witnessed financial distress and bankruptcy during those periods (Lyubov & Heshmati, 2023), leading to challenging times when firms aimed for external funding. That prompted the researchers to examine the determinants of CS before and after crises.

In light of the political instabilities that affected the Middle East and North Africa (MENA), the Arab Spring (AS), which started in 2010 in Tunisia, was one of the most significant catastrophes that influenced the MENA region, rapidly spreading across the Arab countries (Egypt, Syria, Yemen, Oman, Libya, and Bahrain). The political unrest started as protests against the government, with involved parties demanding a better standard of living and equality in the Arab nations, causing a dramatic deterioration in the countries' economic and financial conditions. Nevertheless, Egypt was one of the leading countries in the MENA region with the oldest stock market (El-Diftar et al., 2017) and a solid banking system; its economy further deteriorated significantly during that period (Wagdi et al., 2018). The departure of the Egyptian president, Hosny Mubarak, was an incomprehensible event to all Egyptians since he had remained president of Egypt for more than 30 years. The change in the presidential system and the substitution of the old regime with different rules and regulations caused firms' performance to become volatile, significantly affecting their profitability, investment opportunities, and financial policies (CBE, 2010/2011). Their net income decreased by 36% compared to the prior year (Abdelbaki, 2013), forcing them to minimise expenses by laying off many employees. Furthermore, the Central Bank of Egypt (CBE) modified their credit policy (CBE, 2010/2011), which led banks to become cautious and conservative. The accessibility of external sources of funds became more difficult because both creditors and investors were insecure and lost confidence during that period (Abdelbaki, 2013). The AS made the investment environment unstable (Dang et al., 2018); for example,

it deteriorated the country's credit rating (CBE, 2010/2011; Ghosh, 2016). According to Moody's, Standard & Poor (S&P), and Fitch Credit Agency, the credit rating of Egypt has deteriorated (Trading Economics, 2023), the GDP growth rate decreased from 5.1% to 1.8% (World Bank, 2023), and the inflation rate increased from 8.6% to 19.48% (CBE, 2010/2011).

To stabilise the Egyptian economy, the CBE floated the local currency at the end of 2016. The Egyptian pound (EGP) was traded to a dollar at $8.8 and jumped to be traded at $19.62 after one month of devaluation. This, in turn, resulted in an upturn in the inflation rate from 13.8% in 2016 to 29.5% in 2017 (BBC, 2016). The floatation of the EGP made it lose more than 45% of its value, which had a major influence on the Egyptian economy (Essam El-Din, 2024). Consequently, some firms experienced significant losses because of the increased expenses caused by the rise of imported product prices, forcing companies to cut unnecessary expenses (BBC, 2016). This further increased banks' interest rates, affecting firms' financing decisions. All of the above major occurrences significantly affected the country's investment environment, which made financing and investment decisions more challenging. Therefore, those significant events were the motives behind conducting this research. Especially since there is a dearth of studies regarding the impact of AS and 2016 EGP floatation on CS and its determinants, this paper endeavours to fill the literature gap by examining their impacts on i. CS, ii. their moderating impact on the association between firm-level factors (tangibility, firm size, liquidity, profitability, business risk, growth opportunity, tax effect, and non-debt tax shield) and CS in 128 listed companies in the Egyptian stock market from 2007 to 2019 using System-Generalized Method of Moments (SYS-GMM). With the aim of helping firms adjust their financing policies and be prepared for periods of high uncertainty. It also offers a research guide to assist firms' decision-makers in making the right financing decisions during uncertain periods.

The rest of the paper is outlined as follows. Section 2 presents the literature review, Section 3 identifies the research methodology, Section 4 provides the outcomes of univariate and multivariate analyses, Section 5 summarises the conclusion of the paper, Section 6 presents the recommendations and implications, and finally, Section 7 provides the limitations and avenues for future research.

1. Literature Review and Development of the Hypotheses

Modigliani and Miller (1958) (M&M) were pioneers in investigating the determinants of CS via the introduction of their "Irrelevance Theory of Capital Structure" in 1958 under unrealistic propositions. Their unrealistic assumptions led to further examinations of CS, considering other factors that might affect the CS determinants. **The trade-off theory** stands in contrast with M&M's theorems' assumptions, asserting that even though using debt has advantages (e.g., tax shields), there are also drawbacks, including higher probabilities of bankruptcy and financial distress. The theory argues that the optimal capital structure can be obtained by balancing the cost (the agency and bankruptcy costs) with the benefits (the tax shield) of using the debt (Myers, 1984). The borrowing interest rate is deductible from taxes, allowing the corporation to consume more leverage, while bankruptcy and agency costs push the company to take on less debt. To reach an optimal level of leverage, firms should maintain a level of leverage to obtain the maximum benefit (tax deduction) without risking bankruptcy. The primary assumption of the trade-off theory is that debt financing is cheaper than equity financing, and the theory generally supports debt financing. A considerable number of researchers have validated the trade-off assumptions in explaining the relationship between firm-level factors and CS, resulting in widespread reliance across countries and industries (Chipeta & Deressa, 2016; Khémiri & Noubbigh, 2018; El-Diftar, 2020; Saif-Alyousfi et al., 2020).

In contrast to the trade-off theory, **the pecking order theory** assumes that firms should first rely on their internal financing using their retained earnings, and in cases of insufficient funds, they should utilise external sources of funds ranked from the cheapest to the most expensive (Myers & Majluf, 1984). The assumptions of the pecking order were developed because of the agency problem, which arises from the conflict of interest between different parties and the asymmetric information problem, which arises because stock market investors believe that insiders have more information than outsiders, causing an adverse selection problem. Furthermore, the theory also suggests that firms may refrain from distributing dividends to maintain financial slack and avoid depending on external sources of funds in periods of insufficient funds. The pecking-order theory showed greater power in explaining the relationship between liquidity, profitability, growth opportunities and CS in developing countries (see Harris & Raviv, 1990; Al-Fayoumi & Abuzayed, 2009; Al-Najjar & Hussainey, 2011; Haque et al., 2011; Ebrahim et al., 2014; Balios et al., 2016; Öhman & Yazdanfar, 2017; El Bahsh et al., 2018).

1.1. Arab Spring and Capital Structure

Based on the trade-off theory, firms operating in countries with a high level of risk should consume a lower level of debt (Myers, 1984) for the following reasons: First, the interest rate is usually higher during crises, leading to a higher cost of debt. Second, bankruptcy is further increased due to volatility in the firms' performance because of the decrease in their revenue and profitability. Furthermore, instabilities have affected the banks' supply side, making them stricter when issuing loans (Zeitun et al., 2017). Considering these factors, uncertainties will increase the probability of financial distress and bankruptcy, outweighing the disadvantages of debt over its advantages and should avoid consuming more debt. Such financing behaviour might continue even following those periods because managers may become more cautious about debt financing, especially with longer debt maturities (Pan et al., 2019). The majority of earlier researchers documented a negative relationship between CS and the different financial crises (for example, Ovtchinnikov, 2010; Proença et al., 2014; Graham et al., 2015; Öhman & Yazdanfar, 2017; Moradi & Paulet, 2019; Khan et al., 2020). In contrast to the previous arguments, some scholars have found that firms rely more on leverage during recessionary periods due to the decrease in the firm's profitability, facing huge losses and insufficient internal funds, which led them to depend more on debt (Proença et al., 2014; Yazdanfar et al., 2019; Cardoso & Pinheiro, 2020). However, Balios et al. (2016) and Trinh and Phuong (2016) demonstrated that the financial crisis did not make any difference in the determinants of CS, reasoning that their stock market was not matched with the worldwide stock markets due to governmental interventions to stabilise their economies. Furthermore, Lyubov and Heshmati (2023) claimed that each crisis had a different impact on CS and its determinants. Hence, in line with the majority of the prior studies and trade-off theory, the following hypothesis is therefore put forward: *H1: There is a negative relationship between periods during and after the AS and 2016 EGP floatation and leverage.*

1.2. Firm-Level Factors and Capital Structure Across Periods

The firms' specific factors are among the most influential factors in determining CS (for example, Titman & Wessels, 1988; Wald, 1999; De Miguel & Pindado, 2001; Chen, 2004; Deesomsak et al., 2004; Huang & Song, 2006; Antoniou et al., 2008; De Jong et al., 2008; Frank & Goyal, 2009; Kayo & Kimura, 2011). Consistent with prior studies, this paper uses tangibility, firm size, liquidity, profitability, business risk, asset growth, tax effect, and non-tax shield as indicators of firm-level factors.

