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## Article

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## Characteristics of firms that issue redeemable convertible preferred stock: Evidence from South Korea

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### ABSTRACT

**Purpose:** The issuance of redeemable convertible preferred stock (RCPS) has been steadily increasing in Korea since the revision of the Commercial Act, which allows firms to issue various types of stocks, in 2010. This study aims to verify equity financing behavior by examining the characteristics of firms that issue RCPS.

**Design/methodology/approach:** Using a sample of 12,768 firm-year observations of Korean listed companies from 2011 to 2018, this study conducts univariate and multivariate analyses to examine the factors that affect firms' decisions regarding RCPS issuance. For multivariate analysis, logistic regression analysis is used.

**Findings:** This study shows that firms issuing RCPS have higher debt ratios and lower operating cash flows than non-issuing firms. It is also found that firms issuing RCPS are smaller and younger than non-issuing firms. These findings indicate that firms with higher costs of financial distress, lower internal cash flow, and lower credibility/reputation are more likely to issue RCPS because they are constrained by debt capacity.

**Research limitations/implications:** According to pecking order theory, firms prefer debt over equity if external funds are required. The results of this study support the pecking order theory by providing evidence that firms rely on hybrid securities financing like redeemable preferred stock, a priority after debt when they are constrained by debt capacity.

**Originality/value:** This study sheds light on financing decisions related to the issuance of hybrid securities from the perspective of pecking order theory. It also contributes to broadening the scope of research on hybrid securities by providing empirical evidence on the financial characteristics of firms that issue RCPS.

*Keywords: Capital Structure, Debt, Equity, Hybrid Securities, Redeemable Convertible Preferred Stock*

## I. Introduction

Redeemable convertible preferred stock (hereafter referred to as RCPS) is a particular type of hybrid securities that provides investors with both redemption

and conversion options, so it can be converted to common stock or redeemed on the terms wherein they are issued.<sup>1)</sup> This feature of RCPS is attractive to potential investors, allowing firms to increase their external financing opportunities. However, it simultaneously embeds the risk of diluting the stock value of existing

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1) RCPS is favorable to investors in that they can secure the downside protection against the risk of investment loss and at the same time maintain the upside potential inherent in equity investments.

shareholders due to conversion options or by leading to an overestimation of firm value (Forbes, 2019; Economist, 2020). Recently, RCPS has been widely used as a typical capital-raising option for firms, but there is a lack of understanding regarding the firms that finance RCPS because research on RCPS is very limited. Thus, this study investigates the characteristics of firms that issue RCPS based on the pecking order theory.

According to pecking order theory, firms rely on internal financing when internal funds are sufficient. If external financing is required, they first prefer to finance with debt, then possibly with hybrid securities like preferred stocks, and finally with common stocks (Myers 1983; Myers and Majluf 1984). Pecking order theory has been empirically tested in numerous studies, but the results are inconsistent and mixed, leaving the ability of the theory to explain firms' financing decisions ambiguous (Fama and French 2002; Frank and Goyal 2003; Leary and Roberts 2010). Unlike prior studies, Lemmon and Zender (2010) suggest that pecking order theory is valid to describe the financing behavior of firms when considering debt capacity. They find that firms that are not constrained by concerns over debt capacity prefer debt to equity if external funds are required, whereas firms with debt capacity constraints tend to rely on equity financing. Given their findings, firms constrained by debt capacity are expected to turn to equity financing and choose hybrid securities with the highest priority preference among equity. Specifically, RCPS is a type of hybrid securities with both redemption and conversion options that enhance firms' chances of securing external financing as they appeal to investors. Therefore, RCPS is likely to be one of the most preferred options for firms facing difficulties in debt financing. Given this, investigating the characteristics of RCPS-issuing firms seems appropriate to verify whether firms with concerns over debt capacity follow pecking order theory and explain the motivation for issuing hybrid securities.

