



NYSE R&D Innovation Index (NYINOV8 / NYINOV8T)

Version 2.0
Valid from
May 1, 2017

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Version History:

Version 2.0 (Effective May 1, 2017)

Index Name updated to **NYSE R&D Innovation Index** effective May 1, 2017

Version 1.0 (Effective May 10, 2016)

1. Index summary

Factsheet	
<i>Full name</i>	NYSE R&D Innovation Index (NYINOV8) / NYSE R&D Innovation Index Total Return (NYINOV8T)
<i>Index Type</i>	Price Return (NYINOV8) Gross Total Return (NYINOV8T)
<i>Index Description</i>	The NYSE R&D Innovation Index (NYINOV8) and NYSE R&D Innovation Index Total Return (NYINOV8T) Indices are designed to provide exposure to the most innovative companies in the US across sectors and market capitalization. Central to the estimation of Innovation potential of a company is Research Quotient (RQ) for all eligible equities in the investable universe. The RQ determines how well a company can transform an additional US dollar spent on R&D into revenue and therefore creates a link between Innovation investment and Innovation performance
<i>Eligible stocks</i>	Common stocks of selected companies listed on the NYSE, NASDAQ, NYSE MKT, or another major U.S. exchange
<i>Number of constituents</i>	39 as of May 10, 2016. Ranges at rebalance
<i>Weighting</i>	Equal-Dollar Weighting
<i>Review of composition</i>	Announced Annually in December three (3) business days preceding the 3rd Friday
<i>Effective date of the rebalance</i>	Effective Annually after the close of the 3 rd Friday of December
<i>Calculation frequency</i>	Price Return: 15 seconds between 09:30 & 18:00 ET Gross Total Return: Once-a-day 18:15 & 19:00 ET
<i>Base date</i>	May 10, 2016
<i>Base level</i>	1000.0000
<i>Historic data available since</i>	December 29, 1989
<i>NYSE code</i>	Price Index : NYINOV8 / Total Return Index : NYINOV8T
<i>Bloomberg code</i>	NYINOV8 INDEX / NYINOV8T INDEX
<i>Reuters code</i>	.NYINOV8 / .NYINOV8T
<i>Launch date</i>	May 10, 2016

2. Governance and disclaimer

Index sponsor and Index calculation agent

NYSE[®] Group, Inc. is the index sponsor. NYSE[®] Arca[®] is the index calculation agent on behalf of NYSE[®] Group, Inc.

The NYSE[®] Arca[®] Index Committee is responsible for the day-to-day management of the index and is also responsible for decisions regarding the interpretation of these rules. The Index Committee reviews all rule book modifications and index constituent changes to ensure that they are made objectively and without bias. NYSE[®] Arca[®] believes that information regarding rule book modifications and index constituent changes is material and can have an impact on the market. Consequently, all Index Committee discussions and decisions are confidential.

Cases not covered in rules

In cases which are not expressly covered in these rules, operational adjustments will take place along the lines of the aim of the index. Operational adjustments may also take place if, in the opinion of the index calculation agent, it is desirable to do so to maintain a fair and orderly market in derivatives on this index and/or this is in the best interests of the investors in products based on the index and/or the proper functioning of the markets.

Rule book changes

The Index Committee reviews all rule book modifications and index constituent changes to ensure that they are made objectively and without bias. These rules may be supplemented, amended in whole or in part, revised or withdrawn at any time. Supplements, amendments, revisions and withdrawals may also lead to changes in the way the index is compiled or calculated or affect the index in another way. Changes affecting the index are typically publically communicated in advance of such change (see Announcement policy section)

Liability

NYSE[®] Arca[®] is not liable for any losses resulting from supplementing, amending, revising or withdrawing the Rules for the index.

