How Weights Assigned to Each Valuation Method Impact IPOs Valuation Performance?

Douaa Tizniti[1*] and Mohammed Rachid Aasri[1]

[1]*Faculty of Juridical, Economic and Social Sciences – Souissi, Mohammed V University of Rabat, Rabat, Morocco*

ABSTRACT

We investigate the impact of weights assigned to each valuation method on initial public offerings' valuation performance. Review of existing literature reveals that such valuation performance lacks examination in terms of weights assigned as most studies focus on the valuation method used per se. Accordingly, we compare between individual value estimate and fair value estimate to examine initial public offerings' valuation performance before and after assigning weights. Whereby, underwriters assign a weight between 0% and 100% to individual value estimate produced by each valuation method used in order to reach one fair value estimate. We assess initial public offerings' valuation performance through bias and accuracy valuation errors as well as valuation explainability. Our sample consists of 110 observations associated to initial public offerings conducted on the Moroccan stock exchange between 2004 and 2018. Results reveal that weights assigned to individual value estimate when setting fair value estimate enhance initial public offerings' valuation performance. Specifically, valuation errors decrease while valuation explainability increases. In fact, both optimistic and pessimistic fair value estimate are closer to market price in comparison with individual value estimate. A closer analysis reveals that weights partially absorb valuation optimism and pessimism. Consequently, these weights reduce the extent of both underpricing and overpricing of initial public offerings. We conclude that combining different valuation methods enhance initial public offerings' valuation performance. Additionally, underwriters play an important role when valuing initial public offerings by assigning specific weights to each valuation method that differ from one initial public offering to another.

Keywords: optimism; overpricing; pessimism; underpricing; underwriters.

1. Introduction

Initial public offerings (IPOs) underpricing is a phenomenon extensively and internationally documented. Why issuers deliberately leave money on the table when going public is still considered an IPO puzzle. Theoretically, there are four main explanations for IPOs underpricing: asymmetric information, institutional, ownership and control and last behavioral (Ljungqvist, 2007). Researchers suggest that the understanding of IPOs underpricing is closely related to IPOs valuation and pricing process (Ritter & Welch, 2002; Shiller, 1990).

The valuation and pricing process of IPOs, as described and illustrated by Roosenboom (2012), begins with individual value estimate of all methods used. A weight is then assigned to valuations of each method to reach one fair value estimate. Next, a deliberate price discount is applied to reach the preliminary offer price. Last, positive price updates are incorporated through investors' indications of interests in order to reach the final offer price. These positive price updates allow to recover part of the deliberate discount which is consistent with the partial adjustment phenomenon (Hanley, 1993). For IPOs valuation, various methods are available, whether methods from the intrinsic model or methods from the comparable model. However, while the discounting method is considered a heavy process in terms of time and costs, particularly with regard to estimating free cash flows and the discount rate (Barker, 1999), the multiple method is considered delicate particularly with regard to value derivers, multiples aggregation measure and comparable firms (Baker & Ruback, 1999). Hence, underwriters are subject to a tradeoff between the positive and negative aspects of each valuation method when valuing IPOs (Courteau et al., 2006).

Review of existing literature reveals a major research gap, which is IPOs lack examination in terms of weights' impact on IPOs valuation performance. Therefore, the main objective of the present paper is to investigate the impact of weights assigned to each valuation method on IPOs valuation performance. Namely, whether weights assigned by underwriters to individual value estimate when setting fair value estimate enhance or degrade IPOs valuation performance. Accordingly, we compare between value estimates before weights (individual value estimate) and value estimates after weights (fair value estimate). Whereby, underwriters assign a weight between 0% and 100% to individual value estimate produced by each valuation method used in order to reach one fair value estimate.

Results reveal that weights assigned to individual value estimate when setting fair value estimate enhance IPOs valuation performance. Specifically, valuation errors decrease while valuation explainability increases. A closer analysis reveals that weights reduce the extent of both IPOs underpricing and overpricing. We conclude that combining different valuation methods enhance IPOs valuation performance. Additionally, underwriters play an important role when valuing IPOs by assigning specific weights to each valuation method that differ from one IPO to another. Our study makes two key contributions to IPOs valuation performance literature. First, we provide exclusive comparison of individual value estimate and fair value

estimate in terms of bias and accuracy errors as well as explainability. Second, we show that weights enhance IPOs valuation performance.

The remainder of this paper is organized as follow: section 2 provides an overview of related literature, section 3 presents sample and methodology, section 4 reports empirical results and section 5 highlights main conclusions.