1.2.1. Tangibility

Based on the trade-off theory assumption, firms should compare the advantages and disadvantages of obtaining debt. Accordingly, it is assumed that firms with high tangibility have more stable earnings with a lower agency problem, less probability of insolvency, and less bankruptcy risk, which gives those firms the privilege to take on more debt to benefit from the debt advantages (the tax shield) (Myers, 1984). That argument has been largely supported empirically (see Harris & Raviv, 1990; Delcoure, 2007; Frank & Goyal, 2009; Gungoraydinoglu & Öztekin, 2011; Cortez & Susanto, 2012; Matemilola & Ahmad, 2014; Chipeta & Deressa, 2016; El Bahsh et al., 2018; Khémiri & Noubbigh, 2018; Saif-Alyousfi et al., 2020; Lyubov & Heshmati, 2023). In contrast to the above studies, Mihalca and Antal (2009), Balios et al. (2016), and Cardoso and Pinheiro (2020) reported a negative relationship between tangibility and leverage.

Furthermore, prior scholars revealed different outcomes concerning the impact of tangibility on debt maturity, i.e., Short-Term Debt (STD) and Long-Term Debt (LTD). These outcomes are supported by the matching principle concept (Stohs & Mauer, 1996; Nguyen, 2022). Consistently, Proença et al. (2014), Alipour et al. (2015), Demirgüç-Kunt et al. (2015), Öhman and Yazdanfar (2017), and Van Hoang et al. (2018) found that tangibility is positively related to LTD while negatively associated with STD.

With respect to the association between tangibility and debt financing during crises, Jermias and Yigit (2019) found that creditors need more collateral during a financial crisis to secure their money. Accordingly, a higher level of tangible assets can further facilitate access to debt financing during crises. Lyubov and Heshmati (2023) found a consistently positive relationship between tangible assets and CS decisions throughout the 1997 Asian and 2018 financial crises.

Hence, in conjunction with the majority of the preceding findings and the trade-off theory assumption, the following hypothesis is developed: *H2: There is a positive relationship between tangibility and leverage.*

1.2.2. Firm Size

Trade-off theory posits that large companies are more stable and diversified, absorbing more debt with lower bankruptcy and insolvency costs (Myers, 1984). Furthermore, larger firms have a better reputation and image in the market, which means they can take on more loans at a lower cost. The

majority of prior researchers found a positive relationship between firm size and CS (for example, Rajan & Zingales, 1995; Frank & Goyal, 2009; Mihalca & Antal, 2009; Kayo & Kimura, 2011; Arena et al., 2012; Demirgüç-Kunt et al., 2015; Balios et al., 2016; Chipeta & Deressa, 2016; El Bahsh et al., 2018; Khémiri & Noubbigh, 2018; Cardoso & Pinheiro, 2020; El-Diftar, 2020; Lyubov & Heshmati, 2023). In contrast with the previous arguments, the pecking order theory assumes that larger firms are more profitable; therefore, they should depend on their internal financing and leave external financing as a last option (Myers & Majluf, 1984). Aligning with that assumption, Alipour et al. (2015) and Grabinska et al. (2021) reported a negative relationship between firm size and debt ratio.

Concerning the relationship between firm size and CS decisions during crises. Large firms have a better market image and, therefore, they may have better opportunities to obtain more loans with better terms and lower costs in times of uncertainty. Besides, larger firms are anticipated to be more stable during crises than smaller ones because they are more diversified, which enables them to stand in times of crisis. Supporting that argument, Zeitun et al. (2017) and Lyubov and Heshmati (2023) documented that the impact of firm size on debt financing has been strengthened after the global financial crisis. Conversely, according to the trade-off theory approach, firms should avoid taking on more debt during those periods because the risk of debt financing surpasses its advantages (Myers, 1984).

In line with the trade-off theory and most earlier findings, the hypothesis is put forward as follows: ***H1.3: There is a positive association between firm size and leverage.***

1.2.3. Liquidity

According to trade-off theory, firms with high liquidity indicate that they are profitable, and consequently, they should consume more debt to benefit from the tax shield (Myers, 1984). Salehi and Biglar (2009), Abdou et al. (2012), and Cardoso and Pinheiro (2020) support the positive association between liquidity and debt financing. On the other hand, according to pecking order theory assumptions, profitable firms with high liquidity should use their internal funds to lessen asymmetric information and agency problems (Myers & Majluf, 1984). Several scholars agreed with that assumption, supporting the negative association between them (for example, Deesomsak et al., 2004; Balios et al., 2016; El Bahsh et al., 2018; Khémiri & Noubbigh, 2018; El-Diftar, 2020; Saif-Alyousfi et al., 2020). In contrast to prior arguments, Jaworski and Czerwonka (2019) demonstrated that liquidity has no impact on a firm's level of leverage.

Considering the relationship between liquidity and CS during crises, Öhman and Yazdanfar (2017) reported that Swedish firms depended more on their internal funds, which even increased after the financial crisis, strengthening the negative correlation between them. They also asserted that firms found it more challenging to access external funds during uncertain periods, forcing them to rely more on retained earnings. Similarly, Zeitun et al. (2017) found that the relationship between liquidity and LTD turned negative after the crisis. Hence, based on those arguments, firms with high liquidity should minimise their debt, particularly LTD, and depend on their internal funding if it is sufficient during crises.

In accordance with pecking order theory and the majority of prior empirical findings, the following hypothesis is developed: *H4: There is a negative relationship between firms' liquidity and leverage.*

1.2.4. Profitability

Among the many explanatory variables, Chipeta and Deressa (2016) and Cardoso and Pinheiro (2020) affirmed that firms' profitability is one of the essential elements in making the CS decision. The pecking order theory supports a negative correlation between firms' profitability and CS. This is because the theory supposes profitable firms should first finance their projects using their internal funds, then use debt financing if their internal sources are insufficient, and keep equity financing as a last resort (Myers & Majluf, 1984). Furthermore, Chipeta and Deressa (2016) asserted that most developing countries have undeveloped stock markets, a lack of bond markets, and more banking constraints, which makes firms rely more on their internal funds due to the limited options of external sources of finance. Consistently, the majority of the prior studies supported the theory's assumption and reported a negative relationship between the firm's profitability and leverage (for example, Harris & Raviv, 1990; Rajan & Zingales, 1995; Frank & Goyal, 2009; Cortez & Susanto, 2012; Matemilola & Ahmad, 2014; Alipour et al., 2015; Demirgüç-Kunt et al., 2015; Balios et al., 2016; Chipeta & Deressa, 2016; Tripathy & Asija, 2017; El Bahsh et al., 2018; Khémiri & Noubbigh, 2018; Cardoso & Pinheiro, 2020; El-Diftar, 2020; Saif-Alyousfi et al., 2020). On the other hand, trade-off theory supports a positive association between profitability and leverage to benefit from the tax exemption (Myers, 1984).

Concerning the impact of crises on the association between profitability and CS, the AS deteriorated the Egyptian financial and economic condition (Dang et al., 2018), consequently affecting firms' profitability. Based on trade-off theory, firms operating in a highly volatile environment should not consume high debt because the risk is also high (Myers, 1984). Öhman and Yazdanfar (2017) and Lyubov and Heshmati (2023) empirically verified that the negative correlation between profitability and debt financing even strengthened after the financial crisis.

