

NAFTA Effect On Company Values And Performance

Sergiy Rakhmayil, Ryerson University, Canada
Ayse Yuce, Ryerson University, Canada

ABSTRACT

This paper examines the long-term affect of NAFTA on company performances in Canada, Mexico, and the U.S.A. Our main focus is to study the impact of the liberalization process on various aspects of performance, including profitability, operating efficiency, investment, output, employment, leverage, and firm valuation. We discover that output, profitability and efficiency increased in all three countries, and other effects are country-specific. Overall, we find that NAFTA affected companies in the three countries positively and their profitability and efficiency increased which led to value increases.

Keywords: International Trade Liberalization; Firm Performance; NAFTA

INTRODUCTION

The North American Free Trade Agreement implemented in 1994 offers a unique chance to study the effect of liberalization on company performances in all three participating countries, Mexico, U.S.A and Canada. Proponents of free-trade agreements argue that NAFTA should increase trade among three countries, increase competition and create benefits for both the consumers and the companies by reducing tariffs and regulations and making markets accessible for all companies in three countries. On the other hand, opponents fear that small and medium size local companies will suffer because they cannot compete with large multinational companies without protection provided by their governments.

The purpose of this paper is to examine the long-term affect of NAFTA on company performances in the three countries. It has been more than a decade after administrations of three countries ratified the NAFTA agreement, and several prior studies have investigated this subject using different methodologies and country samples with mixed evidence. Our study adds to this literature by analyzing changes in financial and operating performance, as well as changes in firm valuation, for public companies in Mexico, U.S.A and Canada using annual data from 1993 to 1997. Our main focus is to study the impact of the liberalization process on various aspects of performance, including profitability, operating efficiency, investment, output, employment, leverage, and firm valuation for corporations in North America. In particular, we investigate whether the liberalization increased firm performance and firm valuation by conducting nonparametric tests for changes in distribution parameters of performance measures before and after the introduction of NAFTA.

Our study makes the following contributions to the literature. Whereas a large number of studies have examined the capital market implications of NAFTA using cointegration and event study analysis of stock returns, we are aware of only one other study of firm financial and operating performance by Baggs, and Brander (2006), who investigated the effect of trade liberalization on firm profitability and financial leverage in Canada. Analysis of financial and operating performance is important because it allows us to understand the intrinsic company value and is free from investor expectations. Our study differs from the previous research in that we analyze the whole range of performance aspects, including profitability, efficiency, investment, output, employment, leverage, dividends, and company valuation. Next, to the best of our knowledge, this is the first study to conduct the analysis of firm performance for all three countries participating in NAFTA: Canada, Mexico, and the USA.

This paper is organized as follows. First we examine previous studies then we will introduce our data. The fourth section discusses the methodology; the fifth section presents the results and is followed by the conclusion.

PREVIOUS STUDIES

Researchers that specialize on time-series analysis and long and short –term relationships among different stock market return series investigated the properties of various stock index returns. In the following paragraphs we will discuss some representative studies.

Amitava and Amlan (2000) examines the effect of the North American Free Trade Agreement (NAFTA) process on daily stock index returns in the North American markets and the selected Association of South East Asian Nations (ASEAN) markets to find that the advent and eventual ratification of NAFTA has significant effect. Phengpis and Swanson's (2006) results indicate that the passage of NAFTA may have reinforced economic interdependence among member countries, but it has not contributed to the existence of long-run interdependence among the members' stock markets through consistent cointegrating relation(s). Similarly, Aggarwal, and Kyaw (2004) documents that financial (equity) markets in the NAFTA region have become more integrated after the formation of NAFTA. There seems to be greater financial integration after NAFTA and so lesser opportunity for international portfolio diversification in the NAFTA region after 1994.

NAFTA causes short-term dependencies to increase among the three countries however it did not cause long-term dependency and cointegration relationship. Ciner (2006) shows that the documented cointegration property among the NAFTA equity markets was in fact confined to a sub-period in the late 1990s. He argues that the comovement was caused by the global boom in information technology shares. Both Ewing, Lynch, and Payne (1999) and Atteberry and Swanson (1997) find no cointegration among the markets.

Braun, and Traichal (1999) tests the hypothesis of a trend toward commonality of business practices. As international competition in both product and financial markets increases, business practices should converge. Little or no support was found for differences in profitability and business growth opportunities for the firms in this sample.

MacDermott (2007) concludes that NAFTA increases FDI flows into the US by approximately 0.96%, while flows into Mexico rise by 1.73% and into Canada by 1.54%. These findings are similar to but exceed the country-specific results of Globerman and Shapiro (1999) and Sanchez and Karp (1999).

Effect of NAFTA on company performances is not investigated as extensively as that of on equity index levels. The following studies examine various aspects of firm performance during and after NAFTA agreement. Ghani and Haverty (1995) investigates the stock market reaction associated with the passage of the North American Free Trade Agreement (NAFTA) for firms that cited NAFTA as a favorable development in the Management Discussion and Analysis on the president's letter to the shareholders sections of their annual reports to show that significant positive average abnormal returns for a sample of firms which expressed favorable views. In contrast, no significant average abnormal and average cumulative abnormal returns performances were documented for the industry-matched control group.

