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Igor Semenenko and Junwook Yoo

ACQUISITIONS, PROFITABILITY, AND GROWTH: A STUDY OF CANADIAN FIRMS

ABSTRACT

Large acquisitions in the United States by Canadian firms lower growth prospects and profitability of Canadian companies. Results are driven by post-acquisition performance of the largest Canadian industries, including oil & gas, mining and precious metals, which together account for almost 40 percent of Canadian firms with asset size above 100 million reported in Compustat research files. Cross-border acquisitions of firms in high tech industries do not improve performance of Canadian firms.

Key Words: cross-border acquisitions, competition, productivity gap, corporate culture

Igor Semenenko
Acadia University, Canada

Junwook Yoo
University of Winnipeg, Canada

Correspondence: Igor Semenenko
15 University Avenue Wolfville, Nova Scotia Canada. B4P 2R6
E-mail: igor.semenenko@acadiau.ca

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INTRODUCTION

Canadian and the U.S. corporations. A study performed for Industry Canada (Rao, Tang, and Wang, 2004) suggests that labor productivity at Canadian firms was 18 percent below the U.S. level in 1999, and that the gap further widened since 2000. Various explanations for this gap were forwarded by the academia and in the popular press. Lang (2012) cites "fortress mentality and stiff-upper-lip British heritage"*, whereas Rao and Sharma (2006) links productivity gap between Canada and the United States with regulatory gap between Canada and the U.S., primarily restrictions on foreign direct investments (FDI).

Our study attempts to answer one question: can acquisitions by Canadian firms in the more competitive U.S. market help bridge productivity gap between the two nations? We focus on two measures of corporate performance - return on equity and growth in sales - to examine impact of cross-border and domestic acquisitions.

Ex-ante, it is not clear whether acquisitions should improve acquirers' performance. Canadian companies could use cross-border mergers and acquisitions channel to bridge productivity gap and improve their growth prospects, thus providing support for synergy hypothesis of cross-border acquisitions. Alternatively, cross-border acquisitions could be consistent with agency theory, according to which managers engage in takeovers to maximize personal utility rather that shareholder value.

Our study expands the academic literature by examining impact of cross-border acquisition in the United States, Canada and other geographies on operating performance of Canadian firms. Briefly, our results are as follows. We find that acquisition effects are neutral, but larger acquisitions in the United States have negative impact on both profitability and growth. Acquisitions of high tech companies fail to improve performance of Canadian firms.

We organize the remaining article as follows. Section 2 motivates our analysis and provides sample description. Section 3 presents the empirical results, and section 4 concludes.

MOTIVATION, METHODOLOBY, AND SAMPLE DESCRIPTION

A large number of studies on cross-border acquisitions focuses on motivation issues. Firms could pursue positive NPV projects outside their home markets, lending support to synergy

* Page 29

hypothesis of international acquisitions. Alternatively, managerial objective hypothesis posits that firm managers could pursue their own goals at the expense of outside shareholders (Jensen, 1986). Two types of managerial motives have received considerable attention in the literature: empire building and risk reduction. In both cases, top managers maximize their utility at the expense of shareholders of the acquiring firm. Two other explanations include diversification motive (Adler and Dumas, 1983), and cost tax avoidance and access to low-cost inputs abroad (Morck and Yeung, 1993).

Acquisition in different geographies could have different impact on acquiring firms. Eun, Kolodny, and Scheraga (1996) examine value effects in acquisitions of U.S. firms by bidders from different geographies, including the United Kingdom, Japan and Canada. In a similar vein, Doukas and Travlos (1988) find that international acquisitions by U.S. firms lead to significant and positive returns, especially when target firms are based in less developed economies. More recently, Alexandridis, Petmezas, and Travlos (2010) document that acquirors in more competitive markets for corporate control, including Canada and the United States, pay larger premia and transfer wealth to target firms.

A large number of studies use standard event-study methodology to examine wealth changes around acquisition dates (Dodd and Ruback, 1977; Jensen and Ruback, 1983; Jarrell, Brickley, and Netter, 1988). Ng and Yuce (2003) examine wealth effects in Canadian mergers. The other strand of mergers and acquisitions literature focuses on performance measures based on accounting returns (Ravenscraft and Scherer, 1987; Healy Palepu, and Ruback, 1992). This paper is related to the second stream of literature on impact of mergers and acquisitions on performance of participating firms.

We examine two measures of performance – return on equity and sales growth – of acquiring Canadian firms in three geographies, including the United States, Canada and other jurisdictions. For parsimony, we report only the results of the enhanced specification that controls for firm size, GDP growth and leverage (see model 1 and model 2 below). Models with fewer explanatory variables or enhanced specifications lead to the same conclusions and are not reported in this paper.

