Trading Places: Impact of Ownership Changes on Canadian Firms

This paper examines 151 changes in ownership from widely-held to a controlling shareholder or visa versa to measure the impact on performance and capital structure. We also consider whether the purchase of a control stake by a foreign owner has a different impact from a domestic owner. We estimate the impact of ownership changes using a panel of Canadian firms from 1998 to 2005, using propensity score matching to construct an appropriate counter-factual control group. In the short run, the acquisition of a control stake in a widely-held firm, whether by a Canadian or foreign owner, generates a positive abnormal return around the event while the divestiture of a control stake generates minimal stock market reaction. In the longer term, the acquisition of a control stake by a foreigner is associated with a lower Tobin's q ratio and lower financial leverage, but has no impact on ROA. The purchase of a control stake by a Canadian owner is associated with an increase in valuation, with no other systematic effects. Finally, the divestiture of a control stake is associated with an increase in Tobin's q ratio and a decrease in leverage, with not impact on ROA.

JEL classification: G12; G15

Keywords: ownership structure; foreign takeovers; firm performance; capital structure; Canada

1. Introduction

The integration of global capital markets, combined with a reduction in regulatory barriers to foreign investment, has led to a global boom in international mergers and acquisitions (M&A). Despite the long-run benefits of capital market integration and financial liberalization, some policymakers remain concerned when foreign investors acquire domestic firms. Inside Canada, foreign takeovers of Canadian companies such as Hudson's Bay or Inco have raised concerns about hollowing out, with critics suggesting that these acquisitions will have negative implications for the Canadian economy. Outside Canada, similar concerns have been raised in light of the global investments of sovereign wealth funds and state owned enterprises in strategic industries such as natural resources or infrastructure. In contrast to the public debate, the academic literature generally finds that foreign-owned firms have better performance than domestic-owned firms (Petkova 2007). Critics argue that this finding may be spurious as foreign firms "cherry pick" the best-performing domestic firms or acquire firms in high-productivity areas, rather than improving the domestic firm's performance through the transfer of technology, management techniques, or better corporate governance. Since the decision to acquire a domestic firm may be endogenous, any study of the impact of foreign ownership on the performance of domestic firms must account for this problem of selection bias.[1]

In this paper, we analyse 151 ownership changes in Canadian firms over 1998 to 2005, where a controlling shareholder either acquires 20% or more of the votes in a widely-held Canadian firm, or where the controlling shareholder divests their block holding. We also differentiate between Canadian and foreign blockholders. We first examine the short-run market reaction to the announcement of the change in ownership using an event study of abnormal returns. To capture the longer-term effects, we examine the impact of ownership changes using three measures of a firm's performance: its market performance, proxied by Tobin's q ratio, its accounting performance, proxied by ROA, and firm leverage, as measured by debt-to-total assets. We collect annual data for 613 Canadian firms covering 1998 to 2005 and identify the owner's nationality, and the percentage control of votes held by the largest shareholder. To our

[1] Demsetz and Lehn (1985), Himmelberg, Hubbard and Palia (1999), and Coles, Lemmon and Meschke (2007) argue that ownership and performance are often determined by common characteristics, some of which are unobservable to the econometrician.

knowledge, this is the largest and most comprehensive database of Canadian ownership. We then estimate the impact of changes in ownership using panel data techniques to control for the problem of unobserved firm-level heterogeneity. Given that there may be systematic differences between the control group (domestic controlled firms) and the treatment group (foreign controlled firms), we use propensity score matching techniques to construct an appropriate counter-factual control group. We then implement a difference-in-differences matching estimator to identify changes associated with the change in control. We check to see if the results vary based on the nationality of the blockholder.

One limitation of existing international studies of foreign takeovers is that most studies feature countries or regions with very different legal, regulatory, and market institutions than the United States, making it difficult to disentangle firm-level effects (such as the choice of capital structure, corporate governance, or management quality) from country-level effects. Canada provides an ideal setting for studying this question. Canada and the U.S. share a common legal ancestry, with Canadian corporate and securities laws adopted from American precedents (Buckley 1997). Both countries have the same English common-law legal system, require similar disclosure levels, and exhibit similar levels of shareholder protection (La Porta et al. 1998, 2000). At the same time, Canada features more concentrated corporate ownership than the United States (Attig 2005; King and Santor 2008). For example, 45% of the Canadian firms in our sample have a controlling shareholder at the 20% threshold vs. 28% for the U.S. sample studied by Gadhoum, Lang, and Leslie (2005). A study of Canada therefore provides a useful counterfactual assessment as it features the ownership structures of European or Asian firms in a similar institutional setting to the United States.

Our main findings highlight differences in the short-run and the long-term effects. In the short run, we find that the acquisition of a control stake in a widely-held firm, whether by a Canadian or foreign owner, generates a positive abnormal return around the event with CAARs three times larger than the reaction for the average takeover of a Canadian firm. By contrast, the divestiture of a control stake generates a smaller stock market reaction. Turning to the longer term effect on performance and capital structure, we find that the acquisition of a control stake by a foreigner is associated with lower Tobin's q ratios and lower financial leverage, but has no impact on ROA. The purchase of a control stake by a Canadian owner is associated with an increase in valuation,

with no other systematic effects. Finally, the divestiture of a control stake is associated with an increase in Tobin's q ratio and a decrease in leverage, with not impact on ROA.

The remainder of this paper is organized as follows. Section 2 reviews the related literature and highlights the methodological problems that researchers need to address. Section 3 describes the sample and provides summary statistics. Section 4 conducts an event study on the abnormal returns around changes in ownership, and distinguishes between changes from widely-held to controlled, and visa versa. Section 5 discusses our methodology and estimates the relationship between foreign versus domestic ownership, firm performance, and capital structure. Section 6 concludes.