Hence, in accordance with the pecking order theory and the majority of the studies reviewed, the following hypothesis is put forward: ***H5: There is a negative relationship between a firm's profitability and leverage.***

1.2.5. Business Risk

The trade-off theory assumes that firms with more volatile earnings should use lower leverage to finance their projects. This is because, during those periods, the default and bankruptcy risks are high, which leads to a higher probability of financial distress, increasing the bankruptcy cost and, consequently, the cost of debt (Myers, 1984). Consistently, Chipeta and Deressa (2016) and Khémiri and Noubbigh (2018) reported a negative association between them. In contrast, Ebrahim et al. (2014) and Lyubov and Heshmati (2023) documented a positive relationship between these factors, while Deesomsak et al. (2004) and Balios et al. (2016) found an insignificant correlation between them. In accordance with the trade-off theory's assumption, the following hypothesis is constructed: ***H6: There is a negative relationship between business risk and leverage***.

1.2.6. Growth Opportunity

According to trade-off theory, firms with more growth opportunities may have more volatile cash flow, which increases the probability of financial distress and default risk, increasing bankruptcy costs (Myers, 1984). Accordingly, there is a negative association between them (Alipour et al., 2015; Chipeta & Deressa, 2016; Li & Stathis, 2017; Cardoso & Pinheiro, 2020; Saif-Alyousfi et al., 2020; Lyubov & Heshmati, 2023). Furthermore, Myers (1977) argued that due to the moral hazard problem and the agency problem between debtholders and shareholders, firms with high growth opportunities should minimise their debt, especially LTD, because, in this case, banks will impose a higher interest rate. Consequently, Myers suggested those firms should depend on STD more than LTD. In contrast, the pecking order theory assumes that firms with growth opportunities are predicted to

have a high degree of information asymmetry. Therefore, debt is preferable to equity (Myers & Majluf, 1984). Consistently, a number of researchers have found a positive correlation between growth opportunity and leverage (see Harris & Raviv, 1990; Al-Fayoumi & Abuzayed, 2009; Al-Najjar & Hussainey, 2011; Haque et al., 2011; Ebrahim et al., 2014; Balios et al., 2016; Öhman & Yazdanfar, 2017; El Bahsh et al., 2018).

Regarding the impact of crises on the relationship between them, Deesomsak et al. (2004) reported that the global financial crisis had a different influence on the relationship between these factors across countries. Furthermore, Van Hoang et al. (2018) found that French firms financed their growth opportunities using STD instead of LTD during crises. They reasoned that outcome for two reasons: First, the difficulty of obtaining LTD forced the firms to substitute it with a shorter debt maturity. Second, the STD is more flexible and suitable for high-uncertainty business environments because it allows creditors and the firm's decision-makers to reassess the firm's financing position regularly.

In line with prior studies in developing countries and the pecking order theory, the following hypothesis has emerged: *H7: There is a positive correlation between a firm's growth opportunity (asset growth) and leverage.*

1.2.7. Tax Effect

The core of the trade-off theory is the tax exemption, as it is one of the essential benefits obtained from debt financing (Myers, 1984). Similarly, Omran and Pointon (2009) argued that the country's tax system plays a vital role in firms' choices among the different sources of finance. Consistent with that assumption, Chipeta and Deressa (2016) reported a positive relationship between the tax rate and CS in a third of their tested countries in Sub-Saharan African firms. Conversely, Alipour et al. (2015), Khémiri and Noubbigh (2018), and Saif-Alyousfi et al. (2020) found a negative relationship between tax rate and leverage. This is possible because when firms find that the disadvantages of debt (agency and bankruptcy costs) exceed their advantages (tax shield), they choose not to consume debt and instead depend more on other sources of funds. Furthermore, El-Diftar (2020) stated that firms in the MENA region have a low tax rate level, especially in GCC countries, which causes them to become unmotivated to consume more debt to benefit from the tax shield. Hence, according to trade-off theory, the following hypothesis is constructed: *H8 There is a positive relationship between the tax effect and leverage.*

1.2.8. Non-Debt Tax Shield

When DeAngelo and Masulis (1980) examined the impact of different types of taxes and non-debt tax shields on debt financing, they found that the non-debt tax shield minimises the privileges of debt consumption because it also decreases the firms' taxation. Consequently, firms do not need to take on more debt to benefit from the tax exemption since the non-debt tax shield resulting from the depreciation expenses is also tax-deductible and is considered the best alternative to the tax shield. Accordingly, the non-debt tax shield negatively affected the leverage (Huang & Song, 2006; Cortez & Susanto, 2012; Lim, 2012). On the other hand, some researchers reported a positive association between them (for example, Titman & Wessels, 1988; Harris & Raviv, 1990; Shah & Khan, 2017; D'Amato, 2020). They show that companies acquire more fixed assets to increase depreciation expenses and benefit from the non-debt tax shield. As a result, firms own more collateral assets, and making them borrow on more favourable terms encourages them to increase their leverage. Hence, according to DeAngelo and Masulis (1980) and the majority of the previous empirical studies, the following hypothesis is constructed: *H9: There is a negative relationship between non-debt tax shield and leverage.*

Based on prior arguments, the CS determinants evolved over periods due to the country's economic and financial conditions (for example, De Jong et al., 2008; Belkhir et al., 2016; Zeitun et al., 2017; Cardoso & Pinheiro, 2020; Lin et al., 2020; Lyubov & Heshmati, 2023). Therefore, this paper examines the moderating impact of the AS and 2016 EGP floatation on the relationship between the listed above firm-level factors and leverage to compare and capture the differences of those associations across different periods of instabilities. Hence, the following hypothesis is developed: *H10: The AS and 2016 EGP floatation are expected to moderate the relationship between the firm-level factors discussed above and leverage.*

Table 1 summarises the relationship between the examined firm-level factors and CS on a theoretical background.

Table 1: Summary of Theoretical Findings

Explanatory Variables	Expected Theoretical Relation		
	Trade-off Theory	Pecking Order Theory	DeAngelo and Masulis (1980) Theory
AS and 2016 EGP floatation	-		
Tangibility	+		
Size	+		
Liquidity	+	-	
Profitability	+	-	
Business Risk	-		
Growth Opportunity	-	+	
Tax Effect	+		
Non-debt Tax shield			+

Source: The table was created by the researcher according to the assumptions of the previous theories.

2. Research Methodology

This section discusses the research methodology of the paper.

2.1. Sample Selection and Data Collection

The current paper's sample consists of 128 non-financial firms listed in the Egyptian stock market from 2007 to 2019. The data is gathered from the Osiris database, which is a global database covering millions of listed and unlisted companies worldwide (Osiris, 2023). The sample consists of seven sectors: Consumer Staples, Health Care, Information Technology (IT), Telecom and Media, Industrial, Consumer Discretionary, Real Estate, and Materials. Due to the missing data, the sample of this study became an unbalanced dataset summarised in 1,268-year observations. Up to the researcher's knowledge, the dataset of this paper is considered one of the most extensive in Egypt compared to prior studies that used data from Egypt (for example, Eldomiaty & Azim, 2008; Ebaid, 2009; Omran & Pointon, 2009; Wahba, 2014; El-Habashy, 2018; Sakr & Bedeir, 2018).

2.2. Statistical Techniques

Recently, researchers have tended to use panel data analysis over cross-sectional and time series analysis (Bajaj et al., 2021) because it overcomes the problems arising from cross-sectional analysis (Proença et al., 2014; Balios et al., 2016). However, Antoniou et al. (2008), Khémiri and Noubbigh

(2018) and Saif-Alyousfi et al. (2020) asserted that because of the endogeneity, heterogeneity, and serial correlation problems found while investigating the determinants of CS, they recommend dynamic models to overcome those problems. Accordingly, the current research relies on the SYS-GMM statistical technique using the STATA program. To check the accuracy of the models, two essential diagnostic tests must be used: the Sargan-Hansen and Arellano-Bond tests.

2.3. Measurement of the Variables

This part presents the measurements of the dependent variable, which is the CS proxies, independent variables concentrated on the firm-level factors, and the control factor.

