NYSE Closure and Global Liquidity: The Case of Cross-listed Stocks

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Abstract

This paper examines the impact of NYSE closure on equity trading of cross-listed and non-cross-listed stocks. We argue that the US equity market is an important source of information and its closure will affect liquidity around the globe. Indeed, we find that closure of the NYSE significantly reduces the home market liquidity of both cross-listed and non-cross-listed stocks in our sample. Moreover, we document that stocks that are cross-listed in the US see a greater reduction in liquidity than their non-cross-listed counterparts, which we attribute to deterioration in the information environment or decrease in completion for order flow on days when the NYSE is closed. We further find that cross-listed firms are more affected by NYSE closures when their NYSE trading volume on normal days is higher and when their home market's returns correlate more with the US market's returns. Overall, our findings have important implications for our understanding of the transmission of information across markets, and add an extra dimension to the relation between spill-over effects, information transmission and cross-listed stocks.

Key Words: Stock liquidity, NYSE, stock market closure, cross-listing.

JEL Classifications: C24; G10.

1. Introduction

The New York stock exchange (NYSE) is the largest equity market in the world and as such is a major centre where information is released and priced into financial assets. Closure of this exchange has been shown to affect return variances of stocks in the US (See French and Roll, 1986), who suggest that on days when the US exchanges are closed, there is a reduction in the amount of information that arrives to the market and is incorporated into the market. In an international context, Cheung and Kwan (1992) show that the closure of the US markets reduces volatility and trading in the Canadian market. Surprisingly, there is no further evidence in the literature on the impact of US stock market closure on global market trading activity.

A second strand of literature has focused on the impact of cross-listings in the US and the improvements in the informational environment for these stocks (see e.g. Lang et al., 2003; Baruch et al., 2007; and Fernandes and Ferreira, 2009). These studies show that a listing on the US markets generally leads to an improvement in the information environment for cross-listed stocks, which has positive benefits even for trading in the domestic market. Although the improvements in the informational environment have been well-documented, the impact of closure of the US market on these cross-listed firms has received little attention.[1]

[1] Tannous and Zhang (2008) is the only study that has examined the impact of US closure on a sample of Canadian – US cross-listed firms.

The aim of this paper is to empirically investigate the effects of NYSE closures on trading in other markets, specifically focussing on the impact it has on cross-listed stocks. Based on the notion that the US forms an important source of information for other market, and that information is shown to spill-over between markets, we expect that a closure of the US has a negative impact on the liquidity of stocks around the globe. In addition, we expect that stocks with cross-listings in the US will be more affected by US market closures, as the improvement in the informational environment they experience through cross-listing will make them more dependent on the US as a source of information.

Using daily trading data for non-US stocks cross-listed on the NYSE and matching domestic stocks from 34 countries, we examine the impact of the NYSE closure on the home market trading activity. In our sample the NYSE is closed due to US public holidays and also due to hurricane Sandy in October 2012. Our empirical results confirm our arguments, and we find that closure of the NYSE has a negative impact on liquidity of stocks around the world. Cross-listed stocks appear to be more affected by NYSE closure. Additional testing reveals that those cross-listed stocks that are traded more actively on the NYSE and those that are more visible in the US are more affected by NYSE closure. Also countries with stock market returns that correlate more strongly with the US market returns, observe a greater reduction in liquidity (and cross-listed stocks from these countries are more affected). Our findings are robust to a battery of additional tests.

This study contributes to the debate on the role of information in equity trading in international multi-market environment. The findings shed more light on inter-market connectedness in global equity markets and the role of information generated in the US equity markets. In addition, this paper contributes contribute to the debate on the source of benefits from cross-listing on a foreign exchange. In particular, it provides new evidence on the role of trading on the foreign market for stock liquidity in home market of cross-listed stocks.

The paper is structured as follows. In Section 2, we discuss some of the literature on the impact of market closure and the consequences of cross-listing in the US. Section 3 discusses the data used in the empirical part of the study. Section 4 reports and discusses the results. Finally, Section 5 concludes.

2. Literature Review and Hypotheses

There are various studies that have examined the impact of market closure on stock price dynamics, and there are various studies that have considered the impact on the prices of stock after cross-listing in the US. However, there is limited literature that has looked at the impact of foreign market closures on trading of cross-listed stocks. In this Section, we will, first, discuss the evidence on the impact of stock market closures, and, second, discuss the effects of cross-listing on information environment and trading of cross-listed stocks..

The seminal study on the subject of the impact of stock market closures is by French and Roll (1986). Their study documents that stock returns are more volatile during trading hours than during times when the market is closed. They propose three possible explanations for this phenomenon. First, volatility can be lower during non-trading hours because the arrival of public information is lower. Second, the lower volatility can be explained through a lower arrival rate of private information (as private information is revealed through the trade process, this information cannot be incorporated during non-trading hours). Third, if the trading process itself introduces noise, then the closure of an exchange would result in lower volatility. Overall, their findings suggest that the difference in volatility between trading and non-trading hours is mostly driven by the difference in the arrival and incorporation of (private) information.

Cheung and Kwan (1992) extend the work of French and Roll (1986) into an international setting by examining the impact of an exchange closure on trading in foreign markets. In particular, they study the case of US and Canadian public holidays and the impact these closures have in the trading activities of domestic stocks. They note that during US public holidays, trading volume in Canada decreases significantly to about 60% of its normal levels, whereas a public holiday in Canada only has a marginal impact on the trading volume of stocks in the US. They conclude that the US constitutes an important source of macro-market/public information, and that the closure of the US, therefore, reduces the arrival rate of information in Canada. Hence, the effect of a market closure in the US not only affects the US market itself, but the effects spill-over into foreign markets as well.

Based on this literature, we would expect that the closure of the US market has an impact on equity trading in other markets. We can envisage several channels through which the closures of the US stock market can have an impact on stocks listed in foreign markets. First, we can envisage the effects that occur through traditional spill-over channels. Numerous studies have documented the interconnectedness of stock markets and volatility spill-overs occurring between them (see for instance Hamoa et al., 1990 for an early reference or Diebold and Yilmaz, 2009 for a more recent reference). When the US market closes, the lack of information coming from the US may spill-over through its channels and as such have an impact on foreign markets. In this type of setting, we would expect that those countries that have the strongest relations with the US will see the greatest decrease in trading activity. Second, we can envisage the effects of US closure on foreign markets through the important role that the US market plays as a major source of information. Rapach et al. (2013) show that US stock returns have important predictive power for the returns of many international markets. When the US markets are closed, an important source of information is removed, affecting trading activity in other markets. Overall, we would expect a negative effect of closure of the US stock market on global trading activity.

Another strand of literature has focused on cross-listing in the US and its implications for the cross-listed stock, in particular with regards to multimarket trading activity. In case of cross-listed stocks, on a normal day trading takes place in two markets, the home and foreign markets. If the foreign market, e.g. the US market, is closed, trading activity could migrate to the home market - in this case trading in the home market should not be affected or could even increase. On the other hand, if the foreign market is a source of information that is vital for trading and pricing of cross-listed stocks, then trading in the home market may decrease. Domowitz et al.