Our models are specified as follows:

$$\frac{\text{NetIncome}_{\text{T}}}{\text{Equity}_{\text{T}-1}} = \alpha_0 + \beta_1 \text{Acquisition} + \beta_2 \text{Hightech} + \beta_3 \text{logAssets} + \beta_4 \text{GDP} + \beta_5 \frac{\text{Dept}}{\text{Equity}} + \sum_0^{\text{N}} \beta_{\text{N}} \text{Industry} + \sum_0^{\text{T}} \beta_{\text{t}} \text{Year} + \beta_8 \text{AR} \quad (1)$$

$$\Delta\text{Sales} = \alpha_0 + \beta_1 + \text{Acquisition} + \beta_2\text{HighTech} + \beta_3\text{logAssets} + \beta_4\text{GDP} + \beta_5\frac{\text{Debt}}{\text{Equity}} +$$

$$\sum_0^N \beta_N\text{Industry} + \sum_0^T \beta_T\,\text{Year} + \beta_8\text{AR}(1) \quad (2),$$

where Acquisition is defined in equation 4 and 5 below, and AR(1) is lagged autoregressive term. Year of acquisition is excluded from models with sales growth as dependent variables.

We put three variables to test in order to examine acquisition impact (eq. 3-5):

$$\text{Acquisition dummy} = 1 \text{ in year } 0 - \text{year} \quad (3).$$

All observations are used.

$$\text{Percentage of Assets} = \frac{\text{Acquisition value}_{\text{YEAR 0}}}{\text{MCAP}_{\text{YEAR 0}}} \times \text{Assets}_{\text{YEAR 0}-\text{Year5}} \quad (4).$$

If acquisitions are made over several years, percentage of assets variable is estimated on a rolling basis (weighted average is estimated). In regression models, post-acquisition firm – years for which acquisition value is not available are left out

$$\text{Logvalue} = \text{natural logarithm of } (1 + \text{acquisition value}_{\text{YEAR0}-\text{YEAR5}}) \quad (5).$$

All observations are used. Our choice of five-year post-acquisition period is consistent with previous research findings that the major impact of an acquisition occurs within 5 years (Krug and Hegarty, 1997).

In addition, we introduce high-tech dummy to proxy for desire to overcome technological barriers or gain technological edge in acquisitions. We set high-tech dummy equal to one in year 0 – year 5 after acquisition to test whether acquisitions in industries with high level of research and development expenditures impacts post-acquisition performance of Canadian bidders. High-tech companies are identified following Loughran and Ritter (2004) and Cliff and Denis (2004) and include firms with the following SIC codes: 2833, 2834, 2835, 2836 (drugs), 3571, 3572, 3575, 3577, 3578 (computer hardware), 3661, 3663, 3669 (communications equipment), 3674 (electronics), 3812 (navigation equipment), 3823, 3825, 3826, 3827, 3829 (measuring and controlling devices), 4812, 4813, 4899

(communication services), and 7370, 7371, 7372, 7373, 7374, 7375, 7377, 7378, 7379 (software).

We restrict our sample to firms with asset size above 100 million to avoid possible bias due to inclusion of small-size firms, whose performance metrics are largely skewed to the left. Table 1 reports selected characteristics of firms with asset size below 100 million and above 100 million. Further, we break down acquiring firms with asset size above 100 million by three geographies, including Canada, U.S.A. and other jurisdictions, and report numbers for firms larger than 100 million that do not engage in acquisitions.

Table 1. Selected data for acquiring and non-acquiring firms

Model	Assets <100 mln	Assets >100 mln	USA	Canada	Other	No Acquisitions
Number of obs.	8456	7499	2565	4203	1895	2666
Firms	1229	907	217	406	167	411
ROE, mean	-0.178	0.079	0.1	0.09	0.077	0.064
ROE, median	-0.093	0.103	0.12	0.11	0.108	0.094
EVA, mean	-0.293	-0.029	-0.01	-0.01	-0.028	-0.051
EVA, median	-0.183	0.008	0.02	0.02	0.015	-0.002
Growth, mean	0.388	0.25	0.2	0.203	0.216	0.299
Growth, median	0.061	0.08	0.08	0.08	0.088	0.087
Acquisitions, number	728	1868	510	1014	344	n.a.
Acquisitions/Observations	0.09	0.25	0.20	0.24	0.18	n.a.
Value of acquisition, mean	16	143	132	142	160	n.a.
Value of acquisition, median	5	50	45	50	57	n.a.
High tech, total	218	233	80	100	53	n.a.
% of high tech acquisitions	30%	12%	16%	10%	15%	n.a.
Herfindahl target, mean	0.24	0.19	0.10	0.24	0.18	n.a.
Herfindahl target, median	0.14	0.13	0.06	0.19	0.08	n.a.

Note: a. Selected characteristics of Canadian firms with asset size above 100 million, asset size below 100 million, and four categories of firms asset size above 100 million, including firms pursuing acquisitions in the United States, in Canada and in other jurisdictions, and for firms that do not undertake acquisitions; b. Return on equity, equity economic value added and growth are winsorized at 1% level for firms with assets above 100 million.

Table 2 provides breakdown of firms with asset size above 100 million and acquisitions pursued by these firms by industry. Forty eight industries are defined as in Fama and French (1997). We leave out companies with SIC code 6726 (Investment funds), SIC code 6282 (Investment advice) and SIC code 6799 (Investors, not classified otherwise). Our sample includes 907 firms and 7,499 firm-years from 1991 to 2010.

