



Is the U.S. IPO Market About to Thaw?*

IPC Research Notes

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The U.S. IPO market is in the midst of an unusually long cold spell. Investors are concerned about how the IPO market, and more broadly the market for private equity exits, has affected distributions to their portfolios. For example, one source recently shared with us that distributions as a percent of prior year-end valuations are only about 6% (annualized) through 2023:Q2, versus about 10% for 2022, and 20-25% annually over the past decade. This has led us to wonder how the current episode compares to historical IPO activity and if recent signs (e.g., the recent filing by Shein) suggest the market is thawing. To examine this question, we take a high-level look at long-term trends in buyout fund exit activity, and how this compares to overall IPO activity. We briefly review previous research on IPOs and provide some historical context for current conditions. Finally, we provide estimates from a simple model of IPO activity and use it to understand what economic and market factors could lead to a re-opening of the IPO market in early 2024. The news isn't especially promising. Our analysis suggests that even with strong recent market returns (which are a statistically strong predictor of IPO activity), there is roughly a 2-in-3 chance that the "cold" IPO market will persist through the first half of 2024.

Exit activity and the relative decline of IPOs

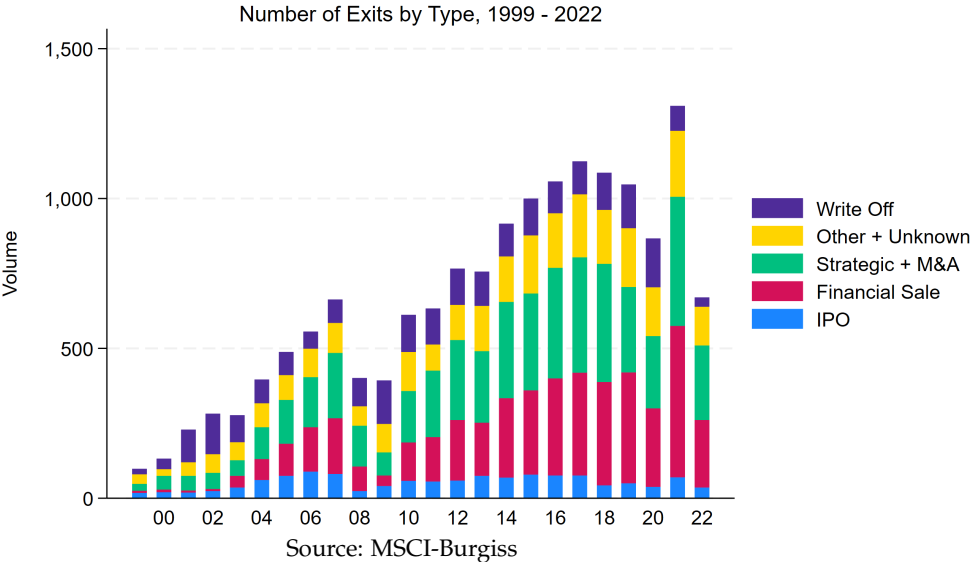
We start by asking a simple question: How important are IPOs for exits? The general decline in the number of publicly listed companies in the U.S. (as well as many other developed economies)

*We thank MSCI-Burgiss and Jay Ritter for providing data. We thank Nick Crain, Keith Crouch, Minmo Gahng, Bob Harris, Steve Kaplan, Pierre-Yves Mathonet, and Jay Ritter for comments on an earlier draft.

has been well documented and much of the decline has been attributed to a fall in the number of IPOs. Nonetheless, IPOs have remained an important exit path for buyout transactions, especially large ones. Just as importantly, the IPO market is typically viewed as a bellwether for other exit paths such as financial sales. Yet, given the lack of comprehensive data on buyout exit activity, it is unclear from existing empirical evidence how important IPOs are either as a direct exit vehicle or as an indicator of overall market health.

To examine the relative importance of IPO activity over the last few decades we have obtained data from MSCI-Burgiss on exit type by year for a sample of almost 17,000 global buyout transactions through the end of 2022. Figure 1 shows the volume of exits by year by type (stacked) and reveals the secular upward trend and cyclical behavior we expect in total number of exits. What’s most notable is that the overall exit volume in 2022 was the lowest since 2011. But what’s also interesting is the relatively modest number of IPOs in the last decade even as the number of financial and strategic sales have ramped up dramatically.

Figure 1: PE Exit by IPO hasn’t changed much in the long run.