(1998) propose a model for cross-listed assets that aims to explain order flow migration from emerging markets. Their model demonstrates that if information linkages between the home and foreign markets are poor, liquidity in the home market will decrease after cross-listing. Depending on the level of integration/segmentation, trading activity may also increase in the domestic market resulting in a decrease in spreads and an increase in trading volume.

Lang et al. (2003) examine whether cross-listings in the US improve the information environment of cross-listed stocks and whether such an improvement leads to an increase in market value. They document that firms that cross-list in the US see an improvement in analyst following and that there is an improvement in forecast accuracy, and that this subsequently leads to higher valuations.

Likewise, Fernandes and Ferreira (2008) investigate how international cross-listing affects the information environment after cross-listing in the US. They find that the quality of information environment, proxied by firm-specific return variation, increases after cross-listing for firms from developed markets but decreases for firms from emerging markets. This support the argument that cross-listing in the US has significant positive information effects and also that lower costs of information acquisition after cross-listing in the US results in an increase in informed trading.

Baruch et al. (2007) propose a theoretical model of multimarket trading that can explain the differences in the foreign share of trading volume of cross-listed stocks. This model shows that the liquidity of the stock in the foreign market is proportional to the correlation of the asset with other stocks in that foreign market. Empirically, Baruch et al. (2007) confirm this relation for a sample of firms cross-listed in the US, by showing that trading volume in the US market is higher for stocks that show higher correlations with the US market.

These studies demonstrate that a cross-listing in the US generally leads to an improvement in the information environment that can lead to a reduction in asymmetric information (as in Domowitz et al., 1998), which in turn reduces the bid-ask spread and improves liquidity and trading activity in the home market. An additional argument for increased trading activity in the home market is put forward by Tannous and Zhang (2008), who suggest that cross-listing increases competition for order flow and therefore leads to more aggressive quote setting, resulting in lower spreads. Again, these lower spreads would lead to an increase in liquidity and trading activity. The closure of the US markets would then have an additional impact for cross-listed firms (beyond the impact of US closure on non-cross-listed firms), resulting in a greater reduction in trading activity.

3. Data

3.1 Sample Selection

To evaluate the role of the NYSE in global equity trading, we obtain a sample of non-US stocks cross-listed on the NYSE and a matching sample of non-US stocks listed only in their home

market (domestic stocks). The list of non-US stocks cross-listed on the NYSE in 2012, (including a company's name, home country and industry and cross-listing date) is obtained from the NYSE's website. Matching stocks are those that are not listed on US exchanges (the NYSE, AMEX or Nasdaq) during the sample period and are matched based on a stock's home country, industry, firm size (market capitalization) and price-to-book ratio. These data are obtained from Datastream.

After eliminating stocks with missing data for the liquidity measures (described below), we obtain a sample of 622 stocks from 34 countries, including 302 stocks cross-listed on the NYSE and 320 domestic stocks. Table 1 reports the sample description by home country. Canadian stocks constitute a significant proportion of the sample (252 stocks or 40.5% of the sample). Other countries that contribute a significant number of stocks to the sample include Brazil (7.6% of the sample), United Kingdom (7.4%), Japan (6.1%), Mexico (4.3%) and Chile (3.5%).

INSERT TABLE 1 HERE

We analyze daily trading of the sample stocks in the home market over the period 1 October 2011 to 28 February 2013. Over this time period, we identify days when the NYSE is closed. In addition to the US public holidays[2], the NYSE is closed on 29 and 30 October 2012 due to

[2] Such as Columbus day, George Washington Day, Independence Day, Labor Day, Martin Luther King Day, Memorial Day, Thanksgiving and Veterans' Day.

hurricane Sandy.[3] Because Christmas and New Year are celebrated in many countries (and therefore are not US-specific holidays), we exclude Christmas day and New Year day from our sample.

3.2 Liquidity measures

We use several measures of stock liquidity to evaluate the impact of US exchange closure. First, we use the daily Number of Shares Traded (NST) in the home market. Second, we use the daily Trading Volume by Value ($TV), which is daily trading volume in US dollars. If trading volume by value data are not available in Datastream, we calculate this variable as a product of the number of shares traded and value-weighted average price on that day. Third, we calculate daily Turnover ratio (Turnover) as the number of shares traded divided by the number of shares outstanding. Fourth, we calculate Amihud (2002) Illiquidity ratio (Illiquidity) as a ratio of absolute daily return to daily trading volume in US dollars. Numbers of shares traded, trading volume by value, value-weighted average price, number of shares outstanding and total return (including dividend income) data are obtained from Datastream. Finally, we calculate the daily Realized Volatility (RV) for each stock. We do this by collecting intraday stock price data sampled at a 5-minute frequency from Thomson Reuters Tick History, and compute realized volatility by summing the intraday squared returns.

Table 2 reports summary statistics for the liquidity measures, Panel A for all stocks, Panel B for stocks cross-listed on the NYSE (NYSE-listed stocks), and Panel C for domestic stocks. Each Panel reports the mean daily liquidity measures and the number of observations for all days, for days when the NYSE was open and for days when the NYSE was closed. Each panel also reports

[3] Note that during these days only the NYSE was closed, other US exchanges were open.

the difference in means between days when the NYSE was open and days when the NYSE was closed, associated t-statistics and significance level.

INSERT TABLE 2 HERE

Comparing average liquidity measures for cross-listed with domestic stocks (Column (5) and Column (9)), it is evident that cross-listed stocks have greater trading volume both in terms of the number of shares traded (2.8 times greater) and trading volume in US dollars (3.4 times greater) than domestic stocks. However, turnover ratio is greater for domestic stocks, which could indicate that cross-listed stocks tend to have greater market capitalization relative to domestic stocks. Cross-listed stocks also have, on average, lower illiquidity ratios and lower realized volatilities compared with domestic stocks.

For all stocks and for domestic stocks, we document a significant decrease both in the number of shares traded and trading volume in US dollars and a significant increase in realized volatility on days when the NYSE is closed (Panel A, Column (4) and Panel C, Column (12)). For NYSE–listed stocks, we document significant changes in all liquidity measures due to the closure of the NYSE. In particular, the number of shares traded decreases by 28% and trading volume in US dollars decreases by 27%. In comparison, for domestic stocks the number of shares traded decreases by 22% and dollar trading volume decreases by 20%. The decrease in realized volatility is comparable for cross-listed and domestic stocks (around 7%). For cross-listed stocks

there is a significant decrease in turnover ratio and a significant increase in illiquidity ratio, while for domestic stocks there are no significant changes in these measures.