Aggarwal, Moore, Long, and Ervin(1998) conclude that NAFTA significantly increases returns for a broad sample of 1471 firms. The study also documents significant industry variations in the firm value impact of NAFTA. Chemicals and Machinery benefit the most and automotive products and telecommunication stock experience significant wealth declines. Hanson, and Song (1998) show that on average shareholders of U.S. firms neither gained nor lost from passage of the NAFTA, but shareholders of Mexican firms experienced significant gains. Similarly Hamid, Mathis, Dandapani, and Prakash (1997) find that the NAFTA lead to the existence of abnormal risk-adjusted price changes. The large firms appeared to be more affected by the NAFTA than the small firms, especially the large firms in the oil and gas and computer industries.

Baggs and Brander (2006) conclude that the net effect of the NAFTA in Canada was to increase profits and reduce leverage. Thompson (1994)'s results suggest that Canadian investors anticipated natural resource intensive firms to benefit relative to capital intensive firms.

The results of Rodriguez (2003) paper about investor expectations in three countries show that investors consistently rewarded manufacturing sectors on the basis of simple factor intensity. The results do not support the existence of a significant relationship between profits, trade liberalization, and the relative scales of production industries in NAFTA countries.

Our paper examines the effects of NAFTA on Canadian, U.S. and Mexican firm performance. We want to conduct a comprehensive study of company performance, efficiency, investment, size and output of all countries after the NAFTA.

DATA

In order to investigate the effect of liberalization on corporate performance we collect balance sheet and income statement data for corporations in Canada, Mexico, and the USA. The sample of Canadian and Mexican companies is drawn from the Datastream, and the sample of US companies is drawn from S&P Compustat between 1993 and 1997. We use introduction of NAFTA in 1994 as a reference point (year 0) and study whether there were significant changes in performance between year -1 and year +3. We include public companies that have available observations for the whole period 1993-1997. We specify this condition because we aim to study within-firm changes during the liberalization process and thus need firms to exist both before and after the implementation of NAFTA.

We collect data on Net Income, Sales, Total Assets, Shareholders' Equity, Number of Employees, Capital Expenditures, Total Debt, and Cash Dividends for the firms. In addition, we use Consumer Price Index (CPI) data for the three countries available from the Datastream. We use these data to construct firm performance measures suggested in Megginson, Nash and van Randenborgh (1994). These measures include proxies for profitability, operating efficiency, capital investment, output, employment, leverage, and dividends. Canadian and especially Mexican datasets are relatively small and have a lot of missing observations, especially for the number of employees. Therefore, we include companies for which we can construct at least one performance proxy during 1993-1997.

We use company balance sheet and income statement data to construct performance proxies. Following Megginson, Nash and van Randenborgh (1994), we construct performance measures for profitability (return on sales, return on assets, return on equity), operating efficiency (sales efficiency, net income efficiency), capital investment (capital expenditure to sales, capital expenditure to total assets), output (real sales), employment, leverage, dividends, and we also construct Tobin's Q as a measure of market valuation. In constructing variables we use local currency data. When we compute real sales and sales efficiency, we deflate the data by local CPI index and normalize observations by real sales in year 0 (the year when NAFTA was introduced). We also use a similar procedure to compute net income efficiency.

We have very large in absolute value extreme observations that skew the distribution of the performance changes, for example change in return on sales (ROS) for Canada ranges from -57.89 to 18.48, with skewness -9.71 and kurtosis 117.99. The same variable without the top and bottom 5% outliers ranges from -1.09 to 0.50, with skewness -3.36 and kurtosis 20.64. The extreme observations affect mean changes but not median changes, which is expected, since medians are by construction less influenced by the outliers. The empirical tests produce similar results with or without the outliers and are available on request from the authors.

We compute changes in the performance proxies between 1993 (year -1) and 1997 (year +3). To ensure that our results are not driven by outliers, we exclude from analysis top and bottom 5% of performance changes. Our final sample consists of 158 firms for Canada, 37 firms for Mexico, and 5458 firms for the USA.

HYPOTHESES AND METHODOLOGY

Economic theory suggests that liberalization process should lead to reduction of risk, increasing use of comparative advantage, economies of scale, and subsequent economic growth. See for example Obstfeld (1994) and Thompson (1994), or Grabowski and Shields (1996), who offer a comprehensive survey of free trade and

protectionist arguments. It implies that at the firm level we should expect to see improvements in financial and operating performance for companies. Opponents of liberalization, on the other hand, argue that reduction of import tariffs should hurt local companies because it will expose them to harsher competition from overseas. We will test the following hypothesis:

Hypothesis 1. The profitability hypothesis

- H1a.** The trade agreement will reduce profitability, especially for firms most vulnerable to import competition.
- H1b.** The trade agreement will increase profitability, especially for firms most able to exploit economies of scale, diversification, and comparative advantage.

Trade liberalization is expected to have a positive efficiency effect on exporting firms because lower export tariffs will imply a better competitive position in the overseas markets. In addition, firms facing import competition are forced to improve efficiency in using their resources in order to stay in business after import tariffs are eliminated. Therefore, as a result of trade liberalization not only do we expect to see profitability improvements in any given firm as a whole, but we also anticipate greater efficiency in using firm's resources. If, on the other hand, firms vulnerable to import competition are unable to improve their efficiency, then we should expect efficiency declines, as the same amount of resources will no longer be generating pre-liberalization levels of income, as stated in Hypothesis 2.

