A Further Exploration of Reverse Takeovers as an Alternative to Initial Public Offerings

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Abstract

In theory a reverse takeover (RTO) should be a viable alternative to initial public offerings (IPO) for private companies looking to access the public capital markets. Since the IPO process can be very timely and include significant costs, both direct and indirect, we analyze reverse takeovers as an alternative method. Recent papers have posed some similar questions, evaluating underpricing and market-timing, which we look to confirm. However, our paper seeks to build on these analyses, with a particular focus on long-term returns for RTO stocks. Overall we find that reverse takeovers can be successfully used instead of IPOs and should be sustainable long-term investments.

JEL classification: G12; G24; G32; G34

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I. Introduction

In November 2011 it was reported that Facebook would target an Initial Public Offering (IPO) around summer 2012. It had been speculated that Facebook would inevitably file for an IPO and become a publicly-traded company. However, a 2011 *New York Times* article by Steven M. Davidoff titled "Facebook May Be Forced to Go Public Amid Market Gloom" asserts that Facebook essentially had no choice but to list publicly. According to Davidoff, "Facebook [would] most likely exceed 500 shareholders" (2011) in 2011 and as a result, management would need to begin filing detailed reports with audited financial information with the Securities and Exchange Commission. According to the '500 Investor Rule,' recently dubbed the 'Facebook Rule,' once a company reaches a shareholder base of 500 different investors and has more than $10 million worth of assets, it must file financial reports with the SEC within 120 days of the end of their latest fiscal year. While this act does not require a company to list publicly, Facebook would lose one key advantage afforded to a private company: not having to file financial reports, which can provide competitors with insight into the company's operations, strategies and past performance. Similar rumors surfaced in 2004 when Google was readying itself for an IPO.

Additionally, reports indicated that Facebook employees were fighting internally for the company to file publicly. This combination, Mr. Davidoff and others have concluded, led Facebook to begin the process to list its stock in the public equity markets. Not surprisingly, the general public and media immediately assumed that Facebook's only viable option for accessing the public markets was an initial public offering (IPO). However, there exists another option, though used more sparingly, for a company to list

publicly: a reverse takeover (RTO).

A major milestone for American companies has long been the completion of its IPO, the first sale of stock by a company via the public equity markets. This goal is especially true for companies seeded by venture capitalists, a category that has grown to encompass more and more technology startups. A private company will ultimately choose to list in the public markets mainly in order to

i) Raise capital and/or

ii) Increase liquidity for existing shareholders.

There are, however, additional motivations such as increased company exposure.

The most popular types of IPO arrangements are:

i) "Firm commitment" contracts, in which the underwriter purchases the entire lot of shares from the company at a guaranteed price and sells them to institutional investors (mutual funds, hedge funds, pension funds, etc.) at the market-determined price in order to fill out demand

ii) "Best efforts" contracts, in which the underwriter sells as many shares as possible at the determined price

STAGE 1: (Weeks 1 - 8)

- Issuer selects counsel.
- Issuer organizes financials and other corporate documents.
- Lead Manager (Underwriter) and counsel begin due diligence process.
- Drafting of Registration Statement begins.

STAGE 2: (Weeks 4 - 8)

- Co-manager(s) is selected.
- Registration Statement completed.
- Issuer completes audited financials.

STAGE 3: (Weeks 9 - 13)

- Registration Statement filed with SEC.
- Wait 30 - 40 days for comments from SEC.

STAGE 4: (Weeks14 - 16)

- Receive comments from SEC.
- Amendments to Registration Statement are filed.
- Preliminary prospectuses are printed.
- Institutional sales executives set up road show meetings.
- Road show (2-3 weeks).

STAGE 5: (Week 16)

- SEC declares Registration Statement effective.
- Pricing call day before offering.
- Underwriting documents signed.
- OFFERING.
- Press release issued after offering.
- Final prospectuses are printed.

STAGE 6: (Week 17)

- Closing 3 days past offer.
- Closing documents are signed.
- Securities are distributed.

Figure 1 Notes – "Issuer" is the company that will be issuing equity; "Co-manager" is the investment bank(s) leading the offering; "Registration Statement" is also known as the Form S-1

Figure 1 illustrates a typical IPO process ("IPO timeline", 2001). The average timeframe for an IPO is 16-18 weeks. The first step, after deciding to offer stock to public investors, is to select an investment bank (or usually multiple banks), which will act as the underwriter/manager. Certain factors involved in this selection include existing relationships, reputation and research coverage. The next major step is drafting the Registration Statement, or Form S-1, to register with the Securities and Exchange Commission (SEC). This document contains information on the security (stock) issuer and is extremely detailed, as the publication is a key way for investors to evaluate such

new opportunities. Thus, the S-1 can take a significant amount of time and revisions before the SEC finally accepts it.

The IPO process then continues with the road show, where the bankers and company management travel to meet with potential institutional investors. Soon after the road show, execution of the IPO begins. After the SEC declares the S-1 effective, the co-managers can work on pricing the equity. This process is called "book building", as the co-managers generate and record investor demand before finally offering the equity on the open market.

If executed properly using the firm commitment process, the co-manager (investment bank) earns a profit through the price spread, the difference between purchase price and offer price. Very often, however, there are other underwriters involved in a transaction in addition to the co-managers. These secondary banks help assist the lead manager in selling the shares and are compensated with lesser, though still sizeable, fees. As shown by researchers such as Jay Ritter (2002), there are significant direct and indirect costs associated with an IPO. Direct costs are mainly investment banking fees, which empirically have been found to total 7% of a typical transaction, though this figure can vary (Moody, n.d.). Indirect costs result from underpricing, best described as "money left on the table" (Ritter, 2002, p. 273). Specifically, underpricing occurs when an IPO prices below its true market value, as calculated by:

$$\text{Underpricing} = \frac{(\text{Closing Bid Price on First Day} - \text{Offer Price})}{\text{Offer Price set by the co} - \text{managers}}$$

While underpricing varies greatly from transaction to transaction, it represents a significant opportunity cost for firms undergoing the IPO. Ritter's research found that, from 1977-1982, the average underpricing ("initial return") was 14.8% for firm commitment IPOs and 47.8% for best efforts IPOs. While Ritter's analysis showed a significant difference in underpricing for the two different IPO processes, the important takeaway is that underpricing is both present and sizeable for IPOs, regardless of the type. The combination of these direct and indirect costs reflects a significant negative for companies undergoing an IPO.

Before even beginning the IPO process, shareholders of a privately held firm must choose between going public or staying private as the company matures. The opportunity to cash out, raise capital for new undertakings, pay down debt, or significantly increase liquidity motivates private shareholders to "go public", even though going public is often associated with the costly and lengthy process of an IPO. An important alternative route to get access to the public market is sometimes ignored by shareholders and management teams. Instead of an IPO, a company can undergo a reverse takeover (RTO). According to the SEC, a reverse takeover, also known as a reverse merger, is a transaction where "an existing public 'shell company,' which is a public reporting company with few or no operations, acquires a private operating company – usually one that is seeking access to funding in the U.S. capital markets" (Securities and Exchange Commission [SEC], 2011, p.1). These public firms usually are companies that were left from previous transactions where certain operations were sold, that entered bankruptcy, or that were simply created with the sole purpose of eventual acquisition. As outlined in the SEC investor bulletin "Reverse Mergers" and illustrated in Figure 2, a RTO occurs when:

1) Shareholders of the private operating company accumulate a majority of the public shell company's outstanding shares
2) Now, the private company's shareholders have a controlling interest in the public shell company. At this point, typically the public company's board of directors is replaced with that of the private company
3) The public company's assets and business operations now reflect those of the formerly private company
4) (Optional) File to have the public company's stock ticker changed and restructure the public entity accordingly

