Proactive Indexing: Index Funds and IPOs

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ABSTRACT: Although a vast amount of research on IPOs exist, little research has been done from the point of view of index funds and the excess return opportunity gained from buying IPOs before the index inclusion date. In this article, the authors analyze US listed IPOs added to the Russell 1000 and Russell 2000 Indexes between 2010 and 2018. They conclude that index funds could have generated excess returns by buying IPOs before their inclusion in indexes. However, the potential for excess returns differs depending on the index involved, the timing of the purchase, the relative size (market capitalization) of the IPO, and the IPO’s sector. Further, the authors examine the risk that index funds incur by buying IPOs early as it is not clear in advance which IPOs will eventually be included in an index. The authors conclude that for Russell 1000 Index funds, IPOs with a larger market capitalization have a higher probability of being included in that index but have a commensurately lower excess return. The reverse is true for IPOs with a comparatively lower market capitalization. For the potential excess returns to be harvested, the authors developed a risk–return framework that could guide index portfolio managers in timing and sizing their IPO trades before their inclusion in indexes.

TOPICS: Fundamental equity analysis, passive strategies*

KEY FINDINGS
- Index funds tracking the Russell 1000 and Russell 2000 could have generated excess return by buying IPOs before their inclusion in indexes.
- The potential for excess returns differs depending on the index involved, the timing of the purchase, the relative size (market capitalization) of the IPO, and the IPO’s sector.
- The authors develop a risk–return framework that could guide index portfolio managers in timing and sizing their IPO trades before their inclusion in indexes.

Recently the decline in global IPO volume has spurred research assessing the disincentives for companies to go public. At the same time, during the past decade, many assets have shifted from high-fee active funds to low-fee index funds. Although a vast amount of research on IPOs exists, not much research has been conducted on IPOs in the context of index funds. We believe that a more nuanced understanding of the implications of IPOs for index investors is warranted.

In this article, we look at the performance of IPOs between the IPO offer date, the close of the first day of trading after the
IPO, and the close of the index inclusion date (IID) (the date an IPO is added to the index). In practice, most index fund managers do not buy IPOs on their offer date or on the first trading day before the index change announcement; they will wait until a time closer to the IID. Our aim is to understand the optimal time for index funds to buy IPOs with the objective of generating excess returns for index investors. (The closing price on the IID is used for the index calculation and hence is the benchmark price against which excess returns are calculated.) Is there any benefit in proactively participating in the book-building process leading up to the IPO date? And how much excess return can be generated by buying IPOs at the close on the first day of trading or on some date before the index announcement or IIDs? We also aim to understand whether security characteristics, such as size and sector membership, affect these observations.

The outline of this article is as follows. The relevant aspects of the literature to date are briefly summarized. Next, an introduction to the size of the global IPO market, with a deep dive into the US market, is provided. The data and the analysis framework used follow, and the key dates, time periods, and metrics of interest are defined. The next section describes the empirical results, specifically the excess returns witnessed during different time periods between the IPO date and the IID. Finally, we discuss how an index portfolio manager might take advantage of these empirical observations through a strategy that maximizes excess return relative to risks. We identify in particular the risk of erroneous IPO predictions, that is, an IPO that is initially expected to be added to an index but ultimately is not.

OVERVIEW OF THE LITERATURE

The IPO literature covers a broad range of themes; we do not attempt a full literature review here. For interested readers, Lowry, Michaely, and Volkova (2017) offer a comprehensive recent survey. Focusing on the main themes that are relevant to our article, we highlight the research on IPO security price behavior, from the well-known first-day IPO pop to the security performance during the first week, month, year, and so forth.1

Empirical studies on the pricing of IPOs have been done since the 1970s. Stoll and Curley (1970), Ibbotson and Jaffe (1975), and Stern and Bornstein (1985) produced early studies that documented two key observations on IPO price behavior: short-term price appreciation and long-term underperformance. In other words, there is a strong but temporary pop in the price of securities after their IPO; but, over the long run, these securities underperform the market. The initial pop is usually in the first day(s) after the IPO. Ibbotson, Sindelar, and Ritter (1988) estimate a 16.4% average initial return (from the offer price to the market price to the close of the first day of trading) for a sample of 8,668 US IPOs during the 1960 to 1987 period. This price appreciation has appeared to change over time. Loughran and Ritter (2004) find an average first-day return of 7% in the 1980s, 15% during the 1990-to-1998 period, 65% during the 1999-to-2000 bubble years, and 12% during the 2001-to-2003 period.

