



The issuance of warrants in rights offerings: Agency costs and signaling effects

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journals.sagepub.com/home/aum**Balasingham Balachandran**

Department of Economics and Finance, La Trobe University, Bundoora, VIC, Australia

Sutharson Kanapathippillai

Department of Accounting, Deakin University, Burwood, VIC, Australia

Chandrasekhar Krishnamurti

University of Southern Queensland, Toowoomba, QLD, Australia; University of South Australia, Adelaide, SA, Australia

Michael Theobald

University of Birmingham, Birmingham, UK; Mifranthe Associates, Warwick, UK

Eswaran Velayutham

University of Southern Queensland, Toowoomba, QLD, Australia

Abstract

We examine the issuance choice across rights issues of equity, unit offerings, and standalone warrants and investigate the market reactions to these issue types. We find that agency costs, growth opportunities, and current funding needs relative to assets in place are prime drivers of the type of equity issuance choice. Managers use quality signals such as underpricing, underwriting status, and the proportion of funds raised by exercising warrants in determining the features of the warrant issue. Furthermore, we document that the market reacts more favorably to standalone warrants issues than units and equity during the rights offering period.

JEL Classification: **G14; G32**

Keywords

Agency cost, Australia, equity, issuance choice, rights offerings, signaling, unit offerings, warrants

Corresponding author:

Balasingham Balachandran, Department of Economics and Finance, La Trobe University, Bundoora, VIC 3086, Australia.

Email: B.Balachandran@latrobe.edu.au

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1. Introduction

Financial economists have examined the determinants and effects of seasoned equity offerings for over five decades. However, Eckbo et al. (2007) conclude that "... there is surprisingly little consensus on key determinants of the security issuance decision and its economic effects on the firm." Eckbo and Masulis (1992) document that flotation costs are costlier for firm commitment offerings (known as public offerings) than for rights offerings. Despite the relatively lower flotation costs for rights offerings in comparison with firm commitment offerings, the survey by Eckbo et al. (2007) documents an international trend away from the rights offerings method, particularly in the United States, Japan, and Hong Kong. They also show that there is a trend away from non-underwritten rights offerings to underwritten rights offerings in France, Norway, and the United Kingdom.

A number of companies raise equity by issuing units (a package of equity with warrants) in seasoned equity offerings. US companies use the public offering (known as firm commitment) method to issue units (see Byoun, 2004; Byoun and Moore, 2003). While French companies use both rights and public offerings methods to issue units, the majority of units are issued using the public offerings method (see Gajewski et al., 2007). There is a growing empirical research literature on rights offerings of equity in different international markets; however, there is, surprisingly, a scarcity of research on the issuance choice of unit offerings via the rights mechanism.¹ Furthermore, the factors that determine the choice regarding the issuance of standalone warrants have not been previously empirically analyzed.²

In this article, we contribute to this literature by examining issuance choice between equity, unit offerings, and standalone warrants via the rights method, using a large sample drawn from the Australian market. The analysis across three types of rights issue mechanism will provide new and significant insights regarding the motivation for the issuance of warrants in rights offerings and, in particular, provide further empirical evidence regarding the impacts of both agency costs and quality signaling.

Australian listed companies predominantly use placements, rights issues, and share purchase plans and dividend reinvestment plans (DRPs) to raise equity capital, while they use the rights offerings method to issue unit offerings (equity with bonus warrants) and standalone warrants in the secondary market.³ Australian companies can only issue shares of up to 15% of issued capital on a non-pro-rata basis in a 12-month period without seeking shareholder approval (see Australian Stock Exchange (ASX) listing rule 7.1). Prior to June 2009, the maximum amount that could be issued under a share repurchase plan to an individual investor, without a prospectus or Product Disclosure Statement was \$5000 in a 12-month period. The Australian Securities and Investments Commission increased this limit to \$15,000 in June 2009. Shareholders are permitted to reinvest all or part of their dividend payments in new shares under a DRP. DRPs are exempt from the "15% in 12 months capital raising threshold" rule. There is no restriction on the amount of funds that can be raised under a renounceable rights issue. However, the maximum issue size (ratio) on non-renounceable rights issues is 1:1.

Australian companies can issue equity, units (equity with warrants), and standalone warrants via rights offerings. The three types of rights offerings (equity, units, and warrants) available in Australia are associated with differing levels of financing. Firms that have urgent needs are more likely to issue standalone rights equity offerings (hereafter REs), firms that urgently need larger proportions of funds relative to assets, together with further funds to be raised at a later date, are more likely to have rights issues of equity with warrants (hereafter RUs), while those that will need financing in the future are more likely to issue standalone rights issues of warrants (hereafter RWs). When firms include warrants in seasoned equity offerings, they are effectively pre-committing to a subsequent seasoned offering. Therefore, firms issuing RUs and RWs are likely to signal their future growth

potentials, thereby providing an appropriate mechanism for financing growth opportunities, while firms issuing REs are more likely to have lower growth potentials. As such, we also examine the role of growth opportunities upon the issuance choice.

In RUs, in addition to shares, shareholders also receive warrants that are free of charge and generally out-of-the-money at the time of issuance which provide the right to purchase the stock at a predetermined exercise price with an average exercise expiration date of 2 years. In the case of standalone warrants, a shareholder receives the warrants for a small price, with a predetermined exercise price, with an average exercise expiration date of 3 years, which is, again, generally out-of-the-money at the time of issuance.⁴ Australian companies use warrants associated with unit offerings as sweeteners to increase the probability of success in RUs. Warrants associated with unit offerings and standalone warrants are listed at the ASX. As per ASX Listing Rule 7.11.6, companies should issue separate certificates for shares and warrants associated with units and list them separately at the ASX.

Chemmanur and Fulghieri (1997) develop a signaling model for the inclusion of warrants by firms going public where insiders have private information about the riskiness, as well as the expected value, of their firms' future cash flows. They demonstrate that high-risk firms package their equity with warrants, and the package of equity and warrants is underpriced, whereas lower risk firms issue underpriced equity alone. They argue that although their model is developed in the context of initial public offerings (IPOs), it can explain the issuance of seasoned equity offerings packaged with warrants. The inclusion of warrants can also serve as an effective mechanism for mitigating agency costs resulting from potential misuse of free cash flows (see, for example, Schultz, 1993). There is very little empirical research that examines the implications of the Chemmanur and Fulghieri (1997) model and the agency costs rationale for the issuance choice between REs, RUs, and RWs. As such, we examine the signaling and agency cost motivation for this choice as between RUs, RWs, and REs in this article.

Balachandran et al. (2012) find that Australian firms offering fully underwritten rights issues of equity (REs) experience the least unfavorable price reaction, while firms issuing equity with warrants (RUs) experience a more unfavorable price reaction during the rights offering period (from the day before the announcement date to the day the subscription closes). Research evidence is, however, lacking on how the market reaction to RWs differ from REs and RUs. As a consequence, we examine the impacts of the inclusion of standalone warrants on market reactions.

Xu et al. (2015) find that the average (median) market value of firms raising funds issuing private placements is \$86 (22) million. The average (median) market value of REs, RUs, and RWs in our sample is \$69 (13), \$15 (7), and \$20 (9) million, respectively. These results indicate that very small firms issue RWs and RUs. As at the end of 2009, a total of 175 companies had a market capitalization greater than \$1 billion, with 385 companies between \$100 million and \$1 billion, 534 companies between \$20 million and \$100 million, and 855 companies below \$20 million.⁵ Larger companies in Australia use rights issues with private placement and DRPs to raise capital.

Our empirical results provide several key insights. First, RUs and RWs are concentrated in very small, high growth, and not yet profitable companies. This potentially indicates that firms with severe agency problems choose RWs and RUs. Second, we find that younger and smaller firms with lower board independence, lower managerial ownership, higher growth opportunities, and firms which only need limited funds for current requirements relative to assets in place (with further funds to be raised in the future) will be more likely to issue standalone warrants (RWs). Third, smaller firms with lower managerial ownership, lower ownership concentration, relatively lower growth opportunities, and firms which need larger amounts of funds for current requirements relative to assets in place (with further funds raised in the future) will be more likely to issue warrants free of charge as a sweetener packaged with equity (RUs). Fourth, underpricing is stronger for

RWs and RUs than for REs. Fifth, we find a positive relation between underpricing and the riskiness of firms, and between the proportion of funds to be raised by exercising warrants and the riskiness of firms, for both unit offerings and standalone warrants. Sixth, we document evidence that the market reacts more favorably to the announcement of RWs and REs than to RUs during the full period from the day before the announcement date to the day that subscription closes and for the post announcement period from 2 days after the announcement date to the day that subscription closes, whereas the market reacts more favorably to the announcement of RWs than REs and RUs during the 3-day announcement period.

Overall, our evidence is consistent with the view that agency cost considerations, growth opportunities, and the current funding needs of firms relative to assets in place largely determine the issuance choice of equity securities. When companies decide to include warrants in their issue, either standalone or as a package with equity, those firms subject to higher risks tend to use larger underpricing and raise larger proportions of funds by exercising warrants. The more unfavorable market reaction to RUs than REs and RWs during the full rights offering period (from the day before the announcement date to the end of the subscription period), and lower shareholders' take-up to RUs than REs and RWs, is indicative of firms that issue RUs face higher agency problems. It has significant implications for managers and regulators in the designing of RUs.

This article is organized as follows. Section 2 presents the hypothesis development. Section 3 describes the sample, while Section 4 analyzes the issuance choice. Section 5 examines the implications of the Chemmanur and Fulghieri (1997) model for the inclusion of warrants in rights offerings. Section 6 discusses the price reactions for various windows around the rights offering process. Finally, Section 7 presents our conclusions.

2. Hypotheses development

In this section, we develop a set of hypotheses in terms of growth opportunities, agency costs, and signaling within the Australian institutional framework.

2.1. Growth opportunities

The inclusion of warrants in seasoned equity offerings effectively pre-commits a firm to a subsequent seasoned offering, thereby providing an appropriate mechanism for financing growth opportunities. When these growth opportunities are successfully realized, they result in higher earnings and cash flows which will be reflected in increased stock prices, thereby enabling the holders of warrants to profitably exercise the warrants. We argue that for those firms that urgently need larger proportions of funds relative to assets, together with further funds to be raised at a later date, unit offerings (RUs) are the most likely source of funding, while firms which only need a limited set of funds for current requirements, with further funds raised in the future, will be more likely to issue standalone warrants (RWs). Lee et al. (2003) and Suchard (2005) provide empirical evidence that firms issuing unit IPOs and standalone warrants, respectively, have higher growth option, *ceteris paribus*. Accordingly, we propose the following hypotheses:

H1(a): Firms that urgently need larger proportions of funds relative to assets, together with further funds to be raised at a later date, issue unit offerings (RUs).