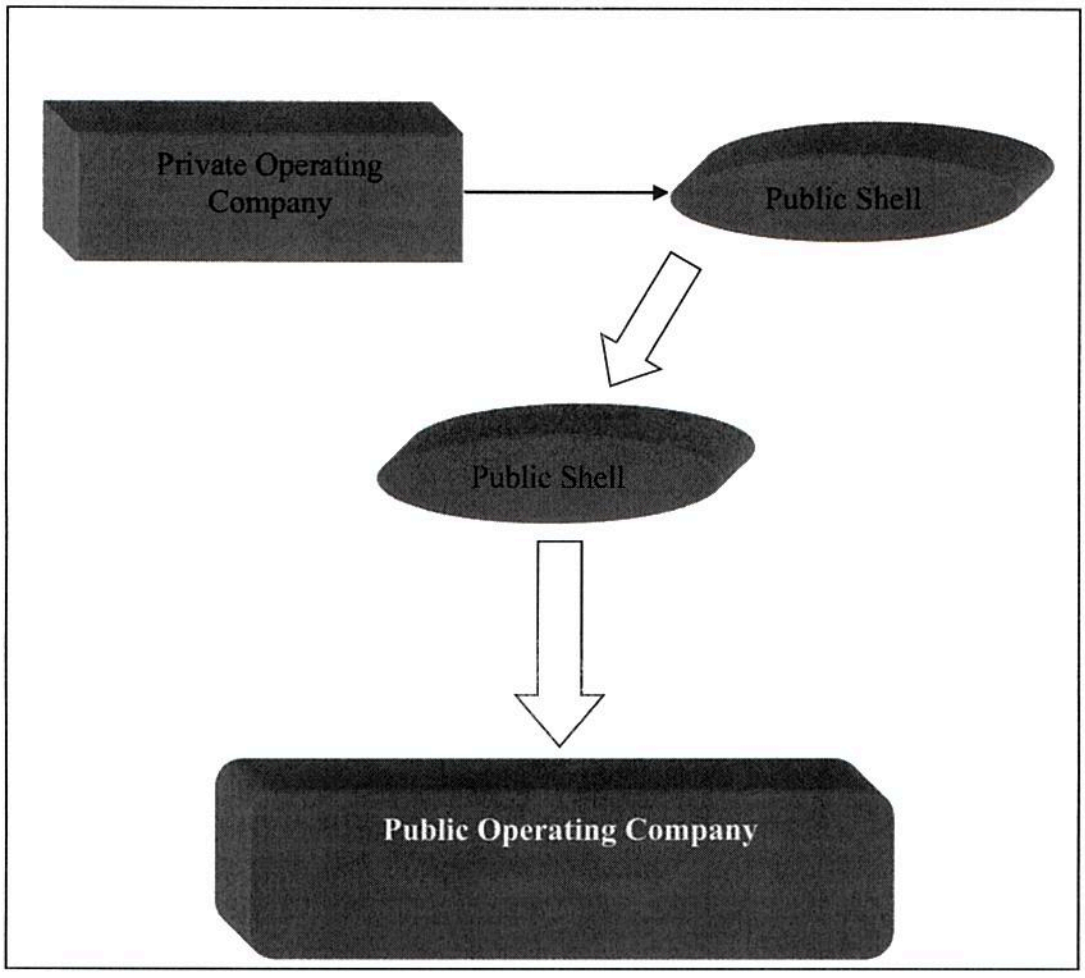

Figure 2 – Illustration of public-private Reverse Takeover

While IPO companies must file such documents as an S-1, the only document necessary for a reverse merger is a Form 8-K filing. According to the Office of Management and Budget (OMB), the estimated average burden hours, defined as the total burden hours expended in completing the form, per S-1 filing are 972.32 ("Form S-1", n.d.). On the other hand, an 8-K filing is simply used to report a material event to shareholders. There are myriad reasons why a public company would file an 8-K with the SEC, but the important distinction is that it is significantly simpler than an S-1. In fact, the estimated average burden hours per response are merely 5.0 ("Form 8-K", n.d.).

Though both transactions arrive at the same end outcome of listing a company in the public equity markets, IPOs and RTOs differ greatly. They key advantages and disadvantages of each are:

Initial Public Offering (IPO)	
Advantages	**Disadvantages**
• Shareholder's Equity increases • Raise capital for various projects or corporate actions • Seen as prestigious occasion • Increases company's public exposure and name recognition • Not much risk associated with IPO process	• Must use investment bank, along with lawyers, and pay them direct fees • Incur significant indirect costs via underpricing • Time-consuming and drawn out process (can last over a year) • Affected by capital markets environment • Stock dilution • Stock sale lock-up period for insiders (company management)

Reverse Takeover (RTO)	
Advantages	**Disadvantages**

• Not necessary to hire underwriter and pay fees
• Can be a much quicker process
• Separates fundraising and listing processes
  ○ Greater number of financing options available
• Not as dependent on conditions of capital markets
• Less incentive for underpricing
• Less stock dilution than an IPO
	• Stigma associated with transaction. Could be viewed as riskier since it's an untraditional path
	• May go unnoticed by some institutional investors
	• Shareholders can sell their stock instantly, potentially driving down the company value
	  ○ Some transactions require a lockup period
	• Risks of fraud or abuse
	  ○ SEC issued an investor bulletin in June 2011
	• Liquidity is only increased if the company markets their stock to the public (ex: Creation of an Investor Relations Division)

In theory a Reverse Takeover should be a viable option for private companies looking to access the public capital markets. This is especially true for companies without intensive funding demands that simply need increased liquidity. Many of the theories related to underpricing in IPOs (incentives of underwriters, price behavior, and IPO regulatory process) do not apply to RTO transactions. Since the IPO process can be long and include significant costs, both direct and indirect, we seek to analyze reverse takeovers as an alternative to initial public offerings for firms seeking access to public capital markets. In late 2011 and two months into our preliminary research, Paul Asquith (M.I.T. Sloan School of Management) and Kevin Rock (Chicago Booth Graduate School of Business) posed a similar question. Specifically, Asquith and Rock evaluated reverse

takeovers as a test of IPO theories surrounding initial returns, looking at underpricing. Our paper seeks to build on this analysis, with a particular focus on long-term returns. We also seek to confirm some of their findings using our own data set (transactions listed by SDC and Bloomberg from 2004-2011). Ultimately, we hope to determine if RTOs can still be viewed as an alternative to IPOs. Our paper begins with an overview of reverse takeovers in order to provide context for the reader, and then continues with a review of existing economic literature on both reverse takeovers and IPOs. After addressing current theories related to each transaction, we offer a description of our data set before evaluating the data and interpreting our various analyses.

II. History of Reverse Takeovers and Initial Analysis

According to a compilation of data from Bloomberg and SDC Platinum services, there have been 395 completed reverse takeovers since January 1st, 2004 with the target, seller, or acquirer based in North America. Table 1 lists the number of reverse takeovers by year:

Aggregate RTO Data	
Year	**# of Deals**
2004	42
2005	44
2006	41
2007	47
2008	58
2009	65
2010	53
2011	45
Total	**395**

Table 1 – RTO Transactions according to Bloomberg and SDC

From this table, we can see that the number of RTO transactions has been fairly consistent since 2004, with a spike in volume from 2008-2010. This increase was perhaps because of the weak IPO market during those years, which is broken out in Table 2.

