TWO SIGMA

Street View

FEBRUARY 2018

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EXECUTIVE SUMMARY The market-adjusted performance of an index of companies directly exposed to NAFTA negotiations is down more than 12 percent since the end of 2016. The analysis shows that, over the past year, a 10% decrease in this index has corresponded with a significant decline of 7.7% in the USD/MXN exchange rate.

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Inside:
Gauging the Market Impact of NAFTA Negotiations

Recent market volatility has been a reminder to market participants that complacency can be hazardous. Risk can rear its ugly head at any moment—and seemingly come from anywhere. Among the most frequently cited sources underlying recent market ructions have been the potential return of inflation and rising interest rates amid prospective monetary tightening and fiscal easing.

Recent issues of Street View have explored ways to identify and quantify not only inflation, but additional sources of potential risk, as well, including policy-related uncertainty and other "unconventional" risks like geopolitical uncertainty. Against this background, it's worth examining still another source of risk, one that's primed to elicit greater attention in the coming weeks: trade—specifically as it pertains to NAFTA negotiations.

For months, the US, Canada, and Mexico have been working to update the landmark 1994 trade agreement along a variety of different dimensions. With both Mexico and Canada opposed to some of the US's key demands (and vice versa), the talks have not gone smoothly. Trade representatives have extended the negotiating timeframe twice already, with the next round of negotiations slated to take place from February 26 to March 6.

While it's impossible to predict either the talks' short-term or final outcomes, a broad re-writing of trilateral terms of trade appears likely, and a breakup of NAFTA, though perhaps less probable, is certainly a possibility. At the very least, further uncertainty seems a given.

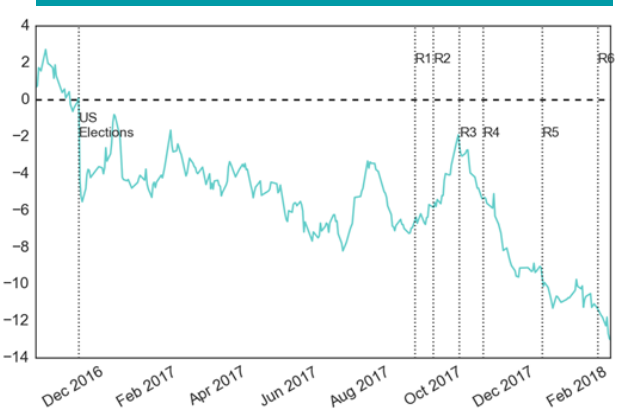
WHAT DO FINANCIAL MARKETS TELL US ABOUT THE STATE OF NAFTA TALKS?

Financial markets have taken notice of the challenges negotiators face making headway toward a deal that would benefit all sides. As Figure 1 shows, an index[1] of shares of predominantly North American companies with relatively high exposure to NAFTA (adjusted for the performance of the S&P 500 Index)[2] has been declining dramatically as renegotiation talks have dragged on. For the moment, at least, financial markets appear to be taking a dim view of the ultimate effects of a NAFTA 2.0.

Although the companies in the index add up to only about 5% of the overall size of the S&P 500, their combined market capitalization is still roughly $1.2 trillion, with high concentrations of consumer staples, consumer discretionary, industrial, and materials firms.

Regressing the performance of this index since October 2016 against that of local and global financial variables shows a pronounced, contemporaneous correlation mainly with currencies (Table 1). Indeed, the epicenter of uncertainty surrounding NAFTA negotiations appears to be the USD/MXN exchange rate. Since October 2016, a 10% decline in the index has corresponded with a 7.7% and 2.5% drop in the value of the peso and Canadian dollar versus the US dollar, respectively.

FIGURE 1 - Cumulative return (adjusted by SP500) of companies exposed to NAFTA negotiations (in %).



Note: "R" stands for "Round of negotiation." Source: Bloomberg.

1 The index, the Morgan Stanley NAFTA basket (MSXXNFTA Index) aims to "help capture headline risk and should underperform in the event of NAFTA withdrawal. Has exposure to autos, ag, beverages, transportation, and lumber - all key trade industries across North America." (Source: Bloomberg)
2 Given the composition of the NAFTA basket (25 US, 7 Mexican, and 8 Canadian companies), the S&P500 explains a large variability of the index (R-squared of 73.6%), thus controlling for additional factors, such as inflation and/or monetary policy, potentially affecting (directly or indirectly) the performance of the index.