Table 2. Sample Description

Industry	N	% of Firms	Acquisitions			Percentage of Acquisitions, by industry
			US	Canada	Other	
Agriculture	3	0.33%	0	0	0	0.00%
Aircraft	3	0.33%	5	10	6	1.12%
Alcoholic beverages	7	0.77%	1	15	6	1.18%
Apparel	2	0.22%	2	0	0	0.11%
Automobiles and trucks	10	1.10%	9	9	17	1.87%
Banking	26	2.87%	36	69	22	6.80%
Business services	45	4.96%	63	59	39	8.62%
Business supplies	19	2.09%	15	20	6	2.19%
Candy and soda	1	0.11%	6	1	3	0.54%
Chemicals	13	1.43%	15	15	10	2.14%
Coal	7	0.77%	0	0	1	0.05%
Computers	8	0.88%	12	11	4	1.45%
Construction	6	0.66%	3	11	0	0.75%
Construction materials	31	3.42%	26	38	11	4.01%
Consumer goods	8	0.88%	8	29	7	2.36%
Defense	0	0.00%	0	0	0	0.00%
Electrical equipment	6	0.66%	6	4	7	0.91%
Electronic equipment	27	2.98%	31	22	21	3.96%
Entertainment	11	1.21%	9	17	0	1.39%
Fabricated Pproducts	3	0.33%	6	4	1	0.59%
Food Pproducts	16	1.76%	19	19	6	2.36%
Healthcare	1	0.11%	3	4	0	0.37%
Insurance	23	2.54%	21	1	14	1.93%
Machinery	16	1.76%	6	16	6	1.50%
Measuring and control equip	2	0.22%	0	0	2	0.11%
Medical equipment	4	0.44%	4	3	1	0.43%
Miscellaneous	5	0.55%	4	1	5	0.54%
Nonmetalic mining	84	9.26%	8	58	38	5.57%
Personal services	6	0.66%	6	3	0	0.48%
Petroleum and nat. gas	18	20.51%	25	195	16	12.63%
Pharmaceutical products	15	1.65%	7	5	10	1.18%
Precious metals	62	6.84%	17	68	42	6.80%
Printing and publishing	4	0.44%	2	4	0	0.32%
Real estate	30	3.31%	27	37	8	3.85%
Recreational products	1	0.11%	1	0	0	0.05%
Restaurants, hotel, motel	5	0.55%	1	5	0	0.32%
Retail	37	4.08%	12	47	1	3.21%
Rubber	9	0.99%	4	6	2	0.64%
Shipbuilding, railroad eq	1	0.11%	0	0	0	0.00%
Shipping containers	0	0.00%	0	0	0	0.00%
Steel works, etc	14	1.54%	4	7	3	0.75%
Telecommunications	28	3.09%	3	62	3	3.64%
Textiles	0	0.00%	0	0	0	0.00%
Tobacco products	1	0.11%	0	0	0	0.00%
Trading	20	2.21%	4	10	4	0.96%
Transportation	32	3.53%	18	34	6	3.10%
Utilities	37	4.08%	29	35	11	4.01%
Wholesale	32	3.53%	32	60	5	5.19%
Total	90	100.00%	510	1014	344	100.00%
Herfindahl target, median	0.	0.13	0.06	0.19	0.08	n.a.

Note: Number and percentage of firms and acquisitions by Canadian firms with asset size above 100 million in 1991-2010 by industry.

RESULTS

Firm characteristics

In our sample of 907 firms, 496 companies make 1,868 acquisitions in 1991-2010 (see table 1), including 1,014 acquisitions in Canada, 510 acquisitions in the United States and 344 acquisitions in other jurisdictions. Univariate statistics in table 1 indicate significant differences between acquiring firms and non-acquiring firms, but little difference between firms that pursue acquisitions in different geographies. Mean return on equity for 496 acquiring firms falls in the range of 0.08 to 0.10, but it equals only 0.06 for 411 non-acquiring firms (see table 1).

Univariates statistics suggest that target firms acquired in the United States operate in more competitive business environment. The mean (median) Herfindahl-Hirshman index estimated for target firms' year-industry industry equals 0.24 (0.19) in Canada versus 0.10 (0.06) in the United States. For other jurisdictions, we assigned Herfindahl-Hirshman index estimated for the U.S. industries on assumptions that these firms operate in the global market, and that level of competition in the United States is a better proxy for global competition than estimates in any other country. The mean (median) value of assigned Herfindahl-Hirshman index is equal to 0.18 (0.06) for target firms' industries outside Canada and the United States.

We use panel logit model to determine characteristics of firms involved in cross-border acquisitions. The dependent variable is an indicator variable taking the value of one in years when a Canadian firm acquires another company. The dependent variable is an indicator variable taking the value of one when acquisition is made. Acquiring firms are compared with non-acquiring firms. In order to distinguish acquiring firms from non-acquiring firms, we leave out years in which acquirers did not acquire other companies

We report our logit tests in table 3. Profitability is not related to acquisition decisions, but growth is, and results hold for acquisitions in all three geographic areas – the United States, Canada, and other jurisdictions. Age measured as of the first year for which data are included in Compustat, is a statistically significant variable, and is positive related to probability of acquisition. It appears that older firms that have higher rates of growth are more likely to pursue an acquisition strategy.

These firms are likely to come from more concentrated industries with higher reading of Herfindahl-Hirshman index. Interestingly, companies acquiring targets in the United States are less likely to be in one of the three industries with the largest representation

in our sample, including oil and gas, precious metals and nonmetallic mining.