H1(b): Firms that urgently need smaller proportions of funds relative to assets, together with further funds to be raised at a later date, issue standalone warrants (RWs).

2.2. Agency costs hypothesis

Schultz (1993) argues that agency costs are likely to be particularly severe for firms that are characterized by greater uncertainty, and if the resolution of uncertainty about the firm's prospects reveals that the firm does not have profitable projects, managers might squander the firm's funds on poor investments. Therefore, he asserts that such firms will be more likely to issue warrants as a multistage financing process, since by issuing units rather than shares, management initially receives only a portion of the total cash needed to fund the firm's projects. The rest of the funds are obtained only if the firm is shown to grow via its investments and the stock price then rises sufficiently to allow exercise of the warrants. He finds that US companies choosing unit IPOs are smaller, have less income and assets in relation to their IPO proceeds, and are less likely to survive than firms that issue shares.

The availability of the three types of security issues via rights offerings in Australia provides a natural solution to the agency problems associated with free cash flows. Since warrants involve a staged financing process, the agency problem is somewhat mitigated. Thus, in an agency cost-related context, we hypothesize that firms with higher agency costs will be more likely to include warrants in their rights offerings. Thus, issuance choice is consistent with the preferences of shareholders who take the agency costs of free cash flows into account. In the context of agency costs, it also implies that firms with higher growth opportunities would raise a proportion of funds needed when shareholders exercise their warrants, thus minimizing the free cash flows in the hands of managers.

We operationalize agency costs measurement using variables such as managerial ownership, ownership concentration, and board independence. A number of authors have argued and demonstrated that higher equity ownership by firm insiders encourages the pursuit of objectives that maximize shareholder wealth (see, for example, Jensen and Meckling, 1976; Leland and Pyle, 1977). Demsetz (1983) argues, however, that managers get entrenched when there is high managerial ownership, thereby exacerbating agency problems. Morck et al. (1988) and McConnell and Servaes (1990) show that the relationship between managerial ownership and firm performance is not linear with the consequence that high managerial ownership will not necessarily mitigate the agency conflicts after a certain level of ownership. After controlling for the effects of endogeneity and unobservable firm characteristics, Himmelberg et al. (1999) have demonstrated that managerial share ownership has little or no effect on firm value; Pham et al. (2011) report similar findings for Australian firms.⁶ Ang et al. (2000) argue that while significant progress has been achieved in empirically demonstrating the role of agency costs in financial decisions, the actual measurement of the principal variable of interest, agency costs, in both absolute and relative terms, has lagged behind these achievements.

Agency costs can also be reduced through the presence of large-block shareholders or blockholders. Shleifer and Vishny (1986) demonstrate that blockholders do play an active role in monitoring management. Independent directors are effective monitors of managerial behavior because of their own reputational concerns and their desire to obtain additional director positions (Fama and Jensen, 1983) and, as we indicate above, will assume somewhat more importance in a setting where the market for corporate control is not as strong as in the United Kingdom and the United States. Capezio and Mavisakalyan (2016) show that women's representation on company boards is associated with a decreased probability of fraud in Australia. Nguyen and Rahman (2015) find that board compensation and ownership concentration increase the likelihood of a divestiture in Australia.

Weisbach (1988) reports that CEO turnover is more highly correlated with firm performance in corporations having a majority of outside directors in comparison with those firms where

insiders predominate, implying that outside directors are important in the monitoring of management. Hermalin and Weisbach (1988) additionally find that outsiders are more likely to join a board after a firm performs poorly or leaves an industry, implying there is a need for additional outside guidance when a shift in strategy is required. Ryan and Wiggins (2004) find support for the premise that shareholders' economic interests are best served when the board remains independent. Bebchuk and Weisbach (2010) note that there is a growing body of empirical research indicating that director independence is associated with improved decision-making in a number of decision types.

Therefore, we predict that firms with lower ownership concentration, lower managerial ownership, and lower board independence will have higher agency costs, and as a consequence, they will include warrants in their equity capital raising activities. Thus, we propose the following hypothesis.

H2: Firms with higher agency costs as indicated by lower ownership concentration, lower managerial ownership, and lower board independence will include warrants in their equity capital raising activities.

2.3. Signaling hypothesis

Chemmanur and Fulghieri (1997) theoretically model issuance choice and the signaling mix in the context of the issuance of unit IPOs. They posit that relatively risky firms use unit offerings to signal their true value in an environment characterized by information asymmetry. In their model, insiders have private information about the firm type, while investors do not have access to this information. Their signaling model predicts that firms with higher risk, *ceteris paribus*, will include warrants with equity, whereas low-risk firms will issue equity via IPOs. Extending their model to SEOs offered via the rights method leads to the following hypothesis.

H3: Firms with higher riskiness will include warrants in their equity capital raising activities, *ceteris paribus*.

2.4. Underpricing, proportion of funds to be raised by exercising warrants, and risk

Welch (1989) and Allen and Faulhaber (1989) develop models of information asymmetry between risk-neutral entrepreneurs and investors where underpricing constitutes an efficient signaling device. Schultz (1993) argues that models of underpricing based upon uncertainty and asymmetric information regarding firm value predict higher underpricing for unit offerings than equity offerings, all else being equal.⁷ In the signaling model of Chemmanur and Fulghieri (1997), insiders use three endogenous factors that serve as signals to investors. These are (1) the fraction of equity retained by insiders, (2) the proportion of firm value sold as warrants, and (3) the level of underpricing. The exact signaling mix, in terms of the three signals, chosen by the managers depends upon the level of firm riskiness. Their model predicts that underpricing in IPOs will be greater for firms with higher risk, *ceteris paribus*. Gajewski et al. (2007) find that the underpricing in French SEOs is stronger for units than for equity issuance, irrespective of the issuance method. Chollet and Ginglinger (2001) show that the underpricing is positively related with firm riskiness for unit offerings via public offerings in France. Thus, we expect that underpricing will be stronger for units, as well as standalone warrants, than for equity offerings via rights issues.

Extending this rationale for the issuance of warrants in SEOs via rights offerings leads to the following hypothesis:

H4: Underpricing will be positively related to the riskiness of firms that issue standalone warrants and unit offerings.

Chemmanur and Fulghieri (1997) predict that the proportion of firm value sold as warrants is positively related to firm riskiness, holding constant the fraction of equity retained by insiders. Zingales (1995) argues that the IPO decision is made by pre-IPO owners as a value-maximizing endeavor with the aim of eventually selling the company. Brennan and Franks (1997) support this argument by showing that insider holdings decrease significantly after listing. Thus, we argue that the proportion of funds to be raised by exercising warrants relative to initial stage-financing in SEOs is positively related to firm riskiness, irrespective of insiders' ownership. This leads to the following hypothesis.

H5: The proportion of funds to be raised by exercising warrants in standalone warrants and unit offerings is positively related to firm riskiness.

3. Data and methodology

We identify a clean sample of 98 RWs, 234 RUs, and 504 REs during the period 1997–2008 in Australia that meet the following criteria: announcement dates and end of subscription period dates are available; warrants issued in RWs and RUs can be converted into ordinary shares at the predetermined exercise price; warrants are issued only to ordinary shareholders on a pro rata basis; shareholders have to purchase the warrants at a predetermined price (price of the warrant); RWs, RUs, and REs are not announced simultaneously with other potential contaminating announcements, such as earnings announcements, mergers, takeovers, restructurings, on-market or off-market buybacks, stock dividends, stock splits, private placements, public offerings, convertible bonds, convertible preference shares, and bonus warrants; and share prices are available for the estimation and announcement period.⁸

The announcement dates of standalone warrants, unit offerings, and rights offerings of equity by Australian companies are collected from the Bloomberg, DatAnalysis, and IRESS databases. We use the DatAnalysis database to verify the issue price of the warrant, the exercise price of the warrants to convert into shares, information on underwriting, and the expiry dates of the warrants. The market value of the company, share price data adjusted for dividends, and Australian All Ordinary Share Index data are obtained from the Datastream database. Data on ownership concentration, shareholders' takeover, and other financial data were collected from the DatAnalysis database.⁹

We find that 401 firms made one type of SEO announcement, 122 firms made two announcements, 31 firms made three announcements, 16 firms announced offerings four times, 2 firms announced offerings five times, 3 firms announced six times, and 1 firm announced nine times. Very few firms switched their methods over the sample period. That is, 25 prior RE announcers switched to RUs and 7 prior RE announcers switched to RWs; 38 prior RU announcers switched to REs and 13 prior RU announcers switched to RWs; 11 prior RW announcers switched to REs and 17 prior RW announcers switched to RUs; and finally, 4 firms issued all three types of issues (REs, RUs, and RWs) during the sample period.

Table 1 provides a summary of the composition of our sample, with Panel A providing the year-wise distribution of our sample, Panel B providing a categorization on the basis of industry sectors, and Panel C providing information on underwritten status, renounceability, and the moneyness of warrants. Several features in Table 1 are worthy of note. First, warrants are predominantly issued as SEOs by companies from the resources industry (materials and energy), with 65% of RUs and 71% of RWs, whereas only 42% of REs are from the resources industry. Second, issues with

Table 1. Summary of RE, RU, and RW announcements. This table provides the distribution of the number of standalone rights offerings of equity (REs), rights issue of unit offerings (RUs), and standalone rights offerings of warrants (RWs) announcements made by Australian companies during 1997–2008. Panel A provides information based on a year-wise classification. Panel B provides information on industry sector based on global industry classification standard (GICS). Panel C provides information on underwriting status, renounceability, and the moneyness of the warrants.

Panel A: Year-wise classification

Year	REs	RUs	RWs
1997	30	14	11
1998	33	19	08
1999	37	16	11
2000	18	21	12
2001	41	19	05
2002	34	21	07
2003	55	15	06
2004	44	22	05
2005	44	21	06
2006	44	22	11
2007	59	24	09
2008	65	20	07
Total	504	234	98

Panel B: Industry classification

GICS industry sectors	REs	RUs	RWs
Consumer discretionary	46	10	03
Industrials	51	16	04
Financials	47	14	05
Energy	52	32	11
Consumer staples	26	2	—
Health care	62	25	12
Material	161	120	59
Information technology	40	11	03
Telecommunication services	14	2	01
Utilities	5	2	—
Total	504	234	98

Panel C: Underwriting status, renounceable issues, and out-of-the-money issues

	REs	RUs	RWs
% of fully underwritten issues	60.52	46.58	46.94
% of partially underwritten issues	4.96	11.11	1.02
% of renounceable issues	37.30	17.52	8.16
% of out-of- the- money issues	N/A	75.21	76.53

warrants are less likely to be offered with the option of selling the rights. As can be seen in Panel C of Table 1, only 8% of RWs and 18% of RUs are renounceable, whereas 37% of REs are renounceable.¹⁰ Third, issues with warrants are less likely to be fully underwritten than equity

issues alone. Fourth, only 47% of RWs and 47% of RUs are fully underwritten, whereas 61% of REs are fully underwritten.

