

**MONTREAL EXCHANGE**

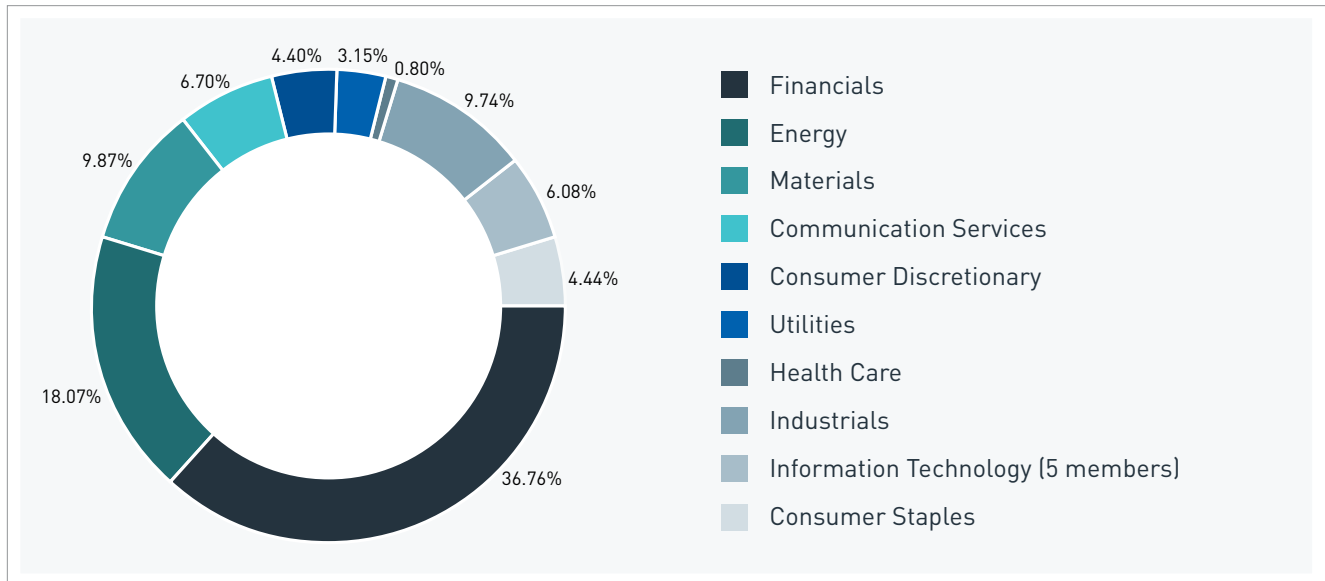
# **Using Options to Hedge Sectoral Risk**



## Introduction

For historical reasons and due to its size and population, the Canadian economy is one of the most concentrated of the G7 countries. As a result, S&P/TSX60, the TSX flagship index, is heavily tilted toward a few industries. This concentration (presented in Chart 1) can be a cause for concern among investors who are uncomfortable with a portfolio that is overweighted in three sectors (i.e. Financials, Energy, Materials)

**Chart 1: Breakdown of S&P/TSX60 Sector Weights**



Source: TMX

In fact, 20 companies in just two sectors, Financials and Energy, represent almost 55% of the index's entire market capitalization.

Given this concentration, sophisticated investors might want to seek to reduce their sectoral exposure through the use of derivative instruments.

To illustrate this challenge, we present S&P/TSX60 returns and the returns of its component sectors in the last 5 years. It becomes clear that most of the S&P/TSX60 return is driven by the Energy and Financials sectors.

In the conclusion, we construct a hedging scheme using options to have a synthetic exposure to the sectors and examine the improved results.

### Take-away highlights

- Historically, S&P/TSX60 sectors weights are tilted towards a few sectors.
- Partially (or fully) hedging the main sectors can optimize the return of a portfolio tracking the S&P/TSX60 returns.
- Options are an effective tool for replicating sectoral exposure.
- A synthetic short index position can be achieved by buying a put option and selling a call option.
- Options provide more flexibility than a security lending desk service.