Hypothesis 2. The efficiency hypothesis

- H2a.** The trade agreement will reduce operating efficiency, especially for firms most vulnerable to import competition.
- H2b.** The trade agreement will increase operating efficiency, especially for firms most able to exploit economies of scale, diversification, and comparative advantage.

A reduction in transaction costs following the trade agreement should in theory lead to better investment opportunities offered by the comparative advantage and economies of scale. Thus, we would expect investment increases for the firms whose competitive position improved in the foreign markets and they need to produce more, or firms that need to re-allocate productive resources in order to become more competitive in the home markets because of increased foreign competition at home. Alternatively, some firms may be unable or unwilling to increase investment, especially if these firms have liquidity problems and are very vulnerable to foreign competition.

Hypothesis 3. The investment hypothesis

- H3a.** The trade agreement will reduce investment, especially for firms most vulnerable to import competition.
- H3b.** The trade agreement will increase investment, especially for firms most able to exploit economies of scale, diversification, and comparative advantage.

The governments of participating countries that enter foreign trade treaties are usually less concerned with profitability for some specific firms and more concerned with overall economic consequences in terms of whether or not a particular agreement will lead to an increase in real output. Therefore, it is important to measure the effect of NAFTA on firm output as stated in Hypothesis 4.

Hypothesis 4. The output hypothesis

- H4a.** The trade agreement will reduce real output, especially for firms most vulnerable to import competition.
- H4b.** The trade agreement will increase real output, especially for firms most able to exploit economies of scale, diversification, and comparative advantage.

In theory a reduction of transaction costs, including the types of transaction costs removed by NAFTA, should lead to more efficient resource allocation. This might mean that grossly inefficient firms may have to cease operations or lay off workers because of greater international competition, and more efficient firms or firms in

different industry sectors will benefit. Thus, at least in the short run one may expect employment to decrease. Alternatively, if the trade liberalization leads to greater utilization of comparative advantage rather than resource reallocation, then firms will have greater demand for their products and will hire more workers to meet the demand, as stated in Hypothesis 5.

Hypothesis 5. The employment hypothesis

- H5a.** The trade agreement will reduce employment, especially for firms most vulnerable to import competition.
- H5b.** The trade agreement will increase employment, especially for firms most able to exploit economies of scale, diversification, and comparative advantage.

The liberalization process includes reduction of transaction costs not only in the goods market, but also in the financial markets. Adler and Qi (2000) and Mittoo (1992, 2003), among others, discuss the effect of liberalization on stock market integration in North America. Stulz (1999) and Bris et al (2004) argue that stock market integration reduces cost of equity capital and leverage. Alternatively, a greater degree of risk sharing and comparative advantage that in theory come with liberalization should reduce cash flow volatility for businesses and more stable cash flows lower probability of financial distress and allow companies to use greater financial leverage. See for example Opler and Titman (1994) for the discussion of the relationship between financial distress and leverage. This is reflected in Hypothesis 6.

Hypothesis 6. The leverage hypothesis

- H6a.** The trade agreement will reduce leverage, especially for firms that prefer cheaper equity financing.
- H6b.** The trade agreement will increase leverage, especially for firms whose cash flows are much less volatile than before.

Following liberalization, the dividends may increase, because private investors will see greater profitability for companies benefiting from the trade agreement, and will subsequently demand greater cash distributions. Alternatively, firms most vulnerable from foreign competition may find it difficult to sustain pre-liberalization payout levels, and may decrease dividends. In addition, if firms identify great investment opportunities resulting from the trade agreement, then there will be less cash available for distribution and thus dividends may decrease. This is formulated in Hypothesis 7.

Hypothesis 7. The dividends hypothesis

- H7a.** The trade agreement will reduce dividends, especially for firms most vulnerable to import competition and for firms with significant investment opportunities.
- H7b.** The trade agreement will increase dividends, especially for firms most able to exploit economies of scale, diversification, and comparative advantage.

The overall effect of the liberalization process is expected to be greater cash flows for firms that take advantage of lower transaction costs, and lower cost of capital due to the effects of financial liberalization. As the result we expect to see the increase in firm values. On the other hand, firms most vulnerable to increased foreign competition may see the opposite, which includes lower cash flows and greater cost of capital, and consequently lower values, as stated in Hypothesis 8.

Hypothesis 8. The firm value hypothesis

- H8a.** The trade agreement will reduce firm values, especially for firms most vulnerable to import competition
- H8b.** The trade agreement will increase firm values, especially for firms most able to exploit economies of scale, diversification, and comparative advantage.

Theoretical predictions and detailed description of the performance proxies are presented in Table 1.

Table 1. Summary of testable implications

Characteristics	Financial Ratios	Predicted relationship
Profitability	Return on sales (ROS) = Net Income/Sales	$ROS_A > ROS_B$
	Return on assets (ROA) = Net Income/ Total Assets	$ROA_A > ROA_B$
	Return on equity (ROE) = Net Income/Shareholders Equity	$ROE_A > ROE_B$
Operating Efficiency	Sales Efficiency (SALEFF) = Sales / Employment	$SALEFF_A > SALEFF_B$
	Net Income Efficiency (NIEFF) = Net Income/ Employment	$NIEFF_A > NIEFF_B$
Capital Investment	Capital expenditure to sales (CESA) = Capital expenditure / Sales	$CESA_A > CESA_B$
	Capital expenditure to total assets (CETA) = Capital expenditure / Total assets	$CETA_A > CETA_B$
Output	Real Sales (SALR) = Nominal sales / Consumer price index	$SALR_A > SALR_B$
Employment	EMPL = Total number of employees	$EMPL_A < EMPL_B$
Leverage	Debt to assets (TDTA) = Total debt / Total assets	$TDTA_A < TDTA_B$
Dividends	DIVSAL = Cash dividend / Sales	$DIVSAL_A > DIVSAL_B$
	Payout = Cash dividend / Net Income	$Payout_A > Payout_B$
Company valuation	Tobin's Q1 = (Total Assets – Shareholders Equity + Market value of equity)/ Total assets	$Q1_A > Q1_B$
	Tobin's Q2 = (Market value of equity + Total Debt)/ Total assets	$Q2_A > Q2_B$

