Is Underwriter Hold-up a Cause of Too Few IPOs?

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I hereby declare and confirm that this thesis is entirely the result of my own work except where otherwise indicated. I acknowledge the supervision and guidance I have received from Dr. Alan Miller. This thesis is not used as part of any other examination and has not yet been published. The length of the thesis is 12,868 words, including footnotes, but excluding the bibliography and table of contents.

Date/Signature
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1. Introduction

Underpricing of Initial Public Offerings (“IPO”) has been the subject of a large body of research in the field of Finance over the past few decades. Numerous theories for IPO underpricing have been developed and empirically tested. In this paper, I build on the Finance literature and develop a theory that IPO underpricing is at least partially a consequence of the complex regulatory regime for companies that wish to issue shares to the public for the first time. The theory is that the time and cost to the issuer of complying with the regulatory regime allow the underwriter to “hold-up” the issuer\(^1\) at the end of the IPO process by agreeing to underwrite the share offering only at a price less than the expected trading price of those shares.\(^2\)

The issue of IPO underpricing made the news after Facebook’s IPO of May, 2012. In a highly anticipated offering, shares of Facebook were sold to investors at $38 and were widely expected to trade well above that price on the first day of trading. After a brief delay, the shares opened for trading at $42 but quickly declined from there to close the first

\(^1\) As in (Loughran & Ritter, 2002), I use the term issuer to include pre-IPO shareholders of the issuer.

\(^2\) The theory is based on the hold-up theory detailed in (Hart, 1995) and is discussed in section 4.1.
day of trading at exactly the issue price of $38. Over the subsequent few months, the shares traded as low as $17.55, but have recovered along with the general stock market and currently trade at around $24.

The business news over the days following the Facebook IPO was blistering. A commentary by Holman W. Jenkins Jr. in the Wall Street Journal on May 21, 2012 summed up the prevailing mood in its headline: “The IPO from Hell”. Mr. Jenkins’ main complaint was that Facebook fully priced the offering, leaving no room for the expected post-IPO increase in share price.

Mr. Jenkins was alluding to the fact that, on average, the closing price of IPO shares on the first day of trading is substantially higher than the issue price. This is known as “IPO underpricing” and has been observed in almost every country and in every time period studied. The Facebook IPO was in the minority of offerings in which the share price fell almost from the beginning of trading. Professor Adam C. Pritchard used the occasion of the Facebook IPO to call for the abolishment of IPOs, calling the Facebook IPO “a salient example of an inefficient process”.

In the United States and most other countries, the regulatory regime requires a company to go through a long, arduous and costly process of preparing detailed disclosure documents and complying with other detailed requirements in order to issue shares to the

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3 See (Diamond, 2012) for a discussion of the history of the run up to the Facebook IPO. The delayed opening was apparently caused by the sheer volume of orders submitted – over 82 million orders were processed in the first 30 seconds of trading.
5 http://online.wsj.com/article/SB10001424052702304019404577420383358865326.html?KEYWORDS=facebook+ipo
6 (Boulton, Smart, & Zutter, 2010).
public for the first time. In the U.S. this process takes between 6 months and a year.\footnote{(PriceWaterhouseCoopers LLP, 2010)} At the beginning of this period the issuer signs a letter of intent with an underwriter which establishes some terms of the relationship, including the underwriting fee. Importantly, however, because of the length of time of the process, the agreement does not unconditionally require the parties to conclude the offering nor specify the price at which the offering will be sold.\footnote{(Dalton, Certo, & Daily, 2003), p. 292.} The price will depend on market conditions that prevail at the time that the shares are actually issued.

Over the course of the going public process, the issuer incurs a great deal of costs and management time in preparing for the offering. These costs and time are relationship-specific because, as a practical matter, the issuer cannot change underwriters during the course of the IPO process. Empirical evidence also shows that if the issuer does not complete the IPO once started, it will likely never go public.\footnote{(Dunbar, et al., 2003), p. 61.} So the costs to the issuer of not completing the offering once started may be very high.

During the IPO process, the underwriter will have gathered information on the issuer, including information as to the issuer’s next best alternative to an IPO. It will also have much better information about demand for shares of the issuer than will the issuer itself. If at the time the issue is priced, the underwriter knows that the costs to the issuer of a failed IPO are high, then the underwriter can “hold-up” the issuer by agreeing to complete the underwriting only at a price less than the expected trading price of the shares. The underwriter will extract underpricing rather than renegotiate its underwriting fee as the
latter action may be seen by the issuer or by a Court as a more odious method of taking advantage of a superior bargaining position.

The underwriter hold-up theory predicts that fewer than the socially optimal number of IPOs may occur. Knowing that they will get held up at the end of the IPO process, issuers for whom IPOs would otherwise be economically efficient will not commence the process. Legislative changes that reduce the cost or complexity of the IPO process, or which dull the bright line between private and public companies could reduce IPO underpricing and result in more IPOs.

IPO underpricing is well-trodden ground for researchers. However, the multiplicity of theories for IPO underpricing and the fact that researchers have not coalesced around any one theory after decades of research suggests that there is scope for developing new theories of underpricing or improving existing ones. There is also scope for systematically considering whether IPO underpricing is a cause of an inefficiently low number of IPOs, which is something lacking in the Finance literature.

The relative dearth of IPOs in the U.S. over the last few years has become a political issue. A widely-quoted report found that the slowdown in IPOs has resulted in the loss of “up to 22 million U.S. jobs”. That figure was favorably quoted in a report presented by the IPO Task Force to the U.S. Department of the Treasury and to the U.S. Senate Banking Committee in 2011. The JOBS Act, which incorporated many of the recommendations of the IPO Task Force, was passed last year in an effort to increase the number of IPOs.

\[\text{References}\]

11 (Weild & Kim, 2009); (Ritter, 2013), pp. 17-22, disputes those figures and finds that the number of “lost jobs” is 1.87 million, p. 28.
Accordingly, an analysis of whether IPO underpricing causes an inefficiently low number of companies to go public and, if so, how to reduce the level of underpricing is topical.

The balance of this paper is structured as follows. Section 2 summarizes the literature on the extent of underpricing and the extent to which IPO shares underperform in the long-run, briefly discusses the issue of social optimality in the context of the IPO market and describes the concept of the Efficient Markets Hypothesis. Section 3 critically assesses the leading theories of IPO underpricing. Section 4 develops the concept of underwriter hold-up, including setting out a simple model and discussing empirical evidence that may support the theory. Section 5 considers legislative changes that may reduce the hold-up problem and IPO underpricing, and Section 6 concludes.

2. Relevant Finance Evidence and Concepts

2.1. Extent of Underpricing

In the U.S., over the period 1980 to 2001, the closing price on the first day of trading of the average IPO was 18.8% higher than the price at which the IPO shares were issued. Other U.S. studies covering different time periods show a similar magnitude of share price appreciation on the first day of trading. The rate of first day price appreciation fluctuates over time and reached a peak of 65% in the US during the period 1999-2000.

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14 (Ritter & Welch, 2002), an equivalent way of expressing this is that the shares were issued at a 15.8% discount to the first day trading price.

15 For example, (Aggarwal & Rivoli, 1990) and (Hoberg, 2007).

16 (Ritter & Welch, 2002), p. 1796, shortly before the dot.com bust.
Compare a 65% average one day return to the average daily return on the US stock markets over the 1999-2000 period of 0.05%.\(^{17}\)

While there is a large variation in the degree of underpricing among countries, significant levels of underpricing exist in most countries. Hopp & Dreher (2007) conducted a study of IPO underpricing covering 29 countries for IPOs issued between 1988 and 2005. They found IPO underpricing in all 29 countries – average first day returns over the period ranged from a high of 66% in India to a low of 2.45% in Austria.\(^{18}\) IPO underpricing can fluctuate quite wildly from year to year in most countries.\(^{19}\) IPO underpricing is not a new phenomenon – IPO underpricing on the Berlin stock market in the 1880s was 31%.\(^{20}\)

2.2. Long-Term Underperformance

There is some evidence that shares issued on an IPO underperform the general stock market in the years following the IPO. Ritter & Welch (2002) found that an investor who bought shares of the average IPO on the first day of trading would have underperformed the market by 23.4% over the following 3 year period.\(^{21}\) However, this apparent gross underperformance may have to do with the nature of the companies that went public over the period studied. The long term underperformance relative to a basket of shares of seasoned companies having attributes (i.e. size, industry) similar to the IPO companies was much lower at 5.1%.\(^{22}\)

