

**Market Reaction to Cross-listing of
Canadian Firm's on U.S. Stock Exchanges**

By

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Abstract

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This paper mainly tests the Canadian market reaction to Canadian firms being cross listed on U.S. stock exchanges. We tested the existence of abnormal returns based on cumulative abnormal returns using 11-day and 21-day event window, and bootstrap testing during the period 2000-2014. The Canadian market presents a significant positive mean cumulative return of 0.67% for the 11-day event window and 1.2% for 21-day window at the 5% significant level. In addition, cross-listing of Canadian firms on U.S. stock exchanges is a value-enhancing activity. The results confirm that security prices do adjust quickly to cross-listing announcements. In summary, Canadian firms cross-listing on U.S. stock exchanges yield a positive market reaction and an increase in shareholders' wealth.

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Chapter 1

Introduction

Determining Canadian market reaction to Canadian firms' cross-listing on U.S. stock exchanges is the main aim of this paper. Cross-listing occurs when a firm lists its equity securities on a foreign stock exchange in addition to the domestic stock exchange. As such, cross-listed stocks are traded on different stock exchanges at the same time. In addition to abnormal returns being realized from cross-listing, there are growth opportunities. Most companies want to cross-list their stocks in the United States because of the excellent business environment, liquidity, and well-developed U.S. capital market. However, Canadian firms that cross-list their stocks on U.S. stock exchanges face higher SEC disclosure and listing requirements. Miller (1999) found that non-U.S. firms experience positive market reaction in the home market when cross-listed on US markets. Doidge, Karolyi, and Stulz (2004) discovered that the company cross-listed in the U.S. has a higher value than a non-cross-listed company.

1.1 Background

Many studies have been conducted on cross-listing. Some researchers have tried to find out whether cross-listing creates value for the firm. Others have looked at market reaction to international cross-listing. Miller (1999), Foerster and Karolyi (1998), Moel (2001), and Doidge et al. (2004) stated that four reasons for cross-listing are discussed in the literature, namely, market segmentation, market liquidity, information disclosure, and investor protection. Miller (1999) did empirical test on cross-listing of stocks on U.S. stock exchanges from 1985 to 1995, and confirmed the existence of abnormal returns around the announcement date.

Theories on cross-listing that have been proposed by researchers include capital market segmentation theory, legal bonding theory, and investor recognition theory. The capital market segmentation theory suggests that the company will have lower costs for capital after cross-listing, which will increase the shareholders' wealth, according to the findings of Doukas and Switzer (2000). Legal bonding theory is supported by Burns, Francis and Hasan (2007) and Masoud (2012).

1.2 Purpose of the study

The purpose of the paper is to investigate whether the Canadian market reacts positively or negatively when a Canadian firm announces cross-listing with the U.S. market. If on average the market reacts positively, then, cross-listing is a value-enhancing activity. If on average the market reacts negatively, then cross-listing is a value-destroying activity. The issues to be discussed are:

What is the market reaction to cross-listing in different markets? What is the Canadian market reaction when a Canadian firm announces cross-listing on U.S. market? Is it a positive or negative reaction? Is cross-listing a value-destroying or value-enhancing activity? Do prices adjust quickly or slowly surrounding a cross-listing announcement? A random sample of 70 Canadian companies is selected that were cross-listed on U.S. exchanges between 2000 and 2014. We perform an event study for this paper. And use a market model. STATA statistical software is for data analysis. This paper analyzes the effect of cross-listing activities for the Canadian company and helps managers make decisions about cross-listing their companies on U.S. stock exchange. Cross-listing companies wanted to know whether they will gain or lose and shareholders care about the effect on their wealth.

1.3 Organization of the paper

This paper has five chapters. Chapter 1 deals with the introduction, background, purpose of the study, and organization of the paper. Chapter 2 presents a review of the literature on cross-listing. Chapter 3 describes the research objective, data gathered, methodology, and research design. Chapter 4 shows the regression analysis and an interpretation of the results. Chapter 5 displays the limitations, conclusions and recommendations of the study.

Chapter 2

Literature Review

This review of literature on Canadian firms' cross-listing in the U.S. includes the rationale for international cross-listing, and different theories relating to cross-listing.