In Korea, the issuance of RCPS continues to increase as the Commercial Law was amended in 2010, permitting firms to issue various types of stocks that are different with respect to their particulars in

terms of profit dividends, repayment, conversion, etc. (Article 344 of Commercial Law). Thus, Korea provides an appropriate setting for researchers to investigate the characteristics of RCPS-issuing firms empirically. This study conducted univariate and multivariate analyses using 12,768 firm-year observations of listed firms in the stock market in South Korea from 2011 to 2018.<sup>2)</sup>

The univariate analysis results show that debt ratio and firm value are higher for RCPS-issuing firms than for non-issuing ones. Operating cash flow, firm size, and age are lower for RCPS-issuing firms than for non-issuing ones. On the other hand, the multivariate analysis results are consistent with the univariate analysis results, except that the firm value of RCPS issuers is not significantly higher than that of non-issuers. Overall, these results indicate that firms with higher costs of financial distress, lower internal cash flow, and lower credibility/reputation are more likely to issue RCPS because they are constrained by debt capacity; thus supporting pecking order theory.

Additionally, this study further investigates whether firms with lower ownership concentration are more likely to issue RCPS because the conversion option of RCPS involves the risk of diluting ownership concentration. However, it finds no evidence that the likelihood of RCPS issuance is affected by firms' ownership concentration.

This study contributes to the literature in several ways. It sheds light on financing decisions related to the issuance of hybrid securities from the perspective of pecking order theory. While prior studies provide inconsistent findings on the pecking order theory, this study determines what lies behind these inconsistent findings. It provides evidence that firms' financing behavior conforms to the pecking order theory when debt capacity is considered, by analyzing firms that issue hybrid securities. Furthermore, few studies have

2) Although RCPS is mainly used to raise capital for start-up or unicorn companies, data of unlisted firms is not available, so this study conducts the analysis by limiting the data of listed firms in this study. Thus, the results of this study should be interpreted with caution as the characteristics of listed firms that issue RCPS.

been conducted on RCPS, although issuing RCPS has become a remarkable trend in the capital market. There is a study on the accounting classification of RCPS as debt or equity based on its market perception (McCarthy and Schneider, 2001), but this is the first study to identify the financial characteristics of firms that issue RCPS. Thus, this study contributes to broadening the scope of research on hybrid securities by providing empirical evidence that the issuance of RCPS is affected by firm characteristics related to concerns over debt capacity. This study has significant implications for managers, auditors, regulators, and capital market participants interested in the issuance of hybrid securities, including RCPS.

The remainder of this paper is organized as follows. Section 2 reviews relevant literature and outlines the study's hypotheses. Section 3 describes the sample selection process and research methods. Section 4 presents the results of the analysis. Section 5 concludes the study.

## II. Literature Review and Hypothesis Development

### A. Literature Review

According to the pecking order theory developed by Myers and Majluf (1984), firms have a preference order for capital financing to minimize adverse selection costs under information asymmetry between firms and investors. Specifically, firms prefer retained earnings, short-term securities, debt, preferred stock, and common stock, in that order. This theory perpetuates that preferred stock is inferior to debt in the preference for external financing, but as the issuance of preferred stock increased in the U.S in the 1970s, studies have been conducted to examine the determinants of corporate financing with preferred stock.

By conducting a ratio analysis for preferred stock-issuing firms and non-issuing control firms, Moyer et al. (1987) found that firms issuing preferred stock have lower market values, lower interest coverage

ratios, lower levels of retained earnings, and lower equity ratios than non-issuing firms. Their findings indicated that firms tend to issue preferred stock rather than debt when they are financially distressed. This is because the tax credits for interest payments from debt financing are insignificant for these firms, and the risk of bankruptcy can be reduced through preferred stock financing. Heinkel and Zeckner (1990) analyzed the optimal capital structure in a model with an investment opportunity and found that firms use preferred stocks to enhance debt capacity without creating an underinvestment problem. Ely et al. (2002) investigated the effect of a firm's tax status on its financing preference with preferred stock relative to debt by analyzing preferred stock issuers and non-issuers. They found that firms with lower expected marginal tax rates are more likely to choose their preferred stock over debt because the value of debt tax shields decreases as a firm's expected marginal tax rate decreases. Further, Frischmann et al. (1999) examined trends in preferred stock issued over 1993-1996 and report significant growth in new types of preferred stock (hybrid securities) like redeemable or convertible preferred stocks. They find that this variant of preferred stock accounts for the majority of recent preferred stock issuances and therefore argue that it is necessary to understand the features of these securities, including the motivations of the firms that issue them. They also discuss the effects of these securities on financial reporting and suggest the establishment of accounting standards related to the classification because they possess both debt and equity characteristics.

