

ROYAL BANK OF CANADA  
Form 424B2  
December 27, 2018

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PRICING SUPPLEMENT

Filed Pursuant to Rule 424(b)(2)

Registration Statement No. 333-227001

Dated December 26, 2018

Royal Bank of Canada Bearish Barrier Market Linked Notes with Daily Barrier Observation  
\$1,417,000 Securities Linked to the S&P 500® Index due on December 31, 2020

Investment Description

Bearish Barrier Market Linked Notes with Daily Barrier Observation (each, a “Security” and collectively, the “Securities”) are unconditional, unsecured and unsubordinated debt securities issued by Royal Bank of Canada with returns linked to the performance of the S&P 500® Index (the “Underlying”). The amount you receive at maturity will be based on the performance of the Underlying over the term of the Securities. If (i) a Barrier Event (as defined below) has occurred during the Observation Period (as defined below), meaning that the closing level of the Underlying on any trading day during the Observation Period is less than the Lower Barrier (as defined below) or (ii) the closing level of the Underlying on the Final Valuation Date (as defined below) is equal to greater than the Initial Underlying Level (as defined below), we will pay you an amount in cash per Security at maturity equal to the principal amount plus a return equal to the Conditional Return (as defined below). If a Barrier Event has not occurred during the Observation Period and the closing level of the Underlying on the Final Valuation Date is less than the Initial Underlying Level, we will pay you an amount in cash per Security at maturity equal to the principal amount plus a return equal to the absolute value of the “Underlying Return,” which is the percentage change in the closing level of the Underlying from the Trade Date (as defined below) to the Final Valuation Date. Investing in the Securities involves significant risks. The Securities do not pay dividends or interest. Your return on the Securities is limited to 2% if a Barrier Event occurs during the Observation Period or if the closing level of the Underlying on the Final Valuation Date is equal to or greater than the Initial Underlying Level. If a Barrier Event does not occur during the Observation Period and the closing level of the Underlying on the Final Valuation Date is less than the Initial Underlying Level, your return on the Securities is limited to 33% due to the inclusion of the Lower Barrier. The repayment of principal applies only if the Securities are held to maturity. Any payment on the Securities, including any repayment of principal, is subject to our creditworthiness. If we were to default on our payment obligations, you may not receive any amounts owed to you under the Securities and you could lose your entire investment. The Securities will not be listed on any securities exchange.

Features Key Dates

Conditional Return at Maturity if a Barrier Event Occurs or if the Closing Level of the Underlying on the Final Valuation Date Is Equal to or Greater than the Initial Underlying Level: If a Barrier Event has occurred during the Observation Period or if the closing level of the Underlying on the Final Valuation Date is equal to or greater than the Initial Underlying Level, we will pay you an amount in cash per Security at maturity equal to the principal amount plus a return equal to the Conditional Return.

Bearish Growth Potential if a Barrier Event Does Not Occur: If a Barrier Event has not occurred during the Observation Period and the closing level of the Underlying on the Final Valuation Date is less than the Initial Underlying Level, we will pay you an amount in cash per Security at maturity equal to the principal amount plus a return equal to the absolute value of the Underlying Return, which is equal to the absolute value of the percentage change in the closing level of the Underlying from the Trade Date to the Final Valuation Date.

Repayment of Principal: If you hold the Securities to maturity, you will receive at least your entire principal amount regardless of the performance of the Underlying, subject to our creditworthiness.

|                                   |                   |
|-----------------------------------|-------------------|
| Trade Date                        | December 26, 2018 |
| Settlement Date                   | December 31, 2018 |
| Final Valuation Date <sup>1</sup> | December 28, 2020 |
| Maturity Date <sup>1</sup>        | December 31, 2020 |

<sup>1</sup> Subject to postponement if a market disruption event occurs, as described under “General Terms of the Securities—Payment at Maturity” in the accompanying product prospectus supplement UBS-IND-1.

NOTICE TO INVESTORS: THE SECURITIES ARE SIGNIFICANTLY RISKIER THAN CONVENTIONAL DEBT INSTRUMENTS. THE SECURITIES HAVE FULL DOWNSIDE MARKET RISK SIMILAR TO THE UNDERLYING. THIS MARKET RISK IS IN ADDITION TO THE CREDIT RISK INHERENT IN PURCHASING OUR DEBT OBLIGATION. YOU SHOULD NOT PURCHASE THE SECURITIES IF YOU DO NOT UNDERSTAND OR ARE NOT COMFORTABLE WITH THE SIGNIFICANT RISKS INVOLVED IN INVESTING IN THE SECURITIES.

YOU SHOULD CAREFULLY CONSIDER THE RISKS DESCRIBED UNDER “KEY RISKS” BEGINNING ON PAGE 5 OF THIS PRICING SUPPLEMENT AND UNDER “RISK FACTORS” BEGINNING ON PAGE PS-4 OF THE ACCOMPANYING PRODUCT PROSPECTUS SUPPLEMENT UBS-IND-1 BEFORE PURCHASING ANY SECURITIES. EVENTS RELATING TO ANY OF THOSE RISKS, OR OTHER RISKS AND UNCERTAINTIES, COULD ADVERSELY AFFECT THE MARKET VALUE OF, AND THE RETURN ON, YOUR SECURITIES.

Security Offering

We are offering Bearish Barrier Market Linked Notes with Daily Barrier Observation Linked to the S&P 500<sup>®</sup> Index. The return on the principal amount is subject to, and will not exceed, the predetermined Maximum Payment at Maturity (as defined below).

| Underlying                       | Initial Underlying Level | Lower Barrier   | Conditional Return | CUSIP       | ISIN       |
|----------------------------------|--------------------------|---|--------------------|-------------|------------|
| S&P 500 <sup>®</sup> Index (SPX) | 2,467.70                 | 1,653.36 (the Initial Underlying Level minus 33% of the Initial Underlying Level) (rounded to two decimal places) | 2.00%              | 78013XTG3US | 78013XTG33 |

See “Additional Information About Royal Bank of Canada and the Securities” in this pricing supplement. The Securities will have the terms specified in the prospectus dated September 7, 2018, the prospectus supplement dated September 7, 2018, product prospectus supplement UBS-IND-1 dated September 7, 2018 and this pricing supplement. Neither the Securities and Exchange Commission nor any state securities commission has approved or disapproved of the Securities or passed upon the accuracy or the adequacy of this pricing supplement or the accompanying prospectus, prospectus supplement and product prospectus supplement UBS-IND-1. Any representation to the contrary is a criminal offense.

| Offering of the Securities                                | Price to Public |              | Fees and Commissions <sup>(1)</sup> |              | Proceeds to Us |              |
|---|-----------------|--------------|-------------------------------------|--------------|----------------|--------------|
|   | Total           | Per Security | Total                               | Per Security | Total          | Per Security |
| Securities Linked to the S&P 500 <sup>®</sup> Index (SPX) | \$1,417,000     | \$1,000      | \$21,255                            | \$15         | \$1,395,745    | \$985        |

<sup>(1)</sup> UBS Financial Services Inc., which we refer to as “UBS,” received a commission of \$15.00 per \$1,000 principal amount of the Securities. See “Supplemental Plan of Distribution (Conflicts of Interest)” below.

The initial estimated value of the Securities as of the date of this document is \$978.56 per \$1,000 in principal amount, which is less than the price to public. The actual value of the Securities at any time will reflect many factors, cannot be predicted with accuracy, and may be less than this amount. We describe our determination of the initial estimated value under “Key Risks” beginning on page 5, “Supplemental Plan of Distribution (Conflicts of Interest)” and “Structuring the Securities” below.

The Securities will not constitute deposits insured under the Canada Deposit Insurance Corporation Act or by the United States Federal Deposit Insurance Corporation or any other Canadian or United States government agency or instrumentality.

UBS Financial Services Inc. RBC Capital Markets, LLC

Additional Information About Royal Bank of Canada and the Securities

You should read this pricing supplement together with the prospectus dated September 7, 2018, as supplemented by the prospectus supplement dated September 7, 2018, relating to our senior global medium-term notes, Series H, of which these Securities are a part, and the more detailed information contained in product prospectus supplement UBS-IND-1 dated September 7, 2018. This pricing supplement, together with the documents listed below, contains the terms of the Securities and supersedes all other prior or contemporaneous oral statements as well as any other written materials including preliminary or indicative pricing terms, correspondence, trade ideas, structures for implementation, sample structures, fact sheets, brochures or other educational materials of ours. You should carefully consider, among other things, the matters set forth in “Risk Factors” in the accompanying product prospectus supplement UBS-IND-1, as the Securities involve risks not associated with conventional debt securities.

