

Title:

Dividend Policy: Does the capital structure matter?

Authors:

- **Konstantinos Kakouris**, PhD candidate, Department of Industrial Management and Technology, University of Piraeus, 80 M. Karaoli & A. Dimitriou Str., Piraeus GR 185 34, Greece. kkakouris@unipi.gr
- **Evangelos Charalampakis**, Researcher, Economic Analysis and Research Department, Bank of Greece, 21 E. Venizelos Av., Athens GR 102 50, Greece. echaralampakis@bankofgreece.gr
- **Dimitrios Psychoyios**, **Corresponding author**, Department of Industrial Management and Technology, University of Piraeus, 80 M. Karaoli & A. Dimitriou Str., Piraeus GR 185 34, Greece. dpsycho@unipi.gr

Short Bios:

Konstantinos Kakouris is a PhD candidate in Corporate Finance in the School of Maritime and Industrial Studies at the University of Piraeus. He is double majored in Economics and Physics. He studied Economics at the University of Macedonia and he studied Physics at the Aristotle University of Thessaloniki. He holds an MSc in Energy Management from the University of Piraeus. He has taught corporate finance and financial management in undergraduate programs at the University of Piraeus. Konstantinos Kakouris published his research in international conferences. His research areas are Corporate Finance and Financial Management.

Evangelos Charalampakis is a Senior Economist at the Economic Analysis and Research Department at the Bank of Greece. He holds a MSc in Finance from the University of Essex and a PhD in Accounting and Finance from the Manchester Business School. He is currently seconded at the Business Cycle Analysis Division at the European Central Bank. His main research interests are in the fields of Corporate Finance and Household Finance.

Dimitrios Psychoyios is an Associate Professor of Finance at the University of Piraeus. He started his academic career at the Manchester Business School of the University of Manchester as a lecturer in Finance. His expertise is in the area of financial economics, corporate finance and investments, and his research has been published in international scientific journals receiving hundreds of citations. Dimitrios Psychoyios has taught in MBA programs at European and American universities, and his professional experience includes over 15 years of consulting, research, and training services for organizations in the private and public sector in Europe and Greece.

Dividend Policy: Does the capital structure matter?

K. Kakouris, E. Charalambakis and D. Psychoyios

Abstract

Managers feel comfortable to forgo pecking order than dividend smoothing. Using a sample of US firms over the period 1960 – 2020, we test the pecking order model and Lintner model. Firstly, we focus on firms with deficit. As pecking order theory predicts, firms with deficits, prefer to raise funds first with debt and then with equity. We find strong evidence that debt – issuing firms follow pecking order as well as dividend smoothing. However, we find that equity – issuing firms do not follow pecking order and tend to follow less dividend smoothing. Secondly, we focus on firms with surplus. As pecking order theory predicts, firms with surplus, prefer to pay down debt and then repurchase equity. We document that paying – down – debt firms follow pecking order, although smooth their dividends less. Our results imply that the type of issue/repurchase is critical when firms determines its dividend smoothing and pecking order policy.

1. Introduction

We examine how dividend smoothing policy and pecking order theory vary across firms with the issuing and repurchasing variables proposed by the capital structure theory – equity issue, debt issue, equity repurchase and debt redemption. We assume that firms with financing deficit (surplus) issue (repurchase) debt or equity. We build in the idea proposed by [Myers \(1984\)](#) that firms follow a looser pecking order model of capital structure to smooth their dividends. Thus, pecking order theory seems to support the existence of the “sticky” dividend behavior ([Myers, 1984](#)). The rationale behind the decision of pecking order and dividend smoothing indicates that the income shocks can be absorbed by debt to smooth dividends ([Fama & French, 2002](#); [Lambrecht and Myers, 2012](#); [Hoang & Hoxha, 2016](#)). Dividend smoothing seems to be one of the managers’ first priorities, adjusting their firms’ capital structure decisions to achieve dividend smoothing ([Lintner, 1956](#); [Brav et al., 2005](#)). Thus, the financing decisions seems to relate with dividend policy.

To our knowledge, we are the first to provide a more comprehensive analysis of dividend policy and pecking order jointly. First, we examine the direct impact of financing deficit/surplus on dividend smoothing. Second, splitting the financing deficit (surplus) into equity and debt issue (repurchase) is not novel ([Fama & French, 2012](#)), although the direct impact of equity and debt issues (repurchase) on dividend smoothing, as well as the impact of the level of issue (repurchase) securities on dividend smoothing and pecking order are novel.

We focus on answering the following questions; Does the Lintner’s dividend smoothing theory remain valid under any type of issuing/repurchasing securities? More precisely, how do the types of issuing/repurchasing securities are related to dividend smoothing? How do the firms’ financing deficit and surplus affect dividend smoothing? Do managers prefer to forgo “strict” pecking order hierarchy to smooth their dividends?. Answering these questions, we provide new insights into dividend puzzle

as well as into pecking order puzzle; although we do not argue that we find a solution of everything, leaving enhancements to future work.

Similar studies with ours, propose that financial flexibility, financial slack or shocks absorbed by debt, have positive impact on dividend smoothing (Myers and Majluf, 1984; Fama and French, 2002; Lambrecht and Myers, 2012; Fliers, 2019). Thus, we focus on the direct impact of issuing or repurchasing securities (capital structure decisions) on dividend smoothing using an extended version of Lintner's model. Following De Jong et al. (2010), we also examine the impact of financing deficit/surplus on pecking order theory in our sample. We extend their idea by examining the impact of financing deficit/surplus on dividend smoothing decisions.

Our results shed light on dividend smoothing puzzle as well as on pecking order puzzle. We find an asymmetry in pecking order coefficient between financing deficit and surplus. Firms with deficit seems to follow less pecking order than firms with surplus, although the asymmetry is marginal. The asymmetry confirms De Jong et al. (2010) study, although our restricted sample to dividend paying firms explains the marginal asymmetry. We also document an asymmetry in dividend smoothing between financing deficit and financing surplus. Firms with deficit seems to smooth dividends more, although the asymmetry is marginal.

We also find evidence that debt – issuing firms tend to follow dividend smoothing, while equity – issuing firms follow looser dividend smoothing policy. In addition, we find that debt – issuing firms apply pecking order, while equity – issuing firms do not follow pecking order. This result is not a surprise, as pecking order assumes that managers prefer debt to equity issue (Myers, 1984).

Debt – redemption firms smooth dividends less, while equity – repurchasing firms smooth dividends more. We also document that debt – redemption firms tend to follow the pecking order model, while equity – repurchasing firms do not follow pecking order. As pecking order theory works in financing surplus as good as financing deficit (Shyam – Sunder & Myers, 1999), the disappearing pecking order under equity repurchase seems reasonable.

Next, we test the impact of the level of deficit, surplus, equity issue, debt issue, equity repurchase and debt redemption on dividend smoothing and pecking order. We notice that as deficit level increases the pecking order coefficient significantly decreases, while dividend smoothing remains almost steady. We also notice that as surplus level rises, dividend smoothing decreases, but the impact on pecking order coefficient is insignificant.

Lastly, we also find that pecking order coefficient significantly decreases in both very high level of debt issue and debt redemption. However, pecking order coefficient increases in both very high level of equity issue and equity repurchase. The results seem surprising at first glance. However, the rationale behind firm's behavior is explained by financing constraints, stockholders wealth maximization and managers' willing to minimize agency conflicts, as discussed later in this paper (see Section (4)) (Chirinko & Singha, 2000; Karpavičius, 2014).