4. Results

4.1 Model Specification

Summary statistics of the liquidity measures show a significant decrease in liquidity of non-US stocks on the days when the NYSE is closed and this effect appears to be more profound for non-US stocks cross-listed on the NYSE (Table 2). To assess this effect more formally, we conduct regression analysis (with the stock liquidity measures as the dependent variables) that allows controlling for firm- and country-specific characteristics that might affect stock liquidity. Our sample includes both cross-listed and domestic stocks and, based on the discussion in Section 2, we expect these two groups of stocks to be affected differently by the closure of the NYSE. The regression takes the form of a difference-in-difference equation, i.e.,

$$\log(Liq_{i,t}) = \alpha + \beta_1 D_{NYSE\_closure} + \beta_2 (D_{NYSE\_closure} * D_{CL}) + \beta_3 D_{CL} + \gamma_m Controls_{m,i,t} + \varepsilon_{i,t}, \qquad (1)$$

where $Liq_{i,t}$ is any of the liquidity measures discussed in Section 3, $D_{NYSE\_closure}$ is a dummy variable that equals one on days when the NYSE is closed and zero otherwise, D_{CL} is a dummy variable that equals one if the stock is cross-listed on the NYSE and zero otherwise. In this regression, β_1 indicates the effects of the NYSE closure for all stocks (cross-listed and domestic), which according to the arguments developed in Section 2 should be negative for measure of

liquidity (and positive for measures of illiquidity). Furthermore, β_2 captures the interaction variable between the NYSE closure and cross-listed stocks dummy variables ($D_{NYSE\_closure}$* $D_{NYSE\_closure}$), and indicates the additional effects of the NYSE closure for cross-listed stocks. Again, as we argued in Section 2, we expect values for β_2 to be negative (positive) for liquidity (illiquidity) measures. Finally, $Controls_{m,i,t}$ are a set of control variables. Since stock liquidity is determined by firm characteristics, in the regression analysis we control for firm size, measured by the market capitalization, price-to-book ratio and free float, i.e. percentage of common shares available for trading to ordinary investors, obtained from Datastream. We also control for variation across industries and across countries by including industry fixed effects and country fixed effects.[4] We estimate Equation (1) as a panel data regression with clustered (by stock) standard errors (see Petersen, 2009).

4.2 Estimation Results

4.2.1. The NYSE closure and cross-listed stocks

We begin our analysis with the evaluation of the impact of the NYSE closure on all stocks, by estimating Equation (1) without the interaction variable between the NYSE closure and cross-listed stocks dummy variable. Panel A of Table 1 reports the estimation results for each liquidity measure. NYSE closure variable is significant for all liquidity measures. In particular, we observe a significant decrease in the number of shares traded, trading volume in US dollars, turnover ratio, realized volatility and a significant increase in illiquidity ratio in the home market

[4] We have also estimated regressions with country level variables, such as market liquidity and the level of economic and financial development, instead of the country fixed effects and obtained very similar results. In addition, the differences in daily stock liquidity could be an outcome of the 'day of the week' effect. We have estimated the regressions with day-of-the-week dummies and find that our results are robust to controlling for this.

on the days when the NYSE is closed. This supports the argument that the absence of trading on the NYSE results in a significant decrease in global market liquidity because equity trading on the NYSE provides information important for trading in other equity markets, and confirms and extends the findings of Cheung and Kwan (1992).

Estimates for the cross-listed stocks dummy variable (CL stocks) suggest that there are no significant differences in trading volume and stock turnover between cross-listed and matching domestic stocks, while cross-listed stocks have higher illiquidity ratio and higher realized volatility. With regards to the control variables, larger firms have significantly greater number of shares traded, dollar trading volume and turnover and significantly lower illiquidity ratio and realized volatility. Stocks with higher price-to-book ratios have significantly lower number of shares traded, trading volume in US dollars and turnover ratio. Finally, stocks with higher free float have significantly greater number of shares traded, dollar trading volume and turnover and lower illiquidity ratio.

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Next, we estimate Equation (1) to evaluate whether the NYSE closure affects cross-listed stocks to a higher degree than domestic stocks. Panel B of Table 3 reports the estimation results for each liquidity measure. The dummy variable for NYSE closure remains significant with coefficient estimates comparable to those reported in Panel A for all liquidity measures. This

confirms that all stocks, cross-listed and domestic, are significantly affected by the NYSE closure. In addition, the interaction variable between the NYSE closure and cross-listed stocks dummy variable (Closure x CL stocks) is significant for all liquidity measures but one (realized volatility). This indicates that liquidity of stocks cross-listed on the NYSE is affected by the NYSE closure more significantly than liquidity of domestic stocks. This finding is broadly in line with the findings of Tannous and Zhang (2008) who study the impact of US closure on Canadian-US cross-listed stocks, and supports our argument that the NYSE is an important source of information for global equity trading and even more so for cross-listed stocks.

4.2.2 The degree of importance of the NYSE for cross-listed stocks

Cross-listing on a foreign market does not always result in active trading and high visibility of the cross-listed stock in the foreign market. In other words, not all cross-listed companies are successful in attracting investors' interest in the foreign market (Baruch et al., 2007; Halling et al., 2008; King and Segal, 2009). If the importance of the NYSE varies across cross-listed stocks, then the impact of the NYSE closure on trading of cross-listed stocks could also be different. In particular, cross-listed stocks that have significant trading volume and high visibility on the NYSE should be affected by the NYSE closure more significantly. To examine whether visibility on the NYSE affects the impact of closure on liquidity in the home market, we compute the NYSE's share of trading as a measure of importance of the NYSE in the stock's trading and use two measures of a stock's visibility on the NYSE, the duration of listing on the NYSE and foreign ownership.

First, we examine whether cross-listed stocks that are more actively traded on the NYSE on normal days are more significantly affected by the NYSE closure. Baruch et al. (2007) and Halling et al. (2008) report that the US share of trading, i.e. the fraction of trading in the US exchange as a percentage of the stock's total trading volume, of non-US stocks cross-listed on the US exchanges varies significantly across stocks. We calculate the NYSE share of trading as a ratio of the stock's trading volume on the NYSE (in US dollars) to the stock's total trading volume (in US dollars), calculated as a sum of the stock's trading volume in the home market and the NYSE. Trading volume data are obtained from Datastream.

We estimate Equation (1) where we replace the interaction variable ($D_{NYSE\_closure}$*D_{CL}), the product of the NYSE closure variable and cross-listed stocks dummy variable, with an interaction variable ($D_{NYSE\_closure}$*TVS_{NYSE}), which is the product of the NYSE closure variable and the NYSE's share of trading variable (TVS_{NYSE}).[5] Panel A of Table 4 reports the estimation results. The NYSE closure variable remains significant for all liquidity measures as was documented before. The interaction variable between the NYSE closure and the NYSE's share of trading variable (Closure x TVS_{NYSE}) is significant for all liquidity measures but one (realized volatility), showing that stocks with higher trading volume in the US see a greater decrease (increase) in liquidity (illiquidity). In addition we note that the coefficient estimates are greater and with higher statistical significance compared with the estimates from the interaction variable between the NYSE closure and cross-listed stocks dummy variable (Closure x CL stocks) reported in Panel B of Table 3. This is supportive of our expectation that cross-listed stocks that

[5] Note that TVS_{NYSE} is zero for non cross-listed stocks, hence the omission of the cross-listing dummy.

have an active market on the NYSE on normal days are affected more significantly by the NYSE closure.