Notes. This table presents firm characteristics that we expect to change as a result of the liberalization process in North America, and empirical proxy variables used to measure these characteristics. We also outline the predicted changes in the firm performance characteristics based on economic theory. Subscriptions A and B denote firm characteristics after and before, respectively. Sales efficiency is calculated using CPI-deflated sales per employee, and is normalized to equal 1.00 in year 1994, so that other year numbers represent output per employee as a fraction of performance in year 1994. Real sales and net income efficiency are computed in a similar way.

We use the matched pairs methodology, similar to the one employed earlier by Megginson, Nash and van Randenborgh (1994), to study whether the liberalization process resulted in significant financial and operating performance changes for companies in our sample. Megginson, Nash and van Randenborgh (1994) designed a methodology to analyze the effect of privatization on firm performance. This methodology has been successfully used in studying changes in firm performance. Its key advantages are simplicity and robustness to outliers in the data. There is no need for currency conversion for data from different countries. We use this methodology because it ideally fits our purpose of studying changes in firm performance in Canada, Mexico, and the USA following regulatory changes for cross-border transactions as a result of NAFTA.

To test theoretical predictions, we compute performance proxies for each firm between 1993 (year -1) and 1997 (year +3). Next, we use Wilcoxon/Mann-Whitney test to examine whether there are significant median changes between year -1 and year +3 in company performance measures. We also use a proportion test to find out whether the proportion of the firms that have predicted performance changes is significantly different from 0.5, which would be expected if firms changed performance just by chance. If, on the other hand, we find that a large proportion of firms changes performance in a given direction, this evidence may be helpful in understanding the effects of North American liberalization processes on firm performance.

RESULTS

Profitability

Hypothesis 1 is related to firm profitability. A major part of the liberalization process in North America has been reduction of cross-border transaction costs, including import and export tariffs. A reduction in transaction costs in theory should improve firm profitability. We measure profitability with three proxies: return on sales (ROS), return on assets (ROA), and return on equity (ROE). In interpreting the tests for profitability changes, we follow Megginson, Nash and van Randenborgh (1994) and focus more on the ROS variable, mainly because this is a ratio of current dollar flow that are less subject to accounting adjustments than the other two ratios.

Table 2 shows results of median equality tests of the profitability measures for Canadian, Mexican, and the American companies. For Canada all three profitability measures display significant positive median changes. For example, the median for ROS changed from 0.0320 to 0.0517, and the change is highly significant with p-value of the median equality test of 0.0006. The proportion of firms that improved ROS is 67.9% and significantly greater than 50%, which we would expect to observe if firms' ROS were changing by pure chance. We observe a similar picture for ROA and ROE, which constitutes clear evidence that liberalization improved profitability of Canadian firms.

Mexican firms also display positive median changes but only changes in ROE are statistically significant, while median changes in ROS and ROA are insignificant. At the same time the proportion of firms that displays ROS median changes as predicted is 74.2% and significantly different from 50%, with corresponding p-value of 0.0107. Therefore, we do find evidence of profitability improvements for Mexican firms, but this evidence is less compelling. We conjecture that the lack of statistical significance is due to the small number of observations; for each profitability variable there are 36 or fewer usable observations for Mexico.

For the US firms, ROS has significant positive median change from 0.0416 to 0.0450 with corresponding p-value of 0.0171 for the median equality test. We also find that the proportion of firms that changed ROS in the predicted direction is 51.6% and significantly higher than 50%, with the corresponding p-value of 0.0371. We find similar and significant evidence for ROE. The median change in ROA is positive but lacks significance, whereas the proportion of the firm where ROA changed in the predicted direction is 51.5% and is significantly higher than 50%. Therefore, we conclude that US firms significantly improved profitability during the process of North American liberalization. Thus, we find evidence that in all three countries firm profitability improved with reduction of transaction costs, which is consistent with economic theory and the evidence on net effect of NAFTA for Canadian firms concluded by Baggs and Brander (2006).

We conducted several robustness tests. In addition to Wilcoxon/Mann-Whitney test, we also use the following median equality tests for all performance variables: Wilcoxon/Mann-Whitney (tie-adjusted), Median Chi-square, Adjusted Median Chi-square, Kruskal-Wallis, Kruskal-Wallis (tie-adjusted), and van der Waerden test. In addition to the sign (exact binomial) proportion test that $p=50%$, we also use sign (normal approximation) proportion test that $p=50%$, Wilcoxon signed rank test that $p=50%$, and van der Waerden (normal scores) test that $p=50%$. Next, we varied the testing period from year -3 to year +3. All tests produce similar results.

