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Today’s Discussion  About Royal Bank of Canada (RBC) & RBC Capital MarketsRules-Based Investment Securities (RBIs) - A New Way to InvestRBC Global Tactical Total Return Index - Risk-Adjusted Global AccessRBC Global Tactical Total Return Index - Historical Performance & AnalysisFrequently Asked Questions & ConsiderationsRBC Emerging Market Tactical Index - Historical Performance & AnalysisRBC Global Tactical Sub-Indices - Historical Performance & AnalysisAppendix

About Royal Bank of Canada (RBC) & RBC Capital Markets

Part of a Leading Financial Service Provider: Royal Bank of Canada Top 10 One of the largest global banks by market capitalization1 11.5% Common Equity Tier 1 Ratio 2 Aa2 & AA- Credit ratings fromMoody's and S&P, respectively3 $1.3 trillion Total Assets2 16 million Clients served around the globe2 36 Countries of operations2 Leading, diversified provider of financial services10th largest bank globally, 5th largest bank in North America1Universal structure with diversified business model20-25% of earnings from RBC Capital Markets2Consistently outperforms global peers:17.6% Return on Equity in 2018211% 5-Year Annualized Total Shareholder Return in 20182 By The Numbers Strong Financial Performance Market Capitalization (US$ Billion)1 1 By Market Capitalization, Bloomberg (November 2018)2 RBC 2018 Annual Report (November 2018) 3 Based on long-term senior debt ratings, as at November 2018

“Our daily focus is on creating valued partnerships with our clients to help achieve their business goals. We are able to do this by maintaining our longstanding record of financial strength and performance. It’s that straightforward.”Doug McGregorChairman & CEO RBC Capital Markets Today Deep expertise in capital markets, banking, and financeRecognized by significant corporations, institutional investors, asset managers, private equity firms, and governments around the globe as an innovative, trusted partnerWell-established in the largest, most mature capital markets Our Presence Vancouver Calgary San Francisco Los Angeles Denver Houston Chicago Toronto Montreal Atlanta Boston New York Paris Mumbai Beijing Singapore Sydney Hong Kong Frankfurt Major Trading Hubs Coverage Offices Madrid Tokyo London and 33 other cities around the world An Innovative, Trusted Partner Top-10Global Investment Bank Over7,300professionals around the globe Footprint covers80%of global investment banking fee pool4 Serving14,700clients in115 countries Operating from70offices in15 countries By the Numbers 4 Thomson Reuters Global Investment Banking Review (H1 2018)

A Decade of Momentum and Growth Moved up from 16th largest to the 9th largest global investment bank7 Ranked as one of the most trusted global investment banks by The Economist Doubled our annual revenue and increased our global team by 20% (now at more than 7,300 professionals)5Grown our debt, equity, and loan origination businesses, while becoming a recognized corporate finance and M&A advisor Over the last 10 years,RBC Capital Markets… By the Numbers (2008 vs. 2017)5,6 340.3 494.4 3.9 8.1 38.3 83.4 6,090 7,300 +4%Annual +8%Annual +9%Annual +20%Total 16th Largestin 20087 9th Largestin 20177 1.1 2.2 1,433 2,921 +8%Annual +8%Annual 5 RBC Annual Reports (2008-2017)6 Dealogic Analytics (Criteria based on completion date between 1/1/2008 – 12/31/2017) 7 Dealogic Analytics (2008-2017) 2008 2017 2008 2017 2008 2017 2008 2017 2008 2017 2008 2017

Quantitative Investment Strategies ("QIS") at RBC RBC currently offers an extensive range of QIS3 areas of focus: Equities Commodities Multi-AssetRange of fundamental, tactical, technical and allocation strategies, on a variety of timeframes, including intra-dayStrong presence in the Canadian equities and Americas commodities QIS marketIssued over $4B in notional linked to QIS strategies in AmericasOff-the-shelf strategies, as well as customized to suit client needsOngoing trade-execution, performance reporting and operational support

Liquidity Carry Momentum Volatility Targeting Thematic Factor Driven Tactical Volatility Targeting Fixed Allocation Dynamic Allocation Volatility
Targeting COMMODITIES EQUITIES MULTI-ASSET Timing Existing Capabilities

Rules-Based Investment Securities (RBIs)A New Way to Invest

A New Risk Management ToolInvestment product that potentially provides more efficient access to strategies designed to meet or exceed risk-adjusted benchmark returnsPositioned as an alternative to traditional equity and/or fixed income portfoliosDifferentiated solution for the US market, with some features not available in ETFs and/or mutual fundsKey FeaturesWrapper: Unsecured senior debt obligation of RBC (Note)Unwinds: Redemption daily at indicative note valueMaturity: Up to 20 yearsLinked to: Index developed by RBC Capital Markets designed to try to provide better risk-adjusted returns relative to applicable benchmark- Independently administered, maintained, calculated and verified by an Index Administrator & Calculation AgentPeriodic Payments: None; total return investment; investors do not receive any dividends declared by the issuers of the index constituentsTaxation1: Treated as pre-paid cash settled derivatives. Possible capital gain or loss treatment upon sale, redemption or maturityTracking error: None or minimal to underlying indexAt maturity: 100% participation in the index for invested funds, with deduction for applicable fees; full principal at risk What are Rules-Based Investment Securities (RBIs)? Linked to arules-based strategy Alternative totraditional equities & bonds Distinctive features not availablein ETFs or mutual funds 1 Taxation: The tax consequences of these RBIs are not certain. No statutory, judicial or administrative authority directly discusses their treatment. Alternative tax treatments are possible. Please see the applicable prospectus (https://www.sec.gov/Archives/edgar/data/1000275/000114036119006307/formfwp.htm) for a more complete discussion of the potential tax treatments. Please consult with your tax advisor to discuss your tax consequences.

Why consider RBIs now? Systematic Approach to Risk ManagementRemoves emotion from investingAllows clients to focus on long-term investing goals and not near-term market noiseLinked to a rules-based strategy (an index) designed to potentially deliver improved risk-adjusted returnsAutomatically allocates to equities on bullish signals, allocates away from the market and plays defense (cash/fixed income) on bearish signalsTransparencyIndex methodology and notional positions are fully disclosed and easily observable (not a “black box”)The Index Methodology is available to investors upon request, or at the following link https://www.solactive.com/wp-content/uploads/2019/02/Guideline_Global_Tactical_Equity_final.pdf Daily redemptions and monthly performance reportingEfficient Implementation“One-ticket” solution – no need to manually rebalance or execute numerous transactionsTreated as pre-paid cash settled derivatives. Possible capital gain or loss treatment upon sale, redemption or maturity1Given the rules, anyone could try to implement a rules-based strategy; but the potential remains for:Emotional bias (i.e. ignoring the rules based on own views)Missed trades (i.e. not properly following the strategy)Difficulty in monitoring positionsHigher trading costs than RBC’s institutional trading deskTracking error to the targeted strategyCustomizationRBIs’ term and the underlying index strategy can be customized to meet specific investment views, risk tolerances and return expectations 1 Taxation: The tax consequences of these RBIs are not certain. No statutory, judicial or administrative authority directly discusses their treatment. Alternative tax treatments are possible. Please see the applicable prospectus (https://www.sec.gov/Archives/edgar/data/1000275/000114036119006307/formfwp.htm) for a more complete discussion of the potential tax treatments. Please consult with your tax advisor to discuss your tax consequences.