2.1 Rationale for international cross-listing

Alexander, Eun and Janakiramanan (1988) confirm the empirical relationship between stock returns and international cross-listing. They find that cross-listed Canadian firms will experience a much smaller negative effect on their stock price than non- cross-listed Canadian firms. Similarly, cross-listed firms can gain more income from their businesses in overseas operations. Miller (1999) studies the market reaction to international cross-listing and finds there is an impact on stock prices when a firm cross-lists internationally. He observes that dual listing reduces the barrier to capital flow and minimizes the cost of capital. Also, there is a positive change to stock prices and shareholder wealth as a result of dual- listing. Furthermore, abnormal return is higher in U.S. stock exchanges than any other stock exchanges in the world.

Kadlec and McConnell (1994) indicate that there is a five percent positive abnormal return surrounding the cross-listing announcement date. The main reasons for this are an increase in shareholders and a decrease in bid-ask spread when a firm cross-lists to other countries. Investor recognition and liquidity of the firm improves from cross-listing. Van Horne (1970) claims that reputation of a firm rises with the public when it cross-lists internationally.

Foerster and Karolyi (1998) notice a decrease in effective spread on the Toronto Stock Exchange (TSE) when firms cross-listed in the U.S. Some firms, such as TSE losers, try to stay competitive by lowering the trading cost of their stock in the U.S market. Doidge (2004) mentions that minority investors can gain from cross-listing as private benefit control decreases in the firm.

2.2 Different theories relating to cross-listing

2.2.1 Segmentation theory of cross-listing

Doukas and Switzer (2000) identify a significant positive effect on stock prices when a Canadian firm cross-lists on a U.S. stock exchange. They reveal that firms can benefit from lowering the risk premium of their stock.

Peter (2009) suggest that the cross-listing will raise market liquidity, increase shareholder wealth, enhance information disclosure, and protect minority investors.

2.2.2 Legal bonding theory of cross-listing

According to Burns, Francis and Hasan (2007), cross-listed companies that have strong protection of law, have more opportunities to finance with equity and afford the lower risk premium than those companies that have less legal protection in their home country. Also, this leads to a lower agency cost for the cross-listed company.

Tavazoei (2012) states that based on the bonding hypothesis, higher risk-taking enables better protection of minority shareholders. On the other hand, the bonding hypothesis helps companies maintain a good reputation and improves their credit rating. In addition, companies will spend large amounts of money on R&D and will cut capital expenditures. In brief, lower-risk investment programs transfer into higher-risk investment programs due to the legal bonding hypothesis.

2.2.3 Investor recognition theory of cross-listing

Huang, Elkinawy and Jain (2013) demonstrate that higher levels of protection for investors allow greater opportunity for cash holding. Usually, large cash holdings demonstrate strong management in cross-listed companies. For instance, for the cross-listed company, the stronger corporate governance is, the less negative effects is. In addition, if investors have highly protection awareness, the cross-listed firm holds more cash than a non- cross-listed firm. Therefore, an increase of holding cash is highly correlated to the high quality of investor protection.

2.3 Cross-listing toward developed and emerging capital market

Roosenboom, and Dijk (2009) conduct research to find the target market for cross-listing. Their evidence shows small technology firms experience larger trading volumes and more volatile stock returns in the U.S. market than in any emerging market in the world. For instance, firms in emerging markets do not experience a higher local turnover rate in their cross-listing year but firms in a developed market do experience a raising domestic turnover rate in a cross-listing year. In other words, firms should keep in mind that emerging markets do not have well established insider-trading regulations. In addition, they found that a solid protection policy for investors is present in the United States. In conclusion, U.S. stock exchanges have stronger safeguards for cross-listed companies. Furthermore, cross-listed firms' CEOs outperform the non- cross-listed firms' CEOs on U.S. stock exchanges.

Silva and Chavez (2007) find that there is a positive relationship between cross-listing and liquidity in emerging markets (e.g. Latin America). For example, trading cost is different in this area and large firms experience lower trading cost in the local market. In addition, the liquidity cost advantage is not always present in different cross-listing markets. Therefore, market conditions and firm size are important factors for international cross-listing.

Similarly, Doidge et al. (2004) remark that cross-listed firms can get the lowest cost of capital by dual listing in the stock exchange of developed countries. However, there is strong corporate governance and high disclosure in the U.S. market, and many foreign firms may not choose to cross-list there because their controlling shareholders feel it may result in lesser private benefit control.

Roosenhoom and van Dijk (2004) reveal an interesting result about market reaction toward cross-listing in different market. They use a sample of 526 firms from 44 countries, and include 8 major stock exchanges. They find that there is a positive market reaction surrounding cross-listing announcement dates of 1.3% on U.S. exchanges, 1.1% on the London Stock Exchange, 0.6% on exchanges in continental Europe, and 0.5% on the Tokyo Stock Exchange. They establish that the market reaction to cross-listing is highest in developed countries like the U.S. and Britain. Foerster and Karolyi (1999) obtain the result that cross-listed firms experience an increase in cumulative abnormal return (CAR) before cross-listing and a decrease in CAR afterwards.