2. Literature review

Papers that investigate the methods used for IPOs valuation document that underwriters rely essentially on a combination of different methods, predominantly discounted cash flows (DCF), dividend discount models (DDM) and multiples (Deloof et al., 2009; Roosenboom, 2007, 2012). This is consistent with the expectation that the fundamental analysis is more powerful when combining valuations of several methods and that one particular method does not fully substitute another, whether in terms of explanatory power (Kaplan & Ruback, 1995) or in terms of corroboration (Courteau et al., 2006). Roosenboom (2007) investigates IPOs valuation and pricing by underwriters in France and discovers that the choice for a particular valuation method depends mainly on three factors: firm characteristics, aggregate stock market returns and aggregate stock market volatility. The paper documents that the DDM is more reliable when valuing older firms from mature industries and with high dividend payments; the DCF is more reliable when aggregate stock market returns are high or when aggregate stock market is relatively volatile; and multiples are more reliable when valuing firms with rapid growth and relatively profitable that operate in the technology industry. Rasheed et al. (2018) conduct a similar analysis in Pakistan and finds consistent results. Cassia et al. (2004) investigate IPOs valuation in Italy using only multiples and argue that the discretion of underwriters gives them the leisure to implicitly influence IPOs valuation and overprice the shares through a biased selection of comparable firms. This argument is later demonstrated for IPOs in France, Germany and Italy by Paleari et al. (2014) and Vismara et al. (2015) who shows that underwriters exclude potential comparable firms that make IPOs seem overvalued.

A survey of IPOs valuation literature enables us to deduce that the valuation performance being examined can be classified into three main groups. First, papers that investigate the absolute performance, where value estimates of one method using different inherent attributes are being compared with each other. Second, papers that investigate the relative performance, where value estimates of two methods or more are being compared with each other. Third, papers that investigate the absolute performance as well as the relative performance. Kim & Ritter (1999) investigate IPOs absolute valuation performance in the US using several comparable multiples and discover that multiples are substantially more accurate when using forecasted numbers instead of historical numbers or numbers without adjustments. The paper argues that underwriters are capable of performing superior fundamental analysis by incorporating additional valuable information about the demand for the IPO when setting the final offer price. Likewise, Deloof et al. (2009) document similar results regarding IPOs in Belgium in terms of both the valuation performance and the important role of underwriters. Studies that investigate

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the IPOs relative valuation performance in different countries using DCF, DDM and multiples predominantly find that all of these methods have a similar accuracy (Berkman et al., 2000; Deloof et al., 2009; Roosenboom, 2012). This is consistent with the study results of Kaplan & Ruback (1995) who investigate the relative valuation performance of highly leveraged transactions (HLT) in the US. This paper includes an analysis for a small sample of eight IPOs and reach consistent results. Furthermore, Berkman et al. (2000) find that the Price-to-Earnings (P/E) multiple using market based or transaction based comparable firms and the DCF using market based beta have the best valuation accuracy. Roosenboom (2012) additionally finds that the most popular methods (DCF, DDM and multiples) have not only a similar accuracy, but also a similar bias and explainability. Contrary to these papers, Tutuncu (2020) investigates IPOs relative valuation performance in Turkey and discovers that the DCF is more biased and less accurate than multiples and that bookbuilding IPOs are more biased and less accurate than fixed price IPOs.

Most of these papers document that underwriters apply a discount to value estimates and relate it to IPOs underpricing and positive initial returns. Through interviews with underwriters, Deloof et al. (2009) discover that IPOs are deliberately underpriced by applying a discount to value estimates. Similarly, Roosenboom (2007, 2012) reports that underwriters apply a discount to fair value estimate when setting preliminary offer price and that part of this discount is recovered through positive price updates while the other part of the discount remains and contributes to IPO underpricing. Contrarily, Paleari et al. (2014) and Vismara et al. (2015) document that the discount does not fully offset the optimistic bias and leaves IPOs overpriced, while Tutuncu (2020) shows that the deliberate discount depends mainly on the optimistic valuation bias and does not lead to significant initial returns as expected by IPOs underpricing theories. Tizniti & Aasri (2021a, 2021b) introduce a new approach and show that discounts enhance IPOs valuation performance. These researchers reveal that the discount applied to fair value estimate when setting the final offer price is composed of two components: a justified part qualified as warranted discount and an unjustified part qualified as unwarranted discount. Tizniti & Aasri (2021a, 2021b) document that warranted discounts enhance IPOs valuation performance while unwarranted discounts increase IPOs underpricing.