RBC Global Tactical Equity Total Return IndexRisk-Adjusted Global Access

Index Composition: The RBC Global Tactical Index is comprised of 4 sub-indices, the “Tactical Indices”, which together provide global equity exposure:Rules-Based StrategyDynamic Allocation: Each sub-index will either be allocated to:Fixed-income: Fed Funds rate orEquity Exposure: Front-month futures contract linked to its respective equity index + Fed FundsAllocation Determination Monthly observations of a tactical trigger (Daily Moving Average (DMA))Tactical Trigger: On the monthly observation date, if the closing price level (“Spot”) of a Relevant ETF is:Greater than or equal to its 100 DMA (200 DMA for Large Cap US) => Bullish signal = >100% equity exposure for that sub-indexLess than its 100 DMA (200 DMA for Large Cap US) => Bearish signal => 100% Fed Funds allocation for that sub-indexRebalancing: Index is rebalanced annually to the Target Weights (see table above) The RBC Global Tactical Equity Total Return Index aims to optimize asset allocation between global equities and fixed-income by observing bullish or bearish trends in the market RBC Global Tactical Equity Total Return Index Global Allocation Sub-Index Name Target Weight Relevant ETF Domestic(60%) RBC Large Cap US Tactical Equity Total Return Index 50% SPY RBC Small Cap US Tactical Equity Total Return Index 10% IWM International(40%) RBC International Developed Tactical Equity Total Return Index 25% EFA RBC Emerging Markets Tactical Equity Total Return Index 15% EEM

RBC Global Tactical Index Methodology (Hypothetical Example) SPY200
DMA FedFunds EquityExposure Sub-Index #1U.S. Large CapWeight: 50% IWM100 DMA EFA100
DMA EEM100 DMA Sub-Index #2U.S. Small CapWeight: 10% Sub-Index #3International DevelopedWeight:
25% Sub-Index #4Emerging MarketsWeight: 15% Sub-Index & Weighting Tactical Trigger Monthly
Observation
Dates EquityExposure FedFunds EquityExposure FedFunds FedFunds EquityExposure EquityExposure FedFunds SPYS

Index Construction Summary Allocation Determination:Monthly Observations Global Allocation Sub-Index & Weighting Relevant ETF Tactical Trigger At or above Tactical TriggerBullish Signal Equity Exposure Below Tactical TriggerBearish SignalFixed-Income Exposure Domestic(60%) RBC Large Cap US Tactical Equity TR Index 50% SPY 200 DMA S&P 500 Index front-month futures contract2 + Fed Funds Fed Funds RBC Small Cap US Tactical Equity TR Index 10% IWM 100 DMA Russell 2000 Index front-month futures contract2 + Fed Funds Fed Funds Int'l(40%) RBC Int'l Developed Tactical Equity TR Index 25% EFA 100 DMA MSCI EAFE Index front-month futures contract2 + Fed Funds Fed Funds RBC Emerging Markets Tactical Equity TR Index 15% EEM 100 DMA MSCI EM Index front-month futures contract2 + Fed Funds Fed Funds RBC Global Tactical Equity Total Return Index 2 Futures Contracts: For important details about the futures contracts used, such as the index levels that they track, their name, exchange they trade on etc., please see the table describing them at the end of this document on page 55, and refer to the relevant pricing supplement found at https://www.sec.gov/Archives/edgar/data/1000275/000114036119006307/formfwp.htm.

RBC Global Tactical Equity Total Return IndexHistorical Performance & Analysis

Source: Solactive, Bloomberg, RBC Capital Markets Hypothetical Historical Performance Historical Period: December 29, 19951 - March 31, 2019 Any historical analysis presented above is intended solely for illustrative purposes. It relies on historical data and past performance, and does not guarantee future returns. The performance of the RBC Global Tactical Equity Total Return Index shown is hypothetical only. The performance was derived by applying the strategy to the relevant index data. However, there is no actual historical information or an index applying the strategy of the RBC Global Tactical Equity Total Return Index for the indicated period. Performance data does not reflect all the fees that would reduce the performance of a product linked to the RBC Global Tactical Equity Total Return Index. Hypothetical Performance Using Proxies as described on pp. 23, 56-58 Hypothetical Performance of Current Indexas described in Section III (pp. 10-13) 1: See pages 23 and 56-58 for important information regarding the use of Proxies in showing extended hypothetical historical performance.

Hypothetical Historical Out-Performance during Market Corrections Historical Period: December 29, 19951 - March 31, 2019Potential protection against market downturns Dot.com Bubble Drawdown(Mar ’00 - Oct ’02) MSCI ACWI IMI Net TR -49.2% RBC Global Tactical Equity TR -10.8% Financial Crisis Drawdown(Oct ’07 - Mar ’09) MSCI ACWI IMI Net TR -58.4% RBC Global Tactical Equity TR -9.1% 1: See pages 23 and 56-58 for important information regarding the use of Proxies in showing extended hypothetical historical performance. Source: Solactive, Bloomberg, RBC Capital Markets Any historical analysis presented above is intended solely for illustrative purposes. It relies on historical data and past performance, and does not guarantee future returns. The performance of the RBC Global Tactical Equity Total Return Index shown is hypothetical only. The performance was derived by applying the strategy to the relevant index data. However, there is no actual historical information or an index applying the strategy of the RBC Global Tactical Equity Total Return Index for the indicated period. Performance data does not reflect all the fees that would reduce the performance of a product linked to the RBC Global Tactical Equity Total Return Index.

Hypothetical Historical Annual Returns Distribution Historical Period: December 29, 19951 - March 31, 2019Hypothetical outperformance in 11 out of 23 annual periods, including all 7 years where the benchmark return was negative 1: See pages 23 and 56-58 for important information regarding the use of Proxies in showing extended hypothetical historical performance. Source: Solactive, Bloomberg, RBC Capital Markets Any historical analysis presented above is intended solely for illustrative purposes. It relies on historical data and past performance, and does not guarantee future returns. The performance of the RBC Global Tactical Equity Total Return Index shown is hypothetical only. The performance was derived by applying the strategy to the relevant index data. However, there is no actual historical information or an index applying the strategy of the RBC Global Tactical Equity Total Return Index for the indicated period. Performance data does not reflect all the fees that would reduce the performance of a product linked to the RBC Global Tactical Equity Total Return Index.

Hypothetical Historical Difference in Annual Returns  Historical Period: December 29, 19951 - March 31, 2019Hypothetical outperformance in 11 out of 23 annual periods, including all 7 years where the benchmark return was negative  1: See pages 23 and 56-58 for important information regarding the use of Proxies in showing extended hypothetical historical performance.   Source: Solactive, Bloomberg, RBC Capital Markets  Any historical analysis presented above is intended solely for illustrative purposes. It relies on historical data and past performance, and does not guarantee future returns. The performance of the RBC Global Tactical Equity Total Return Index shown is hypothetical only. The performance was derived by applying the strategy to the relevant index data. However, there is no actual historical information or an index applying the strategy of the RBC Global Tactical Equity Total Return Index for the indicated period. Performance data does not reflect all the fees that would reduce the performance of a product linked to the RBC Global Tactical Equity Total Return Index.