Aggregate IPO Data	
Year	**# of Deals**
2004	202
2005	194
2006	176
2007	202
2008	31
2009	63
2010	127
2011	117
Total	1,112

Table 2 – IPO transactions with shares listing in the US

While Table 1 shows that reverse takeovers do in fact occur somewhat regularly, the process has long received somewhat of a stigma due to its association with fraudulent companies, particularly Chinese ones. Listing in the US became a popular option for Chinese companies that were unable to secure loans from Chinese banks, which have traditionally favored state-owned enterprises. Chinese companies listing in the US via the reverse takeover process typically quote their shares on the OTCBB (Over-The-Counter Bulletin Board). While compliance costs are lower for the OTCBB than other US exchanges like NYSE or NASDAQ, all companies still must follow the rules of public companies as outlined by the Securities Exchange Act of 1934. Over the years there have been numerous Chinese RTO companies involved in questionable accounting practices and problematic corporate governance. Some of these Chinese RTO companies have used smaller American auditing firms, "which may not have the resources to meet auditing obligations when all or substantially all of the private company's operations are in another country." (SEC, 2011, p.2) As a result, the enforcement and corporation-

finance divisions of the SEC have launched investigations into how accountants, lawyers, and bankers have helped Chinese companies list onto American stock markets through manipulations of data and filings.

Despite the belief that reverse takeover transactions receive little notice from the media and general public, there have been several notable transactions in recent years, such as:

- Atari and JTS Storage (February 13, 1996)
- AirTran Holdings (July 11, 1997)
    - Formed when ValuJet Airlines was acquired by AirWays Corp
- US Airways and America West Airlines (September 27, 2005)
- Citadel Broadcasting Corporation and ABC Radio (February 6, 2006)
- New York Stock Exchange and Archipelago Holdings (February 27, 2006)
- Frederick's of Hollywood and Movie Star (December 20, 2006)
- Stobart Group and Westbury Property Fund (August 15, 2007)

A key reason these legitimate transactions were able to occur was the passage of SEC Rule 419 in 1992, "designed to protect shareholders from fraud in reverse merger transactions" (Feldman, 2006, p. 43). With this rule, the SEC started treating shell companies differently; increasing filing requirements for such companies in order to better protect shareholders and investors. The passage of Rule 419 led to a decrease in the amount of fraudulent cases and was likely the most significant change in regulation of reverse takeovers by the SEC until 2005. With new rules published in "Use of Form S-8, Form 8-K, and Form 20-F by Shell Companies," private companies transacting with

public shells now have to produce a major filing within four days of closing, as well as adhere to other minor changes in rules. By more closely regulating reverse takeover transactions, the SEC has helped further legitimize this process. As shown in Table 1, RTO transactions have generally increased in recent years and this trend could very well continue going forward.

III. Literature Review

a. Reverse Takeovers

Compared to the IPO process, reverse takeovers have not been covered as extensively by academics. "Backing into being public: an exploratory analysis of reverse takeovers" (Gleason & Wigginsiii, 2005) is one of the few papers that focused on using a quantitative approach to understanding reverse takeovers. First, the authors collected data from 121 reverse takeovers from 1987 to 2001, and analyzed the distribution by year, comparing the distribution to that of the IPO market. The authors also examined rationales behind the reverse takeover process, analyzing the reasons cited for the transactions. Next, the authors analyzed the industry characteristics of the 121 reverse takeover transactions, trying to identify the relationship between the industry category of the shell company and the private company. Later in the paper, the authors analyzed the economic performance of the reverse takeover company and concluded that the reserve takeover approach is beneficial for owners of distressed companies as a way to recover part of their investment.

One recent study has shed great light on the reverse takeover process and its possible role as an alternative to IPOs: "A test of IPO theories using reverse mergers" by Asquith and Rock (2011). According to the authors, "since reverse mergers are an alternative to IPOs yet do not include the institutional requirement of an underwriter, they provide an out-of-sample test of these IPO underpricing theories." (p. 3) The main question posed by Asquith and Rock was how a firm should choose between an IPO and a reverse takeover when going public. To answer this question, the authors compared the two (IPOs and RTOs) on a year-by-year basis. They compiled all public-public (reverse

takeover where both companies are already public and thus the motivation is not to list in the public equity markets), public-private (reverse takeover in the traditional sense, where a private company takes over a public one), and public-sub (reverse takeover where a subsidiary takes over a public company) reverse takeovers from 1990 to 2008 and after removing unsuccessful transactions, they analyze

a) 3- Day Excess Stock Returns, by looking at each stock's cumulative excess stock returns. The authors calculate excess stock returns as:

Firm's return – NYSE/AMEX/NASDAQ market return over the same period

b) 3-Day Excess Trading volume, by analyzing the change in trading volume around the announcement date. This is calculated as:

Average Daily Volume over the 3 day periods surrounding the announcement date – Average Daily Volume over the period 25 to 16 trading days before the announcement date

The results of this study are copied below:

			Announcement Date			Outcome Date			Cumulative	
	Firm Position and Completion Status	Number of Reverse Mergers	% Excess Returns		% Excess Volume*	% Excess Returns		% Excess Volume*	% Excess Returns	
			Three Day (-1, +1)	% Positive	Three Day (-1, +1)	Three Day (-1, +1)	% Positive	Three Day (-1, +1)	Cumulative for period	% Positive
Public- Private	Bidder	124	21.8% (5.82***)	72.6%***	1169% (3.81***)	1.9% (0.64)	49.2%	824% (2.72***)	23.8% (3.26***)	58.9%**
	Completed	77	24.0% (4.94***)	76.6%***	761% (4.57***)	9.1% (2.40**)	59.7%*	854% (1.87**)	46.6% (5.19***)	68.8%***
	Withdrawn	47	18.2% (3.08***)	66.0%**	1858% (2.41***)	-9.9% (-2.37**)	31.9%***	774% (2.83**)	-13.6% (-1.30)	42.6%

Figure 3– Public-Private Reverse Merger Results from Asquith & Rock (2011, p.33)

We are most interested in the public-private transaction results since this is the type of RTO analyzed in our paper and the traditional form of RTO. The authors observed that excess returns for the bidding firm were similar to those seen in companies completing IPOs. Additionally, the excess volume of RTO bidders was seen as "large and statistically significant." (18) Since shareholders still retain a large percentage of their stock once the merger is completed, the authors conclude that the results are consistent with RTOs serving as an alternative to IPOs.

To examine if subsequent financing or changing company operations were responsible for the excess returns, the authors regress 3-day excess return against merger type, exchange, and other explanatory variables:

(1) 3-Day Excess Returns = a_0 + a_1Public-Private + a_2Public-Sub + a_3Target Ownership + a_4NASDAQ + a_5AMEX + a_6Completion-Outcome + a_7Market Cap + a_8Shell+ a_9PIPE+ a_{10}Equity Finance + a_{11}SIC Code

Figure 4 – Regression of 3-Day Excess Announcement Date Returns from Asquith & Rock (2011, p.34)

In this regression, the variables represent:

- Public-Private, Public-Sub: Dummy variable for type of RTO
- Target ownership: Percentage of stock in the merged firm held by the target's shareholders
- NASDAQ, AMEX: Dummy variable for listing exchange
- Completion-Outcome: Dummy variable for final status of transaction

- Market Cap: Market Capitalization of the bidder's stock 5 days post-transaction
- Shell: Dummy variable if a shell company is used
- PIPE: Dummy variable for the use of PIPE financing at the time of the merger
- Equity Financing: Dummy variable if equity financing was used within 12 months after the merger
- SIC Code: Dummy variable if the company keeps the same SIC code after the merger

In this regression, the only statistically significant variables are Public-Private, Public-Sub, and Target Ownership. In regards to the other variables, the results show that new financing is not important for initial RTO returns, and neither are synergies between bidder and target, firm size, or shell use.