\(^{17}\) (Ritter & Welch, 2002), p. 1802.
\(^{18}\) (Hopp & Dreher, 2007), p. 12.
\(^{19}\) (Ljunquist, 2006).
\(^{20}\) (Fohlin, 2000).
\(^{21}\) (Ritter & Welch, 2002), p. 1797.
\(^{22}\) (Ritter & Welch, 2002), p. 1797.
The conclusion that IPO shares underperform the market or their seasoned peers in the long-term is controversial. The more recent literature suggests that, adjusted for risk and for other factors, this underperformance may be greatly reduced or even eliminated.\textsuperscript{23} Underperformance of IPO shares may be due to the fact that IPO companies are less risky than seasoned companies because IPO companies have lower leverage and higher liquidity, and thus investors require a lower expected return to hold IPO shares than shares of similar seasoned companies.\textsuperscript{24} There are also a number of serious statistical measurement problems that make it difficult to precisely measure the degree of long-term underperformance.\textsuperscript{25}

There is no reliable evidence that initial IPO underpricing of a particular stock is correlated with long-term underperformance of that stock; that is, offerings that have higher underpricing are no more likely to underperform the market than issues that have less underpricing.\textsuperscript{26}

2.3. Summary of Underpricing and Underperformance

In summary, IPO underpricing has been observed in almost all countries and over all time periods studied. However, the rate of IPO underpricing fluctuates widely through time and across countries. There is some evidence that there is long-term underperformance but more recent literature suggests that the underperformance is due to factors other than the high initial trading price. As well, there is no correlation between a high initial trading

\textsuperscript{23} See for example (Eckbo & Norli, 2005).
\textsuperscript{24} (Eckbo & Norlis, 2005), p. 32.
\textsuperscript{25} (Brav, 2000) contains a detailed discussion of these issues.
\textsuperscript{26} (Ritter & Welch, 2002), p. 1822.
price and long term underperformance – issues that have a high degree of underpricing do not suffer a greater degree of long term underperformance.\textsuperscript{27}

2.4. Efficiency in the Market for IPOs

Kahan (1992) stated that:

\begin{quote}
\ldots one principal goal of securities law [is] to create stock markets in which the market price of a stock corresponds to its fundamental value.\textsuperscript{28}
\end{quote}

Kahan defined the fundamental value of a stock to be the best estimate of the discounted value of all future distributions on that stock given all available information.\textsuperscript{29} This is in accordance with a basic axiom of Finance, known as the Efficient Markets Hypothesis (“EMH”), that the prices of stocks on a well-functioning stock market are equal to fundamental value, at least in the sense that the prices reflect all publicly available information.\textsuperscript{30}

In most papers describing IPO underpricing theories, researchers categorize them by underlying economic theory (e.g. asymmetric information, private benefits). I take a somewhat different approach and place each theory into one of two categories:

1. Theories that IPO shares are issued below fundamental value and that the first day trading price reflects fundamental value, and

2. Theories that IPO shares are issued at fundamental value and that the first day trading price is above fundamental value.

\textsuperscript{27} (Ritter & Welch, 2002), p. 1822.
\textsuperscript{28} (Kahan, 1992), p. 979, emphasis added.
\textsuperscript{29} (Kahan, 1992), p. 979.
Kahan (1992) suggests that the social cost of the price of shares of a company not reflecting the value of that company is highest at the time that the company is issuing shares.\textsuperscript{31} Inaccurate share prices at that time might result in losing ventures getting funded and winning ventures not getting funded.\textsuperscript{32} Therefore, on the Kahan view, IPO underpricing should be more of an efficiency concern if the theories in category 1 hold than if the theories in categories 2 hold. If companies must issue shares at a discount to their fundamental value in order to go public (as in category 1 theories) then there is a concern that the number of companies that go public is less than the socially optimal number. However, if IPO shares are issued at fundamental value (as in category 2 theories), the fact that the shares may subsequently trade above fundamental value may not entail as significant a social cost.\textsuperscript{33}

Bebchuk & Zingales (2000) state that, in the absence of externalities, (i) private decisions of entrepreneurs to go public or to stay private would lead to the socially optimal number of public companies as entrepreneurs would internalize all costs and benefits of going public and (ii) government regulation of the IPO market would lead to an inefficient number of public companies.\textsuperscript{34} They develop a model in which the privately chosen level of public companies differs from the socially optimal level. In their model, entrepreneurs will structure their companies so as to discourage takeovers, as the entrepreneur may not capture all of the surplus of a sale of the company to an acquiror. Accordingly, when deciding on a capital structure, he will not fully internalize the benefit of selling to a buyer who values the

\textsuperscript{31} (Kahan, 1992), p. 1012.
\textsuperscript{32} (Kahan, 1992), p. 1006.
\textsuperscript{33} (Kahan, 1992), p. 1014.
\textsuperscript{34} (Bebchuk & Zingales, 2000), p. 2.
company more than the entrepreneur. The authors suggest that in the U.S., this negative externalization leads to more public companies than is socially optimal.

Subrahmanyam and Titman (1999) develop a model in which each public company creates a positive externality by making it easier to value comparable companies. One implication of their model is that this positive externality could result in fewer than the optimal number of public companies.

If the EMH holds and prices of stocks on a stock market are equal to their fundamental value, it follows that IPOs completed at a price below their first day trading price are issued at lower than fundamental value. Accordingly, if entrepreneurs can only go public at a discount to the expected market price (which, by the EMH, is equal to fundamental value), fewer entrepreneurs will go public. Ignoring for the moment the externality issues raised by Bebchuk & Zingales (2000) and by Subrahmanyam and Titman (1999), it follows that if the EMH holds, the presence of IPO underpricing means that the number of companies going public will be less than the socially optimal number.

The EMH has stood as the dominant theory in Finance since the 1950s, but more recent literature and empirical data cast doubt on the EMH. Stout (2002) suggests that there are actually two senses of EMH used in the literature. The first is that prices quickly adjust to new information so there is little room for trading profits. The second is that of

37 It would only be by chance that IPO underpricing would correct for the negative externality identified by Bebchuk & Zingales (2000) and it would exacerbate the positive externality identified by Subrahmanyam and Titman (1999).
38 (Stout, 2002).
fundamental value efficiency; that is, prices adjust both quickly and accurately. \textsuperscript{39} Stout (2002) challenges the second sense of the EMH. \textsuperscript{40}

A closely related concept to the EMH is the Capital Asset Pricing Model (the “CAPM”), which states that the price of an asset is based solely on the systematic risk of that asset. \textsuperscript{41} The systematic risk is the non-diversifiable risk (or non-company specific risk). The higher the risk, the higher the expected return on that asset. Stout (2002) points out that the CAPM is based on a number of assumptions, one of which is that investors have homogeneous expectations about the future cash flow of assets. \textsuperscript{42} Miller (1977) showed that if expectations are heterogeneous, unlimited shorting is not possible and investors are risk averse, the share price of a company will reflect the value ascribed by the shareholder of the company who holds the least optimistic views on the company. Stout (2002) says that, if these conditions hold, only the first sense of the EMH will hold and that share prices will not necessarily reflect fundamental value. \textsuperscript{43} She also suggests that, under these circumstances, there is a downward sloping demand curve for the shares of a company; that is, the more shares a company wishes to issue, the lower the price it will receive. \textsuperscript{44}

If the fundamental value sense of the EMH does not hold and shares sometimes trade above fundamental value then, at those times, IPO shares could be issued at or above fundamental value (even with IPO underpricing). Underpricing would not necessarily be a cause of too few IPOs at those times.

\textsuperscript{39} (Stout, 2002), p. 639.
\textsuperscript{40} (Stout, 2002), p. 640.
\textsuperscript{41} (Bodie & Merton, 2000).
\textsuperscript{42} (Stout, 2002), p. 641.
\textsuperscript{43} (Stout, 2002), p. 645.
\textsuperscript{44} (Stout, 2002), p. 645.
However, if one further assumes a downward sloping demand curve for shares in general (i.e. the more shares on the market, the lower the market price), IPOs might be a mechanism to correct stock prices when they are relatively high.\textsuperscript{45} However, high underpricing might dampen this mechanism, so in that sense, underpricing could cause inefficiently few IPOs, even in hot markets. For example, if shares of companies in a particular industry were trading above fundamental value, private companies in that industry may go public, but at a slower rate than if there was no underpricing.

3. Theories of Underpricing

In this section, I briefly assess the leading theories of IPO underpricing. Section 3.1 assesses theories which suggest that underpricing causes IPOs to be issued at below fundamental value and section 3.2 assesses theories which suggest that underpricing does not cause IPOs to be issued at below fundamental value.