Table 3. Logistic regressions for acquisitive firms

	USA	Canada	Other
Intercept	-3.818***	-3.710***	-5.782***
	0.297	0.236	0.372
LogAssets	0.041	0.216***	0.183***
	0.046	0.035	0.055
LogGoodwill	0.375***	0.194***	0.304***
	0.030	0.022	0.036
ROE, 5-year average	0.005	0.117	-0.277
	0.155	0.180	0.174
Growth, 5-year average	0.636***	0.513***	0.897***
	0.173	0.096	0.202
Herfindahl, Industry	1.563***	0.923***	2.600***
	0.310	0.279	0.357
Top 3 industries dummy, Canada	-0.626***	0.523***	0.536***
	0.188	0.112	0.189
Debt-equity ratio	-0.231***	-0.252***	-0.334***
	0.064	0.052	0.092
LogAge	0.335***	0.305***	0.436***
	0.085	0.064	0.104
Likelihood ratio	464.94***	425.20***	370.67***
Wald	348.67***	327.48***	283.53***
Observations	2,406	2,806	4,403
Acquisitions	510	1014	344

Note: The dependent variable is binary and takes the value of one in acquisition-year. Data on acquisitive firms is included only for acquisition-years and is compared with data on non-acquisitive firms. *, **, and *** indicate a p-value of 10%, 5%, and 1%, respectively.

Regression Models

We report regression model results in table 4, divided into three panels. Panel A includes regression models with acquisition indicator variables set equal to one in year 0 – year 5 after acquisition. In panel B, percentage of assets variable is put to test, and panel C models include natural logarithm of acquisition value. In panel B models, we exclude observations for post-acquisition years when value of acquisitions is not known. We follow Peterson (2009) in our approach to clustering, and include industry dummies in order to correct for residuals correlated across firms, years and industries.

Categorical dummy lowers sales growth in Canada and in the United States, but it does not attain significance in profitability equations. Two different coefficients that proxy for size of the acquisition – percentage of assets variable and logarithm of value of

acquisition – are negative and statistically significant in models that measure impact of U.S. acquisitions. The results in table 4 are supportive of the agency hypothesis.

Table 4. Regressions for Return on Equity and Growth in Sales

Panel A. Models with Acquisition Dummy

	USA ROE	USA Growth	Canada ROE	Canada Growth	Other ROE	Other Growth
Intercept	-0.052*	0.002	-0.051*	-0.001	-0.054**	0.004
	0.027	0.042	0.027	0.041	0.027	0.042
Acquisition	-0.008	-0.048***	-0.000	-0.039**	-0.008	-0.004
	0.009	0.018	0.007	0.016	0.012	0.031
HighTech	-0.024	-0.060	-0.010	-0.019	-0.039	-0.134**
	0.030	0.060	0.017	0.032	0.042	0.054
LogAssets	0.015***	0.000	0.015***	0.001	0.015***	-0.001
	0.002	0.005	0.002	0.005	0.002	0.005
GDP	0.004	0.053***	0.004	0.053***	0.004	0.053***
	0.003	0.007	0.003	0.007	0.003	0.007
DE_Ratio	-0.001***	0.0004*	-0.001***	0.0004*	-0.001***	0.0004*
	0.000	0.0002	0.000	0.0002	0.000	0.0002
AR(1)	0.285***	0.104***	0.286***	0.103***	0.285***	0.103***
	0.030	0.026	0.030	0.026	0.030	0.027
Industry	Yes	Yes	Yes	Yes	Yes	Yes
Year	Yes	Yes	Yes	Yes	Yes	Yes
R-Sq	0.158	0.103	0.158	0.102	0.158	0.102
Mean dependent variable	0.080	0.167	0.080	0.167	0.080	0.167
Observations	6024	4484	6024	4484	6024	4484
Clusters	816	728	816	728	816	728

Note: a. Dependent variables - return on equity (ROE) and growth in sales (Growth) - are winsorized at 1% level; b. Acquisition variables take on the same value in year 0 - year 5 after acquisition. Acquisition-years are dropped in regressions with growth as dependent variable; c. Standard error is corrected for clustering following Peterson (2009); d. *, **, and *** indicate a p-value of 10%, 5%, and 1%, respectively. All models include fixed industry and fixed year effects.

Yet, such interpretation leaves unexplained why acquisitions in the United States are different from domestic acquisitions in Canada. The result could be attributed to the argument made by Harris and Ravenscraft (1991), who show that target wealth gains are significantly higher in cross-border takeovers than in domestic acquisitions. Separately, Eckbo and Thorburn (2000) note Canadian bidders are in a better position to exploit economic synergies following the takeover in the domestic market. The opposite may hold for Canadian acquisitions in the United States.