To the extent that the terms discussed in this pricing supplement differ from those discussed in the product prospectus supplement, the prospectus supplement, or the prospectus, the terms discussed herein will control. For example, under the terms of the Securities, investors will not benefit from increases in the level of the Underlying from the Trade Date, because in such a case, they will receive only the Conditional Return.

You may access these on the SEC website at [www.sec.gov](http://www.sec.gov) as follows (or if such address has changed, by reviewing our filing for the relevant date on the SEC website):

..Product prospectus supplement UBS-IND-1 dated September 7, 2018:

<https://www.sec.gov/Archives/edgar/data/1000275/000114036118038046/form424b5.htm>

..Prospectus supplement dated September 7, 2018:

<https://www.sec.gov/Archives/edgar/data/1000275/000121465918005975/f97180424b3.htm>

..Prospectus dated September 7, 2018:

<https://www.sec.gov/Archives/edgar/data/1000275/000121465918005973/l96181424b3.htm>

As used in this pricing supplement, “we,” “us” or “our” refers to Royal Bank of Canada.

Investor Suitability

The Securities may be suitable for you if, among other considerations:

.. You fully understand the risks inherent in an investment in the Securities, including the risk of receiving a return at maturity that may be equal to, or less than, the Conditional Return.

.. You can tolerate fluctuations in the price of the Securities prior to maturity that may be similar to or exceed the downside fluctuations in the level of the Underlying.

You believe that the closing level of the Underlying will not be less than the Lower Barrier on any trading day during the Observation Period and the Final Underlying Level will be less than the Initial Underlying Level and understand and are willing to accept that you will benefit from the absolute value of the Underlying Return only if a Barrier Event does not occur during the Observation Period and the Final Underlying Level is less than the Initial Underlying Level.

You understand and accept that your potential return is limited by the Lower Barrier if a Barrier Event does not occur during the Observation Period and the Final Underlying Level is less than the Initial Underlying Level. Conversely, you understand and accept that your potential return is limited by the Conditional Return if a Barrier Event occurs during the Observation Period or if the Final Underlying Level is equal to or greater than the Initial Underlying Level.

.. You are willing to invest in the Securities based on the Conditional Return and the Lower Barrier, each indicated on the cover hereof.

.. You do not seek current income from your investment and are willing to forgo dividends paid on the securities represented by the Underlying.

.. You are willing to hold the Securities to maturity and accept that there may be little or no secondary market for the Securities.

.. You are willing to assume our credit risk for all payments under the Securities, and understand that if we default on our obligations, you may not receive any amounts due to you, including any repayment of principal.

.. You fully understand and accept the risks associated with the Underlying.

The Securities may not be suitable for you if, among other considerations:

.. You do not fully understand the risks inherent in an investment in the Securities, including the risk of receiving a return at maturity that may be equal to, or less than, the Conditional Return.

.. You believe that the closing level of the Underlying on any trading day during the Observation Period will decrease to a level below the Lower Barrier.

.. You believe that the Final Underlying Level of the Underlying will approach or exceed the Initial Underlying Level of the Underlying.

.. You cannot tolerate fluctuations in the price of the Securities prior to maturity that may be similar to or exceed the downside fluctuations in the level of the Underlying.

You do not fully understand or are unwilling to accept that you will benefit from the absolute value of the Underlying Return only if a Barrier Event does not occur during the Observation Period and the Final Underlying Level is less than the Initial Underlying Level.

You believe that the closing level of the Underlying over the term of the Securities will be less than the Lower Barrier, that the Final Underlying Level of the Underlying will approach or exceed the Initial Underlying Level of the Underlying or you seek an investment that has unlimited return potential without a cap on appreciation.

.. You are unwilling to invest in the Securities based on the Conditional Return and the Lower Barrier, each indicated on the cover hereof.

.. You seek current income from this investment or prefer to receive the dividends paid on the securities represented by the Underlying.

.. You are unable or unwilling to hold the Securities to maturity or you seek an investment for which there will be an active secondary market.

.. You are not willing to assume our credit risk for all payments under the Securities, including any repayment of principal.

.. You do not fully understand and accept the risks associated with the Underlying.

The suitability considerations identified above are not exhaustive. Whether or not the Securities are a suitable investment for you will depend on your individual circumstances, and you should reach an investment decision only after you and your investment, legal, tax, accounting, and other advisers have carefully considered the suitability of an investment in the Securities in light of your particular circumstances. You should also review carefully the “Key Risks” in this pricing supplement and “Risk Factors” in the accompanying product prospectus supplement UBS-IND-1 for risks related to an investment in the Securities. In addition, you should review carefully the section below, “Information About the Underlying,” for more information about the Underlying.

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Final Terms of the Securities<sup>1</sup>

|   |   |
|---|---|
| Issuer:                                     | Royal Bank of Canada  |
| Issue Price:                                | \$1,000 per Security  |
| Principal Amount:                           | \$1,000 per Security  |
| Term:                                       | 24 months   |
| Underlying:                                 | S&P 500 <sup>®</sup> Index  |
| Conditional Return:                         | 2%  |
| Maximum Payment at Maturity (per Security): | \$1,330   |
| Barrier Event:                              | A Barrier Event will occur if the closing level of the Underlying is less than the Lower Barrier on any trading day during the Observation Period.  |
| Lower Barrier:                              | 1,653.36 (Initial Underlying Level minus 33% of the Initial Underlying Level)(rounded to two decimal places)  |
| Observation Period:                         | Each trading day from but excluding the Trade Date to and including the Final Valuation Date. If a market disruption occurs on any such trading day, the Calculation Agent may disregard it for purposes of determining whether a Barrier Event has occurred.<br>If a Barrier Event has occurred during the Observation Period, irrespective of the Final Underlying Level, we will pay you an amount in cash per Security on the Maturity Date equal to:<br>\$1,000 × (1 + Conditional Return)<br>If a Barrier Event has not occurred during the Observation Period and the Final Underlying Level is equal to or greater than the Initial Underlying Level, we will pay you an amount in cash per Security on the Maturity Date equal to:<br>\$1,000 × (1 + Conditional Return)                   |
| Payment at Maturity (per \$1,000 Security): | If a Barrier Event has not occurred during the Observation Period and the Final Underlying Level is less than the Initial Underlying Level, we will pay you an amount in cash per Security on the Maturity Date equal to:<br>\$1,000 × (1 + absolute value of the Underlying Return)<br>Because the Lower Barrier will be equal to the Initial Underlying Level minus 33% of the Initial Underlying Level, the Maximum Payment at Maturity is \$1,330 per Security, and your maximum return is limited to 33%.<br>Any payment on the Securities, including any repayment of principal, is subject to our creditworthiness.<br>If we were to default on our payment obligations, you may not receive any amounts owed to you under the Securities and you could lose all of your initial investment. |
| Underlying Return:                          | $\frac{\text{Final Underlying Level} - \text{Initial Underlying Level}}{\text{Initial Underlying Level}}$   |

<sup>1</sup> Terms used in this pricing supplement, but not defined herein, shall have the meanings ascribed to them in the product prospectus supplement.

If a Barrier Event has not occurred during the term of the Securities and the Final Underlying Level is less than the Initial Underlying Level, your Payment at Maturity will be based on the absolute value of the Underlying Return. For example, if the Underlying Return is -5%, the absolute value of the Underlying Return will be equal to 5%.

|                           |  |
|---------------------------|--|
| Initial Underlying Level: | 2,467.70   |
| Final Underlying          | The closing level of the Underlying on the Final Valuation Date. |

Level:

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Investment Timeline

Trade

Date:

Each Trading Day During the  
Observation Period:

Maturity Date:

The Maximum Payment at Maturity was set. The Initial Underlying Level and the Lower Barrier were determined.

The closing level of the Underlying is observed.

The Final Underlying Level is determined on the Final Valuation Date and the absolute value of the Underlying Return is determined.