3. Sample and methodology

Our sample consists of 39 IPOs conducted on the Casablanca stock exchange, the only stock exchange in Morocco, over a period of 15 years (from 2004 to 2018). This is the equivalent of 110 value estimates. Since the creation of the stock exchange in 1929, 75 IPOs were conducted. Due to this limited number of IPOs, no particular selection criteria is applied for the construction of our sample.

All of our data is hand collected. Data about individual value estimate, fair value estimate and weights assigned to each valuation method are hand collected from the prospectus and technical results available online on the website of the stock exchange. IPOs with missing prospectus or with no details on the valuation process are omitted from our study. Hence, leaving our sample

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at a number of 39 IPOs. The IPO prospectus is reviewed and approved by the market regulator as well as the stock exchange before made public. The technical results is a document prepared by the stock exchange and made public on its website after the IPO. Data about market is also hand collected from the stock exchange website.

Consistent with previous studies, we use both 1st day closing market price as well as the average 1st month closing market price (Berkman et al., 2000; Deloof et al., 2009; Kim & Ritter, 1999; Roosenboom, 2012; Tutuncu, 2020). In fact, the Moroccan stock exchange applies a volatility limit of 10% for newly listed equities during the first five trading sessions. This is consistent with Ljungqvist (2007) who suggests the examination of IPOs market price over a longer period in less developed markets or in the presence of daily volatility limits. Hence, we use both market prices, where the results of one market price serves to corroborate the results of the other market price. As both market prices lead to the same conclusions, we report results using only the average 1st month market price. Results using 1st day market price are available upon request to authors.

The relative superiority of a valuation performance with another is determined through the examination of the valuation error bias, the valuation error accuracy and the valuation explainability. In this context, the term error is not considered in its strict sense, rather it is a quantitative indication of the distance between value estimate and market price (Deloof et al., 2009). Consequently, the best value estimate is the closest to market price, hence with the least valuation error bias and accuracy and with a strong explainability.

$$\text{Valuation error bias} = (\text{value estimate} - \text{market price}) / \text{market price} \quad \textbf{(1)}$$
$$\text{Valuation error accuracy} = | \text{value estimate} - \text{market price} | / \text{market price} \quad \textbf{(2)}$$
$$\text{Valuation explainability: } \text{Ln (market price)} = \beta_0 + \beta_1 \text{Ln (value estimate)} + \varepsilon_i \quad \textbf{(3)}$$

Unless otherwise stated, we construct our analysis based on the median instead of the mean, as it is more robust to outliers. This is consistent with Dittmann & Maug (2008) who suggest to report the median when using the percentage error measure.

4. Results

Examining the general valuation errors lead to different results. Table 1 reveals that there is no statistically significant difference between individual value estimate (-2,87%) and fair value estimate (-1,23%). These results suggest that weights assigned to individual value estimate when setting fair value estimate do not impact IPOs valuation performance. However, table 2 reveals that fair value estimate (14,25%) is more accurate than individual value estimate (21,24%), which indicates that fair value estimate is closer to market price in comparison with individual value estimate. These results suggest that weights assigned to individual value estimate when setting fair value estimate decrease valuation errors. Consequently, weights enhance IPOs valuation performance. Central tendency, which refers to the percentage of

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observations with an error less than 15%, further supports this latter suggestion as fair value estimate (51,28%) have more central tendency than individual value estimate (40,91%).

Table 1 : Valuation error bias

		N	Mean	Std. dev	25th per	50th per	75th per	Min	Max
• General valuation error bias									
Individual Value Estimate		110	-,93	29,35	-22,63	-2,87	18,92	-57,86	151,01
Fair Value Estimate		39	-,98	20,80	-12,08	-1,23	16,82	-49,45	32,40
• Specific valuation error bias									
Individual Value	Optimistic	50	23,74***	22,47	9,49	21,00***	31,93	2,81	151,01
Estimate	Pessimistic	60	-21,48***	15,05	-31,38	-21,39***	-7,64	-57,86	-,68
Fair Value	Optimistic	19	16,22***	8,46	10,23	16,82***	19,35	2,81	32,40
Estimate	Pessimistic	20	-17,33***	14,84	-30,72	-10,13***	-5,84	-49,45	-1,23

Except N, all figures are in percent (%). Significance is tested using t-test for means and sign rank test for medians. ***, ** and * denote statistical significance at 1%, 5% and 10% levels.
Source: Authors' computation