2.4 The reason for cross-listing in the United States

Doidge, Karolyi and Stulz (2004) disclose that foreign firms are worth more if they cross-list into the U.S. They find 16.7% higher Tobin's Q ratio for a U.S. cross-listed firm compared to a non- U.S. -cross-listed firm from the same country. Besides, excellent growth opportunities exist for firms that cross-list into the U.S. because there are fewer expropriation opportunities for controlling shareholders. Additionally, cross-listed firms in the U.S. experience higher growth rates compared to non- cross listed firms as a result of stronger investor rights than exist in any other country. The result is consistent with the research of Doidge (2004). He finds that firms cross-listed in the U.S. are worth more than non- cross-listed firm. Additionally, the private benefits of control decreases through cross-listing in the U.S. Thus, cross-listing in the U.S. offer many benefits to foreign firms.

Hail and Leuz (2009) show that there is a decline of 70 to 120 basis points in cost of capital when a firm cross-lists in the U.S. It depends on whether the firm cross-lists in over the-counter market or exchange market; cost of capital decreases when a firm cross-lists in the exchange market. In addition, a firm's valuation changes as its growth expectations change.

Similarly, Khurana, Martin and Periera (2008) find that a positive relationship exists between cross-listing and growth rates of externally financed firms. Cross-listing enables firms to access lower cost financing capital.

Lang, Ready and Yetman (1984) reveal that most companies that newly cross-list in the U.S., maintain correct accounting data, manage earnings effectively, and take into account bad news about the company. Also, they observe a strong association between stock price and accounting data in the U.S. Finally, they confirm that cross-listed firms in the U.S. are systematically different from firms that do not cross-list in the U.S.

2.5 Canadian firms' cross-listing in U.S..

Cross-listing in the U.S. can offer many benefits to Canadian firms, but the listing fees are higher to dual list with some major stock exchanges in the U.S. such as NYSE, NASDAQ, and AMEX. On the other hand, Canadian firms can get higher growth opportunities and reduced cost of capital by cross-listing in the U.S.

King and Segal (2003) find that Canadian firms cross-listed in the U.S. have a higher valuation than non- cross-listed firms because of higher investor protection in the U.S. Moreover, secondary market liquidity, investor coverage, profitability etc. are higher in the U.S than in Canada. As a result, many Canadian firms have been cross-listed in different U.S. stock exchanges.

Sarkissian and Schill (2012) perform a cross-country examination of foreign listing premiums. They show that non-U.S. firms get a unique valuation premium if they cross-list in the U.S. Additionally, cross-listing is attractive to those firms that have recently experienced high valuation. Similarly, Leuz (2003) showed that Canadian firms experience higher analyst coverage and forecast accuracy when they cross-list in the U.S.

Chapter 3

Data description & Research methodology

3.1 Research Objective

The main objective of this paper is to investigate whether the Canadian market reacts positively or negatively when a Canadian firm announces cross-listing on the U.S. market. If, on average, Canadian markets react positively, cross-listing is a value-enhancing activity. But if they react negatively, it is a value-destroying activity.

3.2 Data description

We will select a random sample of 70 Canadian companies that cross-listed in the U.S. between 2000 and 2014. Announcement dates will be obtained from Bloomberg while stock price data and market index return data are available from the Canadian Financial Markets Research Centre (Cfmrc/TSX).

3.3 Research design

An event study is planned to implement the research on Canadian market reaction when Canadian firms' cross-list on U.S. stock exchange.

3.3.1 Event window

I will test two event windows, which are 11 days (-5, 0, +5) and 21 days (-11, 0, +11) around the announcement dates. To be specific, an 11-day window event has 0 as the announcement date; -5 means 5 days' stock price and market return data before the announcement date; +5 means 5 days' stock price and market return data after the announcement date. Similarly, a 21-day window event has 11 days' stock price and market return data before and after the announcement date.

3.3.2 Estimation window

Prior announcement date from 120 days to 31 days is chosen for the estimation window. Collecting of -120 to -31 days' stock price data and market index return data is from CFMRC database.

3.3.3 Market model

Market model is one of a popular model used to conduct an event study and shows the linear relationship between security return and market return. Normal return is calculated using market model. A statistical software STATA will be used to get results from the event study.