Dividend smoothing marginally fluctuates across the levels of debt and equity issues. Managers seem to keep dividends constant under any level of equity or debt

issue. We also show that very large debt – redemption firms do not follow dividend smoothing. Managers do not give priority to dividends, as they target a high level of financial slack (Lemmon & Zender, 2010; Khieu & Pyles, 2016; De Angelo, 2022).

The remainder of the paper proceeds as follows. Section (2) develops the theoretical rationale behind hypotheses development. Section (3) presents the data and our empirical analysis. Section (4) and (5) discusses the results of our empirical analysis. Section (6) concludes the paper.

2. Theoretical Implications and Hypotheses Development

The pecking order model of capital structure suggests that firms take the financing decisions on hierarchical order. Firms prefer internal to external financing under a financing deficit. If internal resources are not sufficient for firm's funding needs, managers turn to external resources. Then, firms prefer the safest issuing process. Firms prefer to issue safe debt, then risky debt and as a final resort equity (Myers, 1984).

The idea of the pecking order theory works in reverse when firms pay down debt or repurchase shares. Shyam – Sunder and Myer (1999) propose that pecking order works in financing surplus. The rationale behind the validity of pecking order in surplus is as follows. The most optimistic managers may want to repurchases shares, hence the stock price increases under the upcoming repurchasing event. Thus, the stock price elevates so high that no manager want to repurchase shares. Managers prefer to pay down debt than repurchase equity (De Jong et al., 2010). Even the most optimist manager prefers to pay down debt than repurchase shares (Shyam – Sunder & Myers, 1999).

Thus, the rationale behind capital structure decision varies across managers in firms with financing deficit and financing surplus. While, capital structure decisions for firms with deficits are driven by financial costs, capital structure decisions for firms with surpluses are driven by managers' optimism (Myers, 1984; Shyam – Sunder & Myers, 1999; De Jong et al., 2010).

A “strict” pecking order theory never allows equity issue (Myers, 1984). Myers (1984) and Myers and Majluf (1984) recognize this problem and propose a “modified” pecking order model that allows equity issue. They also notice that a “strict” pecking order theory is always rejected in real world finance. Similarly, Chirinko and Singha (2000) name the “modified” pecking order as “semi – strong”, implying that firms with no unused debt capacity turn to equity issue. Leary and Roberts (2010) present a spectrum of firms' pecking order compliance ranging from strict to liberal. The liberal form imply that financial unconstrained firms, with unused debt capacity, issue equity to finance their funding needs than debt. Firms follow a looser financing hierarchical order.

Myers (1984) and Fama and French (2012) recognize that firms may prefer to decrease dividends to hold more cash and finance their investments under the “strict” pecking order, although firms do not seem to cut down dividends (Brav et al., 2005). It seems that managers prefer to issue equity than change dividend policy, providing to shareholders stable dividends, as shareholders put a premium in dividend smoothing firms to non – smoothing (Brockman et al., 2022). Managers are willing to raise external capital or forego positive NPV projects to avoid cutting dividends (Fama &

Babiak, 1968; Allen & Michaely, 2003; Brav et al., 2005; Hoang & Hoxha, 2016; Balli et al., 2022). Thus, firms seem to have a “sticky” dividend target and slowly adjust their dividends to their target (Lintner, 1956).

Hypothesis 1: Firms are able to smooth their dividends under the “modified” pecking order theory.

External financing splits to debt issue and equity issue (Fama & French, 2012). Previous studies suggest that debt is a shock absorber of cash flows. Keeping investments constant, debt issues absorb any income variation, enhancing dividend smoothing (Lambrecht and Myers, 2012). Furthermore, the debt – issuing firms are more likely to redistribute wealth from bondholders to stockholders through dividends (Handjinicolaou & Kalay, 1984). However, lenders consider payout as good news. The positive payouts is a sign of future firm’s profitability (Handjinicolaou & Kalay, 1984; Lambrecht & Myers, 2017). Thus, we expect that debt – issuing firms smooth their dividends more. According to the financing hierarchical order, firms prefer to issue debt to equity (Myers, 1984), indicating that debt – issuing firms are more likely to follow the pecking order, while equity – issuing firms are less likely to follow pecking order.

Equity – issuing firms may subject to debt – financing constrains. Thus, managers want to attract investors, conveying good news to the market by smoothing their dividends to achieve a successful equity issue. Managers recognize that investors prefer dividend – smoothing firms as these firms have higher market value (Brockman et al., 2022). However, equity – issuing firms are more likely to face higher costs (e.g. high transaction costs) than debt – issuing firms (Fama & French, 2012). Thus, managers having in mind the benefits and costs of equity issues, may be more conservative about their dividend policy. We expect that equity – issuing firms follow dividend smoothing to convey good news to the market, but they do not increase or decrease the dividend smoothing behavior.

Hypothesis 2a: Debt – issuing firms increase dividend smoothing and they follow the “modified” pecking order model.

Hypothesis 2b: Equity – issuing firms do not change dividend smoothing behavior and they do not follow the “modified” pecking order model.

Previous studies suggest that the pecking order coefficient is lower than one (Shyam – Sunder and Myers, 1999). It seems reasonable because firms issue equity as a last resort. However, pecking order coefficient may take significantly low values; much lower than one, indicating the disappearance of the pecking order. These firms may have very large deficit or may be high levered with low levels of unused debt capacities. Thus, they end up issuing equity to finance their funding needs (De Jong et al., 2010). Similarly, Chirinko and Singha (2000) and Lemmon and Zender (2010) confirm that firms with very large debt issues may increase their leverage ratios and become more debt constrained¹. Thus, they turn to equity issue as a final resort. Moreover, the debt

¹ Very large debt and equity issue: greater than 10% threshold

– constrained firms are more likely to issue very large amount of equity, as firms do not have alternatives of raising external capital. The existence of no alternatives determines the definition of “firms issue equity as a final resort”. Thus, we expect that the “semi – strong” form of the pecking order theory, proposed by [Chirinko and Singha \(2000\)](#), is confirmed under a very high level of equity issue.

We also expect that in very large equity issue, dividend smoothing and pecking order coexists, implying that financially constrained firms want to attract investors through dividend smoothing to raise funds ([Chirinko & Singha, 2000](#); [Lemmon & Zender, 2010](#); [Brockman et al., 2022](#)). In addition, firms with very large debt issue are more likely to smooth their dividends. [Lambrecht and Myers \(2012\)](#) show that debt can be a shock absorber that allows steady dividends. Thus, external financing behavior seems to support dividend smoothing policy ([Brav et al., 2005](#)). We expect that manager’s dividend smoothing decisions remains unaltered and dividend smoothing do not change under any level and form of external financing.

Hypothesis 3a: Dividend smoothing remains steady under any level of debt or equity issue.

Hypothesis 3b: “Modified” pecking order decreases at very high level of debt issue and increases at very high level of equity issue.

According to the pecking order theory, even the most optimistic managers do not repurchase shares ([Shyam – Sunder & Myers, 1999](#)). They prefer to pay down debt. However, firms with undervalued stock price, take the opportunity to repurchase shares in low prices, implying the violation of the pecking order theory. The stock price increases as managers repurchase shares ([De Jong et al., 2010](#)). The higher the stock price, the wealthier the stockholders. [Karpavicius \(2014\)](#) support that share price is positively related to dividend smoothing leading to shareholder wealth maximization. However, debt – redemption firms prefer to pay down debt to increase their unused debt capacity or to retain their financial slack ([De Angelo, 2022](#)), implying that dividend smoothing is of secondary importance. The firm’s performance may outweigh the bad signal of fluctuated dividends. Previous studies document that profitability is negatively related to dividend smoothing ([Javakhadze et al., 2014](#)) and high – risk firms tend to follow dividend smoothing ([Kumar & Lee, 2001](#)), especially in bad times ([Lambrecht & Myers, 2017](#)). Moreover, firms that pay down debt may struggle with debt constraints, indicating a low unused debt capacity. [Fliers’ \(2019\)](#) finds a positive relation between unused debt capacity and dividend smoothing. Thus, we expect managers to smooth their dividends under equity repurchases, although they forego dividend smoothing under debt redemption.