3.1. IPOs are Priced Below Fundamental Value

3.1.1. Underwriter Superior Information

There are a number of theories which explain IPO underpricing by reference to superior information wielded by underwriters. Baron (1982) developed a model of an IPO offering “in which the investment banker is better informed about the capital markets than is the issuer of the securities.”\textsuperscript{46} His model suggested that issuers would compensate underwriters for their superior information by delegating the pricing decision to the

\textsuperscript{45} There is evidence that future stock returns are lowest when the stock market is relatively overpriced (measured by market to book ratios and similar measures), (Campbell & Viceira, 2005).

\textsuperscript{46} (Baron, 1982), p. 955.
underwriter who would then set the issue price below the market price as compensation for its information. Loughran and Ritter (2002) call the underpricing a form of indirect compensation to underwriters. Setting the issue price below the market price helps the underwriter in a number of ways. A lower price allows the underwriter to more easily sell the issue. A lower price may also reduce the chances of the underwriter getting sued for misrepresentation and, accordingly, it reduces the underwriter’s litigation costs. There is some empirical evidence that prestigious underwriters (i.e. those who yield more market power) may be able to use that market power to extract greater payments in the form of IPO underpricing than their less prestigious counterparts. There is also evidence that underwriters intentionally underprice so that they can allocate shares to their clients in tacit exchange for higher commissions or future business. In the 1990’s, these tacit exchanges appear to have become actual quid pro quo; underwriters asked for and were given kickbacks and promises of trading business in exchange for allocation of IPO shares.

One researcher suggests that the fact that IPO underpricing exists is itself evidence of underwriter market power:

“The Loughran and Ritter line of research implicitly raises the issue of industrial organization in underwriting. In a

47 (Baron, 1982), p. 975.
49 (Adams, Thornton, & Hall, 2008).
50 (Hughes & Thakor, 1992), but see (Drake & Vetsuypens, 1993) who find empirically that underpricing does not reduce the chances of getting sued.
52 (Loughran & Ritter, 2002).
53 The creditors of bankrupt eToys are suing Goldman Sachs for underpricing eToys’ 1999 initial public offering. The issue was priced at $20 a share and opened at $78. Internal Goldman Sachs emails were disclosed in the course of the lawsuit (and inadvertently made public) indicating that Goldman Sachs had an aggressive program for seeking additional commission revenue from those to whom it allocated eToys shares (http://blogs.reuters.com/felix-salmon/2013/03/11/where-banks-really-make-money-on-igos/). Credit Suisse First Boston was alleged to have extracted such commissions from its customers and paid a fine of $100 million to settle the SEC charges without admitting or denying the charges (Adams, Thornton, & Hall, 2008).
perfectly competitive market for underwriting services, underwriters would be unable to impose excess charges through underpricing. The fact that underpricing persists suggests that underwriting is imperfectly competitive and permits the exercise of market power.\textsuperscript{54}

Theories that an underwriter’s superior information contributes to IPO underpricing are compelling. However, they do not fully explain why issuers go along with the underpricing.\textsuperscript{55} Information regarding (i) the fact that IPOs are typically underpriced and (ii) the magnitude of the underpricing is freely available to issuers.\textsuperscript{56} Even if we accept that underwriters have superior information, why don’t issuers simply make use of public information regarding average underpricing to negotiate a higher IPO share price? As well, the theories generally do not explain why underwriters prefer to underprice an IPO rather than to simply extract higher underwriting fees.\textsuperscript{57}

3.1.2. Private Benefits

Another theory is that underpricing allows the issuing company to allocate shares in such a way as to maintain diffuse ownership.\textsuperscript{58} By issuing shares at a price lower than fundamental value, the issuer can pick and choose the investors to whom it wishes to sell. Diffuse ownership makes it less likely that minority shareholders will monitor the company since monitoring is expensive and the benefit from monitoring is low if shareholders have

\textsuperscript{54} (Fohlin, 2000), p. 7.
\textsuperscript{55} The leading explanations for this are behavioural economics arguments. See, for example, (Loughran & Ritter, 2002).
\textsuperscript{56} In a survey of CFOs, most said that they were aware of underpricing, although they did underestimate the average underpricing (actual underpricing in the relevant period was 27.8% and CFOs thought it was 14.8%) (Brau & Fawcett, 2006), p. 415.
\textsuperscript{57} An exception is (Loughran & Ritter, 2002), p. 416, who suggest that issuers view a discount more favourably than an equivalent additional underwriting fee.
\textsuperscript{58} (Brennan & Franks, 1997).
small holdings. Accordingly, lack of monitoring allows the management of the issuing company or its major shareholder to more easily extract private benefits from the company. Diffuse ownership may also make it more difficult for the company to be the subject of a hostile takeover bid. However, studies in the U.S. and the U.K. found no correlation between IPO underpricing and post-IPO ownership structure, strongly suggesting that IPO underpricing is not caused by a desire for diffuse ownership.

3.1.3. Underpricing to Create an Informational Cascade

Welch (2002) developed a theory of IPO underpricing based on informational cascades, otherwise known as herding. In his model, investors approached by an underwriter base their decision to buy IPO shares not on their own assessment of the value of the offering but on the decisions made by investors who were earlier approached by the underwriter. Under this theory, early interest drives later interest. Underpricing an issue may promote early interest and help generate the cascade, driving up the first day trading price above fundamental value. If the IPO price is too high, the cascade can work in reverse; that is, if investors approached early do not buy, investors approached later in the process will be less likely to buy and the first day trading price will be below fundamental value.

It seems unlikely that the cascade effect in respect of a particular issue would continue indefinitely. Assume, for example, an IPO that was priced at fundamental value

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was not well received by investors (i.e. there was a negative informational cascade) and, accordingly, the issue had negative first day returns. I suggest that at some point investors will recognize that the shares are trading below fundamental value and will bid the price up.\textsuperscript{64} More generally, under an informational cascade theory, one would expect IPOs with negative first day trading returns to have higher long-term performance than those that traded above their issue price. But this is not the case - there is no reliable evidence of a positive correlation between underpricing and long-term underperformance.\textsuperscript{65}

3.1.4. \textit{Underpricing as Payment for Demand Information}

One of the most developed theories of underpricing is the theory that underwriters underprice IPOs to induce purchasers to truthfully disclose demand information – the discount is payment for this information.\textsuperscript{66}

An adjunct to that theory is that in hot issues, investors will get allocated less than their full order but in cold issues, their orders will be fully filled. Without underpricing, these investors might lose money on IPOs, on average, and stay out of the market completely.\textsuperscript{67} On the other hand, institutional investors know that they can sell cold issues on the first day of trading at close to the issue price (which is supported by the underwriter\textsuperscript{68}), thus minimizing losses. There is evidence that IPO investors do sell losers

\textsuperscript{64} It may be, however, that the negative first day returns has negative effects on the business of the issuer so that the fundamental value of the company is lower than if it initially traded above the IPO price. Perhaps the low stock price makes it harder to attract talented employees. Creditors may require a higher interest rate or better terms of payment because of the perception that a low stock price means a higher default risk. But (Kahan, 1992), p. 1010 doubts that there is any theoretical or empirical support for this proposition.\textsuperscript{65} (Ritter & Welch, 2002) p. 1822.\textsuperscript{66} (Ritter & Welch, 2002), p. 180; (Levy, 2003), p. 204.\textsuperscript{67} See (Levy, 2003), p. 206, for a numerical example.\textsuperscript{68} See section 3.2.1.
at or near the IPO price.\textsuperscript{69} The fact that institutions sell cold issues severely weakens the “payment for demand information” theory of IPO underpricing.

3.1.5. \textit{Summary of Category 1 Theories}

The empirical evidence in support of the private benefits theory is weak. Cascade theory cannot explain why the price of IPO shares does not eventually converge to its fundamental value.

The main knock against the underpricing as payment for demand information theory is just the sheer magnitude of the payment in relation to the service.\textsuperscript{70} On average, it exceeds all other IPO costs, including the underwriting fee.\textsuperscript{71} As well, underpricing fluctuates widely over time and is highly correlated with market conditions.\textsuperscript{72} Is demand information really that much more difficult to obtain (or more valuable) in a hot market than in a cold market?

The theories based on superior information of underwriters are compelling. As well, these theories are consistent with the empirical data. However, one needs to explain why rational issuers will not bargain for lower underpricing, given that they must be assumed to be aware of the phenomenon. One also needs to explain why underwriters do not simply extract greater underwriting fees rather than insist on underpricing. In section 4, I develop a theory of underwriter “hold up”, which may provide explanations.