Overall, the Asquith & Rock paper has many interesting findings. They found that the average three-day excess return (post-announcement) for public-private reverse mergers was 21.8%, which is very similar to IPO price behavior. Thus, they conclude that reverse mergers are an alternative to IPOs and have played a greater role in recent years. Some other findings were that the status of the target did not greatly affect market reaction, nor did the issuance of new equity. RTOs were smaller in size than IPOs, on average, which could explain the decision to pursue such a transaction since "the fixed costs of being acquired by a shell corporation are much smaller than the underwriting and other fees of an IPO." (Asquith & Rock, 2011, p.17)

The Asquith & Rock paper offered a great basis to understanding prior work on reverse takeovers, though other papers must also be mentioned, and are in fact cited by Asquith and Rock. "The choice of IPO versus takeover: Empirical evidence" by Brau, Francis, and Kohers (2003) is particularly useful, as it first presents the question of how firms decide between conducting an IPO or reverse takeover. The authors identify four chief factors that drive this decision process: industry characteristics, market timing, demand for funds for private companies, and certain deal-specific factors. To analyze variables within each set of factors, the authors test for differences in means and differences in medians between the IPO sample and RTO sample. Additionally, they run an interesting logistic regression and estimate the following model (Brau, Francis & Kohers, 2003, p.601):

$$\begin{aligned}\text{[0 if IPO or 1 if Takeover]} = \alpha_i &+ \sum_{i=1,5} \beta_i \text{ industry-related factors} \\ &+ \sum_{i=6,11} \beta_i \text{ market-timing factors} \\ &+ \sum_{i=12,13} \beta_i \text{ deal-related factors} \\ &+ \sum_{i=14,22} \beta_i \text{ demand for fund factors} + \varepsilon_i,\end{aligned}$$

It should be noted that the data used contains transactions from 1984 to 1998.

Overall, the Brau study shows that firm and deal characteristics that are more likely for an IPO are "industry concentration, high-tech industry affiliation, current cost of debt, relative 'hotness' of the IPO market, firm size, and insider ownership percentage" (p.583) On the other hand, "high market-to-book industries, financial service sectors, highly leveraged industries, and deals involving greater liquidity for selling insiders show a stronger likelihood for takeovers." (p.583) While other studies have since

built on the work by Brau, Francis and Kohers, the paper is important to understand, as the authors claim they were the first to analyze a private firm's decision between an IPO and a reverse takeover.

b. Initial Public Offerings

The second set of insightful literature deals with initial public offerings (IPOs). "A model of the demand for investment banking advising and distribution services for new issues" (Baron, 1982) presents an interesting model to explain IPO underpricing. Baron theorizes that the investment banker is better informed about capital market conditions and demand for the new issue. Such asymmetry often leads to "adverse selection and moral hazard problems." (p.955) Baron ultimately concludes that IPO offer prices are lower than the levels that would be seen in the absence of asymmetric information. Years later Muscarella and Vetsuypens (1989) evaluated Baron's model in their paper, "A simple test of Baron's model of underpricing". Looking at 38 investment banks that completed IPOs and participated in the issue's distribution from 1970-1987, they observed "statistically significant underpricing of about 7 percent on the first day of trading." (p.135) In fact, underpricing was greatest in cases where the bank had a dominant impact on pricing its own stock. The authors thus conclude that Baron's model does not hold and instead, that "underpricing is a pervasive phenomenon that cannot be explained solely by information asymmetries between issuers and underwriters." (p.135)

One of the leading economists currently interested in the study of the IPO market is Professor Jay Ritter of the University of Florida. In his "Equilibrium in the IPO market" (2011) paper, Ritter addressed the underpricing of IPOs and the decrease in total volume since the end of the technology bubble in 2000. While part of the decrease is attributable to regulatory hurdles, he argues that there has been a structural change in the equilibrium of the IPO market. One of the main problems with the state of the market is that underwriters consistently underprice. However, listing companies seem content with

allowing this practice, as the underwriters have developed somewhat of an "oligopoly power" (p.28) due to the fact that there are a limited number of underwriters with industry expertise, a large reach with the institutional investor base (pension funds, mutual funds, hedge funds, etc.), and practical experience.

Ritter also discusses several popular reasons why IPO volume has decreased. One reason which we had not previously considered is the growth of the secondary market (market where securities are purchased from other investors, as opposed to issuers/dealers) for private companies, made possible largely by the Internet. Ritter claims that one rarely noted factor behind this dip is the decline in profitability of smaller companies compared to larger competitors. He claims this phenomenon has been exhibited by investor sentiment in the public markets and has influenced the decision behind pursuing an IPO. The final reason we found noteworthy and relevant for our study is that many companies, especially smaller ones, are disadvantaged by the large fixed costs that are incurred in order to comply with the Sarbanes-Oxley Act. This, combined with the decline in analyst coverage of smaller companies, is seen by the fact that the "median age of companies going public in the U.S. has increased from seven years during 1980-2000 to ten years during 2001-2010." (p.21)

Another study that was insightful regarding the IPO market was on "The Variability of IPO Initial Returns" (Lowry, Officer & Schwert, 2010). This paper investigates what some have deemed to be an excessive underpricing of IPO stocks in recent years. To evaluate IPO pricing, the authors evaluated the initial returns of IPOs and found there to be a great deal of volatility. The average underpricing was calculated as 22%, though nearly 1/3 of initial returns are negative. Thus, there is a great deal of

volatility with initial IPO returns, particularly during "hot IPO Markets" (p.425). The authors claim initial returns were more volatile for companies that were difficult to value because of informational asymmetries, such as differences in the reach of roadshows or the extent of filing updates. Such findings could have implications for smaller companies that are considering an IPO, but have fewer deployable resources.

IV. Theory Behind Initial Public Offerings (IPO) and Reverse Takeovers (RTO)

Our theoretical base for this paper addresses the factors behind a private firm's decision in choosing between an IPO and RTO to list publicly. The main considerations are financing, insider transactions, underpricing, firm size, market timing, liquidity, and industry-related factors.

As stated earlier, the need to finance can be a large determinant for how a private firm should list publicly. The IPO process combines the financing process through new equity issuance with the listing process, while an RTO separates the process into two steps, as the merger process does not involve any new equity issued. Shareholders of the newly merged company, however, still have the option to raise capital at a later date. This is often through PIPE (Private Investment in Public Equity) or other stock offerings, either in conjunction with or at a point following the merger. Thus, since the capital raising process is more indirect in an RTO, companies with significant fundraising needs would seemingly be better served undergoing an IPO.

The anticipation of insider transactions is another consideration when deciding between an IPO and RTO. It is generally accepted that insider shareholders can sell their shares more easily after an RTO transaction, since it is a merger. In comparison, "insiders who sell large portions of their firm in the IPO send a signal that the firm is overvalued. These negative signaling effects are less likely in takeovers since acquiring firms might face fewer information asymmetries relating to the target firm's value." (Brau, Francis & Kohers, 2003, p.585-586)

IPO underpricing is also a major reason why private firms would be wary of an IPO, as their total proceeds would not reflect the true value of the sold stock. Loughran and Ritter's paper (2004) suggested that the IPO discount could be rationalized by risk aversion behavior from the underwriters. If the IPO is under-subscribed, the underwriter has the obligation to purchase the rest of the stock for itself. In order to avoid such a situation, underwriters must offer the stock as a discount so that the shares are ideally over-subscribed. Also, in the investment-banking world it is extremely common for the underwriter to have an Asset Management division or in-house hedge fund. This can create a further conflict of interest in the process. In this Loughran and Ritter paper, allocation bias to certain investors is also mentioned as a rationale for the underwriter to discount an IPO share price so that its Asset Management clients or the investment bank itself can benefit from underpricing and the subsequent run-up in stock value. Underpricing could also be explained as a strategy to increase trading liquidity. The larger the spread is between expected first day price and offering price, the more likely it will be that shares get changed hands, which benefits the investment bank directly through trading commissions. Asquith & Rock also theorized that liquidity is another possible explanation for widespread underpricing in IPOs. According to this logic, a stock with high liquidity, in particular an IPO stock, will trade at higher levels than a peer with lower liquidity. Thus the immediate increase in IPO prices could be explained by the IPO's liquidity. We believe that this phenomenon is tough to explain by evaluating underpricing on an immediate basis (1-day or 3-day returns) and instead, must be evaluated in both the short-term and long-term. Nonetheless, these underpricing theories

are important for understanding why reverse takeovers could be advantageous for companies looking to access the public markets.