Efficiency

Hypothesis 2 is related to operating efficiency. We measure efficiency using two proxy variables, real sales per employee (SALEFF) and real net income per employee (NIEFF). Median equality tests presented in Table 3 show improvements in both efficiency variables for the three countries. In Canada median SALEFF changed from 0.9012 to 1.1632 of its year 0 value during the 1993-1997 period. This change is highly significant with $p < 0.0001$. In addition, 89.5% of firms display improvements in SALEFF, and this proportion is highly significantly different from 50%. NIEFF displays a highly significant and sharp increase in mean, from 0.4300 to 1.8437, and in median, from 0.5368 to 1.2533, with 82.1% of companies displaying improvements in NIEFF.

Table 2. Profitability changes in Canada, Mexico, and the USA

Variable	Obs.	Mean (Median) Before	Mean (Median) After	Mean (Median) Change	Wilcoxon/Mann- Whitney median equality test (p-value)	Percentage of firms that changed as predicted	Sign (exact binomial) proportion test that p=0.5 (p-value)
<i>Canada</i>							
ROS	140	0.0348 (0.0320)	0.0413 (0.0517)	0.0065 (0.0198)	3.4341 (0.0006)	67.9%	91.0000 (0.0000)
ROA	147	0.0148 (0.0229)	0.0270 (0.0367)	0.0122 (0.0138)	3.4301 (0.0006)	67.2%	90.0000 (0.0001)
ROE	136	0.0531 (0.0685)	0.0997 (0.1217)	0.0466 (0.0532)	4.0521 (0.0001)	65.6%	80.0000 (0.0007)
<i>Mexico</i>							
ROS	35	0.0815 (0.0652)	0.0968 (0.0926)	0.0153 (0.0274)	1.2921 (0.1963)	74.2%	23.0000 (0.0107)
ROA	36	0.0563 (0.0573)	0.0711 (0.0730)	0.0147 (0.0157)	1.6049 (0.1085)	72.7%	24.0000 (0.0135)
ROE	28	12.2411 (10.8200)	17.7125 (17.8050)	5.4714 (6.9850)	2.7448 (0.0061)	72.0%	18.0000 (0.0433)
<i>USA</i>							
ROS	4602	0.0186 (0.0416)	0.0250 (0.0450)	0.0064 (0.0034)	2.3846 (0.0171)	51.6%	2260.0000 (0.0371)
ROA	4725	0.0120 (0.0254)	0.0069 (0.0257)	-0.0051 (0.0003)	0.4285 (0.6683)	51.5%	2273.0000 (0.0436)
ROE	4715	0.0431 (0.0899)	0.0467 (0.1013)	0.0036 (0.0115)	4.8760 (0.0000)	52.1%	2276.0000 (0.0056)

Mexican firms display some signs of efficiency improvements as well. SALEFF increased in mean by 0.2063 and in median by 0.1898 of its year 0 values, from 0.9038 to 1.0936. This change in median is statistically significant, with p-value of 0.0404 and 90% of firms changing SALEFF in the predicted direction. The change in NIEFF, however, is not significant and the NIEFF change proportion test results are not statistically significant either. We attribute the lack of significance for NIEFF to the number of degrees of freedom problem: for these two variables there are only 12 usable observations. Hence, we find evidence of efficiency improvements in Mexico, but this evidence is not as strong as for the other two countries.

Table 3 reveals significant efficiency improvements for the US firms around the introduction of NAFTA in 1994. SALEFF mean increased from 0.9756 to 1.1088 of its value in 1994 (year 0), and its median increased from 0.9688 to 1.0634. The median equality test results suggest that the change in medians is highly significant, with the corresponding p-value <0.0001. We see that 66.6% of firms improved efficiency, and this proportion is significantly different from 50% at any conventional significance level. Test results for NIEFF are very similar; we find an increase in mean by 0.0398 and in median by 0.0173, with the change in median statistically significant at 1% level. In our sample 52.2% firms improved NIEFF, and this proportion is significantly different from 50% with the test p-value of 0.0081.

Overall, we find evidence of efficiency improvements in all three countries. Test results for Canada and the USA are very strong, and evidence for Mexico is strong for one efficiency proxy and insignificant for the other proxy variable. We hypothesize that the significance of the results for Mexico is affected by the number of the observations problem.

Investment

Hypothesis 3 deals with capital investment. Economic theory suggests that reduction of transaction costs should lead to more investment opportunities. Bris et al (2006) find an increase in investment spending for some European countries as a result of financial liberalization in Europe. As import and export tariffs are reduced as a part of North American liberalization process, we expect to see greater investment spending by companies in the three

countries, just like it happened in Europe. Investment spending is measured with two variables, capital expenditures divided by sales (CESA), and capital expenditures divided by total assets (CETA). Out of these two measures, CESA is less distorted by accounting adjustments because it is denominated in current flow dollars divided by current flow dollars.

Evidence shows that for Canada the liberalization process indeed resulted in higher investment spending. Table 3 reveals that CESA increased in mean (median) from 0.0803 (0.0349) to 0.0972 (0.0547), and the median change is significant at 10% level. CETA also increased in median from 0.0409 to 0.0562, and this increase is statistically significant, with the corresponding p-value of 0.0201. In Canada 58.0% of companies display an increase in CESA and 61.7% of companies display an increase in CETA, in both cases the proportion is significantly different from 50%. Therefore, we find strong evidence that the liberalization process led to an increase in investment spending by Canadian firms. This is consistent with evidence presented in Globerman and Shapiro (1999), Sanchez and Karp (1999), and MacDermott (2007), who find increases in foreign direct investments following NAFTA.