The index calculation agent will do everything within its power to ensure the accuracy of the composition, calculation, publication and adjustment of the index in accordance with relevant rules. However, NYSE[®] Arca[®] is not liable for any inaccuracy in share prices, calculations and the publication of the index, the information used for making adjustments to the index and the actual adjustments. Furthermore, NYSE[®] Arca[®] does not guarantee nor the continuity of the composition of neither the index, nor the continuity of the calculation of the index, nor the continuity of the dissemination of the index levels, nor the continuity of the calculation of the index.

Ownership and trademarks

Intercontinental Exchange, Inc. (ICE) owns all intellectual and other property rights to the index, including the name, the composition and the calculation of the index. NYSE[®], NYSE Arca[®] and NYSE[®] Group, Inc. are registered trademarks of ICE's subsidiaries.

3. Publication

3.1 The opening, intraday and closing or daily publication of index values.

Opening

The first index level is calculated and published around 09:30 ET, when the U.S. equity markets open for their regular trading session. In the case of constituents that have a non-traded, halted or suspended status, or have not opened for the current day, the previous day's reference prices or estimated prices (for IPOs, buyouts and swap offers) are used.

Dissemination frequency

The level of the index is in principle published every 15 seconds to the NYSE Global Index Feed (NYSE GIF). The calculated index levels incorporate the latest traded price of each constituent from within the regular trading session, normally 09:30 to 18:00 ET. The index only holds equities listed and traded in the U.S., and thus, intraday calculations of the index would incorporate trades on a consolidated level, from all exchanges and venues including those not designated as the official primary exchange.

The price return index is calculated from 09:30 until 18:00 ET on those days specified as index business days. Index business days will be classified as days on which the U.S. Equity Markets (NYSE, NASDAQ, NYSE MKT) are open for a full or partial day of trading.

The gross total return index will be calculated on an end-of-day basis and its closing level will be published between 18:00 and 19:00 ET.

Closing level

The closing level is the last level disseminated on the trading day and uses the official close prices from the primary listing market for each constituent. For constituents that have non-traded, halted or suspended status, or have not opened for the current day, the previous day's reference prices or estimated prices (for IPOs, buyouts and swap offers) are used instead. In the case of exceptional market conditions, the index calculation agent reserves the right to utilize other prices in the calculation of the official closing level, as indicated below in Section 3.2.

Sources of Data

The Consolidated Tape (CTS/UDTF) is the primary market data source for U.S. equity real-time and closing prices. Additional sources of data less commonly used include other market data vendors, company announcements, exchange announcements, and other official sources.

3.2 Exceptional market conditions and corrections

The index calculation agent retains the right to delay the publication of the opening level of the index. Furthermore, the index calculation agent retains the right to suspend the publication of the level of the index if it believes that circumstances prevent the proper calculation of the index.

If index constituent prices are cancelled, the index will not be recalculated unless the index calculation agent decides otherwise.

Commercially reasonable efforts are made to ensure the correctness and validity of data used in real-time index calculations. If incorrect price or corporate action data affects index daily highs, lows, or closes, it is corrected retroactively as soon as possible.

There is the possibility of an exchange or market-wide event resulting in the normal closing auction not going off or official closing prices not being available. In those situations, the index will take guidance from the respective exchange(s) and address on an event-by-event basis. Exchange or market-wide events include, but are not limited to, the following:

- Volatility Halts
 - LULD (Limit Up / Limit Down)
 - Circuit Breaker
- Technological Problems / Failures
- Natural Disaster or Other BCP-Related Event

3.3 Announcement policy

Announcement policy

Changes to the index methodology will be announced by an index announcement which will be distributed via www.nyxdata.com and [ftp2.nyxdata.com](ftp://ftp2.nyxdata.com).

As a general rule the announcement periods that are mentioned below will be applied. However, urgently required corporate action treatments, often resulting from late notices from the relevant company or exchange, may require the index calculation agent to deviate from the standard timing.

Inclusion of new constituents

The inclusion of new companies in the index will typically only occur during the yearly rebalances or reviews, although there could be exceptions based on a specific corporate action affecting a current constituent. The inclusion of the new company will be announced at least three trading days before the effective date of the actual inclusion. For example, for the rebalance effective for December 19, 2016, the announcement would occur on December 14, 2016.