Table 4. Regressions for Return on Equity and Growth in Sales

Panel B. Models with Percentage of Assets

	USA ROE	USA Growth	Canada ROE	Canada Growth	Other ROE	Other Growth
Intercept	-0.043*	0.008	-0.053*	0.003	-0.051**	-0.007
	0.027	0.044	0.028	0.045	0.025	0.043
Percentage of assets	-0.037***	-0.087**	-0.003	-0.014*	-0.001	-0.036**
	0.010	0.040	0.005	0.007	0.007	0.016
HighTech	-0.031	-0.125*	-0.004	-0.052	-0.039	-0.154**
	0.028	0.070	0.019	0.039	0.044	0.064
LogAssets	0.014***	-0.001	0.015	-0.000	0.014***	0.000
	0.002	0.006	0.003	0.006	0.002	0.006
GDP	0.004	0.055***	0.003	0.056***	0.002	0.053
	0.003	0.007	0.003	0.007	0.003	0.007
DE ratio	-0.001***	0.0004**	-0.001***	0.0004*	-0.001***	0.0004**
	0.000	0.0002	0.000	0.0002	0.000	0.0002
AR(1)	0.280***	0.105***	0.277***	0.104***	0.291***	0.107***
	0.031	0.027	0.032	0.027	0.031	0.027
Industry	Yes	Yes	Yes	Yes	Yes	Yes
Year	Yes	Yes	Yes	Yes	Yes	Yes
R-Sq	0.156	0.104	0.159	0.101	0.165	0.103
Mean dependent variable	0.079	0.171	0.077	0.175	0.081	0.168
Observations	5557	4225	5253	3992	5636	4288
Clusters	805	717	797	708	801	713

Note: a. Dependent variables - return on equity (ROE) and growth in sales (Growth) - are winsorized at 1% level; b. Acquisition variables take on the same value in year 0 - year 5 after acquisition. Acquisition-years are dropped in regressions with growth as dependent variable; c. Standard error is corrected for clustering following Peterson (2009); d. *, **, and *** indicate a p-value of 10%, 5%, and 1%, respectively. All models include fixed industry and fixed year effects.

In models reported in table 4 acquisition impact on profitability and growth is statistically significant, but economic impact of acquisitions is not large. R-squared in regression models with profitability and growth is below 20 percent. This is not very different from results obtained by Ng and Yuce (2006), who report adjusted R-squared of 18 percent to 35 percent for regressions explaining change in return on assets in year 1 – year 3 after acquisition versus return on assets one year prior to the acquisition in a sample of Canadian firms.

A number of other variables were put to test to examine post-merger performance. Method of acquisition – cash versus stock – had a neutral effect, matching results reported by Healy *et al.* (1992) for a sample of 50 largest mergers between U.S. public firms completed in the period 1979 to 1983. Acquisition variables took on the same sign and significance

when equity economic value added (EVA) deflated by lagged book value of equity as dependent variable. Contrary to Maqueira, Megginson, and Nail (1998), we find no evidence of wealth benefits for stockholders in mergers of related firms. Finally, we find no evidence of conglomerate effect - acquisitions in the same industry do not impact profitability or post-merger growth.

Table 4. Regressions for Return on Equity and Growth in Sales
Panel C. Models with Logarithm of Acquisition Value

	USA ROE	USA Growth	Canada ROE	Canada Growth	Other ROE	Other Growth
Intercept	-0.057***	-0.002	-0.054**	-0.004	-0.052*	0.003
	0.026	0.042	0.027	0.042	0.026	0.040
Log value acquisition	-0.008***	-0.013***	-0.002	-0.008	0.001	-0.006
	0.002	0.005	0.001	0.031	0.003	0.007
HighTech	-0.018	-0.070	-0.007	-0.028	-0.048	-0.113**
	0.029	0.056	0.017	0.031	0.043	0.050
LogAssets	0.016***	0.001	0.015***	0.001	0.015***	-0.001
	0.002	0.005	0.002	0.005	0.002	0.005
GDP	0.004	0.053***	0.004	0.054***	0.004	0.059***
	0.003	0.007	0.003	0.007	0.003	0.007
DE_Ratio	-0.001***	0.0004*	-0.001***	0.004*	-0.001***	0.0004*
	0.000	0.0002	0.000	0.002	0.000	0.0002
AR(1)	0.285***	0.104***	0.286***	0.104***	0.285***	0.107***
	0.030	0.026	0.030	0.026	0.030	0.024
Industry	Yes	Yes	Yes	Yes	Yes	Yes
Year	Yes	Yes	Yes	Yes	Yes	Yes
R-Sq	0.159	0.103	0.158	0.102	0.158	0.106
Mean dependent variable	0.080	0.167	0.080	0.167	0.080	0.181
Observations	6024	4484	6024	4484	6024	5117
Clusters	816	728	816	728	816	745

Note: a. Dependent variables - return on equity (ROE) and growth in sales (Growth) - are winsorized at 1% level; b. Acquisition variables take on the same value in year 0 - year 5 after acquisition. Acquisition-years are dropped in regressions with growth as dependent variable; c. Standard error is corrected for clustering following Peterson (2009); d. *, **, and *** indicate a p-value of 10%, 5%, and 1%, respectively. All models include fixed industry and fixed year effects.