In line with the diversification of preferred stock, some academic studies extend the literature by focusing on a specific type of security. Carter and Manzon (1995) examined mandatorily redeemable preferred stock, which can be viewed as substitutes for debt because they have similarities in cash flows and contractual rights. They find that firms with low marginal tax rates issue more mandatorily redeemable preferred stock relative to debt compared to firms with high tax rates. This suggests that firms that cannot efficiently use interest tax shields are more likely

to rely on mandatorily redeemable preferred stock over debt. Lee and Figlewicz (1999) investigated the characteristics of firms that issue convertible preferred stock by comparing them with firms that issue convertible debt. They find that the levels of financial, operating, and bankruptcy risks are higher for firms issuing convertible preferred stock than for those issuing convertible debt. They also find that convertible preferred stock-issuing firms have lower levels of free cash flow and growth potential than convertible debt-issuing firms.

Kimmel and Warfield (1995) found that the market perception of redeemable preferred stock varies depending on their attributes like voting rights and conversion features by analyzing the systematic risk of 239 firms that issue redeemable preferred stock. Therefore, they proposed that the specific disclosure of security attributes, rather than dichotomous classification, is required to represent the economic substance of hybrid securities. McCarthy and Schneider (2001) investigated the market perception of preferred stocks with both redeemable and convertible features. Based on a sample of firms reporting convertible redeemable preferred stocks from 1991 to 1995, they found that the market perceives the convertible redeemable preferred stock as debt for two out of five years. They argued that the current accounting rules for convertible redeemable preferred stock which must be excluded from equity but not classified as debt, do not adequately reflect market perceptions. More recently, Levi and Segal (2015) examined whether firms' financing behavior is affected by the enactment of SFAS 150, which classifies mandatorily redeemable preferred stock as a liability. They found a decline in the issuance of mandatorily redeemable preferred stock after the adoption of SFAS 150, implying that a change in the classification of hybrid securities from equity or mezzanine to debt reduces the incentives for firms to issue mandatorily redeemable preferred stock. Their findings demonstrate that the reporting classification of these securities is one of the factors that influences firms' financing decisions.

This study extends the literature by exploring the characteristics of firms that issue RCPS to understand

firms' financing decisions with the issuance of hybrid securities based on pecking order theory.

## B. Hypothesis Development

This study considers firm characteristics including debt ratio, operating cash flow, firm value, size, and age to investigate whether firms constrained by debt capacity are more likely to issue RCPS. First, firms with higher debt ratios have higher financial distress costs because the probability of default and bankruptcy is greater. Therefore, firms with higher debt ratios are more likely to curtail debt financing and turn to equity. The issuance of RCPS can be a favorable option for firms with high debt ratios in their financing choices, because it can possibly reduce the risk of default and preserve debt capacity. RCPS allows firms to refuse to pay the holder for a redemption request when their profits are not available to distribute dividends, although it contains a debt-like redemption feature that requires firms to pay the holder. Furthermore, RCPS is classified as equity if certain conditions are satisfied.<sup>3)</sup> Thus, firms with a higher debt ratio are expected to be more likely to issue an RCPS.

**Hypothesis 1.** RCPS-issuing firms are more likely to have a higher debt ratio than non-issuing firms.

Second, the capacity of firms to generate cash flow is a crucial factor in assessing their default risk and credit ratings (Standard and Poor's, 2006).<sup>4)</sup> Thus, firms without sufficiently generated cash flows are likely to have difficulty accessing the debt market at a low cost. They cannot rely heavily on debt financing and are forced to rely on equity to fill their financing deficits. Accordingly, RCPS issuance is likely to be

3) Under K-IFRS 1032, RCPS is classified as equity if the issuer has a redemption option and there is no reflex option clause which allows the conversion price to be adjusted in a case of a fall in stock price.

4) Firms find it difficult to raise external financing using bank debt or issuing bond when their default risk is high or credit rating is low.

affected by debt capacity constraints due to an incapacity to generate cash flow. It is expected that firms with a lower level of operating cash flow are more likely to issue RCPS as operating cash flow represents the firms' capacity to generate cash flow.

**Hypothesis 2.** RCPS-issuing firms are more likely to have a lower level of operating cash flow than non-issuing firms.