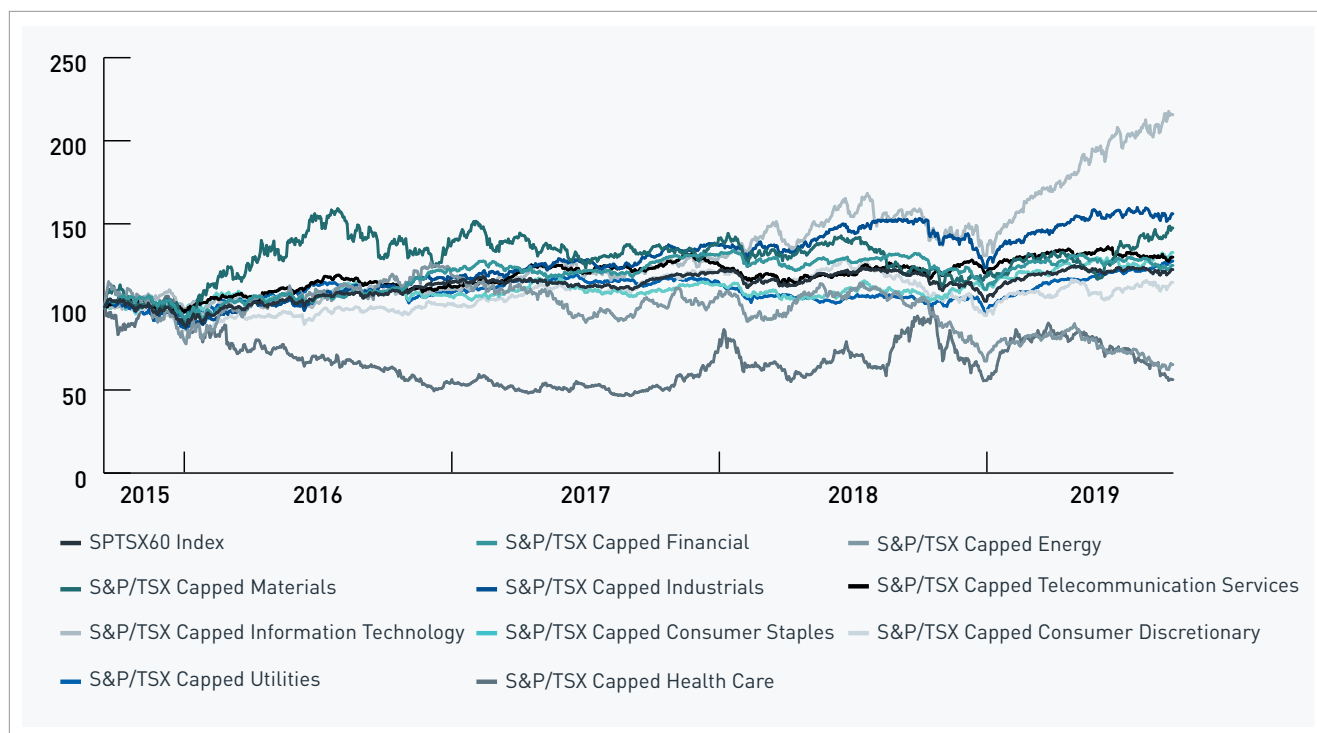
## Historical Returns

Over the last 5 years, the S&P/TSX60 has provided steady and consistent returns to investors who decided to track the index's return.

With a Sharpe ratio of close to 2 and a cumulative return in excess of 20%, the index has delivered significant results throughout the years.

However, an attentive investor will not be surprised by Chart 2, which illustrates a more complex history.

**Chart 2: S&P/TSX60 vs. Sectoral Indices Evolution (2015 = 100)**



Source: TMX

As a matter of fact, the 10 sectors comprised in the index presented large variations in performance, with some posting a return of more than 100% while others falling 50% over the same period.

Table 1 presents correlations between the return of S&P/TSX60 and the returns of its component sectors.