Table 2 provides descriptive statistics of the characteristics of our sample firms and the issue details for the three issue subgroups. Table 2 also documents basic nonparametric Mann–Whitney (Kruskal–Wallis) tests for the differences in median values across two (three) subgroups. As can be seen in Table 2, firms with smaller market capitalizations, lower leverage, higher risk (IDYRISK), lower managerial ownership, lesser board independence, lower ownership concentration, lower income, and stronger stock price runup and firms looking for smaller issue proceeds relative to assets tend to choose RWs rather than REs. The results reported in Table 2 also indicate that firms with smaller size, higher risk, lower managerial ownership, lesser board independence, lower ownership concentration, lower leverage, and lower income and firms looking for higher issue proceeds relative to assets tend to choose RUs with lower subscription price discounts rather than REs. Moreover, the means and medians for both runup and earnings are negative for REs, RUs, and RWs. These findings potentially indicate that loss-making firms with poor price runups choose to issue via rights offerings as they may not be able to use earnings or DRPs for investment. Furthermore, the level of discount is significantly lower for RUs than for REs. However, when we calculate the underpricing by incorporating the value of warrants issued consistent with Gajewski et al. (2007), we find that underpricing is stronger for RUs and RWs than for REs.

A comparison of RUs with RWs demonstrates some interesting patterns. In terms of firm risk, size, earnings, managerial ownership, board independence, and ownership concentration, no significant differences exist between these two subgroups. However, these same variables are significantly different from those found in REs. Moreover, RUs and RWs differ only in terms of the absolute and relative issue proceeds, leverage, price runup, level of underpricing, and shareholders' takeover. This potentially indicates that smaller firms with lower price runups intending to raise relatively larger amounts of capital (both in relative and absolute size) at the initial stage of financing choose to issue RUs rather than RWs.

Table 3 shows the Pearson correlation matrix for the key variables used in this article (see Appendix 1 for the key to the variable notations used and definitions). The matrix shows that MV is highly correlated with IDYRISK, OP, AGE, BM, RUNUP, and BIND. TOP20 and BH have a correlation of 0.905 between them. Discount (DISC) is highly correlated with UNDERP, IDYRISK, DEBTRATIO, EPTOSP, and TAKEUP. TAKEUP is highly correlated with MV, OPTOTA, OP, RUNUP, IDYRISK, TOP20, BH, DISC, and EPTOSP.

4. Issuance choice—empirical results

This section examines the issuance choice between RWs, RUs, and REs using a multinomial logistic regression framework. The dependent variable is the issue choice, which takes a value of 0 for an RE, 1 for an RU, and 2 for an RW. The independent variables are LNOPTOTA: the natural logarithm of the ratio of offer proceeds at the initial stage of financing to total assets; TOP20: the proportion of shares held by the top 20 shareholders; BH: the proportion of shares held by blockholders (the sum of who hold 5% or more of shares); MSO: the proportion of shares held by the directors; MSOSQ: square of MSO; BIND: the proportion of independent directors on the board; LAGE: the natural logarithm of the company's age from its listing date; IDYRISK: the idiosyncratic risk as already defined, previously; LMV: the natural logarithm of the market value of the issuing firm 1 month prior to the announcement; LNOP: the natural logarithm of the offer proceeds at the initial stage of financing; RUNUP: the raw return for the 1-year period prior to the announcement date (return from -260 to day -2 , with day 0 being the announcement date); DEBTRATIO: the ratio of total debt to total assets; DRE: a dummy variable that takes a value of unity if the issue is

Table 2. Firm characteristics: RWs, RUs, and Res. This table provides financial characteristics of our sample as well as univariate tests across three groups: standalone rights offering of equity (REs), rights issue of unit offerings (RUs), and standalone rights offering of warrants (RWs). The table also provides nonparametric test statistics Kruskal–Wallis (KW) and Mann–Whitney (MW) for the differences in median values between subgroups. BM: the book-to-market ratio measured, as the ratio of the book value of assets to market value of assets; MV: the market value of the issuing firm 1 month prior to the announcement; OPTOTA: the ratio of the total proceeds at the initial stage of financing to total assets; OP: the offer proceeds at the initial stage of financing; RUNUP: the raw return for 1-year period prior to the announcement date (return from –260 to day –2); IDYRISK: the idiosyncratic risk measured as the standard error of the market model regression of daily stock returns over the period from day –260 to day –61 for each issuing company; TOP20: the proportion of shares held by the top 20 shareholders; BH: the proportion of shares held by blockholders (holders of 5% or more); MSO: the proportion of shares held by the directors; BIND: the proportion of independent directors on the board; DEBTRATIO: the ratio of the total debt to total assets; TA: the total assets; AGE: the company age from its listing date (years); EBITDATOTA: the ratio of earnings before interest, tax, and depreciation to total assets; DISC: the subscription price discount relative to the preannouncement price 2 days prior to the announcement; EPTOSP: the ratio of the exercise price to share price 2 days prior to the announcement; TAKEUP: the actual percentage shareholders' takeup of the issue; and UNDERP: Underpricing incorporating the value of warrants. Takeup information is available only for 478 REs, 205 RUs, and 88 RWs. *Significantly different from zero at the 10% level, **significantly different from zero at the 5% level, and ***significantly different from zero at the 1% level.

		REs	RUs	RWs	KW test	MW test RE vs RW	MW test RU vs RW	MW test RE vs RU
BM	Mean	0.73	0.84	0.80	3.40	0.22	1.25	1.76*
	Median	0.65	0.71	0.63				
MV (\$M)	Mean	68.56	14.77	19.76	31.86***	2.62***	1.52	5.43***
	Median	13.51	7.05	8.77				
OPTOTA	Mean (%)	61.21	68.63	27.62	64.02***	6.27***	7.60***	3.81***
	Median (%)	28.15	38.48	11.91				
OP (\$M)	Mean	12.05	4.05	1.43	159.09***	11.78***	9.67***	5.11***
	Median	3.63	2.64	0.54				
RUNUP	Mean (%)	–15.02	–21.54	–0.51	19.44***	3.88***	4.36***	1.08
	Median (%)	–19.74	–28.32	–2.29				
IDYRISK	Mean (%)	5.52	6.52	6.56	36.55***	4.10***	0.16	5.26***
	Median (%)	5.08	5.98	6.20				
TOP20	Mean (%)	61.33	53.65	55.23	34.83***	3.17***	0.93	5.56***
	Median (%)	61.07	52.74	54.55				
BH	Mean (%)	37.14	28.88	28.85	29.83***	3.51***	0.02	4.87***
	Median (%)	36.10	25.68	25.19				
DEBTRATIO	Mean (%)	14.89	9.83	8.64	33.71***	4.74***	1.67*	4.56***
	Median (%)	3.68	0.21	0.00				
TA (\$M)	Mean	63.23	12.76	14.83	64.76***	5.73***	1.10	6.78***
	Median	13.15	6.61	6.31				
AGE	Mean	13.53	11.99	10.43	2.87	1.53	0.89	0.99
	Median	10.01	8.58	10.34				
DISC	Mean (%)	21.07	18.32	N/A	N/A	N/A	N/A	2.29**
	Median (%)	17.59	14.29					
MSO	Mean (%)	17.34	12.94	10.45	12.80***	3.14***	1.44	2.56**
	Median (%)	10.11	6.99	5.77				
BIND	Mean (%)	46.05	37.33	34.94	26.86***	3.85***	0.90	4.29***
	Median (%)	50.00	33.33	33.33				

Table 2. (Continued)

		REs	RUs	RWs	KW test	MW test RE vs RW	MW test RU vs RW	MW test RE vs RU
EPTOSP	Mean	N/A	1.75	1.75			0.52	
	Median	N/A	1.36	1.25				
EBITDATOTA	Mean (%)	-24.60	-41.10	-31.56	32.20***	2.35**	1.55	5.55***
	Median (%)	-9.15	-18.69	-15.99				
TAKEUP	Mean (%)	63.31	57.18	65.81	7.84**	0.48	2.42**	2.48**
	Median (%)	65.80	55.96	69.38				
UNDERP	Mean (%)	21.07	45.76	53.16	202.32***	9.16***	3.37***	12.59***
	Median (%)	17.59	43.76	67.00				
SAMPLE SIZE		504	234	98				

renounceable and zero otherwise; INDUMMY: dummy variables for each industry classification as per Panel B of Table 1 except for resources (Materials and Energy); LBM: the natural logarithm of the book-to-market ratio, measured as the logarithm of the ratio of the book value of assets to the market value of assets; EBITDATOTA: the ratio of earnings before interest, taxes, and depreciation to total assets; UNDERP: the underpricing; DPRIORRE is a dummy variable that takes a value of unity if the company made prior an RE announcement, and zero otherwise; DPRIORRU is a dummy variable that takes a value of unity if the company had a prior RU announcement, and zero otherwise; and DPRIORRW is a dummy variable that takes a value of unity if the company had a prior RW announcement, and zero otherwise. We provide detail definitions of the variables in Appendix 1 of this article.

Due to multicollinearity problems, we present results for various restricted versions of the multinomial models in Table 4. The coefficient of TOP20 is significantly negative for RUs in all the reported models.¹¹ The coefficient of MSO is significantly negative for RUs in all models when we include it as a linear variable. While the coefficient of the BIND is negative in all models for RUs, it is, however, significantly negative only in models 3 and 7 at the 10% level when we do not include the TOP20 variable or in model 6 at the 1% level when the LMV or LNOP variables are excluded. These results indicate that firms with lower ownership concentration and lower managerial ownership issue RUs rather than REs, thereby providing support for the argument that firms with higher agency costs will choose sequential financing as a means of mitigating these costs.

The coefficient of MSO is significantly negative for RWs in all the models in which we include it as a linear variable.¹² The coefficient of BIND is significantly negative in all models except in model 5 for RWs. The coefficient of the variable TOP20 is significantly negative for RWs only in model 4 when we do not have MSO as an independent variable. In unreported results, we also find similar results for RWs using blockholders (BH) as a proxy for ownership concentration. It appears that low managerial ownership, lesser BIND, and low ownership concentration play similar roles in influencing issuance choice of RWs.