Hypothesis 4a: Equity – repurchasing firms increase dividend smoothing but they do not follow the “modified” pecking order model.

Hypothesis 4b: Debt – redemption firms decrease dividend smoothing and they follow the “modified” pecking order model.

Very large debt – redemption firms are more likely to be profitable firms that accumulate cash and prefer to pay down debt². These firms’ managers may also foresee possible future investment opportunities (Khieu & Pyles, 2016). According to the possible future investment opportunities argument, firms want both to hold cash by reducing payout and to target high level of financial slack to finance possible future investment opportunities (Khieu & Pyles, 2016). Thus, we expect that very large debt – redemption firms, decrease dividend smoothing. However, paying – down – debt firms seems not to work in favour of stockholders. Thus, debt – redemption firms’ managers eventually decide to increase the value of stocks through repurchases (De Jong et al., 2010), attracting investors through dividend smoothing policy (Brockman et al., 2022). These arguments indicate an increasing pecking order coefficient in very large equity repurchases under the “semi – strong” form of the pecking order theory (Chirinko & Singha, 2000) as well as an increasing dividend smoothing. Thus, firms may follow stockholders wealth maximization strategy reducing a possible agency conflict between bondholders and shareholders originating by the remaining cash holdings after paying off the debt.

Hypothesis 5a: Dividend smoothing increases at very high levels of equity repurchase, although decreases at very high level of debt redemption.

Hypothesis 5b: “Modified” pecking order decreases at very high level of debt repurchase and increases at very high level of equity repurchase.

3. Data and Methodology

3.1 Data

We collect balance sheet annual data, for the US firms, from COMPUSTAT database. Following previous studies, we exclude financial firms (with SIC codes 4900 – 4999) and utilities (with SIC code 6000 – 6999). We only consider the dividend paying firms with more than 10 consecutive years of dividend payments, as we examine capital structure models on dividend smoothing (Leary & Roberts, 2011).³

We also exclude firms that have deficit equal to zero, because we examine the impact of positive or negative deficit on dividend smoothing and on pecking order theory. Also included are firms with non – missing equity issues (repurchase) and debt issues (redemptions) for more than 5 consecutive years. We consider share repurchases as a part of capital structure rather than as a part of payout policy, because repurchases are a pro – cyclical variable (Karpavicius, 2014).

Finally, following Chang and Dasgupta (2009), we winsorize our dataset at 0.5% and 99.5% level to eliminate the influence of outliers in our results⁴. Thus, we eventually end up with a panel dataset of 2188 unique US firms, with 52112 firm – year observations over the period of 1960 – 2020⁵.

² Very large equity and debt repurchase: greater than 10% threshold

³ We also examine firms with at least 15 consecutive years. The results are essentially the same.

⁴ The results remain essentially the same under a 1% and 99% level of winsorization.

⁵ We also examine a different period from 1971 to 2020. The results are essentially the same.

3.2 Methodology

3.2.1 Dividend Smoothing

Basic Lintner model

Lintner (1956) suggests that firms (managers) have a dividend target; hence, dividends are smoothly fluctuated towards the target. The partial adjustment model of Lintner (1956), is widely used in literature to test the existence of dividend smoothing across firms (see for example, Aivazian et al., 2006).

We estimate Lintner's model to examine the existence of dividend smoothing behavior (Lintner, 1956), as shown in Equation (1).

$$D_{i,t} = a_0 + a_1 D_{i,t-1} + a_2 E_{i,t} + e_1 \quad (1)$$

$D_{i,t}$ is the annual dividend per share of firm i at time t , $D_{i,t-1}$ is the annual dividend per share of firm i at time $t - 1$, and $E_{i,t}$ is the annual earnings per share of firm i at time t . We calculate dividend's speed of adjustment (SOA), as $1 - \alpha_1$. The component of SOA is the inverse metric of dividend smoothing. The larger the SOA, the lower the dividend smoothing.

Financing deficit and financing surplus

To address the impact of financing deficits and surplus, large deficits, “non – large” deficits, large surpluses and “non – large” surpluses on dividend smoothing, we estimate the following equation (Eq. 2):

$$D_{i,t} = a_0 + a_1 D_{i,t-1} + a_2 E_{i,t} + a_3 x_{i,t} D_{i,t-1} + e_1 \quad (2)$$

$x_{i,t}$ is a vector of controls of firm i at time t . SOA is calculated as $1 - (\alpha_1 + \alpha_3)$.

The control variables are dummy variables. Deficit (DEF) is a dummy variable equal to 1 (0), if the firms have financing deficit (surplus). Large deficit (large_DEF) is a dummy variable equal to 1 if a firm's financing deficit, divided by total assets, takes positive values above the 75th percentile. Large surplus (large_SUR) is a dummy variable equal to 1 if a firm's financing surplus, divided by total assets, takes negative values below the 25th percentile. No large deficit (non_large_DEF) is a dummy variable equal to 1 if a firm's financing deficit, divided by total assets, takes positive values below the 75th percentile. No large surplus (non_large_SUR) is a dummy variable equal to 1 if a firm's financing surplus, divided by total assets, takes negative values above the 25th percentile.

Debt and equity issues

To address the impact of equity and debt issue on dividend smoothing, we estimate the following equation (Eq. 3):

$$D_{i,t} = a_0 + a_1 D_{i,t-1} + a_2 E_{i,t} + a_3 Equity_{Issue_{i,t}} D_{i,t-1} + a_4 Debt_{Issue_{i,t}} D_{i,t-1} + e_1 \quad (3)$$

$Equity_{Issue_{i,t}}$ and $Debt_{Issue_{i,t}}$ are dummy variables of firm i at time t , equals to 1 in case of large equity issue and large debt issue, respectively. A large equity or debt issue is defined if a firm's net equity or debt issues, divided by total assets, is greater than 5% (Hovakimian, 2004; Chang & Dasgupta, 2009). SOA is calculated as $1 - (\alpha_1 + \alpha_3)$ under large equity issue and $1 - (\alpha_1 + \alpha_4)$ under large debt issue.

Debt and equity repurchases

To address the impact of equity repurchase and debt redemption on dividend smoothing, we estimate the following equation (Eq. 4):

$$D_{i,t} = a_o + a_1 D_{i,t-1} + a_2 E_{i,t} + a_3 \text{EquityRepurchase}_{i,t} D_{i,t-1} + a_4 \text{DebtRepurchase}_{i,t} D_{i,t-1} + e_1 \quad (4)$$

$\text{EquityRepurchase}_{i,t}$ and $\text{DebtRepurchase}_{i,t}$ are dummy variables of firm i at time t , equals to 1 in case of large equity repurchase and large debt redemption, respectively. A large equity or debt repurchase is defined if a firm's net equity or debt repurchases, divided by total assets, is greater than 5% (Hovakimian, 2004; Chang & Dasgupta, 2009). SOA is calculated as $1 - (\alpha_1 + \alpha_3)$ under large equity repurchase and $1 - (\alpha_1 + \alpha_4)$ under large debt redemption.

3.2.2 Pecking order model

Basic model

We follow the model of Shyam – Sunder and Myers (1999) to examine the pecking order behavior in our sample (Eq. 5).

$$\text{Net Debt Issue}_{i,t} = a_o + b_{PO} \text{Deficit}_{i,t} + e_1 \quad (5)$$

$\text{Deficit}_{i,t}$ is the financial deficit scaled by total assets. b_{PO} is the pecking order coefficient. Firms tend to follow pecking order policy, when pecking order coefficient takes values close to 1. Ideally, a pecking order coefficient equals to 1 means that firms cover \$1 of deficit with \$1 of issuing debt without issuing equity.