The results for Mexico are the opposite from expected. The statistical tests show that mean (median) CESA decreased from 0.1286 (0.0994) to 0.0861 (0.0822), and the decrease in median is statistically significant with p-value of 0.0411. We observe a similar effect in CETA, the mean (median) decreased by 0.0145 (0.0164) and this decrease is significant, with p-value of 0.0687. In addition, the proportion of firms that increased investment is 34.4% for CESA and 36.4% for CETA, we cannot reject the hypothesis that this proportion is significantly different from 50%, but still evidence points at a reduction of investment in Mexico. We conjecture that this reduction in investment is caused by increased business climate instability in Mexico because of the 1994 Mexican peso crisis and thus it would be difficult to attribute the reduction in investment to liberalization process.

Evidence from the United States is inconclusive. On one hand, we observe increases in medians for both CESA and CETA, even though these increases are statistically insignificant. On the other hand, the proportion of firms where investment measures increased is less than 50%, for CESA it is 43.7% and for CETA it is 43.9%, in both cases the proportions are significantly different from 50%. Thus, we do not find empirical support for our investment hypotheses for Mexico and the USA, but we find strong evidence for Canada supporting the hypothesis that investment should increase with liberalization.

Output

Hypothesis 4 is related to firm real output. Lower transaction costs, increased competition, and cheaper financing that come with liberalization should in theory increase firm output. We measure company output with real sales (SALR) variables, which is calculated as a percentage of the real sales in year 0. In all three countries SALR displays large and highly significant improvement. Table 3 shows that in Canada mean (median) real sales increase by 0.5168 (0.3637). In Mexico, SALR increases in mean (median) from 0.8719 (0.8918) to 1.1963 (1.2141). In the USA, real sales increase in mean (median) by 0.5299 (0.3522). In all three countries the change in medians is highly significant at any conventional level. The proportion of firms that increase output between 1993 and 1997 is 89.8% in Canada, 84.4% in Mexico, and 80.9% in the USA. In all three countries the test results suggest that these proportions are significantly different from 50% with the corresponding p-value < 0.0001. Hence, we find very strong evidence suggesting large increases in firm output around the implementation of NAFTA, which is consistent with the theory.

Employment

Hypothesis 5 is related to firm employment. Liberalization and free trade should lead to higher allocating efficiency of capital and possible displacement of workers towards growing industry sectors. Thus, it is possible to construct an argument based on classical economic theory or infant industry protection theory that after liberalization employment may decrease. Grabowski and Shields (1996) provide a thorough review of wage, profitability, employment, and other economic implications of various development theories, and point that protectionist arguments have multiple assumptions that may not be true in reality. We measure employment by the number of employees working for firms in our sample.

Table 3. Efficiency, investment, output, and employment changes

Variable	Obs.	Mean (Median) Before	Mean (Median) After	Mean (Median) Change	Wilcoxon/Mann- Whitney median equality test (p-value)	Percentage of firms that changed as predicted	Sign (exact binomial) proportion test that p=0.5 (p-value)
<i>Canada</i>							
SALEFF	61	0.9141 (0.9012)	1.2183 (1.1632)	0.3042 (0.2620)	7.4195 (0.0000)	89.5%	51.0000 (0.0000)
NIEFF	61	0.4300 (0.5368)	1.8437 (1.2533)	1.4137 (0.7165)	5.9397 (0.0000)	82.1%	46.0000 (0.0000)
CESA	146	0.0803 (0.0349)	0.0972 (0.0547)	0.0169 (0.0198)	1.7098 (0.0873)	58.0%	83.0000 (0.0654)
CETA	153	0.0475 (0.0409)	0.0640 (0.0562)	0.0165 (0.0153)	2.3247 (0.0201)	61.7%	92.0000 (0.0052)
SALR	147	0.8680 (0.8814)	1.3848 (1.2451)	0.5168 (0.3637)	11.6293 (0.0000)	89.8%	123.0000 (0.0000)
EMPLOYEES	61	9.55 (4.12)	10.59 (4.82)	1.04 (0.71)	0.5095 (0.6104)	33.3%	40.0000 (0.0135)
<i>Mexico</i>							
SALEFF	12	0.8973 (0.9038)	1.1037 (1.0936)	0.2063 (0.1898)	2.0496 (0.0404)	90.0%	9.0000 (0.0215)
NIEFF	12	0.7542 (0.8276)	1.3764 (0.7484)	0.6222 (-0.0792)	0.0289 (0.9770)	45.5%	6.0000 (1.0000)
CESA	34	0.1286 (0.0994)	0.0861 (0.0822)	-0.0425 (-0.0172)	2.0422 (0.0411)	34.4%	21.0000 (0.1102)
CETA	35	0.0743 (0.0687)	0.0598 (0.0523)	-0.0145 (-0.0164)	1.8206 (0.0687)	36.4%	21.0000 (0.1628)
SALR	35	0.8719 (0.8918)	1.1963 (1.2141)	0.3244 (0.3223)	5.1096 (0.0000)	84.4%	27.0000 (0.0001)
EMPLOYEES	12	21.01 (17.30)	22.37 (0.37)	1.37 (-0.27)	0.0866 (0.9310)	41.7%	7.0000 (0.7744)
<i>USA</i>							
SALEFF	3893	0.9756 (0.9688)	1.1088 (1.0634)	0.1332 (0.0945)	22.9442 (0.0000)	66.6%	2414.0000 (0.0000)
NIEFF	3925	0.7193 (0.8191)	0.7591 (0.8364)	0.0398 (0.0173)	2.5841 (0.0098)	52.2%	1930.0000 (0.0081)
CESA	4732	0.0586 (0.0319)	0.0549 (0.0338)	-0.0036 (0.0019)	0.1237 (0.9016)	43.7%	2592.0000 (0.0000)
CETA	4859	0.0451 (0.0348)	0.0461 (0.0351)	0.0010 (0.0003)	0.6280 (0.5300)	43.9%	2635.0000 (0.0000)
SALR	4704	0.9044 (0.9174)	1.4343 (1.2696)	0.5299 (0.3522)	54.5618 (0.0000)	80.9%	3531.0000 (0.0000)
EMPLOYEES	5458	2.0 (0.30)	2.6 (0.40)	0.6 (0.10)	3.9159 (0.0001)	26.3%	3986.0000 (0.0000)

