

## Oil Price Declines Could Hurt U.S. Financial Markets: The Role of Oil Price Level

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### Online Appendix

#### Appendix A

Table A1: 27 event days from 1/1/2011 to 11/13/2014

Date	Description	Expected Effect	Actual Effect
<b>10/23/14</b>	Crude oil prices sprint higher as Saudi Arabia is said to have cut supply last month, according to a source familiar with the country's oil policy. <a href="http://www.bloomberg.com/news/articles/2014-10-23/saudi-arabia-said-to-cut-crude-oil-supply-to-market-in-september">http://www.bloomberg.com/news/articles/2014-10-23/saudi-arabia-said-to-cut-crude-oil-supply-to-market-in-september</a>	+	2.80%
<b>6/12/14</b>	Islamist militant made rapid gains across northern Iraq on Wednesday and Kurdish forces on Thursday took control some parts of Kirkuk <a href="http://www.wsj.com/articles/oil-prices-surge-after-militants-seize-iraqi-cities-1402572871">http://www.wsj.com/articles/oil-prices-surge-after-militants-seize-iraqi-cities-1402572871</a>	+	2.03%
<b>10/10/2013</b>	A group of former rebels aligned with the Libya's interior ministry has seized Libyan Prime Minister Ali Zaidan and taken him to an unknown destination. <a href="https://www.bloomberg.com/news/articles/2013-10-10/libyan-pm-taken-from-hotel-by-revolutionary-group">https://www.bloomberg.com/news/articles/2013-10-10/libyan-pm-taken-from-hotel-by-revolutionary-group</a>	+	1.42%
<b>8/27/2013</b>	Possible missile strikes on Syria aimed at sending message <a href="http://msnbcvvd.nbcnews.com/news/2013/08/27/20209022-military-strikes-on-syria-as-early-as-thursday-us-officials-say">http://msnbcvvd.nbcnews.com/news/2013/08/27/20209022-military-strikes-on-syria-as-early-as-thursday-us-officials-say</a>	+	3.01%
<b>7/5/2013</b>	Supporters of ousted President Morsi continue to call his removal invalid and vow continued protests until he is reinstalled. <a href="http://online.wsj.com/article/SB10001424127887323899704578587131736732940.html?mod=wsj_share_tweet">http://online.wsj.com/article/SB10001424127887323899704578587131736732940.html?mod=wsj_share_tweet</a>	+	1.14%
<b>7/3/2013</b>	Crowds in Cairo are alarming and partly responsible for WTI crude pushing past \$100/bbl, but Liam Denning reminds that Egypt is a net oil importer, and Suez Canal oil transit totals just 0.1% of global demand. <a href="http://online.wsj.com/article/SB10001424127887324260204578583723667583486.html">http://online.wsj.com/article/SB10001424127887324260204578583723667583486.html</a>	+	2.25%

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<b>7/1/2013</b>	Unrest in Egypt is helping add to anxiety in the oil markets (USO +1.4%), but it is not likely to significantly lift oil prices that already have been elevated for months due to Middle East turmoil, says the head of Middle East research for IHS CERA. <a href="http://www.cbsnews.com/8301-202_162-57591775/egypt-military-gives-president-morsi-48-hours-to-reach-agreement-with-opposition-or-face-political-transition/">http://www.cbsnews.com/8301-202_162-57591775/egypt-military-gives-president-morsi-48-hours-to-reach-agreement-with-opposition-or-face-political-transition/</a>	+	1.63%
<b>1/17/2013</b>	Islamic militants taken Algerian gas pumping station As many as 20 hostages, including several Americans, reportedly have escaped their captors at an Algerian gas pumping station taken over by Islamic militants. <a href="http://www.nydailynews.com/news/world/hostages-daring-escape-islamic-militants-algerian-gas-plant-article-1.1241698">http://www.nydailynews.com/news/world/hostages-daring-escape-islamic-militants-algerian-gas-plant-article-1.1241698</a>	+	1.28%
<b>11/9/2012</b>	Tension between Iran and U.S. escalates News that Iranian warplanes fired on an unmanned U.S. drone in international airspace is a reminder of how quickly underlying tensions could turn into conflict. <a href="http://online.wsj.com/article/SB10001424127887324439804578107191429662874.html">http://online.wsj.com/article/SB10001424127887324439804578107191429662874.html</a>	+	1.18%
<b>10/9/2012</b>	West Texas crude pushes past \$90/bbl. on rising tension between Turkey and Syria, as yesterday's pipeline blast raises concerns about supply disruptions. <a href="http://www.balkans.com/open-news.php?uniquenumber=159149">http://www.balkans.com/open-news.php?uniquenumber=159149</a>	+	3.29%
<b>7/19/2012</b>	Tensions across the Middle East are as good an excuse as any, with Israeli authorities blaming Iran for the deadly bombing of a tour bus in Bulgaria. <a href="http://www.marketwatch.com/story/oil-rallies-to-end-at-best-since-mid-may-2012-07-19?siteid=bnbh">http://www.marketwatch.com/story/oil-rallies-to-end-at-best-since-mid-may-2012-07-19?siteid=bnbh</a>	+	3.18%
<b>7/9/2012</b>	Statoil (STO) says it is preparing to shut down production on the Norwegian continental shelf at midnight after strike negotiations broke down Sunday. <a href="http://online.wsj.com/article/BT-CO-20120709-703493.html">http://online.wsj.com/article/BT-CO-20120709-703493.html</a>	+	1.83%
<b>7/3/2012</b>	Iran claims it successfully test-fired missiles capable of hitting Israel. <a href="http://www.reuters.com/article/2012/07/03/us-iran-nuclear-missiles-idUSBRE8620HF20120703">http://www.reuters.com/article/2012/07/03/us-iran-nuclear-missiles-idUSBRE8620HF20120703</a>	+	4.69%
<b>6/11/2012</b>	Crude slides another dollar near a weekly low (now -2.6% to \$82) as Saudi Arabia's oil minister hints at higher production as he arrives for OPEC meetings. <a href="http://www.forexlive.com/blog/2012/06/11/oil-nears-one-week-low-as-saudis-hint-at-more-supply/">http://www.forexlive.com/blog/2012/06/11/oil-nears-one-week-low-as-saudis-hint-at-more-supply/</a>	-	-1.80%
<b>5/4/2012</b>	The UAE completes and expects to have operational within 90 days a pipeline which will allow it to bypass the Strait of Hormuz for its oil exports. <a href="http://www.bi-me.com/main.php?id=57676&amp;t=1&amp;c=34&amp;cg=4&amp;mset=1011">http://www.bi-me.com/main.php?id=57676&amp;t=1&amp;c=34&amp;cg=4&amp;mset=1011</a>	-	-4.05%