Financing deficit and financing surplus

To investigate the difference in pecking order behavior for firms with financing deficits, large deficits, “non – large” deficits, large surpluses and “non – large” surpluses, we estimate the following model (Eq. 6):

$$\text{Net Debt Issue}_{i,t} = a_o + b_{PO} \text{Deficit}_{i,t} + b_1 \text{Deficit}_{i,t} x_{i,t} + e \quad (6)$$

Pecking order coefficient is calculated as $b_{PO} + b_1$ under deficit.

Debt and equity issue/repurchase

To test the impact of large equity and debt issue on pecking order policy, we use the model of Shyam – Sunder and Myers (1999) as in Equation (5), controlling for debt issue and equity issue. We use the same model for equity repurchase and debt redemption.

4. Results

Deficit and Surplus

We test Equation (1) using the econometric technique of feasible generalized least squares to solve possible econometric problems of autocorrelation. We also use different econometric techniques with firm, industry and year fixed effects. The results remain essentially the same.

The pecking order model predicts the dividend stickiness view (Myers, 1984). In our sample, it is more likely for firms to follow dividend smoothing policy (SOA = 0.309) (Table 1, Panel A) as well as the pecking order policy (pecking order coefficient

equal to 0.709) (Table 1, Panel B) because of the narrow collection of the data to dividend paying firms. The results of Equation (1) and (5) are presented in Table 1. They confirm previous studies, implying that dividend smoothing firms tend to follow pecking order policy (Myers, 1984; Fama & French, 2002).

Table 1: Dividend smoothing and pecking order policy

Panel A: Lintner model		
Equations	(1)	(2)
D_{t-1}	0.691*** (233.31)	0.682*** (182.82)
E_t	0.0851*** (78.22)	0.0849*** (77.88)
$DEF_t * D_{t-1}$		0.0132*** (3.85)
Intercept	0.0938*** (27.72)	0.0940*** (27.77)
Obs.	49924	49924
Panel B: Pecking order model		
Equations	(5)	(6)
$Deficit_t$	0.709*** (161.74)	0.712*** (62.69)
DEF_t		0.00912*** (12.49)
$DEF_t * Deficit_t$		-0.0328** (-2.52)
Intercept	0.00289*** (11.68)	-0.00131** (-2.35)
Obs.	43348	43348

Notes: We calculate the dividend smoothing using Equation (1) and the dividend smoothing under financing deficit/surplus using Equation (2) in Panel A and the pecking order coefficient using Equation (5) and Equation (6) in Panel B. ***, ** and * denote significance at 1%, 5% and 10% level, respectively.

Next, we examine the impact of deficit and surplus on dividend smoothing (Table 1, Panel A) using Equation (2), as well as on pecking order policy (Table 1, Panel B) using Equation (6). The results indicate an asymmetry between deficit and surplus. Dividend smoothing seems to be marginally larger in firms with deficits (SOA = 0.305) than in firms with surpluses (SOA = 0.318). Similarly, firms with deficit seems to follow the pecking order theory less ($b_{PO} = 0.679$) than firms with surpluses ($b_{PO} = 0.712$). However, while the results are statistically significant, the asymmetry is marginal.

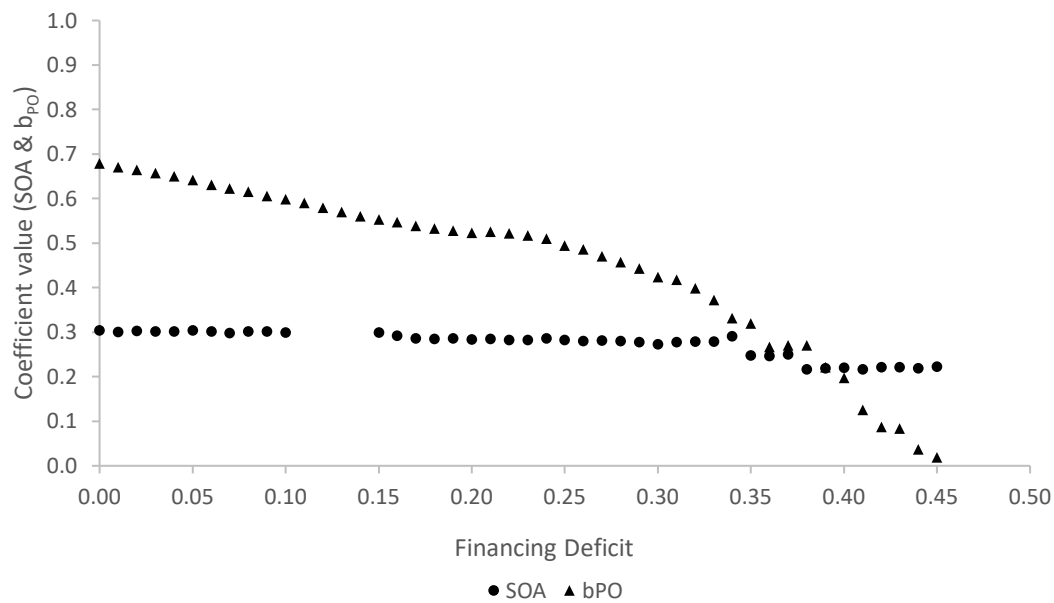
Financing Deficit

Different Levels of Deficit

According to the level of deficit, it seems that as deficit levels rises, pecking order coefficient decreases, but dividend smoothing remains steady (Figure 1). In Figure 1, we test the varying values of pecking order coefficient and SOA as deficit level rises. We notice that the pecking order coefficient significantly decreases, while SOA

remains almost steady. The result confirms our first hypothesis under lower levels of deficits. Thus, dividend smoothing does not move in lockstep with pecking order policy under large financing deficit. The rationale behind the pecking order extinction indicates that firms with large debt outstanding or financially constrained firms cannot issue more debt. Thus, they finance the remaining deficit with equity (Shyam – Sunder & Myers, 1999; Chirinko & Singha, 2000; De Jong et al., 2010). To achieve equity issuance, managers convey good news to the market by smoothing their dividends. As previous literature support, managers avoid cutting dividends (Brav et al., 2005) because of negative reaction in the stock price (Handjinicolaou & Kalay, 1984) and investors seem to prefer dividend-smoothing firms as they have higher market value (Brockman et al., 2022).

Figure 1: The SOA and pecking order coefficient across different levels of financing deficit



Notes: The triangle – shaped dotted line represents the pecking order coefficient across different levels of financing deficit. We calculate the pecking order coefficient as $b_{PO} + b_1$ using Equation (6). The circle – shaped dotted line represents the SOA across different levels of financing deficit. We calculate the SOA as $1 - (\alpha_1 + \alpha_3)$ using Equation (2).

External financing

We split managers' external funding decisions into two categories under financing deficit. We assume that firms with financing deficit and funding needs, use two external source of funds. They issue either debt or equity. Denis and McKeon (2021) notice a third external source of fund, the sale of fixed assets. However, we examine only the equity issue and debt issue, as external finance, under the purview of the pecking order.