Hypothetical Historical Performance Metrics  Historical Period: December 29, 19951 - March 31, 2019Potentially improved risk-adjusted returns relative to the benchmark  Performance Statistics  MSCI ACWI Proxy Net Total Return Index  RBC Global Tactical Equity Total Return Index  Annualized Returns      Since December 29, 1995  6.1%  8.7%  1 Year  2.7%  5.9%  3 Year  11.0%  11.4%  5 Year  6.6%  7.0%  10 Year  11.7%  9.3%  15 Year  6.9%  7.9%  Best/Worst      Best 3-month Return  45.9%  25.3%  Worst 3-month Return  -42.4%  -13.5%  Best 6-month Return  65.2%  34.9%  Worst 6-month Return  -51.1%  -14.2%  Best 12-month Return  77.9%  43.2%  Worst 12-month Return  -51.1%  -12.3%  Max Drawdown  -58.4%  -15.2%  Period Start  10/31/2007  04/29/2011  Trough Date  03/09/2009  08/08/2011  Period End  05/17/2013  05/03/2013  Duration Under Water  67 months  24 months  Longest Drawdown  -49.8%  -12.7%  Period Start  03/27/2000  03/24/2000  Trough Date  10/09/2002  02/13/2003  Period End  01/06/2006  06/17/2003  Duration Under Water  69 months  39 months  Additional Statistics      Annualized Alpha to Benchmark2  N/A   4.7%  Beta3  1  0.43  Sharpe Ratio4  0.31  0.63  Standard Deviation  15.3%  10.6%  1: See pages 23 and 56-58 for important information regarding the use of Proxies in showing extended hypothetical historical performance2: Excess return of the Index once all beta-drive performance has been accounted for3: Expected variability of the Index returns relative to the Benchmark returns4:Based on the average of daily excess returns against Fed Funds, annualized with a 252-day factor  Source: Solactive, Bloomberg, RBC Capital Markets  Any historical analysis presented above is intended solely for illustrative purposes. It relies on historical data and past performance, and does not guarantee future returns. The performance of the RBC Global Tactical Equity Total Return Index shown is hypothetical only. The performance was derived by applying the strategy to the relevant index data. However, there is no actual historical information or an index applying the strategy of the RBC Global Tactical Equity Total Return Index for the indicated period. Performance data does not reflect all the fees that would reduce the performance of a product linked to the RBC Global Tactical Equity Total Return Index.

Hypothetical Monthly Historical Allocation1 Historical Period: December 29, 19952 - March 31, 2019 Source: Solactive, Bloomberg, RBC Capital Markets Any historical analysis presented above is intended solely for illustrative purposes. It relies on historical data and past performance, and does not guarantee future returns. The allocation was derived by applying the strategy to the relevant index data. However, there is no actual historical information or an index applying the strategy of the RBC Global Tactical Equity Total Return Index. 1: Allocation shows the hypothetical exposure the Global Tactical Index would have had for each month to the four Tactical Indices. It is meant only to capture whether each sub-index was allocated or not to its relevant Futures for that month, and hence the annual Target Weight (see page 11) for the sub-index is shown. The Global Tactical Index always maintains 100% exposure to the Fed Funds rate. 2: See pages 23 and 56-58 for important information regarding the use of Proxies in showing extended hypothetical monthly historical allocation.3: Average hypothetical allocation based on Target Weights to each Tactical Index over the Historical Period.

Maximum Average Median Minimum Deviation 374% 183% 191% 1% 70% Hypothetical Annual Turnover1 Historical Period: December 29, 19952 - March 31, 2019Individual investors may not be likely to complete the transactions required to replicate the Index performance Source: Solactive, Bloomberg, RBC Capital Markets Any historical analysis presented above is intended solely for illustrative purposes. It relies on historical data and past performance, and does not guarantee future returns. The allocation was derived by applying the strategy to the relevant index data. However, there is no actual historical information or an index applying the strategy of the RBC Global Tactical Equity Total Return Index. 1: Annual Turnover measures the total notional transactions measured as a percentage of the Index value performed over the course of a one year period by the Global Tactical Index. This includes changes due to the Annual Rebalance and also those due to the monthly allocation determination done within each of the four Tactical Indices. 2: See pages 23 and 56-58 for important information regarding the use of Proxies in showing extended hypothetical historical annual turnover.

RBC Global Tactical Equity Index – Hypothetical Historical Monthly
Returns Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec Year 2019 0.2% 0.5% 0.5% 1.3% 2018
Period: December 29, 19951 - March 31, 2019 1: See pages 23 and 56-58 for important information regarding the use of Proxies in showing extended hypothetical historical performance. Source: Solactive, Bloomberg, RBC Capital Markets Any historical analysis presented above is intended solely for illustrative purposes. It relies on historical data and past performance, and does not guarantee future returns. The performance of the RBC Global Tactical Equity Total Return Index shown is hypothetical only. The performance was derived by applying the strategy to the relevant index data. However, there is no actual historical information or an index applying the strategy of the RBC Global Tactical Equity Total Return Index for the indicated period. Performance data does not reflect all the fees that would reduce the performance of a product linked to the RBC Global Tactical Equity Total Return Index.

What is the Proxy Backtest?  RBC Capital Markets developed the rules and methodology of the Global Tactical and Tactical Indices described on pages 10-13 with the benefit of hindsight. In other words, the Indices were developed with the benefit of being able to evaluate how the Indices rules would have caused the Indices to perform had it existed during the hypothetical back-tested period.Historical information for the Relevant Futures Contracts, the relevant ETFs, and the relevant Benchmarks is not available for all periods covered by the hypothetical back-tested information. For those periods, the back-tested information is based on the performance of related assets, as described below (in chronological order). Accordingly, the information for these periods may not reflect the performance of the Global Tactical and Tactical Indices had the Relevant Futures Contracts and/or ETFs been available at those times. The term Proxy thus indicates that the Global Tactical and Tactical Indices methodology was applied to the changes in the prices or levels of the related assets of the Relevant Futures, the relevant ETFs, and the relevant Benchmarks for the periods over which historical information the Relevant Futures, and/or the relevant ETFs, and /or the relevant Benchmarks was not available. Relevant FuturesRelevant front-month futures contracts available on different trading venues –refer to Appendix II for more detailsRelevant net total return indices –refer to Appendix II for more detailsRelevant net total return versions of the Investable Market Indices (IMI) –refer to Appendix II for more detailsETFsRelevant price return indices –refer to Appendix III for more detailsBenchmarksRelevant net total return indices –refer to Appendix IV for more detailsRelevant net total return versions of the Investable Market Indices (IMI) –refer to Appendix IV for more details

Frequently AskedQuestions & Risks and Considerations

What are some differences between RBIs and ETFs? Feature RBIs ETFs Liquidity Daily, through the redemption provisions included in the terms of the RBIs Daily on exchange, subject to market Recourse Issuer credit Value of ETF shares depends on value of the securities that it holds Principal Subject to market and issuer credit risk Typically subject to market risk only Tracking error Typically none or minimal to the underlying index, subject to the fees embedded in the RBI Low Tax Treated as pre-paid cash settled derivatives. Possible capital gain or loss treatment upon sale, redemption or maturity. See the relevant offering documents for a more detailed discussion of potential alternative tax treatment. Investors should consult their tax advisors to determine their own tax treatment of the RBIs1 Potential exposure to capital gains and losses of portfolio, although creation/redemption mechanism works to minimizethis. Dividends and interest income passesthrough to shareholders Transparency Performance of RBIs is based on the return of the underlying index, minus applicable fees and costs. The underlying index methodology, including the index constituents, is fully transparent and disclosed Generally depends on the returns of a portfolio of securities, which are fully disclosed Investment Strategy Linked to the performance of a rules-based index: the RBC Global Tactical Equity Total Return Index or the RBC Emerging Market Tactical Equity Total Return Index Passive, active, and quantitative strategies are available 1 Taxation: The tax consequences of these RBIs are not certain. No statutory, judicial or administrative authority directly discusses their treatment. Alternative tax treatments are possible. Please see the applicable prospectus (https://www.sec.gov/Archives/edgar/data/1000275/000114036119006307/formfwp.htm) for a more complete discussion of the potential tax treatments. Please consult with your tax advisor to discuss your tax consequences.