The coefficient of the LBM is significantly positive for RUs at the 1% level and significantly negative for RWs at the 1% level, indicating that firms with higher growth opportunities issue listed RWs, whereas firms with lower growth opportunities issue equity packaged with bonus warrants, potentially as a sweetener. The coefficient of LMV is significantly negative for RUs and RWs, demonstrating that smaller firms choose to issue RUs or RWs rather than REs except for RUs in model 4. The coefficient of LNOP is significantly negative for RUs and RWs, indicating that firms will choose to include warrants in rights offerings when raising small amounts at the

Table 3. Correlation table. This table presents the Pearson correlation matrix of key variables used in this article. The variables are defined as follows: BM: the book-to-market ratio measured, as the ratio of the book value of assets to market value of assets; MV: the market value of the issuing firm 1 month prior to the announcement; OPTOTA: the ratio of the total proceeds at the initial stage of financing to total assets; OP: the offer proceeds at the initial stage of financing; RUNUP: the raw return for 1-year period prior to the announcement date (return from -260 to day -2); IDYRISK: the idiosyncratic risk measured as the standard error of the market model regression of daily stock returns over the period from day -260 to day -61 for each issuing company; TOP20: the proportion of shares held by the top 20 shareholders; BH: the proportion of shares held by blockholders (holders of 5% or more); MSO: the proportion of shares held by the directors; BIND: the proportion of independent directors on the board; DEBTATIO: the ratio of the total debt to total assets; TA: the total assets; AGE: the company age from its listing date (years); EBITDATOTA: the ratio of earnings before interest, tax, and depreciation to total assets; DISC: the subscription price discount relative to the preannouncement price 2 days prior to the announcement; EPTOSP: the ratio of the exercise price to share price 2 days prior to the announcement; TAKEUP: the actual percentage shareholders takeover of the issue; and UNDERP: underpricing incorporating the value of warrants. ^aSignificantly different from zero at the 1% level, ^bsignificantly different from zero at the 5% level, and ^csignificantly different from zero at the 10% level.

	BM	MV	OPTOTA	OP	RUNUP	IDYRISK	TOP20	BH	DEBTATIO	TA	AGE	DISC	MSO	BIND	EPTOSP	EBITDATOTA	TAKEUP
MV	-0.089 ^a																
OPTOTA	-0.257 ^a	-0.044															
OP	-0.072 ^b	0.680 ^a	0.064 ^c														
RUNUP	-0.108 ^a	0.099 ^a	0.104 ^a	0.063 ^c													
IDYRISK	0.117 ^a	-0.241 ^a	0.084 ^b	-0.261 ^a	-0.082 ^b												
TOP20	-0.052	0.042	0.019	0.078 ^b	0.004	0.003											
BH	-0.032	0.080 ^b	0.013	0.128 ^a	0.004	-0.010	0.905 ^c										
DEBTATIO	-0.150 ^a	0.043	0.069 ^b	0.089 ^a	-0.041	0.055	0.304 ^a	0.292 ^a									
TA	-0.001	0.688 ^a	-0.105 ^a	0.721 ^a	0.024	-0.254 ^a	0.038	0.085 ^b	0.143 ^a								
AGE	-0.033	0.115 ^a	-0.019	0.089 ^a	0.053	-0.046	0.033	0.063 ^b	0.076 ^b	0.145 ^a							
DISC	-0.038	-0.048	-0.082 ^b	-0.058	-0.026	0.145 ^a	-0.042	-0.032	-0.090 ^b	-0.044	0.027						
MSO	0.063 ^c	-0.039	-0.025	-0.055	0.021	0.003	0.321 ^a	0.296 ^a	0.044	-0.001	-0.027	-0.003					
BIND	-0.034	0.096 ^a	0.061 ^c	0.165 ^a	-0.025	-0.123 ^a	0.131 ^a	0.118 ^a	0.091 ^a	0.144 ^a	0.056	-0.103 ^a	-0.046				
EPTOSP	0.192 ^a	-0.188 ^a	-0.103 ^c	-0.118 ^b	-0.145 ^a	0.100 ^c	-0.158 ^a	-0.111 ^b	-0.108 ^b	-0.088	0.053	-0.127 ^c	-0.053	-0.064			
EBITDATOTA	0.231 ^a	0.116 ^a	-0.322 ^a	0.125 ^a	0.127 ^a	-0.205 ^a	0.081 ^b	0.089 ^b	-0.014	0.152 ^a	0.020	-0.052	0.119 ^a	0.041	0.034		
TAKEUP	-0.041	0.181 ^a	-0.069 ^c	0.141 ^a	0.196 ^a	-0.175 ^a	0.122 ^a	0.113 ^a	0.004	0.168 ^a	0.032	0.089 ^b	0.054	0.018	-0.132 ^b	0.093 ^b	
UNDERP	0.023	-0.104 ^a	-0.082 ^b	-0.154 ^a	0.092 ^a	0.295 ^a	-0.067 ^c	-0.081 ^b	-0.114 ^a	-0.115 ^a	-0.037	0.738 ^a	-0.072 ^b	-0.148 ^a	-0.214 ^a	-0.123 ^a	0.073 ^c

Table 4. Issue choice. This table provides the results of multi-nominal logistic regression analysis using issue choice as a dependent variable. Issue choice takes the value of 1 for rights issue of unit offerings (RUs), 2 for standalone rights offerings of warrants (RWs), and 0 for standalone rights offering of equity (REs). The independent variables are LNOPTOTA: the natural logarithm of the ratio of offer proceeds at the initial stage financing to total assets; TOP20: the proportion of shares held by the top 20 shareholders; MSO: the proportion of shares held by the directors; MSOSQ: the square of MSO; BIND: the proportion of independent directors on the board; LAGE: the natural logarithm of company age from its listing date; IDYRISK: the idiosyncratic risk measured as the standard error of the market model regression of daily stock returns over the period from day -260 to day -61; LMV: the natural logarithm of the market value 1 month before the announcement date; LNOP: the logarithm of the offer proceeds at the initial stage financing; RUNUP: raw return for 1-year period prior to the announcement date (return from -260 to day -2); DEBTATIO: the ratio of total debt to total assets; DRE: a dummy variable that takes a value of unity if the issue is renounceable, and zero otherwise; INDUMY: industry dummies—dummy variables for each industry classification as per Panel B of Table 1 except for resources (Materials and Energy); LBM: the natural logarithm of the book-to-market ratio measured as the ratio of the book value of assets to the market value of assets; EBITDATOTA: the ratio of earnings before interest, taxes, and depreciation to total assets; UNDERP: discount calculated incorporating the value of warrants; DPRIORRE: a dummy variable that takes a value of unity if the company had prior RE announcement, and zero otherwise; DPRIORRW: a dummy variable that takes a value of unity if the company had a prior RW announcement, and zero otherwise; and DPRIORRU: a dummy variable that takes a value of unity if the company had prior RU announcement, and zero otherwise. Robust test statistics are reported in parenthesis. *Significantly different from zero at the 10% level, **significantly different from zero at the 5% level, and ***significantly different from zero at the 1% level.

	Model 1		Model 2		Model 3		Model 4		Model 5		Model 6		Model 7	
	RU	RW	RU	RW	RU	RW	RU	RW	RU	RW	RU	RW	RU	RW
Constant	1.2688 (2.23)**	-0.8417 (-1.10)	1.2965 (2.20)**	-0.7443 (-0.95)	0.8020 (1.60)	-1.0123 (-1.38)	1.1490 (2.03)**	-1.2551 (-1.68)*	1.1646 (2.12)**	-0.2307 (-0.29)	1.2094 (2.49)**	-2.3648 (-3.67)***	0.6743 (1.35)	-1.2927 (-1.78)*
LNOPTOTA	0.5680 (4.68)***	-1.3973 (-7.04)***	0.5679 (4.68)***	-1.3911 (-6.98)***	0.5674 (4.70)***	-1.4032 (-6.96)***	0.5814 (4.80)***	-1.2976 (-6.21)***	0.6913 (5.74)***	-0.5559 (-2.46)**	0.4132 (3.81)**	-1.3371 (-7.12)***	0.5917 (4.75)***	-1.4737 (-6.73)***
TOP20	-1.1896 (-1.94)*	-0.4283 (-0.45)	-1.1912 (-1.95)*	-0.4344 (-0.46)	-1.1523 (-1.5123)	-1.5629 (-2.74)***	-1.5016 (-1.70)*	-1.1249 (-1.83)*	-1.1249 (-1.83)*	0.3013 (0.29)	-1.0498 (-1.88)*	-0.3789 (-0.44)	-0.3789 (-0.44)	-0.3789 (-0.44)
MSO	-1.1317 (-1.79)*	-4.2796 (-3.42)***	-1.3955 (-0.92)	-5.3280 (-2.03)**	-1.5123 (-2.54)**	-4.4103 (-3.66)***	-1.5016 (-1.70)*	-1.1249 (-1.83)*	-1.1249 (-1.83)*	-5.6522 (-3.58)***	-0.9639 (-1.68)*	-4.1348 (-3.54)***	-1.3604 (-2.28)**	-4.7870 (-3.95)***
MSOSQ														
BIND	-0.6275 (-1.61)	-1.6455 (-2.37)**	-0.6356 (-1.62)	-1.6653 (-2.39)**	-0.7279 (-1.87)*	-1.6684 (-2.45)**	-0.5720 (-1.47)	-1.3266 (-2.05)**	-0.5420 (-1.36)	-1.0409 (-1.47)	-0.9569 (-2.80)***	-1.9410 (-2.98)***	-0.7291 (-1.89)*	-1.8407 (-2.54)**
LAGE	-0.0568 (-0.54)	-0.3346 (-2.30)**	-0.0600 (-0.56)	-0.3422 (-2.41)**	-0.0378 (-0.37)	-0.3295 (-2.27)**	-0.0449 (-0.43)	-0.2223 (-1.73)*	-0.0702 (-0.66)	-0.2864 (-1.74)*	-0.0694 (-1.73)*	-0.4380 (-3.19)***	0.0306 (0.28)	-0.1749 (-1.19)
IDYRISK	-8.7120 (-2.09)**	-2.8407 (-0.47)	-8.7123 (-2.09)**	-2.9535 (-0.49)	-9.6483 (-2.34)**	-3.2519 (-0.54)	-7.9938 (-1.97)**	-1.5603 (-0.27)	-8.5594 (-2.05)**	-8.1782 (-1.23)	7.9928 (2.20)**	14.9867 (3.52)***	-9.9932 (-2.46)**	-0.0852 (-0.01)
LMV	-0.1889 (-1.85)*	-0.7478 (-3.78)***	-0.1890 (-1.86)*	-0.7510 (-3.80)***	-0.2059 (-2.06)**	-0.7582 (-3.80)***	-0.1530 (-1.54)	-0.6770 (-3.52)***					-0.1686 (-1.68)*	-0.7164 (-3.58)***

(Continued)

Table 4. (Continued)