TABLE 1 - Regressions' loadings of each financial variable on the NAFTA index (adjusted by S&P 500).

Variable	**Coefficient**	R^2(%)
USDMXN	-0.77***	19.6
USDCAD	-0.25***	7.6
VIX	1.19	0.7
Euro Stoxx 50	0.12	0.8
Canada	-0.06	0.2
Mexico	-0.14	0.6
WTI	0.59***	3.6
Gold	0.02	0.0
CADMXN	-0.52*	10.1

Note: The constant is included but not reported. See Appendix for variable description. Levels of significance: 1%***, 5%**, 10%*

ECONOMIC RISKS GREATEST FOR CANADA AND MEXICO

The simple analysis in Table 1 suggests that the market impacts surrounding the NAFTA agreement are mostly confined to the three North American economies—for now, at least (the Euro Stoxx 50 Index of Eurozone-domiciled companies, for example, shows very little correlation).[3] Additionally, the NAFTA negotiations seem to affect the performance of WTI crude prices, as shown by the positive loading. Indeed, as reported by MIT's Observatory of Economic Complexity[4] , Mexico and Canada export about 48 and 98% of their internal production of crude petroleum to the United States.

POTENTIAL IMPLICATIONS FOR INVESTORS

Recent weeks have demonstrated how quickly sanguine financial markets can turn unstable. And while inflation, monetary policy, and fiscal policy have been dominating headlines, allocators and other market participants should not ignore other, less frequently noted sources of uncertainty, including trade.

Appendix: Variable Description

Variable	**Description**	**Bloomberg Ticker**
NAFTA Index	NAFTA-exposed stocks	MSXXNFTA Index
USDMXN	USD versus Mexican Pesos	USDMXN Curncy
USDCAD	USD versus Canadian dollar	USDCAD Curncy
VIX	Volatility Index	VIX Index
Eurostoxx	European stock market	SX5E Index
Canada	Canadian stock market in USD	SPTSX Index
Mexico	Mexican stock market in USD	MEXBOL Index
WTI	Crude Oil Index	CL1 Comdty
Gold	Gold Index	XAU Comdty
CADMXN	Implied Canadian dollar versus Mexican Pesos	Author's computation

3 Canadian and Mexican stock markets are in USD.
4 Source: www.atlas.media.mit.edu.

INTERESTING TECHNOLOGY-RELATED ARTICLES

Two Sigma views itself as a technology company that applies a rigorous, scientific method-based approach to investment management. Our technology is inspired by a diverse set of fields including artificial intelligence and distributed computing. Occasionally, we read articles in the popular press that describe applications of technology that we find interesting, thought-provoking, and relevant for people thinking about improving the investment management process. Below is a subset of the articles we read this month. Please do not view the inclusion of these articles as an endorsement by Two Sigma of their viewpoints or the companies discussed therein. Two Sigma welcomes discussions (and contributions) about these and other such technology-related articles.

"Deep Learning Neural Network Used to Detect Earthquakes " by Bob Yirka, Tech Xplore

https://techxplore.com/news/2018-02-deep-neural-network-earthquakes.html

Researchers from Harvard and MIT have developed a way to use neural networks to detect earthquakes more accurately than previous methods could. The researchers trained a deep learning algorithm on historical seismograph data, with the result being a 17x improvement in detection accuracy. While the neural network isn't designed to predict earthquakes, the improved ability to identify them contemporaneously could result in faster, more accurate civil notification systems.

"Neural Networks Everywhere: New chip reduces neural networks' power consumption by up to 95 percent, making them practical for battery-powered devices." by Larry Hardesty

http://news.mit.edu/2018/chip-neural-networks-battery-powered-devices-0214

Machine learning algorithms can be extremely computationally intensive, which makes them difficult to implement on small devices, such as smartphones. To help address this limitation, researchers at MIT have developed a new type of microchip that delivers a 3-7x speed improvement over its predecessors, while using roughly 95% less power. By reducing the number of times data has to be passed back and forth between memory and a chip's processor, the researchers were able to implement neural networks much more efficiently, without sacrificing much accuracy. The discovery could help pave the way toward more complex computational operations on small devices.

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