Measurement of Capital Structure (Dependent Variable): Earlier studies demonstrated that there is a distinction between the determinants of debt maturity (Barclay & Smith, 1995). This is due to the fact that each type of financing (i.e., STD and LTD) has a different association with firms' characteristics (Bevan & Danbolt, 2002; Zeitun et al., 2017). Consequently, they have suggested that the forthcoming studies need to consider breaking CS down into STD and LTD (such as Achy, 2009; Chang et al., 2009; Mouamer, 2011; Lyubov & Heshmati, 2023). Moreover, firms operating in developing countries mainly depend on STDs because of the inefficiency in their bond market, making STDs an essential source of external funds for those countries (Omran & Pointon, 2009; Alipour et al., 2015; Etudaiye-Muhtar et al., 2017). Additionally, it has been found that crises affect debt maturity differently. For instance, Saif-Alyousfi et al. (2020) found that Malaysian firms rely more on STD than LTD during periods of instability. Therefore, consistent with the majority of prior studies, the three measurements for CS are the book value of total debt (TD), STD, and LTD, which are formalised as follows:

$$\text{Total Debt(TD)} = \frac{\text{Total Debt}}{\text{Total Assets}}$$

$$\text{Short-Term Debt (STD)} = \frac{\text{Short-Term Debt}}{\text{Total Assets}}$$

$$\text{Long-Term Debt (STD)} = \frac{\text{Long-Term Debt}}{\text{Total Assets}}$$

Firm-Level Factors Measurements (Independent Variables): Consistent with prior studies (for example, Zeitun et al., 2017), this paper used the ratio of tangible fixed assets to fixed assets as a proxy for tangibility, logarithms

of total assets as a proxy for firm size, and current assets to current liabilities as a proxy for liquidity. Return on Assets is used to indicate the firm's profitability; business risk is measured by earnings before interest and tax volatility. The asset growth rate is used to measure the firm's growth opportunity. The tax effect is measured by dividing the difference between earnings before tax and earnings after tax by earnings after tax. Lastly, depreciation and amortization to total assets is a proxy for the non-debt tax shield.

Time Span Measurement: The time frame of this study is from 2007 to 2019, divided into five spans. To measure these periods, a dummy variable is used to differentiate between them. The first period is before the AS, which covers 2007 to 2010. The second period was during the political revolution (AS), from 2011 to 2014, since political instability started in January 2011 and continued until 2014. The last period is after the AS, from 2015 to 2019. For the 2016 EGP floatation, economic reform was changed at the end of November 2016; hence, from 2007 to 2016 is the period before the floatation, and from 2017 to 2019 is considered the period after the floatation.

Moderation Effect: The interaction term is used to examine the moderating impact of the AS and 2016 EGP floatation on CS determinants. It is measured by multiplying those periods by the examined firm-level factors. This method is consistent with Jermias and Yigit (2019) and Iqbal and Kume (2014), who measured the effect of the global financial crisis on CS determinants.

Control Variable: To avoid biased results, the present study controlled the effect of the industry, which is in line with most of the previous studies that examined the determinants of CS (such as Wiwattanakantang, 1999; Cassar & Holmes, 2003; Deesomsak et al., 2004; Alabdullah et al., 2018). A dummy variable is used to differentiate between the industries.

2.1. Models' Specifications

Panels 1, 2, and 3 examine the relationship between tangibility, firm size, liquidity, profitability, business risk, asset growth, tax effect, non-debt tax shield, and CS (STD, LTD, and TD), considering the AS period. **Panels 1, 2, and 3**: $Y_{it} = \beta_0 + \alpha Y_{it-1} + \beta_1 TANG_{it} + \beta_2 FSize_{it} + \beta_3 LIQUID_{it} + \beta_4 ROA_{it} + \beta_5 BR_{it} + \beta_6 ASSETGROW_{it} + \beta_7 Tax\ Effect_{it} + \beta_8 Non-debt\ tax\ shield_{it} + \beta_9 During\ AS_{it} + \beta_{10} After\ AS_{it} + \sum_k \delta_k Z_{itk} + \varepsilon_{it}$

Panels 4, 5, and 6 will be regressed with the existence of the moderating impact of the AS by interacting during and after the AS with the firm-level

factors mentioned above. **Panels 4, 5, and 6**: $Y_{it} = \beta_0 + \alpha Y_{it-1} + \beta_1 TANG_{it} + \beta_2 FSize_{it} + \beta_3 LIQUID_{it} + \beta_4 ROA_{it} + \beta_5 BR_{it} + \beta_6 ASSETGROW_{it} + \beta_7 Tax\ Effect_{it} + \beta_8 Non-debt\ tax\ shield_{it} + \beta_9 During\ AS_{it} + \beta_{10} After\ AS_{it} + \sum_{k=1}^{8} \varphi_k DuringAS * X_{itk} + \sum_{k=1}^{8} \theta_k AfterAS * X_{itk} + \sum_k \delta_k Z_{itk} + \varepsilon_{it}$

Panels 7, 8, and 9 test the relationship between the chosen firm-level factors and CS, considering the 2016 EGP floatation period. **Panels 7, 8, and 9:** $Y_{it} = \beta_0 + \alpha Y_{it-1} + \beta_1 TANG_{it} + \beta_2 FSize_{it} + \beta_3 LIQUID_{it} + \beta_4 ROA_{it} + \beta_5 BR_{it} + \beta_6 ASSETGROW_{it} + \beta_7 Tax\ Effect_{it} + \beta_8 Non-debt\ tax\ shield_{it} + \beta_9 Floatation_{it} + \sum_K \delta_K Z_{itk} + \varepsilon_{it}$

Panels 10, 11, and 12 are regressed with the existence of the moderating impact of the 2016 EGP floatation by testing the interaction between the above-mentioned firm-level factors and the 2016 EGP floatation. **Panels 10, 11, and 12**: $Y_{it} = \beta_0 + \alpha Y_{it-1} + \beta_1 TANG_{it} + \beta_2 FSize_{it} + \beta_3 LIQUID_{it} + \beta_4 ROA_{it} + \beta_5 BR_{it} + \beta_6 ASSETGROW_{it} + \beta_7 Tax\ Effect_{it} + \beta_8 Non-debt\ tax\ shield_{it} + \beta_9 Floatation_{it} + \sum_{k=1}^{8} \gamma_k Floatation * X_k + \sum_K \delta_K Z_{itk} + \varepsilon_{it}$

Where,

Y is the CS proxies (STD, LTD, and TD).

β_0: is the constant term.

β_i: is the regression coefficient for an independent variable I

TANG = Tangibility

FSize= Firm size

LIQUID= Liquidity

ROA= Return on Assets to measure profitability

BR= Business Risk

ASSETGROW= Asset Growth

Tax Effect= Tax Effect

Non-debt tax shield= Non-debt tax shield

Floatation = 2016 EGP floatation from 2017-2019; a dummy variable is used to measure 2016 EGP floatation. The period before the 2016 EGP floatation takes 0, and 1 if the period is after the floatation.

$\sum_{k=1}^{8} \gamma_k Floatation * X_k$: represent interaction terms between the 2016 EGP floatation dummy and all independent variables.

During: From 2011-2014, a dummy variable takes one during AS and 0 otherwise.

After: From 2015-2019, a dummy variable takes one after AS and 0 otherwise.

$\sum_{k=1}^{8} \varphi_k During * X_k$: represent interaction terms between during the AS dummy and all independent variables.

$\sum_{k=1}^{8} \theta_k After * X_k$: represent interaction terms between After the AS dummy and all independent variables.

ε: is the residual regress term.

Z_K: is the control variable (industry classification).

δ_K: regression coefficient of the K control variable.

3. Empirical Analysis

The analysis is divided into two subsections: univariate and multivariate.