To more easily see how the relative importance of exit type has evolved over time, Figure 2 plots the proportions of each type by exit year. We again see intuitive trends in secular and cyclical trends such as the bumps in the number of write-offs during the dot.com bust, the global financial crisis (GFC), and the Covid outbreak of 2020. However, the cyclical aspects of IPO activity are largely eclipsed by the secular decline in IPO activity as a percent of exits over the last two decades – from over 15% in the majority of years prior to the GFC to around 5% on average since 2018. Even in 2021 which was a record year for exit activity, the contribution of IPOs remained at about 5% (Figure 3 zooms in on just IPO percent of total exit volume for clarity). If we look instead at the combined percent of IPOs and financial exits, it has stayed fairly constant even as IPO volume has declined. This suggest that financial buyers are filling the gap generated by

lower IPO activity. However, on a cyclical basis, the total number of IPOs and financial buyers are positively correlated which is consistent with IPOs as a bell-weather for exit opportunities (there is also a positive correlation with strategic buyers, and as expected, a negative correlation with write-offs).

Figure 2: IPOs are becoming less common relative to other types of exit, especially relative to financial sales.

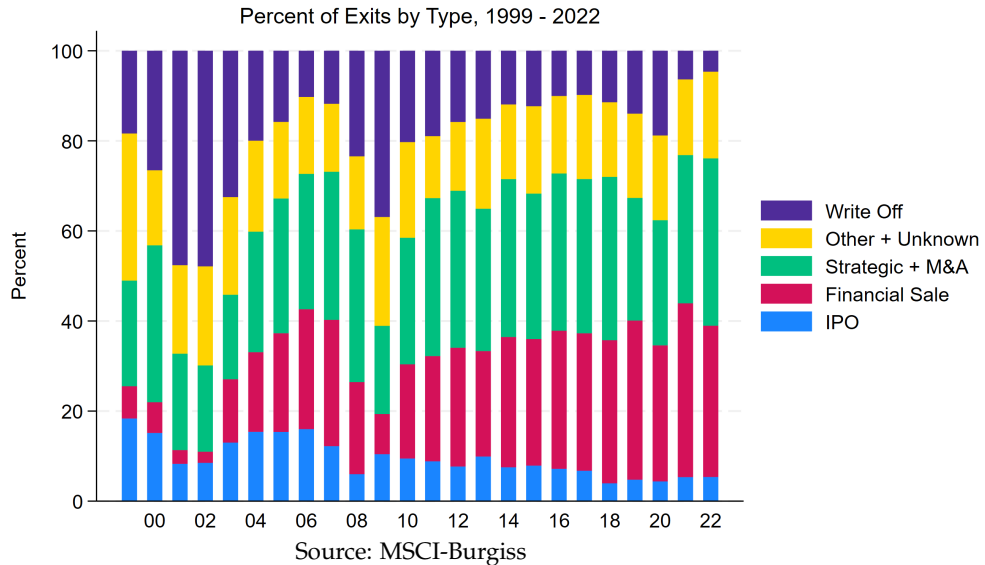
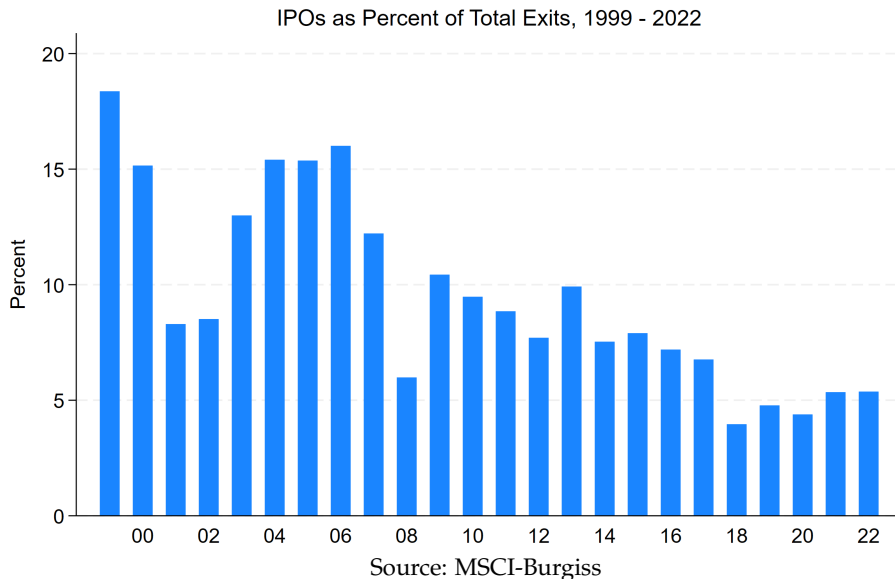


Figure 3: Recently IPOs constitute only around 5 percent of buyout exits.



These data are just counts of exits by type and we know that the value of the typical IPO exit tends to be larger than average. We have similar data for the value of exits from MSCI-Burgiss, but it is a bit more complicated to analyze since, for example, not all value from an exit is realized

at the time of the IPO (see, Jenkinson et al. (2022)). In an Appendix we provide plots similar to Figures 1-3 based on the value of exits for 2004-2022. As expected, IPOs average closer to 20% of exit value because IPO exits tend to be larger than average (but also because write-offs have negligible value in most years). However, the trend in IPO exit value as a percent of all exit value is still declining and there is no apparent trend in combined financial sales and IPOs as a percent of exit value.