2. Related Literature

This paper is related to several strands of research. A first strand of literature examines the impact of foreign takeovers or foreign investments on domestic firm performance. The foreign acquirer may be a widely-held firm, with no shareholder controlling more than 20% of the voting shares, or a firm controlled by a family, a widely-held corporation, or a financial investor such as a pension or mutual fund. Studies of foreign acquisitions typically measure the impact by looking for changes in total factor productivity (TFP), return on assets (ROA), or labour income around the event with results reported for the United States (Girma et al. 2006), Japan (Fukao et al. 2006), U.K. (Haskel, Pereira, and Slaughter 2007), Italy, France, Mexico, Indonesia, and India (Petkova 2007). Our contribution is to examine Canadian data, and to consider the impact on valuations, ROA, and financial leverage. We focus on changes in ownership, where a foreign or Canadian blockholder acquires a control stake in a widely-held Canadian firm, or a closely-held Canadian firm becomes widely-held. This type of event is less common, but should be expected to have a greater impact on firm characteristics and performance. We are not aware of any other Canadian study that looks at this question.

The results of two U.K. studies highlight the methodological difficulties that plague this area of research. Conyon et al (2002), for example, study the productivity and wage effects of foreign acquisition in the United Kingdom. Using a specially constructed database for the period 1989-1994, the authors use ownership change to control for unobserved differences between plants. They find that U.K. firms that are acquired by foreign firms exhibit an increase in labour

productivity of 13%. In a related study, Harris and Robinson (2003) find that foreign investors cherry-pick the best performing U.K. firms, but subsequently the acquired firms do not demonstrate any benefits from foreign ownership. This finding raises the problem of selection bias, as it suggests the results may be sensitive to the control sample used to evaluate the change in performance. Recent papers by Arnold and Javorcik (2005), Fukao et al (2006), and Petkova (2007), among others, address this issue using the propensity score matching technique to establish the control sample, combined with difference-in-differences estimation approach to isolate the impact of the change in ownership. We employ this methodology is in this paper.

Given their focus on productivity or wages, it is not surprising that few if any studies in this literature examine either the impact of ownership change on a domestic firm's valuation, or the impact on the use of financial leverage. Studies of U.S. firms that consider these issues are studies of leveraged buy-outs by Lichtenberg and Siegel (1990) and of management buy-outs by Harris, Siegel, and Wright (2005).

A second strand of literature considers the impact of concentrated ownership on performance. There are over 100 studies of the impact of concentrated ownership – whether by insiders or outside investors – on firm performance. These studies report mixed results, with ownership structure leading to better performance, worse performance, or no observable effect on performance (King and Santor 2008). Increased ownership by insiders or the presence of a large blockholder can lead to better performance due to the greater alignment of interests between manager and minority shareholders, better monitoring of managers, and less myopic behaviour. Concentrated ownership can have a negative effect on firm performance by entrenching poor managers, facilitating the expropriation of minority shareholders by insiders or controlling shareholders, and concentrating manager wealth leading to excessive risk-aversion. A final set of studies suggests that concentrated ownership may have no observable effect on firm performance due to endogeneity between ownership structure and firm performance.

One approach to disentangle the impact of ownership on performance is to conduct an event study of changes in control, then to compare the performance before and after the event. Smith and Amoako-Adu (1999), for example, look at 124 management successions within Canadian family-controlled firms. They document negative abnormal returns around the appointment of

family successors, whereas there is no significant decrease when either non-family insiders or outsiders are appointed. Bennedsen, Nielsen, and Pérez-González (forthcoming) use a unique dataset from Denmark to investigate the impact of family succession on firm performance. The authors find that family successions have a large negative causal impact on firm performance: operating profitability on assets falls by at least four percentage points around CEO transitions, with greater underperformance in fast-growing industries, industries with highly skilled labour force and relatively large firms. We adopt an event study of abnormal returns to identify the short-run market reaction, although we believe the impact of the ownership change may take longer to manifest itself.

A second approach advocated by Himmelberg, Hubbard and Palia (1999) is to use panel regressions techniques to address unobserved firm heterogeneity. This approach is employed by Villalonga and Amit (2007) in a study of U.S. firms, Claessens et al. (2002) for European firms, and Lins (2003) for Asian and emerging market firms. King and Santor (2008) study a panel dataset of Canadian firms to distinguish the effect of family ownership on firm performance and capital structure choices. The authors find that freestanding family-owned firms with a single share class have similar valuations, higher ROA, and higher financial leverage than widely-held firms. We use panel regressions in this study to control for unobserved firm heterogeneity.

This review of this literature suggests two methodological problems that researchers must address in their empirical design, namely: the issue of selection bias, and the potential endogeneity between ownership and performance. We discuss these issues in section 4 on methodology below.

3. Data description and summary statistics

We collect annual data on ownership and control from management proxy circulars (SEDAR), the Statistics Canada InterCorporate Ownership database, and the Financial Post Top 500. We follow Claessens et al. (2002) and divide firms into five categories based on a 20% control threshold: firms are classified by whether they are controlled by a family, government entity, non-financial corporation (including publicly-traded subsidiaries), or financial institution. Firms are classified as widely-held where no shareholder controls more than 20% of the voting rights, either directly or indirectly using dual-class shares or pyramidal structures. We collect annual

financial statement data from Standard & Poor's Compustat, and stock prices from the CRSP and the TSX-CFMRC databases.