INSERT TABLE 4 HERE

As an alternative way of assessing the impact of trading volume in the US, we break down the NYSE's share of trading variable (TVS_{NYSE}) into three variables: 1) low NYSE's share of trading (TVS_{NYSE}^{Low}), which is a dummy variable that equals one if the NYSE's share of trading is less than 0.33, and zero otherwise; 2) medium NYSE's share of trading (TVS_{NYSE}^{Medium}), which is a dummy variable that equals one if the NYSE's share of trading is more than 0.33 and less than 0.67, and zero otherwise; and 3) high NYSE's share of trading (TVS_{NYSE}^{High}), which is a dummy variable that equals one if the NYSE's share of trading is more than 0.67 and zero otherwise. Panel B of Table 4 reports the estimation results. It is evident that cross-listed stocks are affected by the NYSE closure more significantly than domestic stocks only when their NYSE's share of trading is high, i.e. more than two thirds of trading volume normally takes place on the NYSE.

Second, we test whether stocks that are listed on the NYSE for longer are more significantly affected by the NYSE closureWe calculate the duration of the NYSE listing as log of the number years since the cross-listing. Cross-listing dates are obtained from the NYSE's web-site.

We estimate Equation (1), where we replace the interaction variable ($D_{NYSE\_closure}$*D_{CL}), the product of the NYSE closure variable and cross-listed stocks dummy variable, with an interaction variable ($D_{NYSE\_closure}$*Years_CL), which is the product of the NYSE closure variable and the duration of the NYSE listing variable. The estimation results, reported in Panel A of Table 5, suggest that the longer a stock has been cross-listed on the NYSE, the more significantly it is affected by the NYSE closure.

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In addition, we break down the duration NYSE listing variable (Years_CL) into three variables: 1) recently cross-listed on the NYSE (Years_$CL_{0\text{-}2}$), which is a dummy variable that equals one if the number of years since cross-listing on the NYSE is less than 2 years, and zero otherwise; 2) cross-listed for some time (Years_$CL_{3\text{-}7}$), which is a dummy variable that equals one if the number of years since cross-listing on the NYSE is more than 2 years and less than 7 years, and zero otherwise; 3) cross-listed for long time (Years_CL_{over7}), which is a dummy variable that equals one if the number of years since cross-listing on the NYSE is more than 7 years, and zero otherwise. We re-estimate the model (reported in Panel A of Table 5) with these three variables instead of the duration of the NYSE listing variable. Panel B of Table 5 reports the estimation results. It is evident that cross-listed stocks are affected by the NYSE closure more significantly than domestic stocks only when they have being cross-listed on the NYSE for over 7 years.

Third, we test whether presence of foreign institutional investors can explain the impact of the NYSE closure on stock liquidity in other markets. Foreign institutional investors have greater access to trading in various markets than domestic investors, and, therefore, on the days when the NYSE is closed potentially could trade cross-listed stocks in their home markets instead of the NYSE. In this case, the liquidity of cross-listed stocks would increase when the NYSE is closed. On other hand, if equity trading on the NYSE provides a vital source of information for equity trading in other markets, then foreign institutional investors would generally trade less when the NYSE is closed. While foreign institutional investors could invest in both cross-listed and domestic stocks, potentially, cross-listing improves a stock's visibility in the foreign market and increases foreign ownership (Foerster and Karolyi, 1993). If this is the case, cross-listed stocks are affected more significantly by the NYSE closure possibly due to greater foreign institutional ownership. To test this proposition, we obtain foreign institutional ownership data, which is a percentage of common shares owned by institutional investors domiciled outside of the stock's home country, from Datastream. To account for the effects of presence of foreign investors for all stocks (cross-listed and domestic) and also to evaluate additional effects of presence of foreign investors for cross-listed stocks we estimate the following equation:

$$\log(Liq_{i,t}) = \alpha + \beta_1(D_{NYSE\_closure} * ForInvestors) + \beta_2(D_{NYSE\_closure} * ForInvestors * D_{CL}) + \\ + \beta_3 D_{CL} + \gamma_m Controls_{m,i,t} + \varepsilon_{i,t}, \quad (2)$$

where $Liq_{i,t}$ is a liquidity measure (discussed in section 3); $D_{NYSE\_closure}$ is a dummy variable that equals one on the days when the NYSE is closed and zero otherwise; *ForInvestors* is foreign

institutional investors variable; D_{CL} is a dummy variable that equals one if the stock is cross-listed on the NYSE and zero otherwise; $Controls_{m,i,t}$ are control variables including market capitalization, price-to-book ratio and free float. The interaction variable between the NYSE closure and foreign investors variables ($D_{NYSE\_closure}$*$ForInvestors$) indicates the effects of foreign ownership for all stocks while the interaction variable between the NYSE closure, foreign investors and cross-listed stocks dummy variables ($D_{NYSE\_closure}$*$ForInvestors$* D_{CL}) indicates the additional effects of foreign ownership for cross-listed stocks.

We estimate Equation (2) first without the interaction variable between the NYSE closure, foreign investors and cross-listed stocks dummy variables (reported in Panel A of Table 6) and then full specification of Equation (2) (reported in Panel B of Table 6). We observe that the interaction variable between the NYSE closure and foreign investors variables is negative and significant in the number of shares traded, dollar trading volume and turnover regressions, suggesting that for stocks (both cross-listed and domestic) that have greater foreign institutional ownership stock liquidity decreases on the days when the NYSE is closed. However, the interaction variable between the NYSE closure, foreign investors and cross-listed stocks dummy variable (Closure x Foreign investors x CL) is insignificant for all liquidity measures (Panel B, Table 6). This suggests that foreign ownership of cross-listed stocks cannot explain the additional effects of the NYSE closure on liquidity of cross-listed stocks.

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4.2.3. The importance of the NYSE: country level effects

Until now we have considered the degree of the NYSE's importance only at the stock level. It is, however, possible that the role of the NYSE for equity trading varies across various markets. One way to quantify the degree of the NYSE's importance at the country level is to estimate market return correlations between the US equity market and other equity markets. The higher the market return correlation with the US market return the more important the NYSE is, and the more interconnected the markets are. We use market return data on the Datastream Total market indices, obtained from Datastream, to estimate correlations with the US market return for all home countries in our sample.