Third, many studies find that high-growth firms are the primary issuers of equity (Myers 1977; Smith and Watts 1992; Barclay et al. 2006; Modigliani and Miller 1963; Almeida et al. 2004; Fama and French 2002; Frank and Goyal 2003).<sup>5)</sup> Lemmon and Zender (2010) suggest that these firms tend to issue equity because they have significant external financing needs and move quickly toward debt capacity. In line with previous research, this study anticipates that firms with high growth opportunities attempt to fulfill their financing needs with hybrid securities such as RCPS, because they are highly likely to face debt capacity constraints. Firms with higher growth opportunities have higher firm value as growth opportunities are reflected in market prices as intangible assets.<sup>6)</sup> Thus, issuance of an RCPS is expected to be positively related to firm value.

**Hypothesis 3.** RCPS-issuing firms are more likely to have higher firm value than non-issuing firms.

Fourth, firms' size and age are critical indicators that determine their capability to access debt financing. Large firms have a lower probability of bankruptcy because they tend to be more diversified and fail

less often (Rajan and Zingales, 1995). Firms that operate for a long period have a solid reputation in the market (Diamond, 1991). Therefore, large and mature firms have easier access to the debt market at a lower cost than do small and young firms. Conversely, smaller and younger firms are more likely to be constrained by debt financing because of low creditability or reputation, which makes it difficult to cover most of their financing needs with debt. Hence, smaller and younger firms are expected to be more likely to issue RCPS.

**Hypothesis 4.** RCPS-issuing firms will be smaller and younger than non-issuing firms.

Lastly, RCPS gives the holders the option to convert preferred shares into a fixed number of common shares at a set price: the conversion price. In Korea, firms are allowed to issue RCPS with reflex option clauses that adjust the conversion price in the case of a fall in stock price. This could be beneficial for investors, as the number of common shares they can receive increases when stock prices decrease. This embeds the risk of diluting ownership concentration for major shareholders, resulting from an increase in the number of common shares issued. Hence, firms with concentrated ownership are expected to be reluctant to use RCSP in their financing decisions. That is, RCPS is more likely to be a preferred option for firms with lower ownership concentration.

**Hypothesis 5.** RCPS-issuing firms will have lower ownership concentration than non-issuing firms.

### III. Research Design

#### A. Data Collection

Our initial sample consists of firms listed on the Korea Stock Exchange (KSE) during the period between 2011 and 2018. Firms in the financial industry are excluded from the process of selecting

5) Fama and French (2002) and Frank and Goyal (2003) argue that their findings contract the pecking order theory because they have a great asymmetric information and thus have the strong incentives to follow the pecking order theory.  
6) However, simultaneously, there exists a possibility that the issuance of RCPS is recognized as financial distress of firms or future cash outflow of redemption option to the investors in the market, leading to a negative impact on the firm value. Therefore, it is an empirical question whether RCPS issuing firms have a higher firm value than non-issuing firms.

**Table 1.** Sample selection procedure

Procedures	Number of Firm-years
2011-2018 Observations with reporting data in TS2000 excluding firms in the financial industry	14,396
Less:	
Observations without stock price and other financial data	1,163
Observations with impaired capital	465
Final sample firm-years	12,768

**Table 2.** Number of firms by year

Year	Number of Firms
2011	11
2012	10
2013	16
2014	24
2015	19
2016	21
2017	24
2018	33
total	158

the final sample because they have different financial statement forms and accounting rules, and thus cannot be compared with those in other industries. This study excludes firms for which the necessary financial and stock price data are not available in the TS 2000 and KIS-VALUE databases.<sup>7)</sup> It also eliminates firms with impaired capital from the sample to prevent financial ratio distortion that might occur because of the aggravation of the financial structure. These procedures result in a final sample comprising 12,768 firm-years. A winsorization process was performed for continuous variables above and below the 1 percent level to rule out the effect of outliers. The sample selection procedure is presented in Table 1. The number of observations with the issuance of the RCPS is 158 firm-years in the final sample, as shown in Table 2.<sup>8)</sup>

7) TS2000 ([www.kokoinfo.com](http://www.kokoinfo.com)) and KIS-VALUE ([www.kisline.com](http://www.kisline.com)) databases systems are Korean equivalents of COMPUSTAT or CRSP in the USA, providing financial and stock price data for firms listed on the KSE (Choi and Lee, 2013).

8) Data related to the issuance of the RCPS are hand-collected

## B. Model Specification

This study conducted univariate and multivariate analyses to examine the factors that affect firms' decisions regarding RCPS issuance. For the univariate analysis, the total sample is divided into two subsamples: RCPS-issuing and non-issuing firms. The t-test and Wilcoxon test were used to compare the mean values of the variables of interest between the two subsamples.