The full sample consists of all Canadian firms that meet the following criteria: positive assets (DATA6 on Compustat), positive sales (DATA12), non-missing book value of equity (DATA60), and non-missing income before extraordinary items (DATA18). We exclude financial firms to make our sample comparable with other studies, and drop firms with a market capitalization below $10 million Canadian dollars. Following Villalonga and Amit (2006) we exclude 43 observations of firms with Tobin's q ratios above 10. These restrictions result in a final sample size of 2,758 firm-year observations from 613 firms, of which the median firm is in our sample for four years. The distribution of owner type for the entire sample is 56% widely-held, 32% family-owned, 8% controlled by a corporate entity and 4% controlled by a financial institution.

Panel A of Table 1 presents summary statistics and univariate tests of the key variables used in our analysis for the 613 Canadian firms over the period 1998 to 2005. We use a parametric t-test to examine whether the differences in means of firm characteristics by owner type are statistically significant, where the comparison is always relative to widely-held firms. We highlight three key differences between family-owned firms and widely-held firms. First, family-owned firms have similar market capitalization to widely-held firms but greater total assets, implying that financial leverage at family-owned firms must be higher. In fact, their total debt-to-total assets ratio is 27.9%, significantly higher than the 21.4% for widely-held firms. Second, family-owned firms have statistically lower sales growth (19.1%) but higher ROA (10.5%). The mean Tobin's q ratio is lower at 1.420, representing an discount of more than 25% relative to the average widely-held firm. Given higher profitability, this discount may be explained by a higher cost of capital, while lower sales growth may point to fewer growth opportunities. Third, family-owned firms have half the capital expenditure (capex)-to-sales (14.0%) of widely-held firms (30.5%), consistent with lower sales growth. We check how these characteristics vary based on firm size. Larger firms exhibit higher Tobin's q ratios compared to smaller firms (1.906 vs.

1.428), higher financial leverage (27.8% vs. 24.1%), but lower capex-to-sales and cash-to-assets (results not shown).[2]

Panel B of Table 2 shows the distribution of owner type by industry. We classify firms into five broad industries: high technology, transportation and utilities, natural resources, manufacturing and construction, and wholesale and retail trade and services. Close to 70% of firms in transportation and utilities and natural resources are widely-held at the 20% threshold, with family ownership accounting for 22% in each sector. Family ownership is higher in the high tech (35%), manufacturing (37%), and service sectors (40%). Ownership by a corporation also tends to be higher in services and high tech, while financial owners are most prevalent in the service sector. Given the variation in owner type by industry, we control for industry in our regressions below.

Figure 1 highlights the changes in ownership that are the focus of our analysis. We identify 151 changes in ownership across 101 firms. These events represent either the acquisition of a control stake of 20% or greater in a widely held firm, or the divestiture of a control stake leading a closely-held Canadian firm to become widely-held. Given that the entire sample represents 613 firms, this implies that 17.5% of the firms experience a control change of this type over the period covered by this study. The most common change is for a firm controlled at the 20% threshold to become widely-held, whether due to the divestiture or dilution of the control stake by a Canadian or a foreign owner. We observe 88 such ownership changes from 1988 to 2005. In 36 cases, a foreign owner acquires a control stake in a widely-held Canadian firm. Finally, 27 cases represent a Canadian owner acquiring a block holding of 20% of more in a widely-held Canadian firm.

4. Event study of change in control

As discussed above, a standard approach to measure the impact of a corporate event is to study the abnormal returns before and after the event. While our sample contains 151 such events, we can identify the date when a material change in ownership occurs in 62 cases, typically when a

2 We observe considerable cross sectional variation based on firm size, but the relative distribution of owner type is comparable across size quartiles.

takeover bid is announced.[3] For the remaining cases, the control stake is acquired over time with the change identified by comparing annual management proxy circulars. We identify 21 firms that change from widely-held to controlled, and 41 firms where the controlling shareholders sell their block holding and the firm becomes widely-held. We collect market data on total returns and shares outstanding from the TSX-CFMRC database. The absence of sufficient trading data required to estimate abnormal returns reduces the sample to 49 cases. For these transactions, we identified the correct "news-adjusted" announcement date using electronic news searches on Factiva.

We conduct a standard event study of abnormal returns and trading volume following the methodology in MacKinlay (1997). The 'zero date' in our study, t=0, is the date of the first public announcement of the takeover. Given that takeover announcements may be announced when the market is closed or may be reported in the financial media the day following the announcement, we include the trading day after the announcement in our zero date so our event date is [0,1]. Our event window begins 50 trading days prior to the first public announcement and ends 20 trading days after this date, [-50, 20]. Our estimation window lasts from 250 to 101 trading days before the first public announcement, [-250,-101]. We calculate daily abnormal returns (ARs) for target firm i and event date t in our sample according to the equation:

$$AR_{it} = R_{it} - E(R_{it} \mid X_t) \tag{1}$$

where AR_{it}, R_{it}, and $E(R_{it} \mid X_t)$ are the abnormal, actual, and normal returns, respectively, for the time period t. X_t is the conditioning information for the normal return model. We estimate normal returns over the estimation window [-250,-101] using a standard market model. We use the TSX-CFMRC equal-weighted index as the proxy for the market.[4] We aggregate individual abnormal returns across securities to generate average abnormal returns (AAR). The average abnormal returns are then aggregated over the event window to calculate cumulative average abnormal returns (CAAR) over different windows from t *to* T, [t,T]. We conduct two tests of the null hypothesis that the AARs or CAARs are zero, using a parametric z-test.

[3] We only consider control changes that are material, namely where the control stake increases or decreases by at least 5%. This restriction eliminates changes in control due to marginal changes in controls stakes around the 20% threshold.

[4] Our results are robust when using the TSX-CFMRC market-weighted index.