<b>3/20/2012</b>	Apparently trying to do its part to keep oil prices in check, Saudi Arabia has hired 11 large tankers to send to U.S.-based refiners this month. <a href="http://im.media.ft.com/content/images/16220aa4-71f6-11e1-8497-00144feab49a.img">http://im.media.ft.com/content/images/16220aa4-71f6-11e1-8497-00144feab49a.img</a>	-	-2.25%
<b>3/6/2012</b>	Six world powers, including the U.S., are prepared to resume talks with Iran about its nuclear program in what could be a final attempt to reach a deal that will avoid military action by Israel or the U.S. <a href="http://www.ft.com/intl/cms/s/0/d1bc9f78-678c-11e1-b6a1-00144feabdc0.html">http://www.ft.com/intl/cms/s/0/d1bc9f78-678c-11e1-b6a1-00144feabdc0.html</a>	-	-1.88%
<b>3/2/2012</b>	Crude oil continues to retreat, down nearly \$4/barrel from yesterday's spike following the (apparent) hoax of an attack and explosion at a Saudi pipeline. <a href="https://www.bloomberg.com/news/articles/2012-03-02/oil-trades-near-one-week-high-on-economic-recovery-middle-east-tension">https://www.bloomberg.com/news/articles/2012-03-02/oil-trades-near-one-week-high-on-economic-recovery-middle-east-tension</a>	-	-1.93%
<b>3/1/2012</b>	Already up on the day, crude oil flies higher on a report of an attack and explosion on a Saudi pipeline. <a href="http://www.thearabdigest.com/2012/03/saudi-arabias-eastern-revolution.html">http://www.thearabdigest.com/2012/03/saudi-arabias-eastern-revolution.html</a>	+	1.56%
<b>1/23/2012</b>	Oil prices show mild gains off of a more specific proclamation from Iran that it will "definitely" close the Strait of Hormuz if the EU embargo disrupts exports. <a href="https://twitter.com/#!/BreakingNews/status/161417225444667392">https://twitter.com/#!/BreakingNews/status/161417225444667392</a>	+	1.34%
<b>12/13/2011</b>	Crude oil spikes \$2 in minutes to \$100.45/barrel on a report Iran has closed the Strait of Hormuz "until further notice," for a military exercise. <a href="http://www.tehrantimes.com/politics/93462-iran-to-hold-war-game-to-close-strait-of-hormuz-mp">http://www.tehrantimes.com/politics/93462-iran-to-hold-war-game-to-close-strait-of-hormuz-mp</a>	+	2.49%
<b>6/8/2011</b>	Oil skies as OPEC talks break down with no agreement to increase production. Saudi Oil Minister Naimi says it's the worst OPEC meeting he's ever attended. <a href="http://blogs.wsj.com/marketbeat/2011/06/08/opec-keeps-oil-production-unchanged/">http://blogs.wsj.com/marketbeat/2011/06/08/opec-keeps-oil-production-unchanged/</a>	+	1.59%
<b>3/27/2011</b>	After seizing several key oil production towns, Libyan rebels would like to resume crude exports within a week. <a href="http://www.nytimes.com/2011/03/29/business/global/29oil.html?smid=tw-nytimesbusiness&amp;seid=auto">http://www.nytimes.com/2011/03/29/business/global/29oil.html?smid=tw-nytimesbusiness&amp;seid=auto</a>	-	-1.30%
<b>3/22/2011</b>	Steve Levine reports that Yemen, a minor producer of crude, may still influence the price because its porous northern border with Saudi Arabia could allow a flood of (armed) refugees into the Kingdom. <a href="http://oilandglory.foreignpolicy.com/posts/2011/03/21/back_to_saudis_fault_lines">http://oilandglory.foreignpolicy.com/posts/2011/03/21/back_to_saudis_fault_lines</a>	+	2.10%
<b>3/21/2011</b>	Coalition forces launch a 2nd wave of air strikes, furthering weakening and isolating Gaddafi's forces near Benghazi. <a href="http://www.cnn.com/id/42187153">http://www.cnn.com/id/42187153</a>	+	1.28%