So with this information as a back-drop, we want to better understand the current situation and especially what might pull conditions out of the lull in exit activity. To try to get a handle on what could happen in the first half of 2024, we now take a brief tour of the research on IPOs to motivate factors for a predictive model.

What does extant IPO research say?

Historically, IPO activity has been highly variable with periods that are typically described as “hot” and “cold” markets characterized by the volumes of IPOs and first-day stock returns (Ibbotson and Jaffe, 1975; Helwege and Liang, 2004). From a statistical standpoint, IPO volume is highly persistent on a month-to-month basis with hot months tending to follow hot months. Similarly, cold months tend to follow cold months but the duration of cold markets is typically shorter than the duration of hot markets. The cyclical nature of IPO volume and underpricing has been considered puzzling given that such large cycles would suggest capital allocation inefficiencies (Lowry and Schwert, 2002). Specifically, why does IPO volume change so much rather than more constant volume with changing prices? Over the last four decades a large literature has attempted to explain the persistence of hot and cold IPO periods based on both fundamental market properties and investor sentiment. We briefly summarize some key findings here.¹

There is little evidence that industry-specific or firm-specific characteristics are related to hot or cold markets. Helwege and Liang (2004) note that when the overall IPO market is hot or cold, it is because most industries are respectively hot or cold. They also track hot and cold firms following their IPO and find little difference in profits, size, or sales growth. Likewise, start-ups and young firms are not disproportionately found in hot markets. They conclude that the IPO market is typically a market for high-growth firms, and IPO activity depends on how many high-growth firms investors find palatable. The “investor sentiment hypothesis” posits that the cost of issuing equity is a function of investor optimism: when investors are overly-optimistic, they are willing to overpay for firms, and so the cost of going public is low, ergo a hot IPO market (Lowry, 2003). The empirical relevance of investor sentiment has been repeatedly established (Lowry, 2003; Helwege and Liang, 2004; Ivanov and Lewis, 2008).

Beyond sentiment, it makes sense to focus on general market conditions since firm-specific and industry-specific factors explain little of the variation in IPO activity. Loughran et al. (1994) note

¹See, Lee et al. (1991); Lerner (1994); Rajan and Servaes (1997); Pagano et al. (1998); Persons and Warther (1997); Stoughton et al. (2001); Lowry and Schwert (2002); Pástor and Veronesi (2005); Chemmanur and He (2011) among others.

that around the world high IPO volume is associated with stock market peaks, and stock market behavior and IPO volume are highly correlated. They propose that firms waiting to go public “stockpile” which then leads to a future surge in IPO activity (i.e., a flip from a cold market to a hot market). To that end, Pástor and Veronesi (2005) find that broad stock market activity is a crucial factor and explains why large drops in IPO volume follow drops in the broad market: private firms wait for more favorable market conditions, as reflected by stock prices, before going public. Empirically, Ritter and Welch (2002) observe that many firms withdraw their offering entirely in cold markets rather than lowering their prices, again suggesting a “stockpile” mechanism.

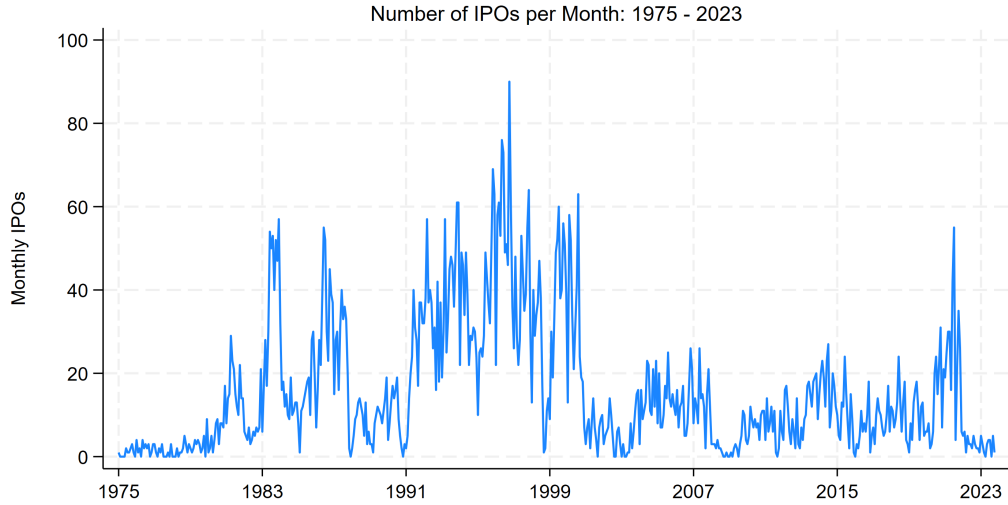
Pástor and Veronesi (2005) break down market conditions into three factors: expected market return, expected aggregate profitability, and prior uncertainty about (excess) profitability, linking all three to IPO volume. They also find that IPO volume is positively related to previous total market returns and changes in interest rates, but is negatively related to current and past changes in market volatility. Lowry (2003) adds that IPOs are more likely when capital demand is higher (i.e. during periods of good economic conditions) because the additional source of capital provided by an IPO provides the greatest net benefits.