However, subsequently, most studies have found that IPOs underperform during the subsequent three- and five-year periods after the IPO. Ritter (1991) finds a difference of -27.4% in average total return using a sample of 1,526 US IPOs during the 1975-to-1984 period three years after they went public. Similarly, Loughran and Ritter (1995) find that five years after an IPO, the average firm underperforms by a total return of 44% compared with non-issuing firms of the same size. Most recently, extending his methodology, Ritter (2018) calculates a three-year buy-and-hold market-adjusted return of -18.4% during the 1980-to-2016 period for IPOs, relative to the broader market.

What explains these performance patterns? Ritter (1991) and Loughran and Ritter (1995) argue that IPO underperformance reflects investor behavioral biases that cause unwarranted optimism under certain conditions. They find that underperformance is greater for firms that issue during high-volume months, consistent with that hypothesis. Another reason suggested for the underperformance of IPOs is the impact of transaction costs related to shorting. Field and Lowry (2009) show that IPO underperformance is limited to firms with the lowest levels of institutional ownership, a characteristic that tends to make the firms costlier to short; thus any overvaluation that arises from a subset of investors who

1 The uncertainty about performance and pricing is intuitive. As pointed out by Lowry and Michaely (2017), 36% of IPOs delist within the first five years after the IPO, with 12% as a result of poor performance and 24% as a result of acquisitions. Many companies that start the IPO process do not make it to market; 20% of IPOs are withdrawn.
are overoptimistic at the time of the IPO may be more likely to persist.

The literature of course is not without debate. Other researchers have questioned what yardstick is right for gauging the performance of IPOs. Brav and Gompers (1997) show that firms with size and book-to-market value similar to those of analyzed IPOs perform equally poorly, that is, the IPO underperformance disappears after one controls for size and value effects. Lowry, Michaely, and Volkova (2017) confirm similar results using more recent data (1973 to 2012). Thus, it may be that IPOs do not actually underperform when their other characteristics (such as traditional factor exposures) are accounted for.

In this article, we focus on a more intermediate time period than previous studies do. It is usually a matter of several weeks, and not more than several months, before IPOs of sufficient size are added to major benchmark indexes. Rather than multiple years, we focus on the short window that occurs between the IPO date and the key dates for index inclusion. To date, little research has been done on these shorter periods as well as the relationship between IPOs and index investing, which is arguably becoming more critical given the growth of index funds.

GLOBAL IPO LANDSCAPE

Globally, more than 29,000 companies filed to go public between January 1, 2000, and December 31, 2018; 27,936 companies ultimately raised more than USD 3.5 trillion, as shown in Exhibit 1.

The US-based exchanges, predominately NYSE and NASDAQ, account for more than 25% of the global IPOs listed during this period. From 2000 to 2018, more than 3,500 companies filed to go public in the United States; more than USD 800 billion was raised. As shown in Exhibit 2, the spurt in the number of IPOs during the past three years from 2017 to 2019 can be attributed to privately held “unicorns” going public. However, the
average annual number of IPO listings on US exchanges between 2000 and 2018 has been 187, which is 40% lower than the average of 310 listings between 1980 and 2000. A few of the reasons posited for this decline in the IPO volume range are regulatory overreach, economies of scope, and capital availability hypotheses.²

²The regulatory overreach hypothesis proposes that the 2002 Sarbanes–Oxley Act and the 2003 Global Settlement have substantially increased the regulatory burdens on a public company, particularly for small companies. The economies of scope hypothesis argues that the importance of bringing products quickly to market has increased; hence small independent companies have lower profits relative to their potential profit compared with larger companies. The drop in IPOs could also be attributed to what we posit as the capital availability hypothesis. This hypothesis postulates that the drop in IPOs could also be attributed to the large increase in investments by institutional investors, especially public pensions, in private equity and venture capital funds. As these funds now have lots of dry powder (cash) on hand, they can finance the growth of private companies much longer than in prior periods.

ANALYSIS FRAMEWORK AND DATA

As US exchanges have accounted for more than a quarter of the total capital raised during the period studied, our analysis focuses on the US market. To capture the entire spectrum of companies from large cap to small cap, we evaluate the Russell 1000 and 2000 Indexes in this article. The Russell 1000 Index covers the large cap segment, whereas the Russell 2000 covers the small cap segment. The Russell 1000 and Russell 2000 Indexes not only cover the entire spectrum but also have the largest amount of assets tracking them. As shown in Exhibit 3, the assets tracked by Russell 1000 and Russell 2000 have grown exponentially in the past decade. We limit our analysis to IPOs with offer dates between January 1, 2010, and December 31, 2018.