In addition to these theories on banker incentives and liquidity, Asquith & Rock present another interesting theory on underpricing that regards short selling interest. The authors point out that RTO stocks can immediately be sold short and trade freely from the announcement date to the completion date. They briefly explore the idea that RTOs result in more efficient pricing since "short sales can be executed at any time and the parties to the merger are free to promote the advantages of the deal prior to closing." (p.11)

While not another explanation for underpricing, fraction of firm sold is presented by Sugata Ray as a consideration for total size of underpricing. In his "IPO Discounts and fraction of the firm sold: theory and evidence" (2008) the author suggests that the IPO discount percentage decreased as the fraction of the firm sold during the IPO increased. Ray identified three key factors that cause this relationship: venture capital funding, issuance during the tech bubble, and high issuances in the tech industry. A lower fraction of firm sold implies that the total size of IPO was likely smaller in these instances. While not a direct connection, this increase in underpricing could also apply to smaller private firms. For such firms, the costs (both indirect and direct) should be a greater consideration due to their size relative to the firm's overall size. As implied by the Lowry, Officer & Schwert (2010) study mentioned in our literature review, smaller firms might be better served pursuing RTOs.

Firm specific factors aside, one of the biggest considerations for firms looking into the IPO process is market timing. The existence of hot IPO periods has been well

documented, and is clearly evidenced by the increase in IPOs during the tech bubble. Brau, Francis, & Kohers (203) write that "during periods characterized by high information asymmetry, adverse selection costs are high, and, as a result, fewer firms choose to issue equity." (p.592) Another consideration is overall investor sentiment, which often hinges on the levels of major stock market indices such as the S&P 500, Dow Jones Industrial Average, and NASDAQ Composite. Market timing seems to relate most directly to the IPO market, though "anecdotal evidence…suggests that IPOs and takeovers occur in waves that are negatively correlated." (Brau, Francis, & Kohers, 2003, p.592)

Overall there are many theories related to IPOs and RTOs separately. Our paper concentrates on the tradeoffs in deciding between the two transactions. As addressed, the main theories we have studied and considered are in relation to financing, insider transactions, underpricing, firm size, market timing, liquidity, and industry-related factors.

V. Description of Data

The data sources used for our paper are Bloomberg and Thomson Reuters SDC Platinum. While we initially decided that Bloomberg had a sufficient list of transactions, Paul Asquith and Kevin Rock, the authors of "A Test of IPO Theories Using Reverse Mergers," collected a very similar set of data from SDC. We think that a combination of the two yields a more comprehensive set of data since RTO transactions are not always made known to the public and thus could be missing from certain databases. Using these databases, we have identified 1,112 IPOs and 395 Completed RTOs from January 1st, 2004 to December 31st, 2011. To obtain IPO transactions, in addition to the above timeframe, the following criteria are used:

- Pricing range: 1/1/2004 – 12/31/2011
- IPO's Only
- Shares Offered: >1M
- Country: US

For our list of Reverse Takeover transactions, in addition to the above timeframe, the following criteria are used:

- Domestic Mergers
- Deal Status: Completed
- Deal Type: Reverse Takeover
    - Definition for SDC: "A merger in which the acquiring company offers more than 50% of its equity as consideration offered to the target company resulting in the target company becoming the majority owner of the new company." (Thomson SDC Platinum, 2012)

- Definition for Bloomberg: "A merger in which a private company acquires a public company in order to become public and avoid going through the IPO process." (Bloomberg, 2012)

For each Reverse Takeover transaction, we gathered the following data:

- Acquirer & Target Info
  - Name, Ticker, & SIC Code (Industry Code)
- Transaction Information
  - Transaction Value
  - Completion/Termination Date
  - Payment Type
- Stock Performance Data (First trading date until 5 years later or latest available date)
  - Closing Price
  - Volume
  - Shares Outstanding
  - Enterprise Value
  - Equity Value
  - Latest Annual Revenue
  - Latest Annual EBITDA
  - Price to Earnings (P/E) Ratio
  - Enterprise Value to EBITDA (EV/EBITDA) Ratio
  - Last Twelve Months Earnings Per Share (EPS)

VI. Evaluation of Data & Results

After first collecting all of the necessary data, we arrange the deals in chronological order. Table 3 and Figure 5 show a side-by-side breakout of annual RTO and IPO completed transactions from 2004 to 2011. Using the data and parameters explained in Section V, we calculated 395 total RTOs and 1,112 total IPOs completed during this timeframe, with each occurring an average of 56.75 and 114.75 times per year, respectively. There is a clear peak in the frequency of RTOs in 2009, with increases in occurrence also in 2008 and 2010. Prior to 2008, IPO annual volume seemed fairly predictable at around 180 to 200 deals per year. However, deal volume dropped significantly during the Great Recession of 2008, likely due to the weak global equity market, and has remained at much lower levels than those seen pre-2008. On the other hand, the number of RTOs increased when the number of IPOs significantly decreased. We imagine that both effects were likely caused by the unstable public equity market, and in particular, the new issue market.

Aggregate RTO Data		**Aggregate IPO Data**	
Year	**# of Deals**	**Year**	**# of Deals**
2004	42	2004	202
2005	44	2005	194
2006	41	2006	176
2007	47	2007	202
2008	58	2008	31
2009	65	2009	63
2010	53	2010	127
2011	45	2011	117
Total	**395**	**Total**	**1,112**

Table 3 – Annual Comparison of RTOs and IPOs

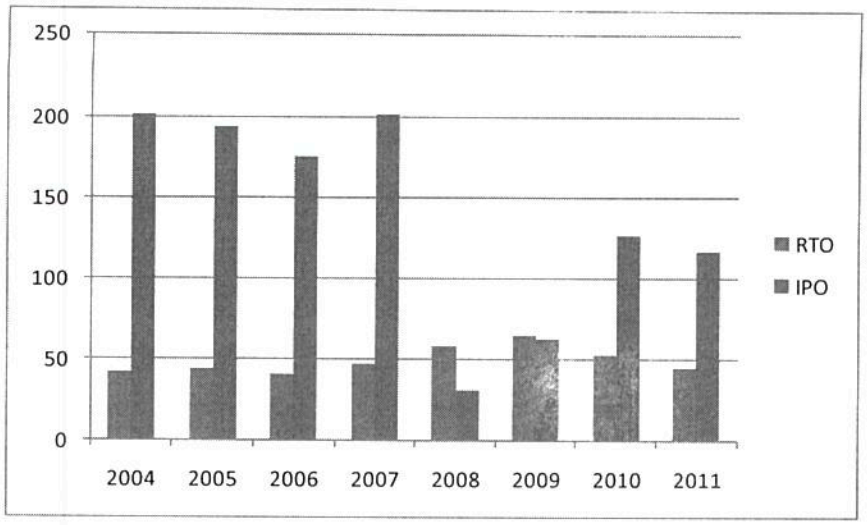

Figure 5 – Graphical Annual Comparison of RTOs and IPOs

For a more detailed chronological analysis, we look at the data on a quarterly basis, as seen in Appendix 1. To evaluate our theory that RTO volume and IPO volume are negatively correlated, we run a regression of the two quarterly data sets with RTO deals as the dependent variable and IPO deals as the independent variable.

$$\text{RTO Deals} = \alpha_0 + \alpha_1 \text{ IPO Deals}$$

Variable	Parameter	t Value
Intercept	14.81	10.77
IPO Deals	-0.07	-2.06
N	32	
F-Value	4.23	
Adjusted R-square	0.09	

Table 4 – Regression Results of RTO & IPO Deal Correlation

The regression shows that Number of IPO Deals is negative and small, though statistically significant. Thus, the two do in fact have an inverse relationship for deal frequency.