Debt and Equity Issue

We examine the impact of large equity and large debt issue under financing deficit, as defined in Chang and Dasgupta's (2009) study, on dividend smoothing and on pecking order coefficient. We document that equity – issuing firms follow a looser

dividend smoothing policy and no pecking order policy, while debt – issuing firms follow a tighter dividend smoothing policy and pecking order policy. Panel A of Table 2 illustrates that equity – issuing firms smooth dividends less ($SOA = 0.410$) than debt – issuing firms ($SOA = 0.305$). The nature of debt as shock absorber may explain the dividend smoothing asymmetry between equity – issuing firms and debt – issuing firms. We also find that equity – issuing firms do not follow pecking order ($b_{PO} = 0.081$), while debt – issuing firms follow ($b_{PO} = 0.897$) (Table 2, Panel B). The results confirm that dividends are smoothed (less or more) and pecking order coefficient varies regarding the type of the security issue. The findings confirm hypothesis 2a, but hypothesis 2b is partly supported as equity – issuing firms slightly decrease dividend smoothing.

Table 2: Dividend smoothing and pecking order under equity / debt issue

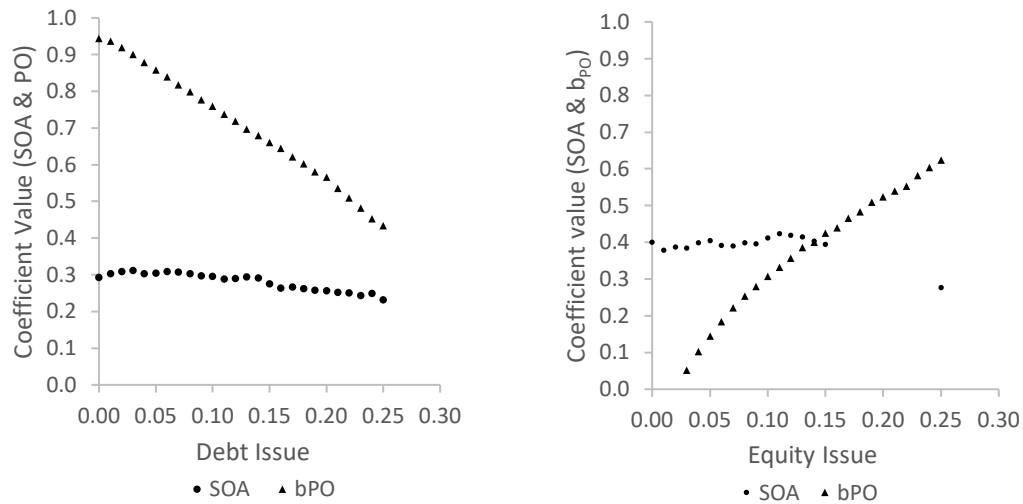
Panel A: Dividend Smoothing		
Equation	(3)	
D_{t-1}	0.671***	
	(191.15)	
E_t	0.0848***	
	(69.90)	
$equity_issue_t * D_{t-1}$	-0.0806***	
	(-7.75)	
$debt_issue_t * D_{t-1}$	0.0235***	
	(5.62)	
Intercept	0.107***	
	(27.73)	
Obs.	41802	
Panel B: Pecking Order Model		
Equations (5)	Equity Issue	Debt Issue
$Deficit_t$	0.0807***	0.897***
	(10.24)	(229.02)
Intercept	-0.00454***	0.00673***
	(-3.91)	(14.26)
Obs.	1573	11858

Notes: We calculate dividend smoothing using Equation (3) in Panel A. We test the impact of security issue on dividend smoothing. We also calculate pecking order coefficient using Equation (5) in Panel B. We test the impact of security issue on pecking order coefficient. ***, ** and * denote significance at 1%, 5% and 10% level, respectively.

Different Levels of Issue

In Figure 2, we test our findings using different levels of debt issue and equity issue. According to the level of debt and equity issue, it seems that pecking order coefficient significantly decreases as debt issue level rises (Figure 2, left – hand figure) and increases as equity issue level rises (Figure 2, right – hand figure). The findings support hypothesis 3a. Dividend smoothing seems to vary across the levels of debt and equity issues, although the fluctuations are insignificant. The type of financing do not affect manager's dividend decisions. The findings support hypothesis 3b.

Figure 2: The SOA and pecking order coefficient across different levels of security issue



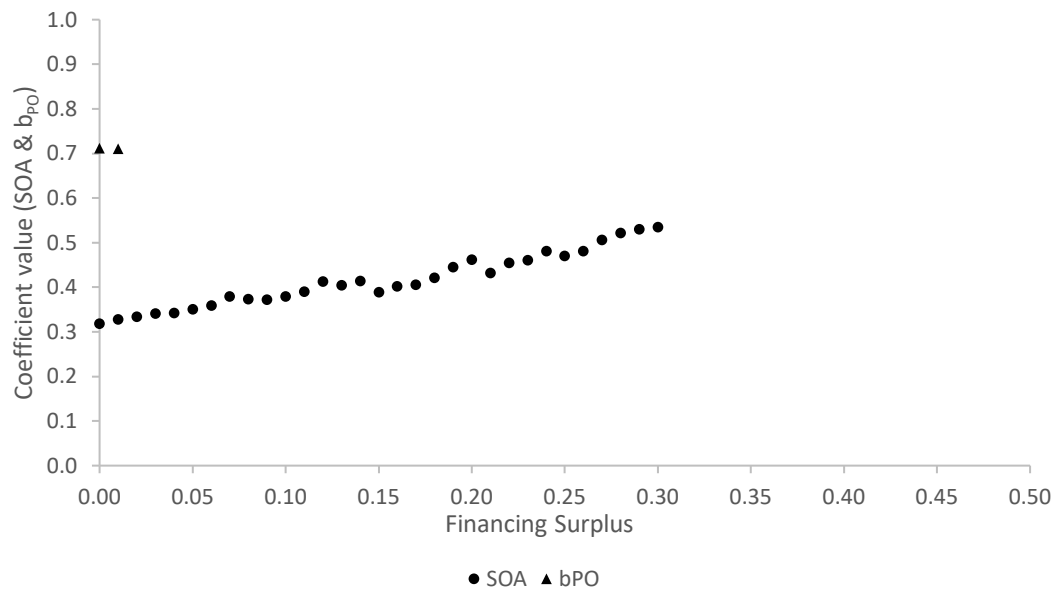
Notes: In this figure, the left – hand figure shows both coefficients of SOA and pecking order under debt issue. The right – hand figure shows both coefficients of SOA and pecking order under equity issue. The triangle – shaped dotted line represents the pecking order coefficient across different levels of security issue. We calculate pecking order coefficients using Equation (5) controlling for equity issue firms. We also calculate pecking order coefficients using Equation (5) controlling for debt issue firms. The circle – shaped dotted line represents the SOA across different levels of security issuance. We calculate SOAs as $1 - (\alpha_1 + \alpha_3)$ and $1 - (\alpha_1 + \alpha_4)$ under equity issue and debt issue using Equation (3), respectively.

Financing Surplus

Different Levels of Surplus

According to the level of surplus, it seems that as surplus levels rises, dividend smoothing decreases, but the impact on pecking order coefficient is insignificant (Figure 3). In Figure 3, we test the varying values of pecking order coefficient and SOA as surplus level rises. We notice that the pecking order coefficient are not affected by the surplus level, while SOA eventually increases.

Figure 3: The SOA and pecking order coefficient across different levels of financing surplus



Notes: The triangle – shaped dotted line represents the pecking order coefficient across different levels of financing surplus. We calculate the pecking order coefficient as $b_{PO} + b_1$ using Equation (6). The circle – shaped dotted line represents the SOA across different levels of financing surplus. We calculate the SOA as $1 - (\alpha_1 + \alpha_3)$ using Equation (2).

Cash Outflows

We split managers' repurchase decisions into two categories under financing surplus. We assume that firms with financing surplus use the excess cash holdings to pay down debt or repurchase equity. [Lambrecht and Myers \(2017\)](#) mention that firms with surpluses and accumulated cash may prefer to lend excess cash, although we test only the debt redemption and equity repurchase under the purview of the pecking order.