Note: Employees in thousands.

Table 3 presents empirical results for tests of Hypothesis 4 that liberalization should decrease employment. The average (median) number of employees in Canada increased from 9.55 (4.12) to 10.59 (4.82) thousand. Even though this employment increase is not statistically significant according to the Wilcoxon/Mann-Whitney median equality test, the proportion of firms that decreased employment is estimated 33.3% and is significantly different from 50% at 5% level. Test results for Mexico are inconclusive, probably because of the small number of available observations. Finally, the results for the USA indicate that the mean (median) employment per firm increased by 600 (100) employees, and this increase is highly significant, with the corresponding p-value of 0.0001. Furthermore the proportion of firms where employment decreased is 26.3% and is significantly different from 50%. Overall, the evidence suggests that employment increased in Canada and the USA, and there was no significant decrease in employment for Mexico between 1993 and 1997.

Leverage

The liberalization process included reduction of transaction costs in the goods and the financial markets, and is expected to reduce the cost of equity capital for firms. We state in Hypothesis 6 that in all three countries firms should change their capital structure towards lower use of debt and greater use of equity capital as the process of North American liberalization progresses. We measure leverage by the ratio of total debt to total assets (TDTA).

We present test results for changes in median leverage in Table 4. Surprisingly, we find significant leverage increase in the USA. The mean (median) TDTA ratio increased from 0.1814 (0.1481) to 0.2121 (0.1885) for our sample firms, and the median leverage increase is highly significant. The proportion of firms where leverage decreased is 40.5% and highly significantly different from 50%. Tests results for Canada and Mexico are inconclusive. Thus, evidence suggests that the hypothesis with respect to reduction of leverage did not get empirical support in all three countries. Our results are different from evidence in Baggs and Brander (2006) who find significant leverage decreases in Canada. It is possible that other more significant forces affected the capital structure decisions of the sample companies, for example the US economic boom in 1990s, or that the TDTA ratio is not a good proxy for leverage because it is calculated using book values and not market values for debt and total assets.

Dividends

Hypothesis 7 is related to dividends. We study whether liberalization increased dividends for the sample companies. We follow Megginson, Nash and van Randenborgh (1994) methodology and measure dividends as a ratio of cash dividend to sales (DIVSAL) and cash dividends to net income (Payout). In all three countries our tests do not yield significant results except in the USA the proportion of firms that increased dividends is 40.5% and is significantly different from 50%. Thus, we find no empirical support for the hypothesis that liberalization should increase dividends. As a robustness test, we also conduct the proportion test of the hypothesis that the liberalization should decrease dividends. This test does not produce significant results either. Hence, we conclude that NAFTA did not result in significant dividend changes for the companies in the participating countries, at least in the short term.

Tobin's Q

We investigate whether liberalization process in North America affects company values. In theory, company value should increase if a firm has greater free cash flows, and if a firm has lower cost of capital. An increase in real output, coupled with increased production efficiency, should result in higher free cash flow to the firm. In addition, financial liberalization led to capital market integration in North America, and this resulted in lower cost of capital for companies. Thus, in theory we should expect to observe increases in company valuation as a result of liberalization. We measure company value with Tobin's Q. The current study uses two formulations for this variable: Tobin's Q1 = (Book Value of Total Assets – Book Value of Shareholders Equity + Market value of equity)/ Book Value of Total Assets, and Tobin's Q2 = (Market value of equity + Book Value of Total Debt)/ Book Value of Total assets. The former formulation is used in Bris et al (2004), and the latter is used in Ng Yuce (2006). Test results for Hypothesis 8 presented in Table 4 show increases in means and medians of Tobin's Q in Canada, but in both variables we cannot reject the hypothesis of median equality at any conventional significance level.