To further evaluate whether volume of each deal type is significantly influenced by public equity market conditions, we regress RTO deals on S&P % return and IPO deals on S&P % return, in separate analyses.

$$RTO\ Deals = \alpha_0 + \alpha_1 S\&P\ \%\ Return$$

Variable	Parameter	t Value
Intercept	12.30	17.24
S&P % Return	6.86	0.79
N	32	
F-Value	0.63	
Adjusted R-square	-0.01	

Table 5 – Regression Results of RTO Deals and S&P 500 Returns

$$IPO\ Deals = \alpha_0 + \alpha_1 S\&P\ \%\ Return$$

Variable	Parameter	t Value
Intercept	34.18	10.22
S&P % Return	83.14	2.05
N	32	
F-Value	4.21	
Adjusted R-square	0.09	

Table 6 – Regression Results of IPO Deals and S&P 500 Returns

The regression shows that for RTO deal count, S&P % returns are positive, but not statistically significant. On the other hand, S&P % returns are positive, large, and statistically significant for IPO deal count. This shows that while RTOs and IPOs are negatively correlated, IPO deals are more dependent on S&P returns, which should reflect the general equity market conditions.

Our next set of analyses focuses on short-term RTO returns, testing what the significant factors are affecting RTO initial returns 3 days after announcement date, a

common measure of underpricing. We regress 3-day return on 3-day average volume, 3-day average volume as a percentage of shares outstanding, 3-day average market capitalization, stock exchange, shares floating as a percentage of shares outstanding, and 3 day Price-to-Earnings ratio. These variables are defined as:

- Announcement date
    - Announcement Date is the date that the each reverse merger transaction is announced according to Bloomberg Transaction Database and SDC Platinum database followed the criteria mentioned in the Data section
- 3 Day Volume (A3day_vol)
    - Average daily trading volume between the announcement date and 2 days after the announcement date
- 3 Day Volume as a Percentage of Shares Outstanding (A3day_vol_as_SH_OUT)
    - $\text{3day\_vol\_as\_SH\_OUT} = \frac{\text{3day trading volume}}{\text{number of shares outstanding on the 2nd day after announcement date}} \times 100\%$
    - Measures how actively the stock is traded. Number of Shares outstanding is obtained from company annual or quarterly files, excluding treasury shares
- 3 Day Market Capitalization (A3rd_day_mcap)
    - 3day_mcap = price per share(US$)×latest number of shares outstanding by 2day after announcement date
    - Measures the size of the firm and is used as a common metric by investors
- Stock Exchange
    - NYSE, NASDAQ and OTC are dummy variables representing the exchange where the stock is listed
- Shares Floating as a Percentage of Shares Outstanding

- $\text{3d\_floating\_as\_SH\_OUT} = \frac{\text{number of shares floating on 2 day after announcement day}}{\text{shares outstanding on 2 day after announcement date shares outstanding}} \times 100\%$
  - This metric represents the percentage of the firm that is available to public investors
- 3 Day Price-to-Earnings Ratio (A3rd_PE)
  - $\text{3day PE} = \frac{\text{trailing 12M EPS before XO items by announcement date}}{\text{last traded price}}$
  - Popular valuation metric that represents the price paid by an investor for every dollar of earnings

3 day excess return was calculated as:

$$\text{3 day excess return} = \frac{\text{market capitalization 2 day after announcement date} - \text{market capitalization on the announcement day}}{\text{market capitalization on the announcement day}}$$

It should be noted that NYSE as a variable was omitted because of collinearity and that there were 329 total transactions that had earnings information available dating back to the time of the transaction. We ran three total regressions, each with an increasing number of variables, as seen in Table 7.

	(1) A3day_return	(2) A3day_return	(3) A3day_return
A3day_vol	4.78e-09	7.60e-09	9.63e-10
	(1.64e-08)	(1.66e-08)	(6.37e-09)
A3day_vol_as_SH_OUT	0.000279	0.000238	0.177
	(0.000424)	(0.000424)	(0.506)
A3rd_day_mcap	-0.00000894	-0.00000773	-0.00000234
	(0.0000155)	(0.0000163)	(0.00000597)
nyse		0.0219	0.0337
		(0.133)	(0.0609)
o.nasdaq		0	0.0371
		(.)	(0.0565)
otc		0.133	
		(0.0955)	
A3d_SH_Floating_as_SH_OUT			0.0429
			(0.110)
A3d_PE			0.000227
			(0.000347)
_cons	0.116**	0.0284	-0.0482
	(0.0359)	(0.0876)	(0.0942)
N	326	326	69
adj. R-sq	-0.007	-0.006	-0.080

Standard errors in parentheses
* p<0.05, ** p<0.01, *** p<0.001

Table 7 – Regression Results for 3-Day Excess Return

In all three regressions, there were no statistically significant variables. Thus, we find that unlike IPO transactions where there was an expected significant upside due to underpricing, RTO company returns do not predictably increase with statistical significance in the 3-day window after the announcement date. Perhaps the most interesting finding from this regression is that volume and market cap are not significant. This is different from IPO theory, which often suggests that initial returns are partially due to increase liquidity, as would be reflected by volume. Additionally, firm size has

been speculated as playing a role in IPO underpricing after Sugata Ray's study (2008) on fraction of firm sold.

Overall, the median 3-day return for this RTO data set was 0% and the average return was 21%. Though the regression showed that underpricing was not statistically significant, it is possible that underpricing does in fact occur. Asquith & Rock calculated average 3-day return as 21.8%, so we cannot fully ignore underpricing in reverse takeovers. This phenomenon would further prove that RTOs are an alternative to IPOs and even behave in a similar initial pricing manner. However, it would eliminate lower indirect costs as a theoretical advantage of reverse takeovers.

The final analysis we conduct is an analysis of 3-year returns after announcement date for the reverse takeover companies. Specifically, we compute 3-year returns as:

- Change in Market Cap 3 year after Announcement Date (3yr_mcap)

  3yr_mcap = price per share(US$)×latest number of shares outstanding by 3 year after announcement date

The purpose of this test is to evaluate the long-term sustainability of reverse takeovers. A major negative of reverse takeovers is the stigma that such transactions are only associated with fraudulent, often Chinese, companies. While prior work has tested short-term phenomena also present in IPOs, such as underpricing, we hope to better understand the long-term implications of reverse takeovers.

- 3 year Return (A3yr_~d_cap_)
  - Percentage increase of market capitalization between 3 year and 3day market capitalization, instead of per share price, is used to compute the

long term return so that we can mitigate the effects of stock splits and stock reverse splits

- $A3yr\_\sim d\_cap\_ = \frac{(3yr\_mcap - 3d\_mcap)}{3d\_mcap} \times 100\%$

- 3 year volume (A3yr_vol)
  - Average daily trading volume between announcement date and 3 year after announcement date
- 3 year volume as shares outstanding (A3yr_vol_as_SH_OUT)
  - $A3yr\_vol\_as\_SH\_OUT = \frac{\text{3 year trading volume}}{\text{number of shares outstanding on 3 year after announcement date}} \times 100\%$
- Stock Exchange
  - NYSE, NASDAQ and OTC are dummy variables representing the exchange where the stock is listed
- Delisting Flag
  - We used Bloomberg "Corporate Action Calendar" function to track if the stock is delisted from any of the NYSE, NASDAQ or OTC market between Jan 1st, 2004 to Dec 31st, 2011. Stocks delisted from NYSE or NASDAQ usually relist to the OTC market, though they are counted as delisted in our paper
- 3 year floating shares as shares outstanding (A3y_SH_Floating_as_SH_OUT)
  - $A3y\_SH\_Floating\_as\_SH\_OUT = \frac{\text{number of shares floating on 3 year after announcement date}}{\text{shares outstanding on 3 year after announcement date}} \times 100\%$
- 3 year short interest as shares outstanding (A3y_short_int_ _as_SH_OUT)
  - $A3y\_short\_int\_\_as\_SH\_OUT = \frac{\text{number of shares sold short on 3 year after announcement date}}{\text{shares outstanding on 3 year after announcement date}} \times 100\%$
- 3 year PE (A3yr_PE)
  - $A3yr\_PE = \frac{\text{trailing 12M EPS before XO items by 3 year after announcement date}}{\text{last traded price}}$