**Table 1: Index and sector correlation**

	SPTSX60 Index
S&P/TSX Capped Financial	0.86
S&P/TSX Capped Energy	0.72
S&P/TSX Capped Materials	0.41
S&P/TSX Capped Industrials	0.77
S&P/TSX Capped Telecommunication Services	0.47
S&P/TSX Capped Information Technology	0.53
S&P/TSX Capped Consumer Staples	0.48

S&P/TSX Capped Consumer Discretionary	0.67
S&P/TSX Capped Utilities	0.48
S&P/TSX Capped Health Care	0.31

Source: TMX

Not surprisingly, S&P/TSX60 returns are highly correlated with the Financials and Energy sectors. It can be observed that the Capped Industrial sector is more correlated with the Index than Energy sector. However, due to its lower weight, we concentrate the analysis on the Financial and Energy sectors.

We performed a multivariable linear regression using the return of S&P/TSX Capped Financial and S&P/TSX Capped Energy as the explanatory variables and S&P/TSX60 returns as the dependent variable. We found an adjusted R<sup>2</sup> of more than 80%, highlighting the dependency of S&P/TSX60 returns on these two sectors.

These findings underscore the need to manage the risk inherent to this over concentration.

Table 2 ranks the returns of each sector during the period from 2015 to 2019.

**Table 2: Ranked Annual Sectoral Returns (2015 to 2019)**

2015-2016	2016-2017	2017-2018	2018-2019
S&P/TSX Capped Materials <b>39.71%</b>	S&P/TSX Capped Industrials <b>17.87%</b>	S&P/TSX Capped Health Care <b>73.41%</b>	S&P/TSX Capped Information Technology <b>33.55%</b>
S&P/TSX Capped Telecommunication Services <b>14.92%</b>	S&P/TSX Capped Consumer Discretionary <b>17.39%</b>	S&P/TSX Capped Information Technology 20.93%	S&P/TSX Capped Utilities <b>26%</b>
S&P/TSX Capped Energy <b>12.94%</b>	S&P/TSX Capped Financial <b>15.91%</b>	S&P/TSX Capped Industrials <b>14.93%</b>	S&P/TSX Capped Consumer Staples <b>22.46%</b>
S&P/TSX Capped Information Technology <b>11.56%</b>	S&P/TSX Capped Information Technology <b>12.92%</b>	S&P/TSX Capped Financial <b>2.54%</b>	S&P/TSX Capped Materials <b>11.04%</b>
S&P/TSX Capped Industrials <b>11.5%</b>	SPTSX60 Index <b>7.73%</b>	SPTSX60 Index <b>2.29%</b>	S&P/TSX Capped Telecommunication Services <b>7.77%</b>
S&P/TSX Capped Utilities <b>10.19%</b>	S&P/TSX Capped Telecommunication Services <b>7.11%</b>	S&P/TSX Capped Energy <b>-0.11%</b>	SPTSX60 Index <b>3.18%</b>
S&P/TSX Capped Consumer Staples <b>8.95%</b>	S&P/TSX Capped Utilities <b>3.05%</b>	S&P/TSX Capped Consumer Staples <b>-1.38%</b>	S&P/TSX Capped Financial <b>1.22%</b>
S&P/TSX Capped Financial <b>8.82%</b>	S&P/TSX Capped Consumer Staples <b>0.25%</b>	S&P/TSX Capped Telecommunication Services <b>-1.83%</b>	S&P/TSX Capped Consumer Discretionary <b>0.6%</b>
SPTSX60 Index <b>8.04%</b>	S&P/TSX Capped Materials <b>-4.69%</b>	S&P/TSX Capped Consumer Discretionary <b>-4.87%</b>	S&P/TSX Capped Industrials <b>-1%</b>
S&P/TSX Capped Consumer Discretionary <b>-0.32%</b>	S&P/TSX Capped Energy <b>-8.02%</b>	S&P/TSCapped Materials <b>-7.6%</b>	S&P/TSX Capped Energy <b>-34.23%</b>
S&P/TSX Capped Health Care <b>-36.69%</b>	S&P/TSX Capped Health Care <b>-18.78%</b>	S&P/TSX Capped Utilities <b>-8.55%</b>	S&P/TSX Capped Health Care <b>-45.25%</b>