We start with the IPO date and monitor the security price from the first day of listing to the date the security is included in the Russell index. FTSE Russell
has a set quarterly calendar for IPO additions. There are four scheduled rebalances in a year for Russell US indexes. Index entry rules generally differ from one provider to another, with different eligibility criteria, but all index providers will announce the index inclusion of a security at least a day before the IID. (For more information on IPO entry rules for major indexes, please see the appendix.) The key dates in the process are as follows:

- **Offer date**: date on which the security is priced. Generally, it is a day before the first day of trading.
- **First day of trading (FD)**: date of the first day of trading on the specified exchange.
- **Announcement date**: date on which the index vendor announces future index changes. Generally, it is at least a day before the IID for an IPO.
- **Index inclusion date (IID)**: date on which the IPO security is included in the index.

Our primary focus is the excess return opportunity between the security IPO offer date and the IID. For our analysis we look at securities with IPOs that are included in the Russell 1000 or Russell 2000 within the first six months of listing (126 business days). Generally, this provides recent IPOs with two rebalances for the security to be included in either of the indexes.

Our data are sourced from FactSet and FTSE Russell. Our analysis data set contains 13,405 global IPOs issued between 2010 and 2018. Of these, 1,940 IPOs were registered on US exchanges and 1,793 IPOs were priced. From this data set, we identify 932 IPOs that are included in either the Russell 1000 (115 securities qualified) or the Russell 2000 (817 securities qualified) Index in the first six months of listing.

Large institutional index managers can participate in the book-building process for IPOs. Book building refers to the process used by investment banks, which underwrite the IPO, to accept firm commitments from large buyers such as financial institutions, corporations, or high-net-worth individuals. The buyers are allocated...
the securities at the offer price set on the basis of the demand of the book-building process. We break down the performance of an IPO into two parts:

- First-day performance (FDP)
- Index adjusted performance (IAP) for any date after the first date the shares are available publicly (i.e., the first day of trading)

We define FDP as follows:

\[
\frac{\text{Security price at the close of first day of trading}}{-\text{IPO offer price}} - \text{IPO offer price}
\]

If the FDP is positive, investors will have seen positive gains if they received an allocation in the book-building process that would be at the offer price determined. If the FDP is instead negative, the investor would have been better off not participating in the book-building process.

For any date after the first day of trading, we define the IAP for that date as

\[
\frac{\text{Total return of security} - \text{Total return of index}}{(\text{between the closing price of the first day of trading and the closing price of any later day})}
\]

The IAP is a market-adjusted measure capturing excess returns. We can compute the IAP on any date after the first day of trading, which may be weeks or months later than the IPO. If the IAP is positive on any particular date after the IPO, the investor will have generated excess returns by buying at the close of the first day of trading. If the IAP is negative at that later day, then the investor would have been better off waiting until that later date to buy.

We provide an illustration in Exhibit 4, using a company, GoPro, Inc., that had an IPO on June 26, 2014. The IAP for GoPro, Inc., was positive every day after the first day of trading. The IAP generally increased as the IID approached. In this case, it would have been better for an investor to buy at almost any time before the IID.

**Exhibit 4**
Index Adjusted Performance of GoPro, Inc., Class A from First Day of Trading to Index Inclusion Date
EMPirical Observations—When Should Index Funds Buy IPOs?

Most index funds tend to track indexes closely—buying and selling securities on the day the index changes (including IPO inclusions) become effective. Typically, IPOs are not added to major indexes immediately; sometimes it takes weeks if not months after the IPO offer date. Hence, index fund managers are left with the conundrum of whether to accumulate positions ahead of the time the security is expected to be added, or to just wait until the IID. In the first scenario with advance accumulation, the index manager takes on tracking error as the index portfolio would hold the IPO security, which is not part of the index. If the index manager obtains an allocation in the IPO book buildings, commissions can sometimes be significant, and the index manager may not be able to obtain as many shares of the IPO as needed for the index fund. Moreover, if after the listing, the security price drops relative to the IPO offer price, the security may fall below the market capitalization eligibility threshold of an index. In such a scenario, the index fund also has to bear the transaction costs of selling out of the IPO position. Hence, an index fund manager has to assess various risk–return attributes before pursuing the excess return opportunity associated with the buying of IPOs before the IID.

To better understand the potential excess returns of buying IPOs before the IID, we first look at the opportunity of participating in the book-building process.

Analysis of the Day of the IPO: Should Index Funds Participate in IPO Book Building?

To begin, we assume we know which securities will be added to the Russell 1000 and 2000 Indexes. (In the next section, we account for the fact that we do not have perfect foresight of the additions.) We evaluate the 932 IPOs that were included in the Russell 1000 or Russell 2000 Index in the first six months of the listing. As shown in Exhibits 5A and 5B, the FDP for IPOs added to both indexes is unequivocally positive on average. The average FDP is 22% for the Russell 1000 IPO additions, and the median FDP is 10%; thus, validating the IPO first-day pop in past studies. The average FDP is 16% for the Russell 2000 IPO additions, and the median FDP is 9%. The higher averages compared with the median values for the Russell 1000 reflect the higher probability of there being a negative FDP for Russell 2000 additions. Still, in general, if we assume perfect foresight of which IPOs will be added to the Russell Indexes, index funds should participate in the book-building process with a view to buying the allocated number of shares as of the IPO offer date.