- 3 year floating shares as percentage increase of 3 day (a3y_floating_as_3d_Floating)
    - $\text{a3y\_floating\_as\_3d\_Floating} = \frac{\text{A3y\_SH\_Floating\_as\_SH\_OUT} - \text{A3d\_SH\_Floating\_as\_SH\_OUT}}{\text{floating on A3y\_SH\_Floating\_as\_SH\_OUT}} \times 100\%$
- 3 year price-earnings ratio as percentage increase of 1y_ price-earnings ratio (a3y_PE_AS_of_1y_PE)
    - $\text{a3y\_PE\_AS\_of\_1y\_PE} = \frac{\text{a3yr\_PE} - \text{a1yr\_PE}}{\text{a1yr\_PE}} \times 100\%$
- Additionally, certain variables from the 3 day returns regression are included

For this regression, the variables omitted due to collinearity are NASDAQ, A1yr_vol, and A1yr_vol_as_SH_OUT. The results of the regression are:

	(1) A3yr_~d_cap_	(2) A3yr_~d_cap_	(3) A3yr_~d_cap_	(4) A3yr_~d_cap_
A3yr_mcap	0.000620 (0.00126)	-0.0000449 (0.00216)	0.00734*** (0.00105)	-0.000801 (0.000947)
A3yr_vol	-0.00000652 (0.00000662)	-0.000000200 (0.0000128)	-0.00000211 (0.00000345)	0.00000110 (0.00000378)
A3yr_vol_as_SH_OUT	-41.06 (141.8)	-2435.6 (3212.9)	-201.1** (68.85)	-459.0 (807.9)
nyse	-17.59 (22.38)			5.557 (8.582)
o.nasdaq	0 (.)	20.00 (37.97)	9.913 (11.27)	-0.194 (7.144)
otc	-29.77 (16.09)	-23.31 (37.65)	5.761 (9.482)	
Delist_Flag	-19.85 (15.78)	-36.88 (35.14)	-16.16* (8.141)	-4.335 (7.505)
o.nyse		0 (.)	0 (.)	
A3y_SH_Floating_as_SH_OUT		-59.67 (57.92)		-20.29 (14.34)
A3y_short_int_as_SH_OUT		58.46 (353.9)		111.3 (71.14)
A3yr_PE		0.0674 (0.0662)		-0.00598 (0.0621)
o.A3yr_vol_as_SH_OUT			0 (.)	0 (.)
A3day_vol			-0.0000174*** (0.00000187)	0.00000173 (0.00000175)
A3day_vol_as_SH_OUT			959.2*** (41.63)	-97.00 (83.56)
A3d_SH_Floating_as_SH_OUT			-0.0412 (8.361)	25.60 (14.26)
A3rd_day_mcap			0.000268 (0.00153)	-0.000231 (0.000858)
A3y_Floating_as_3d_Floating			0.00881*** (0.000996)	0.614*** (0.0438)
o.otc				0 (.)
A3y_PE_AS_of_1y_PE				0.483*** (0.0716)
_cons	45.58** (15.19)	83.71 (55.34)	-3.989 (11.43)	-4.973 (12.29)
N	196	88	177	57
adj. R-sq	-0.004	-0.038	0.787	0.980

Standard errors in parentheses
* p<0.05, ** p<0.01, *** p<0.001

Table 8 – Regression Results for 3-Year Returns in Total Market Cap

	(1) A3yr_~d_cap_
A1yr_mcap_increase_as_3d_cap_	-0.231** (-3.38)
A3yr_mcap	0.0000380 (0.07)
A3yr_vol	5.15e-08 (0.02)
A3yr_vol_as_SH_OUT	-93.07 (-0.14)
nyse	9.291 (1.23)
nasdaq	3.171 (0.48)
o.otc	0 (.)
Delist_Flag	-1.550 (-0.22)
A3y_SH_Floating_as_SH_OUT	-19.28 (-1.58)
A3y_short_int_as_SH_OUT	101.8 (1.62)
A3yr_PE	0.0122 (0.22)
o.A3yr_vol_as_SH_OUT	0 (.)
o.A3yr_vol	0 (.)
A3rd_day_mcap	0.0000534 (0.07)
A3y_Floating_as_3d_Floating	1.232*** (6.19)
A3y_PE_AS_of_1y_PE	0.246* (2.48)
_cons	5.382 (0.60)
N	57

t statistics in parentheses
* p<0.05, ** p<0.01, *** p<0.001

Table 9 – Regression Results for 3 Year Returns in Total Market Cap with accompanying t-Values

Among the 4 regressions, we observed small correlation between 3 year return and market cap. This suggests that small cap RTO companies do not necessarily outperform larger companies. However, 3-year volume as a percentage of shares outstanding is

significant in the third regression ($p<0.01$), which suggests that the long-term returns will benefit from active trading. Ultimately this can be interpreted as a liquidity premium.

In the third regression, 3day_trading_volume ($t = -6.14$) and 3day_trading_volume_as_shares_outstanding ($t=19.09$) are significant in predicting 3-year return. One possible explanation could be that the short term trading volume right after announcement date measures confidence in the transaction. Also, 3-year number of shares floating as a percentage of 3-day number of shares floating is significant in the third and fourth regressions. This suggests that if more shares were sold to the public by company management or cornerstone investors, the overall long-term return is expected be higher. One plausible explanation is that public investors are less fearful of fraud and stock price manipulation when there are more floating shares available to the market. 3-year price-earnings ratio as a percentage of 3-day price-earnings ratio is also significant in the fourth regression, which could mean that investors used PE as a valuable metric to value the stock and thus the stock price reflects earning expectations. Finally, it is important to note that among the 538 RTO companies we tracked, 59 were delisted. The coefficient of -19.30% suggests that delisting, not surprisingly, has a significant impact on long-term return, for it is a strong flag representing credibility concerns. As seen in Table 9, the t-value of the "Delist" Variable is -1.28, equivalent to a p value of 0.206.

To further show the sustainable returns of RTO companies, we constructed an index of our data set in comparison to the S&P 500:

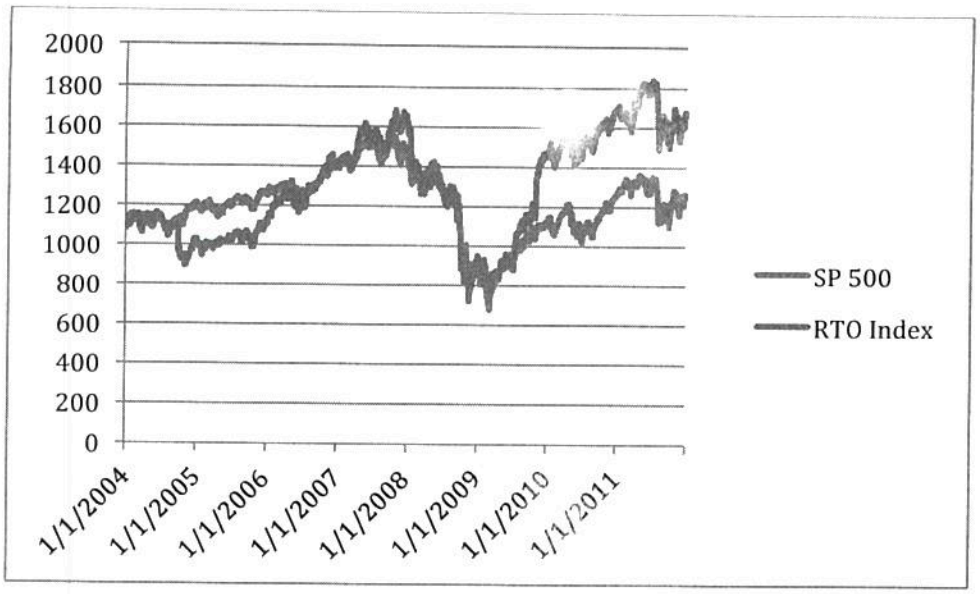

Figure 6 – RTO Index in comparison to S&P 500 from 1/1/2004 to 12/31/2011

We structured a market-cap based RTO index with the following method: For every trading day, we calculated the last trading price, and shares outstanding for each individual stock. If the stock is newly added to the index or delisted from the exchange, we adjust the index base denominator to make sure that the RTO index is comparable over time. For example, the number of stocks in the index increased steadily from 187 on Jan 1st, 2004 to 431 on Dec 31st, 2011. Our regression shows that the RTO index actually has a low beta of 0.873, which implies lower volatility than the market as a whole, and started to steadily outperform the S&P 500 after the middle of 2009.