Hot and cold markets

To better understand the current cold market for IPOs, we can compare recent conditions to the last 50 years of IPO activity in the U.S. Figure 4 plots the number of monthly U.S. IPOs since 1975 and shows the highly cyclical nature of IPOs and the persistence of IPO activity.² We note several well-known periods of low IPO activity: in the late 1970s following the long bear market that started at the beginning of 1973; following the October 1987 stock market crash; following the burst of the dotcom bubble in March 2000; and following the GFC of 2008.

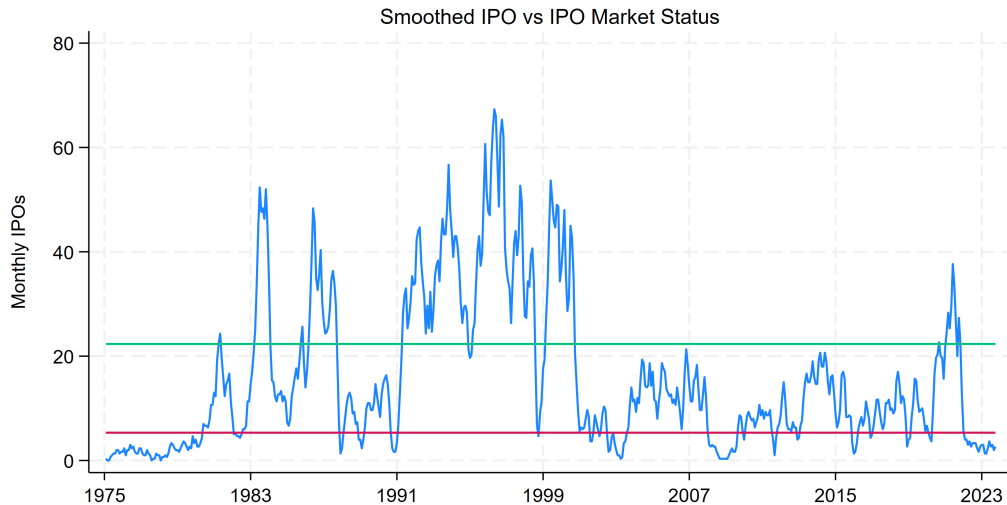
²We thank Jay Ritter for sharing his IPO data (<https://site.warrington.ufl.edu/ritter/ipo-data/>). The average IPO volume per month is about 16 with a standard deviation of 16, a minimum of 0, and a maximum of 90.

Figure 4: Despite a sustained burst of activity in the 1990s, there has been no long-run trend in IPO volume since 1975.



To facilitate the analysis of IPO market conditions we start with a very simple approach to defining hot and cold markets. We define a cold market month to be any month when the centered three-month moving average of the number of IPOs is in the historical (pre-2020) bottom quartile, which corresponds to an average of 5.3 or fewer IPOs per month. Similarly, a hot market would be the top quartile of this 3-month average, and we call the inter-quartile range a “normal” market. Figure 5 shows the thresholds for hot and cold markets along with the 3-month centered moving average of the number of monthly IPOs.³

Figure 5: Hot markets have become relatively uncommon in the last 20 years.



³These numbers do not include SPACs, but including SPACs has the effect of making the recent hot market even hotter, but little impact on other periods. Due to the apparently transient popularity of SPACs, we consider them to have little bearing on the analysis in this note focused on what may happen in the future.

Figure 6 plots the state of the IPO market each month and shows that much of the 1990s was a hot market and most of the last two decades have been a normal market interspersed with occasional cold markets. In the last 20 years, it was only in 2020 and 2021 that the U.S. experienced a hot market. Importantly, Figure 6 also shows that while cold markets are quite common they are usually short-lived. In several cases, the IPO market will (by our definition) slip in and out of cold periods over a multi-year slowdown (e.g., in 2001-2003 after the dotcom bubble).

Table 1 provides a list of cold markets and their duration, ranked from longest to shortest, as well as some summary statistics for cold markets. The average duration of a cold market is 7.5 months, but the median is just 3 months. The longest cold market was from February 1975 through May 1980, lasting 64 months. Currently the IPO market has been cold from February 2022 through November 2023 (the final month in the data set as of writing). At 21 months, the current episode is the second longest cold market since 1975-1980 period, even longer than the 19-month cold market period around the Global Financial Crisis in 2009. The current situation is especially noteworthy given that 2022 experienced the largest volume of IPOs of the last 20 years.

Figure 6: Cold markets are relatively common but usually short-lived.