Why are futures used for the equity exposure as opposed to the actual index?Most efficient way to gain access to the indexOther access vehicles:ETFs: buying and selling ETFs could be treated differently from a tax perspective (see previous page)Buying basket of stocks: operationally inefficient and costly to maintainOptions: pricing would not accurately reflect the performance of the strategy in real-timeWhy do we observe the tactical trigger ahead of the 3rd Friday of every month?The futures contracts used all expire on the 3rd Friday of each calendar quarter (March, June, September and December)Market participants typically "roll" from the expiring future into the next expiring future in the week leading up to this expiryLiquidity is typically highest during this period; therefore, it makes sense to match those windows to help reduce any potential trading and transaction costs of implementing the strategyWhy do we use the 200 DMA for US Large Cap and 100 DMA for the other equity exposures?200 DMA is typically more appropriate when determining trends in less-volatile indexes, which could be expected to move up or down more slowly. In that case, such indices will stay close to their moving averages. A shorter DMA would increase the risk of false signals. Using a longer-term moving average will include values from further back in time, hence increasing the distance of spot to the moving average, and potentially reducing the risk of false signals Conversely, a 100 DMA is typically more appropriate when an index moves more quickly, as the distance to its moving average could be high. If that were the case, with a longer DMA, there is a higher risk that large moves are required before the moving average can generate any signal. A shorter moving average would mitigate this by reacting more quickly RBC Global Tactical Equity Total Return Index Construction Questions

Considerations – How is a Moving Average Calculated? What difference does the length make? Example Calculation of MA – Underlying Up 1% Each Day Closing Price 5 Day MA 10 Day MA Day 1 100.00 Day 2 101.00 Day 3 102.01 Day 4 103.03 Day 5 104.06 102.02 Day 6 105.10 103.04 Day 7 106.15 104.07 Day 8 107.21 105.11 Day 9 108.29 106.16 Day 10 109.37 107.22 104.62 Day 11 110.46 108.30 105.67 Day 12 111.57 109.38 106.73 Day 13 112.68 110.47 107.79 Day 14 113.81 111.58 108.87 Day 15 114.95 112.69 109.96 Day 16 116.10 113.82 111.06 Day 17 117.26 114.96 112.17 Day 18 118.43 116.11 113.29 Day 19 119.61 117.27 114.42 Day 20 120.81 118.44 115.57 To calculate the moving average (“MA”), add the values for each day and divide by the number of days, e.g. in the table add the values for Day 1-5 (100 +101 +102.01 +103.03 +104.06). This adds to 510.1. Now divide by the number of days, 5, to obtain the average of 102.02We say “moving” average because on each new day we will drop the oldest Spot and include the latest Spot in its calculation. Hence, the average of the Spot “moves”We refer to “Closing Price” and “Spot” interchangeably When the Closing Price is strictly rising (table to the left), the longer MA will always be lower than the shorter MAThis is because, in such a scenario, the longer MA still takes into account the lower, earlier values. E.g. the value for the 10 Day MA (“10DMA”) can first be calculated from Day10 onwards. Its calculation includes the Period 1-5 values, which are the lowest, whereas the 5DMA ignores these, averaging only the Day 6-10 Closing Price values When the Spot is strictly falling (table to the right), the opposite holds true – the longer MA will be strictly higher than the shorter MA Example Calculation of MA – Underlying Down 1% Each Day Closing Price 5 Day MA 10 Day MA Day 1 100.00 Day 2 99.00 Day 3 98.01 Day 4 97.03 Day 5 96.06 98.02 Day 6 95.10 97.04 Day 7 94.15 96.07 Day 8 93.21 95.11 Day 9 92.27 94.16 Day 10 91.35 93.22 95.62 Day 11 90.44 92.28 94.66 Day 12 89.53 91.36 93.72 Day 13 88.64 90.45 92.78 Day 14 87.75 89.54 91.85 Day 15 86.87 88.65 90.93 Day 16 86.01 87.76 90.02 Day 17 85.15 86.88 89.12 Day 18 84.29 86.01 88.23 Day 19 83.45 85.15 87.35 Day 20 82.62 84.30 86.48

Considerations – Why use different MA lengths? Example Calculation of MA – Underlying Up 1% Each Day Spot 5 Day MA 10 Day MA Day 1 100.00 Day 2 101.00 Day 3 102.01 Day 4 103.03 Day 5 104.06 102.02 Day 6 105.10 103.04 Day 7 106.15 104.07 Day 8 107.21 105.11 Day 9 108.29 106.16 Day 10 109.37 107.22 104.62 % Drop Required -2% -4.5% Consider two assets: one that rises 1% each Day (Slow), the other rises 2% (Fast). For the Spots to fall below their respective MAs, the loss on Fast would need to be twice as great as the loss on Slow. For a faster moving index or market, it can thus be more prudent to choose a shorter MA, as it is going to require less of a loss before it triggers. False signals and whipsawing (see page 30) are major risks when using MAs. A shorter MA may help limit the losses from a false signal. A shorter MA would trigger more often than a longer one, but would be expected to show smaller gains or losses each time it does trigger (assuming it's applied to the same market). Example Calculation of MA – Underlying Up 2% Each Day Spot 5 Day MA 10 Day MA Day 1 100.00 Day 2 102.00 Day 3 104.04 Day 4 106.12 Day 5 108.24 104.08 Day 6 110.41 106.16 Day 7 112.62 108.29 Day 8 114.87 110.45 Day 9 117.17 112.66 Day 10 119.51 114.91 109.50 % Drop Required -4% -9.1% Example on S&P 500 over historical period from December 31, 2007 to December 31, 2011100D MA vs 200D MA 100DMA triggers back into market;200DMA stays out 100DMA gets back into market earlier;200DMA stays out longer 100DMA gets false signal;200DMA steers clear 100DMA whipsaws;200DMA does not Source: Bloomberg, RBC Capital Markets

Risk Considerations – False Moving Average Signals Consider two ways of observing the tactical trigger used in the RBC Emerging Market Tactical Equity Total Return Index: one using the MXEF Index and the other using the EEM ETF, along with their respective 100-day Moving Average On June 16, 2008, the tactical trigger is observed and the allocation is made on June 18, 2008 An investor would not allocate to equity using the trigger on the MXEF Index, but would be fully exposed to equity using the trigger on the EEM ETF, until the next allocation date (July 16, 2008) If the observation date had been three calendar days earlier (on June 13, 2008), an investor would not have been exposed to equity using either methodThe performance in each scenario is displayed in the table below Historical Period: April 2, 2007 - December 31, 2009For illustration purposes only – graph not to scale Historical Period: May 30, 2008 - July 21, 2008For illustration purposes only – graph not to scale May 30, 2008 – July 21, 2008 Out In In Out Out Observation Date 06/16/2008 06/13/2008 Allocation Date 06/18/2008 06/17/2008 Next Allocation Date 07/16/2008 07/15/2008 EM Futures contract -9.3% - Fed Funds Rate 0.16% 0.16% Signal on MXEF OUT OUT Return using Trigger on MXEF Index 0.16% 0.16% Signal on EEM IN OUT Return using Trigger on EEM ETF -9.1% 0.16% Source: Bloomberg, RBC Capital Markets

Considerations – Negative Return Asymmetry versus “Whipsawing” What is the trade-off I make when using this strategy? On the plus side….The Tactical Indices attempt to exit the equity markets and switch to cash, thus avoiding the worst negative returnsDue to the way negative returns impact overall compounded returns, this can be a good long-term strategyThis is because negative returns affect compound returns more strongly than positive ones (“asymmetry”), as discussed below Depending on the magnitude of the loss avoided, this could make a substantial difference to investment returnsOn the minus side… False signalsThe signals used to identify when to enter and exit equity exposure can be “false”Meaning the signals could cause the index to exit the equity exposure, yet equities rise thereafter; and they could also cause the index to re-enter the market when the equity market subsequently fallsWhen this happens in sequence, the index “buys high and sells low” or gets “whipsawed”, which causes it to underperform versus maintaining the equity or cash exposure throughout On the minus side… Lagged signalsThe moving average signal will react with a lag – by construction, it will only be able to signal to exit market exposure when markets have already fallen and it can only signal to re-enter market exposure when it has already started to riseThe rise and fall required to trigger the signal could be substantial, which in turn could negatively impact investment returnsOverall?When markets exhibit clear and prolonged periods moving in alternate directions (up then down, or vice-versa) this strategy would be expected to work bestWhen markets move sideways with large swings in either direction, causing not only many false signals, but large ones, the strategy would be expected to work the worst and underperform a buy and hold alternative the mostOver a full-cycle, outperformance is possible (more likely if large down periods are included). Outperformance is likely in a down market only and unlikely in an up market only