**If a Barrier Event has occurred during the Observation Period, irrespective of the Final Underlying Level, we will pay you an amount in cash per Security on the Maturity Date equal to:**

$$\$1,000 \times (1 + \text{Conditional Return})$$

**If a Barrier Event has not occurred during the Observation Period and the Final Underlying Level is equal to or greater than the Initial Underlying Level, we will pay you an amount in cash per Security on the Maturity Date equal to:**

$$\$1,000 \times (1 + \text{Conditional Return})$$

**If a Barrier Event has not occurred during the Observation Period and the Final Underlying Level is less than the Initial Underlying Level, we will pay you an amount in cash per Security on the Maturity Date equal to:**

$$\$1,000 \times (1 + \text{absolute value of the Underlying Return})$$

INVESTING IN THE SECURITIES INVOLVES SIGNIFICANT RISKS. ANY PAYMENT ON THE SECURITIES, INCLUDING ANY REPAYMENT OF PRINCIPAL, IS SUBJECT TO OUR CREDITWORTHINESS. IF WE WERE TO DEFAULT ON OUR PAYMENT OBLIGATIONS, YOU MAY NOT RECEIVE ANY AMOUNTS OWED TO YOU UNDER THE SECURITIES AND YOU COULD LOSE YOUR ENTIRE INVESTMENT.





## Key Risks

An investment in the Securities involves significant risks. Investing in the Securities is not equivalent to investing directly in, or taking a short position in, any of the component securities of the Underlying. These risks are explained in more detail in the “Risk Factors” section of the accompanying product prospectus supplement UBS-IND-1. We also urge you to consult your investment, legal, tax, accounting and other advisors before investing in the Securities.

### Risks Relating to the Securities Generally

**The Stated Payout on the Securities Applies Only at Maturity —** You should be willing to hold your Securities to maturity. The stated payout on the Securities is available only if you hold them to maturity. If you are able to sell your Securities prior to maturity in the secondary market, you may have to sell them at a loss relative to your initial investment, irrespective of the performance of the Underlying.

**Your Potential Return on the Securities Is Limited to the Maximum Payment at Maturity per Security —** The return potential of the Securities is limited and in no event will the Payment at Maturity exceed the Maximum Payment at Maturity per Security. Accordingly, an investment in the Securities may return less than an instrument directly linked to the negative performance of the Underlying.

**If a Barrier Event Occurs During the Observation Period, You Will Receive the Principal Amount of Your Securities Plus the Conditional Return, Even if the Final Underlying Level Is Less than the Initial Underlying Level —** If a Barrier Event occurs during the Observation Period, you will receive an amount in cash at maturity equal to the principal amount of your Securities plus a return equal to the Conditional Return, even if the Final Underlying Level is less than the Initial Underlying Level. Therefore, if a Barrier Event occurs at any point during the term of the Securities, you will not benefit from any absolute value of the Underlying Return and your return on the Securities will be limited to the Conditional Return.

**If the Final Underlying Level Is Equal to or Greater than the Initial Underlying Level, You Will Receive the Principal Amount of Your Securities Plus the Conditional Return, Even if a Barrier Event Has Not Occurred During the Observation Period —** If a Barrier Event has not occurred during the Observation Period, if the Final Underlying Level is equal to or greater than the Initial Underlying Level, you will receive an amount in cash at maturity equal to the principal amount of your Securities plus a return equal to the Conditional Return. Therefore, the Securities are designed for investors who believe that a Barrier Event will not occur during the Observation Period and that the Final Underlying Level of the Underlying will be less than the Initial Underlying Level.

**The Securities Provide Bearish Exposure to the Underlying —** Unlike a hypothetical direct investment in the Underlying or the stocks comprising the Underlying, which would be positively correlated to the return of the Underlying or its components, your return on the Securities will be limited to the Conditional Return if the Final Underlying Level is equal to or greater than the Initial Underlying Level. Your return on the Securities will be maximized if the level of the Underlying declines during the term of the Securities, so long as a Barrier Event does not occur during the Observation Period.

**No Interest Payments —** We will not pay any interest with respect to the Securities.

**An Investment in the Securities Is Subject to Our Credit Risk —** The Securities are our unsubordinated, unsecured debt obligations, and are not, either directly or indirectly, an obligation of any third party. Any payment to be made on the Securities, including any repayment of principal at maturity, depends on our ability to satisfy our obligations as they come due. As a result, our actual and perceived creditworthiness may affect the market value of the Securities and, in the event we were to default on our obligations, you may not receive any amounts owed to you under the terms of the Securities and you could lose your entire initial investment.

**The Securities Will Be Subject to Risks, Including Non-Payment in Full, Under Canadian Bank Resolution Powers —** Under Canadian bank resolution powers, the Canada Deposit Insurance Corporation (“CDIC”) may, in circumstances where we have ceased, or are about to cease, to be viable, assume temporary control or ownership over us and may be granted broad powers by one or more orders of the Governor in Council (Canada), including the power to sell or dispose of all or a part of our assets, and the power to carry out or cause us to carry out a transaction or a series of transactions the purpose of which is to restructure our business of the Bank. As See “Description of Debt Securities — Canadian Bank Resolution Powers” in the accompanying prospectus for a description of the Canadian bank resolution powers, including the bail-in regime. If the CDIC were to take action under the Canadian bank resolution powers with respect to us, this could result in holders of the Securities being exposed to losses.

**Your Return on the Securities May Be Lower than the Return on a Conventional Debt Security of Comparable Maturity** — The return that you will receive on the Securities may be less than the return you could earn on other investments. Your return may be less than the return you could earn if you bought a conventional senior interest bearing debt security of ours with the same Maturity Date or if you were to take a short position in the Underlying or the securities included in the Underlying. Your investment may not reflect the full opportunity cost to you when you take into account factors that affect the time value of money.

**No Dividend Payments or Voting Rights** — Investing in the Securities is not equivalent to investing directly in any of the component securities of the Underlying. As a holder of the Securities, you will not have voting rights or rights to receive cash dividends or other distributions or other rights that holders of the securities represented by the Underlying would have. The Underlying is a price return index, and the Underlying Return excludes any cash dividend payments paid on its component stocks.

**The Absolute Return Feature of the Securities Is Not the Same as Taking a Short Position Directly in the Components of the Underlying**— Because of the Lower Barrier, you will not benefit from any absolute value of the Underlying Return that exceeds the Maximum Payment at Maturity per Security. Further, even if the Underlying Return is negative and the Final Underlying Level is equal to or greater than the Lower Barrier, the return on the Securities will not reflect the return you would realize if you actually took a short position directly in the components of the Underlying. For example, to maintain a short position in a component of the Underlying, you could receive certain interest payments from the lender.

**The Initial Estimated Value of the Securities Is Less than the Price to the Public** — The initial estimated value that is set forth on the cover page of this document, which is less than the public offering price you pay for the Securities, does not represent a minimum price at which we, RBC Capital Markets, LLC ("RBCCM") or any of our other affiliates would be willing to purchase the Securities in any secondary market (if any exists) at any time. If you attempt to sell the Securities prior to maturity, their market value may be lower than the price you paid for them and the initial estimated value. This is due to, among other things, changes in the level of the Underlying, the borrowing rate we pay to issue securities of this kind, and the inclusion in the price to the public of the underwriting discount and our estimated profit and the costs relating to our hedging of the Securities. These factors, together with various credit, market and economic factors over the term of the Securities, are expected to reduce the price at which you may be able to sell the Securities in any secondary market and will affect the value of the Securities in complex and unpredictable ways. Assuming no change in market conditions or any other relevant factors, the price, if any, at which you may be able to sell your Securities prior to maturity may be less than the price to public, as any such sale price would not be expected to include the underwriting discount and our estimated profit and the costs relating to our hedging

of the Securities. In addition, any price at which you may sell the Securities is likely to reflect customary bid-ask spreads for similar trades. In addition to bid-ask spreads, the value of the Securities determined for any secondary market price is expected to be based on a secondary market rate rather than the internal borrowing rate used to price the Securities and determine the initial estimated value. As a result, the secondary price will be less than if the internal borrowing rate was used. The Securities are not designed to be short-term trading instruments. Accordingly, you should be able and willing to hold your Securities to maturity.