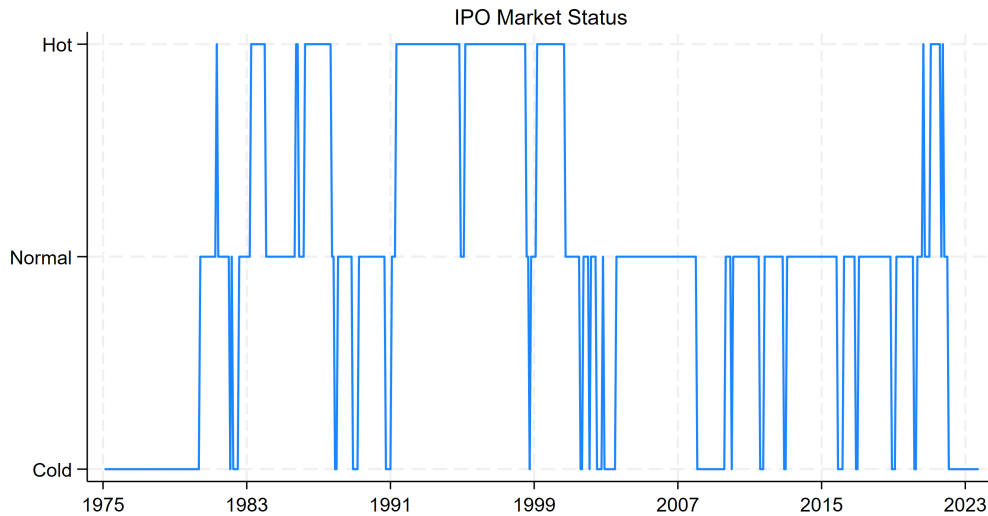


Table 1: IPO Cold Markets

| Longest Cold-Market Periods | | | | Cold Market Statistics | |
|-----------------------------|-----------|----------|------|------------------------|------|
| Start Month | End Month | Duration | Rank | Statistic (Months) | |
| Feb-1975 | May-1980 | 64 | 1 | Number of Spells | 20 |
| Feb-2022 | present | 23 | 2 | Mean Duration | 7.6 |
| Feb-2008 | Aug-2009 | 19 | 3 | Std. Dev. | 14.3 |
| Dec-2002 | Jul-2003 | 8 | 4 | Shortest Duration | 1 |
| Oct-1990 | Jan-1991 | 4 | 5 | 25% | 2 |
| Dec-2015 | Mar-2016 | 4 | 5 | Median Duration | 3 |
| Dec-1988 | Mar-1989 | 4 | 5 | 75% | 4 |
| Jul-2002 | Oct-2002 | 4 | 5 | Longest Duration | 64 |
| Apr-1982 | Jul-1982 | 4 | 5 | | |
| Aug-2011 | Oct-2011 | 3 | 6 | | |
| Dec-2018 | Feb-2019 | 3 | 6 | | |
| Aug-2001 | Sep-2001 | 2 | 7 | | |
| Dec-1987 | Jan-1988 | 2 | 7 | | |
| Mar-2020 | Apr-2020 | 2 | 7 | | |
| Dec-2012 | Jan-2013 | 2 | 7 | | |
| Dec-2016 | Jan-2017 | 2 | 7 | | |
| Oct-1998 | Oct-1998 | 1 | 8 | | |
| Feb-1982 | Feb-1982 | 1 | 8 | | |
| Jan-2010 | Jan-2010 | 1 | 8 | | |
| Feb-2002 | Feb-2002 | 1 | 8 | | |

Source: Jay Ritter Data Library. Cold IPO windows of 3 months or more determined by months with a centered 3-month rolling average number of IPOs below the 25th percentile of the pre-2020 sample average.

With this historical background on U.S. IPO activity we seek to better understand the factors driving the unusually long cold spell in U.S. IPOs and how conditions would need to change to predict an end to the current cold market.

Model of IPO volume

As a quick and easy way to model monthly IPO volume we estimate a simple ordinary least squares (OLS) regression with the following lagged explanatory variables (motivated by prior research): market return above the risk-free rate, 3-month inflation (measured using the CPI), the real short-term interest rate, the BAA credit spread, and average monthly first-day IPO returns (as a sentiment proxy).⁴ We use a single lag except for market returns where we include 5 additional lags. The model is inherently predictive based on market conditions: next month's IPO volume is explained purely on known market values from this month (or before). Other independent variables, such the term spread and the Chicago Fed National Activity Index (a proxy for macroeconomic activity), were also examined but excluded in our final model after exhibiting

⁴The dependent variable, monthly volume, is entered as a logarithm to give results in terms of percentage change of IPOs. The model is estimated from January 1975 through December 2021 so that the years of 2022 and 2023 can be compared to the historical precedent captured by the model.

no explanatory significance (and their removal had no meaningful impact on other variables or explanatory power). We also control for some important monthly seasonal factors.⁵