3.1.1. Univariate Analysis

This section consists of two parts. The first part presents the descriptive analysis of the entire sample, which will then be broken down and analysed according to periods (throughout the AS and the 2016 EGP floatation). ANOVA, Kruskal-Wallis, and Mann-Whitney are used to test the differences between periods. The second part presents the outcome of the multicollinearity tests.

i. *Descriptive Analysis*

Table 2: Entire Dataset Descriptive Analysis

Variables	Obs.	Mean	Median	Minimum	Maximum	Std. Deviation
TD	1,268	17.76	11.73	0.00	100	19.08
STD	1,268	11.05	5.01	0.00	92.77	13.85
LTD	1,268	6.72	1.01	0.00	100	11.76
TANG	1,268	32.31	30.59	0.01	96.89	25.03
FSize	1,268	5.97	5.94	3.88	8.02	0.81
LIQUID	1,268	2.755	1.13	0.04	92.69	7.435
ROA	1,268	4.76	3.53	-39.31	48.28	8.87
BR	1,268	0.02	-0.01	-6.85	7.90	1.39
ASSETGROW	1,268	0.09	0.04	-0.55	1.14	0.20
Tax Effect	1,268	0.20	0.17	0.00	0.98	0.34
Non-debt Tax shield	1,268	0.02	0.01	0.00	0.40	0.03

Note: All variables are formatted in percentages except FSize, Tax Effect, and Non-debt Tax Shield. FSize is in millions of Egyptian pounds, and the Tax Effect and Non-debt Tax Shield are in decimal form.

Table 2 reveals that the average percentage of Egyptian firms' TD is 17.76%, with a minimum of 0% and a maximum of 100%. Meanwhile, the average percentage of STD is 11%, with a maximum value of 92.77% and a minimum value of 0%, while for the LTD, it is 6.7%, with a minimum value of 0% and a maximum value of 100%, in line with El-Habashy (2018). This outcome demonstrates that Egyptian firms depend more on STD than LTD, which is consistent with most previous studies that used data from developing

countries (for example, Booth et al., 2001; Psillaki & Daskalakis, 2009; Alipour et al., 2015; Chipeta & Deressa, 2016). With respect to the description of independent variables, the average percentage of the tax effect is 20%, with a median of 17%, the average profitability percentage is 4.6%, and the average percentages of liquidity and tangibility are 2.75 and 32.31.

Table 3: Descriptive Analysis Based on the AS Period

AS Period Classification		TD	STD	LTD	TANG	FSize	LIQUID	ROA	BR	ASSETGROW	Tax Effect	Non-debt tax shield
Before AS	N	362	362	362	362	362	362	362	362	362	362	362
	Mean	19.88	11.48	8.39	30.92	5.81	2.13	6.99	0.02	0.10	0.15	0.02
	Median	13.36	5.34	1.78	27.35	5.80	1.195	5.21	0.00	0.05	0.14	0.01
	Minimum	0.00	0.00	0.00	0.01	3.88	0.12	-16.49	-3.72	-0.55	0.00	0.00
	Maximum	100	87.98	100	91.56	7.98	39.78	38.69	7.39	1.11	0.85	0.17
	Std. Deviation	20.42	14.33	14.66	24.40	0.80	3.68	8.27	0.98	0.21	0.21	0.02
During AS	N	396	396	396	396	396	396	396	396	396	396	396
	Mean	17.54	10.86	6.67	33.51	5.92	3.82	3.33	-0.07	0.07	0.24	0.02
	Median	10.48	4.31	1.21	31.04	5.90	1.17	2.59	-0.01	0.03	0.20	0.02
	Minimum	0.00	0.00	0.00	0.01	3.92	0.04	-37.69	-6.22	-0.50	0.00	0.00
	Maximum	74.88	68.45	72.09	96.89	7.83	92.69	39.16	7.14	1.14	0.94	0.26
	Std. Deviation	18.82	13.75	10.61	25.41	0.78	10.61	8.20	1.32	0.17	0.44	0.03
After AS	N	510	510	510	510	510	510	510	510	510	510	510
	Mean	16.44	10.88	5.56	32.37	6.12	2.36	4.30	0.10	0.10	0.21	0.02
	Median	9.88	4.78	0.63	30.97	6.11	1.04	3.05	-0.03	0.05	0.19	0.02
	Minimum	0.00	0.00	0.00	0.01	3.89	0.08	-39.31	-6.85	-0.55	0.00	0.00
	Maximum	92.77	92.77	57.17	96.43	8.02	78.95	48.28	7.90	1.12	0.98	0.40
	Std. Deviation	18.17	13.60	10.05	25.19	0.82	6.27	9.47	1.66	0.22	0.32	0.04
ANOVA	F value	3.491	0.249	6.224	1.014	16.688	6.147	17.709	1.65	3.617	6.64	4.727
	Sig.	0.031	0.779	0.002	0.363	0	0.002	0	0.192	0.027	0.027	0.009
Kruskal-Wallis	Z-Value	6.51	1.086	6.849	1.446	33.143	7.928	49.316	0.687	7.017	15.546	18.305
	Sig.	0.039	0.581	0.033	0.485	0	0.019	0	0.709	0.03	0	0

As per Table 3, the average percentages of TD before, during, and after the AS decreased from 19.88% to 17.7% and 16.44%, respectively. These results are consistent with Ovtchinnikov (2010), who posited that the level of leverage decreased after economic shocks. Further, the Egyptian firms decreased their LTD from 8.39% before the AS to 6.67% during the AS and 5.56% after the AS. This signifies that Egyptian firms avoided bank

financing, especially LTD, during the AS and that avoidance continued even after the AS. With respect to the firm-level factors, some of them witnessed a significant change during the AS. This matches previous arguments that Egyptian firms during the AS were challenged by a sharp deterioration in their profitability and high volatility in operating income. The ANOVA and Kruskal-Wallis tests proved a statistically significant difference in TD and LTD across the AS periods. The findings of those tests confirmed that the CS varied across periods and that change might come from changes in firm-level factors, forcing firms to reshape their financing policies.

Table 4: Descriptive Analysis Based on the 2016 EGP Floatation

2016 EGP Floatation Classification		TD	STD	LTD	TANG	FSize	LIQUID	ROA	BR	ASSE TGR OW	Tax Effect	Non-debt Tax shield
Before Floatation	N	971	971	971	971	971	971	971	971	971	971	971
	Mean	18.27	11.04	7.23	32.43	5.90	2.99	4.80	-0.02	0.09	0.20	0.02
	Median	11.91	4.82	1.29	30.70	5.88	1.17	3.66	-0.01	0.04	0.17	0.01
	Minimum	0.00	0.00	0.00	0.01	3.88	0.04	-39.31	-6.85	-0.55	0.00	0.00
	Maximum	100	92.77	100	96.89	7.98	92.69	48.28	7.39	1.14	0.94	0.40
	Std. Deviation	19.51	14.04	12.34	25.05	0.80	8.06	8.60	1.26	0.21	0.32	0.03
After Floatation	N	297	297	297	297	297	297	297	297	297	297	297
	Mean	16.11	11.09	5.02	31.94	6.20	1.96	4.64	0.18	0.08	0.21	0.03
	Median	10.07	5.62	0.46	29.97	6.23	1	3.09	-0.02	0.05	0.20	0.01
	Minimum	0.00	0.00	0.00	0.01	3.89	0.1	-26.00	-6.57	-0.49	0.00	0.00
	Maximum	76.50	62.22	49.45	91.83	8.02	54.16	43.77	7.90	0.91	0.98	0.40
	Std. Deviation	17.51	13.23	9.43	25.02	0.82	4.76	9.70	1.73	0.20	0.38	0.04
ANOVA	F-test	2.916	0.003	8.086	0.088	30.57	4.413	0.075	4.991	0.358	0.697	4.21
	Sig.	0.088	0.955	0.005	0.766	0	0.036	0.788	0.026	0.55	0.404	0.04
Mann-Whitney U	Z-test	-1.345	-0.381	-2.574	-0.45	-5.40	-2.791	-0.72	-0.785	-0.351	-1.003	-2.041
	Sig.	0.179	0.703	0.01	0.653	0	0.005	0.472	0.433	0.725	0.316	0.041

Consistent with Table 3, Table 4 shows that the Egyptian firms decreased their TD from an average percentage of 18.27% before floatation to 16.11% after it. Similarly, LTD decreased from 7.23% to 5.02% after the floatation. The outcome of the ANOVA and Mann-Whitney tests proved that LTD was statistically significantly different across the two periods compatible with the Egyptian firms' financing behaviour during and after the AS.

ii. *Multicollinearity Tests*

Pearson Correlation Matrix, Tolerance, and Variance Inflation Factors (VIF) tests are statistical techniques used to diagnose multicollinearity. According to Table 5 and Table 6, there is no multicollinearity problem between the independent variables.