We next analyze the FDP of IPOs on the basis of the size of the IPO. We sort the IPOs into quartiles according to the gross proceeds raised. Exhibits 6A and 6B show that size does have a significant impact on the FDP. The first quartile has the lowest return, and the fourth quartile has the highest return in both indexes. The top quartile securities for which the risk of non-inclusion in the index is minimal have the least excess return of all of the quartiles. Moreover, the relationship between size and FDP is monotonic for both the Russell 1000 and the Russell 2000 Indexes.

Turning to sectors, Exhibits 7A and 7B show that sectors such as health care, financial services, and technology dominated the US IPO landscape during the analysis period. Sector classification also appears to have a significant effect on the FDP. For the Russell 1000 IPOs in Exhibit 7A, the technology sector had the best average and median FDP, whereas materials and processing had the worst median FDP. For the Russell 2000 IPOs in Exhibit 7B, Consumer Discretionary and Health Care had the best performance, similar to the Russell 1000. On the basis of this historical data, index fund managers might choose to participate before the IID only in IPOs from certain sectors.

Analysis of Performance between the Day of the IPO and the IID: Should Index Funds Buy IPO Securities before Index Inclusion?

If index funds do not participate in the book-building process or do not get the desired allocation in the book-building process, when should index funds buy securities with recent IPOs? We gauge IAP to ascertain the best time to buy securities with recent IPOs, with a focus on the period between the first day of trading and the IID. On average, it takes 49 days for an IPO to be included in either the Russell 1000 or the Russell 2000. Therefore, we focus on the first six months of trading after the IPO.

Exhibits 8A and 8B show the average and median IAPs for each date between the first day of trading and
the IID. (A positive IAP reflects positive excess returns if one were to buy shares of the IPO at the close of the first day of trading and hold them through to the IID.) The excess returns are highest if one buys closer to the first day of trading, even if away from the IID. Also, the IAP keeps increasing even after the announcement date. Hence, index managers with tight tracking error constraints can still add value by initiating positions after the announcement date but before the IID.

The average IAP at the IID for Russell 1000 IPOs is 6.89% (as shown in Exhibit 8A), which is significantly lower than the average IAP of 8.59% (as shown in Exhibit 8B) for Russell 2000 IPOs. Yet the smaller spread between average and median for Russell 1000 IPOs indicates a generally lower dispersion of IAP among Russell 1000 IPOs. The opposite seems to be true for Russell 2000 IPOs: as shown in Exhibit 8B, the difference between average and median IAP keeps increasing until IID.

On the basis of the empirical evidence, potential excess returns appear possible through any one of following three approaches:

- IPO date: buying entire position in the IPO security via allocation through the book-building process to benefit from the FDP
- Close of first day of trading: buying entire position in the security at the close on the first day of trading to benefit from positive IAP
- Interim date (between the IPO date and index inclusion): buying entire position in the security at the close on the first day of trading to benefit from positive IAP

Exhibit 5A

FDP of US IPOs (IPOs between January 2010 and December 2018 included in Russell 1000 in first six months)
According to Exhibit 9, the IPO date approach, which requires buying the entire position at the IPO offer price, has the highest excess returns. However, there is uncertainty concerning the allocation of IPOs; the uncertainty is based on the over-/under-subscription of the IPO book-building process. A large index manager may not be able to obtain the necessary shares as required by the fund. A pragmatic approach could be for the manager to try to buy as many shares as feasible during the book-building process and to supplement this approach with either or both of the other two approaches.
Does Size or Sector Matter?

Next we consider how much the size of the IPO or the sector classification matters to the excess returns possible from buying between the first day of trading and the IID. Exhibits 10A and 10B show the IAP over time for quartiles of IPOs ranked by size (gross proceeds).

The top quartile contains the largest IPOs. In Exhibit 10A, consistent with the earlier results in Exhibit 6A, the top quartile (largest IPOs) exhibits the lowest median outperformance, while the smallest quartile exhibits the highest outperformance. For the Russell 2000, in Exhibit 10B, the results are slightly different: the third quartile shows the highest IAP historically.

