

# Adverse selection, public information, and underpricing in IPOs<sup>☆</sup>

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## Abstract

This paper generalizes the informational environment of the Rock model to address empirical evidence and conjectures that cannot be addressed within the standard model based on informed and uninformed investors such as underpricing being positively related to market returns observed prior to the IPO, the number of IPOs being positively related to market returns, underpricing being partly predictable based on public information, and the return to uninformed participation being negative overall but positively related to market returns observed prior to the IPO. Finally, the model suggests that a positive relation between market returns and underpricing need not represent an inefficiency in the pricing of IPOs.

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## 1. Introduction

Empirical evidence shows that IPO underpricing is positively related to market returns observed prior to the IPO date, which suggests that IPO prices are only partially adjusted to publicly available information.<sup>1</sup> The present paper generalizes the informational assumptions of

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<sup>1</sup> See e.g., Logue (1973), Hanley (1993), Loughran and Ritter (2002), Bradley and Jordan (2002), Lowry and Schwert (2004), Amihud et al. (2003), Edelen and Kadlec (2005), and Derrien and Womack (2003).

the winner's curse model (Rock, 1986) and shows that it is consistent with this evidence. In particular, the paper shows that favorable public information (such as high market returns) reduces the winner's curse problem and that this induces the issuer to price the issue more conservatively in order to increase its success probability. The result is a negative relation between market returns and the quality of the marginal (zero profit) investor, and in turn a positive relation between the public signal and underpricing, consistent with partial adjustment.

The paper complements Loughran and Ritter (2002) who offer an explanation of partial adjustment based on prospect theory, which implies that the issuer cares about the change in wealth rather than its level and hence is willing to leave more money on the table for investors as the offer price is increased in response to favorable public information during the bookbuilding period. While Loughran and Ritter (2002) address partial adjustment to public information from a behavioral perspective, the present paper addresses it from a purely rational perspective, as do Edelen and Kadlec (2005). They develop a bargaining model in which the issuer bargains less aggressively with the investment banker if market returns are high compared to if market returns are low, and hence high market returns (or favorable public information) lead to greater underpricing and a lower withdrawal probability. In the present model, favorable public information reduces adverse selection. This induces the issuer to price the issue more conservatively, which increases its success probability and increases expected underpricing.

The basic Rock argument assumes that some investors are perfectly informed about the value of the IPO while the rest is uninformed, and explains underpricing as compensation to uninformed investors for being allocated a disproportionately large fraction of overpriced IPOs. In the present model, investors are heterogeneously informed as in Rock, but no investor is perfectly informed and the participation of uninformed investors is not needed to obtain underpricing. Indeed, the quality of the marginal (zero profit) investor is determined endogenously from the price set by the issuer: more aggressive pricing increases the quality of the marginal investor and reduces the number of potential bidders, which in turn reduces the success probability of the issue and reduces expected underpricing. Investors with less precise information than the marginal investor will choose not to submit bids, while investors with more precise information than the marginal investor submit bids if their respective signals are favorable. These investors earn a positive rent, which is observed empirically as underpricing.

The main empirical prediction of the winner's curse argument is that the excess return to uninformed investors is zero, despite average underpricing. This prediction, however, assumes that the marginal investor is uninformed. In the present model the marginal investor may be informed, in which case the expected return to uninformed participation must be negative (and rational uninformed investors will choose not to participate). In addition, from the result that the winner's curse problem is inversely related to the public signal and from the result that the issuer will tend price the issue more conservatively after favorable public information than after unfavorable public information, the model implies that the expected return to uninformed participation will be closer to zero in issues preceded by high market returns than in issues preceded by low market returns. These implications are consistent with empirical evidence by Amihud et al. (2003), who document a negative excess return to (simulated) uninformed participation in IPOs preceded by negative market returns, a zero excess return in IPOs preceded by positive market returns, and a negative excess return overall (They also find partial adjustment.).

Finally, the paper suggests a novel link between publicly available information and the cost of going public. Specifically, the model predicts a negative relation between public information observed prior to the IPO and the winner's curse problem, which in turn implies a negative relation between public information and the cost of going public. This gives the prediction that

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