Table 5: Pearson Correlation Matrix

Variable	TANG	Fsize	LIQUID	ROA	Tax Effect	Non-debt Tax shield	ASSETGROW	BR
TANG	1							
FSize	0.061*	1						
LIQUID	-0.163**	-0.273**	1					
ROA	-0.139**	0.088**	0	1				
Tax Effect	0.036	0.068*	-0.044	-0.034	1			
Non-debt Tax shield	0.373**	0.172**	-0.119**	-0.052	0.024	1		
ASSETGROW	-0.123**	0.007	-0.021	0.162**	0.039	-0.111**	1	
BR	-0.007	-0.011	0.02	0.119**	0.036	-0.035	0.133**	1
*. Correlation is significant at the 0.05 level (2-tailed).								
**. Correlation is significant at the 0.01 level (2-tailed).								

Table 6: VIF and Collinearity Tolerance

Variable	Collinearity Tolerance (1/VIF)	Variance Inflation Factor (VIF)
Tangibility	0.893	1.12
FSize	0.825	1.212
LIQUID	0.989	1.011
ROA	0.938	1.066
BR	0.942	1.062
ASSETGROW	0.833	1.201
Tax Effect	0.969	1.032
Non-debt Tax shield	0.901	1.11
Mean VIF		**1.10175**

3.1.2. Multivariate Analysis and Discussion

Table 7 and Table 8 show the outcome of the twelve regressed panels that examined the impact of the AS and 2016 EGP floatation on CS and the moderating impact of those periods on CS determinants using the chosen firm-level factors discussed above (tangibility, firm size, liquidity, profitability, business risk, growth opportunity, tax effect, and non-debt tax shield) in 128 listed companies in the Egyptian stock market from 2007 to 2019 using SYS-GMM, in addition to the two essential diagnostic tests. The Sargan-Hansen and Arellano-Bond (AR1 and AR2) confirmed that there is no over-identification and no autocorrelation problems.

Table 7: The Outcomes of Panels from 1 to 6 – The AS periods

Dependent/ Independent Variables	Direct Relationship			The AS Moderating Effect		
	Panel 1 TD	Panel 2 STD	Panel 3 LTD	Panel 4 TD	Panel 5 STD	Panel 6 LTD
TD_{-1}, STD_{-1}, LTD_{-1}	0.477***	0.433***	0.329***	0.470***	0.433***	0.280***
	(0.0422)	(0.0324)	(0.0254)	(0.0452)	(0.0396)	(0.0234)
During AS	0.636	1.182***	-1.525***	-9.496**	-7.951**	-0.743
	(0.530)	(0.402)	(0.319)	(4.560)	(3.884)	(2.478)
After AS	-0.717	1.023	-3.204***	-3.409	-10.15**	7.624
	(0.699)	(0.647)	(0.477)	(6.930)	(4.934)	(4.748)
TANG	0.00725	0.0172	0.0623***	-0.0215	0.00371	0.120***
	(0.0268)	(0.0294)	(0.0218)	(0.0553)	(0.0450)	(0.0370)
FSize	6.707**	0.297	9.359***	4.518	-2.481	10.46***
	(3.164)	(2.460)	(2.415)	(3.227)	(2.729)	(2.476)
LIQUID	-0.0127	-0.0184	0.00735	0.137	-0.0967***	-0.0567
	(0.0283)	(0.0193)	(0.0106)	(0.136)	(0.0339)	(0.0434)
ROA	-0.246***	-0.150*	-0.0271	-0.220**	-0.182**	-0.0101
	(0.0785)	(0.0857)	(0.0325)	(0.0932)	(0.0711)	(0.0417)
BR	-0.121	0.0992	-0.0918	0.367	-0.0139	0.0601
	(0.131)	(0.118)	(0.0622)	(0.413)	(0.291)	(0.114)
ASSETGROW	1.213	2.991***	0.136	-1.241	0.0121	-2.127**
	(1.127)	(1.051)	(0.772)	(3.093)	(2.296)	(1.027)
Tax Effect	-1.435**	0.529	-1.191***	-1.944	2.925	-6.058***
	(0.713)	(0.380)	(0.397)	(2.902)	(2.167)	(1.358)
Non-debt Tax shield	-9.874*	8.868	-12.29	-8.569	-8.293	-17.20
	(5.428)	(9.832)	(8.390)	(24.64)	(16.92)	(16.43)
TANG *During AS				0.0272	0.0121	-0.0647**
				(0.0409)	(0.0313)	(0.0262)
FSize*During AS				1.557*	1.668**	-0.184
				(0.800)	(0.662)	(0.429)
LIQUID *During AS				0.137	0.0858*	0.0874**
				(0.136)	(0.0482)	(0.0412)

Dependent/ Independent Variables	Direct Relationship			The AS Moderating Effect		
	Panel 1 TD	Panel 2 STD	Panel 3 LTD	Panel 4 TD	Panel 5 STD	Panel 6 LTD
ROA *During AS				-0.0340	-0.221***	0.130**
				(0.0912)	(0.0769)	(0.0599)
BR*During AS				-0.661	0.213	-0.169
				(0.412)	(0.314)	(0.158)
ASSETGROW *During AS				3.170	3.050	0.937
				(3.788)	(2.831)	(1.683)
Tax Effect *During AS				0.274	-2.992	4.948***
				(3.043)	(2.237)	(1.542)
Non-debt tax *During AS				-13.72	-4.662	28.71*
				(26.13)	(17.18)	(16.65)
TANG *After AS				0.0196	-0.0124	-0.0616*
				(0.0527)	(0.0430)	(0.0320)
FSize *After AS				0.283	1.838**	-1.654**
				(1.220)	(0.936)	(0.796)
LIQUID *After AS				0.103	0.0753*	0.0808
				(0.142)	(0.0426)	(0.0562)
ROA *After AS				0.00432	-0.00708	-0.0603
				(0.118)	(0.110)	(0.0441)
BR *After AS				-0.465	0.124	-0.214
				(0.445)	(0.328)	(0.148)
ASSETGROW *After AS				3.423	3.460	4.019**
				(3.686)	(2.902)	(1.722)
Tax Effect*After AS				1.124	-2.196	5.172***
				(3.011)	(2.227)	(1.414)
Non-debt Tax *After AS				6.265	27.64	-6.525
				(24.48)	(21.15)	(20.58)
Constant	-34.79*	-25.33	-43.87***	-24.29	-12.98	-56.14***
	(18.08)	(16.23)	(16.48)	(18.23)	(17.91)	(16.33)
Observations	1,140	1,140	1,140	1,140	1,140	1,140
Number of companies	128	128	128	128	128	128
Sargan test	0.4031	0.2856	0.1502	0.4108	0.1855	0.1306
Arelleno-bond test (AR1)	0.0001	0.0018	0.0042	0.0002	0.0010	0.0054
Arelleno-bond test (AR2)	0.9074	0.8791	0.2340	0.8011	0.7120	0.3238

Dependent/ Independent Variables	Direct Relationship			The AS Moderating Effect		
	Panel 1 TD	Panel 2 STD	Panel 3 LTD	Panel 4 TD	Panel 5 STD	Panel 6 LTD
*** p<0.01, ** p<0.05, * p<0.1						

Note: Industry Classification is controlled in all panels.