Table 2 presents the results of this event study. Column 1 reports the AARs and CAARs for the full sample of 49 events over the window [-50,20], estimated using the market model. The AARs fluctuate around zero with few days where the values are statistically different from zero. The percentage of AARs that are positive on any given day fluctuates around 50 per cent (result not shown). By contrast, the CAARs become positive and significant from 10 trading days prior to the announcement of the control change. This pattern of pre-bid run-ups has been documented in other studies of Canadian takeovers (Jabbour, Jalilvand and Switzer 2000; King and Padalko 2005).

Column 2 of Table 2 reports the results for 15 cases where a widely-held Canadian firm becomes closely held, following the acquisition of a control stake by either a Canadian or a foreign owner. We note the positive CAARs beginning far ahead of the announcement, consistent with (i) market anticipation of the control change or (ii) the acquisition of the control stake over time. By the day of the announcement, the CAAR is 28.06%, and it rises to close to 45% within a week of the announcement. We do not report the results for Canadian and foreign acquirers separately due to the small sample size, although we note that they are similar in magnitude. Figure 2 graphs daily AARs and the CAAR over the window [-50,20] for this acquisition of control, and shows the pre-bid run-up in CAAR. The large and economically important market reaction is consistent with a control premium being reflected in the target's share price, and is typical of a takeover setting. The magnitude of the CAAR over the window [-50,20] at 42.86% is more than three times larger than the similar CAAR of 18.71% reported for 399 Canadian takeovers studied by King and Padalko (2005). These acquisitions of control clearly represent an unusual event.

Column 3 of Table 2 reports the results for 34 cases where either a Canadian or a foreign owner divests or dilutes their control stake below 20% of the voting shares, and the firm becomes widely-held. The CAAR is positive and significant from a week prior to the announcement, but the magnitude is much smaller at 6.79% over the window [-50,20]. The CAAR peaks at 8.53% on the tenth trading day following the announcement. Figure 3 shows the AARs and CAARs for these 34 cases. The smaller reaction to the change in control suggests that the divestiture is important but not nearly as important as the acquisition of a control stake by either a Canadian or a foreign owner.

5. Regressions on firm performance and leverage

5.1 Methodology

Next we examine the longer-term reaction to the change in control using multivariate regressions. We examine the impact of foreign ownership on two measures of a firm's performance: its market performance, proxied by Tobin's q ratio, and its accounting performance, proxied by ROA. Thus, we estimate the following equation:

$$y_{it} = a + b' x_{it} + d\, OWN_{it} + e_{it} \quad (2)$$

where y_{it} is either Tobin's q or ROA_{it}. The x's are firm characteristics, namely firm size, sales growth, industry Tobin's q, ROA, financial leverage, firm age, membership in the TSE300 index, and capex-to-sales. ROA is a control in the regressions on Tobin's q only. OWN_{it} is a measure of ownership, i.e. whether the firm has a Canadian owner, a foreign owner, or is widely held. εit is the mean-zero residual adjusted for firm-specific heterogeneity. While equation (2) estimates the impact of foreign ownership on the level of firm performance, we aim to evaluate the impact of a change in ownership, and in particular, acquisition by a foreign firm. For this, (2) can be augmented as follows:

$$y_{it} = a + b' x_{it} + d' CH\_OWN_{it} + e_{it} \quad (3)$$

where *CH_OWN* is a vector of three dummy variables that indicate whether the firm was acquired by a Canadian owned firm, a foreign owned firm, or was a firm with a controlling shareholder that became widely-held. We repeat the same exercise to examine the effect of a change in ownership on capital structure using the following model:

$$lev_{it} = a + b' x_{it} + d\, OWN_{it} + e_{it} \quad (4)$$

where lev_{it} is financial leverage, measured as total debt-to-total assets, and the control variables on the right-hand side are the same as in (1), except that financial leverage is excluded and cash-to-assets is included. OWN is ownership, or the change in ownership, as described before.

5.2 Econometric Issues

There is a widespread consensus that foreign-owned firms have better performance than domestic-owned firms (Petkova 2007). But it may be the case that foreign firms simply "cherry pick" the best-performing domestic firms, or choose only to acquire firms in high-productivity areas, rather than improve the domestic firm's performance through the transfer of technology, management techniques, or better corporate governance.[5] The decision to acquire a domestic firm may be endogenous, and thus any study of the impact of foreign ownership on the performance of domestic firms must account for the problem of selection bias.

The problem of endogeneity described above complicates the evaluation, for example, of the impact of a change in ownership. Estimation by OLS will only produce unbiased estimates of ownership change if the change is exogenous. That is, firms that change ownership have to be identical to those that do not, except that the change in ownership was exogenously determined. It is clear that the outcome of acquisition is not exogenous for the firm, as it is often the firms with best growth potential that are acquired. Nevertheless, OLS estimation can still produce unbiased estimates of the change in ownership if the characteristics that determine acquisition are observable.[6] It is most likely, however that ownership change is a function of firm characteristics that are often unobservable: i.e. firm characteristics such as managerial competence, and/or the availability of good projects may determine which firms are acquired. Most studies utilize simple Heckman correction models to address these issues.[7] However, these standard approaches, even when they identify acquisition successfully, may still be inadequate for evaluating the impact of acquisition.