The market model:

$$\mathbf{R}_{it} = \alpha_i + \beta_i \mathbf{R}_{mt} + \epsilon_{it}$$

Where

R_{it} is return to stock i, in period t,

R_{mt} is the return to market index in period t,

α_i is the intercept of the model,

β_i is the slope of the model

ϵ_{it} is the error term

The estimation window observation:

$$\hat{R}_{it} = \alpha_i + \beta_i \hat{R}_{mt}$$

Where

\hat{R}_{it} is normal return on the stock i, in period t,

α_i is the intercept in the model,

β_i is the slope in the model

\hat{R}_{mt} is the return to the market index in period t

Abnormal return

Abnormal returns are the difference between normal returns in the estimation window and the actual returns in the event window.

$$AR_{it} = R_{it} - \hat{R}_{it}$$

Where AR_{it} is the abnormal return in t period, R_{it} is the actual return on stock i on t period and \hat{R}_{it} is normal return on stock i on t period.

Average abnormal returns (AAR) are calculated to measure the effect of the sample for the each day of the event period by

$$AAR_t = \sum_{i=1}^N \frac{AR_{it}}{N}$$

Where AAR_t is average abnormal return on the stock at t period, AR_{it} is abnormal return on the stock at t period and N is sample number

Cumulative Abnormal Return (CAR) is the sum of abnormal returns in event period:

$$CAR_t = \sum AR_{it}$$

3.3.4: Hypothesis Testing

Hypothesis testing is to test the significance of the abnormal returns. We have to calculate Cumulative Abnormal Return for all companies to test across all events.

Hypothesis will be:

$$H_0 = AAR_t = 0 \text{ (Average abnormal return is zero)}$$

$$H_1 = AAR_t \neq 0 \text{ (Average abnormal return is not equal to zero)}$$

t test can be calculated as

$$t\text{-test} = \frac{AAR_t}{sd/\sqrt{N}}$$

where AAR_t is average abnormal return at t period, sd is the abnormal return standard deviation and N is days in event window

Decision Rule:

We will obtain p value from the regression to discover the significance of cumulative return of the sample firms. P value is the probability that the null hypothesis is true for given test statistics. If P value is less than .05, the decision rule under 5% significance level will be to reject the null hypothesis. If p value is higher than .05, then decision rule under 5% significance level will be not to reject null hypothesis.

Chapter4

Analysis & Results

Our main goal is to discover the Canadian market reaction when a Canadian company cross lists in the U.S. market. Also, in this chapter, we test whether there exists abnormal return or not when a Canadian firm announces cross-listing to U.S. market. As well, we test whether mean cumulative abnormal return is positive or negative during the period. Positive mean cumulative abnormal return from the test will mean that the Canadian market reaction is positive and cross-listing is a value-enhancing activity. As stated in Chapter 3, the sample size is 70 companies from the TSX (Toronto Stock Exchange) that cross-listed to the U.S. between 2000 and 2014. Normally distributed daily stock return data and market return data are collected from the CFMRC/TSX database. Cross-listing announcement data are from Bloomberg. Linear regression test runs on the STATA as follows for an 11-event and a 21-event window. Estimation-window trading day is -120 to -31 days. This chapter will also show the results of mean cumulative abnormal return.

4.1 Analysis of 11-day event window

4.1.1 Graphical presentation of 11-day event window

We will test whether abnormal return exists in the event window and our event window period is -5, 0, +5 days. We can see from the graph that there are increasingly abnormal returns from -1 day to announcement day. After that, the average abnormal return decreases considerably. This graph confirms a positive Canadian market reaction when a firm announces cross-listing into the U.S. market. Also, we recognize that positive abnormal return increases during cross-listing announcement day.