	Model 1		Model 2		Model 3		Model 4		Model 5		Model 6		Model 7	
	RU	RW	RU	RW	RU	RW	RU	RW	RU	RW	RU	RW	RU	RW
LNOP														
RUNUP	-0.1807 (-1.34)	0.8951 (5.31)***	-0.1806 (-1.34)	0.8972 (5.31)***	-0.1783 (-1.32)	0.9025 (5.33)***	-0.2104 (-1.61)	0.8011 (5.05)***	-0.2151 (-1.92)*	-1.6670 (-7.23)***	-0.0863 (-0.77)	0.7313 (5.07)***	-0.1582 (-1.17)	0.9950 (5.81)***
DEBTRATIO	0.6876 (1.49)	0.3603 (0.40)	0.6848 (1.49)	0.3418 (0.38)	0.4538 (1.01)	0.2742 (0.30)	0.7781 (1.72)*	0.4162 (0.45)	0.7698 (1.66)*	1.5070 (1.78)*	0.0719 (0.16)	-0.2252 (-0.25)	0.4232 (0.95)	0.2482 (0.27)
DRE	-0.7737 (-3.07)***	-1.3872 (-3.11)***	-0.7740 (-3.07)***	-1.3925 (-3.12)***	-0.8507 (-3.44)***	-1.4148 (-3.03)***	-0.7670 (-3.04)***	-1.3212 (-2.99)***	-0.7623 (-3.04)***	-0.7879 (-1.49)	-0.7858 (-3.46)***	-1.7307 (-3.47)***	-0.8432 (-3.25)***	-1.3905 (-2.98)***
LBM	0.5780 (3.31)***	-1.2887 (-4.49)***	0.5790 (3.31)***	-1.2866 (-4.50)***	0.5880 (3.34)***	-1.2961 (-4.52)***	0.6009 (3.46)***	-1.1512 (-4.19)***	0.6765 (3.98)***	-0.7117 (-2.91)***	0.5463 (3.69)***	-0.9347 (-4.02)***	0.6212 (3.43)***	-1.3138 (-4.48)***
EBITDATOTA	0.0279 (0.13)	-0.0044 (-0.01)	0.0267 (0.13)	0.0030 (0.01)	0.0175 (0.08)	-0.0084 (-0.03)	-0.0045 (-0.02)	-0.1327 (-0.44)	0.0749 (0.35)	0.3835 (1.32)	-0.2185 (-1.29)	-0.4104 (-1.20)	-0.0138 (-0.07)	-0.1893 (-0.62)
UNDERP	4.8398 (10.02)***	3.0580 (3.52)***	4.8420 (10.05)***	3.0806 (3.58)***	4.8008 (10.07)***	3.0297 (3.51)***	4.8652 (10.03)***	3.2567 (3.88)***	4.9126 (9.79)***	2.4110 (2.71)***			4.8395 (10.09)***	2.9507 (3.37)***
INDDUMMY	yes	yes	yes	Yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
DPRIORRE													-0.9383 (-3.16)***	-1.6655 (-2.75)***
DPRIORRU													0.0843 (0.30)	-0.6518 (-1.46)
DPRIORRW													0.7255 (1.56)	-0.5805 (-0.92)
LR χ^2	500.28		500.46		496.40		489.84		550.68		343.90		524.93	
p-value	0.0000		0.0000		0.0000		0.0000		0.0000		0.0000		0.0000	
Pseudo R ²	0.3407		0.3408		0.3381		0.3324		0.3750		0.2286		0.3575	

announcement of the initial stage of financing. The coefficient of LNOPTOTA, a proxy for the relative issue size, is significantly positive for RUs at the 1% level and significantly negative for RWs at the 1% level. Firms making relatively large size issues choose RUs over REs but prefer REs to RWs. The coefficient of LAGE is significantly negative for RWs in all models except in model 7. The coefficient of LAGE is insignificant for RUs. The coefficient of RUNUP is significantly positive for the issue choice of RWs and insignificant for the choice of RUs. The DEBTRATIO variable does not have any impact on the issuance choice when we control for size and MSO. EBITDATOTA does not have a significant impact on issuance choice. These results provide empirical evidence to indicate that smaller and younger firms with higher growth opportunities issue standalone warrants when they need to raise smaller amount of funds in absolute size as well as relative to their assets in place. However, by contrast, smaller firms with lower growth opportunities issue unit offerings when they need to raise larger amount of funds relative to their assets in place. These firms are potentially issuing warrants packaged with equity as a sweetener to counteract their relatively low growth opportunities.

The coefficient of the UNDERP takes a significantly positive sign for RWs and RUs, indicating that the level of underpricing is stronger for firms issuing warrants as either standalone warrants (RWs) or units as a package with equity (RUs). The coefficient of the IDYRISK variable, a proxy for risk, is significantly negative for RUs and insignificant for RWs in the models which include the UNDERP and LMV variables. These results are not consistent with the findings in Table 2 which show that IDYRISK is stronger for RUs and RWs than for REs. When we exclude the variables UNDERP and LMV in model 6, the coefficient of IDYRISK becomes significantly positive for RUs and RWs. We also find that the coefficient of IDYRISK is significantly positive for both RUs and RWs when we use IDYRISK as the only independent variable.¹³ These findings demonstrate that the impact of risk on the issuance choice disappears after controlling for firm size and underpricing. Since idiosyncratic risk and underpricing are positively related, the inclusion of underpricing inevitably subsumes the impact of idiosyncratic risk. We, therefore, consider this finding as evidence of limited support for the signaling hypothesis. The dummy variable DRE is significantly negative for the issuance choice of RUs and RWs except in Model 5 for RW, indicating that managers who choose these issue types are less likely to provide the option of selling the rights to existing shareholders.

We have also examined the impact of switching the SEO type of issue in the case of multiple announcements by a company during the sample period. We have used the dummy variables DPRIORRE, DPRIORRU, and DPRIORRW in model 7 to capture the impact of prior SEO type announcements. As can be seen in the results for model 7, the coefficient of DPRIORRE is significantly negative for both RUs and RWs, indicating that prior RE announcers are less likely to subsequently issue RUs or RWs. However, the coefficient of DPRIORRU is statistically insignificant, indicating that the prior announcement of RUs does not influence the choice of subsequent RUs or RWs. The coefficient of DPRIORRW is not statistically significant for both RUs and RWs, indicating that prior choice of RWs are not likely to influence issuance choice. Overall, our “switch related” results provide somewhat more support for an underlying agency-based rationale/effect, in that prior RE issuers do not have a marked tendency to subsequently switch to agency cost alleviating RUs and RWs, while those firms using these latter agency relieving methods do not manifest a strong tendency to switch within the warrant-based issue methods.

Overall, we find that smaller firms with lower board independence, lower managerial ownership, higher growth opportunities, and firms which only need limited funds for current requirements relative to assets in place (with further funds raised in the future) will be more likely to issue standalone warrants (RWs). Furthermore, smaller firms with lower ownership concentration, lower managerial ownership, lower growth opportunities, and firms which need larger amounts of funds for current requirements relative to assets in place (with further funds in the future) will be more

likely to issue bonus warrants as a sweetener packaged with equity (RUs). Summing up, our empirical results provide support for Hypotheses 1(a) and 1(b) relating to the proportion of funds to be raised at the initial stage relative to a later stage. Our results also support Hypotheses 2 and 3 concerning the impacts of agency costs and signaling effects upon issuance choice.

5. Underpricing, proportion of funds to be raised by exercising warrants, and risk

The signaling model of Chemmanur and Fulghieri (1997) predicts that issue underpricing will be greater for firms with higher risk, and that the proportion of firm value sold as warrants is positively related to firm riskiness. They assert that although their model is developed in the context of IPOs, it can also explain the issuance of warrants with equity in seasoned offerings. In this section, we extend the predictions of their model to the inclusion of warrants via rights offerings within the structure of the hypotheses developed in Section 2 of this article, in particular, investigating whether underpricing and the proportion of funds to be raised via exercising warrants are positively related to firm riskiness for the issuance of standalone warrants as well as unit offerings.

We examine the impact of risk on underpricing and the proportion of funds to be raised via exercising warrants, controlling for the following variables: the natural logarithm of relative issue size at the initial stage of financing (LNOPTOTA), the natural logarithm of the market value 1 month prior to the announcement (LMV), the natural logarithm of the ratio of funds to be received by exercising the warrants to the initial stage of financing (LNEWTOIF), the logarithm of the book-to-market ratio (LBM), the proportion of managerial ownership (MSO), board independence (BIND), ownership concentration (TOP20), the ratio of warrants issued to current shares outstanding (WIES), the ratio of shares issued to current shares outstanding (SIES), and the ratio of warrants issued to new shares issued (WISI). As before, multicollinearity issues meant that a number of control variables could not be included simultaneously in the various models reported, and as before, the results arising from estimating various restricted model versions are reported in Table 5 for the relation between underpricing and risk and in Table 6 for the relation between the proportion of funds to be raised via exercising warrants and risk.

The key result of Panel A of Table 5 is that the level of underpricing is significantly and positively related to idiosyncratic risk for RUs in all models reported. This finding provides strong support for our prediction that underpricing will be positively related to risk as posited in Hypothesis 4 in Section 2.4. LNEWTOIF has a positive and significant impact on underpricing for RUs. Firms which are expected to raise more funds upon exercise of warrants relative to initial financing are underpriced to a greater degree. LBM has a negative impact on underpricing for RUs in models A1 and A2; however, the significance level disappears when we control for LMV in model A3 or control for SIES and WISI in model A4. LBM has a significantly negative impact on underpricing for RWs in model B1; however, the significance level disappears when we control for MSO, BIND, and TOP20. MSO has a positive and significant effect on underpricing for RUs. It appears that higher managerial ownership, signifying lower agency costs, does not reduce underpricing. WISI also has a strong positive effect on underpricing on RUs. As warrants are issued free of charge, RUs with large WISI are subject to more underpricing.

For RWs, we find that, once again, idiosyncratic risk has a positive effect on underpricing, thereby providing support for the predictions contained in Hypothesis 4. Furthermore, LNOPTOTA has a negative coefficient suggesting that raising more money at the initial stage is not penalized with a higher degree of underpricing. In fact, the results suggest the opposite, that is, raising more money relative to total assets at the initial stage results in a lower degree of underpricing. The TOP20 variable has a positive and significant effect upon underpricing for RWs, indicating that

Table 5. Underpricing and risk. This table provides tobit regression results on the relation between the underpricing (UNDERP) and risk for RUs and RWs. The dependent variable is underpricing calculated incorporating the value of warrants. Independent variables are IDYRISK: the idiosyncratic risk measured as the standard error of the market model regression of daily stock returns over the period from day -260 to day -61; LNOPTOTA: the natural logarithm of the ratio of offer proceeds at the initial stage financing to total assets; LMV: the natural logarithm of the market value 1 month before the announcement date; LNEWTOTF: the natural logarithm of the ratio of funds to be received by exercising the warrants to the initial stage of financing; LBM: the natural logarithm of the book-to-market ratio measured as the book value of assets to the market value of assets; MSO: the proportion of shares held by the directors; BIND: the proportion of independent directors on the board; TOP20: the proportion of shares held by top 20 shareholders; WIES: the ratio of warrants issued to current shares outstanding; SIES: the ratio of shares issued to current shares outstanding; and WISI: the ratio of warrants issued to new shares issued. Panel A provides the results for rights issue of unit offerings (RUs). Panel B provides the results for standalone rights offering of warrants (RWs). Robust test statistics are reported in parenthesis. *Significantly different from zero at the 10% level, **significantly different from zero at the 5% level, and ***significantly different from zero at the 1% level.