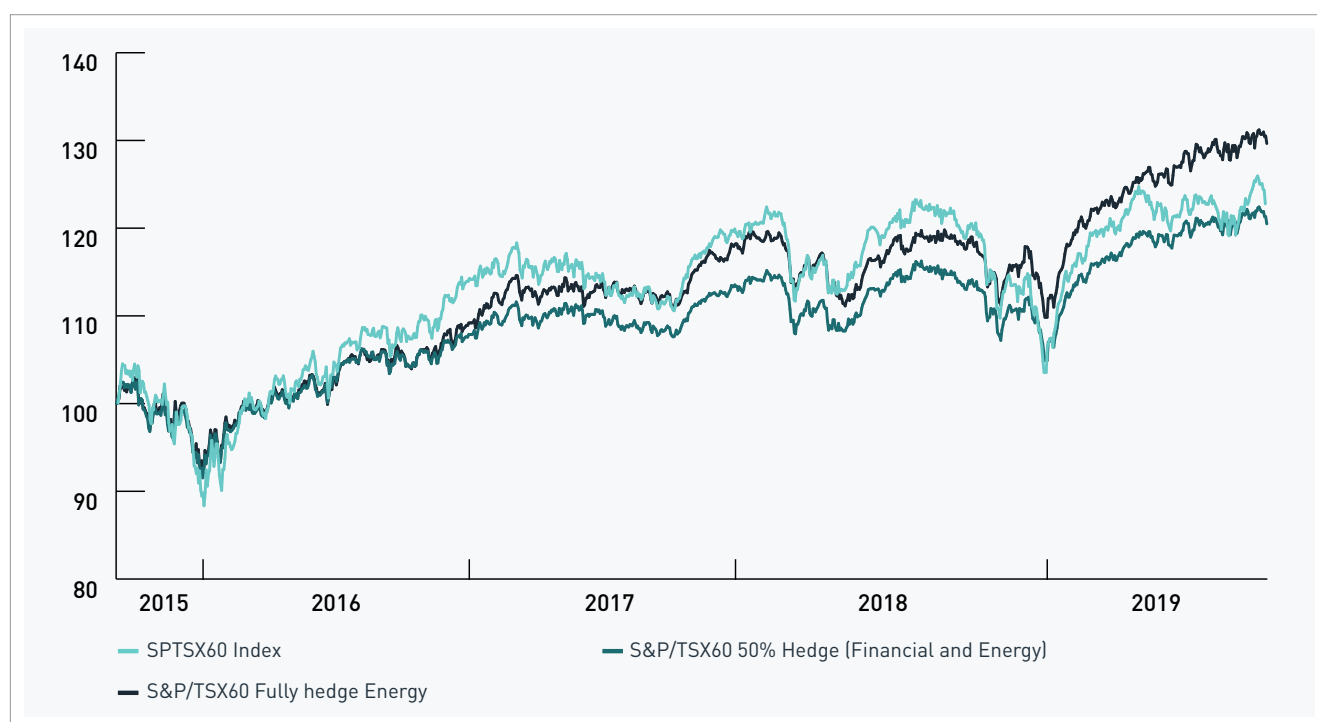
Source: TMX

With the exception of 2016-2017, the Financials sector never ranked in the top 3 highest performing sectors. More problematically, the Energy sector, representing 18% of the total index weight, finished 2 out of the 4 periods among the bottom three sectors.

## Hedging sector risk

Having confirmed the risk inherent to the over concentration in two sectors, we explore how (partially) hedging this sectoral risks can improve the Sharpe ratio of the investor's portfolio.

**Chart 3: S&P/TSX60 vs. Hedged Portfolios (2015 = 100)**



Source: TMX

To analyze a partial hedge solution, we examine two portfolios: one hedges 50% of the weight exposure to the Financials and Energy sectors. The other only hedges the Energy sector risk.