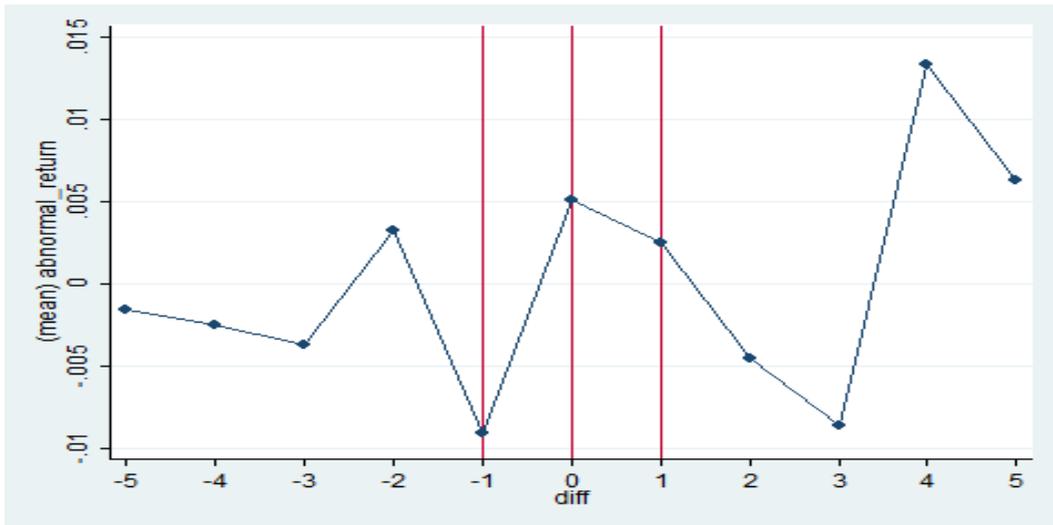


Figure 4.1.1 11-day abnormal return graph

4.1.2 Testing the hypothesis for 11-day event window

Hypothesis testing evaluates a statement or idea about a population statistically. The null hypothesis in our study is that average abnormal return is zero. The alternative hypothesis is that average abnormal return is not equal to zero. P value is the smallest level of significance by which we can reject null hypothesis. In our study, we test at 5% significance level. The table shows that p-value is more than 0.05. Therefore, we do not reject null hypothesis and we can rationally say that the average abnormal return is zero. In other words, it is a quick adjustment to the new information by Canadian stock exchanges.

```
. reg cumulative_abnormal_return if dif==0, robust
```

```
Linear regression                                Number of obs =      48
                                                F( 0, 47) =      0.00
                                                Prob > F      =      .
                                                R-squared     = 0.0000
                                                Root MSE     = .17353
```

	Coef.	Robust Std. Err.	t	P> t	[95% Conf. Interval]	
_cons	-.0005434	.025047	-0.02	0.983	-.0509315	.0498447

Table 4.1.2 - 11 days linear regression result

4.1.3 Bootstrap testing for 11 days event window

The bootstrap test help to measure correct sample estimates and try to accurate the indeterminacy in parameters. Also, bootstrap is the best way to check the P value. P value is equal to 0.983, which is greater than 0.05. Also, bootstrap result is consistent with our linear regression result. Hence, we do not reject the null hypothesis. Based on this result, the average abnormal return is not significant around the cross-listing announcement date on 11-day event window.

```

Bootstrap results                                Number of obs    =        48
                                                Replications    =       5000

      command: bootcumret
    boottest: r(cumret)
  
```

	Observed Coef.	Bootstrap Std. Err.	z	P> z	Normal-based [95% Conf. Interval]	
boottest	-.0005434	.0250643	-0.02	0.983	-.0496686	.0485817

Table 4.1.3 11-day event window bootstrap results

4.1.4 Mean cumulative abnormal return for 11-day event window

As Table 4.1.4 shows, the mean value is .0067042 or 0.67%, which means the Canadian market reaction is positive when a Canadian firm announces cross-listing in the U.S. market; therefore, we can confirm that cross-listing is a value-enhancing activity. The investor can gain from the cross-listing announcement because of the firm's increasing value.

. mean cumulative_abnormal_return

Mean estimation Number of obs = 4748

	Mean	Std. Err.	[95% Conf. Interval]	
cumulative_abnormal_return	.0067042	.002293	.0022088	.0111996

Table 4.1.4 Mean cumulative abnormal return for 11-day event window

4.2 Analysis of 21-day event window

4.2.1 Graphical presentation of 21-day event window

The abnormal return is present in the event window period of -10, 0, +10 days. Specifically, the highest abnormal return appears on the announcement date. Then, average abnormal return drops quickly. In other words, this graph illustrates the positive abnormal return on the cross-listing announcement day.