For multivariate analysis, this study estimated the following logistic regression model wherein the dependent variable was *RCPS*. *RCPS* stands for the dummy variable that equals 1 if the firm issued RCPS and 0 otherwise. The main variables of interest are the debt ratio (*LEV*), operating cash flows (*OCF*), firm value (*TQ*), firm size (*SIZE*), firm age (*AGE*), and ownership concentration (*OWN*). The model includes control variables like log of total assets (*ASSET*), return on assets (*ROA*), ratio of tangible assets to total assets (*TANG*), year indicators (*YR*), and industry indicators (*IND*).

$$\begin{aligned} \text{Logit} (RCPS) = & \beta_0 + \beta_1 LEV + \beta_2 OCF + \beta_3 TQ \\ & + \beta_4 SIZE + \beta_5 AGE + \beta_6 OWN \\ & + \beta_7 ASSET + \beta_8 ROA + \beta_9 FLX \\ & + \beta_{10} \sum YR + \beta_{11} \sum IND \\ & + \varepsilon \text{ (Model 1)} \end{aligned}$$

*RCPS*: dummy variable that equals 1 if the firm issued RCPS and 0 otherwise.

*LEV*: total liabilities divided by total assets.

*OCF*: operating cash flows divided by total assets.

from the firms' annual reports disclosed in DART site (Repository of Korea's Corporate Filings, <https://dart.fss.or.kr>).

*TQ*: firm value measured by Tobin's Q (the sum of debt and market value of equity divided by total assets).

*SIZE*: dummy variable that equals 1 if the firm is classified as a large business and 0 otherwise.

*AGE*: log of firm age.

*OWN*: ownership ratio of the largest shareholder.

*ASSET*: log of total assets.

*ROA*: net income divided by total assets.

*TANG*: tangible assets divided by total assets.

*YR*: year indicators.

*IND*: industry indicators.

RCPS is approximately 1.2% of the listed firms in the stock market from 2011 to 2018. The mean (median) values of debt ratio (*LEV*), operating cash flow (*OCF*), and firm value (*TQ*) are 0.371 (0.367), 0.043 (0.043), and 1.421 (1.088), respectively. The mean value of the dummy variable for large businesses (*SIZE*) is 0.116, which indicates that firms classified as large businesses constitute approximately 11.6% of the total sample. The mean (median) value of the log of firm age (*AGE*) is 3.178 (3.219). The ownership ratio of the largest shareholder (*OWN*) is approximately 28.1%. For the control variables, the mean (median) value of the log of total assets (*ASSET*) is 19.005 (18.743). The mean (median) values of return on assets (*ROA*) and tangible assets divided by total assets (*TANG*) are 0.015 (0.027) and 0.262 (0.243), respectively.

Table 4 presents the results of the correlation analysis of the variables. The dummy variable for RCPS-issuing firms (*RCPS*) has a significantly positive correlation with debt ratio (*LEV*) and a significantly negative correlation with operating cash flow (*OCF*) and firm age (*AGE*), as hypothesized. *RCPS* is positively correlated with firm value (*TQ*) but not significantly.

## IV. Empirical Results

### A. Descriptive Statistics and Correlation

Table 3 presents descriptive statistics of the variables used in the tests. To rule out the effects of outliers, this study winsorizes the top and bottom 1% of the observations for all the continuous variables. The mean (median) value of the dummy variable for *RCPS* is 0.012, implying that the ratio of firms issuing

**Table 3.** Descriptive statistics of variables

Variables	N	Mean	Median	SD	MIN	MAX
<i>RCPS</i>	12,768	0.012	0.000	0.111	0.000	1.000
<i>LEV</i>	12,768	0.371	0.367	0.197	0.026	0.822
<i>OCF</i>	12,768	0.043	0.043	0.082	-0.215	0.269
<i>TQ</i>	12,768	1.421	1.088	1.025	0.464	6.729
<i>SIZE</i>	12,768	0.116	0.000	0.320	0.000	1.000
<i>AGE</i>	12,768	3.178	3.219	0.689	0.693	4.290
<i>OWN</i>	12,768	0.281	0.254	0.143	0.046	0.700
<i>ASSET</i>	12,768	19.005	18.743	1.351	16.698	23.717
<i>ROA</i>	12,768	0.015	0.027	0.094	-0.401	0.222
<i>TANG</i>	12,768	0.262	0.243	0.187	0.000	0.763

Variable definitions

*RCPS*: dummy variable that equals 1 if the firm issued RCPS, and 0 otherwise.