### Exhibit 7A
ICB Classification of FDP of Russell 1000 IPOs according to Sector (IPOs between January 2010 and December 2018 added to index in first six months)

<table>
<thead>
<tr>
<th>Sector</th>
<th>Count</th>
<th>Negative FDP out of Total</th>
<th>Average FDP</th>
<th>Median FDP</th>
</tr>
</thead>
<tbody>
<tr>
<td>Technology</td>
<td>31</td>
<td>3%</td>
<td>41%</td>
<td>31%</td>
</tr>
<tr>
<td>Financial Services</td>
<td>27</td>
<td>11%</td>
<td>11%</td>
<td>7%</td>
</tr>
<tr>
<td>Consumer Discretionary</td>
<td>18</td>
<td>11%</td>
<td>24%</td>
<td>19%</td>
</tr>
<tr>
<td>Energy</td>
<td>11</td>
<td>9%</td>
<td>7%</td>
<td>5%</td>
</tr>
<tr>
<td>Health Care</td>
<td>10</td>
<td>10%</td>
<td>23%</td>
<td>16%</td>
</tr>
<tr>
<td>Producer Durables</td>
<td>7</td>
<td>29%</td>
<td>2%</td>
<td>4%</td>
</tr>
<tr>
<td>Consumer Staples</td>
<td>5</td>
<td>20%</td>
<td>35%</td>
<td>11%</td>
</tr>
<tr>
<td>Materials and Processing</td>
<td>4</td>
<td>25%</td>
<td>6%</td>
<td>3%</td>
</tr>
<tr>
<td>Utilities</td>
<td>2</td>
<td>0%</td>
<td>11%</td>
<td>11%</td>
</tr>
<tr>
<td>Overall Average</td>
<td></td>
<td>10%</td>
<td>22%</td>
<td>10%</td>
</tr>
</tbody>
</table>

### Exhibit 7B
ICB Classification of FDP of Russell 2000 IPOs according to Sector (IPOs between January 2010 and December 2018 added to index in first six months)

<table>
<thead>
<tr>
<th>Sector</th>
<th>Count</th>
<th>Negative FDP out of Total</th>
<th>Average FDP</th>
<th>Median FDP</th>
</tr>
</thead>
<tbody>
<tr>
<td>Health Care</td>
<td>262</td>
<td>18%</td>
<td>21%</td>
<td>13%</td>
</tr>
<tr>
<td>Financial Services</td>
<td>167</td>
<td>29%</td>
<td>6%</td>
<td>2%</td>
</tr>
<tr>
<td>Technology</td>
<td>147</td>
<td>17%</td>
<td>22%</td>
<td>20%</td>
</tr>
<tr>
<td>Consumer Discretionary</td>
<td>99</td>
<td>19%</td>
<td>22%</td>
<td>13%</td>
</tr>
<tr>
<td>Energy</td>
<td>50</td>
<td>30%</td>
<td>5%</td>
<td>2%</td>
</tr>
<tr>
<td>Producer Durables</td>
<td>38</td>
<td>39%</td>
<td>11%</td>
<td>0%</td>
</tr>
<tr>
<td>Materials and Processing</td>
<td>30</td>
<td>43%</td>
<td>5%</td>
<td>3%</td>
</tr>
<tr>
<td>Consumer Staples</td>
<td>16</td>
<td>13%</td>
<td>17%</td>
<td>11%</td>
</tr>
<tr>
<td>Utilities</td>
<td>8</td>
<td>50%</td>
<td>7%</td>
<td>3%</td>
</tr>
<tr>
<td>Overall Average</td>
<td></td>
<td>23%</td>
<td>16%</td>
<td>9%</td>
</tr>
</tbody>
</table>

### Exhibit 8A
Average/Median of IAP between First Day of Trading and IID Range for All IPOs Included in Russell 1000 in First Six Months of Trading

![Average/Median of IAP between First Day of Trading and IID Range for All IPOs Included in Russell 1000 in First Six Months of Trading](https://jii.pm-research.com)
Exhibits 11A and 11B show the results for each sector. For the Russell 1000 IPOs in Exhibit 11A, the producer durables sector has by far the lowest median IAP at the IID. The spread between that and the sector with the highest median IAP (utilities) is quite large by the date of the IID. The spread is not quite as large for Russell 2000 IPOs in Exhibit 11B. Moreover, the sectors that exhibit the largest IAP are not the same as for the Russell 1000. As of the IID, the IAP is highest for consumer discretionary and materials and processing for Russell 2000 IPOs. Meanwhile, the IAP is highest at the announcement date for utilities and for materials and processing for Russell 1000 IPOs.
**EXHIBIT 10A**
Median of IAP Between First Day of Trading and IID Range for All IPOs Included in Russell 1000 in First Six Months of Trading (ranked by quartile)

Days After the First Day of Trading (FD)

Average Announcement Date Range

Average Index Inclusion Date Range

<table>
<thead>
<tr>
<th>Average Index Adjusted Performance (IAP)</th>
<th>Days After the First Day of Trading (FD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Median IAP – Top Quartile</td>
<td>Median IAP – 2nd Quartile</td>
</tr>
<tr>
<td>Median IAP – 3rd Quartile</td>
<td>Median IAP – Bottom Quartile</td>
</tr>
</tbody>
</table>