The regression results for market variables are shown in Table 2. All variables are statistically significant at the 90 percent confidence level and most at 99 percent. To interpret the coefficients, consider the Day 1 IPO Returns coefficient of 0.786, which estimates that IPO volume will typically be 7.86 percent higher when Day 1 IPO returns average 10 percentage points higher, all else equal. The signs of coefficients are all quite intuitive. For example, the positive, but declining, coefficients on prior stock market returns indicate a positive relation between stock market gains and IPO activity that decays with longer lags.⁶

Table 2: Regression Results: Dependent Variable: Log(IPO volume)

| | (Log) IPOs |
|------------------------|------------|
| Excess Returns (Lag 1) | 3.094*** |
| Excess Returns (Lag 2) | 2.657*** |
| Excess Returns (Lag 3) | 1.786** |
| Excess Returns (Lag 4) | 2.250*** |
| Excess Returns (Lag 5) | 2.115*** |
| Excess Returns (Lag 6) | 1.397* |
| Inflation (Lag 1) | -11.036*** |
| Real Rate (Lag 1) | 12.131*** |
| Credit Spread (Lag 1) | -37.399*** |
| Day 1 Returns (Lag 1) | 0.786*** |
| N | 564 |
| Adj R-sq | 0.360 |

* p<0.10, ** p<0.05, *** p<0.01

p-values are heteroskedasticity- and autocorrelation-robust.

Estimation data from 01/1975 through 12/2021

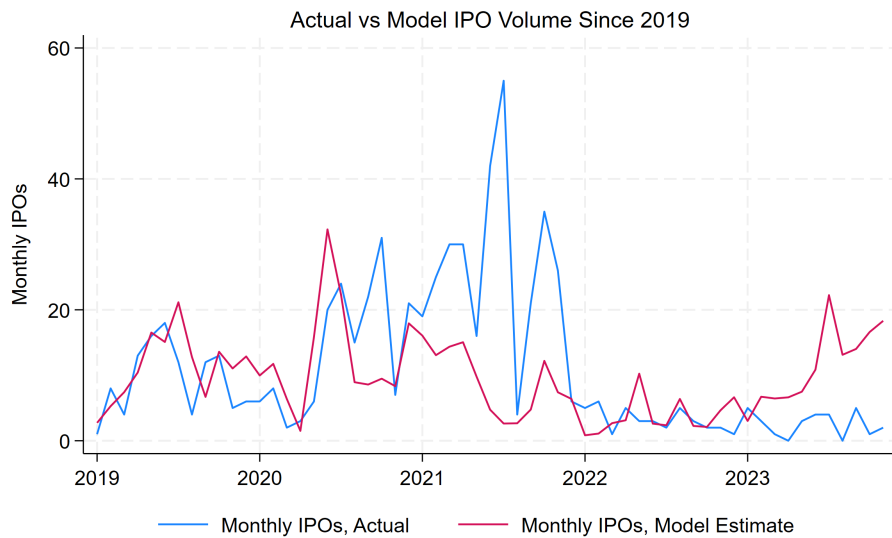
Adjusting for the size of each variable’s standard deviation and lag length, excess returns constitute 37 percent of the market variables’ explanatory power, inflation constitutes 19 percent, the real return constitutes 18 percent, the credit spread constitutes 16 percent, and day 1 IPO returns constitute 10 percent. The adjusted R-squared of the model is 0.36. Given the generally good fit of the model, it is interesting to look at what it suggests IPO volume “should” have been for the last few years. In this vein, Figure 7 plots actual monthly IPO volume and fitted IPO volume since . The fit is mostly good except for the notable surge in IPOs from mid-2020 until late 2021, which the model fails to capture, suggesting that the surge is difficult to explain with only historical market

⁵The IPO market tends to cool down in January and September because they respectively follow Christmas and Labor Day (Helwege and Liang, 2004).

⁶Likewise, the negative coefficient on inflation is consistent a common-sense hypothesis that IPO volume is typically lower when inflation is higher as was the case in the 1970s. The positive coefficient on real interest rates is consistent with a hot economy that the Fed is trying to slow down. The negative coefficient on credit spreads is consistent with weak IPO activity during times of stress in credit markets. Finally the positive coefficient on Day 1 IPO Returns is consistent with positive sentiment driving IPO activity.