5.3 Matching Methods

Standard non-experimental evaluation techniques rely on the fact that the treatment (acquired firms) and control groups (non-acquired firms) share common supports for the distribution of firm characteristics. That is, firms in the treatment and control groups are comparable across a range of characteristics, such as firm size, age and profitability. However, if the supports of the distribution are not similar, Heckman et al. (1996) show that the implementation of standard non-

[5] Moreover, Demsetz and Lehn (1985), Himmelberg, Hubbard and Palia (1999), and Coles, Lemmon and Meschke (2007) argue that ownership and performance are often determined by common characteristics, some of which are unobservable to the econometrician.
[6] This depends on whether one has enough "controls" to account for the determinants of a change in ownership.
[7] One notable exception is Petkova (2007)

experimental techniques may produce biased estimates of acquisition impacts. This is because OLS estimates assume that the impact of ownership change can be captured entirely by the single index $X'ß$, which may not be related to the firm's propensity to be acquired. Furthermore OLS, and other standard non-experimental techniques imply a common acquisition effect across all firms. If there were substantial differences between the control and treatment groups, then estimates of the impact of acquisition would be biased since the treatment group may respond differently to the treatment. For example, the treatment group may consist of young, growth-oriented firms in the natural resources industry, while the control group may be older, established firms operating in the service industry. Consequently, the impact of acquisition may differ substantially between firms, and these differences are not resolved by standard selection models. For example, a treatment effects model estimates the difference, d, between acquired and non-acquired as:

$$d = E(\Pi_1 \mid CH\_OWN = 1) - E(\Pi_0 \mid CH\_OWN = 0) \tag{5}$$

where ? is the outcome of interest. But to accurately assess the impact of acquisition, one needs to calculate the effect of the treatment (acquisition) on the treated (those who were acquired):

$$d_T = E(\Pi_1 \mid CH\_OWN = 1) - E(\Pi_0 \mid CH\_OWN = 1) \tag{6}$$

That is, one needs to observe the outcomes for firms that received the treatment and compare them to outcomes for firms that are otherwise identical, except for the fact that the control group did not experience a change in ownership (but were eligible to be acquired and would do so). Unfortunately, the second term of the right hand side of (6) does not exist in the data since it is not observed. [8]

A solution to this evaluation problem is to create the counterfactual $E(\Pi_0 \mid CH\_OWN = 1)$ by matching treatment and control firms along observable characteristics. For every firm in the treatment, one needs to find a firm that is identical in every respect except for the fact that the

[8] A solution is for the researcher to create the right hand side of (5) through the implementation of a randomized experiment: firms would be randomly acquired by a foreign or Canadian firm. This would create a true control group sample analogue that could be used to determine the difference between the outcomes of those firms that were acquired and those that were not. While the implementation of randomized experiments has been successfully executed in certain settings, thus evaluation techniques is clearly not available.

firm experienced a change in ownership. For instance, if the treatment group consisted of young, growth-oriented firms in the natural resources industry, one would like to find similarly profitable firms, from the same the same industry. Fortunately, there is a solution to this problem, known as "matching methods." Rosenbaum and Rubin (1984) show that instead of matching along X, one can match along P(X), the probability that the firm participated in the treatment group, and still develop consistent and unbiased estimates of the effect of acquisition on the treated.[9]

There are several methods of matching that one can consider: "without replacement", "with replacement" and "nearest neighbour" techniques (Dehajia and Wahba, 1998). The standard technique, matching without replacement, is conducted as follows. First run a logit and/or probit regression to generate a scalar measure of the probability of acquisition P(X). Then, sort the data according to the estimate of P(X) from highest to lowest. For each firm in the treatment group match it to a control firm, in descending order and repeat until each treatment firm is matched with a firm from the control group. This technique can also be done "with replacement". In this case, *P(X)* is estimated and then the data randomly ordered. Then each firm in the treatment group is matched with the firm from the control group that is its nearest neighbour. In this way, different treatment firms may have the same control group analogue. Lastly, one can match each treatment firm to those control firms within some radius d of P(X) and take the weighted average of the characteristics of those firms in the radius.[10]

The viability of propensity score matching techniques to construct a suitable control group sample analogue depends on the following crucial assumption:

$$E(\Pi_0 \mid P(X), CH\_OWN = 1) = E(\Pi_0 \mid P(X), CH\_OWN = 0) \tag{7}$$

that is, conditional on the propensity score, the outcome in the non-participation state is independent of participation. To be able to create suitable counterfactuals to the treatment group

[9] Note that it is quite hard to match on multiple dimensions especially when *X* consists of continuous variables: this is the so-called curse of dimensionality. Rosenbaum and Rubin (1984) have proposed the propensity score matching approach employed in this paper to this dimensionality problem. See Smith and Todd (2001) and Ham, Li and Reagan (2003) for a thorough discussion of matching method techniques.

[10]. *The size of d* is determined by the researcher. Likewise, one can use local linear regression or kernel estimator methods to generate the control group analogue within the range of *d*.

one needs to be able to match along observable characteristics. The limitation of the propensity score as a measure of "comparability" is determined by the availability of sufficient conditioning variables. If the outcome to be acquire is poorly measured, the treatment and control groups will be poorly matched, and any inferences on the effect of the "treatment on the treated" will be biased in an undetermined manner. In this way, matching may actually accentuate the bias caused by selection on unobservable firm characteristics (Smith and Todd, 2001). The results from the application of matching methods to the sample of treatment and control groups are presented below in addition to the standard descriptive statistics and regression results.

5.4 The impact of ownership changes on performance

We estimate (3) using random effects regression, and include dummy variables to capture the effect of a change in ownership. Three types of ownership changes are considered: (1) the acquisition of a widely-held firm by a Canadian owner; (2) the acquisition of a widely-held firm by a foreign owner; and (3) a Canadian or foreign owned firm that divests and becomes widely held.