\textsuperscript{69} (Krigman, Shaw, & Womack, 1999).
\textsuperscript{70} (Ritter & Welch, 2002), p. 1805.
\textsuperscript{71} (Zingales, 1995), p. 425.
\textsuperscript{72} (Lowry, 2003); (Derrien, 2005).
3.2. IPO Prices Reflect Fundamental Value

3.2.1. Underwriter Price Maintenance

In the U.S., underwriters can legally support the price of the shares of an initial public offering once they start trading.\textsuperscript{73} Underwriters will generally do this if the first day trading price threatens to fall below the IPO price. Thus, on average, the first day trading price will be higher than the IPO price since there are very few issues that end the first day of trading below their issue price.\textsuperscript{74} Additional evidence of the price support is that one-quarter of the IPOs studied ended the first day of trading at exactly the issue price, which is statistically highly improbable in the absence of price support.\textsuperscript{75}

In most IPOs, the underwriter will over allot shares and if the shares trade above the issue price, the underwriter will exercise a previously issued option to acquire additional shares from the issuer and will transfer those shares to its customers.\textsuperscript{76} However, if the price falls below the issue price, the underwriter will fill its customers’ allocations by acquiring shares on the market and transferring those shares to its customers. This buying in the market will increase (at least temporarily) the price of the shares.\textsuperscript{77} It may be that

\textsuperscript{73} The Securities Act of 1934, 15 U.S.C. §10(b) and 17 C.F.R. §240.10b-7.
\textsuperscript{74} (Ruud, 1993), p. 136.
\textsuperscript{75} (Ruud, 1993).
\textsuperscript{76} (Dalton, Certo, & Daily, 2003), p.292, this option is known as a “greenshoe” and is generally an option to acquire an additional 15% of the shares issued on the IPO.
\textsuperscript{77} This is why such a large percentage of IPOs (including the Facebook IPO) close on the first day of trading at a price equal to the issue price (Ruud, 1993).
this market manipulation has the effect of increasing the first day trading price above fundamental value, as the price stabilization is only in one direction.\textsuperscript{78}

Underwriters rarely support IPO shares for more 4 days from the first day of trading.\textsuperscript{79} Therefore, if underwriter price support were the cause of IPO underpricing, one would expect that the share price would revert to fundamental value once the underwriters ceased supporting the price. While, there is evidence that the distribution of returns becomes normal (in the statistical sense) within a few days after the IPO (suggesting that underwriter share support has ceased), there does not appear to be any evidence that the average price of the IPO shares falls from its first day closing price level following the cessation of price support.\textsuperscript{80}

3.2.2. \textit{Underpricing to Reduce the Effect of Market Timing}

The volume of IPOs tends to increase in periods of high stock prices and there is strong evidence that issuers are able to successfully time the market.\textsuperscript{81} As well, underpricing tends to be higher when stock prices are high.\textsuperscript{82} In another line of research,

\textsuperscript{78} Under the EMH theory this strategy would not work. Arbitrageurs would sell short as many shares as possible at the support price, knowing that the price support was temporary and they would swamp the underwriter’s ability to maintain the share price. It had previously been thought that short-selling did not occur very often on the first few days of trading. However, (Edwards & Hanley, 2010) show that short-selling occurs on the first day of trading in 99.5% of IPOs. Interestingly, short-sellers lose, on average, 4% of their investment.

\textsuperscript{79} (Ruud, 1993), p. 139.

\textsuperscript{80} (Ruud, 1993) does not present any evidence of this. (Bradley, Gonas, Highfield, & Roskelley, 2009) in a study of 2531 U.S. IPOs between 1993 and 2003, found no statistically significant decrease in share price from the close of the first day of trading to the end of the sixth day of trading.

\textsuperscript{81} (Baker & Wurgler, 2002).

\textsuperscript{82} (Ritter & Welch, 2002).
there is evidence that future stock returns are lowest at times when stock prices are high.\textsuperscript{83} Combining these lines of research, one underpricing theory is that:

> “When equity markets perform well, investors anticipate that companies and investment banks try to time the market when going public and therefore require a higher underpricing in return.”\textsuperscript{84}

In other words, investors know that prices of existing shares exceed fundamental value, and they are only prepared to buy IPO shares at fundamental value (which is less than the market price). In a similar vein are theories that IPO shares are issued at fundamental value and that the prices are driven up by optimistic retail investors.\textsuperscript{85} These theories are based on models of investors having heterogeneous expectations of future cash flows.\textsuperscript{86}

3.2.3. \textit{Summary of Category 2 Theories}

The underwriter price support theory could explain the average first day increase in price from the IPO price. However, if the price support was the reason for the first day increase in price, then once that support ceases (which occurs within 4 days of trading) the average share price should fall from the closing price of the first day of trading price. This does not appear to happen.\textsuperscript{87}

With regards to the latter theories, it seems odd that IPO investors are smart enough to realize that companies tend to go public in overpriced markets but that they are not smart.

\textsuperscript{83} See for example (Campbell & Viceira, 2005) and (Baker & Wurgler, 2006).
\textsuperscript{84} (Hopp & Dreher, 2007), p. 29.
\textsuperscript{85} See for example (Derrien, 2012).
\textsuperscript{86} See discussion in section 2.4.
\textsuperscript{87} (Bradley, Gonas, Highfield, & Roskelley, 2009).
enough to get out of that overpriced market altogether. If IPO buyers truly thought that the
shares they acquired became overpriced once trading commenced, one would expect them
to sell.

Theories based on retail investors bidding up prices above their fundamental value
are also difficult to maintain in light of the fact that there is no correlation between initial
underpricing and long-term underperformance.\footnote{See discussion in section 2.2.}

In summary, none of the theories in category 2 are compelling.

4. Underwriter Hold-up Theory of Underpricing

The theory that is most theoretically compelling and that appears to be most
supported by the empirical evidence is that underpricing is caused by underwriters
exploiting their superior information \textit{vis-à-vis} the issuer. That theory is in category 1; that
is, the category that IPO shares are issued at below their fundamental value. In the balance
of this paper, I will assume that underwriter superior information is at least a substantial
cause of IPO underpricing.

Behavioural theories, such as framing and prospect theory, have been invoked to
explain why an issuer would agree to underprice an issue.\footnote{See for example (Loughran & Ritter, 2002).} For example, underpricing is
higher if the price range of an issue was revised upwards during the course of the
shareholders perceive that the increased price increases their wealth relative to their
reference point and, accordingly, they will be less concerned about underpricing. Relying on prospect theory, Loughran & Ritter (2002) suggest that if demand for the offering is weaker than expected, shareholders will bargain hard to avoid a reduction in price, resulting in lower underpricing.

4.1. Hold-ups and Incomplete Contracts

I propose an alternative theory as to why issuers would agree to underprice an issue; one based on the “hold-up” problem first identified by Williamson (1971). The theory is consistent with rational behaviour on the part of both issuers and underwriters. The fullest exposition of the “hold-up” problem is in the seminal work by Hart (1995). Hart (1995) starts with the proposition that in many cases it may be “prohibitively expensive” to write a complete contract; that is, a contract that describes the parties’ rights and obligations in all possible future states of the world. Where one party has to make a significant “relationship-specific investment” under the terms of an incomplete contract, the other party may use the fact of that investment to extract from the first party all the profit that the first party would otherwise have obtained under the contract. Anticipating the potential hold-up problem, parties will be reluctant to make relationship-specific investments that would otherwise be economically efficient.

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91 (Loughran & Ritter, 2002); (Hanley A.W., 1993) found that the average underpricing where the issue price was revised upwards was 32%.
93 (Williamson, 1971).
96 (Hart O. D., 1995), p. 27.
Hart (1995) used the hold-up problem to explain why General Motors acquired its major supplier, Fisher Body, rather than negotiate a new supply agreement with Fisher Body. Hart suggested, for example, that Fisher Body would have been reluctant to invest in machinery necessary to supply car bodies to General Motors’ specifications because, having done so, General Motors could attempt to renegotiate the contract to a price equal to Fisher Body’s variable cost, which would result in Fisher Body incurring a loss equal to its initial investment in the machinery. For this reason (and other potential hold-up reasons), General Motors acquired Fisher Body and operated it as a combined entity.