	Panel A—RUs					Panel B—RWs				
	A1	A2	A3	A4	A5	B1	B2	B3	B4	B5
Constant	0.1035 (1.94)*	0.1202 (1.83)*	0.1290 (1.36)	-0.0303 (-0.47)	-0.0964 (-1.83)*	-0.2019 (-1.05)	-0.5366 (-1.77)*	-0.5254 (-1.81)*	0.1664 (0.75)	0.5155 (4.41)***
IDYRISK	3.7863 (5.87)***	3.8919 (6.32)***	3.9325 (5.95)***	3.6196 (6.68)***	3.7132 (6.30)***	5.4417 (3.03)***	4.5511 (2.61)**	2.9028 (1.74)*	3.3713 (2.32)**	3.9549 (2.46)**
LNOPTOTA	-0.0366 (-1.95)*	-0.0365 (-1.90)*				-0.1799 (-3.90)***	-0.1799 (-3.81)***			
LMV			0.0123 (0.62)					0.1226 (3.25)***		
LNEWTOTF	0.0738 (3.75)***	0.0685 (3.36)***	0.0769 (3.57)***			-0.0400 (-1.21)	-0.0162 (-0.50)	0.0683 (1.86)*		
LBM	-0.0573 (-2.53)**	-0.0599 (-2.53)**	-0.0318 (-1.53)	-0.0274 (-1.50)		-0.1369 (-1.75)*	-0.1059 (-1.25)	0.0925 (0.92)	0.0535 (0.59)	

(Continued)

Table 5. (Continued)

	Panel A—RUs					Panel B—RWs				
	A1	A2	A3	A4	A5	B1	B2	B3	B4	B5
MSO		0.2414 (2.51)**	0.2424 (2.30)**	0.1481 (1.65)*			-0.2590 (-0.84)	0.1066 (0.29)	-0.0281 (-0.09)	
BIND		-0.0541 (-0.77)	-0.0565 (-0.81)	-0.0945 (-1.60)			-0.0639 (-0.45)	0.0538 (0.36)	-0.0019 (-0.01)	
TOP20		-0.0638 (-0.74)	-0.0529 (-0.60)	-0.1200 (-1.53)			0.6777 (2.09)**	0.5993 (1.76)*	0.8205 (2.23)**	
SIES				0.0724 (1.57)	0.0500 (1.11)					
WISI				0.3165 (6.07)***	0.3195 (6.43)***					
WIES									-0.5508 (-2.73)***	-0.4890 (-2.25)**
DFU	0.0476 (1.67)*	0.0377 (1.32)	0.0414 (1.44)	0.0470 (1.74)*	0.0582 (2.12)**	0.0193 (0.19)	0.0214 (0.21)	-0.0162 (-0.15)	0.0260 (0.26)	0.0117 (0.12)
LR χ^2	80.87	83.98	79.59	114.21	108.08	17.35	21.55	12.12	16.26	9.64
p-value	0.0000	0.0000	0.0000	0.0000	0.0000	0.0001	0.0003	0.0056	0.0291	0.0330

Table 6. Ratio of funds to be raised by exercising warrants to initial stage financing and risk. This table provides cross-sectional regression results on the relation between the ratio of funds to be raised by exercising warrants to initial stage of financing (LNEWTOIF) and risk. Panel A provides the results for rights issue of unit offerings (RUs). Panel B provides the results for standalone rights offering of warrants (RWs). The dependent variable used in this regression is the natural logarithm of the ratio of funds to be raised by exercising warrants to initial stage of financing. Independent variables are IDYRISK: the idiosyncratic risk measured as the standard error of the market model regression of daily stock returns over the period from day -260 to day -61; MSO: the proportion of shares held by the directors; TOP20: the proportion of shares held by the top 20 shareholders; LMV: the logarithm of the market value 1 month prior to the announcement; LNOPTOTA: the natural logarithm of the ratio of offer proceeds at the initial stage financing to total assets; BIND: the proportion of independent directors on the board; LBM: the natural logarithm of the book-to-market ratio measured as the book value of assets to the market value of assets; WIES: the ratio of warrants issued to current shares outstanding; SIES: the ratio of shares issued to current shares outstanding; and WISI: the ratio of warrants issued to new shares issued. Robust test statistics are reported in parenthesis. *Significantly different from zero at the 10% level, **significantly different from zero at the 5% level, and ***significantly different from zero at the 1% level.

	Panel A—RUs					Panel B—RWs									
	A1	A2	A3	A4	A5	A6	A7	B1	B2	B3	B4	B5	B6	B7	
Constant	0.0153 (0.12)	0.4124 (2.45)**	1.1877 (5.89)***	0.9834 (4.68)***	0.9708 (4.62)***	0.9295 (4.25)***	-0.5559 (-3.05)***	2.6462 (9.53)***	3.4110 (8.19)***	4.3548 (9.90)***	3.9265 (8.18)***	3.5931 (7.38)***	3.6068 (7.45)***	2.7415 (6.25)***	
IDYRISK	4.6916 (2.85)***	5.5802 (3.70)***	2.4457 (1.74)*	2.8005 (2.03)**	2.9854 (2.16)**	3.1987 (2.31)**	3.5500 (3.09)***	15.5047 (3.98)***	16.6429 (4.60)***	11.4880 (2.82)**	12.5877 (2.87)***	13.7149 (3.04)***	13.6967 (3.03)***	14.0911 (3.89)***	
MSO	0.0099 (0.02)	0.2533 (0.61)	-0.1223 (-0.32)	-0.1397 (-0.36)	-0.1475 (-0.38)	-0.0891 (-0.23)	-0.2150 (-0.78)	-0.5697 (-0.73)	-0.1628 (-0.21)	-0.4373 (-0.70)	-0.7112 (-1.13)	-0.7581 (-1.11)	-0.7857 (-1.21)	0.0617 (0.09)	
TOP20		-0.9040 (-3.32)***	-0.9269 (-3.57)***	-0.8194 (-3.11)***	-0.7852 (-2.83)***	-0.8239 (-2.94)***	-0.7397 (-3.18)***		-1.6059 (-2.25)**	-0.9609 (-1.34)	-0.7739 (-1.08)	-0.9747 (-1.38)	-0.9612 (-1.40)	-2.1663 (-3.07)***	
LMV			-0.2449 (-4.87)***	-0.2556 (-4.96)***	-0.2415 (-4.45)***	-0.2262 (-4.16)***				-0.4097 (-3.54)***	-0.4094 (-3.53)***	-0.4575 (-3.90)***	-0.4575 (-3.92)***		
LNOPTOTA				-0.1595 (-3.48)***	-0.1367 (-2.41)**	-0.1382 (-2.44)**					-0.1310 (-1.87)*	-0.2590 (-2.95)***	-0.2625 (-2.86)***		
LBM					0.0553 (0.68)	0.0679 (0.81)	0.2063 (3.68)***					-0.3507 (-2.24)**	-0.3536 (-2.22)**	0.0280 (0.27)	
BIND						0.0355 (0.19)	-0.0971 (-0.56)						-0.0754 (-0.17)	0.2790 (0.73)	
SIES							0.1775 (1.34)								
WISI							1.3741 (9.04)***								
WIES														1.7419 (4.83)***	
Adj. R ²	0.0250	0.0660	0.1523	0.1950	0.1934	0.1901	0.4130	0.1107	0.1550	0.2647	0.2805	0.3131	0.3057	0.3065	
F-statistics	4.08	7.00	10.70	10.89	9.60	8.36	19.06	8.01	7.95	12.95	10.58	8.94	7.85	7.64	
p-value	0.0182	0.0002	0.0000	0.0000	0.0000	0.0000	0.0000	0.0006	0.0001	0.0000	0.0000	0.0000	0.0000	0.0000	

underpricing occurs for firms with higher ownership concentration to a greater extent. Interestingly, WIES has a negative coefficient which suggests that firms issuing more warrants (listed in the ASX) per share suffer less underpricing.

As can be seen in Table 6, the proportion of funds to be raised by exercising warrants is significantly and positively related to IDYRISK for both RUs and RWs in all models reported. This outcome provides support for our prediction that the proportion of funds to be raised by exercising warrants will be positively related to risk as posited in Hypothesis 5. TOP20 has a significantly negative impact on the proportion of funds to be raised by exercising warrants for RUs, indicating that blockholders favor more initial stage financing than inclusion of bonus warrants. Given that RUs have relatively lower growth opportunities, it appears that blockholders act to mitigate agency problems. The significantly negative coefficient on the LMV variable indicates that smaller firms tend to raise relatively more funds from warrants exercise relative to larger firms. LNOPTOTA is also negative and significant, indicating that the greater the amount of money raised in the initial stage, the lesser the amount raised from exercising the warrants. LBM has a positive coefficient for RUs, but is negative for RWs. That is, firms issuing RWs with higher growth opportunities raise higher proportions of funds by exercising warrants. In the case of RUs, firms with lower growth opportunities raise relatively more money from exercising warrants. WISI has positive effect for RUs, and WIES has positive impact on RWs indicating the effect of having more warrants in the issuance on funds raised. Overall, we find strong support for Hypothesis 5 which was developed on the basis of extending the original Chemmanur and Fulghieri (1997) model.

6. Price reactions

This section examines the market reactions to the announcements of RWs, RUs, and REs for the 3-day announcement period and the rights offering period from the day before the announcement period to the end of the subscription period.

6.1. Event study framework

An event study framework is employed to examine the price reactions to the announcements of RWs, RUs, and REs, with the daily returns measured in logarithmic form adjusted for dividends and capital structure changes. Following Balachandran et al. (2008), we employ ex-rights date adjustment factors provided by the ASX to adjust the share prices used to calculate returns. For both renounceable and non-renounceable rights issues, this ex-rights day adjustment imputes the intrinsic value of the right. Abnormal returns are generated for the full period from the day before the announcement date to the end of the subscription period (day $-A1$ to day $C0$), the day before the announcement date to the day after the announcement (denoted as day $-A1$ to day $+A1$), and post announcement period from 2 days after the announcement period to the last day of the subscription period, using the market model as the return generating process. The estimation period used in this study runs from 260 to 61 days prior to the announcement day (i.e. day -260 to day -61), with the value weighted Australian All Ordinaries Share Index used as the market proxy. The t -test statistic (standardized residual test statistic) employed by Mikkelsen and Partch (1986) and Singh (1997) is used to report the significance levels of the price reactions to the various announcements/events.