**Our Initial Estimated Value of the Securities Is an Estimate Only, Calculated as of the Time the Terms of the Securities Were Set** — The initial estimated value of the Securities is based on the value of our obligation to make the payments on the Securities, together with the mid-market value of the derivative embedded in the terms of the Securities. See “Structuring the Securities” below. Our estimate was based on a variety of assumptions, including our credit spreads, expectations as to dividends, interest rates and volatility, and the expected term of the Securities.

These assumptions were based on certain forecasts about future events, which may prove to be incorrect. Other entities may value the Securities or similar securities at a price that is significantly different than we do. The value of the Securities at any time after the Trade Date will vary based on many factors, including changes in market conditions, and cannot be predicted with accuracy. As a result, the actual value you would receive if you sold the Securities in any secondary market, if any, should be expected to differ materially from the initial estimated value of your Securities and the amount that may be paid at maturity.

**Changes Affecting the Underlying** — The policies of the index sponsor concerning additions, deletions and substitutions of the stocks included in the Underlying and the manner in which the index sponsor takes account of certain changes affecting those stocks included in the Underlying may affect its level in a manner that is adverse to the interests of holders of the Securities. The policies of the index sponsor with respect to the calculation of the Underlying could also adversely affect its level. The index sponsor may discontinue or suspend calculation or dissemination of the Underlying and has no obligation to consider your interests in the Securities when taking any action regarding the Underlying. Any such actions could have an adverse effect on the value of the Securities and the amount that may be paid at maturity.

**Lack of Liquidity** — The Securities will not be listed on any securities exchange. RBCCM intends to offer to purchase the Securities in the secondary market, but is not required to do so. Even if there is a secondary market, it may not provide enough liquidity to allow you to trade or sell the Securities easily. Because other dealers are not likely to make a secondary market for the Securities, the price at which you may be able to trade your Securities is likely to depend on the price, if any, at which RBCCM is willing to buy the Securities.

**Potential Conflicts** — We and our affiliates play a variety of roles in connection with the issuance of the Securities, including hedging our obligations under the Securities. In performing these duties, the economic interests of the calculation agent and other affiliates of ours are potentially adverse to your interests as an investor in the Securities.

**Potentially Inconsistent Research, Opinions or Recommendations by RBCCM, UBS or Their Affiliates** — RBCCM, UBS or their affiliates may publish research, express opinions or provide recommendations that are inconsistent with investing in or holding the Securities, and which may be revised at any time. Any such research, opinions or recommendations could affect the level of the Underlying or the equity securities included in the Underlying, and therefore, the market value of the Securities.

**You Will Be Required to Include Income on the Securities Over Their Term Based Upon a Comparable Yield, Even Though You Will Not Receive Any Payments Until Maturity** — The Securities are considered to be issued with original issue discount. You will be required to include income on the Securities over their term based upon a comparable yield, even though you will not receive any payments until maturity. You are urged to review the section entitled “What Are the Tax Consequences of the Securities? —U.S. Federal Income Tax Consequences” and consult your own tax advisor.

**Potential Royal Bank of Canada and UBS Impact on Price** — Trading or other transactions by Royal Bank of Canada, UBS and our respective affiliates in the equity securities composing the Underlying or in futures, options, exchange-traded funds or other derivative products on the equity securities included in the Underlying may affect the market value of those equity securities or the level of the Underlying in a manner that is adverse to the interests of the holders of the Securities, and, therefore, the market value of the Securities.

**The Probability That a Barrier Event Will Occur, or that the Final Underlying Level of the Underlying Will Be Greater than the Initial Underlying Level on the Final Valuation Date Will Depend on the Volatility of the**

Underlying — “Volatility” refers to the frequency and magnitude of changes in the level of the Underlying. Greater expected volatility with respect to the Underlying reflects a higher expectation as of the Trade Date that a Barrier Event could occur, or that the Underlying could close above its Initial Value on the Final Valuation Date, resulting in the loss of all or a portion of your investment in the Securities. However, an Underlying’s volatility can change significantly over the term of the Securities. The level of the Underlying could rise or fall sharply, which could significantly reduce your return on the Securities.

The Terms of the Securities Were Influenced at Issuance and Their Market Value Prior to Maturity Will Be Influenced by Many Unpredictable Factors — Many economic and market factors influenced the terms of the Securities at issuance and will affect their value prior to maturity. These factors are similar in some ways to those that could affect the value of a combination of instruments that might be used to replicate the payments on the Securities,

including a combination of a bond with one or more options or other derivative instruments. For the market value of the Securities, we expect that, generally, the level of the Underlying on any day will affect the value of the Securities more than any other single factor. However, you should not expect the value of the Securities in the secondary market to vary in proportion to changes in the level of the Underlying. The value of the Securities will be affected by a number of other factors that may either offset or magnify each other, including:

• the actual or expected level of the Underlying, including whether a Barrier Event has occurred;

• the actual or expected volatility of the Underlying;

.. the time remaining to maturity of the Securities;

• the dividend rates on the securities represented by the Underlying;

.. interest and yield rates in the market generally, as well as in each of the markets of the securities represented by the Underlying;

• a variety of economic, financial, political, regulatory or judicial events; and

• our creditworthiness, including actual or anticipated downgrades in our credit ratings.

Some or all of these factors influenced the terms of the Securities at issuance and will also influence the price you will receive if you choose to sell the Securities prior to maturity. The impact of any of the factors set forth above may enhance or offset some or all of any change resulting from another factor or factors. You may have to sell the Securities at a substantial discount from the principal amount if, for example, the level of the Underlying has decreased, but a Barrier Event has not occurred.

## Hypothetical Examples and Return Table at Maturity

Hypothetical terms only. Actual terms may vary. See the cover page for actual offering terms.

The examples below are provided for illustrative purposes only and are purely hypothetical. They do not purport to be representative of every possible scenario concerning increases or decreases in the levels of the Underlying. We cannot predict the Final Underlying Level of the Underlying. You should not take these examples as an indication or assurance of the expected performance of the Underlying. The examples below illustrate the Payment at Maturity for a \$1,000 Security on a hypothetical offering of the Securities, with the following assumptions (amounts may have been rounded for ease of reference):

|                              |  |
|------------------------------|--|
| Principal Amount:            | \$1,000                                |
| Term:                        | 24 months                              |
| Conditional Return:          | 2.00%                                  |
| Lower Barrier:               | 67.00% of the Initial Underlying Level |
| Maximum Payment at Maturity: | \$1,330 per Security                   |

Example 1 — A Barrier Event has occurred during the Observation Period and the Underlying Return is 20%.

Because a Barrier Event has occurred during the Observation Period, we will pay you an amount in cash per Security at maturity equal to the principal amount plus a return equal to the Conditional Return, calculated as follows:

$$\$1,000 \times (1 + 2.00\%)$$

$$= \$1,020 \text{ per Security (a 2.00\% total return).}$$

Although the level of the Underlying has appreciated from the Initial Underlying Level to the Final Underlying Level, you will not benefit from any appreciation in the level of the Underlying at all and your return is limited to the Conditional Return.

Example 2— A Barrier Event has occurred during the Observation Period and the Underlying Return is -30%.

Because a Barrier Event has occurred during the Observation Period, we will pay you an amount in cash per Security at maturity equal to the principal amount plus a return equal to the Conditional Return, calculated as follows:

$$\$1,000 \times (1 + 2.00\%)$$

$$= \$1,020 \text{ per Security (a 2.00\% total return).}$$

Though the level of the Underlying has depreciated from the Initial Underlying Level to the Final Underlying Level and the Final Underlying Level is equal to or greater than the Lower Barrier, you will not benefit from any decline in the level of the Underlying at all and your return is limited to the Conditional Return.

Example 3— A Barrier Event has occurred during the Observation Period and the Underlying Return is -5%.

Because a Barrier Event has occurred during the Observation Period, we will pay you an amount in cash per Security at maturity equal to the principal amount plus a return equal to the Conditional Return, calculated as follows:

$$\$1,000 \times (1 + 2.00\%)$$

$$= \$1,020 \text{ per Security (a 2.00\% total return).}$$

Although the Final Underlying Level of the Underlying has depreciated relative to the Initial Underlying Level and the Final Underlying Level is equal to or greater than the Lower Barrier, you will not benefit from any decline in the level of the Underlying at all and your return is limited to the Conditional Return.