Considerations – Return Asymmetry Hypothetical Illustrations Consider the 7 Scenarios belowIn Scenario 1, an investment falls by 5%. A $100 initial investment would now be worth $95. To recover that loss, the investment must rise by $5 or in percentage returns by $5/$95 or just over 5%In Scenario 3, after a $20 or 20% loss to a value of $80, the required return to get back to $100 would be $20/$80, or 25%To recover from a 50% loss, the required return is 100%, or a doublingBy the time a 75% loss is arrived at, even a small additional loss can make a very large difference in required recovery returns: losing $75 of the initial $100 requires a fourfold increase to recover; losing just another $5 (or $80 in total), requires a fivefold increase to recoverShould such losses materialize in practice, it could take a very long time to recover. Avoiding half of the loss of 50% and suffering only 25% loss would mean an increase of only one third is required to recover, versus a doubling to recover

FedFunds Equity Considerations – Underperformance Potential (“Whipsaw”) Underperformance Scenario #2Rising equity market FedFunds Equity Equity FedFunds Equity Underperformance Scenario #1Declining equity market Underperformance Scenario #3Declining & Rising equity market

Other Risks to Consider Credit RiskRBIs are senior unsecured debt obligations of the issuer, Royal Bank of CanadaAll payments at maturity, if any, are subject to the credit of the issuerFederal Funds RateThe reference rate used is the Federal Funds rate, which may be low and in theory even negativeThus when the index is allocated to the Federal Funds rate, the scope for gains may be very limited, particularly when the effect of any Index Adjustment Factor applied to the RBIs is includedNo Active ManagementThe index is completely rules-based. Hence, if the strategy underperforms, even if it underperforms significantly, no attempts will be made to change the rules to try to address such underperformanceEquity RisksThe index, via the respective futures, exposes an investor to small capitalization stock risks, emerging market stock risks and foreign securities market stock risksIndex Specific RisksThe index uses moving averages which exposes investors to the risk of the chosen parameters not working well, or at all, going forward. These risks, some of which have been discussed previously, can be associated with, but are not necessarily limited to: (i) the choice of when the signal is observed versus an alternative choice; (ii) the length of the moving average chosen versus another choice; (iii) the frequency at which the signal is observed and acted upon versus alternatives etc.The index may not perform well relative to alternative choices of investmentThe hypothetical performance information that RBC has provided in this document is based on criteria that has been applied retroactively with the benefit of hindsight, and these criteria cannot account for all financial risk that may affect the actual performance of a product linked to the indexPlease refer to the relevant pricing supplement (available at https://www.sec.gov/Archives/edgar/data/1000275/000114036119006307/formfwp.htm) for a more thorough discussion of risks associated with RBIs. You should only invest in securities linked to the index after carefully reviewing the risk factors set forth in that document.

Tactical Indices – The RBC Emerging Market Tactical Equity Total Return Index Historical Performance & Analysis

Hypothetical Historical Performance  Historical Period: December 29, 19951 - March 31, 2019 Average Allocation to Emerging Markets: 57%2  Hypothetical Performance Using Proxies  Hypothetical Performance of Current Indexas described in Section III (pp. 10-13)  1: See pages 23 and 56-58 for important information regarding the use of Proxies in showing extended hypothetical historical performance. 2: The percentage of months that the Index was allocated to the relevant Futures over the Historical Period.   Source: Solactive, Bloomberg, RBC Capital Markets  Any historical analysis presented above is intended solely for illustrative purposes. It relies on historical data and past performance, and does not guarantee future returns. The performance of the RBC Emerging Market Tactical Equity Total Return Index shown is hypothetical only. The performance was derived by applying the strategy to the relevant index data. However, there is no actual historical information or an index applying the strategy of the RBC Emerging Market Tactical Equity Total Return Index for the indicated period. Performance data does not reflect all the fees that would reduce the performance of a product linked to the RBC Emerging Market Tactical Equity Total Return Index.

Allocation to Futures Contracts

Hypothetical Historical Annual Returns Distribution Historical Period: December 29, 19951 - March 31, 2019Hypothetical outperformance in 9 of the 23 annual periods, including 9 out of 11 years where the benchmark return was negative 1: See pages 23 and 56-58 for important information regarding the use of Proxies in showing extended hypothetical historical performance. Source: Solactive, Bloomberg, RBC Capital Markets Any historical analysis presented above is intended solely for illustrative purposes. It relies on historical data and past performance, and does not guarantee future returns. The performance of the RBC Emerging Market Tactical Equity Total Return Index shown is hypothetical only. The performance was derived by applying the strategy to the relevant index data. However, there is no actual historical information or an index applying the strategy of the RBC Emerging Market Tactical Equity Total Return Index for the indicated period. Performance data does not reflect all the fees that would reduce the performance of a product linked to the RBC Emerging Market Tactical Equity Total Return Index.

Hypothetical Historical Difference in Annual Returns Historical Period: December 29, 19951 - March 31, 2019 Hypothetical outperformance in 9 of the 23 annual periods, including 9 out of 11 years where the benchmark return was negative 1: See pages 23 and 56-58 for important information regarding the use of Proxies in showing extended hypothetical historical performance. Source: Solactive, Bloomberg, RBC Capital Markets Any historical analysis presented above is intended solely for illustrative purposes. It relies on historical data and past performance, and does not guarantee future returns. The performance of the RBC Emerging Market Tactical Equity Total Return Index shown is hypothetical only. The performance was derived by applying the strategy to the relevant index data. However, there is no actual historical information or an index applying the strategy of the RBC Emerging Market Tactical Equity Total Return Index for the indicated period. Performance data does not reflect all the fees that would reduce the performance of a product linked to the RBC Emerging Market Tactical Equity Total Return Index.

Performance Statistics  MSCI EM Proxy Net Total Return Index  RBC EM Tactical Equity Total Return Index  Annualized Returns   Since December 29, 1995  5.2%  8.9%  1 Year  -7.3%  3.6%  3 Year  11.7%  12.9%  5 Year  3.9%  7.5%  10 Year  8.5%  7.4%  15 Year  8.1%  9.2%  Best/Worst   Best 3-month Return  68.9%  42.7%  Worst 3-month Return  -54.3%  -22.8%  Best 6-month Return  84.2%  65.5%  Worst 6-month Return  -61.8%  -21.2%  Best 12-month Return  113.5%  84.5%  Worst 12-month Return  -63.0%  -27.6%  Max Drawdown  -65.2%  -31.9%  Period Start  10/29/2007  07/08/1997  Trough Date  10/27/2008  01/25/1999  Period End  07/19/2017  07/02/1999  Duration Under Water  117 months  24 months  Longest Drawdown  -65.2%  -23.5%  Period Start  10/29/2007  01/11/2010  Trough Date  10/27/2008  05/19/2016  Period End  07/19/2017  07/14/2017  Duration Under Water  117 months  90 months  Additional Statistics   Annualized Alpha to Benchmark2  N/A  5.5%  Beta3  1  0.40  Sharpe Ratio4  0.24  0.52  Standard Deviation  18.8%  14.2%  Hypothetical Historical Performance Metrics  Historical Period: December 29, 19951 - March 31, 2019Potentially improved risk-adjusted returns relative to the benchmark  Any historical analysis presented above is intended solely for illustrative purposes. It relies on historical data and past performance, and does not guarantee future returns. The performance of the RBC Emerging Market Tactical Equity Total Return Index shown is hypothetical only. The performance was derived by applying the strategy to the relevant index data. However, there is no actual historical information or an index applying the strategy of the RBC Emerging Market Tactical Equity Total Return Index for the indicated period. Performance data does not reflect all the fees that would reduce the performance of a product linked to the RBC Emerging Market Tactical Equity Total Return Index.   1: See pages 23 and 56-58 for important information regarding the use of Proxies in showing extended hypothetical historical performance2: Excess return of the Index once all beta-driven performance has been accounted for3: Expected variability of the Index returns relative to the Benchmark returns4:Based on the average of daily excess returns against Fed Funds, annualized with a 252-day factor  Source: Solactive, Bloomberg, RBC Capital Markets