6.2. Empirical results on price reactions

Table 7 provides the results on price reactions to the announcements of RWs, RUs, and REs for all event windows. The price reaction to the announcement of REs for the full period (day $-A1$ to day

Table 7. Price reaction to RE, RU, and RW announcements. This table reports the mean and median abnormal returns, and standardized residual test (SRT) for the period from the day before the announcement to the day after the announcement (day -A1 to day +A1), full period from the day before the announcement to the last day for the subscription period (day -A1 to C0), and post announcement period (A + 2 to C0), employing the market model, for the samples of standalone rights offering of equity (REs), rights issue of unit offerings (RUs), and standalone rights offering of warrants (RWs). This table also provides test statistics for the difference in mean abnormal returns between two subgroups. ***Significantly different from zero at the 1% level.

		REs	RUs	RWs	t-test: REs vs RUs	t-test: REs vs RWs	t-test: RUs vs RWs
Day -A1	Mean (%)	-1.73	-2.63	1.99	0.89	-2.66***	-3.05***
to day	Median (%)	-0.52	-0.98	0.48			
+A1	SRT	(-6.38)***	(-7.55)***	(3.02)**			
Day -A1	Mean (%)	-0.49	-7.84	3.31	3.63***	-1.38	-3.02***
to Day	Median (%)	-0.87	-5.61	0.40			
+C0	SRT	(-3.92)***	(-5.41)***	(4.78)***			
Day +A2	Mean (%)	1.24	-5.21	1.31	3.32***	-0.03	-1.91*
to Day	Median (%)	0.49	-4.02	0.29			
+C0	SRT	(1.35)	(-4.71)***	(1.98)**			
	Sample size	504	234	98			

C0) is significantly negative, with average (median) abnormal returns of -0.49% (-0.87%). The price reaction to REs is similarly significantly negative for the 3-day announcement period defined above, with average (median) abnormal returns of -1.73% (-0.52%). The post announcement period price reaction to REs is insignificant.

The price reaction to the announcement of RUs for the full period is significantly negative, with average (median) abnormal returns of -7.84% (-5.61%) and it is also significantly negative for the three day announcement period (average abnormal returns of -2.63%) and post announcement period (average abnormal returns of -5.21%). In contrast to the results for REs and RUs, the price reaction to the announcement of RWs is significantly positive for all periods. *t*-tests between the groups indicate that during the announcement period, RWs experience significantly more positive stock reactions than either RUs or REs. For the full period, both REs and RWs experience more favorable stock price reactions than do RUs, while RUs perform the worst among the three groups analyzed. During the post announcement period, the market reacts negatively to RUs, positively to RWs, and insignificantly to REs. Overall, these results indicate that market does not look favorably upon RUs.

We employ a cross-sectional analysis to examine the factors that determine the price reaction for the full period, the 3-day announcement period and the post announcement period. The independent variables are DRU: a dummy variable, taking a value of unity for a unit offerings only (RU), and zero otherwise; DRW: a dummy variable, taking a value of unity for a standalone warrants, and zero otherwise; DFU: a dummy variable, taking a value of unity for a fully underwritten issue, and zero otherwise; DPU: a dummy variable, taking a value of unity for a partially underwritten issue, and zero otherwise; TAKEUP: the actual percentage of shareholders take up; UNDERP: underpricing; RUNUP: the raw return for the 1-year period prior to the announcement date (return from -260 to day -2); LBM: the natural logarithm of the book-to-market ratio measured as the book value of assets to the market value of assets; LMV: the natural logarithm of the market value 1 month before the announcement date; DRE: a dummy variable that takes a value of

unity if the issue is renounceable, and zero otherwise; LNOPTOTA: the natural logarithm of the ratio offer proceeds at the initial stage financing to total assets; MSO: percentage of managerial ownership; BIND: proportion of independent directors on the board; TOP20: proportion shares held by top 20 shareholders; LAGE: the natural logarithm of the age of the company; DEBT_RATIO: the ratio of total debt to total assets; IDYRISK: idiosyncratic risk; and INDUMMY: dummy variables for each industry classification as per Panel B of Table 1. We also use 3-day announcement period abnormal returns (MMN1P1) as an independent variable in Panel C. The results are reported in Table 8.

Panels A, B, and C present the results for the full, announcement, and post announcement periods, respectively. As can be seen in Panel A, the coefficient of DRU is significantly negative in model A1, indicating that the market reacts more negatively for RUs during the full period. In contrast, the coefficient of DRW is significantly positive in model A1, indicating that the market reacts more positively to RWs. However, when we control for underpricing, the coefficient of DRU becomes insignificant in model A2, as underpricing for RUs is significantly larger in this case than for REs. The coefficient of DRW is positive and significant in both models even after controlling for the impacts of underpricing. Other things being equal, RWs experience more positive returns during the full period. Fully underwritten issues experience positive abnormal returns, *ceteris paribus*. TAKEUP has a positive and statistically significant impact on post announcement and full period returns. RUNUP has a negative impact. DRE is negative in both models indicating that firms making renounceable issues face more negative stock price reactions.

As can be seen in Panel B, DRW, DFU, and TAKEUP are positively related to announcement period abnormal returns. The coefficient of DRU is insignificant in both models B1 and B2, indicating that the market reaction does not vary between REs and RUs during the announcement period. The BIND and TOP20 variables have positive impacts upon announcement period returns, indicating that the reductions in agency costs, as reflected in these variables, have positive stock price effects during the announcement period. These results confirm the insights from prior research that suggests market reactions are more positive when investors believe that they are better protected (Chen, 2015).

As can be seen in Panel C, DFU and TAKEUP are positively related to post announcement period abnormal returns, whereas underpricing and RUNUP are both negatively related to post announcement period abnormal returns. The coefficient of DRU is significantly negative in model C1; however, it disappears when we control for underpricing. The coefficient of DRW is significantly positive in model C2, only when we control for underpricing.

Overall, these findings indicate that the market does not prefer RUs when compared to RWs and REs. We conjecture the following reasons for the adverse market reaction. First, shareholders' takeup is lower for RUs than RWs and REs. Second, we find that firms with lower growth opportunities tend to prefer to issue RUs than REs, whereas firms with higher growth opportunities tend to prefer RWs than REs, controlling for other variables. Finally, firms making RU issues tend to raise a greater proportion of funds initially compared to total funds raised. Given that firms making RUs and RWs both suffer from high agency costs; investors may be punishing RU issuers due to the greater potential for misuse of free cash flows.

7. Conclusion

There is a paucity of empirical research regarding the motivation for the inclusion of warrants in SEOs via rights offerings. We examine this phenomenon from a number of differing perspectives using Australian data. We argue that an agency costs approach suggests that managerial ownership, board independence, and ownership concentration would play important roles in determining the

Table 8. Analysis of price reaction. This table provides cross-sectional regression results explaining the market reaction to the announcement of REs, RUs, and RWs. Panels A, B, and C present the results for the determination of price reaction for full, announcement, and post announcement periods, respectively. Dependent variables in Panels A, B, and C are price reaction for full, announcement, and post announcement periods, respectively. Independent variables are DRU: a dummy variable takes value of one for unit offerings, and zero otherwise; DRW: a dummy variable takes value of one for standalone warrants, and zero otherwise; DFU: a dummy variable takes value of one for fully underwritten issues, and zero otherwise; DPU: a dummy variable takes value of one for partially underwritten issues, and zero otherwise; TAKEUP: the actual percentage shareholders take up of the issue; UNDERP: Underpricing; RUNUP: the raw return for the 1-year period prior to the announcement date (return from -260 to day -2); LBM: the natural logarithm of the book-to-market ratio measured as the book value of assets to the market value of assets; LMV: the natural logarithm of the market value 1 month before the announcement date; DRE: a dummy variable that takes a value of unity if the issue is renounceable, and zero otherwise; LNOPTOTA: the natural logarithm of the ratio of offer proceeds at the initial stage financing to total assets; MSO: the proportion of shares held by the directors; BIND: the proportion of independent directors on the board; TOP20: the proportion of shares held by the top 20 shareholders; LAGE: the natural logarithm of company age from its listing date; DEBT_RATIO: the ratio of total debt to total assets; IDYRISK: the idiosyncratic risk measured as the standard error of the market model regression of daily stock returns over the period from day -260 to day -61; MMNIP1: abnormal return from the day before the announcement date to the day after; INDUMMY: industry dummies—dummy variables for each industry classification as per Panel B of Table 1; and Robust test statistics are reported in parenthesis.

*Significantly different from zero at the 10% level, **significantly different from zero at the 5% level, and

***significantly different from zero at the 1% level.

	Panel A—Full period (day -A1 to day C0)		Panel B—Announcement period (day -A1 to day +A1)		Panel C—Post announcement period (day +A2 to day C0)	
	A1	A2	B1	B2	C1	C2
Constant	-0.1165 (-1.56)	-0.1348 (-1.86)*	-0.0799 (-2.70)***	-0.0850 (-2.80)***	-0.0653 (-0.87)	-0.0839 (-1.14)
DRU	-0.0824 (-3.41)***	-0.0251 (-1.00)	0.0037 (0.31)	0.0195 (1.40)	-0.0848 (-3.71)***	-0.0368 (-1.54)
DRW	0.0916 (2.21)**	0.1462 (3.41)***	0.0528 (2.99)***	0.0679 (3.41)***	0.0578 (1.47)	0.1055 (2.65)***
DFU	0.0679 (3.35)***	0.0764 (3.80)***	0.0180 (1.82)*	0.0204 (2.07)**	0.0563 (2.95)***	0.0642 (3.38)***
DPU	-0.0070 (-0.21)	0.0019 (0.06)	-0.0289 (-1.41)	-0.0264 (-1.31)	0.0115 (0.32)	0.0177 (0.51)
TAKEUP	0.2316 (6.18)***	0.2526 (6.72)***	0.0447 (2.60)***	0.0505 (2.88)***	0.2030 (5.55)***	0.2223 (6.01)***
UNDERP		-0.2239 (-4.74)***		-0.0621 (-2.29)**		-0.1867 (-4.29)***
RUNUP	-0.0490 (-2.37)**	-0.0436 (-2.09)**	-0.0015 (-0.28)	-0.0000 (-0.00)	-0.0481 (-2.47)**	-0.0436 (-2.21)**
LBM	0.0157 (0.85)	0.0050 (0.27)	0.0016 (0.20)	-0.0014 (-0.17)	0.0147 (0.82)	0.0059 (0.32)
LMV	-0.0093 (-0.86)	-0.0104 (-0.98)	-0.0020 (-0.39)	-0.0023 (-0.46)	-0.0080 (-0.79)	-0.0090 (-0.90)
DRE	-0.0512 (-2.16)**	-0.0498 (-2.20)**	-0.0270 (-2.00)**	-0.0267 (-2.02)**	-0.0338 (-1.58)	-0.0338 (-1.62)