Removal of Constituents

Components would be removed from the index as a result of periodic corporate actions as well as the results of the annual reviews. All removals will be announced at least three trading days before the effective date of the removal. It should be noted that in the case of mergers and acquisitions, every effort will be made to remove the company at some reasonable time ahead of the last day of trading in the acquired company. There will be certain situations and corporate actions that would

require a removal of a company with less than three trading days of notice. In those cases, the removal would be announced no later than 15:00 ET on the trading day preceding the effective date of the removal. Any replacement for the company to be removed would be announced and made effective on the same dates.

Corporate actions

In case of an event that could affect one or more constituents, the index calculation agent will inform the market about the intended treatment of the event in the index shortly after the firm details have become available and have been confirmed. When possible, the corporate action will be announced, even if not all information is known, at least three trading days before the effective date of the action. Once the corporate action has been effectuated, the index calculation agent will confirm the changes in a separate announcement.

Rule changes

For the future, barring exceptional circumstances, a period of at least two months should pass between the date a proposed change is published and the date it goes into effect. Exceptions can be made if the change is not in conflict with the interests of an affected party, which specifically includes external parties that license the index for a tracking product.

Reviews: publication of new selection

The new composition of the index, including the companies to be a part of the index and their corresponding percentage weightings, will be announced at least three trading days before the effective date on www.nyxdata.com and [ftp2.nyxdata.com](ftp://ftp2.nyxdata.com). The new index shares that correspond to those weightings will be determined and announced after the close of trading on the 3rd Friday of December.

4. Calculation

4.1 Calculation of the price and total return indexes

The index is calculated on a Price Return and Gross Total Return basis. The current index level would be calculated by dividing the current modified index market capitalization by the index divisor. The divisor was determined off of the initial capitalization base of the index and the base level. The divisor is updated as a result of corporate actions and composition changes.

The Gross Total Return calculation incorporates regular cash dividends paid in the underlying constituents and reinvests those distributions into the index at the open of the dividend ex-date.

NYSE Arca may also choose to publish a Net Total Return index. The Net Total Return index calculation adjusts the gross dividends for international withholding tax rates in force at the time. The full table of international withholding tax rates being utilized in the index calculation will be available on www.nyse.com/indices and will be reviewed semi-annually at the start of March and September. Intra-review changes to the tax withholding rates can be made at the discretion of the index calculation agent and will be announced at a reasonable time prior to effectiveness of the changes.

4.2 Currency Conversion

The index is calculated and published in USD. The index calculation agent reserves the right to create, calculate, and publish the index in other currencies as required.

5. Index reviews

5.1 General aim of reviews and frequency

General aim of the periodical review

The general aim of the periodical review of the index is to ensure that the selection of the constituents continues to reflect the underlying market. The index is reviewed yearly to ensure that the index components continue to meet the continued inclusion requirements. The index calculation agent reserves the right to, at any time, change the number of stocks comprising the index by adding or deleting one or more stocks, or replacing one or more stocks contained in the index with one or more substitute stocks of its choice, if in the index calculation agent's discretion such addition, deletion or substitution is necessary or appropriate to maintain the quality and/or character of the index.

Frequency

The reviews become effective after the close of trading of the 3rd Friday of December.

The announcement will be made three trading days before the effective date of the rebalance.

The reference date for all company-specific data and information utilized in the rebalancing process will be taken from the announcement day, three business days preceding the 3rd Friday of December. It should be noted that the prices utilized to determine a constituent's new shares from its assigned percentage weighting are taken from the close of the 3rd Friday of December.

5.2 Index universe and selection principle

Index Universe

The universe is defined based on the criteria described in this section.