5.4.1 Benchmark regressions to explain firm performance

Table 3 presents the results of estimating equation (3), where the dependent variables are firm performance, as proxied by Tobin's q, ROA and financial leverage. The benchmark model for Tobin's q in column 1 shows that size and financial leverage are negatively correlated to Tobin's q. Industry q, membership in the TSE 300, capex-to-sales and cross-listing on a U.S. exchange are positively correlated to Tobin's q. Firm age and sales growth are not significant. When controlling for firm characteristics, Tobin's' q does not change when the firm acquired by a Canadian owner, is lower when acquired by foreign firm, and is higher when a controlled firm becomes widely held.

Columns (3) and (4) in Table 3 examine the relationship between ROA and ownership changes.

For the benchmark model in column 3, we find that larger firms with higher growth opportunities have higher ROA. Higher financial leverage, TSE 300 membership and capex-to-sales are associated with lower ROA, with firm age not significant. The impact on ROA (column 4) is negative for foreign acquisitions, and not statistically different from zero for the other two types of ownership changes.

Lastly, Table 3 presents the results when the dependent variable is a firm's total debt-to-total assets. For the benchmark model in column (5), we find that larger firms with high capex-to-sales have higher ratios of financial leverage. Higher ROA, membership in the TSE 300, and higher cash-to-assets are associated with lower financial leverage. In all three cases, acquisition leads to lower financial leverage, although this effect is not statistically significant when the firm is acquired by a foreign owner. In summary, it would appear that when firms are acquired by a firm with a controlling foreign shareholder, this leads to lower valuations. This stands in stark contrast to when firms that had a controlling shareholder (be it foreign or Canadian) become widely held, as they show a large and positive increase in their Tobin's q.

5.4.2 Matching Methods

As discussed above, an evaluation of the impact of ownership changes on firm performance, using standard econometric techniques, may lead to biased results. To check the robustness of our results, we estimate a difference-in-differences matching method model. First, we utilize a probit model using all available control variables to estimate the propensity of a change in ownership. Given the values of the propensity score, for each firm in the treatment group, we find its nearest neighbour in the control group. Having constructed a suitable control group, we compare the change in the three measures of firm performance. For each measure, in addition to

the simple matching estimator, we also trim the sample at the 2% (5%) level and consider "nearest neighbours" for the control group within a 0.02 (0.05) band of the propensity score.

Table 4 presents the results from the matching methods difference-in-difference estimator for the three measures of performance, when the treatment group consists of firms acquired by a Canadian owner. The treatment group saw an increase in Tobin's q of 0.147, compared to -0.012 for the control group (all other firms that did not experience a change in ownership). However, the difference of 0.159 in the change in Tobin's q between the two groups is not statistically different than zero (column 3). When matching methods are used and the correct control group is identified, the control group firms experience a larger fall in their Tobin's q (column 4). Consequently, we find that the impact of the treatment on Tobin's q is 0.333 (column 5) , but not significantly different than zero. However, when the sample is trimmed on either tail of the distribution by 2% and 5%, respectively, and the control group augmented to include all firms within 0.02 and 0.05 of the propensity score of the treatment group, the results, are stronger than before, and are significantly positive. With respect to ROA, the matching results broadly reflect the previous regression results, with no impact on ROA from being acquired by a Canadian owner. Likewise , in the case of leverage, matching reveals that there is no impact from Canadian acquisition. This stands in contrast to the negative estimate from the regression results (albeit this result was only significant at the 10% level).

Table 5 presents the results from the matching methods difference-in-difference estimator for when the treatment group consists of firms acquired by a foreign owner. The treatment group saw a decrease in Tobin's q of -0.358, compared to -0.012 for the control group, and the difference between the two groups is statistically different than zero (column 3) at -0.347. When matching methods are used, the control group firms experience a larger decrease in their Tobin's

q when compared to the unmatched sample (column 4). Consequently, we find that the impact of the treatment on Tobin's q is -0.313 (column 5), and this is not significantly different than zero. However, when the sample is trimmed on either tail of the distribution by 2% and 5%, respectively, and the control group augmented to include all firms within 0.02 and 0.05 of the propensity score of the treatment group, the results are stronger and more negative than before Importantly, these results confirm the estimates from the random effects model. With respect to ROA, the matching results again broadly reflect the standard regression results, with no impact on ROA from being acquired by a foreign owner. In the case of leverage, however, matching reveals that there is an impact from foreign acquisition, a result that is confirmed by the regression results.

Table 6 presents the results from the matching methods difference-in-difference estimator for when the treatment group consists of firms that became widely held. The treatment group saw an increase in Tobin's q of 0.029, compared to -0.012 for the control group (all other firms that did not experience a change in ownership), and the difference of 0.041 in the change in Tobin's q between the two groups is not statistically different than zero (column 3). When matching methods are used, the control group firms experience a larger fall in their Tobin's q (column 4). Consequently, we find that the impact of the treatment on Tobin's q is 0.320 (column 5) and is significantly different than zero. However, when the sample is trimmed on either tail of the distribution by 2% and 5%, respectively, and the control group augmented to include all firms within 0.02 and 0.05 of the propensity score of the treatment group, the results, while weaker than before, remain statistically significant. With respect to ROA, the matching results broadly reflect the previous regression results, with no impact on ROA from becoming widely held. In the case of leverage, matching reveals that there is an impact from becoming widely held –

leverage falls, a result that is consistent with the regression results.

6. Conclusion

This study examines the link between family ownership, firm performance, and capital structure using a panel data set of 613 Canadian firms from 1998 to 2005. A Canadian sample provides an ideal counterfactual to studies of U.S. firms, as Canada features the same legal, regulatory and market institutions as the U.S. but exhibits higher ownership concentration and greater use of control-enhancing mechanisms. Previous U.S. studies of the impact of ownership on these relationships have produced mixed or inconclusive results, likely due to the endogeneity between these variables as well as the failure to distinguish between ownership and mechanisms that enhance control. Following Himmelberg, Hubbard and Palia (1999) and Claessens et al. (2002), we use panel data techniques to control for unobserved firm heterogeneity in order to better identify these relationships.