To account for the effects of market return correlations for all stocks (cross-listed and domestic) and also to evaluate additional effects of market return correlations for cross-listed stocks, we estimate the following equation:

$$\log(Liq_{i,t}) = \alpha + \beta_1(D_{NYSE\_closure} * Correlation) + \beta_2(D_{NYSE\_closure} * Correlation * D_{CL}) + \\ + \beta_3 D_{CL} + \gamma_m Controls_{m,i,t} + \varepsilon_{i,t}, \qquad (3)$$

where $Liq_{i,t}$ is a liquidity measure (discussed in section 3); $D_{NYSE\_closure}$ is a dummy variable that equals one on the days when the NYSE is closed and zero otherwise; *Correlation* is log of correlation coefficient between the home market return and the US market return; D_{CL} is a

dummy variable that equals one if the stock is cross-listed on the NYSE and zero otherwise; $Controls_{m,i,t}$ are control variables including market capitalization, price-to-book ratio and free float. The interaction variable between the NYSE closure and correlation variables ($D_{NYSE\_closure}$*$Correlation$) indicates the effects of market return correlation between the home market and the US market for all stocks, while the interaction variable between the NYSE closure, correlation and cross-listed stocks dummy variables ($D_{NYSE\_closure}$*$Correlation$* D_{CL}) indicates the additional effects of market return correlation for cross-listed stocks.

We estimate Equation (3) first without the interaction variable between the NYSE closure, correlation and cross-listed stocks dummy variables (reported in Panel A of Table 7) and then the full specification of Equation (3) (reported in Panel B of Table 7). We observe that the interaction variable between the NYSE closure and market return correlation variables is highly significant for all liquidity measures (negative for the number of shares traded, trading volume, turnover and realized volatility and positive for illiquidity ratio), suggesting that for stocks (both cross-listed and domestic) that originate in markets that have higher correlation of market returns with the US market returns stock liquidity decreases significantly on the days when the NYSE is closed. Furthermore, the interaction variable between the NYSE closure, correlation and cross-listed stocks dummy variable (Closure x Foreign investors x CL) is significant for all liquidity measures except one (realized volatility) (Panel B, Table 7). This suggests that the NYSE's importance at the country level, measured by market return correlations between the home market and the US market, contributes to the additional effects of the NYSE closure on liquidity of cross-listed stocks. These results support the argument that markets are connected and what happens in one market spills over into another. When one market (in this case the US) is closed,

information cannot spill-over to other markets and this may reduce the trading activity in the home market.

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4.3 Robustness Tests

4.3.1 Canada vs. other home countries

As discussed in Section 3, a significant portion of the sample consists of Canadian stocks Canadian stocks are more likely to cross-list in the US, and generally have a considerable share of trading taking place in the US exchanges (see e.g. Eun and Sabherwal, 2003). Also, the Canadian market is geographically and economically more proximate to the US market than any other markets in our sample. In this section, we test whether the effects of the NYSE closure are different for (driven by) Canadian stocks than for stocks from other markets. Table 8 reports estimation results of Equation (1) for five liquidity measures for two subsamples: (i) Canadian stocks and (ii) all other stocks (excluding Canadian stocks).

INSERT TABLE 8 HERE

As documented by Tannous and Zhang (2008), it is evident that Canadian stocks, and particularly, Canadian cross-listed stocks, are affected strongly by the NYSE closure to a greater degree than stocks from other countries. However, we find that the effect is not limited to

Canadian stocks. Stocks from other countries also experience a significant drop in stock liquidity, measured by the number of shares traded, trading volume in US dollars and turnover ratio, when the NYSE is closed.[6] Hence, our results are not solely driven by the impact on the Canadian market.

4.3.2. US public holidays vs. hurricane Sandy

In our sample the NYSE is closed on the US public holidays (scheduled closure) and also is closed for two days due to a natural disaster such as hurricane Sandy (unscheduled closure). To evaluate whether the effects of scheduled and unscheduled closures are different, we estimate Equation (1) with two closure variables, US holiday and Sandy dummy variables, and two interaction variables, US holiday and Sandy dummy variables, each interact with cross-listed stocks dummy variable individually. The estimation results are reported in Table 9. We observe that the effects of schedules and unscheduled closure of the NYSE on stock liquidity in other markets are similar. The additional effects on cross-listed stocks seem to be stronger when the closure is scheduled, i.e. US public holidays. However, the low statistical significance of the estimates for the interaction variable between Sandy and cross-listed stocks dummy variables could be due to small number of observations for this particular event. Overall, there is no evidence of significant differences between scheduled and unscheduled closures of the NYSE.

[6] We also estimate Equation (1) for sub-samples by geographic region. The estimation results suggest that the NYSE closure effect holds strongly for American and Western European markets; Central and Eastern European and African markets are not affected by the NYSE closure but cross-listed stocks from these markets are significantly affected; Asian Pacific markets overall are significantly affected by the NYSE closure and cross-listed stocks from these markets are affected in the same way as domestic stocks. Overall, this analysis suggests that our results are not driven by any one particular geographic region.

INSERT TABLE 9 HERE

5. Conclusion

In this study, we examine the impact of NYSE closure on the trading volume in the home market for cross-listed and non-cross-listed stocks. Prior literature has suggested that the US market forms an important source of information for stocks around the globe, and with the US markets closed an important source of information is missing, which affects trading volume around the globe. We show that closure of the NYSE significantly reduces the liquidity of the stocks in our sample confirming the importance of the US as a source of information. Moreover, we document that stocks that are cross-listed in the US see a greater reduction in trading volume than their non-cross-listed counterparts. This suggests that the informational environment and, accordingly, liquidity of stocks cross-listed in the US depends to a greater degree on information produced in the US markets. We further find that cross-listed stocks are more affected by NYSE closures when their NYSE trading volume on normal days is higher, and when the stock's home market returns correlate more with the US market returns. Overall, our findings have important implications for our understanding of the transmission of information across markets, and add an extra dimension to the relation between spill-over effects, information transmission and cross-listed stocks.

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Table 1. Sample description

Home country	Number of all stocks	Number of NYSE-listed stocks	Number of matching stocks
Argentina	15	8	7
Australia	14	7	7
Belgium	2	2	0
Brazil	47	22	25
Canada	252	127	125
Chile	22	11	11
China	13	4	9
Colombia	3	1	2
Denmark	2	1	1
Finland	2	1	1
France	12	6	6
Germany	7	4	3
Greece	8	2	6
India	15	7	8
Indonesia	4	2	2
Ireland	4	2	2
Israel	9	4	5
Italy	5	3	2
Japan	38	16	22
Korea	15	8	7
Luxembourg	1	1	0
Mexico	27	13	14
Netherlands	11	4	7
Norway	4	2	2
Peru	5	2	3
Philippines	1	1	0
Portugal	3	1	2
Russia	5	2	3
South Africa	12	6	6
Spain	3	1	2
Switzerland	10	4	6
Taiwan	10	5	5
Turkey	2	1	1
United Kingdom	46	21	25
All countries	**622**	**302**	**320**