*LEV*: total liabilities divided by total assets.

*OCF*: operating cash flows divided by total assets.

*TQ*: firm value measured by Tobin's Q (the sum of debt and market value of equity divided by total assets).

*SIZE*: dummy variable that equals 1 if the firm is classified as large business, and 0 otherwise.

*AGE*: log of firm age.

*OWN*: ownership ratio of the largest shareholder.

*ASSET*: log of total assets.

*ROA*: net income divided by total assets.

*TANG*: tangible assets divided by total assets.



Additionally, *RCPS* is negatively correlated with firm size (*SIZE*) and the ownership ratio of the largest shareholder (*OWN*) but not significantly.

## B. Univariate Analysis

Table 5 presents the results of the t-test and Wilcoxon test to examine the differences in the characteristics of RCPS-issuing firms compared to non-issuing firms. The Kolmogorov-Smirnov test proved that the p-values of all variables are less than 0.05, which rejects the null hypothesis of normal distribution; therefore, the results of the Wilcoxon test are used for interpretation.

RCPS-issuing firms have higher mean values than non-issuing firms for debt ratio (*LEV*) and firm value (*TQ*). This indicates that RCPS issuers have relatively higher leverage and growth opportunities than non-issuers. As for operating cash flow (*OCF*) and firm age (*AGE*), RCPS-issuing firms have lower mean values than non-issuing firms, indicating that RCPS

issuers have a relatively lower capacity to generate cash flow and reputation than non-issuers. These results suggest that RCPS-issuing firms are more likely to be constrained by concerns over debt capacity than non-issuing firms. However, there is no significant difference between the two firms in the mean values of firm size (*SIZE*) and ownership ratio of the largest shareholder (*OWN*). However, these results were

**Table 5.** The results of t-test and Wilcoxon test

Variables	RCPS=0	RCPS=1	t-test	Wilcoxon test
	Mean	Mean	t-stat	z-stat
<i>LEV</i>	0.370	0.448	-4.95***	-4.94***
<i>OCF</i>	0.044	0.023	3.19***	2.72***
<i>TQ</i>	1.420	1.516	-1.17	-2.65***
<i>SIZE</i>	0.116	0.076	1.89*	1.57
<i>AGE</i>	3.180	2.984	3.09***	3.44***
<i>OWN</i>	0.281	0.281	0.06	0.12

Note: These variables are listed in Table 3. \* and \*\*\* indicate significance levels at the 10, and 1%, respectively, based on two-tailed tests.

**Table 4.** Correlations of variables

	<i>RCPS</i>	<i>LEV</i>	<i>OCF</i>	<i>TQ</i>	<i>SIZE</i>	<i>AGE</i>	<i>OWN</i>	<i>ASSET</i>	<i>ROA</i>	<i>TANG</i>
<i>RCPS</i>	1.0000	0.0438 <.0001	-0.0282 0.0014	0.0104 0.2419	-0.0139 0.1156	-0.0315 0.0004	-0.0005 0.9544	0.0100 0.2600	-0.0242 0.0063	0.0002 0.9833
<i>LEV</i>		1.0000	-0.1345 <.0001	-0.1221 <.0001	0.1219 <.0001	0.0669 <.0001	-0.0418 <.0001	0.2033 <.0001	-0.2392 <.0001	0.2894 <.0001
<i>OCF</i>			1.0000	-0.0070 0.4319	0.0422 <.0001	-0.0309 0.0005	0.1070 <.0001	0.1320 <.0001	0.5228 <.0001	0.1147 <.0001
<i>TQ</i>				1.0000	-0.0578 <.0001	-0.2159 <.0001	-0.0689 <.0001	-0.1778 <.0001	-0.0478 <.0001	-0.1499 <.0001
<i>SIZE</i>					1.0000	0.0938 <.0001	0.1267 <.0001	0.5718 <.0001	0.0450 <.0001	0.0160 0.0712
<i>AGE</i>						1.0000	-0.1004 <.0001	0.2359 <.0001	0.0101 0.2551	0.0905 <.0001
<i>OWN</i>							1.0000	0.0872 <.0001	0.1523 <.0001	0.0238 0.0072
<i>ASSET</i>								1.0000	0.1918 <.0001	0.1174 <.0001
<i>ROA</i>									1.0000	-0.0011 0.9020
<i>TANG</i>										1.0000

Note: The variables are defined as in Table 3.

derived when the control variables were not considered, and a multiple regression analysis was required to test the hypotheses.