Robustness

Our results in table 4 suggest that larger acquisitions in the United States have negative impact on growth and profitability of Canadian firms. Univariate statistics in table 1 suggest that acquiring firms may possess different characteristics. In our sample, firms that acquire U.S. targets are more profitable – their mean (median) ROE is 0.10 (0.12) versus ROE of 0.06 (0.09) in a subsample of non-acquiring firms. In order to remove effect of different

characteristics of acquiring firms, we match each merging firm with one of the 411 non-acquiring firms using propensity score matching technique. We employ the following model to match acquirer firms with one of the 411 non-acquiring firms in acquisition year:

$$\text{MA} - \text{year} = \alpha_0 + \beta_1 \text{logAssets} + \beta_2 \text{lagGrowth} + \beta_3 \text{lagROE} + \beta_4 \text{HHI} + \beta_5 \text{top3} + \beta_6 \frac{\text{Debt}}{\text{Equity}} + \beta_6 \text{logAge} \quad (6)$$

where MA-year is year of acquisition, HHI is acquirer industry Herfindahl-Hirshman index, and top 3 designates three industries with the largest number of firms in our sample, including Petroleum and Natural Gas, Precious Metals and Nonmetallic Mining. Herfindahl-Hirshman index is defined for each of 48 industries designated by Fama and French (1997). It is estimated separately for U.S.A. and Canada, and the U.S. estimates are used to describe industry concentration in other jurisdictions.

Table 5. Propensity Score Match of Acquisitive and Non-acquisitive Firms

	USA ROE	USA Growth	Canada ROE	Canada Growth	Other ROE	Other Growth
Panel A. Selected results for regression models with acquisition dummy						
Acquisition dummy	-0.023*	-0.030	-0.012	-0.034*	0.009	-0.039
R-Sq	0.1557	0.1194	0.1451	0.1007	0.1599	0.1851
Observations	2954	2125	4212	3128	2164	1502
Clusters	334	325	497	484	256	248
Panel B. Selected results for regression models with acquisition size						
Size	-0.065*	-0.210*	-0.001	-0.009*	0.006	-0.040
R-Sq	0.1563	0.1232	0.1447	0.1002	0.1601	0.1852
Observations	2954	2125	4212	3128	2164	1502
Clusters	334	325	497	484	256	248
Panel C. Selected results for regression models with log of acquisition value						
Value of acquisition (log)	-0.006***	-0.009*	-0.003*	-0.011***	0.003	-0.012
R-Sq	0.1565	0.1199	0.1453	0.1015	0.1603	0.1856
Observations	2954	2125	4212	3128	2164	1502
Clusters	334	325	497	484	256	248

Note: a. Dependent variables - return on equity (ROE) and growth in sales (Growth) - are winsorized at 1% level; b. Propensity score match is used to match one acquisitive firm with non-acquisitive firm in match-year; c. Regression model has the same specification as models in table 3, but control variables are suppressed; d. Acquisition-years are dropped in regressions with growth as dependent variable; e. Standard error is corrected for clustering following Peterson (2009); f. *, **, and *** indicate a p-value of 10%, 5%, and 1%, respectively.

Table 6. Betas for Regression Models by Industry

Industry	N	USA ROE	USA Growth	Canada ROE	Canada Growth	Other ROE	Other Growth
Agriculture	17	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Aircraft	56	-0.10	0.06	-0.09	0.44**	0.09	1.16
Alcoholic beverages	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Apparel	15	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Automobiles and trucks	104	-0.18	-0.90***	-0.55	-0.47	0.05	0.96
Banking	313	-1.03***	1.53***	-0.00	-0.09***	2.07**	2.03**
Business services	331	-0.04	-0.08	-0.17	-0.17	0.03	-0.41***
Business supplies	160	-0.21	-1.35***	0.34**	0.10	1.03	7.10***
Candy and soda	19	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Chemicals	139	0.07	0.41*	-0.20	0.15	0.17*	2.35***
Coal	32	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Computers	38	0.50*	0.30	-0.11	0.57***	-0.83**	-1.23**
Construction	57	-2.01**	-1.83	-0.16	-0.28	n.a.	n.a.
Construction materials	353	0.007	-0.08	-0.02	-0.04	-0.02	-0.04***
Consumergoods	98	0.25*	0.05	2.62	3.27	0.28	0.05
Defense	0	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Electrical equipment	49	0.46	-3.25	0.71	-1.33**	0.38**	0.29
Electronic equipment	166	0.03	-1.24*	-0.01	0.07	-0.02	-0.04**
Entertainment	85	-0.48***	-0.97***	0.05***	-0.03	n.a.	n.a.
Fabricated products	33	-0.28	0.43	-0.15	-1.30*	n.a.	n.a.
Food products	186	0.01	-0.16	0.27**	-0.43**	1.01**	22.36
Healthcare	7	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Insurance	248	-0.202	-1.04**	-0.00	-0.17	-1.02	-6.29***
Machinery	150	0.75***	8.20***	0.04	-0.55***	0.11	2.71***
Measuring and control equip	13	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Medical equipment	15	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Miscellaneous	51	-0.21	0.08	-0.31*	-0.11**	-20.29***	-2.39
Nonmetalic mining	402	-0.23	-7.72***	-0.04***	-0.03	0.03	0.00
Personal services	33	0.84	-0.37	n.a.	n.a.	n.a.	n.a.
Petroleum and natural gas	1170	-0.37**	-0.14	0.00	-0.01*	0.16	12.36
Pharmaceutical products	88	0.08	-0.28*	0.88	-4.82	-0.13	-0.65
Precious metals	357	-0.18***	-0.47***	0.05	-0.14	0.00	-0.15**
Printing and publishing	31	n.a.	n.a.	-0.62	n.a.	n.a.	n.a.
Real estate	328	-0.04***	-0.04***	-0.10*	-0.25**	-0.12***	-0.57***
Recreational products	11	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Restaurants, hotel, motel	35	n.a.	n.a.	11.73***	n.a.	n.a.	n.a.
Retail	396	0.03	0.79***	0.00	0.50*	n.a.	n.a.
Rubber	58	-0.32	-0.10	-0.04	-0.13	-0.77**	-1.37***
Shipbuilding, railroad eq	1	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Shipping containers	0	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Steel works, etc.	143	-0.38	-0.243	-0.27**	-0.01	-0.34***	0.08***
Telecommunications	346	0.05***	0.037***	0.00	0.04	-0.02	0.30***
Textiles	0	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Tobacco products	18	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Trading	147	-1.17***	-2.781***	-0.13**	-0.40	0.15	1.57***
Transportation	317	-0.15	-0.017	-0.02	-0.36***	0.68***	0.33*
Utilities	444	-0.09**	0.220	-0.01	-0.52***	-0.02	-0.09***
Wholesale	359	0	-0.222***	-0.03	0.23	0.06	0.22