Example 4— A Barrier Event does not occur during the Observation Period and the Underlying Return is -1%.

Because no Barrier Event has occurred during the Observation Period and the Final Underlying Level of the Underlying has depreciated relative to the Initial Underlying Level, we will pay you an amount in cash per Security at maturity equal to the principal amount plus a return equal to the absolute value of the Underlying Return, calculated as follows:

$$\$1,000 \times [1 + (-1 \times -1.00)]$$

$$= \$1,010 \text{ per Security (a 1.00\% total return).}$$

Although no Barrier Event has occurred during the Observation Period and the Final Underlying Level of the Underlying has depreciated relative to the Initial Underlying Level, because the absolute value of the Underlying Return is less than the Conditional Return, your return is less than it would have been if a Barrier Event occurred during the Observation Period and or if the Final Underlying Level was equal to or greater than the Initial Underlying Level.

Example 5 — A Barrier Event does not occur during the Observation Period and the Underlying Return is -30%.

Because no Barrier Event has occurred during the Observation Period and the Final Underlying Level of the Underlying has depreciated relative to the Initial Underlying Level, we will pay you an amount in cash per Security at maturity equal to the principal amount plus a return equal to the absolute value of the Underlying Return, calculated as follows:

$$\$1,000 \times [1 + (-1 \times -30.00\%)]$$

= \$1,300 per Security (a 30.00% total return).

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Because the level of the Underlying has declined from the Initial Underlying Level to the Final Underlying Level and no Barrier Event has occurred during the Observation Period, you will receive a return equal to the absolute value of the Underlying Return.

Example 6 — A Barrier Event does not occur during the Observation Period and the Underlying Return is 10%.

Although no Barrier Event has occurred during the Observation Period, because the Final Underlying Level is equal to or greater than the Initial Underlying Level, we will pay you an amount in cash per Security at maturity equal to the principal amount plus a return equal to the Conditional Return, calculated as follows:

$\$1,000 \times (1 + 2.00\%)$

= \$1,020 per Security (a 2.00% total return).

Although no Barrier Event has occurred during the Observation Period, because the Final Underlying Level is equal to or greater than the Initial Underlying Level, your return is equal the Conditional Return, which is less than the Underlying Return.



Table 1: A Barrier Event occurs during the Observation Period.

| Underlying Return | Payment at Maturity | Total Return per Security at Maturity |
|-------------------|---------------------|---------------------------------------|
| 40.00%            | \$1,020.00          | 2.00%                                 |
| 30.00%            | \$1,020.00          | 2.00%                                 |
| 20.00%            | \$1,020.00          | 2.00%                                 |
| 10.00%            | \$1,020.00          | 2.00%                                 |
| 5.00%             | \$1,020.00          | 2.00%                                 |
| 0.00%             | \$1,020.00          | 2.00%                                 |
| -5.00%            | \$1,020.00          | 2.00%                                 |
| -10.00%           | \$1,020.00          | 2.00%                                 |
| -20.00%           | \$1,020.00          | 2.00%                                 |
| -30.00%           | \$1,020.00          | 2.00%                                 |
| -40.00%           | \$1,020.00          | 2.00%                                 |
| -50.00%           | \$1,020.00          | 2.00%                                 |
| -60.00%           | \$1,020.00          | 2.00%                                 |
| -70.00%           | \$1,020.00          | 2.00%                                 |
| -80.00%           | \$1,020.00          | 2.00%                                 |
| -90.00%           | \$1,020.00          | 2.00%                                 |
| -100.00%          | \$1,020.00          | 2.00%                                 |

Table 2: A Barrier Event does not occur during the Observation Period.

| Underlying Return | Payment at Maturity | Total Return per Security at Maturity |
|-------------------|---------------------|---------------------------------------|
| 20.00%            | \$1,020.00          | 2.00%                                 |
| 15.00%            | \$1,020.00          | 2.00%                                 |
| 10.00%            | \$1,020.00          | 2.00%                                 |
| 5.00%             | \$1,020.00          | 2.00%                                 |
| 2.00%             | \$1,020.00          | 2.00%                                 |
| 1.00%             | \$1,020.00          | 2.00%                                 |
| 0.00%             | \$1,020.00          | 2.00%                                 |
| -5.00%            | \$1,050.00          | 5.00%                                 |
| -10.00%           | \$1,100.00          | 10.00%                                |
| -15.00%           | \$1,150.00          | 15.00%                                |
| -20.00%           | \$1,200.00          | 20.00%                                |
| -25.00%           | \$1,250.00          | 25.00%                                |
| -30.00%           | \$1,300.00          | 30.00%                                |
| -33.00%           | \$1,330.00          | 33.00%                                |

## What Are the Tax Consequences of the Securities?

### U.S. Federal Income Tax Consequences

The following is a general description of the material U.S. tax considerations relating to the Securities. It does not purport to be a complete analysis of all tax considerations relating to the Securities. Prospective purchasers of the Securities should consult their tax advisors as to the consequences under the tax laws of the country of which they are resident for tax purposes and the tax laws of the U.S. of acquiring, holding and disposing of the Securities and receiving payments under the Securities. This summary is based upon the law as in effect on the date of this document and is subject to any change in law that may take effect after such date.

The following section supplements the discussion of U.S. federal income taxation in the accompanying prospectus and prospectus supplement and it supersedes the discussion of U.S. federal income taxation in the accompanying product prospectus supplement. It applies only to those holders who are not excluded from the discussion of U.S. federal income taxation in the accompanying prospectus. This discussion applies only to holders that will purchase the Securities upon original issuance and will hold the Securities as capital assets for U.S. federal income tax purposes. You should consult your tax advisor concerning the U.S. federal income tax and other tax consequences of your investment in the Securities in your particular circumstances, including the application of state, local or other tax laws and the possible effects of changes in federal or other tax laws.

**NO STATUTORY, JUDICIAL OR ADMINISTRATIVE AUTHORITY DIRECTLY DISCUSSES HOW THE NOTES SHOULD BE TREATED FOR U.S. FEDERAL INCOME TAX PURPOSES. AS A RESULT, THE U.S. FEDERAL INCOME TAX CONSEQUENCES OF AN INVESTMENT IN THE NOTES ARE UNCERTAIN. BECAUSE OF THE UNCERTAINTY, YOU SHOULD CONSULT YOUR TAX ADVISOR IN DETERMINING THE U.S. FEDERAL INCOME TAX AND OTHER TAX CONSEQUENCES OF YOUR INVESTMENT IN THE NOTES, INCLUDING THE APPLICATION OF STATE, LOCAL OR OTHER TAX LAWS AND THE POSSIBLE EFFECTS OF CHANGES IN FEDERAL OR OTHER TAX LAWS.**

We will not attempt to ascertain whether any of the entities whose stock is included in the Reference Asset would be treated as a “passive foreign investment company” within the meaning of Section 1297 of the Code, or a “U.S. real property holding corporation,” within the meaning of Section 897 of the Code. If any of the entities whose stock is included in the Reference Asset were so treated, certain adverse U.S. federal income tax consequences could possibly apply to a holder. You should refer to any available information filed with the SEC and other authorities by the entities whose stock is included in the Reference Asset and consult your tax advisor regarding the possible consequences to you in this regard, if any.

Royal Bank intends to treat any interest with respect to the Securities, as determined for U.S. federal income tax purposes, as from sources within the U.S.

We intend to take the position that the Securities will be treated as debt instruments subject to the special tax rules governing contingent payment debt instruments for U.S. federal income tax purposes. Under those rules, the amount of interest you are required to take into account for each accrual period will be determined by constructing a projected payment schedule for the Securities, and applying the rules similar to those for accruing original issue discount on a hypothetical noncontingent debt instrument with that projected payment schedule. This method is applied by first determining the yield at which we would issue a noncontingent fixed rate debt instrument with terms and conditions similar to the Securities (the “comparable yield”) and then determining a payment schedule as of the issue date that would produce the comparable yield. A projected payment schedule with respect to a note generally is a series of projected payments, the amount and timing of which would produce a yield to maturity on that note equal to the comparable yield. This projected payment schedule is solely for tax purposes and will consist of the Payment at Maturity. These rules will generally have the effect of requiring you to include amounts as income in respect of the Securities prior to your receipt of cash attributable to that income.