Our sample of 613 firms from 1998 to 2005 includes 151 events where a controlling shareholder either acquires 20% or more of the votes in a widely-held Canadian firm, or where the controlling shareholder divests their block holding. We differentiate between Canadian and foreign blockholders, and find that foreign acquisitions of control stakes occur 33% more often than Canadian acquisitions of control. Our results show different reactions in the short-run and the long-run. In the short run, we find that the acquisition of a control stake in a widely-held firm, whether by a Canadian or foreign owner, generates a positive abnormal return around the event. This reaction is consistent with premium on control stakes, although the magnitude of the CAAR over the window [-50,20] is three times larger than for the average takeover of a Canadian firm in this period. By contrast, the change in control from closely-held to widely held generates a minimal stock market reaction. In the long term, we use propensity score matching to generate a control sample of firms with the same characteristics that did not experience a change in control. We use a difference-in-differences method to address unobserved firm heterogeneity and isolate the impact of the 151 ownership changes on firm performance and capital structure. We find that foreign acquisition is associates with lower valuations, while a change in control from closely held to widely held implies higher valuations. Interestingly, leverage falls when the firm is acquired by a Canadian or foreign firm, or becomes widely held. Future research will

consider the impact of these changes of control on the total factor productivity and labour income of Canadian firms.

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Table 1: Descriptive statistics and univariate tests

This table tests for differences at the mean using a parametric t-test. Results for tests at the median using a non-parametric sign-rank test are available upon request. A firm is widely-held if it does not have a blockholder controlling 20% or more of the votes. Controlling blockholders are classified into four types: firms controlled by an individual or family group (including management), firms that are state-owned, firms controlled by a widely-held corporation, and firms controlled by a widely-held financial institution (including banks, mutual funds, or pension funds). Cross-listed firms are firms listed on both a Canadian and a U.S. stock exchange. Market capitalization and total assets are millions of Canadian dollar as of fiscal year-end. Tobin's q is (total assets + market value of equity -book value of equity)/ total assets. ROA is operating earnings / total assets. Financial leverage is total debt / total assets. Sales growth is two-year average growth rate, or one-year if two-year data is not available. Capex/sales is capital expenditures / sales. Cash/Assets is cash and short-term securities / total assets. *, **, and *** indicate statistical significance of the difference of means at the 10%, 5%, and 1% levels for each row relative to the first row of each category. Panel B shows the distribution of owner type by industry based on the firm's primary NAICS code.

Panel A: Firm Characteristics

	Obs	Market Value ($m)	Total Assets ($m)	Tobin's q	ROA	Financial Leverage	Sales Growth	Capex / Sales
All firms	2758	1946	2504	1.714	0.073	0.244	0.236	0.236
Widely-Held	1536	1882	2269	1.913	0.049	0.214	0.194	0.141
Canadian-owner	966	1973	2692*	1.427***	0.113***	0.291***	0.191***	0.187***
Foreign owner	254	2244	3233**	1.600***	0.065	0.253***	0.270**	0.305***

Panel B: Distribution of Owner Type by Industry

Owner type	High Tech	Transportation & Utilities	Natural Resources	Manufac-turing	Services	All Sectors
Widely-held	50.8	69.2	67.7	51.1	42.8	55.7
Canadian owner	43.3	28.2	21.3	39.3	42.8	35.1
Foreign owner	5.9	2.6	10.9	9.5	14.5	9.2
Total	100%	100%	100%	100%	100%	100%

Table 2: Average and cumulative average abnormal returns for 49 firms with a change in control, 1998-2005.

Average abnormal returns (AARs) and cumulative average abnormal returns (CAARs) are estimated using a market model based on the CFMRC Equal Weighted Index. Column (1) reports the results for 49 events. Column (2) reports the results for A two-tailed z-test is used to test for abnormal returns. *** indicates significance at 1%, ** at 5% and * at 10% level.