Note: a. Table reports beta for acquisition size variable by industry; b. Dependent variables - return on equity (ROE) and growth in sales (Growth) - are winsorized at 1% level; c. Regression model includes two explanatory variables - acquisition size and lagged dependent variable; d. Acquisition-years are dropped in regressions with growth as dependent variable; e. Standard error is corrected for clustering following Peterson (2009); f. *, **, and *** indicate a p-value of 10%, 5%, and 1%, respectively.

Table 5 sets out acquisition impact on profitability and growth for a matched

subsample. Five out of six coefficients that measure impact of U.S. acquisitions, including all four coefficients that proxy for target size, are negative and statistically significant, although statistical significance is lower than in models in table 4. Percentage of assets variable that proxies for share of assets of the firm in the United States takes on a negative sign and is statistically significant, although at 10 percent level only. Logarithm of acquisition value is also marginally less significant than corresponding variable in table 4 in a regression model that explains growth in sales for Canadian firms acquiring targets in the U.S., but is significant at 1 percent level in a model that explains return-on-equity. There is no evidence of positive acquisition impact in any geography.

High-tech dummy is insignificant in model specifications reported in table 4. For robustness, we separated target firm industries in terciles by level of research and development expenditures by geography and coded them with dummy variables. In unreported regression models, dummy variables that proxy for the highest level of research and development expense had negative impact on growth in the United States and other geographies, but not in Canada. Level of R&D expense in target firm industries had no impact on acquirers" profitability.

Industry Effects

Rao *et al.* (2004) indicate that Canada enjoys productivity advantage in resource-based and transportation equipment industries. One possibility is that in industries, in which Canada has competitive advantages, cross-border acquisitions create value, boosting profitability and growth in sales. We examine changes in return-on-equity and sales growth by industry using regression models with percentage of assets and one autoregressive term (equation 7):

$$\text{Performance e} = \alpha_0 + \beta_1 \text{percentage of assets} + \beta_2 \text{AR}(1) \quad (7)$$

where performance is return-on-equity or growth in sales. We use simpler models than in specifications 1 and 2 to avoid possible bias in coefficients due to smaller sample size in industry-level regressions.

The results are revealing. In the three largest industries, including oil and gas, precious metals mining and nonmetallic mining, cross-border acquisitions in the United States have negative impact on return-on-equity and growth in sales. In two out of three industries, coefficients are statistically significant in models with both dependent variables,

including return-on-equity and sales growth. Interestingly, impact is positive in industries with higher added value – machinery and telecommunications.

It appears that Canadian firms operating in core industries destroy value when they acquire larger companies in the United States fitting the managerial objective hypothesis, whereas firms in industries in which Canada does not have strong competitive advantages gain from acquisitions of the U.S. counterparts in line with the synergy hypothesis.

Competitive effects

One possible explanation for worse performance of Canadian companies acquiring the U.S. counterparts is higher level of competition (industry-level Herfindahl-Hirshman indices for target firms' jurisdictions are reported in table 1). We put to test this hypothesis using dummy variables that proxy for level of competition for target firm industries in model 8:

$$\text{Performance} = \alpha_0 + \sum_1^3 \beta_{\text{H}}\, \text{Herfindahl} - \text{Hirshman dummy}_{\text{H}} + \beta_4 \text{logAssets} + \beta_5 \text{GDP} + 6\beta_6 \frac{\text{Debt}}{\text{Equity}} + \sum_0^{\text{N}} \beta_{\text{N}}\, \text{Industry} + \sum_0^{T} \beta_{\text{T}}\, \text{year} + \beta_8 \text{AR} \quad (8)$$

where performance is ROE or sales growth. Herfindahl-Hirshman index dummy is set equal to one for each tercile in each of the three jurisdictions for target firms in year 0 – year 5 after acquisition. Herfindahl-Hirshman I represents the highest level of competition. Results are reported in table 7.