The amount of interest that you will be required to include in income during each accrual period for the Securities will equal the product of the adjusted issue price for the Securities at the beginning of the accrual period and the comparable yield for the Securities for such period. The adjusted issue price of the Securities will equal the Securities’ original offering price plus any interest deemed to be accrued on the Securities (under the rules governing contingent payment debt instruments).

To obtain the comparable yield and projected payment schedule for your Security, you should call RBC Capital

Markets, LLC toll free at 1-877-688-2301. You are required to use such comparable yield and projected payment schedule in determining your interest accruals in respect of your Securities, unless you timely disclose and justify on your federal income tax return the use of a different comparable yield and projected payment schedule.

The comparable yield and projected payment schedule are not provided to you for any purpose other than the determination of your interest accruals in respect of the Securities, and we make no representations regarding the amount of contingent payments with respect to the Securities.

If the contingent payment on the Securities becomes fixed on a day that is more than 6 months before the payment is due, applicable Treasury regulations provide that you should make adjustments to the prior and future interest inclusions in respect of your Securities over the remaining term for the Securities in a reasonable manner. You should consult your tax advisor as to what would be a "reasonable manner" in your particular situation.

You will recognize gain or loss on the sale or maturity of the Securities in an amount equal to the difference, if any, between the amount of cash you receive at such time and your adjusted basis in the Securities. In general, your adjusted basis in the Securities will equal the amount you paid for the Securities, increased by the amount of interest you previously accrued with respect to the Securities (in accordance with the comparable yield for the Securities).

Any gain you recognize on the sale or maturity of the Securities will be ordinary interest income. Any loss you recognize at such time will be ordinary loss to the extent of interest you included as income in the current or previous taxable years in respect of the Securities, and thereafter, capital loss. The deductibility of capital losses is limited.

**Backup Withholding and Information Reporting.** Payments made with respect to the Securities and proceeds from the sale of the Securities may be subject to a backup withholding tax unless, in general, the holder complies with certain procedures or is an exempt recipient. Any amounts so withheld generally will be refunded by the Internal Revenue Service ("IRS") or allowed as a credit against the holder's U.S. federal income tax, provided the holder makes a timely filing of an appropriate tax return or refund claim.

Reports will be made to the IRS and to holders that are not exempted from the reporting requirements.

Non-U.S. Holders. The following discussion applies to non-U.S. holders of the Securities. You are a non-U.S. holder if you are a beneficial owner of a Security and are for U.S. federal income tax purposes a non-resident alien individual, a foreign corporation, or a foreign estate or trust.

Except as discussed below, payments made to a non-U.S. holder, and any gain realized on the sale or maturity of the Securities, generally should be exempt from U.S. federal income and withholding tax, subject to generally applicable exceptions set forth in the rules exempting “portfolio interest” from U.S. withholding tax, provided that (i) the holder complies with applicable certification requirements, which certification may be made on Form W-8BEN or W-8BEN-E (or a substitute or successor form) on which the holder certifies, under penalties of perjury, that the holder is not a U.S. person and provides its name and address, (ii) the payment or gain is not effectively connected with the conduct by the holder of a U.S. trade or business, and (iii) if the holder is a non-resident alien individual, the holder is not present in the U.S. for 183 days or more during the taxable year of the sale or maturity of the Securities. In the case of (ii) above, the holder generally should be subject to U.S. federal income tax with respect to any income or gain in the same manner as if the holder were a U.S. holder and, in the case of a holder that is a corporation, the holder may also be subject to a branch profits tax equal to 30% (or such lower rate provided by an applicable U.S. income tax treaty) of a portion of its earnings and profits for the taxable year that are effectively connected with its conduct of a trade or business in the U.S., subject to certain adjustments. Payments made to a non-U.S. holder may be subject to information reporting and to backup withholding unless the holder complies with applicable certification and identification requirements as to its foreign status.

Under Section 871(m) of the Code, a “dividend equivalent” payment is treated as a dividend from sources within the United States. Such payments generally would be subject to a 30% U.S. withholding tax if paid to a non-U.S. holder. Under U.S. Treasury Department regulations, payments (including deemed payments) with respect to equity-linked instruments (“ELIs”) that are “specified ELIs” may be treated as dividend equivalents if such specified ELIs reference an interest in an “underlying security,” which is generally any interest in an entity taxable as a corporation for U.S. federal income tax purposes if a payment with respect to such interest could give rise to a U.S. source dividend. However, the IRS has issued guidance that states that the U.S. Treasury Department and the IRS intend to amend the effective dates of the U.S. Treasury Department regulations to provide that withholding on dividend equivalent payments will not apply to specified ELIs that are not delta-one instruments and that are issued before January 1, 2021. Based on our determination that the Securities are not delta-one instruments, non-U.S. holders should not be subject to withholding on dividend equivalent payments, if any, under the Securities. However, it is possible that the Securities could be treated as deemed reissued for U.S. federal income tax purposes upon the occurrence of certain events affecting the Reference Asset or the Securities (for example, upon a Reference Asset rebalancing), and following such occurrence the Securities could be treated as subject to withholding on dividend equivalent payments. Non-U.S. holders that enter, or have entered, into other transactions in respect of the Reference Asset or the Securities should consult their tax advisors as to the application of the dividend equivalent withholding tax in the context of the Securities and their other transactions. If any payments are treated as dividend equivalents subject to withholding, we (or the applicable withholding agent) would be entitled to withhold taxes without being required to pay any additional amounts with respect to amounts so withheld.

Foreign Account Tax Compliance Act. The Foreign Account Tax Compliance Act (“FATCA”), imposes a 30% U.S. withholding tax on certain U.S. source payments of interest (and OID), dividends, or other fixed or determinable annual or periodical gain, profits, and income, and on the gross proceeds from a disposition of property (including payments at maturity, or upon a redemption or sale) of a type which can produce U.S. source interest or dividends (“withholdable payments”), if paid to a foreign financial institution (including amounts paid to a foreign financial institution on your behalf) unless such institution enters into an agreement with the U.S. Treasury Department to collect and provide to the U.S. Treasury Department certain information regarding U.S. account holders, including certain account holders that are foreign entities with U.S. owners, with such institution or otherwise complies with FATCA. In addition, the Securities may constitute a “financial account” for these purposes and thus, be subject to information reporting requirements pursuant to FATCA. The legislation also generally imposes a withholding tax of 30% on withholdable payments made to a non-financial foreign entity, unless that entity provides the withholding agent with a certification that it does not have any substantial U.S. owners or a certification identifying the direct and indirect substantial U.S. owners of the entity.

The U.S. Treasury Department and the IRS have announced that withholding on payments of gross proceeds from a sale or redemption of the Securities will only apply to payments made after December 31, 2018. However, recently proposed regulations eliminate the requirement of withholding on gross proceeds from the sale or disposition of financial instruments. The U.S. Treasury Department has indicated that taxpayers may rely on these proposed regulations pending their finalization. We will not pay additional amounts with respect to any FATCA withholding. Therefore, if such withholding applies, any payments on the Securities will be significantly less than what you would have otherwise received. Depending on your circumstances, these amounts withheld may be creditable or refundable to you. Foreign financial institutions and non-financial foreign entities located in jurisdictions that have an intergovernmental agreement with the United States governing FATCA may be subject to different rules. You are urged to consult with your own tax advisor regarding the possible implications of FATCA on your investment in the Securities.

#### Canadian Federal Income Tax Consequences

For a discussion of the material Canadian federal income tax consequences relating to an investment in the Securities, please see the section entitled "Tax Consequences—Canadian Taxation" in the accompanying prospectus, which you should carefully review prior to investing in the Securities.

### Information About the Underlying

We have derived all information contained in this document regarding the SPX, including, without limitation, its make-up, method of calculation, and changes in its components, from publicly available sources. The information reflects the policies of, and is subject to change by, the index sponsor. The index sponsor, which owns the copyright and all other rights to the SPX, has no obligation to continue to publish, and may discontinue publication of the SPX. None of us, UBS or RBCCM accepts any responsibility for the calculation, maintenance or publication of the SPX or any successor index.

The SPX is intended to provide an indication of the pattern of common stock price movement in the large capitalization segment of the U.S. equity market. The calculation of the level of the SPX is based on the relative value of the aggregate market value of the common stocks of 500 companies as of a particular time compared to the aggregate average market value of the common stocks of 500 similar companies during the base period of the years 1941 through 1943.