Debt and Equity Repurchase

We examine the impact of large equity and debt repurchase under financing surplus on dividend smoothing and on pecking order coefficient. Panel A of Table 3 illustrates that equity – repurchasing firms smooth dividends more (SOA = 0.293) than debt – redemption firms (SOA = 0.393). Debt – redemption firms seems to follow a looser dividend smoothing policy. In Panel B of Table 3, we show that equity – repurchasing firms do not follow pecking order ($b_{PO} = 0.182$), while debt – redemption firms follow ($b_{PO} = 0.848$). Our findings support hypotheses 4a and 4b.

Table 3: Dividend smoothing and pecking order under security repurchase

Panel A: Dividend Smoothing		
Equation	(4)	
D_{t-1}	0.679***	
	(197.90)	
E_t	0.0846***	
	(69.77)	
$\text{equity_repurchase}_t * D_{t-1}$	0.0275***	
	(2.38)	
$\text{debt_repurchase}_t * D_{t-1}$	-0.0718***	
	(-11.07)	
Intercept	0.107***	
	(27.92)	
Obs.	41802	

Panel B: Pecking Order Model		
Equation (5)	Equity Repurchase	Debt Repurchase
Deficit_t	0.182***	0.848***
	(12.02)	(190.49)
Intercept	0.0225***	-0.0169***
	(16.41)	(-36.38)
Obs.	1029	4020

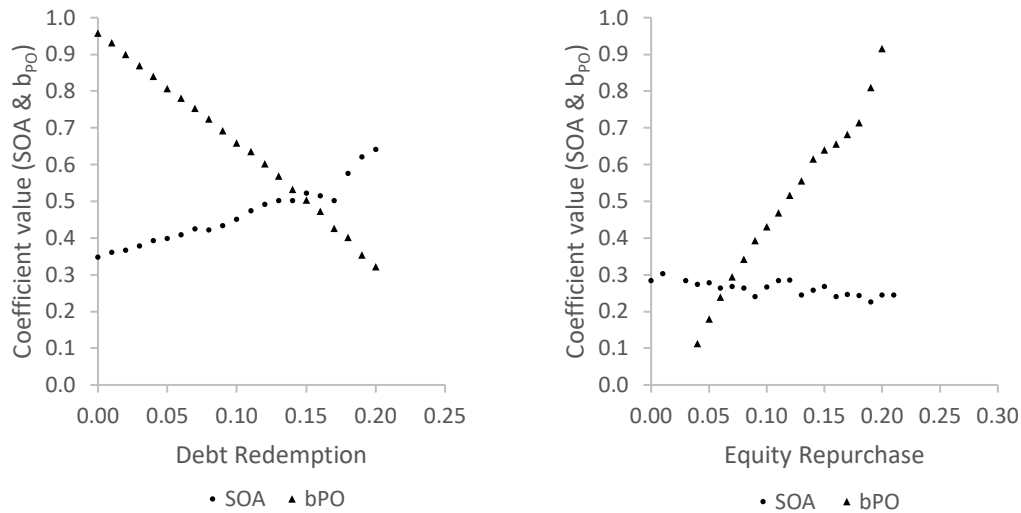
Notes: We calculate dividend smoothing using Equation (4) in Panel A. We test the impact of security repurchase on dividend smoothing. We also calculate pecking order coefficient using Equation (5) in Panel B. We test the impact of security repurchase on pecking order coefficient. ***, ** and * denote significance at 1%, 5% and 10% level, respectively.

Different Levels of Repurchase Securities

In Figure 4, we test our findings using different levels of debt redemption and equity repurchase. According to the level of debt and equity repurchase, it seems that pecking order coefficient significantly decreases as debt redemption level rises (Figure 4, [left – hand figure](#)) and increases as equity repurchase level rises (Figure 4, [right – hand figure](#)).

According to the pecking order theory, managers prefer to pay down debt than repurchase shares, although our results imply the violation of pecking order theory at very high level of debt or equity repurchase. It seems that very large debt – redemption (greater than 10%) firms do not follow pecking order theory neither dividend smoothing. It is obvious that dividend smoothing is of secondary importance by the costs of financial slack. However, the lower pecking order coefficient is a surprising outcome. These findings confirms our last hypothesis (hypothesis 5a and 5b).

Figure 4: The SOA and pecking order coefficient across different levels of security repurchase



Notes: In this figure, the left – hand figure shows both coefficients of SOA and pecking order under debt redemption. The right – hand figure shows both coefficients of SOA and pecking order under equity repurchase. The triangle – shaped dotted line represents the pecking order coefficient across different levels of security repurchase. We calculate pecking order coefficients using Equation (5) controlling for equity repurchase firms. We also calculate pecking order coefficients using Equation (5) controlling for debt redemption firms. The circle – shaped dotted line represents the SOA across different levels of security repurchase. We calculate SOAs as $1 - (\alpha_1 + \alpha_3)$ and $1 - (\alpha_1 + \alpha_4)$ under equity repurchase and debt redemption using Equation (4), respectively.

5. Robustness Check

Large and Non – Large Deficit

We split deficit in large deficit and “non – large” deficit (Table 4, left – hand column). Firms with large deficit follow looser pecking order theory ($b_{PO} = 0.574$) than firms with “non – large” deficit ($b_{PO} = 0.794$). Firms with large deficit may face financial constraints to issue more debt, hence they turn to equity issue (Shyam – Sunder & Myers, 1999; Chirinko & Singha, 2000; De Jong et al., 2010). The asymmetry, between large and “non – large” deficit, is supported by De Jong et al. (2010) findings. They show the same asymmetry, although we do not find very low values of pecking order coefficient as 0.09 under large deficit. We find a pecking order coefficient at 0.574 because we only include firms that smooth their dividends. As previous studies support (Myers, 1984), pecking order theory predicts dividend smoothing, hence the large difference in values of the pecking order coefficient of De Jong et al. (2010) study with ours is not a surprise.

Panel A of Table 4 reports the results of Equation (2). It seems that firms marginally increase dividend smoothing behavior under any magnitude (large and non – large) of

deficit almost equally. The SOA is 0.308 under large deficit and 0.304 under non – large deficit. Thus, managers smooth their dividends under large and “non – large” deficit level, supporting our previous findings that firms with deficit smooth their dividends. We also show no asymmetry in managers’ dividend decisions under large and non – large deficit. This finding support our first hypothesis (Hypothesis 1), that dividends remain steady under the “modified” pecking order. However, our first hypothesis is strongly confirmed under “non – large” deficit.

Large and Non – Large Surplus

We also split surplus in large surplus and “non – large” surplus (Table 4, right – hand column). The pecking order coefficient of firms with “non – large” surplus increases by 0.0688 ($b_{PO} = 0.748$), indicating a tendency to pecking order policy. It seems that managers prefer to pay down debt than repurchase equity in low levels of financing surplus. We also find that the impact of the “non – large” surplus on dividend smoothing is insignificant.

Firms with large surplus have insignificant impact on pecking order coefficient implying no change in pecking order policy. Additionally, we find that firms marginally decrease dividend smoothing behavior under a large surplus. The SOA increases by 0.072 (SOA = 0.393). Thus, managers of large – surplus firms seem to slightly concern about the surplus level when they take decisions about dividend policy indicating that dividend smoothing is of secondary importance. Firms may prefer to pay down debt, lend money or repurchase equity than maintain dividends steady ([Lambrecht & Myers, 2017](#)).