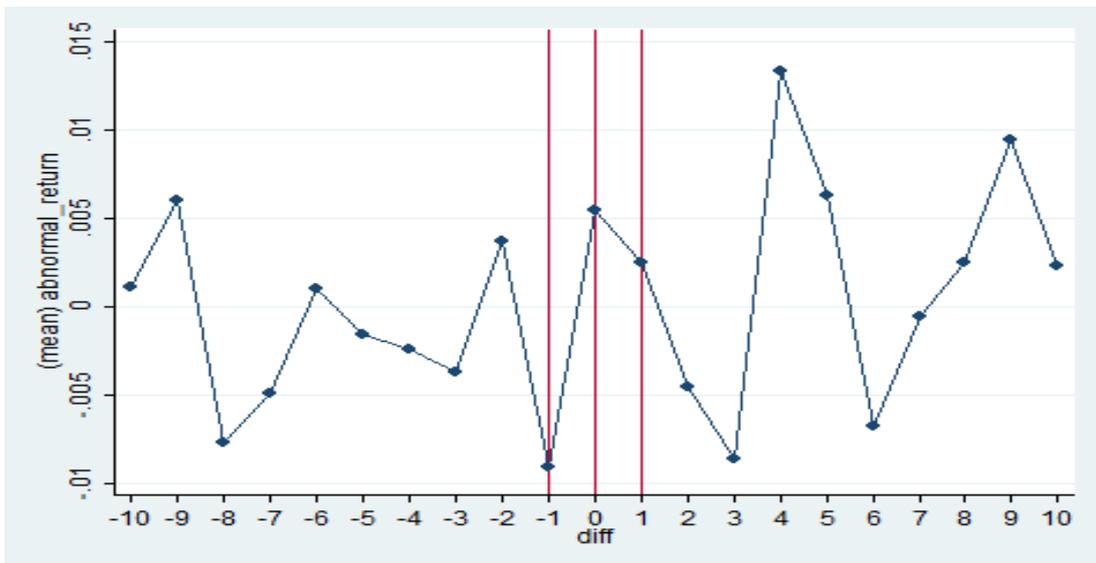


Figure 4.2.1 21-day abnormal return graph

4.2.2: Testing the hypothesis for 21-day event window

According to the Stata result, p-value is greater than 0.05. Thus, we do not reject the null hypothesis at the 5% significance level. The average abnormal return is zero near the cross-listing announcement date. In other words, it is a rapid adjustment of stock prices on Canadian stock exchanges. The result is consistent with the result of the 11-day event window period.

```
. reg cumulative_abnormal_return if dif==0, robust
```

```
Linear regression                               Number of obs =      49
                                                F( 0,      48) =      0.00
                                                Prob > F          =      .
                                                R-squared         =      0.0000
                                                Root MSE         =      .21706
```

cumulative~n	Robust		t	P> t	[95% Conf. Interval]	
	Coef.	Std. Err.				
_cons	.001606	.0310081	0.05	0.959	-.0607399	.0639519

Table 4.1.2 21-day linear regression result

4.2.3 Bootstrap testing for 21-day event window

Our linear regression result is stable with the bootstrap results that again prove the accuracy of the statistical result. Table 4.2.3 shows that the P value is more than 0.05. Therefore, we do not reject the null hypothesis at the 5% significance level. This means that the stock price adjusts quickly around the cross-listing announcement date.

```

Bootstrap results                                Number of obs   =      49
                                                Replications   =     5000

        command: bootcumret
        boottest: r(cumret)

```

	Observed Coef.	Bootstrap Std. Err.	z	P> z	Normal-based [95% Conf. Interval]	
boottest	.001606	.0306007	0.05	0.958	-.0583702	.0615823

Table 4.2.3: 21-day event window bootstrap results

4.2.4 Mean cumulative abnormal return for 21 days event window

The mean value is 0.0120461 or 1.2% in Table 4.2.4. This result represents a positive Canadian market reaction surrounding cross-listing announcement dates. In addition, the mean value of the 21-days event window is greater than the mean value of earlier 11- day event window. We reasonably confirm that cross-listing of Canadian firms in the U.S. market is a value-enhancing activity.

```
. mean cumulative_abnormal_return
```

```
Mean estimation                                Number of obs   =     5328
```

	Mean	Std. Err.	[95% Conf. Interval]	
cumulative_abnormal_return	.0120461	.0025772	.0069937	.0170985

Table 4.2.4: Mean cumulative abnormal return for 21-day event window

Chapter 5

Conclusion, Recommendation and Limitations

Cross-listing activity is a way to finance the company and increase the shareholders' wealth. A Canadian firm can benefit from cross listing in the U.S. market. Canadian firms experience higher growth rates and lower costs of capital in the U.S. market. In this paper, we have tried to determine the Canadian market reaction when a Canadian firm cross lists in the U.S. market. We collected data on 70 random Canadian companies from the TSX that cross-listed on a U.S. stock exchange between 2000 and 2014 and designed an event study to find the effect on the Canadian market. The main aim was to discover the positive or negative Canadian market reaction when Canadian firms cross-list on a U.S. stock exchange.