Table 2 : Valuation error accuracy

		N	Mean	Std. dev	Ctl. tendency	25th per	50th per	75th per	Min	Max
• General valuation error accuracy										
Individual Value Estimate		110	22,51***	18,73	40,91	8,80	21,24***	31,46	,68	151,01
Fair Value Estimate		39	16,79***	12,02	51,28	6,78	14,25***	26,59	1,23	49,45
• Specific valuation error accuracy										
Individual	Optimistic	50	23,74*a	22,47	41,67	9,49	21,00**a	31,93	2,81	151,01
Value Estimate	Pessimistic	60	21,48*a	15,05	40,00	7,64	21,39**a	31,38	,68	57,86
Fair Value	Optimistic	19	16,22	8,46	42,11	10,23	16,82	19,35	2,81	32,40
Estimate	Pessimistic	20	17,33	14,84	60,00	5,84	10,13	30,72	1,23	49,45

Except N, all figures are in percent (%). Significance is tested using t-test for means and sign rank test for medians. ***, ** and * denote statistical significance at 1%, 5% and 10% levels. [a] denotes statistical significance after introducing ln.
Source: Authors' computation

We believe that the inconsistent results the general valuation errors, bias and accuracy, lead to are due to the confrontation between positive and negative errors. Accordingly, examining the specific valuation errors, bias and accuracy, lead to consistent results. Tables 1 and 2 reveal that valuation errors are more pronounced for both optimistic (21,00%) and pessimistic (21,39%) individual value estimate in comparison with fair value estimate (16,82% and 10,13%). Whereby, both optimistic and pessimistic fair value estimate are less biased and more accurate than individual value estimate. In other words, optimistic and pessimistic fair value estimate are closer to market price in comparison with individual value estimate. In fact,

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optimistic individual value estimate errors (21,00%) are superior than optimistic fair value estimate errors (16,82%). Similarly, pessimistic individual value estimate errors (21,39%) are superior than pessimistic fair value estimate errors (10,13%). These findings suggest that weights assigned to individual value estimate when setting fair value estimate decrease both optimistic and pessimistic valuation errors, which enhances IPOs valuation performance. Hence, weights partially absorb valuation optimism and pessimism. Consequently, these weights reduce the extent of both IPOs underpricing and overpricing.

Table 3 : Valuation explainability

Independent variables :	Market price	
Individual Value Estimate	,9686***	
Fair Value Estimate		1,0495***
Intercept	,2467	-,2740
Adj. R²	,8688***	,9173***
N	110	39

***, ** and * denote statistical significance at 1%, 5% and 10% levels.
Source: Authors' computation

Univariate regression analysis documents consistent results. Table 3 reveals that fair value estimate (Adj. R^2: 91,73%) better explain market price variations than individual value estimate (Adj. R^2: 86,88%). Both results are statistically significant at 1% level and indicate that weights assigned to individual value estimate when setting fair value estimate allow better explanation of market price. Additionally, slopes of both value estimates are significant at 1% level while intercepts are insignificant. Berkman et al. (2000) and Roosenboom (2012) explain that slope should equal one and intercept zero if valuations are unbiased and accurate. Hence, results reveal that fair value estimate is less biased and more accurate than individual value estimate. These findings further indicate that weights assigned decrease valuation errors, which enhances IPOs valuation performance.

5. Conclusion

In the present study, we investigate the impact of weights assigned to each valuation method on IPOs valuation performance. Accordingly, we compare between individual value estimate and fair value estimate to examine IPOs valuation performance before and after assigning weights. Whereby, underwriters assign a weight between 0% and 100% to individual value estimate produced by each valuation method used in order to reach one fair value estimate. Results reveal that weights assigned to individual value estimate when setting fair value estimate enhance IPOs valuation performance. Specifically, valuation errors decrease while valuation explainability increases. In fact, both optimistic and pessimistic fair value estimate are closer to market price in comparison with individual value estimate. A closer analysis reveals that weights partially absorb valuation optimism and pessimism. Consequently, these weights reduce the extent of both IPOs underpricing and overpricing. We conclude that

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combining different valuation methods enhance IPOs valuation performance. Additionally, underwriters play an important role when valuing IPOs by assigning specific weights to each valuation method that differ from one IPO to another.

References

Baker, M., & Ruback, R. S. (1999). *Estimating Industry Multiples*. https://www.hbs.edu/faculty/Pages/item.aspx?num=1435

Barker, R. G. (1999). The role of dividends in valuation models used by analysts and fund managers. *European Accounting Review*, *8*(2), 195‑218. https://doi.org/10.1080/096381899335998

Berkman, H., Bradbury, M. E., & Ferguson, J. (2000). The Accuracy of Price-Earnings and Discounted Cash Flow Methods of IPO Equity Valuation. *Journal of International Financial Management & Accounting*, *11*(2), 71‑83. https://doi.org/10.1111/1467-646X.00056