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec Year 2019 0.2% 1.0% 1.2% 2.4% 2018 8.2% -5 Emerging Market Tactical Equity Index – Hypothetical Historical Monthly Returns Historical Period: December 29, 19951 - March 31, 2019 1: See pages 23 and 56-58 for important information regarding the use of Proxies in showing extended hypothetical historical performance. Source: Solactive, Bloomberg, RBC Capital Markets Any historical analysis presented above is intended solely for illustrative purposes. It relies on historical data and past performance, and does not guarantee future returns. The performance of the RBC Emerging Market Tactical Equity Total Return Index shown is hypothetical only. The performance was derived by applying the strategy to the relevant index data. However, there is no actual historical information or an index applying the strategy of the RBC Emerging Market Tactical Equity Total Return Index for the indicated period. Performance data does not reflect all the fees that would reduce the performance of a product linked to the RBC Emerging Market Tactical Equity Total Return Index.

RBC Tactical Equity Total Return Sub-Indices – Hypothetical Historical Performance Historical Period: December 29, 19951 - March 31, 2019 1: See pages 23 and 56-58 for important information regarding the use of Proxies in showing extended hypothetical historical performance. Source: Solactive, Bloomberg, RBC Capital Markets Any historical analysis presented above is intended solely for illustrative purposes. It relies on historical data and past performance, and does not guarantee future returns. The performance of the RBC Global Tactical Equity Total Return Index and the Tactical Indices (together the "Indices") shown is hypothetical only. The performance was derived by applying the strategy to the relevant index data. However, there is no actual historical information or an index applying the strategy of the Indices for the indicated period. Performance data does not reflect all the fees that would reduce the performance of a product linked to the Indices.

RBC Large Cap US Tactical Equity Index – Hypothetical Historical Performance Historical Period: December 29, 19951 - March 31, 2019Average Allocation to Large Cap US: 72%2 Source: Solactive, Bloomberg, RBC Capital Markets Any historical analysis presented above is intended solely for illustrative purposes. It relies on historical data and past performance, and does not guarantee future returns. The performance of the RBC Large Cap US Tactical Equity Total Return Index shown is hypothetical only. The performance was derived by applying the strategy to the relevant index data. However, there is no actual historical information or an index applying the strategy of the RBC Large Cap US Tactical Equity Total Return Index for the indicated period. Performance data does not reflect all the fees that would reduce the performance of a product linked to the RBC Large Cap US Tactical Equity Total Return Index. Allocation to Futures Contracts 1: See pages 23 and 56-58 for important information regarding the use of Proxies in showing extended hypothetical historical performance. 2: The percentage of months that the Index was allocated to the relevant Futures over the Historical Period.

RBC Large Cap US Tactical Equity Index – Hypothetical Historical Annual Returns Distribution Historical Period: December 29, 19951 - March 31, 2019 Hypothetical outperformance in 6 of the 23 annual periods, including all 5 years where benchmark return was negative 1: See pages 23 and 56-58 for important information regarding the use of Proxies in showing extended hypothetical historical performance. Source: Solactive, Bloomberg, RBC Capital Markets Any historical analysis presented above is intended solely for illustrative purposes. It relies on historical data and past performance, and does not guarantee future returns. The performance of the RBC Large Cap US Tactical Equity Total Return Index shown is hypothetical only. The performance was derived by applying the strategy to the relevant index data. However, there is no actual historical information or an index applying the strategy of the RBC Large Cap US Tactical Equity Total Return Index for the indicated period. Performance data does not reflect all the fees that would reduce the performance of a product linked to the RBC Large Cap US Tactical Equity Total Return Index.

RBC Large Cap US Tactical Equity Index – Hypothetical Historical Difference in Annual Returns Historical Period: December 29, 19951 - March 31, 2019 Hypothetical outperformance in 6 of the 23 annual periods, including all 5 years where benchmark return was negative 1: See pages 23 and 56-58 for important information regarding the use of Proxies in showing extended hypothetical historical performance. Source: Solactive, Bloomberg, RBC Capital Markets Any historical analysis presented above is intended solely for illustrative purposes. It relies on historical data and past performance, and does not guarantee future returns. The performance of the RBC Large Cap US Tactical Equity Total Return Index shown is hypothetical only. The performance was derived by applying the strategy to the relevant index data. However, there is no actual historical information or an index applying the strategy of the RBC Large Cap US Tactical Equity Total Return Index for the indicated period. Performance data does not reflect all the fees that would reduce the performance of a product linked to the RBC Large Cap US Tactical Equity Total Return Index.

Performance Statistics  S&P 500 Total Return Index  RBC Large Cap US Tactical Equity Total Return Index  Annualized Returns      Since December 29, 1995  8.8%  9.8%  1 Year  9.5%  9.1%  3 Year  13.6%  13.1%  5 Year  11.1%  7.9%  10 Year  15.7%  10.6%  15 Year  8.6%  8.1%  Best/Worst      Best 3-month Return  40.2%  25.6%  Worst 3-month Return  -40.6%  -16.6%  Best 6-month Return  54.6%  31.8%  Worst 6-month Return  -46.1%  -15.2%  Best 12-month Return  72.3%  51.4%  Worst 12-month Return  -47.5%  -14.0%  Max Drawdown  -55.3%  -19.6%  Period Start  10/09/2007  07/17/1998  Trough Date  03/09/2009  08/31/1998  Period End  04/02/2012  03/08/1999  Duration Under Water  54 months  8 months  Longest Drawdown  -47.4%  -13.1%  Period Start  09/01/2000  03/24/2000  Trough Date  10/09/2002  10/12/2000  Period End  10/23/2006  05/30/2003  Duration Under Water  74 months  38 months  Additional Statistics      Annualized Alpha to Benchmark2   N/A  4.5%  Beta3  1  0.44  Sharpe Ratio4  0.43  0.63  Standard Deviation  18.8%  12.8%  RBC Large Cap US Tactical Equity Index – Hypothetical Historical Performance Metrics  Historical Period: December 29, 19951 - March 31, 2019Potentially improved risk-adjusted returns relative to the benchmark  Any historical analysis presented above is intended solely for illustrative purposes. It relies on historical data and past performance, and does not guarantee future returns. The performance of the RBC Large Cap US Tactical Equity Total Return Index shown is hypothetical only. The performance was derived by applying the strategy to the relevant index data. However, there is no actual historical information or an index applying the strategy of the RBC Large Cap US Tactical Equity Total Return Index for the indicated period. Performance data does not reflect all the fees that would reduce the performance of a product linked to the RBC Large Cap US Tactical Equity Total Return Index.   1: See pages 23 and 56-58 for important information regarding the use of Proxies in showing extended hypothetical historical performance2: Excess return of the Index once all beta-driven performance has been accounted for3: Expected variability of the Index returns relative to the Benchmark returns4:Based on the average of daily excess returns against Fed Funds, annualized with a 252-day factor  Source: Solactive, Bloomberg, RBC Capital Markets

RBC Small Cap US Tactical Equity Index – Hypothetical Historical Performance Historical Period: December 29, 1995[1] - March 31, 2019 Average Allocation to Small Cap US: 66%[2] Hypothetical Performance Using Proxies Hypothetical Performance of Current Indexas described in Section III (pp. 10-13) Source: Solactive, Bloomberg, RBC Capital Markets Any historical analysis presented above is intended solely for illustrative purposes. It relies on historical data and past performance, and does not guarantee future returns. The performance of the RBC Small Cap US Tactical Equity Total Return Index shown is hypothetical only. The performance was derived by applying the strategy to the relevant index data. However, there is no actual historical information or an index applying the strategy of the RBC Small Cap US Tactical Equity Total Return Index for the indicated period. Performance data does not reflect all the fees that would reduce the performance of a product linked to the RBC Small Cap US Tactical Equity Total Return Index. Allocation to Futures Contracts 1: See pages 23 and 56-58 for important information regarding the use of Proxies in showing extended hypothetical historical performance. 2: The percentage of months that the Index was allocated to the relevant Futures over the Historical Period.