Table 2. Liquidity measures: Summary statistics

Daily liquidity measures	Panel A. All stocks				Panel B. NYSE-listed stocks				Panel C. Domestic stocks			
	All days	NYSE open	NYSE closed	Difference in means (3) – (2)	All days	NYSE open	NYSE closed	Difference in means (7) – (6)	All days	NYSE open	NYSE closed	Difference in means (11) – (10)
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
NST	3,938.1 N=209,590	3,970.8 N=203,103	2,914.4 N=6,487	-1,056.4*** (-3.90)	5,812.9 N=104,964	5,863.6 N=101,733	4,218.4 N=3,231	-1,645.2*** (-3.27)	2,057.2 N=104,626	2,071.3 N=101,370	1,620.4 N=3,256	-450.9** (-2.29)
$TV	26,676.2 N=209,190	26,886.7 N=202,717	20,084.4 N=6,473	-6,802.4*** (-8.61)	41,233.6 N=104,964	41,573.8 N=101,733	30,522.3 N=3,231	-11,051.5*** (-7.79)	12,015.8 N=104,226	12,090.7 N=100,984	9,681.87 N=3,242	-2,408.9*** (-4.10)
Turnover	0.0039 N=209,377	0.0039 N=202,896	0.0038 N=6,481	-0.00005 (-0.10)	0.0029 N=104,751	0.0029 N=101,526	0.019 N=3,225	-0.001*** (-9.03)	0.0048 N=104,626	0.0048 N=101,370	0.0056 N=3,256	0.001 (0.93)
Illiquidity	0.0040 N=206,967	0.039 N=200,550	0.0047 N=6,417	0.0007 (0.27)	0.0009 N=104,372	0.0008 N=101,149	0.002 N=3,223	0.0012*** (3.76)	0.0071 N=102,595	0.0071 N=99,401	0.0072 N=3,194	0.0001 (0.02)
RV	2.26 N=195,763	2.27 N=189,685	2.11 N=6,078	-0.16*** (-6.37)	2.13 N=98,775	2.14 N=95,733	1.99 N=3,042	-0.15*** (-4.95)	2.38 N=96,988	2.39 N=93,952	2.23 N=3,036	-0.16*** (-4.25)

Table 3. NYSE Closure and Global Stock Market Liquidity

	Panel A					Panel B				
	NST	$TV	Turnover	Illiquidity	RV	NST	$TV	Turnover	Illiquidity	RV
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
NYSE closure	-0.52***	-0.52***	-0.41***	0.07***	-0.08***	-0.46***	-0.44***	-0.33***	0.05**	-0.08***
	(-26.29)	(-26.18)	(-29.02)	(6.06)	(-8.68)	(-14.79)	(-14.67)	(-17.16)	(2.57)	(-6.12)
Closure x CL						-0.12***	-0.15***	-0.16***	0.04*	0.01
						(-2.82)	(-3.67)	(-5.50)	(1.83)	(0.42)
CL stocks	0.21*	0.03	-0.05	0.12**	0.09***	0.21*	0.03	-0.04	0.11**	0.09***
	(1.65)	(0.28)	(-0.72)	(2.39)	(3.94)	(1.68)	(0.33)	(-0.64)	(2.37)	(3.91)
Firm size	0.65***	1.16***	0.12***	-0.31***	-0.14***	0.65***	1.16***	0.12***	-0.31***	-0.14***
	(14.28)	(42.12)	(5.59)	(-16.07)	(-16.11)	(14.28)	(42.12)	(5.59)	(-16.07)	(-16.11)
PTB ratio	-0.43***	-0.18*	-0.08*	0.03	-0.01	-0.43***	-0.18*	-0.08*	0.03	-0.01
	(-5.84)	(-1.84)	(-1.65)	(0.52)	(-0.93)	(-5.84)	(-1.84)	(-1.65)	(0.52)	(-0.93)
Free float	0.02***	0.02***	0.01***	-0.004***	0.00	0.02***	0.02***	0.01***	-0.004***	0.00
	(5.85)	(6.79)	(8.20)	(-3.74)	(1.53)	(5.85)	(6.78)	(8.20)	(-3.74)	(1.53)
Constant	-0.96	-4.07***	-9.29***	-5.89***	2.12***	-0.97	-4.07***	-9.30***	-5.89***	2.12***
	(-1.46)	(-7.84)	(-38.20)	(-23.47)	(25.32)	(-1.46)	(-7.85)	(-38.20)	(-23.47)	(25.32)
Home country fixed effects	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Industry fixed effects	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Observations	202,139	201,759	201,952	199,804	189,719	202,139	201,759	201,952	199,804	189,719
R-squared	0.56	0.80	0.38	0.40	0.30	0.56	0.80	0.38	0.40	0.30

Robust t-statistics in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 4. NYSE Closure, NYSE's Trading Volume Share and Liquidity of Cross-listed Stocks

	Panel A.					Panel B.				
	NST	$TV	Turnover	Illiquidity	RV	NST	$TV	Turnover	Illiquidity	RV
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
NYSE closure	-0.34***	-0.37***	-0.29***	0.04**	-0.08***	-0.46***	-0.44***	-0.33***	0.05***	-0.08***
	(-9.52)	(-11.97)	(-14.68)	(2.05)	(-7.27)	(-14.86)	(-14.73)	(-17.20)	(2.63)	(-6.14)
Closure x TVS_{NYSE}	-0.75***	-0.61***	-0.51***	0.14**	0.02					
	(-5.66)	(-5.60)	(-7.23)	(2.08)	(0.72)					
Closure x TVS^{Low}_{NYSE}						0.24**	0.07	0.02	0.02	-0.00
						(2.50)	(0.94)	(0.35)	(0.41)	(-0.10)
Closure x TVS^{Medium}_{NYSE}						-0.02	-0.01	-0.09	-0.00	0.02
						(-0.19)	(-0.08)	(-1.53)	(-0.09)	(0.79)
Closure x TVS^{High}_{NYSE}						-0.76***	-0.65***	-0.52***	0.14**	0.00
						(-5.66)	(-5.88)	(-7.51)	(2.16)	(0.12)
CL stocks	0.22*	0.04	-0.04	0.11**	0.09***	0.21*	0.03	-0.04	0.11**	0.09***
	(1.77)	(0.40)	(-0.58)	(2.32)	(3.93)	(1.67)	(0.32)	(-0.65)	(2.37)	(3.91)
Firm size	0.65***	1.16***	0.12***	-0.30***	-0.14***	0.65***	1.16***	0.12***	-0.31***	-0.14***
	(14.24)	(42.12)	(5.56)	(-16.04)	(-16.08)	(14.28)	(42.21)	(5.59)	(-16.08)	(-16.11)
PTB ratio	-0.43***	-0.18*	-0.08*	0.03	-0.01	-0.43***	-0.18*	-0.08*	0.03	-0.01
	(-5.84)	(-1.83)	(-1.65)	(0.52)	(-0.93)	(-5.84)	(-1.83)	(-1.65)	(0.52)	(-0.93)
Free float	0.02***	0.02***	0.01***	-0.00***	0.00	0.02***	0.02***	0.01***	-0.00***	0.00
	(5.82)	(6.76)	(8.18)	(-3.71)	(1.51)	(5.86)	(6.79)	(8.21)	(-3.74)	(1.53)
Constant	-0.96	-4.06***	-9.29***	-5.90***	2.12***	-0.95	-4.06***	-9.29***	-5.89***	2.12***
	(-1.45)	(-7.84)	(-38.21)	(-23.48)	(25.31)	(-1.44)	(-7.82)	(-38.21)	(-23.46)	(25.33)
Home country fixed effects	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Industry fixed effects	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Observations	202,052	201,672	201,865	199,717	189,616	202,139	201,759	201,952	199,804	189,719
R-squared	0.56	0.80	0.38	0.40	0.30	0.56	0.80	0.38	0.40	0.30