However, 62.8% of firms increased Tobin's Q1 and 59.2% of firms increased Tobin's Q2, and in both cases the proportion is significantly different from 50%, which is a case when the variable is assumed to change at random. Tests results for Mexican firms are all insignificant; we suppose this is related to the fact that there are only 30 usable observations for Mexico. Finally, we cannot reject the hypothesis of median equality between year -1 and year 3 for the US firms, but the proportion of firms where Tobin's Q1 changed in the predicted direction is 56.0%, and for Tobin's Q2 it is 53.4%. The proportions of firms that change both variables are significantly different from 50%, with the corresponding p-values <0.0001. Thus, we find evidence that points at increases in company valuations for Canada and the USA, and test results for Mexican firms are inconclusive. Our results are consistent with findings of Ghani and Haverty (1995), Aggarwal, Moore, Long, and Ervin(1998), Hanson, and Song (1998), and Amitava and Amlan (2000) who discover tangible stock market valuation changes as a result of NAFTA.

Table 4. Leverage, dividends, and Tobin's Q changes.

Variable	Obs.	Mean (Median) Before	Mean (Median) After	Mean (Median) Change	Wilcoxon/Mann- Whitney median equality test (p-value)	Percentage of firms that changed as predicted	Sign (exact binomial) proportion test that p=0.5 (p-value)
<i>Canada</i>							
LEVERAGE	158	0.2223 (0.1835)	0.2169 (0.2066)	-0.0054 (0.0231)	0.0222 (0.9823)	47.1%	82.0000 (0.5206)
DIVSAL	149	0.0137 (0.0075)	0.0144 (0.0083)	0.0007 (0.0007)	0.7207 (0.4711)	47.1%	82.0000 (0.5206)
Payout	128	0.2891 (0.1768)	0.2319 (0.1824)	-0.0572 (0.0056)	0.3573 (0.7209)	28.4%	83.0000 (0.0000)
Tobins1Q	140	1.4018 (1.2013)	1.4534 (1.3291)	0.0516 (0.1278)	0.8155 (0.4148)	62.8%	81.0000 (0.0046)
Tobins2Q	140	1.0936 (0.9573)	1.1540 (1.0527)	0.0604 (0.0955)	1.1004 (0.2712)	59.2%	77.0000 (0.0433)
<i>Mexico</i>							
LEVERAGE	36	0.2574 (0.2566)	0.2839 (0.2912)	0.0266 (0.0346)	0.6025 (0.5468)	42.4%	19.0000 (0.4869)
DIVSAL	37	0.0210 (0.0140)	0.0161 (0.0070)	-0.0049 (-0.0070)	1.2919 (0.1964)	42.4%	19.0000 (0.4869)
Payout	36	0.2496 (0.1784)	0.1565 (0.0996)	-0.0931 (-0.0789)	1.4754 (0.1401)	27.3%	24.0000 (0.0135)
Tobins1Q	30	1.8822 (1.6372)	1.6672 (1.5804)	-0.2150 (-0.0568)	0.7762 (0.4376)	35.7%	18.0000 (0.1849)
Tobins2Q	30	1.6906 (1.4677)	1.4695 (1.3248)	-0.2211 (-0.1430)	0.8058 (0.4204)	37.0%	17.0000 (0.2478)
<i>USA</i>							
LEVERAGE	4968	0.1814 (0.1481)	0.2121 (0.1885)	0.0307 (0.0404)	7.9419 (0.0000)	40.5%	2873.0000 (0.0000)
DIVSAL	4773	0.0098 (0.0000)	0.0091 (0.0000)	-0.0007 (0.0000)	0.9631 (0.3355)	40.5%	2873.0000 (0.0000)
Payout	4483	0.1412 (0.0000)	0.1158 (0.0000)	-0.0254 (0.0000)	1.5092 (0.1313)	16.8%	3459.0000 (0.0000)
Tobins1Q	4711	1.7563 (1.4037)	1.6573 (1.3833)	-0.0989 (-0.0204)	0.0248 (0.9802)	56.0%	2455.0000 (0.0000)
Tobins2Q	4690	1.4189 (1.1224)	1.3162 (1.1074)	-0.1027 (-0.0151)	1.3659 (0.1720)	53.4%	2347.0000 (0.0000)

CONCLUSION

We have investigated the effect of NAFTA on performance and efficiency of Mexican, Canadian and U.S. firms by analyzing changes in measures of financial and operating performance and valuation for public companies. We conducted nonparametric tests for median equality between performance measures before and after the introduction of NAFTA, and tested what percentage of firms in the sample improved performance.

Our study brings to light several interesting results. First, we find that output, profitability and efficiency increased in all three countries. Second, our tests indicate that Canadian firms exhibit increase in investment whereas Mexican firms exhibit the reverse trend, with no significant changes in investment for US firms. We find that the number of employees in our sample companies increased after the approval of NAFTA. Our results are inconclusive related to the effects of leverage and dividend changes. Finally Tobin's Q ratios show that firm values increase although not significantly.

Upon examining all the results, we can conclude that NAFTA affected companies in the three countries positively and their profitability and efficiency increased which led to value increases. Our findings are consistent with economic theory suggesting that liberalization should improve efficiency and output.

AUTHOR INFORMATION

Dr. Sergiy Rakhmayil is an Associate Professor at Ryerson University. He holds his Ph.D. in Finance from the University of Manitoba. Professor Rakhmayil's teaching experience is in corporate finance, international finance, and personal financial planning. His research is in corporate finance, international finance, and financial equity markets. E-mail: srakhmay@ryerson.ca. Corresponding author.

Dr. Ayse Yuce is a Professor of Finance at Ryerson University. She has several publications in finance journals as well as two books. As an emerging market expert, Dr Yuce gave speeches at IMF and World Bank on Eastern European Stock Markets. E-mail: ayuce@ryerson.ca.

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