To qualify for inclusion a security must meet the following criteria:

1. Security must be a common stock
2. Security must trade on the NYSE, NYSE MKT or NASDAQ exchange.
3. A company is classified in the universe, if its primary stock market activities are carried out on NYSE MKT, NYSE or NASDAQ. (For cases where the distribution of revenue and asset do not signal unanimously to the country in which it is listed the decision of the Index committee is deemed final.)
4. The security must be an actively trading security
5. The following security types do not qualify:
 - a. American Depository Receipts and American Depository Shares
 - b. Fixed-dividend Shares
 - c. Convertible Notes, Warrants, and Rights
 - d. Limited Partnership/Master Limited Partnership and Limited Liability Companies
 - e. Business Development Companies
 - f. Pooled Investment Vehicles

g. Royalty and Statutory Trust

Selection of constituents

The following criteria are applied in sequence to the survivors of the equity universe selection:

1. Financial Report data required for RQ calculation (namely Revenue, PP&E, SG&A and R&D) are available for the past 7 years
2. The monthly amount of share traded is calculated for all securities. Shares with a monthly turnover lower than 500.000 shares are excluded to ensure constituents meet liquidity requirements. Also any securities not having traded for a period 10 days or longer are excluded from the investable universe.
3. To qualify for inclusion in the Index, a security must have a known RQ score, based on the procedures described below.
4. Equities with a market capitalization below 500m USD are excluded from the investable universe.

For reasons of practicality, the index calculation agent has the discretion to not include all companies that meet the minimum levels for inclusion. These include, but are not limited to, pending corporate actions, litigation or geo-political events that may affect a given stock. In addition, as noted at the start of Section 5.1, the index calculation agent has the discretion to include companies that do not meet the minimum levels for inclusion, if it feels that by doing so it maintains the quality and/or character of the index.

Research Quotient (RQ) Score

The RQ determines how well a company can transform an additional US dollar spent on R&D into revenue and therefore creates a link between Innovation investment and Innovation performance.

The basic underlying formula, an expansion of the capital and labour productivity function in economics, is used to calculate the RQ:

$$Y = K^{\alpha} \times L^{\beta} \times R^{\gamma}$$

Where:

- Y: Output or Revenues (Sales)
- K: Capital (PP&E)
- L: Labour (SG&A)
- R: Research and Development (R&D)
- α : Capital productivity
- β : Labour productivity
- γ : Research and Development Productivity

To use the RQ formula to estimate Innovation potential across the investable universe the logs for K, L, R and Y are computed. Then a regression using the last 7 years of data for each variable is performed to estimate the RQ score for all names in the investable universe.

To compare companies across the universe the Z-Score is calculated. A Z-Score is a statistical measurement of a score's relationship to the mean in a group of scores. A Z-score of 0 means the

score is the same as the mean. In order to avoid market capitalization biases companies of the different market capitalization groups are ranked according to their rescaled RQ separately:

Market Cap	Group Classification
500 million USD < 2.0 billion USD	Small Cap
2 billion USD < 10 billion USD	Mid Cap
10 billion USD < 100 billion USD	Large Cap
100 billion USD < 1000 billion USD	Mega Cap

The top 10% (or the top decile) of the investable universe per market capitalization group qualify.

Removal of constituents

Any stock deleted from the index as a result of a corporate action such as a merger, acquisition, spin-off, delisting or bankruptcy is not replaced by any new stock. The total number of stocks in the index is reduced by one every time a company is deleted. In certain circumstances, the Index Compiler may decide to add another company into the index as a result of the pending removal of a current constituent. This action would be taken while considering the interests of affected parties and would typically only be a result of a certain type of corporate action, such as an acquisition where part of the merger proceeds is paid in the stock of another company. If a company is removed from the index, the divisor will be adjusted to maintain the index level.

Components will be removed from the index during the Annual review if they fail to meet the selection criteria and are not chosen by the index calculation agent to remain in the index under the discretion of the NYSE Arca Index Committee, as outlined above in Rules 5.1 and 5.2:

Selected line

Only one listing is permitted per company within the index. If multiple share classes are available for a particular listing line, the most liquid class will be included in the index. There is no rules-based consideration of the amount of free float shares available for each company. Instead, the index calculation agent evaluates, on a discretionary basis, the amount of free float shares available to the public while performing its review of the universe.