<b>3/17/2011</b>	Rising Middle East tension, talk of U.S. military intervention in Libya, and hope Japan is coming under control all contribute. <a href="http://www.guardian.co.uk/world/2011/mar/17/libya-air-strikes-urged-us-un">http://www.guardian.co.uk/world/2011/mar/17/libya-air-strikes-urged-us-un</a>	+	3.49%
<b>2/22/2011</b>	The Libyan unrest lights a fire under already happy oil and precious metals. <a href="https://seekingalpha.com/news/69184">https://seekingalpha.com/news/69184</a>	+	8.58%

Table A2: 21 Event dates from 11/14/2014 – 10/11/2016

<b>Date</b>	<b>Description</b>	<b>Expected Effect</b>	<b>Actual Effect</b>
<b>10/10/16</b>	Crude oil rallies as Putin says Russia is ready to join production deal <a href="https://www.bloomberg.com/news/articles/2016-10-10/putin-says-russia-ready-to-freeze-or-even-cut-output-with-opec">https://www.bloomberg.com/news/articles/2016-10-10/putin-says-russia-ready-to-freeze-or-even-cut-output-with-opec</a>	+	2.48% <sup>4</sup>
<b>9/28/16</b>	OPEC reportedly agrees to first production cut in 8 years <a href="http://www.bloomberg.com/news/articles/2016-09-28/opec-said-to-agree-on-first-oil-output-cut-in-eight-years">http://www.bloomberg.com/news/articles/2016-09-28/opec-said-to-agree-on-first-oil-output-cut-in-eight-years</a>	+	5.27%
<b>9/21/16</b>	Norway oil workers go on strike, helping send crude prices higher <a href="http://www.reuters.com/article/norway-oil-strike-idUSL8N1BX09O">http://www.reuters.com/article/norway-oil-strike-idUSL8N1BX09O</a>	+	3.32%
<b>9/5/16</b>	Big move in Oil on Saudi-Russia cooperation <a href="http://www.cnn.com/2016/09/05/saudi-arabia-russia-to-call-for-oil-market-cooperation-report.html">http://www.cnn.com/2016/09/05/saudi-arabia-russia-to-call-for-oil-market-cooperation-report.html</a>	+	1.03%
<b>8/23/16</b>	Reuters: Iran signals more willingness for joint action to boost oil price <a href="http://www.reuters.com/article/us-opec-freeze-idUSKCN10Y1MM">http://www.reuters.com/article/us-opec-freeze-idUSKCN10Y1MM</a>	+	1.57%
<b>8/15/16</b>	Crude oil continues three-day rally on potential OPEC action <a href="http://www.marketwatch.com/story/oil-futures-rally-on-fresh-hopes-for-a-production-freeze-2016-08-15">http://www.marketwatch.com/story/oil-futures-rally-on-fresh-hopes-for-a-production-freeze-2016-08-15</a>	+	2.77%
<b>5/9/16</b>	Crude oil gives up Friday gains as Canadian fires slow their spread <a href="http://www.bloomberg.com/news/articles/2016-05-08/alberta-s-vicious-wildfires-spread-to-suncor-oil-sands-site">http://www.bloomberg.com/news/articles/2016-05-08/alberta-s-vicious-wildfires-spread-to-suncor-oil-sands-site</a>	-	-2.56%
<b>4/19/16</b>	Oil prices rises as a result of an oil worker strike in Kuwait that has reduced output to 1.1M barrels per day from 2.8M. <a href="http://www.cnn.com/2016/04/18/crude-prices-edge-up-on-kuwait-oil-worker-strike.html">http://www.cnn.com/2016/04/18/crude-prices-edge-up-on-kuwait-oil-worker-strike.html</a>	+	2.83%
<b>4/12/16</b>	Oil pops higher on report of output freeze agreement. According to Interfax, Saudi Arabia and Russia have reached a consensus on an oil production freeze. <a href="http://www.bloomberg.com/news/articles/2016-04-12/russia-saudi-arabia-reach-oil-freeze-consensus-interfax-says">http://www.bloomberg.com/news/articles/2016-04-12/russia-saudi-arabia-reach-oil-freeze-consensus-interfax-says</a>	+	4.02%
<b>4/1/16</b>	"It looks like the freeze deal may be starting to fall apart," says Dominick Chirichella of the Energy Management Institute, suggesting the April 17 meeting between OPEC and non-OPEC producers to discuss a freeze deal could be postponed. <a href="http://www.wsj.com/articles/oil-prices-decline-ahead-of-u-s-data-1459503111">http://www.wsj.com/articles/oil-prices-decline-ahead-of-u-s-data-1459503111</a>	-	-4.37%

<sup>4</sup> Since WTI oil price is not available on 10/10/2016 (Columbus Day), we take the log change of March 2017 WTI oil future between 10/10/2016 (Monday) and 10/07/2016 (Friday) instead.