From this study, we have found that there is a positive market reaction when Canadian firms cross-list on a U.S. stock exchange. Also, we found positive mean cumulative abnormal return of 0.67% for an 11-day event window and 1.2% for a 21-day event window. It demonstrates that cross-listing on the U.S. market for a Canadian firm is a value-enhancing activity. In other words, the investor can gain from the cross-listing announcement because cross-listing increases firm value and shareholder wealth. Moreover, we have found that the price adjusts very quickly surrounding cross-listing announcement dates, which shows that the Canadian stock market is efficient. The result from this study should help the managers decide whether their companies would benefit from cross-listing on a U.S. stock exchange.

As mentioned above, other benefits include an increase in stock liquidity, decrease in cost of capital, and rise in growth opportunity when Canadian companies cross-list on U.S. stock exchanges. Thus, Canadian firms can earn more profit and increase the firm value and stock price at the same time.

The results of the study are consistent with those of earlier studies related to cross-listing. They support the findings of Roosenhoom and van Dijk (2009), who found a positive market reaction when firms cross-list on U.S. stock exchanges. Similarly, King and Segal (2003) find that cross-listed Canadian firms' gains in value depend on the U.S. regime, firm size, coverage ability, and profitability. Our findings are consistent with those of King and Segal. Doidge (2004) mentions that the higher investor protection in the U.S. market leads to higher voting premium for the U.S. cross-listed company. Furthermore, the result of our study is in accord with Miller (1999) and Kadlec and McConnell (1994). This paper confirms the segmentation theory of cross-listing, which predicts a positive effect in the Canadian market surrounding the cross-listing announcement date.

We collected stock price return and market return from the TSX. Future research should be done in a specific field, such as the energy sector, technology sector, etc. In addition, researchers need to add more samples and use more recent observations to run the regression. Alternatively, additional research could determine the U.S. market's reaction when a U.S. firm cross-lists in Canada.

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Appendix A

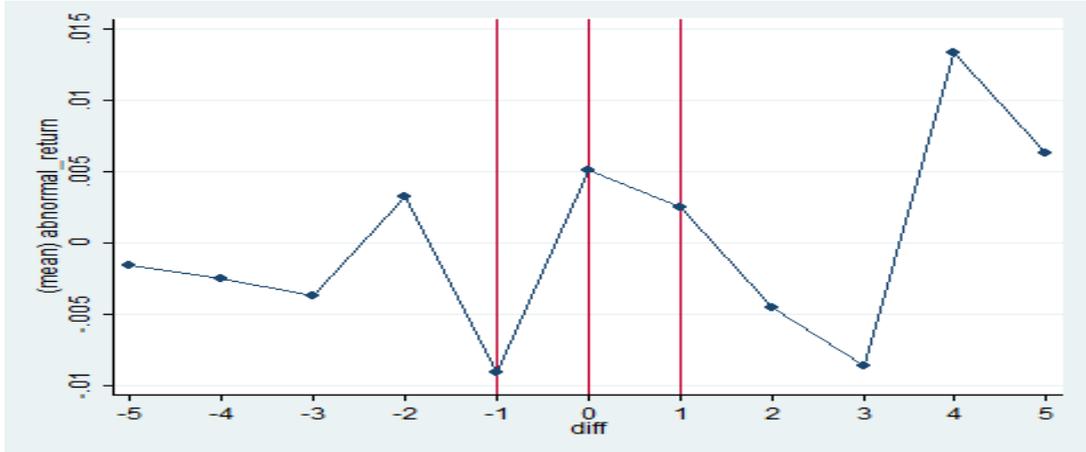
List	Company Name	USA ticker	Announcement Date
1	Advantage Oil & Gas	AAV	2005-07-12
2	Alderon Iron Ore	AXX	2012-05-03
3	Aeterna Zentaris	AEZS	2013-08-28
4	Alamos Gold	AGI	2013-11-02
5	Asanko Gold Inc.	AKZ	2005-11-17
6	Almaden Minerals Ltd.	AAU	2005-11-17
7	Allied Nevada Gold	ANV	2007-08-05
8	Atlantic Power	AT	2010-07-22
9	Golden Minerals	AUMN	2009-10-23
10	Aurico Gold	AUQ	2008-09-10
11	Avalon Rare Metals	AVL	2010-12-21
12	Alexco Resource	AXU	2007-09-19
13	Brookfield Asset Management	BAM	2013-03-18
14	Blackberry Limited	BBRY	2006-06-26
15	BCE Inc.	BCE	2006-06-29
16	Progressive Waste Solutions	BIN	2009-03-06
17	Bank Of Nova Scotia	BNS	2002-04-06
18	Brookfield Property Partners	BPY	2013-03-18
19	B2gold	BTG	2013-04-06
20	Bellatrix Exploration	BXE	2012-09-20
21	Canarc Resource	CRCUF	2001-08-08
22	Counterpath	CPAH	2012-10-07
23	CIBC	CM	2006-07-07
24	Canadian Natural Resources	CNQ	2005-12-05
25	Canadian National Railway	CNI	2004-12-02
26	Cardiome Pharma	CRME	2004-02-07
27	Canadian Pacific Railway	CP	2001-08-20
28	Crescent Point Energy	CPG	2014-01-21
29	Cenovus Energy	CVE	2009-10-30
30	Canadian Zinc	CZICF	2007-10-04
31	Dominion Diamond	DDC	2007-11-15
32	Dejour Energy Inc.	DEJ	2007-05-22
33	Descartes Systems Group	DSGX	2008-12-31
34	Dragonwave	DRWI	2009-10-14
35	Endeavour Silver	EXK	2007-01-26
36	Energy Fuels	UUUU	2013-03-12