**EXHIBIT 10B**
Median of IAP Between First Day of Trading and IID Range for All IPOs Included in Russell 2000 in First Six Months of Trading (ranked by quartile)

Days After the First Day of Trading (FD)

Average Announcement Date Range

Average Index Inclusion Date Range

<table>
<thead>
<tr>
<th>Average Index Adjusted Performance (IAP)</th>
<th>Days After the First Day of Trading (FD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Median IAP – Top Quartile</td>
<td>Median IAP – 2nd Quartile</td>
</tr>
<tr>
<td>Median IAP – 3rd Quartile</td>
<td>Median IAP – Bottom Quartile</td>
</tr>
</tbody>
</table>
**EXHIBIT 11 A**
Median of IAP between First Day of Trading and IID Range for All IPOs Included in Russell 1000 IPOs in First Six Months of Trading

**EXHIBIT 11 B**
Median of IAP between First Day of Trading and IID Range for All IPOs Included in Russell 2000 IPOs in First Six Months of Trading
SYSTEMATIC IPO INVESTING APPROACH
FOR INDEX MANAGERS

So far we have quantified the empirical patterns around IPOs. Our observations indicate a significant opportunity to generate excess returns from early buying of IPOs before the IID. We also note significant differences across sectors, although we caution against generalizing from these observations, as sectoral trends may change from one period to another.

We next propose a systematic strategy for buying IPOs prior to index inclusion. Since we do not know in advance which IPOs will eventually be added to the Russell 1000 and Russell 2000 Indexes, the systematic strategy cannot be based on perfect foresight. But minimizing tracking error against the index is an important objective for all index fund managers. Thus, the strategy must embed a forecast of which IPOs will be added, and the risk of this strategy must be taken into account.

One fruitful approach would be to look at the expected security weight in the index on the IPO debut and set a range of early purchases based on historical data. (The higher the weight, the more likely the IPO security would be included in the index, at least for the Russell 1000 Index.) If we were to compare the gross proceeds with the free float adjusted market capitalization of all index constituents of the index as of the offer date, the expected index weight of the IPO security could be ascertained. The expected index weight of an IPO security as of the IPO offer date is defined as

\[
\text{Expected index weight of IPO security} = \frac{\text{Gross proceeds raised calculated by using the lower end of the offer price range of the IPO}}{\text{Cumulative free float adjusted market capitalization of the relevant index}}
\]

The strategy could be tailored to the investor’s/manager’s risk appetite. Some managers may want to take an aggressive approach in which they buy positions early in as many IPO securities as possible, whereas a more conservative index manager may want to take positions only in IPOs that will be included in the index with high certainty. We suggest the following framework that accounts for different risk appetites.

An index manager may adopt a strategy of buying a position in the IPO security during the book-building process if and only if

\[
\text{The expected index weight of the IPO security in the relevant index} \geq \text{Defined threshold of cumulative free float adjusted market capitalization of the relevant index}
\]

for the rest of this section, we analyze the Russell 1000 Index because predicting IPOs that will be included in the Russell 2000 will require a more nuanced approach to avoid inclusions in the Russell 1000 at the same time.

The expected index weight of an IPO security as of the IPO offer date is defined as

Expected index weight of IPO security in relevant index

Gross proceeds raised calculated by using the lower end of the offer price range of the IPO

Cumulative free float adjusted market capitalization of the relevant index

An index manager may adopt a strategy of buying a position in the IPO security during the book-building process if and only if

The expected index weight of the IPO security in the relevant index

Defined threshold of cumulative free float adjusted market capitalization of the relevant index

Exhibit 12 shows a set of proposed thresholds for three categories of investors with varying levels of risk appetite.

Using the full US IPO data set from before and based on the aforementioned thresholds, Exhibit 13 shows average excess returns from buying in the book-
building process according to the expected weight of the security. The excess returns from all three approaches are positive, with as much as a 16.7% value add possible in the most aggressive strategy. As we move from conservative to aggressive, the accuracy of correct predictions decreases, but the number of securities that qualify for the strategy increases. Also, for simplicity, it is assumed that IPOs that are not included in the Russell 1000 within six months are sold at the close-of-market price of FD + 126 (six months from the first day of trading).

So far we have not taken into account the return volatility of IPOs. Their volatility in the first weeks of trading is higher than the long-term average as the public market participants go through the price discovery process.

We can generate a risk–return profile for all three risk appetite categories if we use the basic definition of risk as the standard deviation of excess returns and initiate positions in the IPO securities on the following dates:

- Book-building process – IPO offer date
- First day of trading (FD) – close
- FD + 10 – Close
- FD + 20 – Close
- FD + 30 – Close

Exhibit 16A shows the risk–return profile of the conservative strategy. The size of the bubble indicates the number of securities that qualify for the strategy. The number of securities increases as we move away from the first day of trading, albeit with lower excess returns for the risk appetite.