Table 3 presents the results of this hedging exercise.

**Table 3: S&P/TSX60 Results vs. Hedged Portfolios**

	S&P/TSX60	Partial hedge (50% Financials and 50% Energy)	S&P/TSX60 fully hedged Energy
Return on the period	22.8%	20.5%	29.6%
Volatility on the period	10.5%	7.3%	7.8%
Sharpe ratio	2.18	2.80	3.79
Max daily loss	-2.45%	-2.06%	-2.37%
Correlation with Financials sector	0.86	0.79	0.84
Correlation with Energy sector	0.72	0.57	0.37

Source: TMX

The main finding of this exercise is how both hedging schemes significantly increase the portfolio's Sharpe ratio (28% and 73% respectively). This should not come as a surprise, given the challenges that the Energy sector has faced in recent years. By partially (or fully) hedging the sector's risk, investors can achieve a better risk/return relationship, optimizing their investments.

## Implementing the Hedge

Having established that partially (or fully) hedging some of a sector's risk can deliver optimized results, let us examine how to implement the hedge.

An index is a theoretical basket of stocks that is itself not directly tradable. In order to hedge an index return, the first step is to identify a tradable instrument that can serve as a proxy for the results of this index.

iShares S&P/TSX Capped Financials Index ETF ("XFN") and iShares S&P/TSX Capped Energy Index ETF("XEG") are two ETFs that offer exposure to the two sectors that we need to hedge.

Because we want to offset the returns of each of these indices, we need to have short positions on the ETFs. To go short on an ETF, an investor needs to access the service of a security lending desk, exposing herself to variations in the security's borrowing rates throughout the duration of her position. A simple alternative way to achieve the same exposure is to create a synthetic position using options.

The main reason why an investor would choose to use a synthetic position is related to the flexibility to increase and decrease her short exposure without needing to borrow the security first. Investors who need to increase or decrease their hedge, if using a short security strategy, always incur the risk that they will not find the ETF units that they need to borrow. Thanks to the market making program in place in the Canadian option market, investors can easily find a two-way market to decrease (increase) their synthetic position using the options market.

Finally, in contrast with a short stock position, the holder of an equivalent synthetic short position is not obliged to pay dividends if the company declares one and is not exposed to the risk of having his stocks being called back by the lending desk.

## Example of a synthetic position using options and futures

Having established the advantages of using options to hedge a portfolio's risk, we will now present a step-by-step example illustrating the hedge mechanism.

Let us assume that an investor has a total of \$200,000.00 to invest on October 16 and the investment needs to track the return of the S&P/TSX60, but the investor wants to reduce her exposure to the Financials and Energy sectors throughout the following month into November.

First, she decides to buy one S&P/TSX 60 Index Standard Futures (SXF) contract, providing an exposure of approximately \$195,000.00.<sup>1</sup>

Alternatively, an investor that does not have access to the future market can gain exposure to the S&P/TSX60 index by buying an ETF such as the iShares S&P/TSX 60 ("XIU").

<sup>1</sup> On October 16, 2019, SXF was trading at 982.3 and, given its 200x multiplier, the notional of one contract is equal to \$196,460.00.

<sup>2</sup> On October 16, 2019.

<sup>3</sup> One option contract is equal of \$3,927 notional, so in order to hedge \$72,000.00 of risk, an investor needs to buy/sell approximately 18 contracts (i.e. \$72,000/\$3,927).

With XFN and XEG are trading at \$39.27 and \$8.14,<sup>2</sup> respectively, and given the sectoral weightings in the S&P/TSX60 of 36% (Financials) and 18% (Energy), the investor who wants to fully hedge both sectors needs to offset exposures of \$72,000.00 and \$36,000.00, respectively.