37	Eldorado Gold	EGO	2010-09-03
38	Enbridge Inc.	ENB	2005-12-05
39	Entree Gold	EGI	2005-07-15
40	Exfo Inc.	EXFO	2009-12-31
41	First Majestic Silver	AG	2010-12-14
42	Fortuna Silver Mines	FSM	2011-09-15
43	Gildan Activewear	GIL	2005-12-05
44	General Moly Inc.	GMO	2006-08-14
45	Great Panther Silver	GPL	2011-07-02
46	Gran Tierra Energy	GTE	2008-04-04
47	US Geothermal Inc.	HTM	2008-04-15
48	Gazit-Globe	GZT	2011-12-13
49	Hudbay Minerals	HBM	2010-10-22
50	Ivanhoe Energy	IVAN	2002-12-26
51	Just Energy Group	JE	2012-01-25
52	Kinross Gold	KGC	2008-01-23
53	Kingsway Financial Services	KFS	2013-06-08
54	Lake Shore Gold	LSG	2011-07-29
55	Mad Catz Interactive	MCZ	2001-10-09
56	Midway Gold	MDW	2007-12-31
57	MDC Partners	MDCA	2006-06-26
58	Minco Gold	MGH	2007-12-11
59	Mitel Networks	MITL	2013-12-31
60	Mountain Province Diamonds	MDM	2005-01-04
61	Merus Labs International	MSLI	2000-05-06
62	McEwen Mining	MUX	2012-10-31
63	Northern Dynasty Minerals	NAK	2004-03-11
64	Novadaq Technologies	NVDQ	2012-02-24
65	Novagold Resources	NG	2012-04-17
66	New Gold	NGD	2008-11-07
67	Norsat International	NSATF	2003-10-14
68	North American Energy Partners	NOA	2007-07-27
69	Nevsun Resources	NSU	2005-11-01
70	Open Text	OTEX	2006-06-26

Appendix B

11 days window event testing

11-day abnormal return graph



11-days Stata result

```
. reg cumulative_abnormal_return if dif==0, robust
```

Linear regression

```
Number of obs = 48
F( 0, 47) = 0.00
Prob > F = .
R-squared = 0.0000
Root MSE = .17353
```

cumulative~n	Coef.	Robust Std. Err.	t	P> t	[95% Conf. Interval]
_cons	-.0005434	.025047	-0.02	0.983	-.0509315 .0498447

21-day Stata result

```
. reg cumulative_abnormal_return if dif==0, robust
```

```
Linear regression                                Number of obs =      49
                                                F( 0,      48) =      0.00
                                                Prob > F       =      .
                                                R-squared     = 0.0000
                                                Root MSE     = .21706
```

	Coef.	Robust Std. Err.	t	P> t	[95% Conf. Interval]	
_cons	.001606	.0310081	0.05	0.959	-.0607399	.0639519

21-day event window bootstrap results

```
Bootstrap results                                Number of obs   =      49
                                                Replications   =     5000
```

```
command: bootcumret
boottest: r(cumret)
```

	Observed Coef.	Bootstrap Std. Err.	z	P> z	Normal-based [95% Conf. Interval]	
boottest	.001606	.0306007	0.05	0.958	-.0583702	.0615823

21-day mean cumulative abnormal return

```
. mean cumulative_abnormal_return
```

```
Mean estimation                                Number of obs   =     5328
```

	Mean	Std. Err.	[95% Conf. Interval]	
cumulative_abnormal_return	.0120461	.0025772	.0069937	.0170985