<b>3/1/16</b>	Crude oil tops \$34 on talk of production agreement <a href="http://www.cnn.com/2016/02/16/oil-prices-spike-on-reports-of-saudi-russia-output-cut-talks.html">http://www.cnn.com/2016/02/16/oil-prices-spike-on-reports-of-saudi-russia-output-cut-talks.html</a>	+	4.91%
<b>2/17/16</b>	Oil pokes above \$30 after bullish comments from Iran The country's oil minister says Iran would support any effort aimed at stabilizing oil prices - including a deal between OPEC and non-OPEC (Russia) producers. <a href="http://www.cnn.com/2016/02/16/russia-saudi-arabia-output-freeze-helps-oil-price-higher-in-asia.html">http://www.cnn.com/2016/02/16/russia-saudi-arabia-output-freeze-helps-oil-price-higher-in-asia.html</a>	+	5.46%
<b>2/12/16</b>	WTI crude oil climbs as much as 12%, supported by yesterday's comments by the UAE energy minister that OPEC may be willing to cooperate on possible production cuts. <a href="http://www.wsj.com/articles/oil-rebounds-from-12-year-low-1455251366">http://www.wsj.com/articles/oil-rebounds-from-12-year-low-1455251366</a>	+	11.29%
<b>1/28/16</b>	Russia's energy minister said Thursday that Moscow was ready to take part in an OPEC meeting aimed at establishing possible "coordination" in the face of low oil prices due largely to a supply glut. <a href="https://www.yahoo.com/news/russia-ready-meet-opec-over-low-oil-prices-184309486.html?ref=gs">https://www.yahoo.com/news/russia-ready-meet-opec-over-low-oil-prices-184309486.html?ref=gs</a>	+	2.72%
<b>12/31/15</b>	North Sea storm forced oil firms to evacuate platforms and shut down production on Thursday <a href="http://www.reuters.com/article/us-weather-northsea-idUSKBN0UE0OR20151231">http://www.reuters.com/article/us-weather-northsea-idUSKBN0UE0OR20151231</a>	+	1.46%
<b>10/6/15</b>	Crude oil rallies following comments by OPEC chief Abdalla Salem el-Badri anticipating big cuts to oil investments that are expected to ease production and draw down global crude supplies. <a href="http://www.wsj.com/articles/opec-chief-sees-oil-price-rising-on-investment-cuts-1444123148">http://www.wsj.com/articles/opec-chief-sees-oil-price-rising-on-investment-cuts-1444123148</a>	+	4.74%
<b>8/27/15</b>	According to the <i>WSJ</i> , the República Bolivariana de Venezuela is pushing for an emergency OPEC meeting to come up with a plan to combat the rout in oil prices. <a href="http://af.reuters.com/article/energyOilNews/idAFL4N1125I320150827">http://af.reuters.com/article/energyOilNews/idAFL4N1125I320150827</a>	+	9.81%
<b>3/25/15</b>	Western-backed President Abed Rabbo Mansour Hadi has reportedly fled the Yemen port of Aden by boat as militants were closing in. <a href="http://www.cbsnews.com/news/yemen-president-abed-rabbo-mansour-hadi-flees-aden-palace-houthi-rebels/">http://www.cbsnews.com/news/yemen-president-abed-rabbo-mansour-hadi-flees-aden-palace-houthi-rebels/</a>	+	3.59%
<b>1/20/15</b>	Bearish Iran comments: "Iran is strong enough to withstand a deeper slump in prices even if the country must sell at \$25 a barrel," <a href="http://www.bloomberg.com/news/articles/2015-01-19/iran-sees-opec-sticking-by-oil-output-decision-amid-price-slump">http://www.bloomberg.com/news/articles/2015-01-19/iran-sees-opec-sticking-by-oil-output-decision-amid-price-slump</a>	-	-3.57%
<b>1/6/15</b>	Saudi Arabia's King Abdullah, in a speech, makes clear Saudi Arabia is giving no signs it will cut supply <a href="http://www.reuters.com/article/us-markets-oil-idUSKBN0KE06V20150106">http://www.reuters.com/article/us-markets-oil-idUSKBN0KE06V20150106</a>	-	-4.22%
<b>11/27/14</b>	Saudis block OPEC output cut, sending oil price plunging <a href="http://www.reuters.com/article/us-opec-meeting-idUSKCN0JA00320141127">http://www.reuters.com/article/us-opec-meeting-idUSKCN0JA00320141127</a>	-	-11.1%
<b>10/23/14</b>	Crude oil prices sprint higher as Saudi Arabia is said to have cut supply last month, according to a source familiar with the country's oil policy. <a href="http://www.bloomberg.com/news/articles/2014-10-23/saudi-arabia-said-to-cut-crude-oil-supply-to-market-in-september">http://www.bloomberg.com/news/articles/2014-10-23/saudi-arabia-said-to-cut-crude-oil-supply-to-market-in-september</a>	+	2.80%

6/12/14	Islamist militant made rapid gains across northern Iraq on Wednesday and Kurdish forces on Thursday took control some parts of Kirkuk <a href="http://www.wsj.com/articles/oil-prices-surge-after-militants-seize-iraqi-cities-1402572871">http://www.wsj.com/articles/oil-prices-surge-after-militants-seize-iraqi-cities-1402572871</a>	+	2.03%
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Figure A1: Seeking Alpha news article – Sample