### C. Multivariate Analysis

Table 6 presents the results of estimating Model 1 to verify our hypotheses. The value of Pseudo-R<sup>2</sup> for Model 1 is 0.0683. The coefficient of the debt ratio (*LEV*) is significantly positive for the dummy variable for RCPS-issuing firms (*RCPS*) at  $p < 0.01$ . This result indicates that firms with higher debt ratios are more likely to issue RCPS, which supports Hypothesis 1. The coefficient of operating cash flow (*OCF*) was significantly negative for *RCPS* at  $p < 0.01$ . This implies that firms with a lower level of operating cash flow are more likely to issue RCPS, thereby supporting Hypothesis 2. The coefficient of firm value (*TQ*) is positive for *RCPS*, but statistically insignificant. Thus, regarding Hypothesis 3, the issuance of RCPS seems to be irrelevant to firms' growth opportunities. However, it is also possible that the

issuance of RCPS is recognized as financial distress of firms or future cash outflow of redemption options to investors in the market, leading to a negative impact on firm value. Thus, the statistically insignificant coefficient of firm value may be attributed to the mixed effect of growth opportunities and financial distress/future cash outflows of the redemption option. The coefficients of firm size (*SIZE*) and firm age (*AGE*) are both significantly negative for the dummy variable for RCPS-issuing firms (*RCPS*), at  $p < 0.01$ . These results indicate that firms of lower size and age are more likely to issue RCPS, thereby supporting Hypothesis 4. The coefficient of the ownership ratio of the largest shareholder (*OWN*) is statistically insignificant for *RCPS*, which rejects Hypothesis 5. This suggests that ownership concentration does not affect firms' decisions regarding the issuance of RCPS.

### D. Additional Analysis

This study conducts an additional analysis using a matching sample because the number of RCPS

**Table 6.** The results of logistic regression analysis

Variables	Logit ( <i>RCPS</i> ) = $\beta_0 + \beta_1 LEV + \beta_2 OCF + \beta_3 TQ + \beta_4 SIZE + \beta_5 AGE + \beta_6 OWN + \beta_7 ASSET + \beta_8 ROA + \beta_9 FIX + \beta_{10} \sum YR + \beta_{11} \sum IND + \varepsilon$		
	Estimate	Wald $\chi^2$	p-value
<i>Intercept</i>	-8.341	29.83***	<.0001
<i>LEV</i>	2.164	21.50***	<.0001
<i>OCF</i>	-2.574	5.32**	0.021
<i>TQ</i>	0.024	0.08	0.775
<i>SIZE</i>	-1.170	9.90***	0.002
<i>AGE</i>	-0.344	9.62***	0.002
<i>OWN</i>	0.398	0.46	0.499
<i>ASSET</i>	0.258	10.62***	0.001
<i>ROA</i>	-0.321	0.11	0.736
<i>TANG</i>	-0.219	0.20	0.656
<i>YR</i>		Included	
<i>IND</i>		Included	
Pseudo-R <sup>2</sup>		0.0683	
N		12,768	

Note: These variables are listed in Table 3. \*\* and \*\*\* indicate significance levels at the 5 and 1%, respectively, based on two-tailed tests.

**Table 7.** The results of additional logistic regression analysis

Variables	Logit (RCPS) = $\beta_0 + \beta_1 LEV + \beta_2 OCF + \beta_3 TQ + \beta_4 SIZE + \beta_5 AGE + \beta_6 OWN + \beta_7 ASSET + \beta_8 ROA + \beta_9 FLX + \beta_{10} \Sigma YR + \beta_{11} \Sigma IND + \varepsilon$		
	Estimate	Wald $\chi^2$	p-value
<i>Intercept</i>	-0.421	0.03	0.853
<i>LEV</i>	2.289	9.90***	0.002
<i>OCF</i>	-2.626	2.33	0.127
<i>TQ</i>	0.074	0.30	0.586
<i>SIZE</i>	-0.375	0.42	0.516
<i>AGE</i>	-0.362	3.96**	0.047
<i>OWN</i>	0.664	0.49	0.485
<i>ASSET</i>	0.027	0.05	0.827
<i>ROA</i>	1.177	0.60	0.441
<i>TANG</i>	0.335	0.19	0.663
<i>YR</i>		Included	
<i>IND</i>		Included	
Pseudo-R <sup>2</sup>		0.0812	
N		316	