Sargan test of overidentifying restrictions   H0: Overidentifying restrictions are valid.

Arellano-Bond test for zero autocorrelation in first-differenced errors H0: No autocorrelation.

Referring to

Table 7, the period during the AS had a significant positive effect on STD. This means that Egyptian firms depended more on STDs during the AS than before it. One possible explanation is that during the AS, Egyptian firms witnessed a significant decline in their profitability, causing insufficient internal funds, which led firms to increase their STD consumption more during that period. This finding is in alignment with Yazdanfar et al. (2019), who found that firms relied more on STDs during the global financial crisis. Furthermore, Jõeveer (2013) reported that creditors prefer to issue shorter debt maturities during periods of more income volatility than longer debt maturities. In contrast, the average percentage of LTD during and after the AS was reduced by 1.525% and 3.02%, respectively. This means that the Egyptian firms decreased their dependency on longer-term maturity during and after the AS, compared to before the AS. This outcome is aligned with the assumptions of trade-off theory (Myers, 1984) and a number of empirical studies claiming that uncertainties increase the firm's default risk, causing an increase in the cost of debt and leading firms to decrease their debt consumption (Cao et al., 2013; Ebrahim et al., 2014; Graham et al., 2015; Tripathy & Asija, 2017; Zeitun et al., 2017; Chen et al., 2019; Lyubov & Heshmati, 2023). Furthermore, the deterioration in the Egyptian economy during that period increased the fears of creditors and firms' decision-makers because of the uncertain future, leading them to minimise longer-term

investments and obligations. Concerning the association between firm-level factors and CS, TD is positively related to firm size, aligning with the trade-off theory (Myers, 1984). Conversely, TD is negatively associated with profitability, tax effects, and non-debt tax shields. The negative association between TD and profitability is supported by the pecking order theory (Myers & Majluf, 1984). This outcome is further reasoned by the fact that Egyptian banks are more conservative in lending and imposing too many financial constraints, which makes firms depend more on their internal financing (Allini et al., 2018). It is also found that the tax effect is negatively related to TD, which contradicts the research hypothesis and is consistent with other studies (for example, Alipour et al., 2015; Khémiri & Noubbigh, 2018; Saif-Alyousfi et al., 2020). Furthermore, the non-debt tax shield is negatively correlated with TD, consistent with previous studies (for example, DeAngelo & Masulis, 1980; Huang & Song, 2006; Cortez & Susanto, 2012; Lim, 2012). Regarding the association between the examined firm-level factors and STD, profitability and asset growth are the only factors that have an effect on it. Profitability is negatively associated with STD, similar to the relationship between profitability and TD, whereas asset growth is positively associated with STD. This outcome has empirical support from the literature (for example, Harris & Raviv, 1990; Al-Fayoumi & Abuzayed, 2009; Al-Najjar & Hussainey, 2011; Haque et al., 2011; Ebrahim et al., 2014; Balios et al., 2016; Öhman & Yazdanfar, 2017; El Bahsh et al., 2018). Regarding the determinants of LTD, among the examined firm-level factors, tangibility and firm size were positively related to LTD, which is consistent with the trade-off theory, while the tax effect was negatively associated with LTD, which is consistent with the previous studies (for example, Alipour et al., 2015; Khémiri & Noubbigh, 2018; Saif-Alyousfi et al., 2020). Meanwhile, liquidity and business risk are insignificantly related to TD, STD, and LTD.

Concerning the moderating impact of the AS on the relationship between the examined firm-level factors and CS, as shown in

Table 7, the negative association between profitability and TD was unaffected by the AS. Furthermore, the negative association between profitability and STD strengthened during the AS, proving that profitable firms avoided debt and that avoidance increased during uncertainties. This means that regardless of the country's circumstances, profitable firms do not rely on debt, supporting the pecking order theory (Jensen & Meckling, 1976). However, during the AS, a positive association developed between firm size and TD and STD. This means that creditors derived their confidence from large firms, giving such firms more creditworthiness during crises; this outcome is aligned with Demirgüç-Kunt et al. (2015) and Lyubov and Heshmati (2023). With respect to the other examined firm-level factors, they were insignificantly related to TD and STD. Importantly, the AS did not change the insignificant association. Among the types of financial debt, LTD was the main type that witnessed a significant change in its determinants. Tangibility was positively related to LTD before the AS; however, during and after the AS, that relationship weakened. Furthermore, during the AS, a positive association developed between profitability and liquidity and LTD; however, these factors were insignificantly associated with LTD after the AS. Such findings are because firms during the AS witnessed significant losses and a decline in their profitability (Abdelbaki, 2013), making them unable to finance their longer-term projects, which in turn caused those firms to rely more on LTD. This outcome is aligned with the pecking order theory. Thus, profitable firms with high liquidity increase the confidence of creditors, facilitating the provision of longer-term maturity. In contrast, asset growth was negatively related to LTD during the AS, but that relationship turned positive after the AS. Such a finding is due to firms having insufficient internal funds to finance the growth of their assets; hence, they increased their LTD, which is consistent with the pecking order theory (Jensen & Meckling, 1976). In addition, Van Hoang et al. (2018) asserted that firms should finance their short-term needs with their internal funds and growth opportunities with longer debt. Furthermore, the negative association between the tax effect and LTD has been weakened but remained in the same direction. A positive association developed between non-debt tax shield and LTD during the AS. This is because firms with high fixed assets during the AS might not have sufficient funds to finance their fixed assets, leading them to consume more LTD.

Table 8: The Outcomes of Panels from 7 to 12 – The 2016 EGP Floatation Period

Dependent/ Independent Variables	Direct Relationship			2016 EGP Floatation Moderating Effect		
	Panel 7 TD	Panel 8 STD	Panel 9 LTD	Panel 10 TD	Panel 11 STD	Panel 12 LTD
TD$_{-1}$, STD$_{-1}$, LTD$_{-1}$	0.473*** (0.0392)	0.441*** (0.03)	0.309*** (0.03)	0.439*** (0.0414)	0.411*** (0.0363)	0.299*** (0.0374)
Floatation/ 2016 EGP floatation	-0.850 (0.552)	0.0820 (0.431)	-2.057*** (0.436)	12.19** (5.245)	10.25*** (3.045)	2.661 (3.438)
TANG	0.00504 (0.0279)	0.0307 (0.0285)	0.0430** (0.0200)	0.000484 (0.0293)	0.0254 (0.0296)	0.0268 (0.0190)
FSize	6.687** (3.371)	1.046 (2.621)	9.781*** (2.402)	6.841** (3.308)	0.901 (2.746)	10.02*** (2.162)
LIQUID	-0.00605 (0.0236)	-0.00884 (0.0175)	0.00269 (0.0102)	0.00144 (0.0288)	-0.00375 (0.0173)	0.00298 (0.00712)
ROA	-0.283*** (0.0748)	-0.221*** (0.0839)	-0.00208 (0.0357)	-0.280*** (0.0823)	-0.164* (0.0905)	-0.0294 (0.0366)
BR	-0.0527 (0.141)	0.0929 (0.121)	-0.00270 (0.0650)	-0.141 (0.180)	0.103 (0.161)	-0.0155 (0.0766)
ASSETGROW	0.966 (1.148)	2.321** (0.963)	0.624 (0.747)	0.532 (1.242)	1.178 (1.165)	0.998 (0.740)
Tax Effect	-1.423** (0.704)	0.271 (0.359)	-0.921*** (0.342)	-2.033** (0.812)	0.238 (0.362)	-1.157*** (0.404)
Non-debt Tax shield	-13.44** (5.489)	4.395 (9.410)	-12.84 (9.588)	-3.042 (7.636)	8.304 (9.935)	-0.555 (3.357)
TANG *Float				0.0147 (0.0181)	-0.0235 (0.0171)	0.0220 (0.0168)
FSize*Float				-2.241*** (0.844)	-1.546*** (0.488)	-0.853 (0.540)
LIQUID *Float				-0.0507 (0.0409)	-0.0518** (0.0238)	0.0247 (0.0278)
ROA*Float				0.0512 (0.0851)	-0.0674 (0.0709)	0.0697 (0.0440)
BR*Float				0.252 (0.245)	0.00268 (0.193)	0.119 (0.127)
ASSETGROW *Float				0.675 (3.180)	5.175** (2.566)	-1.077 (1.531)
Tax Effect*Float				2.021* (1.157)	0.796 (0.789)	0.883* (0.474)
Non-debt Tax shield *Float				-22.40* (12.03)	-9.250 (9.750)	-26.33 (19.51)
Constant	-33.98* (19.02)	-20.04 (18.55)	-44.81*** (16.38)	-33.94* (18.29)	-24.52 (20.23)	-49.28*** (15.65)
Observations	1,140	1,140	1,140	1,140	1,140	1,140
Number of companies	128	128	128	128	128	128
Sargan test	0.2269	0.1697	0.1317	0.3607	0.3267	0.1582
Arelleno-bond test (AR1)	0.0002	0.0011	0.0098	0.0003	0.0020	0.0140
Arelleno-bond test (AR2)	0.8704	0.8596	0.2716	0.9025	0.9890	0.2944
*** p<0.01, ** p<0.05, * p<0.1						