## Crude oil tops \$34 on talk of production agreement

Mar 1 2016, 15:57 ET | By: Carl Surran, SA News Editor 

- WTI crude oil settled at its [highest level in eight weeks](#), gaining 1.9% at \$34.40/bbl, on the possibility of a production agreement among major oil producers.
- Russia's energy minister reportedly said that a "critical mass" of oil-producing countries had [agreed to freeze production](#), and that a decision would be effective even without Iran.
- Additionally, the UAE energy minister said "everyone should move toward freezing production whether they like it or not," due to current low oil prices.
- Oil prices had been lower in earlier trading after the EIA said late Monday that U.S. production fell by 43K bbl/day to 9.3M bbl/day in December, a smaller decline than in the previous two months, when production fell by more than 70K bbl/day.
- ETFs: [USO](#), [OIL](#), [UCO](#), [UWTI](#), [SCO](#), [BNO](#), [DWTI](#), [DBO](#), [DTO](#), [USL](#), [DNO](#), [OLO](#), [SZO](#), [OLEM](#)

Table A3: Impacts of WTI oil price on overall markets: The Instrumental Variable Method with all lagged variables included

VARIABLES	$\Delta \log$ ( Stock index)		$\Delta \log$ (High-yield bond index)		$\Delta \log$ (Investment -grade bond index)		$\Delta \log$ (20+ Treasury bond index)	
$\Delta \log(Oil)$	0.143*** (0.055)	0.144*** (0.055)	0.045** (0.019)	0.041*** (0.010)	-0.029** (0.014)	-0.033*** (0.010)	-0.104** (0.043)	-0.117*** (0.034)
$\Delta \log(Oil)_{t-1}$		0.013 (0.016)		0.019*** (0.004)		-0.004 (0.004)		-0.030** (0.015)
$\Delta \log(Stock)_{t-1}$		-0.003 (0.077)		0.050*** (0.015)		0.039** (0.016)		0.132** (0.055)
$\Delta \log(HY)_{t-1}$		0.203 (0.215)		0.418*** (0.065)		0.058 (0.056)		-0.223 (0.189)
$\Delta \log(Bond)_{t-1}$		-0.141 (0.456)		-0.005 (0.107)		-0.064 (0.134)		-0.202 (0.419)
$\Delta \log(TLT)_{t-1}$		0.085 (0.147)		0.029 (0.034)		0.015 (0.041)		-0.018 (0.129)
Observations	480	479	480	479	480	479	480	479
R-squared	0.098	0.104	0.061	0.456	0.056	0.072	0.099	0.122

Stock: Dow Jones U.S. Market Index. High-yield bond: Bloomberg U.S. high-yield corporate bond index, BUHY. US corporate bond index: Bloomberg U.S. corporate bond index, BUSC. Robust standard errors in parentheses. \*\*\* p<0.01, \*\* p<0.05, \* p<0.1. Period: November 14, 2014-October 11, 2016

Table A4: Impacts of WTI oil price on overall markets: GMM

VARIABLES	$\Delta \log$ ( Stock index)		$\Delta \log$ (High-yield bond index)		$\Delta \log$ (Investment -grade bond index)		$\Delta \log$ (20+ Treasury bond index)	
$\Delta \log(Oil)$	0.0393 (0.0287)	0.219 (0.183)	0.0239*** (0.00399)	0.0400*** (0.0121)	-0.0268*** (0.00418)	-0.0740 (0.127)	-0.140*** (0.0201)	-0.143*** (0.0430)
$\Delta \log(Oil)_{t-1}$		1.713 (1.968)		0.150 (0.130)		-0.714 (1.591)		-0.581 (0.397)
$\Delta \log(Stock)_{t-1}$		-1.933 (2.221)						-2.043* (1.234)
$\Delta \log(HY)_{t-1}$				-0.0125 (0.499)				
$\Delta \log(Bond)_{t-1}$						-2.124 (4.646)		
$\Delta \log(TLT)_{t-1}$								-2.043* (1.234)
Observations	480	479	480	479	480	479	480	479

Stock: Dow Jones U.S. Market Index. High-yield bond: Bloomberg U.S. high-yield corporate bond index, BUHY. US corporate bond index: Bloomberg U.S. corporate bond index, BUSC. Robust standard errors in parentheses. \*\*\* p<0.01, \*\* p<0.05, \* p<0.1. Period: November 14, 2014-October 11, 2016

Table A5: Negative oil price shocks, OLS

VARIABLES	$\Delta \log$ ( Stock index)		$\Delta \log$ (High-yield bond index)		$\Delta \log$ (Investment -grade bond index)		$\Delta \log$ (20+ Treasury bond index)	
$\Delta \log(Oil)$	0.108*** (0.016)	0.109*** (0.017)	0.033*** (0.005)	0.035*** (0.004)	-0.020*** (0.004)	-0.020*** (0.004)	-0.091*** (0.015)	-0.093*** (0.014)
$\Delta \log(Oil)_{t-1}$		0.019 (0.017)		0.019*** (0.004)		0.001 (0.004)		-0.024* (0.013)
$\Delta \log(Stock)_{t-1}$		-0.039 (0.065)						
$\Delta \log(HY)_{t-1}$				0.416*** (0.059)				
$\Delta \log(Bond)_{t-1}$						-0.065 (0.047)		
$\Delta \log(TLT)_{t-1}$								-0.131*** (0.047)
Observations	464	463	464	463	464	463	464	463
R-squared	0.127	0.131	0.136	0.418	0.055	0.060	0.099	0.117