4.2. Underwriter Hold-ups

As a result of the complex regulatory framework, there is a substantial period of time between when the issuer retains the IPO underwriter and the time that the shares are priced – typically, this period is between 6 and 12 months. The agreement which the issuer and the underwriter initially enter into (called a letter of intent) sets out in very broad terms the obligations of both the parties. It establishes the underwriting fee (as a percentage of the gross proceeds of the offering) and allocates costs of the IPO process between the parties. Importantly, the letter of intent does not unconditionally bind the issuer or the underwriter to complete the offering nor does it specify the price at which the offering will be sold or the number of shares to be sold.

Of necessity, the letter of intent is an incomplete contract. Given the length of time of the IPO process, it is not possible for the parties to agree to a price at which the IPO

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99 (PriceWaterhouseCoopers LLP, 2010).
100 (Dalton, Certo, & Daily, 2003), p. 292.
shares will be sold at the time the underwriter is initially retained. The value of the shares of the issuer will depend on market conditions (i.e. general market conditions or market conditions for shares of companies in the issuer’s industry) that prevail at the time that the shares are actually issued. As well, the underwriter may not have much information about the issuer at the time that it is first retained and could not make a good assessment of the value of the issuer at that time.

The IPO process is a long, arduous and expensive process, both in terms of money and of management time.\textsuperscript{101} In the U.S., the issuer must prepare and file with the SEC a registration statement which includes a lengthy prospectus containing disclosure about the issuer and the securities being issued and which must also include audited financial statements for the 2 or 3 year period prior to the IPO.\textsuperscript{102} The prospectus is drafted over the course of several months by a team consisting of several members of management of the issuer, members of the underwriting firm, a team of lawyers for the issuer, a smaller team of lawyers for the underwriter, auditors, accountants and consultants.\textsuperscript{103} The underwriter, auditors and lawyers for the issuer and for the underwriter also perform due diligence on the issuer, which involves reviewing all documents relating to the affairs of the issuer as well as interviewing senior management.\textsuperscript{104} In anticipation of going public, the issuer may also have to make costly changes which make the issuer more suited to be a public

\textsuperscript{101} (PriceWaterhouseCoopers LLP, 2012), p.7, underwriter fees are between 5% and 7% of the offering, direct expenses average $3.7 million and indirect expenses average $1 million.

\textsuperscript{102}Form S-1 under the Securities Act Regulations, the requirements of which are summarized starting on page 43 of (PriceWaterhouseCoopers LLP, 2010). The Facebook, Inc. prospectus ran to 231 pages of dense legal and accounting text.

\textsuperscript{103} (PriceWaterhouseCoopers LLP, 2010).

\textsuperscript{104} These parties are legally liable under s. 11 of the Securities Act of 1933 for any misrepresentation in the registration statement. Their only defence is that they were took due diligence to avoid the misrepresentation (Spindler, 2006), p. 50.
company, such as changing its corporate structure, hiring additional staff (such as an investor relations department) and retaining independent directors.\textsuperscript{105}

The underwriter will also have incurred expenses during this time but its expenses and time commitment will be much less than those of the issuer. It is also standard practice for the issuer to agree to reimburse the underwriter for its expenses if the issuer does not complete the offering.\textsuperscript{106}

The consequences of a failed IPO (i.e. one that does not proceed to completion) are also much more onerous to the issuer than to the underwriter. In the range of 20\% of offerings do not proceed to completion and only about 10\% of companies who withdraw their IPO try again to go public at a later time.\textsuperscript{107} So the consequences to an issuer of a failed IPO are very severe – it will have expended a great deal of time and money in preparing for the IPO (which it cannot recoup), changed its corporate structure to one suited to a public company and will probably never become a public company. While a failed IPO also results in the underwriter suffering a loss, that loss is limited to its foregone underwriting fee (and any benefits it could obtain through underpricing).

In the U.S. and in most developed countries, IPOs are done using a bookbuilding system.\textsuperscript{108} Once the preliminary prospectus has been filed with the securities authorities, the underwriter will establish a price range for the shares of the IPO and will meet with potential investors to assess their interest in the offering at that price range. Based on the demand disclosed by potential investors, the underwriter may increase or decrease the

\textsuperscript{106} (Dalton, Certo, & Daily, 2003), p. 292; (PriceWaterhouseCoopers LLP, 2010), p. 21, states that it is standard practice for underwriter expenses to be reimbursed for up to 3\% of the gross proceeds of the offering.
\textsuperscript{107} (Dunbar & Foerster, 2003), p. 61.
\textsuperscript{108} See (Cornelli & Goldreich, 2001), p. 2339 for a description of the bookbuilding system.
range. However, the actual price of the IPO shares is only agreed to when the issuer and the underwriter enter into an underwriting agreement on the morning that the shares are to be issued.\(^{109}\)

At the point in time that the underwriting agreement is to be executed, the potential for a “hold up” by the underwriter is very high. The issuer will have made a very large investment in the IPO process. That investment is relationally specific in the sense that it would be exceedingly costly for the issuer to switch underwriters.\(^{110}\) The potential for hold-up is exacerbated by the fact that at the time that the underwriting agreement is to be executed, the underwriter likely has much better information than the issuer. Having gone through the prospectus drafting and due diligence processes, the underwriter will have very good information about the issuer, including what alternatives the issuer has if the IPO does not conclude. Through the bookbuilding process, the underwriter will also have very good information about the demand for the IPO shares. On the other hand, the issuer is unlikely to have much information on such things as how badly the underwriter needs the deal to close and will have likely obtained most of the demand information from the underwriter.

Rational underwriters would be expected to extract underpricing to the maximum amount that their superior bargaining power and superior information permit. In theory, an underwriter could extract underpricing up to an amount equal to the difference between the value to the issuer of being a public company and the value to it of its next best alternative (e.g. staying private, merging with another company). The actual amount that it could

\(^{109}\)See (Ellis, Michaely, & O’Hara, 1999), p. 6, for a description of the typical IPO marketing process.

\(^{110}\) A new underwriter would be subject to liability under s. 11 of the Securities Act, so would have to fully review the registration statement and engage in a due diligence process. Changing underwriters in the middle of an IPO could also be seen as a very bad signal to the market. Potential investors would be concerned that the previous underwriters withdrew because of adverse information that they learned about the issuer.
extract in any particular underwriting would depend on the relative bargaining position of the issuer and the underwriter in that underwriting.\footnote{Harsanyi, 1956, p. 144.}

The underwriter will extract underpricing rather than renegotiate its underwriting fee even though it is unlikely to keep the full amount of the underpricing because renegotiating the underwriting fee may be seen by the issuer or by a Court as a more odious method of taking advantage of a superior bargaining position. On the other hand, even \textit{ex post}, the issuer or a Court may not know whether to attribute the underpricing to deliberate acts of the underwriter or to demand for the shares simply having been higher than forecast. It may be difficult to prove in Court that the underwriter did deliberately underprice – the underwriter would argue that the trading price was above fundamental value and that the deal was not underpriced.

4.3. Criticism - Underwriter can Commit to not Underprice

One criticism of the underwriter hold-up theory is that in a competitive underwriting market, an underwriter’s compensation (including benefits that the underwriter obtains through underpricing) should leave it with zero economic profit. Accordingly, to secure an underwriting, the underwriter would demand the competitive level of underwriting fee and would commit not to underprice. Alternatively, it would reduce its fee to an amount such that the fee combined with the benefits it gets from underpricing is equal to the competitive underwriting fee. If the underwriter attempted to extract more than the competitive fee, its competitors would undercut it and the underwriter would not get the business. In theory, in
a competitive market, underpricing would not affect the total compensation that the issuer pays to the underwriter.

The foregoing assumes that the underwriter and the issuer could irrevocably agree to the terms of the underwriting at the time they execute the letter of intent. Maskin & Tirole (1999) suggest that parties can always take steps to commit not to renegotiate, such as by setting up an irrevocable trust.\textsuperscript{112} Hart & Moore (1999) dispute this and consider that an assumption that parties can always commit not to renegotiate is unreasonable. On that point Hart & Moore (1999) conclude that “the degree of commitment is something about which reasonable people can disagree.”\textsuperscript{113}

Maskin & Tirole (1999) envisioned that the parties could commit themselves not to renegotiate (and not to enter into a new contract that removes the benefits of the original agreement from one of the parties).\textsuperscript{114} I suggest that that degree of irrevocability is not even desirable for the arrangements between an underwriter and an issuer, let alone possible. There are many unforeseeable circumstances which might occur between the signing of the letter of intent and the pricing of the offering. On the occurrence of some of these circumstances (e.g. changed business prospects for the issuer, emergence of a new competitor to the issuer, changed market conditions), renegotiation might make sense for both parties. However, given the superior information held by the underwriter, the issuer may not be able to discern if the underwriter is proposing to renegotiate because of “valid” reasons, or simply to increase the underwriter’s compensation. Even \textit{ex post} the issuer or a Court may not know whether or not underpricing was done to benefit the underwriter.