Level of competition in target firm industries does not explain differences in performance of acquiring firms. In the United States target firms' subsample, relationship is monotonic, but it is the opposite of what should be expected. With decrease in the level of competition in the target firm industries, performance of Canadian acquirers deteriorates. There is no discernible patter in regression models that examine impact of acquisitions in Canada and other geographies.

We conclude that level of competition does not explain differences in performances of Canadian acquirers. Our results suggest that other factors, including difference in corporate culture, could be at play.

Table 7. Betas for Regression Models with Herfindahl Index Dummy Variables

	USA ROE	USA Growth	Canada ROE	Canada Growth	Other ROE	Other Growth
	ROE	Growth	ROE	Growth	ROE	Growth
Intercept	-0.055**	-0.003	-0.052*	-0.001	-0.055**	0.002
	0.027	0.041	0.027	0.041	0.027	0.042
Herfindahl-Hirshman I	-0.002	-0.025	-0.017	-0.013	-0.047**	-0.011
	0.014	0.024	0.010	0.024	0.023	0.037
Herfindahl-Hirshman II	-0.008	-0.063**	0.000	-0.043**	-0.006	-0.059*
	0.013	0.027	0.010	0.021	0.019	0.031
Herfindahl-Hirshman III	-0.036**	-0.075**	-0.011	-0.066***	0.001	0.018
	0.015	0.030	0.011	0.018	0.024	0.080
LogAssets	0.016***	0.001	0.015***	0.001	0.015***	-0.001
	0.002	0.005	0.002	0.005	0.002	0.005
GDP	0.004	0.053***	0.004	0.053***	0.004	0.054***
	0.003	0.007	0.003	0.007	0.003	0.007
DE_Ratio	-0.001***	0.0004*	-0.001***	0.0004*	-0.001***	0.0004*
	0.000	0.0002	0.000	0.0002	0.000	0.0002
AR(1)	0.285***	0.104***	0.286***	0.103***	0.284***	0.104***
	0.030	0.007	0.030	0.026	0.030	0.026
Industry	Yes	Yes	Yes	Yes	Yes	Yes
Year	Yes	Yes	Yes	Yes	Yes	Yes
R-Sq	0.158	0.103	0.158	0.103	0.159	0.102
Mean Dependent Variable	0.080	0.1667	0.080	0.167	0.080	0.167
Observations	6024	4484	6024	4484	6024	4484
Clusters	816	728	816	728	816	728

Note: a. Dependent variables - return on equity (ROE) and growth in sales (Growth) - are winsorized at 1% level; b. Herfindahl-Hirshman index dummy is set equal to 1 for each tercile for target firms in year 0 - year 5 after acquisition in ascending order. Values that separate terciles are estimated for each jurisdiction. Herfindahl-Hirshman I dummy represents the highest level of competition, and Herfindahl-Hirshman III dummy represents the lowest level of competition;
c. Regression model has the same specification as models in table 3, but control variables are suppressed; d. Acquisition-years are dropped in regressions with growth as dependent variable; e. Standard error is corrected for clustering following Peterson (2009); f. *, **, and *** indicate a p-value of 10%, 5%, and 1%, respectively.

CONCLUSION

We find robust evidence that cross-border acquisitions by Canadian firms are associated with lower profitability and lower growth rates when compared to purely domestic acquisitions and perform an investigation into possible sources of differential performance of bidders depending on acquisition geography.

Cross-border acquisitions do not provide a channel to bridge productivity gap between the United States and Canada. Further, we contribute to the literature on the valuation effects of mergers and the value of diversification by investigating which cross-border acquisitions impact operating performance of Canadian firms. Our findings suggest

that mergers are value-neutral events, but acquisitions of larger firms in the U.S. market negatively affect profitability and growth of Canadian firms. This provides evidence in support of agency view of mergers as in Eun *et al.* (1996). Alternatively, our results could support Krug and Hegarty (1997), who note that transfer of technology and know-how may be primary acquisition motive and that, therefore, performance may initially be of secondary importance in the context of acquisitions in the United States.

One possible criticism of findings reported in this study is the measurement problem. It is not clear if performance should be measured in terms of financial metrics, technological outputs or integration costs (Oliveira, Roth, and Ponte 2003). One other possible limitation is that the study covers a short post-acquisition window. It is possible that long-term post- acquisition improvements in productivity and operating performance acquisition are positive. Empire Co., which operates food retailer Sobeys, owned a minority percent stake in the New England based grocer Hannaford Bros. Co. in 1979-2000. It is likely that exposure to the U.S. market gave boost to Sobeys performance, but such effect on operating performance of acquiring company could be spread over long period of time and, therefore, is difficult to confirm with econometric results.

One way to examine long-term impact of acquisitions is to compare performance and survivorship in acquisitive firms versus non-acquiring firms. Our study documents that acquiring firms are more profitable, but slightly lower growing (table 1). Further work along these lines is warranted.

Results of this research have implications for investment community and government regulators. In large cross-border acquisitions, agency effect dominates synergy impact, including effect of technology transfer, economies of scale or resource acquisition. Large acquisitions in the United States should be viewed as value-destroying events, whereas smaller acquisitions are value-neutral. Finally, if difference in operating performance between U.S. and Canadian acquisitions is due to corporate culture and, more specifically, due to higher level of domestic industries' protection in Canada, an argument can be made to lower barriers for entry of foreign firms in the domestic market.

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