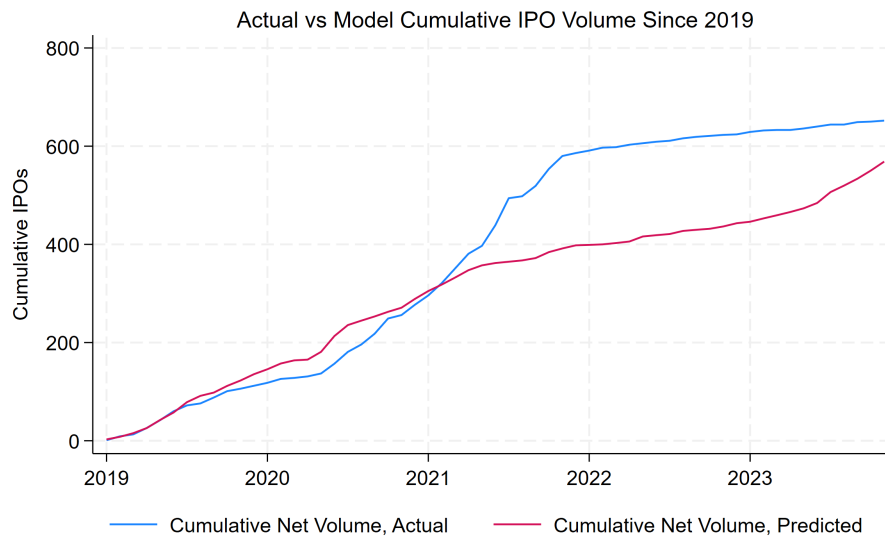
precedent. The situation reverses starting in the summer of 2022, after which actual IPO activity falls to somewhat below the model predictions on average. Given these results it seems that the market was unusually (undeservedly?) hot in late 2020 and most of 2021. Likewise, the current “cold” market is increasingly below what would be expected given current state of predictive factors of historical IPO activity. So, in essence, the current cold market is a bit anomalous though admittedly activity over the last 9 months.

Figure 7: The surge in IPOs from mid-2020 until late 2021 is inconsistent with historical market precedent.



To get a sense of how the IPO market has performed on balance over the last 5 years we accumulate IPOs starting in 2019 for both actual IPOs and based on our model’s predictions. Figure 8 illustrates the unexpectedly rapid increase in IPO accumulation from mid-2020 until late 2021, and the flattening of activity beginning in late 2021. The observation that an IPO surge without clear market causes has been followed by a cold market indicates that the IPO market is likely experiencing something of a “hangover” effect with many more companies than would be expected having recently done IPOs on a cumulative basis. This also suggests that “stockpiling” of IPOs may be less of an issue currently than in prior cold market periods.

Figure 8: The surge in IPOs from mid-2020 until late 2021 may have created a “hangover” effect.



Conditions to escape the cold IPO market

We now ask the following question: what change in market conditions does the model predict would be consistent with a thawing of the cold IPO market?

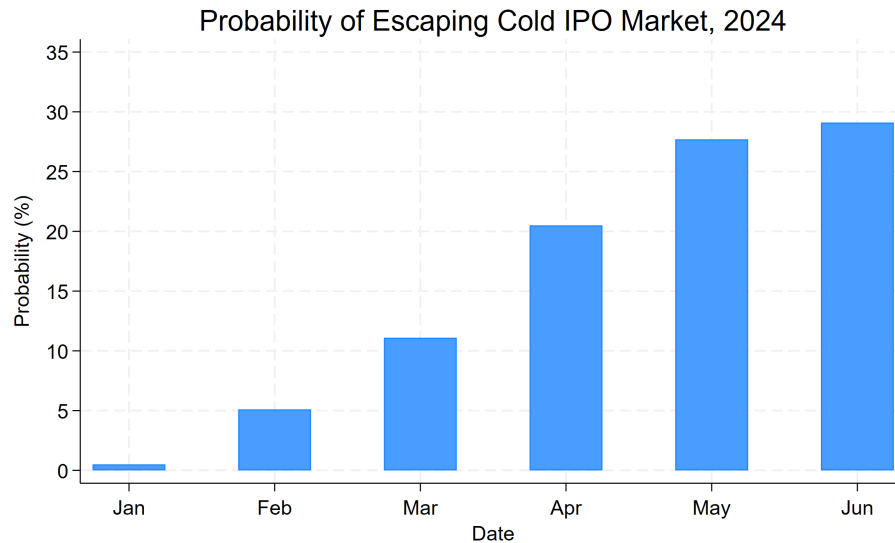
To get at this, we consider how many standard deviations the explanatory variables must simultaneously change (uniformly in a pro-IPO direction with all else equal) for the cold streak to end in early 2024. The model implies that a one standard deviation change of each variable in a pro-IPO direction is associated with 108% higher IPO volume. Considering we would need an IPO volume to jump from 2 to 13, a thawing of the IPO market would be associated with a 550% increase in IPO volume, that is, a 5.1 standard deviation improvement in all model variables. This suggests virtually zero chance, and indeed there is no period in the entire sample with a 550% increase in IPO volume in the next period (the maximum is 451%), and there is no period in the entire sample where a single-digit IPO volume increased by 10 or more in the next period. To put it bluntly, exiting the cold IPO market in the next couple months would be historically unprecedented.