\textsuperscript{112} (Maskin & Tirole, 1999), p. 98.
\textsuperscript{113} (Hart & Moore, 1999), p. 128.
\textsuperscript{114} (Maskin & Tirole, 1999), p. 99.
Another criticism of the underwriter hold-up theory is that an issuer could avoid hold-up if it agreed to pay to the underwriter the competitive level of underwriting fee but required the underwriter to pay to the issuer an up-front non-refundable payment equal to the expected underpricing that the underwriter will extract.

There are several reasons why an underwriter might not agree to these terms. The first is that the underwriter will not receive the full amount of the underpricing. For example, the evidence disclosed in the eToys litigation was that Goldman Sachs attempted to extract 30 to 50% of trading profits that its customer realized on IPO shares allocated to them in the form of cross trade commissions.\(^{115}\)

The second reason is that the amount of the up-front payment would be unknowable at the time the letter of intent is entered into since the underwriter would not know at that time the number of shares that would be issued nor the issue price of those shares. The underwriter may not even be able to form a reasonable estimate of the value of the issuer at the commencement of the IPO process. In any event, the up-front payment would have to be very large. At approximately 18% of the offering price, the average amount of IPO underpricing is greater than all other IPO expenses, including the underwriting fee of 7% of the issue.\(^{116}\) A large up-front payment may attract both “high quality” and “low-quality” issuers. Low quality issuers would be prepared to commence the IPO process in exchange for a large up-front payment but may only be able to issue shares at a low price, if at all. Underwriters may not be able to distinguish between low quality and high quality firms at the beginning of the IPO process and thus would reduce the up-front payment to that which

\(^{115}\) Supra note 53, cross-trades are simultaneous buy and sell orders for the same stock at the same price. The only purpose of such trades are to generate commission income.

it would pay to a low quality firm. Lowering the payment may further reduce the average quality of the issuers who are willing to accept the payment.\textsuperscript{117}

4.4. Model of Underwriter Hold-up

The following is a simple model of the relationship among underwriter hold-up, IPO underpricing and IPO volume. Assume that there is an entrepreneur who is contemplating taking her company public. She holds 100% of a private company and the value of that stake is $V_{pr}$. Assuming that the entrepreneur is risk neutral, she will commence the IPO process if the expected value of her stake in the company by commencing the IPO process, $E(V_c)$, is greater than the value of her stake in the company as a private company (formulaically, if $E(V_c) > V_{pr}$).

If hold-up is not possible (i.e. the underwriter can irrevocable commit not to underprice), then:

$$E(V_c) = (P_c * V_{pu}) + [(1 - P_c) * V_f],$$

where $P_c$ is the probability of completing the IPO process once started, $V_{pu}$ is the value of the entrepreneur’s stake in the company (net of all IPO expenses including the agreed upon underwriting fee) if it becomes a public company and $V_f$ is the value of the entrepreneur’s stake if the IPO fails to be completed. In the model, $V_f$ is lower than $V_{pr}$ due to (i) the costs incurred in the IPO process that do not benefit the company if it remains a private company, (ii) the costs of having to change its corporate structure back to one more suited to a private company and (iii) the opportunity cost associated with the fact that the company is unlikely to ever become a public company. I will call these costs “failure costs”.

\textsuperscript{117} A variation of the lemons issue, (Akerlof, 1970)
Assume that if the underwriter cannot commit not to renegotiate the terms of the underwriting, at the time the issue is priced, the underwriter will make a take it or leave it offer to underprice by one half of the difference between the value of the entrepreneur’s stake in the company as a public company, \( V_{pu} \), and the value of her stake in the company after a failed IPO, \( V_f \). In that case:

\[
E(V_c) = (P_c \times [V_{pu} - \frac{1}{2}(V_{pu} - V_f)]) + [(1 - P_c) \times V_f].
\]

As \((V_{pu} - V_f)\) will be a positive number, \(E(V_c)\) will be lower if there is a possibility of underwriter hold-up than where the underwriter can commit not to underprice. Accordingly, an entrepreneur is less likely to commence the IPO process in the face of possible hold-up and, ceteris paribus, there will be fewer IPOs.

Of course, \(V_f\) decreases as failure costs increase. Accordingly, as failure costs increase, \((V_{pu} - V_f)\) will increase, underpricing will increase, \(E(V_c)\) will decrease and there will be fewer IPOs. As well, failure costs in and of themselves reduce \(E(V_c)\) as per the second part of the right side of the formula. Lowering failure costs will therefore increase the number of IPOs, ceteris paribus.

Table 1 provides a numerical example of how underwriter hold-up can cause an inefficiently low number of IPOs. The example is based on the following assumptions:

1. \(V_{pr} = 95\);
2. \(V_{pu} = 98\);
3. \(V_f = 90\);
4. \(P_c = 90\%\); and

\[118\] (Hart O. D., 1995), p. 77, uses the concept of the parties making a take it or leave it offer to illustrate the economic effect of hold-up where there is a possibility of renegotiation. The assumption that two parties will equally split the surplus in a bilateral monopoly situation is well established, see (Harsanyi, 1956), p. 147.
5. The underwriting fee that would prevail in a competitive market without underpricing is 2.

As the first column of Table 1 indicates, absent underwriter hold-up, the expected benefit to the entrepreneur of going public in a normal market with high failure costs is 2.2 and she would commence the IPO process. Another way of stating it is that the entrepreneur would receive fundamental value of 98 (value of the company as a public company of 100 less the competitive underwriting fee of 2) on a successful IPO.

<table>
<thead>
<tr>
<th>Table 1: Numerical Example of Underwriter Hold Up Causing Too Few IPOs</th>
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<tr>
<td>Value as public company</td>
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<td>Competitive underwriting fee</td>
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<td>Net value as public company</td>
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<td>Value after failed IPO</td>
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<tr>
<td>Maximum underpricing</td>
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<td>Assumed underpricing (% of maximum underpricing)</td>
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<td>Expected value of commencing IPO process*</td>
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<tr>
<td>Pre-IPO value</td>
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<tr>
<td>Benefit of IPO</td>
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<td>Commence IPO Process?</td>
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*90% x (Net value as public company - Assumed underpricing) + 10% x Value After failed IPO

The second column of Table 1 shows that, if it is not possible for the parties to commit not to renegotiate their contract, the entrepreneur would be worse off by commencing the IPO process than had she not commenced the process. Her expected value
of commencing the IPO process is 93.6, which is 1.4 less than the value of her stake had she not commenced the IPO process. Accordingly, she would not commence the process. This example shows that underwriter hold-up could cause entrepreneurs to not commence an IPO process where it would have been efficient for them to do so in the absence of underwriter hold-up.

The third column shows what happens if the value of the entrepreneur’s stake after a failed IPO is 94 rather than 90 (i.e. the failure costs are 1 rather than 5). In that case, the entrepreneur will commence the IPO process since the expected value of commencing the IPO process is 95.8, which is 0.8 higher than the pre-IPO value of the company of 95. The take it or leave it offer will be an underpricing of 2 (rather than 4 in the case where IPO costs were 5). This shows that reducing the cost of the IPO process may reduce underwriter hold-up, reduce underpricing and increase the number of IPOs.

If the value of public companies were to increase relative to the value of private companies (i.e. there was a hot stock market), the underwriter hold-up theory would predict more IPOs but more underpricing. The higher value of public companies relative to private companies would leave more surplus, which would be split equally between the issuer and the underwriter. In the example in the last column of Table 1, the net value of the entrepreneur’s stake as a public company increases from 98 to 118. In that case, the entrepreneur will commence the IPO. An equal split of the surplus of 28 between the entrepreneur and the underwriter leaves the entrepreneur with an expected net benefit of commencing the IPO process of 7.6. In that example, underpricing is relatively high at 14.
These results are consistent with the well-established empirical data of both a large number of IPOs and high underpricing in hot stock markets.119

4.5. Anecdotal Evidence: The Facebook IPO

The underwriter hold-up theory might explain why there was no underpricing in the Facebook IPO. Facebook would have been in a much better bargaining position vis-à-vis its underwriter than most issuers. By the time of its IPO, Facebook was already a large, well-known company that had experience in dealing with underwriters in its previous $2 billion private placement of stock.120 As well, there had been substantial trading in its stock, so Facebook would have had a good sense of the demand for its stock.121 Facebook was also very profitable and had about $3.9 billion of cash at the time of its IPO, so there was no pressing need for raising capital.122 Presumably, Facebook would have had good alternatives if it had not completed the IPO.