To hedge the Financials sector risk, the investor buys 18 at-the-money (ATM) put contracts expiring November 15 and sells 18 ATM call contracts with the same expiration.<sup>3</sup> To hedge the Energy sector risk, following the same logic, our investor needs to buy 44 ATM put contracts and sell 44 ATM call contracts, also expiring November 15.<sup>4</sup>

Table 4 breaks down the desired position (i.e. an S&P/TSX 60 hedged exposure) as of October 16, 2019:

**Table 4: Hedging Instruments**

Instrument	Notional Exposure	Number of Contracts	Initial Cash Flow
S&P/TSX 60 Index Standard Futures	\$195,000.00	1	0
XFN 191115C39.25	\$72,000.00	(18)	\$846
XFN 191115P39.25	\$72,000.00	18	-\$1,026
XEG 191115C8.25	\$36,000.00	(44)	\$748
XEG 191115P8.25	\$36,000.00	44	-\$1,408

Source: MX

Hence, our investor could achieve her goals with a total cash outflow (before transaction costs) of \$840.00.

## Historical results on full and partial sectoral hedges

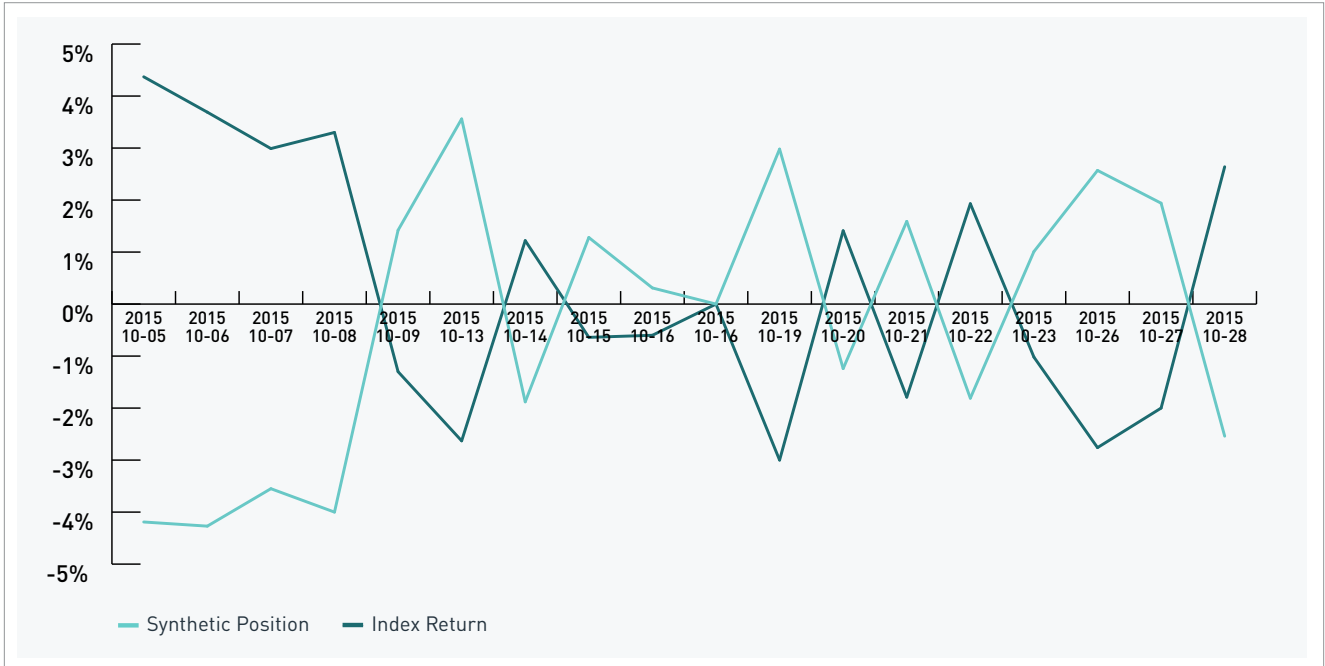
For the option strategy to be effective, its return has to offset the returns on the sectoral indices as precisely as possible.

Chart 4 gives a snapshot of how the option strategies deliver the inverse of the sector return, hence effectively offsetting the sectoral exposure.