5.3 Periodical update of weighting

Update of number of shares

The number of shares included in the index that is effective at the annual review for each constituent is based on its equal-dollar percentage weighting, which itself is based on the number of companies within the index. Each constituent will receive an equal weighting.

Maintenance of the Index

The share quantity of each component stock in the index portfolio remains fixed between annual reviews except in the event of certain types of corporate actions such as stock splits, reverse stock splits, stock dividends, or similar events. The share quantities used in the index calculation are not typically adjusted for shares issued or repurchased between annual reviews. However, in the event

of a merger between two components, the share quantity of the surviving entity may be adjusted to account for any stock issued in the acquisition. NYSE Arca may substitute stocks or change the number of stocks included in the index, based on changing conditions in the industry or in the event of certain types of corporate actions, including mergers, acquisitions, spin-offs, and reorganizations. In the event of component or share quantity changes to the index portfolio, the payment of dividends other than ordinary cash dividends, spin-offs, rights offerings, re-capitalization, or other corporate actions affecting a component stock of the index, the index divisor may be adjusted to ensure that there are no changes to the index level as a result of non-market forces.

5.4 Index Annual Adjustment Process

Upon completion of the index selection process, the list of new companies and their corresponding equal percentage weighting will be announced three business days before the 3rd Friday of December. The shares for each new index constituent are determined and announced after the close of the 3rd Friday of December. The new shares are calculated by applying the percentage weighting of each constituent to the closing index market capitalization on that day, and dividing by the closing price of that constituent, rounding the resulting number. The new index portfolio (constituents and corresponding shares) will become effective at the open on the trading day following the 3rd Friday of December. Any changes in market capitalization between the pre-rebalance and post-rebalance composition are accounted for via a divisor adjustment.

6. Corporate Actions

6.1 General

The index may be adjusted in order to maintain the continuity of the index level and the composition. The underlying aim is that the index continues to reflect as closely as possible the value of the underlying portfolio.

Adjustments take place in reaction to events that occur with constituents in order to mitigate or eliminate the effect of that event on the index performance.

6.2. Removal of constituents

Any stock deleted from the index as a result of a corporate action such as a merger, acquisition, spin-off, delisting or bankruptcy will not be replaced by a new stock. . The total number of stocks in the index is reduced by one every time a company is deleted. In certain circumstances, the Index Compiler may decide to add another company into the index as a result of the pending removal of a current constituent. This action would be taken while considering the interests of affected parties and would typically only be a result of a certain type of corporate action, such as an acquisition where part of the merger proceeds is paid in the stock of another company.

Regardless of the exact change being made to the index, the divisor will be adjusted to maintain the index level.

6.2.1. Mergers and Acquisitions

Merger or acquisition between members of the index: In the event a merger or acquisition occurs between members of the index, the acquired company is deleted and replaced by a company selected by the Index Committee. In selected cases, the acquired company's index market capitalization moves to the acquiring company's stock, according to the merger terms and depending on the portion of proceeds paid in the stock of the acquirer.

Merger or acquisition between a member and a non-member: A non-member is defined as a company that is not a current constituent of the index. A merger or acquisition between one member of the index and one non-member can take two forms:

(1) The acquiring company is a member of the index and the acquired company is not. The acquiring company's shares will not be adjusted.

(2) The acquiring company is not a member, but the acquired company is a member. The acquired company is removed from the index and is replaced with another company. The acquiring company may be considered as the replacement company, provided it meets the initial inclusion criteria. Exceptions to the implied seasoning rule of three months can be made for the acquiring company, at the discretion of the index calculation agent. As in any other addition, these actions would be announced at least three trading days ahead of effectiveness, to the best of the index calculation agent's ability to take such action.