By all accounts, Facebook bargained very hard with its underwriter, Morgan Stanley, to get the highest price possible.123 During the bookbuilding process, the price range of the offering was increased from $28 - $35 to a range of $34 - $38, the size of the offering was increased by 25% and the shares were eventually priced at the top end of the revised range of $38.124 Apparently, Morgan Stanley wanted to price the issue closer to

119 (Loughran & Ritter, 2002); (Lowry, 2003).
120 (Diamond, 2012).
121 The trading took place over internet-based trading sites such as SecondMarket, which allow sophisticated shareholders to trade amongst themselves (Pritchard A. C., 2012), p. 14.
122 Facebook registration statement, p. 10.
123 (Diamond, 2012).
124 http://www.reuters.com/article/2012/05/16/us-facebook-shares-idUSBRE84F02320120516
One can speculate that if the underwriter had not given into Facebook’s demands, Facebook would have eventually gone public with another underwriter. On the other hand, Morgan Stanley stood to lose a very large underwriting fee on the $16 billion raised on the IPO, as well as the loss of prestige at having lost the Facebook IPO.

4.6. Empirical Evidence of Underwriter Hold-up

As the Facebook IPO exemplifies, larger and more established companies might be expected to have better bargaining power with the underwriters and better options if the IPO fails. Accordingly, they would be less susceptible to underwriter hold-up than smaller, younger companies. Studies have consistently shown that IPO underpricing is lower for larger offerings and for more established issuers.126

A prediction of the underwriter hold-up theory is that the higher the costs of the IPO process and the longer the time period between retaining the underwriter and completion of the offering, the higher will be the degree of underpricing as both increase the issuer’s relationship-specific investment. As the regulatory framework of the IPO process become more onerous, it is reasonable to assume that IPO costs increase and the time to completion become longer. Accordingly, the theory predicts that as the IPO regulatory framework becomes more onerous, the underpricing extracted through underwriter hold-up will be higher. There is evidence in the Finance literature to support this proposition.

Chambers and Dinson (2009) studied the degree of underpricing before and after the introduction of the 1948 U.K. Companies Act which mandated financial disclosure. They hypothesized that increased disclosure would narrow the information gap between issuers

125 (Diamond, 2012).
126 (Engelen & van Essen, 2010), Table 1; (Loughran & Ritter, 2004), p. 18.
and investors, which would result in lower underpricing.\textsuperscript{127} In fact the opposite happened. Underpricing was 3.80\% in the years prior to passage of the Act (1917 – 1945) and 9.15\% in the years following passage of the Act (1946 to 1986).\textsuperscript{128} Underpricing on IPOs completed since 1986 (when financial disclosure rules were again tightened) is even higher, at 19\%.\textsuperscript{129} They cite a number of reasons for the result, led by a reduced level of trust among issuers, underwriters and investors.\textsuperscript{130} The hold-up problem would also explain their result. More disclosure may indeed have reduced the information gap but the new regulatory framework would also have made the IPO process longer and more expensive, leaving more scope for underwriter hold-up.\textsuperscript{131} In fact, prior to 1929, 30\% of companies did not even use an underwriter.\textsuperscript{132}

Additional support may be found in Shi, Pukthuanthong, & Walker (2013), who looked at whether better disclosure reduces IPO underpricing. They used a cross country study to test the relationship between disclosure rules in a country and underpricing in that country. Interestingly, in their regression analysis, they controlled for liability and public enforcement standards. They found that disclosure was indeed negatively correlated with underpricing (i.e more disclosure, less underpricing) but that liability and public enforcement standards were positively correlated with underpricing (i.e. the stronger the liability and public enforcement standards, the higher the underpricing).\textsuperscript{133} Using various firm governance measures, Boulton, Smart, & Zutter (2010) find that underpricing is

\textsuperscript{127} (Chambers & Dimson, 2009), p. 1408.  
\textsuperscript{128} (Chambers & Dimson, 2009), p. 1408.  
\textsuperscript{129} (Chambers & Dimson, 2009), p. 1408.  
\textsuperscript{130} (Chambers & Dimson, 2009).  
\textsuperscript{131} (Chambers & Dimson, 2009). This type of event study needs to be taken with a grain of salt since there may be many other reasons why underpricing increased over the years, none of which have been controlled for.  
\textsuperscript{132} (Chambers & Dimson, 2009), p. 1412.  
\textsuperscript{133} (Shi, Pukthuanthong, & Walker, 2013).
greater “in countries with strong investor protections.” Hopp & Dreher (2007) find that better accounting standards reduce underpricing but that more established stock markets increase underpricing.

In summary, there is a substantial amount of empirical evidence that more complex regulatory regimes are associated with more underpricing. Perhaps one way of testing the hold-up theory is to see whether there is a positive correlation between underpricing and a proxy for compliance costs, such as the size of the prospectus (measured in number of pages) or the time it takes to complete an IPO, controlling for firm size and other factors.

5. How to Reduce Underpricing and Improve Efficiency of the IPO Market

As discussed in section 2.4, the extent to which IPO underpricing poses an efficiency concern depends on whether or not the IPO shares are issued below “fundamental value.” If they are issued below fundamental value, ceteris paribus, fewer than the optimal number of IPOs occur and, accordingly, underpricing is inefficient. Theories based on underwriters exploiting their superior information appear to explain at least part of the IPO underpricing, particularly once underwriter “hold-up” is seen as a reason why issuers allow the underpricing. The evaluation of potential solutions to the underpricing problem in the balance of this section is based on the assumption that IPO shares are issued below fundamental value.

5.1. Reduce Costs of Going Public

134 (Boulton, Smart, & Zutter, 2010), p. 207.
Under the underwriter hold-up theory, the possibility of IPO underpricing causing too few IPOs increases with the cost of complying with the regulatory framework of going public. Even if the underwriter hold-up theory does not hold, implementing a less complex regulatory system may reduce underpricing as there is evidence that underpricing increases with market complexity and strength of legal enforcement.\textsuperscript{135} If the regulatory framework is made simpler and less costly to comply with, underpricing should fall and there ought to be more IPOs.\textsuperscript{136} To give some idea of the magnitude of the relationship between underpricing and the volume of IPOs, Ritter (2013) calculates that a decrease in underpricing equal to 5\% of firm value would lead to 10 additional IPOs in the U.S. each year.\textsuperscript{137}

It is important to distinguish between rules relating to disclosure and those relating to the enforcement of the disclosure rules. Empirical studies show that better disclosure rules reduce underpricing but that highly developed enforcement rules increase underpricing.\textsuperscript{138} Accordingly, the focus ought to be on easing the regulatory and enforcement rules which, at least in the U.S., have become more burdensome over time.\textsuperscript{139}

The Securities Act of 1933\textsuperscript{140} was the first U.S. federal legislation mandating disclosure of information prior to an issuance of shares on an IPO. While the essential

\textsuperscript{135} (Hopp & Dreher, 2007); (Shi, Pukthuanthong, & Walker, 2013); (Chambers & Dimson, 2009).
\textsuperscript{136} A simplified regulatory framework should also reduce other IPO transaction costs, such as legal and accounting costs, which would give a second boost to IPOs.
\textsuperscript{137} (Ritter J. R., 2013) pp. 6 and 22.
\textsuperscript{138} (Shi, Pukthuanthong, & Walker, 2013); (Hopp & Dreher, 2007). Easterbrook & Fischel (1984) assume that there is a public benefit in securities regulation and suggest that the focus should be on comparing the costs and benefits of “one kind of regulation against another”. They note that in the 50 years since the passage of the 1933 Securities Act, there had been no “scientifically-acceptable” cost-benefit studies regarding disclosure rules reducing fraud or increasing investor confidence.
\textsuperscript{139} (Mahoney P., 2009).
legislative framework has not changed much since that time, Mahoney (2009) observes that:

“[The Securities Act of 1933] began as a contracting system but over time Congress and the Securities and Exchange Commission have added an increasing number of regulatory features.”141