Robust t-statistics in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 5. NYSE Closure, Duration of NYSE's Cross-listing and Liquidity of Cross-listed Stocks

	Panel A.					Panel B.				
	NST	$TV	Turnover	Illiquidity	RV	NST	$TV	Turnover	Illiquidity	RV
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
NYSE closure	-0.55***	-0.56***	-0.45***	0.09***	-0.08***	-0.46***	-0.44***	-0.33***	0.05**	-0.08***
	(-24.24)	(-24.55)	(-25.76)	(6.95)	(-7.71)	(-14.82)	(-14.73)	(-17.28)	(2.56)	(-6.12)
Closure x Years_CL	-0.01***	-0.01***	-0.01***	0.00**	0.00					
	(-2.64)	(-3.56)	(-5.15)	(2.32)	(0.31)					
Closure x Years_CL$_{0\text{-}2}$						-0.09	-0.05	-0.07	-0.03	-0.08
						(-0.44)	(-0.32)	(-0.63)	(-0.25)	(-1.03)
Closure x Years_CL$_{3\text{-}7}$						-0.13	-0.19	-0.20**	0.03	0.04
						(-0.86)	(-1.59)	(-2.18)	(0.34)	(1.01)
Closure x Years_CL$_{over7}$						-0.12**	-0.15***	-0.16***	0.06*	0.01
						(-2.01)	(-2.88)	(-4.23)	(1.90)	(0.46)
CL stocks	0.21*	0.03	-0.04	0.11**	0.10***	0.21*	0.03	-0.04	0.11**	0.09***
	(1.69)	(0.33)	(-0.62)	(2.35)	(4.07)	(1.68)	(0.32)	(-0.64)	(2.37)	(3.92)
Firm size	0.66***	1.16***	0.12***	-0.31***	-0.14***	0.65***	1.16***	0.12***	-0.31***	-0.14***
	(14.28)	(42.06)	(5.56)	(-16.04)	(-15.99)	(14.27)	(42.09)	(5.58)	(-16.08)	(-16.11)
PTB ratio	-0.43***	-0.18*	-0.08*	0.03	-0.01	-0.43***	-0.18*	-0.08*	0.03	-0.01
	(-5.87)	(-1.86)	(-1.73)	(0.49)	(-0.96)	(-5.83)	(-1.84)	(-1.65)	(0.52)	(-0.93)
Free float	0.02***	0.02***	0.01***	-0.00***	0.00	0.02***	0.02***	0.01***	-0.00***	0.00
	(5.72)	(6.67)	(8.03)	(-3.81)	(1.49)	(5.85)	(6.79)	(8.20)	(-3.74)	(1.52)
Constant	-0.95	-4.06***	-9.28***	-5.88***	2.12***	-0.97	-4.07***	-9.29***	-5.89***	2.12***
	(-1.44)	(-7.83)	(-38.04)	(-23.39)	(25.20)	(-1.46)	(-7.85)	(-38.19)	(-23.46)	(25.32)
Home country fixed effects	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Industry fixed effects	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Observations	199,382	199,002	199,195	197,054	186,962	202,139	201,759	201,952	199,804	189,719
R-squared	0.56	0.80	0.38	0.40	0.30	0.56	0.80	0.38	0.40	0.30

Robust t-statistics in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 6. NYSE Closure, Foreign Institutional Ownership and Global Stock Market Liquidity

	Panel A.					Panel B.				
	NST	$TV	Turnover	Illiquidity	RV	NST	$TV	Turnover	Illiquidity	RV
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Closure x Foreign investors	-0.01***	-0.01***	-0.01***	0.00	-0.00	-0.01**	-0.02***	-0.01***	0.00	-0.00
	(-3.13)	(-4.34)	(-5.31)	(1.59)	(-0.74)	(-1.96)	(-3.36)	(-3.62)	(1.58)	(-0.69)
Closure x Foreign investors x CL						-0.00	0.01	-0.00	-0.00	0.00
						(-0.63)	(1.10)	(-0.35)	(-0.95)	(0.30)
CL stocks	0.21	0.03	-0.05	0.12**	0.09***	0.21*	0.03	-0.05	0.12**	0.09***
	(1.64)	(0.27)	(-0.72)	(2.40)	(3.94)	(1.65)	(0.26)	(-0.72)	(2.41)	(3.94)
Firm size	0.65***	1.16***	0.12***	-0.31***	-0.14***	0.65***	1.16***	0.12***	-0.31***	-0.14***
	(14.29)	(42.16)	(5.60)	(-16.07)	(-16.11)	(14.29)	(42.18)	(5.60)	(-16.07)	(-16.11)
PTB ratio	-0.43***	-0.18*	-0.08	0.03	-0.01	-0.43***	-0.18*	-0.08	0.03	-0.01
	(-5.82)	(-1.83)	(-1.64)	(0.52)	(-0.93)	(-5.82)	(-1.83)	(-1.64)	(0.52)	(-0.93)
Free float	0.02***	0.02***	0.01***	-0.00***	0.00	0.02***	0.02***	0.01***	-0.00***	0.00
	(5.80)	(6.73)	(8.13)	(-3.72)	(1.51)	(5.80)	(6.73)	(8.13)	(-3.72)	(1.51)
Constant	-0.97	-4.07***	-9.30***	-5.89***	2.12***	-0.97	-4.07***	-9.30***	-5.89***	2.12***
	(-1.46)	(-7.83)	(-38.18)	(-23.45)	(25.26)	(-1.46)	(-7.83)	(-38.19)	(-23.45)	(25.27)
Home country fixed effects	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Industry fixed effects	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Observations	202,139	201,759	201,952	199,804	189,719	202,139	201,759	201,952	199,804	189,719
R-squared	0.56	0.80	0.37	0.40	0.30	0.56	0.80	0.37	0.40	0.30

Robust t-statistics in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 7. NYSE Closure, Stock Market Correlations and Global Stock Market Liquidity