RBC Small Cap US Tactical Equity Index – Hypothetical Historical Annual Returns Distribution Historical Period: December 29, 19951 - March 31, 2019 Hypothetical outperformance in 9 of the 23 annual periods, including 5 of 8 years where benchmark return was negative 1: See pages 23 and 56-58 for important information regarding the use of Proxies in showing extended hypothetical historical performance. Source: Solactive, Bloomberg, RBC Capital Markets Any historical analysis presented above is intended solely for illustrative purposes. It relies on historical data and past performance, and does not guarantee future returns. The performance of the RBC Small Cap US Tactical Equity Total Return Index shown is hypothetical only. The performance was derived by applying the strategy to the relevant index data. However, there is no actual historical information or an index applying the strategy of the RBC Small Cap US Tactical Equity Total Return Index for the indicated period. Performance data does not reflect all the fees that would reduce the performance of a product linked to the RBC Small Cap US Tactical Equity Total Return Index.

RBC Small Cap US Tactical Equity Index – Hypothetical Historical Annual Returns Distribution Historical Period: December 29, 19951 - March 31, 2019 Hypothetical outperformance in 9 of the 23 annual periods, including 5 of 9 years where benchmark return was negative 1: See pages 23 and 56-58 for important information regarding the use of Proxies in showing extended hypothetical historical performance. Source: Solactive, Bloomberg, RBC Capital Markets Any historical analysis presented above is intended solely for illustrative purposes. It relies on historical data and past performance, and does not guarantee future returns. The performance of the RBC Small Cap US Tactical Equity Total Return Index shown is hypothetical only. The performance was derived by applying the strategy to the relevant index data. However, there is no actual historical information or an index applying the strategy of the RBC Small Cap US Tactical Equity Total Return Index for the indicated period. Performance data does not reflect all the fees that would reduce the performance of a product linked to the RBC Small Cap US Tactical Equity Total Return Index.

Performance Statistics Russell 2000 Total Return Index RBC Small Cap US Tactical Equity Total Return Index Annualized Returns Since December 29, 1995 8.5% 6.3% 1 Year 2.0% 5.5% 3 Year 13.1% 11.2% 5 Year 7.4% 6.4% 10 Year 15.2% 11.4% 15 Year 8.1% 6.7% Best/Worst Best 3-month Return 54.5% 31.5% Worst 3-month Return -47.1% -27.5% Best 6-month Return 72.2% 42.1% Worst 6-month Return -51.6% -28.2% Best 12-month Return 97.9% 62.4% Worst 12-month Return -48.0% -32.3% Max Drawdown -58.9% -42.5% Period Start 07/13/2007 03/09/2000 Trough Date 03/09/2009 02/13/2003 Period End 02/11/2011 01/10/2006 Duration Under Water 43 months 70 months Longest Drawdown -44.1% -42.5% Period Start 03/09/2000 03/09/2000 Trough Date 10/09/2002 02/13/2003 Period End 01/08/2004 01/10/2006 Duration Under Water 46 months 70 months Additional Statistics Annualized Alpha to Benchmark2 N/A 1.2% Beta3 1 0.45 Sharpe Ratio4 0.38 0.32 Standard Deviation 22.5% 15.5% RBC Small Cap US Tactical Equity Index – Hypothetical Historical Performance Metrics Historical Period: December 29, 19951 - March 31, 2019Potentially improved risk-adjusted returns relative to the benchmark Any historical analysis presented above is intended solely for illustrative purposes. It relies on historical data and past performance, and does not guarantee future returns. The performance of the RBC Small Cap US Tactical Equity Total Return Index shown is hypothetical only. The performance was derived by applying the strategy to the relevant index data. However, there is no actual historical information or an index applying the strategy of the RBC Small Cap US Tactical Equity Total Return Index for the indicated period. Performance data does not reflect all the fees that would reduce the performance of a product linked to the RBC Small Cap US Tactical Equity Total Return Index. 1: See pages 23 and 56-58 for important information regarding the use of Proxies in showing extended hypothetical historical performance2: Excess return of the Index once all beta-driven performance has been accounted for3: Expected variability of the Index returns relative to the Benchmark returns4:Based on the average of daily excess returns against Fed Funds, annualized with a 252-day factor Source: Solactive, Bloomberg, RBC Capital Markets

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RBC Int'l Developed Tactical Equity Index – Hypothetical Historical Performance Historical Period: December 29, 19951 - March 31, 2019 Average Allocation to International Developed Markets: 58%2 Hypothetical Performance Using Proxies Hypothetical Performance of Current Indexas described in Section III (pp. 10-13) Source: Solactive, Bloomberg, RBC Capital Markets Any historical analysis presented above is intended solely for illustrative purposes. It relies on historical data and past performance, and does not guarantee future returns. The performance of the RBC International Developed Tactical Equity Total Return Index shown is hypothetical only. The performance was derived by applying the strategy to the relevant index data. However, there is no actual historical information or an index applying the strategy of the RBC International Developed Tactical Equity Total Return Index for the indicated period. Performance data does not reflect all the fees that would reduce the performance of a product linked to the RBC International Developed Tactical Equity Total Return Index. Allocation to Futures Contracts 1: See pages 23 and 56-58 for important information regarding the use of Proxies in showing extended hypothetical historical performance. 2: The percentage of months that the Index was allocated to the relevant Futures over the Historical Period.

RBC Int'l Developed Tactical Equity Index – Hypothetical Historical Annual Returns Distribution Historical Period: December 29, 19951 - March 31, 2019 Hypothetical outperformance in 10 of the 23 annual periods, including all 9 years where benchmark return was negative 1: See pages 23 and 56-58 for important information regarding the use of Proxies in showing extended hypothetical historical performance. Source: Solactive, Bloomberg, RBC Capital Markets Any historical analysis presented above is intended solely for illustrative purposes. It relies on historical data and past performance, and does not guarantee future returns. The performance of the RBC International Developed Tactical Equity Total Return Index shown is hypothetical only. The performance was derived by applying the strategy to the relevant index data. However, there is no actual historical information or an index applying the strategy of the RBC International Developed Tactical Equity Total Return Index for the indicated period. Performance data does not reflect all the fees that would reduce the performance of a product linked to the RBC International Developed Tactical Equity Total Return Index.