Table 4: Dividend smoothing and pecking order under large / non large financing deficit or surplus

Panel A: Dividend Smoothing		
Equation (2)	Large & Non Large Deficit	Large & Non Large Surplus
D_{t-1}	0.682*** (182.82)	0.697*** (219.28)
E_t	0.0849*** (77.81)	0.0842*** (77.28)
$\text{large_DEF}_t * D_{t-1}$	0.0104** (1.99)	
$\text{non_large_DEF}_t * D_{t-1}$	0.0139*** (3.90)	
$\text{large_SUR}_t * D_{t-1}$		-0.0720*** (-11.27)
$\text{non_large_SUR}_t * D_{t-1}$		0.00271 (0.73)
Intercept	0.0942*** (27.77)	0.0943*** (27.92)
Obs.	49924	49924
Panel B: Pecking Order Model		
Equation (6)	Large & Non Large Deficit	Large & Non Large Surplus
Deficit_t	0.712*** (62.80)	0.679*** (106.09)
large_DEF_t	0.0390*** (15.07)	
$\text{large_DEF}_t * \text{Deficit}_t$	-0.138*** (-8.15)	
non_large_DEF_t	0.00185*** (2.77)	
$\text{non_large_DEF}_t * \text{Deficit}_t$	0.0824*** (6.11)	
large_SUR_t		-0.0134*** (-4.70)
$\text{large_SUR}_t * \text{Deficit}_t$		0.00936 (0.42)
non_large_SUR_t		-0.00778*** (-11.01)
$\text{non_large_SUR}_t * \text{Deficit}_t$		0.0688*** (3.75)
Intercept	-0.00147*** (-2.63)	0.00781*** (16.24)
Obs.	43348	43348

Notes: We calculate dividend smoothing using Equation (2) in Panel A. In the first (second) column, we test the impact of large/non large deficit (surplus) on dividend smoothing. We also calculate pecking order coefficient using Equation (6) in Panel B.

In the first (second) column, we test the impact of large/non large deficit (surplus) on pecking order coefficient. ***, ** and * denote significance at 1%, 5% and 10% level, respectively.

High/Low growth firms

Alti (2006) states that high and low growth firms have different behaviors regarding their preference for debt and equity issue. Baker et al. (2002) also mention that managers' behavior may be explained by the firm's dividend life cycle. The dividend life cycle have five stages' start – up, IPO, rapid growth, maturity and decline. Thus, we test our main results splitting the sample into high and low growth firms.

Deficit and Surplus

Table 5 illustrates that high growth firms follow less dividend smoothing (Panel A) and pecking order (Panel B) than low growth firms. Firms do not alter their behavior under financing deficit or surplus. It seems that firms' growth opportunities is of a great importance for firms' managers.

Low growth firms may be in maturity or decline stage. After the high growth stage of firm's business cycle, firms have less investment opportunities and more cash. Firms are able to fund their needs with internal sources as well as pay down the promised and stable dividend stream to their stockholders, supporting a higher dividend smoothing and a greater pecking order coefficient.

Table 5: Dividend smoothing and pecking order policy for high and low growth firms
Panel A: Dividend Smoothing

Equation	Deficit		Surplus	
	High Growth	Low Growth	High Growth	Low Growth
D_{t-1}	0.684*** (200.33)	0.680*** (202.39)	0.683*** (205.09)	0.680*** (204.22)
E_t	0.0820*** (70.12)	0.0819*** (69.93)	0.0821*** (70.21)	0.0822*** (70.18)
$\text{Deficit}_t * D_{t-1}$	-0.0147*** (-2.98)	0.0123** (2.45)	-0.0223*** (-3.54)	0.0173** (2.49)
Intercept	0.106*** (28.63)	0.107*** (28.72)	0.106*** (28.64)	0.107*** (28.67)
Obs.	44068	44068	44068	44068
Panel B: Pecking Order				
Deficit_t	0.578*** (37.21)	0.775*** (63.94)	0.562*** (19.57)	0.812*** (47.80)
Intercept	0.0127*** (10.58)	0.00326*** (3.99)	0.00650*** (4.42)	-0.00570*** (-6.66)
Obs.	7168	7351	3430	3412

Notes: We calculate the dividend smoothing under financing deficit/surplus for high and low growth firms using Equation (2), in Panel A, and the pecking order coefficient under financing deficit/surplus for high and low growth firms using Equation (5), in

Panel B. ***, ** and * denote significance at 1%, 5% and 10% level, respectively.

Deficit – Equity and Debt Issue

Table 6 illustrates that equity issuing firms follow less dividend smoothing (Panel A) and pecking order (Panel B) than debt issuing firms. A lesser pecking order behavior of equity issuing firms may indicate that these firms are market timers, as firms with growth opportunities prefer to time the market to avoid financial distress (Alti, 2006). Firms do not alter their behavior under high or low growth opportunities. Our main results remain robust under equity issuing firms.

Table 6: Dividend smoothing and pecking order for high and low growth firms under equity / debt issue

Panel A: Dividend Smoothing				
Equation	High Growth	Low Growth		
D _{t-1}	0.683*** (205.21)	0.681*** (206.83)		
E _t	0.0819*** (70.05)	0.0820*** (70.05)		
Equity Issue _t * D _{t-1}	-0.151*** (-6.98)	-0.0470** (-2.52)		
Debt Issue _t * D _{t-1}	0.00637 (0.91)	0.0113 (1.37)		
Intercept	0.107*** (28.72)	0.107*** (28.69)		
Obs.	44068	44068		
Panel B: Pecking Order Theory Security Issue				
	Equity Issue		Debt Issue	
	High Growth	Low Growth	High Growth	Low Growth
Deficit _t	0.0518*** (4.68)	0.144*** (5.91)	0.873*** (114.48)	0.920*** (115.33)
Intercept	0.00182 (0.82)	-0.0108*** (-4.11)	0.00886*** (9.54)	0.00424*** (4.73)
Obs.	386	386	2928	2926

Notes: We calculate dividend smoothing under equity issue and debt issue for high and low growth firms using Equation (3) in Panel A. We also calculate pecking order coefficient under equity issue and debt issue for high and low growth firms using Equation (5) in Panel B. ***, ** and * denote significance at 1%, 5% and 10% level, respectively.

Surplus – Equity and Debt Repurchase

Table 7 illustrates that equity repurchasing firms follow more dividend smoothing (Panel A) and less pecking order (Panel B) than paying down debt firms. Firms do not

alter their behavior under high or low growth opportunities. Our main results remain robust under equity and debt repurchasing firms.

Table 7: Dividend smoothing and pecking order for high and low growth firms under equity / debt repurchase

Panel A: Dividend Smoothing

Equation	High Growth	Low Growth
D_{t-1}	0.682*** (207.57)	0.681*** (207.12)
E_t	0.0817*** (69.85)	0.0821*** (70.16)
Equity Repurchase _t * D_{t-1}	0.126*** (6.33)	0.0693** (2.39)
Debt Repurchase _t * D_{t-1}	-0.0608*** (-4.91)	-0.0000948 (-0.01)
Intercept	0.107*** (28.83)	0.106*** (28.63)
Obs.	44068	44068

Panel B: Pecking Order Theory Security Repurchase

	Equity Repurchase		Debt Redemption	
	High Growth	Low Growth	High Growth	Low Growth
Deficit _t	0.153*** (5.89)	0.155*** (5.53)	0.841*** (77.30)	0.875*** (92.82)
Intercept	0.0244*** (9.46)	0.0159*** (5.56)	-0.0180*** (-17.05)	-0.0140*** (-13.96)
Obs.	251	254	993	992

Notes: We calculate dividend smoothing under equity repurchase and debt repurchase for high and low growth firms using Equation (4) in Panel A. We also calculate pecking order coefficient under equity repurchase and debt repurchase for high and low growth firms using Equation (5) in Panel B. ***, ** and * denote significance at 1%, 5% and 10% level, respectively.