(Continued)

Table 8. (Continued)

	Panel A—Full period (day -A1 to day C0)		Panel B—Announcement period (day -A1 to day +A1)		Panel C—Post announcement period (day +A2 to day C0)	
	A1	A2	B1	B2	C1	C2
LNOPTOTA	0.0204 (1.86)*	0.0106 (0.96)	0.0073 (1.38)	0.0046 (0.86)	0.0157 (1.51)	0.0079 (0.74)
MSO	-0.0028 (-0.05)	-0.0249 (-0.41)	-0.0224 (-0.79)	-0.0285 (-1.02)	0.0115 (0.20)	-0.0078 (-0.13)
BIND	0.0118 (0.29)	0.0005 (0.01)	0.0472 (2.20)**	0.0440 (2.06)**	-0.0184 (-0.46)	-0.0259 (-0.67)
TOP20	-0.0209 (-0.37)	-0.0001 (-0.00)	0.0568 (2.05)**	0.0626 (2.25)**	-0.0573 (-1.08)	-0.0377 (-0.72)
LAGE	-0.0058 (-0.60)	-0.0053 (-0.56)	0.0003 (0.05)	0.0004 (0.08)	-0.0060 (-0.65)	-0.0056 (-0.61)
DEBTRATIO	-0.0481 (-0.79)	-0.0772 (-1.31)	-0.0155 (-0.82)	-0.0235 (-1.25)	-0.0382 (-0.63)	-0.0630 (-1.06)
IDYRISK	0.0840 (0.13)	0.6296 (1.02)	-0.1826 (-0.94)	-0.0314 (-0.15)	0.2010 (0.31)	0.6484 (1.01)
MMN1PI					-0.3594 (-4.13)***	-0.4002 (-4.65)***
INDUMMY	yes	yes	yes	yes	yes	yes
Adj R ²	0.1182	0.1549	0.0365	0.0481	0.1179	0.1456
F-statistics	4.40	4.90	2.02	2.04	4.19	4.68
p-value	0.0000	0.0000	0.0024	0.0018	0.0000	0.0000

issuance choice between equity, units, and standalone warrants, via rights offerings method in this article. We extend the signaling model originally developed for the issuance of warrants in IPOs by Chemmanur and Fulghieri (1997) to the inclusion of warrants in rights offerings and thereby provide strong insights into the various motivations and design features for such issues. Additionally, we examine how the market reaction to RWs differs from REs and RUs.

We find that younger and smaller firms with lower board independence, lower managerial ownership, higher growth opportunities, and firms which only need limited funds for current requirement relative to assets in place (with further funds to be issued in the future) will be more likely to issue standalone warrants (RWs) listed on the Australian Securities Exchange. By contrast, smaller firms with lower managerial ownership, relatively lower growth opportunities, lower ownership concentration, and firms which need larger funds for current requirement relative to assets in place (with further funds in the future) will be more likely to issue bonus warrants as a sweetener packaged with equity (RUs). When companies have made the decision to include warrants in their issue, that is as either a standalone warrant or as a package with equity, it is the firms with higher risk that tend to use larger degrees of underpricing and raise larger proportions of funds by exercising warrants. The underpricing effect is stronger for RWs and RUs than it is for REs. The level of underpricing is found to be positively related to firm riskiness and we also find that the proportion of funds to be received by exercising warrants is positively related to the riskiness of the firm.

The market reacts negatively to the announcement of RUs, whereas the reaction is positive to the announcement of RWs. Moreover, underpricing, underwriting status, preannouncement price runup, and shareholders' takeover all play significant roles in explaining the magnitudes of the

market reactions. Since the market reacts adversely to RUs when compared to both REs and RWs during the full period of rights offering process, our findings have implications for managers and regulators in the designing of RUs.

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Notes

1. See, for example, Hansen (1988), Eckbo and Masulis (1992), Kothare (1997), Singh (1997), Heron and Lie (2004), and Ursel (2006) in the United States; Bohren et al. (1997) in Norway; Slovin et al. (2000) in the United Kingdom; Cronqvist and Nilsson (2005) in Sweden; Balachandran et al. (2008), Balachandran et al. (2012), and He et al. (2016) in Australia; and Ginglinger et al. (2013) in France.
2. Suchard (2005) examines the impact of standalone warrants issued during the period 1983–2004 in Australia. However, her study does not examine the issuance choice between equity, units, and standalone warrants.
3. A total of 546 companies raised \$27.4 billion via placements, 260 companies raised \$12.8 billion via rights offerings, 110 companies raised \$1.0 billion via share repurchase plans, and 269 companies raised \$15.6 billion via dividend reinvestment plans in Australia in 2008.
4. Standalone warrants are issued at an issue price which is, on average, 15% of the preannouncement stock price.
5. ASX information paper on Capital Raising in Australia: Experiences and Lessons from the Global Financial Crisis, 29 January 2010.
6. See a brief review on (a) the effectiveness of various internal and external monitoring mechanisms on firm value (Balachandran and Faff, 2016) and (b) the impact of corporate governance on risk and firm value (Balachandran and Faff (2015)).
7. See Faff et al. (2016) for a review of recent work in Asia Pacific Markets on issue underpricing.
8. We identified 56 REs, 11 RUs, and 2 RWs that are announced simultaneously with half-yearly reports, preliminary final reports and annual reports. We have removed these events from our sample.
9. For fully underwritten issues, companies disclose the percentage of shares taken up by shareholders and underwriters separately. We only consider the percentage of shares taken up by shareholders in both underwritten and non-underwritten rights offerings.
10. In the case of renounceable issues, shareholders are able to sell their in-the-money rights if they do not wish to take up the rights. No such selling opportunity exists for non-renounceable right issues.

11. We also find similar results for RUs using the blockholders (BH) variable as a proxy for ownership concentration.
12. We also examine the impact of MSOs on issuance choice using a non-linear MSO variable (to reflect the McConnell and Servaes (1990) findings) and report the results in model 2. The coefficient of MSOSQ is insignificant for both RUs and RWs.
13. These results are not tabulated in order to conserve space.

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Appendix I

Variable name	Definition
AGE	Company age from its listing date (years).
BH	Proportion of shares held by blockholders (sum of holders of 5% or more of shares).
BIND	Proportion of independent directors on the board.
BM	Book-to-market ratio measured, as the ratio of the book value of total assets to market value of assets at the annual balance sheet date immediately prior to the announcement date. Market value of assets = total assets – book value of equity + market value of equity.
DEBTRATIO	Ratio of the total debt to total assets.
DISC	Subscription price discount relative to the preannouncement price 2 days prior to the announcement.
DFU	Dummy variable, taking a value of unity for a fully underwritten issue, and zero otherwise.
DPU	Dummy variable, taking a value of unity for a partially underwritten issue, and zero otherwise.
DRU	Dummy variable, taking a value of unity for unit offerings only (RU), and zero otherwise.
DRW	Dummy variable, taking a value of unity for a standalone warrants, and zero otherwise.
DPRIORRE	Dummy variable that takes a value of unity if the company had prior RE announcement, and zero otherwise.
DPRIORRU	Dummy variable that takes a value of unity if the company had prior RU announcement, and zero otherwise.
DPRIORRW	Dummy variable that takes a value of unity if the company had a prior RW announcement, and zero otherwise.
DRE	Dummy variable that takes a value of unity if the issue is renounceable, and zero otherwise.
EBITDATOTA	Ratio of earnings before interest, tax, and depreciation to total assets.
EPTOSP	Ratio of the exercise price to share price 2 days prior to the announcement.
IDYRISK	Idiosyncratic risk measured as the standard error of the market model regression of daily stock returns over the period from day –260 to day –61 for each issuing company.
INDUMMY	Industry dummies—dummy variables for each industry classification as per Panel B of Table I.
LAGE	Natural logarithm of company's age from its listing date.
LBM	Natural logarithm of the book-to-market ratio measured as the ratio of the book value of assets to the market value of assets.
LMV	Natural logarithm of the market value of the issuing firm 1 month prior to the announcement.
LNEPTOSP	Natural logarithm of the ratio of the exercise price to the share price 2 days before the announcement date.
LNEWTOIF	Natural logarithm of the ratio of funds to be received by exercising the warrants to the initial stage of financing.
LNEPTOSP	Natural logarithm of the ratio of the exercise price to the share price 2 days before the announcement date.
LNOP	Logarithm of the offer proceeds at the initial stage of financing.
LNOPTOTA	Natural logarithm of the ratio of offer proceeds at the initial stage of financing to total assets.

Appendix I. (Continued)

Variable name	Definition
MMNIP1	3-day announcement period price reaction.
MSO	Proportion of shares held by the directors.
MSOSQ	Square of MSO.
MV	Market value of the issuing firm 1 month prior to the announcement.
OP	Offer proceeds at the initial stage of financing
OPTOTA	Ratio of the total proceeds at the initial stage of financing to total assets.
RUNUP	Raw return for one-year period prior to the announcement date (return from -260 to day -2).
SIES	Ratio of shares issued to current shares outstanding.
TA	Total assets.
TAKEUP	Actual percentage of shareholders' takeover of the issue. Following Balachandran et al. (2008), we use shareholder takeover reported by Australian companies as required by the Australian Stock Exchange (ASX) under its disclosure rule for undersubscription. This variable includes shares taken up by existing shareholders, on a proportionate basis, along with any shortfall facility, as well as shares taken as the result of rights purchased under renounceable issues.
TOP20	Proportion of shares held by the top 20 shareholders.
UNDERP	Underpricing. Underpricing for RUs is calculated as "preannouncement share price plus value of warrants associated with a new share issued on an RU minus the subscription price of the new share" divided by "preannouncement share price plus the value of warrants associated with the new share issued." Underpricing for RWs is calculated as value of standalone warrants minus issue price of warrants to value of standalone warrants. Underpricing for REs are the same as issue price discount "preannouncement share price minus subscription price" divided by the preannouncement share price. To calculate the value of warrants first we use Black and Scholes formula to calculate the call option value. Then, we adjust value of call option to account for the dilution that warrants represent. Then, we calculate the value of warrants associated with one share (a) for the existing shares in the case of RWV, and (b) for the existing shares and newly issued shares in the case of RUs.
WIES	Ratio of warrants issued to current shares outstanding.
WISI	Ratio of warrants issued to new shares issued.