Stock: Dow Jones U.S. Market Index. High-yield bond: Bloomberg U.S. high-yield corporate bond index, BUHY. US corporate bond index: Bloomberg U.S. corporate bond index, BUSC. Robust standard errors in parentheses. \*\*\* p<0.01, \*\* p<0.05, \* p<0.1. Period: November 14, 2014-October 11, 2016

Table A6: Negative oil price shocks, Instrumental Variable method

VARIABLES	$\Delta \log$ ( Stock index)		$\Delta \log$ (High-yield bond index)		$\Delta \log$ (Investment -grade bond index)		$\Delta \log$ (20+ Treasury bond index)	
$\Delta \log(Oil)$	0.011 (0.037)	0.023 (0.029)	0.013 (0.013)	0.014*** (0.005)	-0.046*** (0.015)	-0.044*** (0.012)	-0.132* (0.070)	-0.132** (0.060)
$\Delta \log(Oil)_{t-1}$		0.012 (0.018)		0.017*** (0.004)		-0.001 (0.004)		-0.027* (0.014)
$\Delta \log(Stock)_{t-1}$		-0.027 (0.072)						
$\Delta \log(HY)_{t-1}$				0.419*** (0.063)				
$\Delta \log(Bond)_{t-1}$						-0.070 (0.050)		
$\Delta \log(TLT)_{t-1}$								-0.134*** (0.049)
Observations	464	463	464	463	464	463	464	463
R-squared	0.026	0.050	0.087	0.364	-0.042	-0.020	0.079	0.098

Stock: Dow Jones U.S. Market Index. High-yield bond: Bloomberg U.S. high-yield corporate bond index, BUHY. US corporate bond index: Bloomberg U.S. corporate bond index, BUSC. Robust standard errors in parentheses. \*\*\* p<0.01, \*\* p<0.05, \* p<0.1. Period: November 14, 2014-October 11, 2016



Table A7: Positive oil price shocks – OLS

VARIABLES	$\Delta \log$ ( Stock index)		$\Delta \log$ (High-yield bond index)		$\Delta \log$ (Investment -grade bond index)		$\Delta \log$ (20+ Treasury bond index)	
$\Delta \log(Oil)$	0.106*** (0.015)	0.106*** (0.015)	0.029*** (0.004)	0.031*** (0.004)	-0.021*** (0.004)	-0.021*** (0.004)	-0.090*** (0.013)	-0.092*** (0.013)
$\Delta \log(Oil)_{t-1}$		0.003 (0.016)		0.018*** (0.003)		0.002 (0.004)		-0.024* (0.013)
$\Delta \log(Stock)_{t-1}$		0.003 (0.066)						
$\Delta \log(HY)_{t-1}$				0.472*** (0.059)				
$\Delta \log(Bond)_{t-1}$						-0.040 (0.046)		
$\Delta \log(TLT)_{t-1}$								-0.108** (0.047)
Observations	475	474	475	474	475	474	475	474
R-squared	0.120	0.120	0.115	0.445	0.057	0.059	0.095	0.108

Stock: Dow Jones U.S. Market Index. High-yield bond: Bloomberg U.S. high-yield corporate bond index, BUHY. US corporate bond index: Bloomberg U.S. corporate bond index, BUSC. Robust standard errors in parentheses. \*\*\* p<0.01, \*\* p<0.05, \* p<0.1. Period: November 14, 2014-October 11, 2016

Table A8: Positive oil price shocks – Instrumental Variable method

VARIABLES	$\Delta \log$ ( Stock index)		$\Delta \log$ (High-yield bond index)		$\Delta \log$ (Investment -grade bond index)		$\Delta \log$ (20+ Treasury bond index)	
$\Delta \log(Oil)$	0.213*** (0.053)	0.207*** (0.050)	0.060** (0.028)	0.058*** (0.010)	-0.022 (0.020)	-0.022 (0.018)	-0.092* (0.056)	-0.099** (0.048)
$\Delta \log(Oil)_{t-1}$		0.009 (0.017)		0.019*** (0.004)		0.001 (0.004)		-0.024* (0.014)
$\Delta \log(Stock)_{t-1}$		-0.000 (0.064)						
$\Delta \log(HY)_{t-1}$				0.468*** (0.057)				
$\Delta \log(Bond)_{t-1}$						-0.041 (0.046)		
$\Delta \log(TLT)_{t-1}$								-0.108** (0.047)
Observations	475	474	475	474	475	474	475	474
R-squared	-0.004	0.011	-0.007	0.344	0.057	0.059	0.094	0.108

Stock: Dow Jones U.S. Market Index. High-yield bond: Bloomberg U.S. high-yield corporate bond index, BUHY. US corporate bond index: Bloomberg U.S. corporate bond index, BUSC. Robust standard errors in parentheses. \*\*\* p<0.01, \*\* p<0.05, \* p<0.1. Period: November 14, 2014-October 11, 2016