6. Conclusions

Pecking order theory is one of the dominant theories of capital structure. However, Myers (1984) and Myers and Majluf (1984) recognizes that a “strict” pecking order model is always rejected in modern finance, as firms tend to issue equity or repurchase shares. Thus, the term “modified” pecking order seems more realistic and fit in modern finance (Myers 1984; Chirinko & Singha, 2000; Leary & Roberts, 2010). As Myers (1984) and Fama and French (2012) mention, managers fluctuate dividends to avoid issue equity under the “strict” pecking order theory, meaning the disappearing dividend smoothing behavior. However, we confirm previous studies that firms prefer to follow dividend smoothing instead of “strict” pecking order.

In this paper, we document firms’ dividend adjustments under the “modified” pecking order theory. We find that firms prefer to follow dividend smoothing in lower

levels of financing deficit. Debt – issuing and equity – repurchasing firms also provide a stable stream of dividends to their shareholders. However, equity – issuing firms and debt – redemption firms follow a looser dividend smoothing policy. In addition, we document that pecking order theory is more pronounced in lower levels of financing deficit. Pecking order coefficients of debt – issuing and debt – redemption firms are close to one, indicating the tendency of these firms to follow pecking order. However, an interesting result is the disappearing pecking order under a very high level of debt issue and debt redemption.

The comprehensive analysis of dividend smoothing under the lower or higher level of the “modified” pecking order shed light on firms’ dividend decisions under the aspect of financing hierarchical order. Our results imply that firms are more pronounced to forgo pecking order than dividend smoothing.

References

- Aivazian, V. A., Booth, L., & Cleary, S. (2006). Dividend smoothing and debt ratings. *Journal of financial and quantitative analysis*, 41(2), 439-453.
- Allen, F., & Michaely, R. (2003). Payout Policy. In *Handbook of the Economics of Finance* (Vol. 1, pp. 337-429).
- Alti, A. (2006). How persistent is the impact of market timing on capital structure?. *The Journal of Finance*, 61(4), 1681-1710.
- Baker, H. K., Powell, G. E., & Veit, E. T. (2002). Revisiting the dividend puzzle: Do all of the pieces now fit?. *Review of Financial Economics*, 11(4), 241-261.
- Balli, F., Agyemang, A., Gregory-Allen, R., & Ozer Balli, H. (2022). Corporate dividend smoothing: The role of cross-listing. *Journal of Corporate Finance*, 72.
- Brav, A., Graham, J. R., Harvey, C. R., & Michaely, R. (2005). Payout policy in the 21st century. *Journal of financial economics*, 77, 483-527.
- Brockman, P., Hanousek, J., Tresl, J., & Unlu, E. (2022). Dividend Smoothing and Firm Valuation. *Journal of financial and quantitative Analysis*, 57(4), 1621-1647.
- Chang, X., & Dasgupta, S. (2009). Target behavior and financing: how conclusive is the evidence?. *The Journal of Finance*, 64(4), 1767-1796.
- Chirinko, R. S., & Singha, A. R. (2000). Testing static tradeoff against pecking order models of capital structure: a critical comment. *Journal of financial economics*, 58(3), 417-425.
- DeAngelo, H. (2022). The capital structure puzzle: what are we missing?. *Journal of Financial and Quantitative Analysis*, 57(2), 413-454.
- De Jong, A., Verbeek, M., & Verwijmeren, P. (2010). The impact of financing surpluses and large financing deficits on tests of the pecking order theory. *Financial Management*, 39(2), 733-756.
- Denis, D. J., & McKeon, S. B. (2021). Persistent negative cash flows, staged financing, and the stockpiling of cash balances. *Journal of Financial Economics*, 142(1), 293-313.
- Fama, E. F., & Babiak, H. (1968). Dividend Policy: An Empirical Analysis. *Journal of American Statistical Association*, 68(324), 1132-1161.
- Fama, E. F., & French, K. R. (2002). Testing trade-off and pecking order predictions about dividends and debt. *Review of financial studies*, 1-33.

- Fama, E. F., & French, K. R. (2012). Capital structure choices. *Critical Finance Review*, 1, 59 – 101.
- Fliers, P. T. (2019). What is the relation between financial flexibility and dividend smoothing?. *Journal of international money and finance*, 92, 98-111.
- Handjinicolaou, G., & Kalay, A. (1984). Wealth redistributions or changes in firm value: An Analysis of Returns to Bondholders and Stockholders around Dividend Announcements. *Journal of Financial Economics*, 13, 35–63.
- Hoang, E. C., & Hoxha, I. (2016). Corporate payout smoothing: A variance decomposition approach. *Journal of Empirical Finance*, 35, 1–13.
- Hovakimian, A. (2004). The role of target leverage in security issues and repurchases. *The Journal of Business*, 77(4), 1041-1072.
- Javakhadze, D., Ferris, S. P., & Sen, N. (2014). An international analysis of dividend smoothing. *Journal of Corporate Finance*, 29, 200–220.
- Karpavičius, S. (2014). Dividends: Relevance, rigidity, and signalling. *Journal of Corporate Finance*, 25, 289-312.
- Kumar, P., & Lee, B.-S. (2001). Discrete Dividend Policy with Permanent Earnings. *Financial Management*, 30(3), 55–76.
- Lambrecht, B. M., & Myers, S. C. (2012). A Lintner model of payout and managerial rents. *The journal of finance*, 67(5), 1761-1810.
- Lambrecht, B. M., & Myers, S. C. (2017). The dynamics of investment, payout and debt. *The Review of Financial Studies*, 30(11), 3759-3800.
- Leary, M. T., & Michaely, R. (2011). Determinants of dividend smoothing: Empirical evidence. *The Review of Financial Studies*, 24(10), 3197-3249.
- Leary, M. T., & Roberts, M. R. (2010). The pecking order, debt capacity, and information asymmetry. *Journal of financial economics*, 95(3), 332-355.
- Lemmon, M. L., & Zender, J. F. (2010). Debt capacity and tests of capital structure theories. *Journal of Financial and Quantitative Analysis*, 45(5), 1161-1187.
- Lintner, J. (1956). Distribution of incomes of corporations among dividends, retained earnings, and taxes. *The American economic review*, 46(2), 97-113.
- Myers, S. C., (1984). “The Capital Structure Puzzle”. *Journal of Finance* 39, 575 – 592
- Myers, S. C., & Majluf, N. S. (1984). Corporate financing and investment decisions when firms have information that investors do not have. *Journal of financial economics*, 13(2), 187-221.
- Shyam-Sunder, L., & Myers, S. C. (1999). Testing static tradeoff against pecking order models of capital structure. *Journal of financial economics*, 51(2), 219-244.

Appendix

Variable Definitions

Dividend per share: item 26

Earnings per share: item 58

Total assets: item 6

Retained earnings: item 36

Deficit: change in total assets minus change in retained earnings scaled by total assets

Surplus: negative values of deficit

Net equity issue: change in book equity minus change in retained earnings scaled by total assets

Book equity: total assets minus total liabilities (item 181) and preferred stocks plus deferred taxes and investment tax credit (item 35) plus convertible debt (item 79)

Preferred stocks: item 10, or item 56 if item 10 is missing, or item 130 if item 10 and item 56 is missing

Net equity repurchase: negative values of net equity issues

Net debt issue: change in total assets minus change in retained earnings minus net equity issue scaled by total assets

Net debt repurchase: negative values of net debt issue

Growth: multiplied close price (item 199) by common shares outstanding (item 25) plus total assets (item 6) minus book equity, all divided by total assets (item 6)