Note: Industry dummies are controlled in all models.

As shown in Table 8, the 2016 EGP floatation had a negative impact on LTD, implying that Egyptian firms decreased their dependency on LTD after that period; however, it had no impact on STD and TD. This pattern is consistent with the period after the AS. The direct relationship between examined firm-

level factors and CS for the entire sample, considering both the AS and 2016 EGP, are the same (those associations were explained earlier). With respect to the moderating impact of the period after 2016 EGP floatation on CS determinants, there was a minimum change in the determinants of TD after this period. The positive relationship between firm size and TD weakened after the 2016 EGP floatation. Although there was a negative correlation between tax effect and TD, that association weakened after the 2016 EGP floatation. For the association between the non-debt tax shield and TD, a negative correlation developed between them after the floatation firms with a high non-debt tax shield lowered their TD. This reveals that the non-debt tax shield became one of the significant factors in determining the TD after the 2016 EGP floatation.

Furthermore, after the 2016 EGP floatation, a negative association developed between liquidity, firm size, and STD, and a positive association was established between asset growth and STD. This shows that large firms with high liquidity decreased their STD, while firms with high asset growth increased it after the floatation. This implies that the determinants of the STD witnessed a significant change after the 2016 EGP floatation. The negative association that developed between firm size and STD after the floatation period was possible because large firms had sufficient internal funds to finance their short-term assets, making them avoid shorter debt maturities during this period. Another possible reason is that banks imposed a higher interest rate, forcing even large firms to minimise banking finances. Similarly, the negative relationship that developed between liquidity and STD after floatation confirms the argument of the association between STD and firm size. Larger firms with high liquidity decreased their STD and depended more on internal funds after the 2016 EGP floatation. This outcome is supported by the trade-off theory (Myers, 1984). Generally, currency floatation increases the cost of debt and the uncertainties, leading firms to decrease their debt financing. In contrast, the positive association that developed between asset growth and STD means that Egyptian listed firms only depended on STD after the 2016 EGP floatation when they had asset growth opportunities and insufficient internal funding. This outcome is aligned with the pecking order theory (Jensen & Meckling, 1976). As mentioned earlier, the high cost of debt led firms to avoid LTD and substitute with shorter debt maturity. Furthermore, it is preferable in highly volatile periods for firms to use STD instead of LTD (Van Hoang et al., 2018). This

is because STD allows both firms and creditors to reassess their financing positions more regularly. Regarding the impact of floatation on the determinants of LTD, none has been changed except for the negative association between LTD and tax effect, which weakened after the floatation. The other examined firm-level factors were insignificantly related to CS, even though the 2016 EGP floatation did not affect their associations.

4. Conclusion

The key finding of this paper is that instabilities have different impacts on CS determinants in terms of TD, STD, and LTD. During and after the AS, as well as after the 2016 EGP floatation, Egyptian firms decreased their dependency on longer debt maturity, while during the AS, they relied more on STDs. Generally, large firms with lower profitability, tax effects, and non-debt tax shields consume a higher level of TD, while profitable firms with low asset growth have a lower STD. In contrast, large firms with high tangibility and lower tax rates depended more on LTD. These findings are aligned with research hypotheses and are supported by the trade-off and pecking order theories, except for the association between tax effect and CS. However, the occurrence of AS affected some of the CS determinants. Firms' size was the key determinant of increasing the level of TD and LTD during the AS. Even after the AS, the size of the firm was the main factor for having an STD. Large firms with lower profitability increased their STD during the AS. It was also found that large firms with low profitability and liquidity consumed a higher STD during and after the AS. Furthermore, LTD was the type of debt that witnessed the most significant impact during the AS, and its determinants faced a major change. For instance, despite liquidity, profitability and tax effects being insignificantly associated with LTD after the AS, during the AS, a positive relationship developed between them. This indicates that highly liquid and profitable firms increased their LTD during the AS, while firms with high asset growth increased their LTD after the AS. In contrast to the AS, the 2016 EGP floatation period had a minimal impact on LTD and TD. The 2016 EGP floatation mainly affected STD determinants. The only reason the Egyptian listed firms increased their STD after the 2016 EGP floatation was that they had asset growth. This outcome contradicts the association between asset growth and debt maturity after AS periods. In the end, the AS and 2016 EGP floatation had distinct effects on the determinants of debt maturity (STD and LTD).

5. Recommendations and Implications

The outcomes of this research revealed that, first, every crisis has a different impact on CS determinants, and firms should be more cautious about debt absorption and its maturity during and after the periods of instabilities. Second, firms should decrease their longer debt maturity during and after crises, and if they have insufficient internal funds, they can depend on shorter debt maturity. Third, in light of during the AS-regressed panels' outcomes, Egyptian firms should be profitable with high liquidity to consider longer debt maturity to be able to repay the debt. However, after the crisis, firms should consider obtaining LTD only if they have asset growth. Fourth, in light of the 2016 currency floatation, the cost of debt is higher due to the high inflation rate and the bank's interest rate. Hence, firms should decrease their debt consumption. It is also advisable for even large firms with a high non-debt tax shield to rely less on debt financing, and the only reason the Egyptian listed firms depend on STD is when they have high asset growth. Therefore, it is preferable for firms to switch from LTD to STD after currency floatation.

Hence, the outcomes of this research may help authorities revisit their reforms and take the necessary action to modify the credit policy during periods of uncertainty, with the purpose of minimising bankruptcy risk and supporting and facilitating the accessibility of debt financing. For instance, it is empirically proven from the regressed panels of this paper that banks gained their confidence from large firms during the AS. This means that small and medium firms faced difficulties in raising debt financing. Hence, banks should find more creditability tools to guarantee their rights, apart from the size of the firms, to financially support those firms during crises.

6. Limitations and Avenues for Future Research

Despite this paper's attempts to fully understand the financing behaviour of Egyptian listed firms during and after uncertainties, it has some limitations due to the inaccessibility of data, which may open the door for further research. First, future studies may consider investigating the impact of the AS and 2016 EGP floatation on CS determinants in small and medium firms and subsequently comparing the impact of these events on CS decisions with a view to capturing the differences in financing behaviour based on firm size. Second, future studies may examine the relationship between the cost of debt and CS decisions during the AS and 2016 EGP floatation. Third, further study may consider examining the moderating impact of those crises on the

association between firm-specific factors and the cost of debt. Fourth, future studies may also consider examining to what extent Egyptian-listed firms implemented contingency plans to mitigate financial risk during the AS and 2016 EGP floatation. Fifth, the coming studies may compare the Egyptian companies in terms of crisis preparedness, risk management, and changes in capital structure policy during the AS and 2016 EGP floatation.

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