Note: These variables are listed in Table 3. \*\* and \*\*\* indicate significance levels at the 5 and 1%, respectively, based on two-tailed tests.

firm years accounts for a relatively low proportion of the total sample. Following the paired sample approach, this study constructs a control sample of 158 non-issuing firms matched by industry and asset size to RCPS-issuing firms, additionally generating a matching sample of 365 firm-year observations (Beaver, 1966; Altman, 1968; Barnes, 1990). Table 7 presents the results of estimating Model 1 to verify our hypotheses based on a matching sample of 365 firm years. The coefficient of the debt ratio (*LEV*) is significantly positive, while the coefficient of firm age (*AGE*) is significantly negative. The coefficient of firm value (*TQ*) is positive, but statistically insignificant. These results are consistent with those in Table 6. However, the coefficients of operating cash flow (*OCF*) and firm size (*SIZE*) were negative but statistically insignificant. The lack of statistical significance for these variables is presumed to be due to the small size of the matching sample.

## V. Conclusions

This study attempts to explore the characteristics of firms that issue RCPS as issuing RCPS has recently emerged as a typical option for firms to raise capital. According to pecking order theory, firms prefer debt first, followed by hybrid securities and equity in the case of external funds (Myers 1983; Myers and Majluf 1984). Thus, it is expected that firms restricted by their debt capacity are likely to issue hybrid securities. Specifically, RCPS is a particular type of hybrid security that possibly provides investors with both redemption and conversion options. As this feature appeals to potential investors and thus increases the chance of successful financing, RCPS is likely to be a preferred option in their financing choices of hybrid securities for firms constrained by debt capacity.

Using a sample of 12,768 firm-year observations of Korean listed firms covering 2011 to 2018, this study examines the characteristics of RCPS-issuing firms to verify whether firms with concerns over debt capacity issue hybrid securities based on pecking

order theory. The results of the analysis show that firms issuing RCPS have higher debt ratios and lower operating cash flows than non-issuing firms. It is also found that firms issuing RCPS are smaller and younger than non-issuing firms. These findings indicate that the likelihood of RCPS issuance is affected by firm characteristics related to concerns regarding debt capacity. On the other hand, it is not found that firms issuing RCSP have a higher firm value than non-issuing firms. Additionally, this study investigates whether firms issuing RCPS have a lower ownership concentration than non-issuing firms because the conversion option of RCPS involves the risk of dilution of ownership concentration. However, it does not find a significant relationship between the issuance of RCPS and ownership concentration.

The theoretical and practical contributions of this study are as follows. First, the results of the study contribute to broadening the scope of research on the capital structure by providing evidence that firms' financing behavior conforms to the pecking order theory when debt capacity is considered. Second, to the best of our knowledge, this is the first study to investigate the characteristics of firms that issue RCPS. There is a lack of understanding regarding firms that finance with RCPS, although issuing RCPS has become a notable trend in the capital market. The issuance of RCPS has been steadily increasing in Korea since the revision of the Commercial Act in 2010, which allows firms to issue various types of stocks. This setting provides the valuable opportunity of investigating the characteristics of firms that finance RCPS. In this study, the characteristics of firms issuing RCPS depict that firms restricted by their debt capacity are likely to issue RCPS. It implies that RCPS is one of the most preferred options for firms facing difficulties in debt financing because the feature of RCPS appeals to potential investors and thus increases the chance of successful financing. Lastly, this study provides a caveat that corporate managers should carefully weigh the pros and cons of issuing RCPS in their financing choices, as the issuance of RCPS can send a negative signal to the market that firms are financially constrained. Our

findings help investors, auditors, and regulators to better understand the motivations for issuing RCPS, and also suggest that considerable prudence is required when making economic decisions regarding RCPS-issuing firms.

A limitation of this study is that the analysis is conducted based on the data of firms listed on the stock market because the data of unlisted firms are not available, raising the need for further research. Therefore, in future research, it will be a challenge to identify the characteristics of unlisted firms that issue RCPS. It would also be interesting to examine how RCPS-issuing firms make their financial and tax reporting decisions in consideration of debt capacity concerns.

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