Table A9: Alternative structural break - 13 October 2014

VARIABLES	$\Delta \log$ ( Stock index)		$\Delta \log$ (High-yield bond index)		$\Delta \log$ (Investment -grade bond index)		$\Delta \log$ (20+ Treasury bond index)	
$\Delta \log$ (Oil)	0.148*** (0.054)	0.146*** (0.052)	0.045** (0.019)	0.043*** (0.011)	-0.031** (0.014)	-0.031** (0.013)	-0.108** (0.043)	-0.114*** (0.038)
$\Delta \log(Oil)_{t-1}$		0.014 (0.016)		0.021*** (0.004)		-0.000 (0.004)		-0.029** (0.014)
$\Delta \log(Stock)_{t-1}$		0.008 (0.062)						
$\Delta \log(HY)_{t-1}$				0.468*** (0.054)				
$\Delta \log(Bond)_{t-1}$								
$\Delta \log(TLT)_{t-1}$								-0.112** (0.046)
Observations	503	502	503	502	503	502	503	502
R-squared	0.091	0.097	0.065	0.423	0.052	0.051	0.097	0.108

Stock: Dow Jones U.S. Market Index. High-yield bond: Bloomberg U.S. high-yield corporate bond index, BUHY. US corporate bond index: Bloomberg U.S. corporate bond index, BUSC. Robust standard errors in parentheses. \*\*\* p<0.01, \*\* p<0.05, \* p<0.1. Period: October 14, 2014-October 11, 2016

Table A10: Alternative structural break – 13 December 2014

VARIABLES	$\Delta \log$ ( Stock index)		$\Delta \log$ (High-yield bond index)		$\Delta \log$ (Investment -grade bond index)		$\Delta \log$ (20+ Treasury bond index)	
$\Delta \log$ (Oil)	0.190*** (0.055)	0.185*** (0.052)	0.058** (0.027)	0.055*** (0.009)	-0.027 (0.020)	-0.026 (0.018)	-0.118** (0.059)	-0.123** (0.051)
$\Delta \log(Oil)_{t-1}$		0.012 (0.017)		0.019*** (0.004)		0.000 (0.004)		-0.026* (0.014)
$\Delta \log(Stock)_{t-1}$		0.008 (0.064)						
$\Delta \log(HY)_{t-1}$				0.459*** (0.061)				
$\Delta \log(Bond)_{t-1}$						-0.037 (0.047)		
$\Delta \log(TLT)_{t-1}$								-0.106** (0.048)
Observations	459	458	459	458	459	458	459	458
R-squared	0.039	0.050	-0.028	0.336	0.057	0.059	0.091	0.101

Stock: Dow Jones U.S. Market Index. High-yield bond: Bloomberg U.S. high-yield corporate bond index, BUHY. US corporate bond index: Bloomberg U.S. corporate bond index, BUSC. Robust standard errors in parentheses. \*\*\* p<0.01, \*\* p<0.05, \* p<0.1. Period: December 14, 2014-October 11, 2016

## Appendix B: Dealing with the small sample problem

To alleviate the concern that we have a small sample problem (21 event days), we (a) test for the normality of the error terms in event days, and (b) use bootstrap standard errors.

### a) Test for the normality of the error terms

In this section, we test for whether different indices are normally distributed. We have 21 event days, which might raise some concerns about the small sample problem. However, we can still use the t-distribution for hypothesis tests, even when our sample is small, as long as the data are normally distributed.

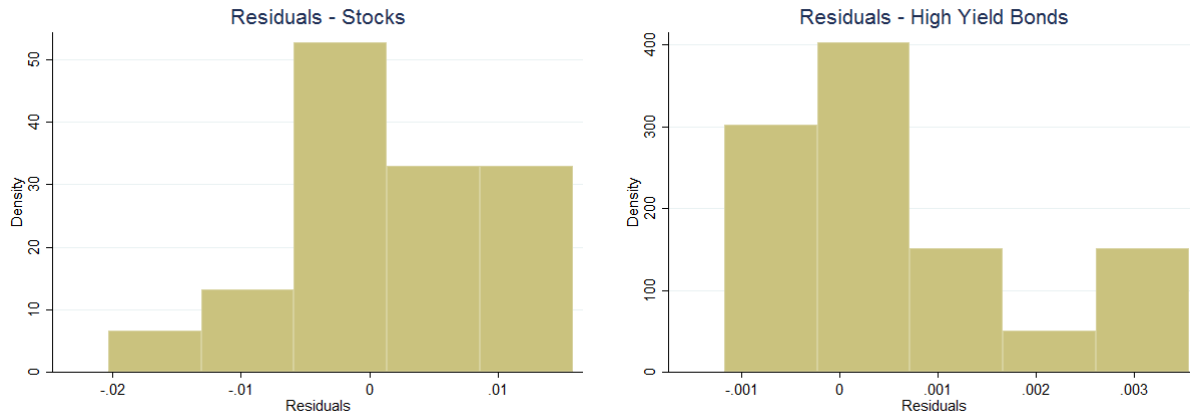
Results of Shapiro-Wilk test for the normality of the baseline regressions' residuals in Table B.1 show that we fail to reject the null hypothesis that the error terms of the baseline regressions for stock prices, investment grade bonds and TLT are normally distributed. We reject the null hypothesis that the error terms of high-yield bonds are normally distributed. Thus, we are more confident when using the regular inference method for hypothesis tests of stocks, investment-grade bonds, and Treasury bonds. We are less confident using the regular inference method for high-yield bonds. As a result, we will present our bootstrap confidence intervals in part (b).