The index sponsor calculates the SPX by reference to the prices of the constituent stocks of the SPX without taking account of the value of dividends paid on those stocks. As a result, the return on the Securities will not reflect the return you would realize if you actually owned the SPX constituent stocks and received the dividends paid on those stocks.

### Computation of the SPX

While the index sponsor currently employs the following methodology to calculate the SPX, no assurance can be given that the index sponsor will not modify or change this methodology in a manner that may affect the Payment at Maturity.

Historically, the market value of any component stock of the SPX was calculated as the product of the market price per share and the number of then outstanding shares of such component stock. In March 2005, the index sponsor began shifting the SPX halfway from a market capitalization weighted formula to a float-adjusted formula, before moving the SPX to full float adjustment on September 16, 2005. The index sponsor's criteria for selecting stocks for the SPX did not change with the shift to float adjustment. However, the adjustment affects each company's weight in the SPX.

Under float adjustment, the share counts used in calculating the SPX reflect only those shares that are available to investors, not all of a company's outstanding shares. Float adjustment excludes shares that are closely held by control groups, other publicly traded companies or government agencies.

In September 2012, all shareholdings representing more than 5% of a stock's outstanding shares, other than holdings by "block owners," were removed from the float for purposes of calculating the SPX. Generally, these "control holders" will include officers and directors, private equity, venture capital and special equity firms, other publicly traded companies that hold shares for control, strategic partners, holders of restricted shares, ESOPs, employee and family trusts, foundations associated with the company, holders of unlisted share classes of stock, government entities at all levels (other than government retirement/pension funds) and any individual person who controls a 5% or greater stake in a company as reported in regulatory filings. However, holdings by block owners, such as depositary banks, pension funds, mutual funds and ETF providers, 401(k) plans of the company, government retirement/pension funds, investment funds of insurance companies, asset managers and investment funds, independent foundations and savings and investment plans, will ordinarily be considered part of the float.

Treasury stock, stock options, restricted shares, equity participation units, warrants, preferred stock, convertible stock, and rights are not part of the float. Shares held in a trust to allow investors in countries outside the country of domicile, such as depositary shares and Canadian exchangeable shares are normally part of the float unless those shares form a control block.

For each stock, an investable weight factor ("IWF") is calculated by dividing the available float shares by the total shares outstanding. Available float shares are defined as the total shares outstanding less shares held by control holders. This calculation is subject to a 5% minimum threshold for control blocks. For example, if a company's officers and directors hold 3% of the company's shares, and no other control group holds 5% of the company's shares, the index sponsor would assign that company an IWF of 1.00, as no control group meets the 5% threshold. However, if a company's officers and directors hold 3% of the company's shares and another control group holds 20% of the company's shares, the index sponsor would assign an IWF of 0.77, reflecting the fact that 23% of the company's

outstanding shares are considered to be held for control. As of July 31, 2017, companies with multiple share class lines are no longer eligible for inclusion in the SPX. Constituents of the SPX prior to July 31, 2017 with multiple share class lines will be grandfathered in and continue to be included in the SPX. If a constituent company of the SPX reorganizes into a multiple share class line structure, that company will remain in the SPX at the discretion of the S&P Index Committee in order to minimize turnover

The SPX is calculated using a base-weighted aggregate methodology. The level of the SPX reflects the total market value of all 500 component stocks relative to the base period of the years 1941 through 1943. An indexed number is used to represent the results of this calculation in order to make the level easier to work with and track over time. The actual total market value of the component stocks during the base period of the years 1941 through 1943 has been set to an indexed level of 10. This is often indicated by the notation 1941- 43 = 10. In practice, the daily calculation of the SPX is computed by dividing the total market value of the component stocks by the “index divisor.” By itself, the index divisor is an arbitrary number. However, in the context of the calculation of the SPX, it serves as a link to the original base period level of the SPX. The index divisor keeps the SPX comparable over time and is the manipulation point for all adjustments to the SPX, which is index maintenance.

#### Index Maintenance

Index maintenance includes monitoring and completing the adjustments for company additions and deletions, share changes, stock splits, stock dividends, and stock price adjustments due to company restructuring or spinoffs. Some corporate actions, such as stock splits and stock dividends, require changes in the common shares outstanding and the stock prices of the companies in the SPX, and do not require index divisor adjustments.

To prevent the level of the SPX from changing due to corporate actions, corporate actions which affect the total market value of the SPX require an index divisor adjustment. By adjusting the index divisor for the change in market value, the level of the SPX remains constant and does not reflect the corporate actions of individual companies in the SPX. Index divisor adjustments are made after the close of trading and after the calculation of the index closing level. Changes in a company’s shares outstanding and IWF due to its acquisition of another public company are made as soon as reasonably possible. At S&P’s discretion, de minimis merger and acquisition share changes are accumulated and implemented with the quarterly share rebalancing.

All other changes of less than 5% are accumulated and made quarterly on the third Friday of March, June, September, and December.

Changes in a company's total shares outstanding of 5% or more due to public offerings are made as soon as reasonably possible. Other changes of 5% or more (for example, due to tender offers, Dutch auctions, voluntary exchange offers, company stock repurchases, private placements, acquisitions of private companies or non-index companies that do not trade on a major exchange, redemptions, exercise of options, warrants, conversion of preferred stock, notes, debt, equity participations, at-the-market stock offerings or other recapitalizations) are made weekly, and are generally announced on Fridays for implementation after the close of trading the following Friday (one week later). If a 5% or more share change causes a company's IWF to change by five percentage points or more, the IWF is updated at the same time as the share change. IWF changes resulting from partial tender offers are considered on a case-by-case basis.

#### License Agreement

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The Securities are not sponsored, endorsed, sold or promoted by S&P Dow Jones Indices LLC, Dow Jones, S&P or any of their respective affiliates (collectively, "S&P Dow Jones Indices"). S&P Dow Jones Indices make no representation or warranty, express or implied, to the holders of the Securities or any member of the public regarding the advisability of investing in Securities generally or in the Securities particularly or the ability of the SPX to track general market performance. S&P Dow Jones Indices' only relationship to us with respect to the SPX is the licensing of the SPX and certain trademarks, service marks and/or trade names of S&P Dow Jones Indices and/or its third party licensors. The SPX is determined, composed and calculated by S&P Dow Jones Indices without regard to us or the Securities. S&P Dow Jones Indices have no obligation to take our needs or the needs of holders of the Securities into consideration in determining, composing or calculating the SPX. S&P Dow Jones Indices are not responsible for and have not participated in the determination of the prices, and amount of the Securities or the timing of the issuance or sale of the Securities or in the determination or calculation of the equation by which the Securities are to be converted into cash. S&P Dow Jones Indices have no obligation or liability in connection with the administration, marketing or trading of the Securities. There is no assurance that investment products based on the SPX will accurately track index performance or provide positive investment returns. S&P Dow Jones Indices LLC and its subsidiaries are not investment advisors. Inclusion of a security or futures contract within an index is not a recommendation by S&P Dow Jones Indices to buy, sell, or hold such security or futures contract, nor is it considered to be investment advice. Notwithstanding the foregoing, CME Group Inc. and its affiliates may independently issue and/or sponsor financial products unrelated to the Securities currently being issued by us, but which may be similar to and competitive with the Securities. In addition, CME Group Inc. and its affiliates may trade financial products which are linked to the performance of the SPX. It is possible that this trading activity will affect the value of the Securities.