RBC Int'l Developed Tactical Equity Index – Hypothetical Historical Annual Returns Distribution Historical Period: December 29, 19951 - March 31, 2019 Hypothetical outperformance in 10 of the 23 annual periods, including all 9 years where benchmark return was negative 1: See pages 23 and 56-58 for important information regarding the use of Proxies in showing extended hypothetical historical performance. Source: Solactive, Bloomberg, RBC Capital Markets Any historical analysis presented above is intended solely for illustrative purposes. It relies on historical data and past performance, and does not guarantee future returns. The performance of the RBC International Developed Tactical Equity Total Return Index shown is hypothetical only. The performance was derived by applying the strategy to the relevant index data. However, there is no actual historical information or an index applying the strategy of the RBC International Developed Tactical Equity Total Return Index for the indicated period. Performance data does not reflect all the fees that would reduce the performance of a product linked to the RBC International Developed Tactical Equity Total Return Index.

Performance Statistics MSCI EAFE Proxy Net Total Return Index RBC Int'l Developed Tactical Equity Total Return Index Annualized Returns Since December 29, 1995 4.4% 6.1% 1 Year -3.5% 1.3% 3 Year 7.8% 6.6% 5 Year 2.5% 4.6% 10 Year 8.7% 5.8% 15 Year 5.2% 5.9% Best/Worst Best 3-month Return 47.1% 26.2% Worst 3-month Return -41.2% -15.6% Best 6-month Return 71.9% 48.4% Worst 6-month Return -51.5% -20.2% Best 12-month Return 75.7% 46.2% Worst 12-month Return -53.1% -17.0% Max Drawdown -60.4% -28.9% Period Start 10/31/2007 01/14/2010 Trough Date 03/09/2009 08/30/2012 Period End 06/02/2014 05/29/2014 Duration Under Water 79 months 52 months Longest Drawdown -60.4% -28.9% Period Start 10/31/2007 01/14/2010 Trough Date 03/09/2009 08/30/2012 Period End 06/02/2014 05/29/2014 Duration Under Water 79 months 52 months Additional Statistics Annualized Alpha to Benchmark2 N/A 3.2% Beta3 1 0.32 Sharpe Ratio4 0.20 0.37 Standard Deviation 17.1% 11.3% RBC Int'l Developed Tactical Equity Index – Hypothetical Historical Performance Metrics Historical Period: December 29, 19951 - March 31, 2019Potentially improved risk-adjusted returns relative to the benchmark Any historical analysis presented above is intended solely for illustrative purposes. It relies on historical data and past performance, and does not guarantee future returns. The performance of the RBC International Developed Tactical Equity Total Return Index shown is hypothetical only. The performance was derived by applying the strategy to the relevant index data. However, there is no actual historical information or an index applying the strategy of the RBC International Developed Tactical Equity Total Return Index for the indicated period. Performance data does not reflect all the fees that would reduce the performance of a product linked to the RBC International Developed Tactical Equity Total Return Index. 1: See pages 23 and 56-58 for important information regarding the use of Proxies in showing extended hypothetical historical performance2: Excess return of the Index once all beta-driven performance has been accounted for3: Expected variability of the Index returns relative to the Benchmark returns4:Based on the average of daily excess returns against Fed Funds, annualized with a 252-day factor Source: Solactive, Bloomberg, RBC Capital Markets

Appendix

Appendix I  RBC Global Tactical Equity Total Return Index  Geography  Name  BBG Ticker  RIC Code  Large Cap US  RBC Large Cap US Tactical Equity Total Return Index  RBCELTUT  .RBCELTUT  Small Cap US  RBC Small Cap US Tactical Equity Total Return Index  RBCESTUT  .RBCESTUT  International Developed  RBC International Developed Tactical Equity Total Return Index  RBCEITUT  .RBCEITUT  Emerging Market  RBC Emerging Market Tactical Equity Total Return Index  RBCEETUT  .RBCEETUT  List of the Tactical Equity Total Return Sub-Indices  Geography  Name  BBG Ticker  RIC Code  Global  RBC Global Tactical Equity Total Return Index  RBCEGTUT  .RBCEGTUT  Geography  Future Contracts  Exchange  Generic Index  Large Cap US  E-mini S&P 500 Future  CME  ES1 Index  Small Cap US  E-mini Russell 2000 Future  CME  RTY1 Index  International Developed  MSCI EAFE Future  ICE  MFS1 Index  Emerging Market  MSCI Emerging Markets Future  ICE  MES1 Index  List of the Future Contracts

Appendix II Futures Contract Proxies used for the Historical Period – From December 29, 1995 to March 31, 2019

| Geography | Futures Contract | Historical Period |
|---|---|---|
| Large Cap US | E-mini S&P 500 Futures (ES1 Index) | September 10, 1997 – March 31, 2019 |
| | S&P 500 Futures (SP1 Index) | December 29, 1995 – September 10, 1997 |
| Small Cap US | E-mini Russell 2000 Futures (RTY1 Index) | July 11, 2017 – March 31, 2019 |
| | Russell 2000 Mini Futures (RTA1 Index) | August 20, 2007 – July 11, 2017 |
| | Russell 2000 Futures (RL1 Index) | December 29, 1995 – August 20, 2007 |
| International Developed | MSCI EAFE Futures (MFS1 Index) | September 9, 2009 – March 31, 2019 |
| | E-mini MSCI EAFE Futures (BL1 Index) | March 20, 2006 – September 8, 2009 |
| | MSCI EAFE Net Total Return Index (M1EA Index) | December 31, 1998 – March 20, 2006 |
| | MSCI EAFE IMI Net Index (MIMUEAFN Index) | December 31, 1995 – December 31, 1998 |
| Emerging Market | MSCI Emerging Markets Futures (MES1 Index) | September 9, 2009 – March 31, 2019 |
| | MSCI Emerging Markets Futures (LLL1 Index) | October 22, 2007 – September 9, 2009 |
| | MSCI Emerging Markets Net Total Return (M1EF Index) | December 29, 2000 – October 22, 2007 |
| | MSCI EM Emerging Markets IMI Net Index (MIMUEMRN Index) | December 29, 1995 – December 29, 2000 |

Appendix III ETF Proxies used for the Historical Period – From December 29, 1995 to March 31, 2019 Geography ETF Historical Period Large Cap US SPDR S&P 5000 ETF Trust (SPY US Equity) December 29, 1995 – March 31, 2019 Small Cap US iShares Russell 2000 ETF (IWM US Equity) October 17, 2000 – March 31, 2019 Russell 2000 Index (RTY Index) December 29, 1995 – October 17, 2000 International Developed iShares MSCI EAFE ETF (EFA US Equity) January 15, 2002 – March 31, 2019 MSCI EAFE Index (MXEA Index) December 29, 1995 – January 15, 2002 Emerging Market iShares MSCI Emerging Markets ETF (EEM US Equity) September 3, 2003 – March 31, 2019 MSCI Emerging Markets Index (MXEF Index) December 29, 1995 – September 2, 2009

Appendix IV Benchmark Proxies used for the Historical Period – From December 29, 1995 to March 31, 2019

| Geography | ETF | Historical Period |
|---|---|---|
| Large Cap US | S&P Total Return Index (SPXT Index) | December 29, 1995 – March 31, 2019 |
| Small Cap US | Russell 2000 Total Return Index (RU20INTR Index) | October 17, 2000 – March 31, 2019 |
| International Developed | MSCI EAFE Net Total Return Index (NDDUEAFE Index) | December 31, 1998 – March 31, 2019 |
| | MSCI EAFE IMI Net Index (MIMUEAFN Index) | December 29, 1995 – December 31, 1998 |
| Emerging Market | MSCI Emerging Net Total Return Index (NDUEEGF Index) | December 31, 1998 – March 31, 2019 |
| | MSCI EM Emerging Markets IMI Net Index (MIMUEMRN Index) | December 29, 1995 – December 31, 1998 |
| Global | MSCI ACWI Net Total Return Index (NDUEACWF Index) | December 31, 1998 – March 31, 2019 |
| | MSCI ACWI IMI Net Total Return Index (MIMUAWON Index) | December 29, 1995 – December 31, 1998 |

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