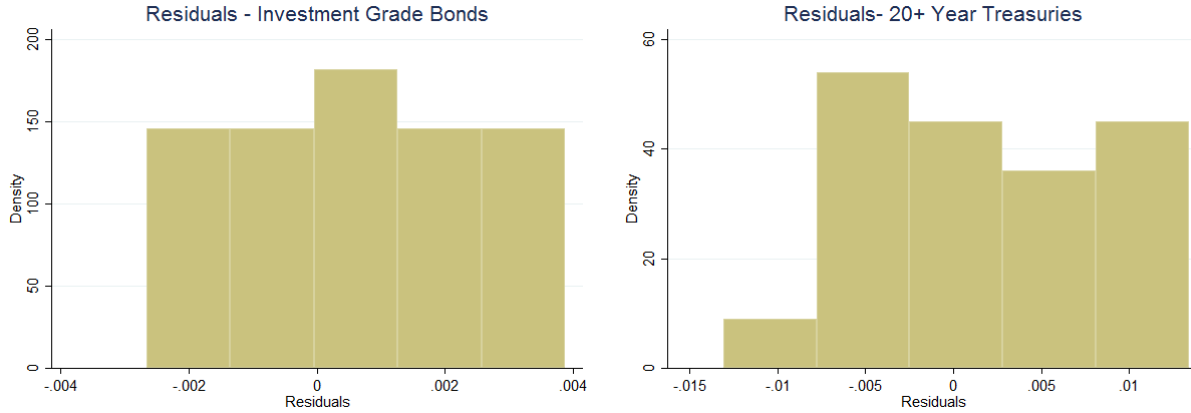
Table B.1: Shapiro-Wilk W Test

	<b>Obs.</b>	<b>W</b>	<b>V</b>	<b>Z</b>	<b>P-value</b>
<b>Stocks</b>	21	0.947	1.289	0.512	0.303
<b>High-Yield Bonds</b>	21	0.892	2.639	1.962	0.025
<b>Investment-Grade Bonds</b>	21	0.960	0.970	-0.061	0.524
<b>TLT</b>	21	0.952	1.167	0.313	0.377

Period: November 14, 2014-October 11, 2016

Figure B.1: Distribution of residuals





### b) Bootstrapping

Following Hébert and Schreger (2017), we implement the bootstrap procedure by Horowitz (2001) to calculate confidence intervals. This robustness check is especially important for the results of high-yield bonds because they are not normally distributed, as shown in part (a). In this section, we find that our confidence intervals for our coefficients are similar to confidence intervals constructed under normal approximations

From our original data, we resample 2000 bootstrap samples with replacements from event and non-event days, separately. Each bootstrap sample contains 21 event days and 459 non-event days. In each bootstrap sample, we compute  $\hat{t}_k = \frac{\hat{\alpha}_k - \hat{\alpha}}{s_k}$ , where  $\hat{\alpha}$  is the point estimate from our original data,  $\hat{\alpha}_k$  is the point estimate in the  $k^{th}$  bootstrap sample, and  $s_k$  is the heteroskedasticity-robust standard error of the  $k^{th}$  bootstrap sample. We calculate the 5th percentile and 95th percentile of  $\hat{t}_k$  in the bootstrap replications, denoted  $\hat{t}_5$  and  $\hat{t}_{95}$ , respectively. We then report 90% confidence interval for  $\hat{\alpha}$  :  $[\hat{t}_{2.5} \times s + \hat{\alpha}, \hat{t}_{97.5} \times s + \hat{\alpha}]$ , where  $s$  is the heteroskedasticity-robust standard error from our original data sample.

Table B.2: Bootstrapping for the 21 events (Bias-corrected CI)

	<b>Stocks</b>		<b>HY Bonds</b>	
	Without lags	With lags	Without lags	With lags
<i><math>\Delta \text{Log (Oil Price)}</math></i>	0.143	0.141	0.045	0.043
<b>90% Confidence Interval</b>	[0.037,0.249]	[0.037,0.238]	[0.0216,0.102]	[0.025,0.065]
<b>Observations</b>	480	479	480	479
	<b>Investment-Grade Bonds</b>		<b>TLT</b>	
	Without lags	With lags	Without lags	With lags
<i><math>\Delta \text{Log (Oil Price)}</math></i>	-0.029	-0.029	-0.104	-0.109
<b>90% Confidence Interval</b>	[-0.051,0.003]	[-0.050,-0.000]	[-0.204,-0.031]	[-0.191,-0.037]
<b>Observations</b>	480	479	480	479

Stock: Dow Jones U.S. Market Index. High-yield bond: Bloomberg U.S. high-yield corporate bond index, BUHY. US corporate bond index: Bloomberg U.S. corporate bond index, BUSC. Robust standard errors in parentheses. \*\*\* p<0.01, \*\* p<0.05, \* p<0.1. Period: November 14, 2014-October 11, 2016