To conclude, Charts 5 and 6 compare the results of using synthetic positions as proxies for the sectoral exposure hedge vs. the theoretical hedge achieved using the sectoral indices. As expected, the results are in line with the ones presented in Chart 3 and Table 3, supporting the validity of our strategy to use options as hedging instruments.

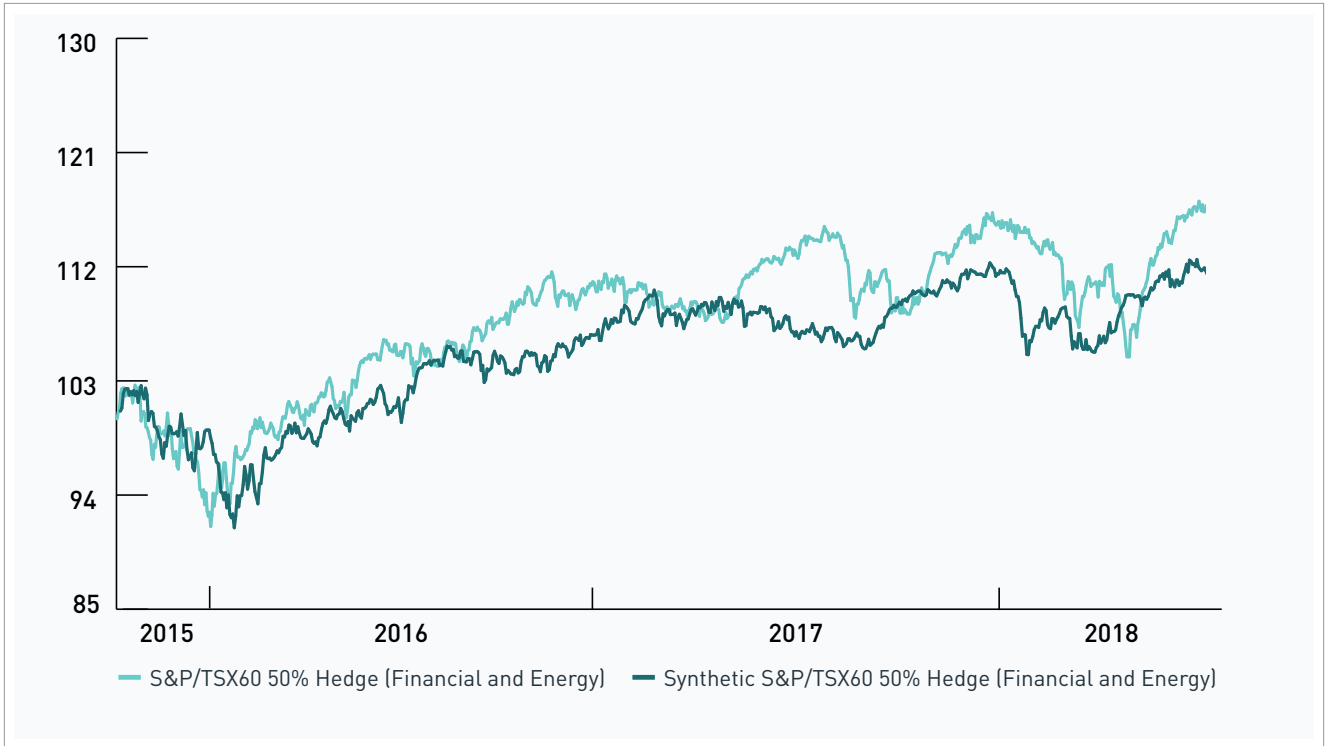
<sup>4</sup> One option contract is equal of \$814 notional, so in order to hedge \$36,000.00 of risk, an investor needs to buy/sell approximately 44 contracts (i.e. \$36,000/\$814).