A more precise way to examine the probability of exiting the current cold market can be determined with a simulation exercise. Specifically, we can ask: How likely is the IPO market to transition out of the current cold state at different horizons given all of the possible historical changes in market conditions? To answer that question, we feed a large number of randomly drawn historical changes in the model’s explanatory variables (which capture co-movements, serial correlations, and other properties exhibited by the data) into the model in order to simulate potential future market paths.⁷ The simulations suggest there is only a (roughly) 30% probability

⁷We conduct 10,000 simulations where we draw a series of changes in variables applied to ending May values of

of the IPO market cold streak ending in the first half of 2024. Figure 9 plots the estimates for each month of 2024 out to June.

Figure 9: The probability of having ended the cold streak increases throughout 2023.



In conclusion, our estimates suggest that the current IPO cold market has a better than 2-in-3 probability of persisting through the summer.

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observed variables in May, 2023

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Appendix

The following plots provide total exit values of buyouts by year of initial exit activity (e.g., IPO year). Data coverage improves over time and so we start these graphs in 2004 which is when we feel the data are largely representative of proportions of different exit types.

Figure 10: Within the last 20 years, IPO proceeds seem to have peaked around 2015.

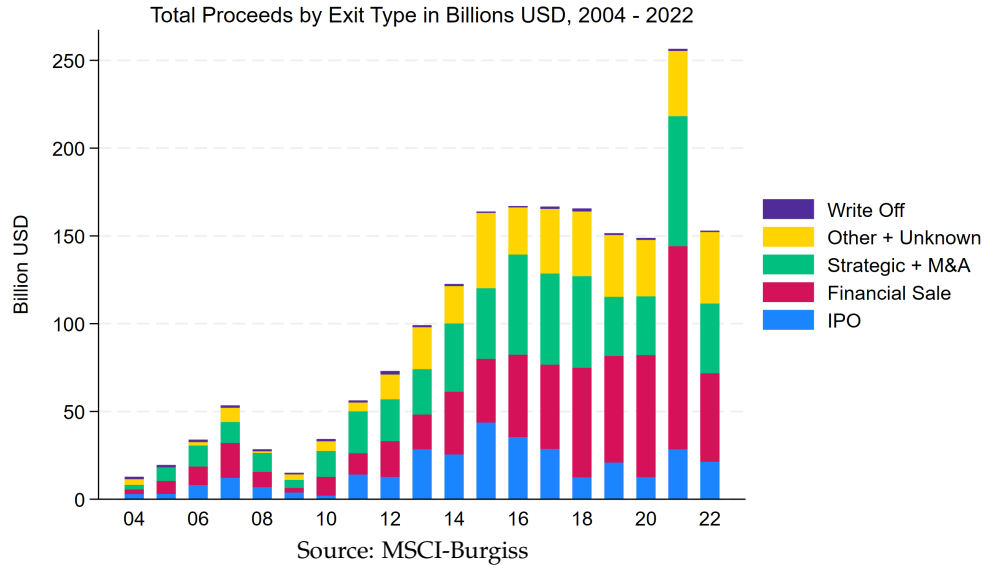


Figure 11: IPO proceeds relative to other types of exits have declined recently, especially relative to financial sales.

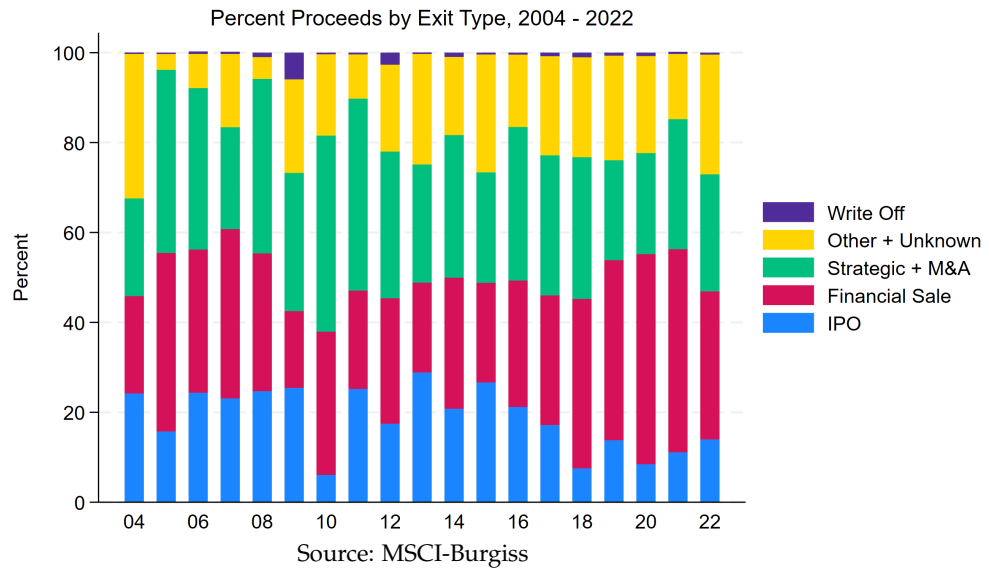


Figure 12: Recently IPOs proceeds constitute only around 10 percent of proceeds from buyout exits.