Cassia, L., Paleari, S., & Vismara, S. (2004). *THE VALUATION OF FIRMS LISTED ON THE NUOVO MERCATO : THE PEER COMPARABLES APPROACH*. https://doi.org/10.1016/S1569-3732(04)10005-4

Courteau, L., Kao, J. L., O'Keefe, T., & Richardson, G. D. (2006). *Relative Accuracy and Predictive Ability of Direct Valuation Methods, Price to Aggregate Earnings Method and a Hybrid Approach*. https://doi.org/10.1111/j.1467-629X.2006.00183.x

Deloof, M., Maeseneire, W. D., & Inghelbrecht, K. (2009). How Do Investment Banks Value Initial Public Offerings (IPOs)? *Journal of Business Finance & Accounting*, *36*(1‑2), 130‑160. https://doi.org/10.1111/j.1468-5957.2008.02117.x

Derrien, F., & Womack, K. L. (2003). Auctions vs. Bookbuilding and the Control of Underpricing in Hot IPO Markets. *Review of Financial Studies*, *16*(1), 31‑61. https://doi.org/10.1093/rfs/16.1.0031

Dittmann, I., & Maug, E. G. (2008). *Biases and Error Measures : How to Compare Valuation Methods*. https://doi.org/10.2139/ssrn.947436

Hanley, K. (1993). The underpricing of initial public offerings and the partial adjustment phenomenon. *Journal of Financial Economics*, *34*(2), 231‑250. https://doi.org/10.1016/0304-405X(93)90019-8

Kaplan, S. N., & Ruback, R. S. (1995). *The Valuation of Cash Flow Forecasts : An Empirical Analysis*. https://doi.org/10.3386/w4724

Kim, M., & Ritter, J. (1999). Valuing IPOs. *Journal of Financial Economics*, *53*(3), 409‑437. https://doi.org/10.1016/S0304-405X(99)00027-6

Ljungqvist, A. (2007). *IPO Underpricing : A Survey*. https://papers.ssrn.com/abstract=609422

Ljungqvist, A. P., Jenkinson, T., & Wilhelm, W. J. (2003). Global Integration in Primary Equity Markets : The Role of U.S. Banks and U.S. Investors. *The Review of Financial Studies*, *16*(1), 63‑99. https://doi.org/10.1093/rfs/16.1.0063

Paleari, S., Signori, A., & Vismara, S. (2014). How Do Underwriters Select Peers When Valuing IPOs? *Financial Management*, *43*(4), 731‑755. https://doi.org/10.1111/fima.12060

Rasheed, A., Sohail, M. K., Din, S.-U., & Ijaz, M. (2018). How Do Investment Banks Price Initial Public Offerings? An Empirical Analysis of Emerging Market. *International Journal of Financial Studies*, *6*(3), 1‑19. https://doi.org/10.3390/ijfs6030077

Ritter, J. R., & Welch, I. (2002). A review of IPO activity, pricing, and allocations. *Journal of Finance*, 1795‑1828. https://doi.org/10.3386/w8805

Roosenboom, P. (2007). How Do Underwriters Value Initial Public Offerings? An Empirical Analysis of the French IPO Market*. *Contemporary Accounting Research*, *24*(4), 1217‑1243.

Roosenboom, P. (2012). Valuing and pricing IPOs. *Journal of Banking & Finance*, *36*(6), 1653‑1664. https://doi.org/10.1016/j.jbankfin.2012.01.009

Shiller, R. J. (1990). Speculative Prices and Popular Models. *The Journal of Economic Perspectives*, *4*(2), 55‑65. JSTOR.

Tizniti, D., & Aasri, M. R. (2021a). Do Discounts Enhance or Degrade IPOs Valuation Performance? *Financial Markets, Institutions and Risks*, *5*(2), 34‑41. https://doi.org/10.21272/fmir.5(2).34-41.2021

Tizniti, D., & Aasri, M. R. (2021b). How discounts impact IPOs valuation performance and underpricing? A confrontation between warranted and unwarranted discounts. *International Journal of Financial, Accounting, and Management*, *3*(1), 1‑14. https://doi.org/10.35912/ijfam.v3i1.510

Tutuncu, L. (2020). Valuation and underpricing of Turkish IPOs. *Journal of Business Economics and Management*, *21*(1), 157‑179. https://doi.org/10.3846/jbem.2020.11927

Vismara, S., Signori, A., & Paleari, S. (2015). Changes in underwriters' selection of comparable firms pre- and post-IPO : Same bank, same company, different peers. *Journal of Corporate Finance*, *34*(C), 235‑250. https://doi.org/10.1016/j.jcorpfin.2015.07.010