S&P DOW JONES INDICES DO NOT GUARANTEE THE ADEQUACY, ACCURACY, TIMELINESS AND/OR THE COMPLETENESS OF THE SPX OR ANY DATA RELATED THERETO OR ANY COMMUNICATION, INCLUDING BUT NOT LIMITED TO, ORAL OR WRITTEN COMMUNICATION (INCLUDING ELECTRONIC COMMUNICATIONS) WITH RESPECT THERETO. S&P DOW JONES INDICES SHALL NOT BE SUBJECT TO ANY DAMAGES OR LIABILITY FOR ANY ERRORS, OMISSIONS, OR DELAYS THEREIN. S&P DOW JONES INDICES MAKE NO EXPRESS OR IMPLIED WARRANTIES, AND EXPRESSLY DISCLAIMS ALL WARRANTIES, OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE OR USE OR AS TO RESULTS TO BE OBTAINED BY US, HOLDERS OF THE SECURITIES, OR ANY OTHER PERSON OR ENTITY FROM THE USE OF THE SPX OR WITH RESPECT TO ANY DATA RELATED THERETO. WITHOUT LIMITING ANY OF THE FOREGOING, IN NO EVENT WHATSOEVER SHALL S&P DOW JONES INDICES BE LIABLE FOR ANY INDIRECT, SPECIAL, INCIDENTAL, PUNITIVE, OR CONSEQUENTIAL DAMAGES INCLUDING BUT NOT LIMITED TO, LOSS OF PROFITS, TRADING LOSSES, LOST TIME OR GOODWILL, EVEN IF THEY HAVE BEEN ADVISED OF THE POSSIBILITY OF SUCH DAMAGES, WHETHER IN CONTRACT, TORT, STRICT LIABILITY, OR OTHERWISE. THERE ARE NO THIRD PARTY BENEFICIARIES OF ANY AGREEMENTS OR ARRANGEMENTS BETWEEN S&P DOW JONES INDICES AND US, OTHER THAN THE LICENSORS OF S&P DOW JONES INDICES.





**HISTORICAL INFORMATION**

The graph below illustrates the performance of the Underlying from January 1, 2008 to December 26, 2018.

**HISTORIC PERFORMANCE IS NOT AN INDICATION OF FUTURE PERFORMANCE.**

Source: Bloomberg L.P. We have not independently verified the accuracy or completeness of the information obtained from Bloomberg Financial Markets.

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#### Supplemental Plan of Distribution (Conflicts of Interest)

We have agreed to indemnify UBS and RBCCM against liabilities under the Securities Act of 1933, as amended, or to contribute payments that UBS and RBCCM may be required to make relating to these liabilities as described in the prospectus supplement and the prospectus. We have agreed that UBS may sell all or a part of the Securities that it will purchase from us to investors at the price to public listed on the cover hereof, or its affiliates at the price indicated on the cover of the pricing supplement.

UBS may allow a concession not in excess of the underwriting discount set forth on the cover of the pricing supplement to its affiliates for distribution of the Securities. Subject to regulatory constraints and market conditions, RBCCM intends to offer to purchase the Securities in the secondary market, but it is not required to do so.

We expect to deliver the Securities on a date that is greater than two business days following the Trade Date. Under Rule 15c6-1 of the Exchange Act, trades in the secondary market generally are required to settle in two business days, unless the parties to any such trade expressly agree otherwise. Accordingly, purchasers who wish to trade the Securities more than two business days prior to the original issue date will be required to specify alternative settlement arrangements to prevent a failed settlement.

We or our affiliates may enter into swap agreements or related hedge transactions with one of our other affiliates or unaffiliated counterparties in connection with the sale of the Securities and RBCCM and/or an affiliate may earn additional income as a result of payments pursuant to the swap or related hedge transactions. See “Use of Proceeds and Hedging” beginning on page PS-13 of the accompanying product prospectus supplement UBS-IND-1.

The value of the Securities shown on your account statement may be based on RBCCM’s estimate of the value of the Securities if RBCCM or another of our affiliates were to make a market in the Securities (which it is not obligated to do). That estimate will be based upon the price that RBCCM may pay for the Securities in light of then prevailing market conditions, our creditworthiness and transaction costs. For a period of approximately six months after the issue date, the value of the Securities that may be shown on your account statement may be higher than RBCCM’s estimated value of the Securities at that time. This is because the estimated value of the Securities will not include the underwriting discount, our hedging costs and profits; however, the value of the Securities shown on your account statement during that period may be a higher amount, reflecting the addition of the underwriting discount and our estimated costs and profits from hedging the Securities. Any such excess is expected to decrease over time until the end of this period. After this period, if RBCCM repurchases your Securities, it expects to do so at prices that reflect their estimated value. This period may be reduced at RBCCM’s discretion based on a variety of factors, including but not limited to, the amount of the Securities that we repurchase and our negotiated arrangements from time to time with UBS.

For additional information as to the relationship between us and RBCCM, please see the section “Plan of Distribution—Conflicts of Interest” in the prospectus dated September 7, 2018.

#### Structuring the Securities

The Securities are our debt securities, the return on which is linked to the performance of the Underlying. As is the case for all of our debt securities, including our structured notes, the economic terms of the Securities reflect our actual or perceived creditworthiness at the time of pricing. In addition, because structured notes result in increased operational, funding and liability management costs to us, we typically borrow the funds under these Securities at a rate that is more favorable to us than the rate that we might pay for a conventional fixed or floating rate debt security of comparable maturity. Using this relatively lower implied borrowing rate rather than the secondary market rate is a factor that resulted in a higher initial estimated value of the Securities at the time their terms are set than if the secondary market rate was used. Unlike the estimated value included on the cover of this document, any value of the Securities determined for purposes of a secondary market transaction may be based on a different borrowing rate, which may result in a lower value for the Securities than if our initial internal borrowing rate were used.

In order to satisfy our payment obligations under the Securities, we may choose to enter into certain hedging arrangements (which may include call options, put options or other derivatives) on the issue date with RBCCM or one of our other subsidiaries. The terms of these hedging arrangements take into account a number of factors, including our creditworthiness, interest rate movements, the volatility of the Underlying, and the tenor of the Securities. The economic terms of the Securities and their initial estimated value depend in part on the terms of these hedging arrangements.

The lower implied borrowing rate is a factor that reduces the economic terms of the Securities to you. The initial offering price of the Securities also reflects the underwriting discount and our estimated hedging costs. These factors result in the initial estimated value for the Securities on the Trade Date being less than their public offering price. See “Key Risks—The Initial Estimated Value of the Securities Is Less than the Price to the Public” above.

#### Terms Incorporated in Master Note

The terms appearing above under the caption “Final Terms of the Securities” and the provisions in the accompanying product prospectus supplement UBS-IND-1 dated September 7, 2018 under the caption “General Terms of the Securities,” are incorporated into the master note issued to DTC, the registered holder of the Securities.

#### Validity of the Securities

In the opinion of Norton Rose Fulbright Canada LLP, the issue and sale of the Securities has been duly authorized by all necessary corporate action of the Bank in conformity with the Indenture, and when the Securities have been duly executed, authenticated and issued in accordance with the Indenture and delivered against payment therefor, the Securities will be validly issued and, to the extent validity of the Securities is a matter governed by the laws of the Province of Ontario or Québec, or the laws of Canada applicable therein, and will be valid obligations of the Bank, subject to equitable remedies which may only be granted at the discretion of a court of competent authority, subject to applicable bankruptcy, to rights to indemnity and contribution under the Securities or the Indenture which may be limited by applicable law; to insolvency and other laws of general application affecting creditors’ rights, to limitations under applicable limitations statutes, and to limitations as to the currency in which judgments in Canada may be rendered, as prescribed by the Currency Act (Canada). This opinion is given as of the date hereof and is limited to the laws of the Provinces of Ontario and Québec and the federal laws of Canada applicable thereto. In addition, this opinion is subject to customary assumptions about the Trustee’s authorization, execution and delivery of the Indenture and the genuineness of signatures and certain factual matters, all as stated in the letter of such counsel dated September 7, 2018, which has been filed as Exhibit 5.1 to Royal Bank’s Form 6-K filed with the SEC dated September 7, 2018.

In the opinion of Morrison & Foerster LLP, when the Securities have been duly completed in accordance with the Indenture and issued and sold as contemplated by the prospectus supplement and the prospectus, the Securities will be valid, binding and enforceable obligations of Royal Bank, entitled to the benefits of the Indenture, subject to applicable bankruptcy, insolvency and similar laws affecting creditors' rights generally, concepts of reasonableness and equitable principles of general applicability (including, without limitation, concepts of good faith, fair dealing and the lack of bad faith). This opinion is given as of the date hereof and is limited to the laws of the State of New York. This opinion is subject to customary assumptions about the Trustee's authorization, execution and delivery of the Indenture and the genuineness of signatures and to such counsel's reliance on the Bank and other sources as to certain factual matters, all as stated in the legal opinion dated September 7, 2018, which has been filed as Exhibit 5.2 to the Bank's Form 6-K dated September 7, 2018.