**Chart 4: S&P/TSX Capped Energy Index Return vs. Synthetic Position Return**



Source: MX

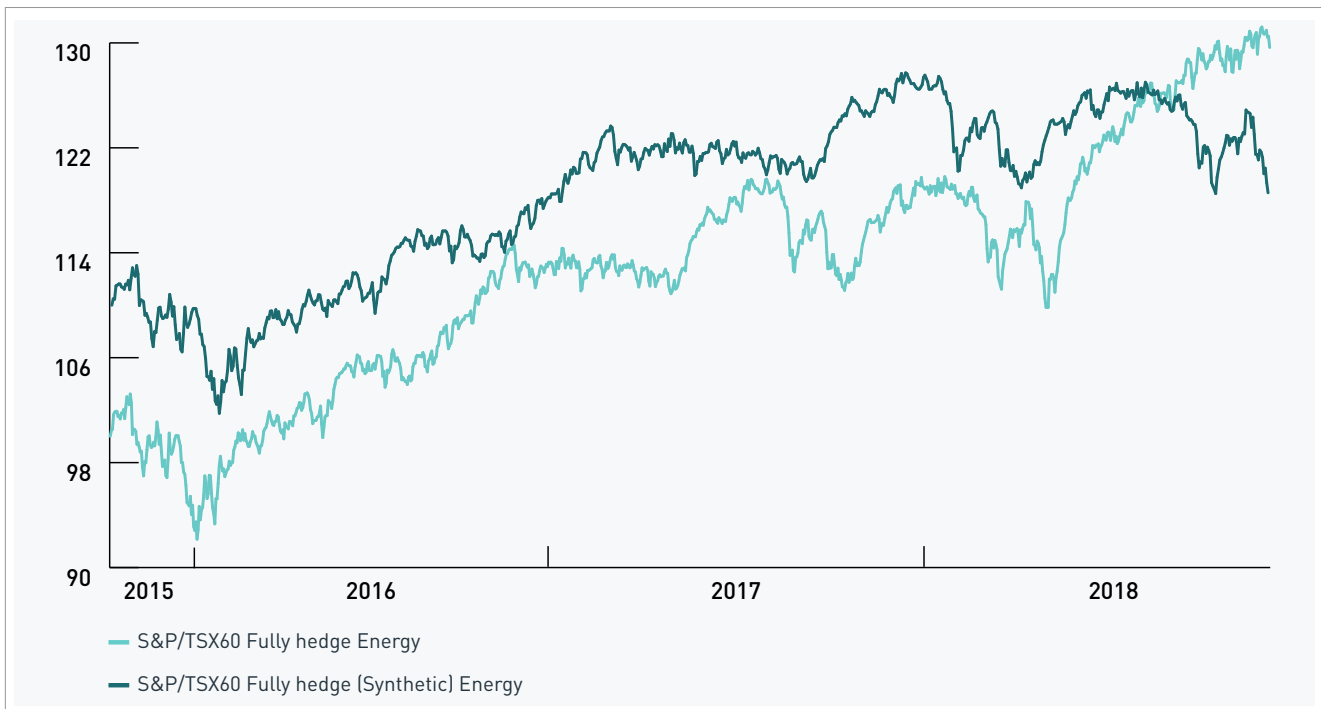
**Chart 5: Theoretical Hedge VS the Synthetic Sectoral Hedge (50% Financials / 50% Energy)**



Source: MX



**Chart 6: Theoretical Hedge VS the Synthetic Sectoral Hedge (Full Energy Hedge)**



Source: MX

## Conclusion

Listed derivative instruments (i.e. options and futures) are powerful tools for investors interested in changing the risk profiles of their portfolios. As presented in this article, they can be used to optimize a portfolio in a way that would be impossible or more difficult to achieve without them. Investors in need of hedging schemes have a variety of solutions at their disposal thanks to the flexibility provided by MX's instruments.

The Montréal Exchange is the Canadian marketplace for investors who want to better control and shape the distribution of their portfolio's risk. Given the versatility of options, investors can easily improve the risk profile of their portfolios using transparent and liquid market.

## For more information

[equityderivatives@tmx.com](mailto:equityderivatives@tmx.com)

**m-x.ca**

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