	Panel A.					Panel B.				
	NST	$TV	Turnover	Illiquidity	RV	NST	$TV	Turnover	Illiquidity	RV
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Closure x Correlation	-0.77***	-0.77***	-0.62***	0.10***	-0.12***	-0.66***	-0.65***	-0.51***	0.07***	-0.12***
	(-25.91)	(-25.91)	(-28.89)	(6.31)	(-8.86)	(-12.56)	(-13.53)	(-16.54)	(2.69)	(-6.06)
Closure x Correlation x CL						-0.23***	-0.23***	-0.21***	0.06*	0.00
						(-2.75)	(-3.16)	(-4.12)	(1.73)	(0.16)
CL stocks	0.21*	0.03	-0.05	0.12**	0.09***	0.21*	0.03	-0.04	0.11**	0.09***
	(1.65)	(0.28)	(-0.72)	(2.39)	(3.94)	(1.68)	(0.32)	(-0.65)	(2.37)	(3.92)
Firm size	0.65***	1.16***	0.12***	-0.31***	-0.14***	0.65***	1.16***	0.12***	-0.31***	-0.14***
	(14.28)	(42.12)	(5.59)	(-16.07)	(-16.11)	(14.28)	(42.12)	(5.58)	(-16.07)	(-16.11)
PTB ratio	-0.43***	-0.18*	-0.08*	0.03	-0.01	-0.43***	-0.18*	-0.08*	0.03	-0.01
	(-5.83)	(-1.84)	(-1.65)	(0.52)	(-0.93)	(-5.83)	(-1.84)	(-1.65)	(0.52)	(-0.93)
Free float	0.02***	0.02***	0.01***	-0.00***	0.00	0.02***	0.02***	0.01***	-0.00***	0.00
	(5.85)	(6.79)	(8.20)	(-3.74)	(1.52)	(5.85)	(6.79)	(8.20)	(-3.74)	(1.52)
Constant	-0.97	-4.08***	-9.30***	-5.89***	2.12***	-0.98	-4.08***	-9.30***	-5.89***	2.12***
	(-1.47)	(-7.86)	(-38.23)	(-23.47)	(25.31)	(-1.48)	(-7.86)	(-38.21)	(-23.46)	(25.30)
Home country fixed effects	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Industry fixed effects	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Observations	202,139	201,759	201,952	199,804	189,719	202,139	201,759	201,952	199,804	189,719
R-squared	0.56	0.80	0.38	0.40	0.30	0.56	0.80	0.38	0.40	0.30

Robust t-statistics in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 8: NYSE Closure and Global Stock Market Liquidity: Canada vs. Other Home Countries

	NST		$TV		Turnover		Illiquidity		RV	
	Canada	ex. Canada	Canada	ex. Canada	Canada	ex. Canada	Canada	ex. Canada	Canada	ex. Canada
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
NYSE closure	-0.73***	-0.32***	-0.73***	-0.32***	-0.57***	-0.23***	0.10***	0.03	-0.11***	-0.07***
	(-17.06)	(-9.44)	(-16.68)	(-9.56)	(-16.45)	(-13.60)	(2.61)	(1.62)	(-4.75)	(-4.50)
Closure x CL	-0.25***	-0.08*	-0.25***	-0.08*	-0.23***	-0.09***	0.10**	0.00	-0.04	0.04*
	(-4.21)	(-1.78)	(-4.27)	(-1.79)	(-4.63)	(-3.50)	(2.03)	(0.03)	(-1.17)	(1.82)
CL stocks	-0.12	0.38*	-0.15	0.21	-0.07	0.05	0.22***	0.02	0.13***	0.03
	(-1.01)	(1.82)	(-1.56)	(1.25)	(-0.95)	(0.48)	(2.99)	(0.27)	(3.41)	(0.87)
Firm size	0.69***	0.71***	1.29***	1.06***	0.22***	0.01	-0.40***	-0.22***	-0.16***	-0.08***
	(20.74)	(7.66)	(45.74)	(19.10)	(12.08)	(0.19)	(-14.79)	(-8.38)	(-15.75)	(-5.75)
PTB ratio	-0.27***	-0.53***	-0.05	-0.22	-0.06	-0.07	-0.07	0.06	-0.01	-0.04**
	(-2.84)	(-5.82)	(-0.65)	(-1.62)	(-1.10)	(-1.14)	(-1.27)	(0.68)	(-0.37)	(-2.07)
Free float	0.02***	0.02***	0.02***	0.02***	0.02***	0.01***	-0.01***	-0.00**	0.00	0.00
	(5.96)	(3.70)	(9.90)	(4.31)	(10.58)	(5.54)	(-4.37)	(-2.29)	(0.31)	(0.82)
Constant	-0.48	-2.46***	-3.25***	-3.66***	-9.18***	-8.65***	-5.47***	-6.34***	1.84***	1.55***
	(-1.33)	(-2.62)	(-13.05)	(-5.58)	(-58.74)	(-25.23)	(-26.59)	(-19.76)	(14.68)	(13.67)
Home country fixed effects	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Industry fixed effects	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Observations	79,859	122,280	79,859	121,900	79,672	122,280	79,310	120,494	74,156	115,563
R-squared	0.55	0.54	0.84	0.78	0.29	0.44	0.40	0.42	0.44	0.23

Robust t-statistics in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 9: NYSE Closure and Global Stock Market Liquidity: Public Holidays vs. Hurricane Sandy

	NST	$TV	Turnover	Illiquidity	RV
	(1)	(2)	(3)	(4)	(5)
US holiday	-0.44***	-0.42***	-0.31***	0.05**	-0.05***
	(-12.78)	(-12.46)	(-16.03)	(2.30)	(-3.99)
US holiday x CL	-0.12**	-0.15***	-0.16***	0.04	0.00
	(-2.54)	(-3.33)	(-5.39)	(1.54)	(0.10)
Sandy	-0.55***	-0.53***	-0.40***	0.04	-0.20***
	(-8.20)	(-7.69)	(-10.59)	(0.90)	(-6.18)
Sandy x CL	-0.13	-0.16*	-0.16***	0.06	0.03
	(-1.58)	(-1.85)	(-3.08)	(1.12)	(0.86)
CL stocks	0.21*	0.03	-0.04	0.11**	0.09***
	(1.68)	(0.33)	(-0.64)	(2.37)	(3.91)
Firm size	0.65***	1.16***	0.12***	-0.31***	-0.14***
	(14.28)	(42.12)	(5.59)	(-16.07)	(-16.11)
PTB ratio	-0.43***	-0.18*	-0.08*	0.03	-0.01
	(-5.84)	(-1.84)	(-1.65)	(0.52)	(-0.93)
Free float	0.02***	0.02***	0.01***	-0.00***	0.00
	(5.85)	(6.78)	(8.20)	(-3.74)	(1.52)
Constant	-0.97	-4.07***	-9.30***	-5.89***	2.12***
	(-1.46)	(-7.85)	(-38.20)	(-23.47)	(25.33)
Home country fixed effects	YES	YES	YES	YES	YES
Industry fixed effects	YES	YES	YES	YES	YES
Observations	202,139	201,759	201,952	199,804	189,719
R-squared	0.56	0.80	0.38	0.40	0.30

Robust t-statistics in parentheses
*** p<0.01, ** p<0.05, * p<0.1