In Exhibits 16B and 16C, the pragmatic and aggressive approaches, respectively, exhibit a similar risk–return profile, but the number of securities that qualify increases compared with the number of securities that qualified in the conservative approach.

In Exhibit 16D, we compare the risk–return profiles for all three approaches. As seen in the prior charts, although the number of securities that qualify for the pragmatic approach is higher than for the conservative

| Risk Appetite       | Accuracy (%) = Number of IPOs Included in Russell 1000 in First Six Months of Trading Divided by Number of IPOs Participated In | Coverage (%) = Number of IPOs Included in Russell 1000 in First Six Months of Trading Divided by Total Number of IPOs Added to Index in That Period | Average Security Level Excess Return Sat IID (%)
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Conservative (expected weight &gt;= 1 bps)</td>
<td>100% (13/13)</td>
<td>12% (13/115)</td>
<td>15.43% = 10.19% (FDP) + 5.24% (IAP@IID)</td>
</tr>
<tr>
<td>Pragmatic (expected weight &gt;= 0.75 bps)</td>
<td>95% (19/20)</td>
<td>17% (19/115)</td>
<td>16.32% = 9.50% (FDP) + 6.82% (IAP@IID)</td>
</tr>
<tr>
<td>Aggressive (expected weight &gt;= 0.50 bps)</td>
<td>88% (36/41)</td>
<td>31% (36/115)</td>
<td>16.69% = 11.22% (FDP) + 5.47% (IAP@IID)</td>
</tr>
</tbody>
</table>
Approach, the risk also reduces although at the cost of lower excess returns. As expected, the aggressive approach participates in the maximum number of IPOs and the highest excess returns although with higher risk, compared with the conservative and pragmatic approaches.

CONCLUSION

With significant assets having moved into index funds, research is needed on the implications for index managers buying IPOs before they are included in the relevant index. Here, we evaluate US IPOs in recent years (January 2000 to December 2018) that are subsequently added to the Russell 1000 or 2000 Index in six months and assess their performance characteristics.

First, we corroborate the well-documented first-day IPO pop for this subset of firms. The size of the IPO did not have an impact on the average first-day IPO pop, but sectors such as technology and consumer discretionary fared significantly better on the first day compared with sectors such as producer durables and materials.
Second, from the close of the first day of trading to the IID (the day the security is added to the index), the average security price rises. These additions historically generated excess returns on average of up to 29% and 25% at a security level for the Russell 1000 and 2000, respectively.

Third, while managers do not know in advance which IPOs will actually be added to the Russell 1000 and 2000 Indexes, we show that a systematic strategy of buying securities of sufficient size can generate positive excess returns without the need to take on significant risk. At least for the Russell 1000 Index, IPOs with a larger market cap relative to the index have a higher probability of being included in that index. To harvest the potential excess returns, we develop a risk–return framework for index funds to decide how many IPOs of what size they should buy at what time. The level of risk can be calibrated to an investor’s risk appetite so that the higher the risk appetite, the earlier the investor is willing to accumulate positions in IPOs ahead of the IID.

Generally, we conclude that index funds could have generated excess returns by buying IPOs at various times before they were included in the indexes—at the IPO offer price provided they could get an allocation of the desired number of shares, at the close on the first day of trading after the IPO or later but before the date the IPO was included in the indexes. Index funds would almost always be better off trading away from the IID. If index investors participate more often in the IPO book-building process, more private companies may be encouraged to go public and enable retail investors to participate in the growth of these companies. This topic would be a promising avenue for future research.

### Exhibit 16A
Conservative Strategy Risk–Return Profile

<table>
<thead>
<tr>
<th>Parameters</th>
<th>FD + 30 – Close</th>
<th>FD + 20 – Close</th>
<th>FD + 10 – Close</th>
<th>FD (First Day of Trading) – Close</th>
<th>Book-Building Process – IPO Offer Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of Positions Taken</td>
<td>55</td>
<td>55</td>
<td>55</td>
<td>53</td>
<td>12</td>
</tr>
<tr>
<td>Average Excess Return Generated</td>
<td>1%</td>
<td>2%</td>
<td>3%</td>
<td>4%</td>
<td>14%</td>
</tr>
<tr>
<td>Average Risk</td>
<td>12%</td>
<td>14%</td>
<td>16%</td>
<td>18%</td>
<td>23%</td>
</tr>
</tbody>
</table>
**EXHIBIT 16B**
Pragmatic Strategy Risk–Return Profile