Mahoney (2009) gives as examples the fact that the original Act allowed small companies to opt out of continuing mandatory disclosure by listing on the over the counter market. This exemption was eliminated in 1964.142 After a spate of securities frauds in the early 2000s (e.g. Enron), the Sarbanes-Oxley Act143 was passed to require stronger accounting standards, greater management and director oversight of internal control and criminal liability on CEOs and CFOs for failing to properly oversee financial reporting.144 Langevoort (2007) suggests that the complexity introduced by Sarbanes-Oxley gives auditors and corporate lawyers greater “rents”.145 It is reasonable to conclude that lawyers and accountants are likely to interpret Sarbanes-Oxley in a way that makes compliance costly, so as to maximize their rents. Underpricing does appear to have increased over time.146

Mahoney (2009) also suggests that a high risk of securities litigation in the U.S. may be discouraging companies from going public, noting that “large-scale and exceedingly costly securities fraud litigation is a fairly recent phenomenon.”147 Various changes to class-action procedural rules since the Securities Act of 1933 was enacted have

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141 (Mahoney P., 2009), p. 325.
142 (Mahoney P., 2009), p. 328.
144 (Mahoney P., 2009), p. 329.
146 (Ritter & Welch, 2002), p. 1816; (Chambers & Dimson, 2009).
147 (Mahoney P. G., 1995), p. 331; (Ritter J. R., 2013) at p. 22 suggests that one way of increasing the number of IPOs in the U.S. is to restrict groundless class action lawsuits.
also made shareholder lawsuits more prevalent. The strong risk of shareholder lawsuits have likely induced issuers and underwriters to take greater care in the preparation of the prospectus during the IPO process, thus increasing the cost of the process.

The current drought in IPOs could derive from issuers refusing to go public because the high cost of complying with the complex system means that there is a good chance that issuers will get held up by their underwriters. The JOBS Act proposes to reduce the complexity of the IPO process by, among other things, exempting new IPOs from certain regulatory requirements, including complying with Sarbanes-Oxley for up to 5 years unless the issuer meets certain revenue or market capitalization requirements. It also reduces the number of pre-IPO years for which audited financial statements are required from 3 to 2. These steps may reduce the costs of an IPO, which may reduce underpricing and increase IPOs.

Prior to the JOBS Act, underwriters were prohibited from soliciting expressions of interest from potential investors in an IPO until the preliminary prospectus was filed. Under the JOBS Act, underwriters may now approach investors about pricing even before the prospectus is filed. Allowing discussions with potential investors about pricing to occur earlier in the process might reduce the hold-up problem. If the issuer is unhappy with the price range, it might be less costly to withdraw the offering or to change underwriters than if price discovery occurs later in the process.

148 (Mahoney P., 2009), pp. 333 & 337 In the 2000s, approximately 2% of public companies were involved in shareholder class action lawsuits.
5.2. Abolish Strict Public Private Distinction

Under the Securities Exchange Act of 1934, a company is either private and largely exempt from disclosure rules or is public and subject to the full panoply of rules.\textsuperscript{153} Private companies can still sell securities to accredited investors\textsuperscript{154} under private placements exemptions.\textsuperscript{155} However, there are practical limitations to such private placements. Prior to the Jobs Act, private companies were not permitted to make a general solicitation for the sale of securities.\textsuperscript{156} General disclosure of information to the public at the time of a private placement could have caused the offering to be considered a distribution to the public, which would cause the company to become public under the Securities Exchange Act.\textsuperscript{157} As well, prior to the JOBS Act amendments, once the number of shareholders of a company exceeded 500, it was automatically considered to be a public company.\textsuperscript{158}

Pritchard (2012) argues that the mismatch between the public-private distinction under the Securities Act and the Exchange Act causes “the transition from private to public [to] inevitably be awkward, abrupt and fraught with problems for issuers, investors and regulators.”\textsuperscript{159} This abrupt move from a private to a public company may also contribute to the hold-up problem.

\textsuperscript{154} §§ 230.501(a)(5)–(6), includes investors whose annual income is greater than $200,000 or who have assets of $1 million.
\textsuperscript{155} § 4(a)(2) of the Securities Act.
\textsuperscript{156} 17 C.F.R. § 230.502(c) (2012).
\textsuperscript{157} Prior to its IPO, Facebook proposed a large U.S. public offering. The offering garnered a great deal of press coverage. This publicity could have caused the issuance to have been considered a public distribution of securities. To avoid that risk, Facebook withdrew the offering and raised capital outside of the U.S. (Pritchard A., 2012), p. 33.
\textsuperscript{158} 17 C.F.R. § 240.12g-1.
A system which allows private company shares to have some trading on public markets and which permits private companies to make some public disclosure may greatly reduce the hold-up problem. Such a system has been proposed by Pritchard (2012). Under his proposal, a company below a certain market capitalization or trading volume threshold would be considered private. That company could sell shares to accredited investors and those investors could freely trade shares amongst themselves. Once a company exceeded the threshold, it could choose to become public and would do so by filing the periodic disclosure documents that public companies are required to file. After some period of time following the first filing, the company could offer shares to the public and existing shareholders could sell their shares to any investor (not just to other accredited investors).

One benefit of the scheme proposed by Pritchard (2012) is that issuers would be less reliant on underwriters at the time they first sell shares to the public. The disclosure documents could be prepared and filed well before any decision was made to sell securities to the public. As well, trading in the shares between accredited investors would diminish the role of the underwriter in price discovery. As a result, once a company decided to issue shares to the public, the company could proceed to closing the offering much more quickly, with less relationship-specific costs and with less asymmetric information than under the current IPO regime. Accordingly, the company would be less subject to hold-up.

161 For example, over online trading sites such as SharesPost and SecondMarket (Pritchard A., 2012).
The JOBS Act goes some way to creating the system proposed by Pritchard. It increased the maximum number of shareholders that a private company may have to 2000 and excludes from that count shareholders who acquired their shares through employee remuneration plans.\textsuperscript{163} The JOBS Act also eliminated the prohibition on general solicitations by private companies, meaning private companies can more widely disseminate information without fear of being found to have made a “distribution to the public”.\textsuperscript{164} Other changes were made to make private offerings more inviting, such as allowing someone who acquires shares in a private offering to freely sell them to qualified institutional buyers.\textsuperscript{165}

Prior to the JOBS Act, the Securities Act exempted offerings of less than $5 million from the full panoply of disclosure requirements if the offerings were made to accredited investors. The JOBS Act increased the limit from $5 million to $50 million. Offerings under these provisions are subject to liability under Securities Act but are exempt from the strict liability rules under §11 of that Act.\textsuperscript{166} However, the SEC must develop detailed rules before this provision of the JOBS Act comes into effect.

Increasing the private placement limits and giving shareholders in private placements the ability to sell their shares may make going public less pressing. As well, when an issuer decides to go public, it may have more experience in dealing with the

\textsuperscript{164} § 201(a)(1) (codified at § 4(b) of the Securities Act); (Pritchard A., 2012), p. 1012, (Ritter J. R., 2013), p. 16, notes that these changes reduce the cost of going public, suggesting that these changes will induce fewer, rather than more companies to go public.
\textsuperscript{165} § 201(a)(2), qualified institutions are those with at least $100 million of assets (17 C.F.R. § 230.144A(a) (2012)).
\textsuperscript{166} (Pritchard A., 2012), p. 1010.
regulatory system, as it will have had to comply with at least some disclosure requirements and it may be able to more quickly and cheaply proceed through the going public process. This may make it less vulnerable to underwriter hold-up.

6. Conclusion

Theories of superior underwriter information may explain a substantial portion of observed IPO underpricing. In this paper, I show how underwriter hold-up can explain why issuers acquiesce to underpricing and why underwriters extract underpricing rather than increase their underwriting fee. I also show that underwriter hold-up and its consequent underpricing may cause an inefficiently low number of IPOs.

The potential for hold-up applies if the underwriter cannot commit to renegotiate the letter of intent. The complexity of the current IPO regulatory scheme makes it impossible for an issuer and an underwriter to irrevocably commit to the terms of an underwriting because of the long time period between the commencement of their relationship and the pricing of the offering. The high relationship-specific costs (in terms of both money and time) that an issuer must incur in order to go public and the cost to the issuer of a failed IPO under the current system also increase the potential for hold-up and the amount of underpricing.

Legislative changes, such as those proposed in the JOBS Act, which reduce the costs or complexity of going public may reduce the potential for underwriter hold-up and underpricing, and increase the number of IPOs. The proposal by Pritchard (2012) would
greatly reduce the information asymmetries between the underwriter and the issuer and would greatly reduce the costs and length of time needed to complete an offering of shares by the issuer. Accordingly, it may increase the number of IPOs.
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