VII. Conclusions

Reverse takeovers should exist as an alternative to an IPO for a private firm looking to list in the public equity markets. Prior work by Asquith & Rock (2011), Brau, Francis, & Kohers (2003) and Gleason & Wigginsiii (2005) show that reverse takeovers were beneficial for owners of distressed companies, exhibited underpricing in a similar manner to IPOs, were generally smaller in size, and could be explained by some common characteristics of the firms that completed RTOs.

Our paper seeks to confirm certain analyses regarding RTO occurrence, marketing timing, returns, firm size, and underpricing. However, our study builds on the work done thus far on this topic by evaluating the long-term sustainability of RTO stocks. Recent work has largely focused on short-term underpricing, which is certainly helpful in looking at an important phenomenon that is often criticized when it occurs with IPOs. We feel that an overlooked aspect of reverse takeovers in academia is the stigma that RTO companies are fraudulent or unreliable investments.

In testing the relationship between IPOs and RTOs, we found the two to have an inverse relationship. This finding suggests that reverse takeovers are in fact used in some cases in lieu of an initial public offering. While the relationship between the RTO market and S&P 500 returns is less clear, there is a statistically significant, positive relationship between the IPO market and S&P 500 returns, suggesting that the public equity market is a main motivator for completing an IPO.

Looking at underpricing in RTOs with our own data set, we found that neither underpricing nor any of the variables tested were significant drivers of 3-day returns after

announcement. However, the average return was calculated as 21%, which could be interpreted as confirmation of Asquith & Rock's finding of underpricing. Though the presence of underpricing would eliminate one possible advantage of reverse takeovers (limitation of indirect costs), it helps prove that initial pricing behavior is similar between IPOs and RTOs.

The main analysis of our paper looks at 3-year returns of RTO companies. We found that: there was small correlation between 3 year return and firm size, long-term returns benefitted from active trading, high trading activity in the first three days after the transaction was a great predictor of long-term returns, and PE ratio growth was positively correlated with returns. The final important finding is that delisting has a significant impact on 3-year returns. This is expected and helps validate some of our findings, as delisting should be the biggest flag representing credibility concerns. With these companies removed, predicting positive 3-year returns for RTO companies was much improved.

Overall our paper looks at the relationship between RTOs and IPOs, specifically studying underpricing, market timing, firm size, and liquidity factors. Our analyses confirm previous findings that RTOs should exist an alternative to IPOs. However, we build on this work by looking at the 3-year returns of these RTO stocks, something we consider to reflect the long-term sustainability of a RTO transaction. One major concern with reverse takeover companies that has never directly been studied, to our knowledge, is the stigma of associating this transaction type with fraudulent companies. Our findings show that reverse takeovers should be sustainable vehicles in the long-term, as well as the short-term, for listing in the public equity markets.

In the future, to further our research on RTO companies, we could also explore reverse takeover transactions in other developed stock exchanges, such as the London Stock Exchange, the Singapore Stock Exchange and Tokyo Stock Exchange. The same analyses could even be run for transactions in developing stock exchanges, such as the Hong Kong Stock Exchange, the Shenzhen Stock Exchange, and the Shanghai Stock Exchange. We could also add additional variables in our regression, such as length of time to complete the transaction, Ratio of Enterprise Value/EBITDA, etc.

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Appendix

Aggregate RTO Data		Aggregate IPO Data	
Year	# of Deals	Quarter	# of Deals
Q1 2004	12	Q1 2004	11
Q2 2004	16	Q2 2004	54
Q3 2004	6	Q3 2004	60
Q4 2004	8	Q4 2004	77
Q1 2005	12	Q1 2005	44
Q2 2005	8	Q2 2005	45
Q3 2005	16	Q3 2005	60
Q4 2005	8	Q4 2005	45
Q1 2006	7	Q1 2006	35
Q2 2006	13	Q2 2006	48
Q3 2006	11	Q3 2006	28
Q4 2006	10	Q4 2006	65
Q1 2007	17	Q1 2007	45
Q2 2007	10	Q2 2007	66
Q3 2007	10	Q3 2007	35
Q4 2007	10	Q4 2007	56
Q1 2008	17	Q1 2008	12
Q2 2008	18	Q2 2008	12
Q3 2008	11	Q3 2008	5
Q4 2008	12	Q4 2008	2
Q1 2009	12	Q1 2009	4
Q2 2009	17	Q2 2009	16
Q3 2009	22	Q3 2009	15
Q4 2009	14	Q4 2009	28
Q1 2010	13	Q1 2010	27
Q2 2010	10	Q2 2010	34
Q3 2010	15	Q3 2010	24
Q4 2010	15	Q4 2010	42
Q1 2011	19	Q1 2011	32
Q2 2011	6	Q2 2011	36
Q3 2011	12	Q3 2011	21
Q4 2011	8	Q4 2011	28

Appendix I – Quarterly Breakdown of RTO and IPO Deals

	All			NASDAQ			NYSE			AMEX		
	All	Completed	Withdrawn	All	Completed	Withdrawn	All	Completed	Withdrawn	All	Completed	Withdrawn
All												
Median market cap	$18.6	$24.6	$13.9	$16.1	$18.0	$11.6	$586.2	$588.3	$584.0	$17.9	$32.5	$7.2
Mean target percentage	68.1%	21.4%	70.5%	68.7%	67.2%	71.5%	63.7%	64.0%	63.2%	69.1%	67.1%	70.8%
Total	233	145	88	181	114	67	30	21	9	22	10	12
Public-Public												
Median market cap	$61.8	$79.1	$53.2	$42.9	$52.4	$22.2	$841.5	$1,313.9	$648.4	$32.8	$35.8	$17.0
Mean target percentage	64.8%	63.0%	67.8%	65.4%	63.30%	69.0%	59.9%	59.4%	60.6%	80.6%	81.5%	80.0%
Total	78	48	30	51	32	19	22	14	8	5	2	3
Public-Private												
Median market cap	$12.7	$17.1	$9.3	$11.9	$15.1	$9.6	$58.8	$67.4	$17.9	$12.6	$21.4	$7.2
Mean target percentage	70.6%	69.4%	72.6%	70.5%	69.3%	72.9%	77.0%	75.3%	84.0%	68.3%	67.7%	69.0%
Total	124	77	47	107	67	40	5	4	1	12	6	6
Public-Sub												
Median market cap	$16.9	$28.5	$11.6	$11.6	$11.4	$15.0	$212.4	$212.4	-	$25.9	$46.8	$6.8
Mean target percentage	66.8%	65.5%	69.1%	68.0%	66.5%	70.7%	70.0%	70.0%	-	59.4%	51.0%	65.0%
Total	31	20	11	23	15	8	3	3	0	5	2	3

Appendix 2 – "Table 2. Number of Reverse Mergers, Median Market Cap, and Mean Percentage of Equity Retained by the Target Stockholders" (Asquith & Rock, 2011, p.31)