<table>
<thead>
<tr>
<th>Parameters</th>
<th>FD + 30 – Close</th>
<th>FD + 20 – Close</th>
<th>FD + 10 – Close</th>
<th>FD (First Day of Trading) – Close</th>
<th>Book-Building Process – IPO Offer Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of Positions Taken</td>
<td>59</td>
<td>60</td>
<td>58</td>
<td>58</td>
<td>19</td>
</tr>
<tr>
<td>Average Excess Return Generated</td>
<td>0.2%</td>
<td>1%</td>
<td>2%</td>
<td>4%</td>
<td>13%</td>
</tr>
<tr>
<td>Average Risk</td>
<td>13%</td>
<td>14%</td>
<td>16%</td>
<td>18%</td>
<td>20%</td>
</tr>
</tbody>
</table>
**EXHIBIT 16 C**

Aggressive Risk–Return Profile

![Graph showing index adjusted performance and risk]

<table>
<thead>
<tr>
<th>Parameters</th>
<th>FD + 30 – Close</th>
<th>FD + 20 – Close</th>
<th>FD + 10 – Close</th>
<th>FD (First Day of Trading) – Close</th>
<th>Book-Building Process – IPO Offer Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of Positions Taken</td>
<td>68</td>
<td>69</td>
<td>69</td>
<td>65</td>
<td>40</td>
</tr>
<tr>
<td>Average Excess Return Generated</td>
<td>1%</td>
<td>1%</td>
<td>2%</td>
<td>5%</td>
<td>15%</td>
</tr>
<tr>
<td>Average Risk</td>
<td>13%</td>
<td>15%</td>
<td>17%</td>
<td>18%</td>
<td>24%</td>
</tr>
</tbody>
</table>

**EXHIBIT 16 D**

Comparison Analysis of Risk–Return Profiles

![Graph comparing aggressive, pragmatic, and conservative profiles]

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**APPENDIX A**

**IPO ENTRY RULES**

Index providers follow a series of pre-determined steps for all corporate actions and IPOs are no different. But each index provider has a different index inclusion eligibility criteria for recent IPOs. For instance, S&P has a minimum trading period for an IPO to be eligible for inclusion, while FTSE has no such criteria. Even within one suite of indices, index providers can vary. For example, within S&P US indices, the minimum length of trading of six months is required for eligibility in S&P 500 whereas it is twelve months for the S&P 1500. But nowadays many index providers have created rules that allow “Fast Track” entry of IPOs into index (within few days of IPO), if the security meets a certain market capitalization and liquidity thresholds. For example, MSCI includes companies after ten days if they meet a certain market capitalization threshold. Exhibit A1 summarizes the IPO entry rules for the major index providers.

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**EXHIBIT A1**

IPO Entry Rules for Major Index Providers

<table>
<thead>
<tr>
<th></th>
<th>MSCI</th>
<th>S&amp;P</th>
<th>FTSE Russell</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Normal criteria</strong></td>
<td>For an IPO to be eligible for inclusion in a Market Investable Equity Universe, the new issue must have started trading at least three months before the implementation of a Semi-Annual Index Review. This rule is referred to as the Minimum Length of Trading Requirement. Large IPOs and large primary/secondary offerings of non-index-constituents are not subject to the Minimum Length of Trading Requirement and may be included in a Market Investable Equity Universe and the Standard Index outside of a Quarterly or Semi-Annual Index Review.</td>
<td>For the S&amp;P Total Market Index, eligible IPOs are added to the index at the next rebalancing, subject to the reference date.</td>
<td>No minimum length of trading</td>
</tr>
<tr>
<td><strong>Fast track</strong></td>
<td>A security must meet the index constituent eligibility rules and guidelines with the exception of the length of trading and liquidity screens, meet the size-segment investability requirements described in and have a company full market capitalization of at least 1.8 times the Interim Market Size-Segment Cutoff and free float-adjusted market capitalization of at least 1.8 times one-half of the Interim Market Size-Segment Cutoff as of the close of its first or second trading day. If the decision is made to early include a security, MSCI will include the security by giving 10 business days’ notice.</td>
<td>None</td>
<td>Between annual reconstitution periods, FTSE Russell will review for index inclusion any share class in addition to that of the pricing vehicle that is made available via IPO as per the quarterly IPO inclusion methodology. Additional share classes will be considered eligible if necessary Size, Liquidity, and Float conditions are met. The timing of the additions is based on the IPO calendar.</td>
</tr>
</tbody>
</table>

*Source: MSCI, S&P and FTSE Russell.*

*The IPO calendar for the FTSE Russell US indices is publicly available. The current version, as of 5th March 2020, of the IPO calendar can be found in the following document – https://research.ftserussell.com/products/downloads/Russell-US-indexes.pdf.*
REFERENCES


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