6.2.2 Suspensions and company distress

Immediately upon a company filing for bankruptcy, an announcement will be made to remove the stock from the index effective for the next trading day. If the stock is trading on an over-the-counter (OTC) market, the last trade or price on that market is utilized as the deletion price on that day.

If the stock does not trade on the relevant exchange between the bankruptcy announcement and the next rebalance effective date, the stock may be deleted from the index in that rebalance with a presumed market value of \$0.00.

6.2.3 Price sources

In the event that the trading in shares is suspended or halted, the last known price established during regular daytime trading on the primary exchange will be used. Depending on the particular situation, the index calculation agent may choose to value the security at a price of \$0 for purposes of index calculation and/or index corporate action. This would be applicable for certain extreme cases such as a company bankruptcy or severe distress.

6.3 *Split-up /spin off*

The closing price of the index constituent is adjusted by the value of the spin-off, and the shares of the index constituent will be adjusted to maintain its existing weighting in the index. The divisor will be adjusted to account for any changes in the overall index market capitalization.

Spun-off companies will not be automatically added into the index at the time of the event. The index calculation agent reserves the right to be able to add spun-off companies into the index, provided they meet general universe requirements. Exceptions to the implied seasoning rule of three months can be made in these situations. As with any other addition, the index calculation agent would try to announce the corporate action at least three trading days ahead of effectiveness. Moreover, if a spun-off company is added to the index, there will be no adjustment made to the shares of the parent company.

6.4. *Dividends*

6.4.1. Distinction ordinary and special dividend

The price return index will be adjusted for dividends that are special in nature, typically through a price adjustment and corresponding share increase to maintain the constituent's existing weighting in the index. The divisor will be adjusted to account for any changes in the overall index market capitalization.

To decide whether a dividend should be considered a special dividend the index calculation agent will use the following criteria:

a) the declaration of a company of a dividend additional to those dividends declared as part of the company's normal results and dividend reporting cycle; merely an adjustment to the timing of the declaration of a company's expected dividend would not be considered as a special dividend circumstance; or

b) the identification of an element of a dividend paid in line with a company's normal results and dividend reporting cycle as an element that is unambiguously additional to the company's normal payment.

For the purpose of clarification, the index calculation agent will not make adjustment for the following situations, specifically in the Price Return index:

1. Payment of ordinary dividends, irrespective of how they are financed;
2. Issue of redeemable shares or any other entitlement in lieu of an ordinary dividend; or
3. Unexpected increase or decrease, resumption or cessation, or change in frequency to an ordinary dividend.

6.5. Rights issues and other rights

In the event of a rights issue, the price is adjusted for the value of the right before the open on the ex-date, and the shares are increased to maintain the constituent's existing weighting within the index. The adjustment assumes that the rights issue is fully subscribed. The amount of the price adjustment is determined from the terms of the rights issue, including the subscription price, and the price of the underlying security. The index calculation agent shall only enact adjustments if the rights represent a positive value, or are in-the-money, or alternatively, represent or can be converted into a tangible cash value.

6.6 Bonus issues, stock splits and reverse stock splits

For bonus issues, stock splits and reverse stock splits, the number of shares included in the index will be adjusted in accordance with the ratio given in the corporate action. Since the event won't change the value of the company included in the index, the divisor will not be changed because of this.

6.7 Changes in number of shares

Changes in the number of shares outstanding, typically due to share repurchases, tenders, or offerings, will not be reflected in the index.

7. Index Formula

7.1 Index calculation formula

The index is calculated using the following formula:

$$I_t = \frac{\sum_i^N Q_{i,t} M_{i,t} C_{i,t}}{DIV}$$

Where:

t: day of calculation

N: number of constituent equities in index

$Q_{i,t}$: number of shares of equity i on day t

$M_{i,t}$: multiplier of equity i (always assumed to be 1 for the index)

$C_{i,t}$: price of equity i on day t

DIV: current index divisor on day t

For the **total return version** of the index, the index divisor is adjusted on the morning of each index constituent's ex-date to take into account the reinvestment of the related dividend.