Relative	(1) ALL DEALS		(2) Widely-held to Controlled		(3) Controlled to widely-held	
To event	AAR	CAAR	AAR	CAAR	AAR	CAAR
-20	-0.0017	0.0360	0.0110	0.0617***	-0.0073	0.0247
-19	0.0014	0.0374	0.0046	0.0663***	0.0000	0.0246
-18	-0.0129**	0.0245	-0.0246*	0.0417**	-0.0077	0.0169
-17	0.0053	0.0298	0.0197	0.0614***	-0.0011	0.0158
-16	0.0015	0.0313	0.0209	0.0823***	-0.0070	0.0088
-15	0.0032	0.0345	0.0062	0.0885***	0.0018	0.0106
-14	0.0131	0.0476*	0.0124	0.1009***	0.0134	0.0240
-13	-0.0004	0.0472*	-0.0021	0.0987***	0.0004	0.0244
-12	-0.0030	0.0441	-0.0078	0.0909***	-0.0009	0.0235
-11	-0.0019	0.0422	-0.0180	0.0729***	0.0052	0.0287
-10	0.0087	0.0509*	0.0128	0.0856***	0.0068	0.0355
-9	0.0028	0.0536*	0.0319	0.1175***	-0.0101	0.0255
-8	-0.0003	0.0533*	0.0210	0.1385***	-0.0097	0.0157
-7	0.0166	0.0699**	0.0269	0.1654***	0.0121	0.0278
-6	0.0052	0.0751**	-0.0197	0.1457***	0.0162**	0.0440*
-5	0.0065	0.0817**	0.0043	0.15***	0.0075	0.0515**
-4	0.0074	0.0890**	0.0018	0.1519***	0.0098	0.0613**
-3	-0.0019	0.0871**	0.0079	0.1598***	-0.0062	0.0551**
-2	0.0025	0.0896**	0.0078	0.1675***	0.0001	0.0552**
-1	0.0260***	0.1156***	0.0568**	0.2243***	0.0124	0.0676**
0	0.0142	0.1298***	0.0563*	0.2806***	-0.0044	0.0632**
1	0.0160	0.1458***	0.0824	0.363***	-0.0114**	0.0519*
2	0.0164	0.1622***	0.0486*	0.4116***	0.0032	0.0551**
3	-0.0023*	0.1599***	0.0064	0.4179***	-0.0058	0.0492*
4	0.0146	0.1745***	0.0327*	0.4506***	0.0072	0.0564**
5	0.0102*	0.1847***	-0.0037	0.4468***	0.0159**	0.0724**
6	-0.0025	0.1823***	-0.0153	0.4315***	0.0028	0.0752**
7	-0.0067	0.1756***	-0.0140	0.4175***	-0.0036	0.0716**
8	-0.0001	0.1755***	0.0023	0.4198***	-0.0011	0.0704**
9	0.0071	0.1826***	0.0244	0.4443***	0.0000	0.0704**
10	0.0093**	0.1919***	-0.0042	0.4401***	0.0149***	0.0853***
11	-0.012**	0.1799***	-0.0243	0.4158***	-0.0069	0.0784**
12	-0.0021	0.1779***	0.0187*	0.4345***	-0.0107**	0.0677**
13	0.0026	0.1804***	0.0105	0.445***	-0.0006	0.0671**
14	0.006	0.1865***	0.0182	0.4632***	0.0010	0.0681**
15	0.0006	0.1871***	0.0175	0.4807***	-0.0063**	0.0618**
16	-0.0058	0.1813***	-0.0150	0.4657***	-0.0021	0.0597*
17	-0.0006	0.1807***	-0.0100	0.4557***	0.0033	0.063**
18	0.0038	0.1845***	-0.0100	0.4457***	0.0095*	0.0725**
19	-0.0102	0.1743***	-0.0074	0.4382***	-0.0113	0.0612*
20	0.0065	0.1808***	0.0059	0.4441***	0.0067	0.0679**

Table 3: Panel Regressions

This table reports results of random effects regressions that estimate the impact of changes in ownership on Tobin's q, financial leverage and ROA. The sample is 613 Canadian firms from 1998 to 2005. Tobin's q is (total assets + market value of equity -book value of equity)/ total assets. ROA is operating earnings / total assets. Financial leverage is total debt / total assets. Ln(assets) is the natural logarithm of total assets in millions of Canadian dollars at fiscal year-end. Sales growth is the two-year average growth rate in sales. If two-year data is not available, one year growth in sales is used. Industry q is the average Tobin's q for an industry based on the 2-digit NAIC code for a given year. Ln(age) is the natural logarithm of the number of years since incorporation. TSE300 is a dummy set equal to 1 if the firm is a member of the TSE300 index, and zero otherwise. Capex/sales is capital expenditures / total sales. Cross is a dummy set to 1 for firms listed on both Canadian and U.S. stock exchanges, and 0 otherwise. Cash/Assets is cash and short-term securities / total assets. All variables lagged one period. Change to Canadian controlled is a dummy set for 1 if the firm is acquired by a Canadian firm or family, 0 otherwise. Change to Foreign controlled is a dummy set for 1 if the firm is acquired by a foreign firm or family, 0 otherwise. Change to Widely-held is a dummy equal to 1 for firms that had a controlling shareholder and became widely-held. Industry and year dummies are included but not shown. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels.

	Dependent Variable					
Variable	Tobin's Q		ROA		Leverage	
	(1)	(2)	(3)	(4)	(5)	(6)
Constant	2.644***	2.548***	-0.078*	-0.057	0.118***	0.107***
Ln(assets)	-0.208***	-0.208***	0.024***	0.023***	0.029***	0.029***
Sales growth	0.074	0.072	-0.009	-0.009	0.011**	0.012**
Industry q	0.186***	0.185***	-0.011	-0.010	0.008	0.008
ROA	0.196	0.183			-0.063***	-0.063***
Age	-0.035	-0.001	0.010	0.000	-0.009**	-0.001**
Financial leverage	-0.517***	-0.505***	0.110***	0.114***		
Capex-to-sales	0.345***	0.353***	-0.051***	-0.051**	0.025**	0.025**
Cash-to-assets					-0.227***	-0.230***
TSE300	0.146***	0.147**	-0.002	-0.002	-0.021***	-0.021***
Cross	0.214***	0.216***	-0.050***	-0.048***	-0.007	-0.006
Change to Canadian controlled		0.175		0.007		-0.040*
Change to Foreign controlled		-0.288*		-0.043*		-0.022
Change to Widely-held		0.238**		0.003		-0.039***
Obs	2,070	2,070	2,070	2,070	2,070	2,070
R2 overall	0.19	0.19	0.19	0.19	0.31	0.31
Chi^2	226.04	238.35	176.561	181.48	343.41	361.20

Table 4: Difference-in-differences matching estimator, change to Canadian controlled

This table reports the results of the matching method differences-in-differences estimator when there is a change in ownership from widely-held to Canadian owned. The sample is 613 Canadian firms from 1998 to 2005. Tobin's q is (total assets + market value of equity -book value of equity)/ total assets. ROA is operating earnings / total assets. Financial leverage is total debt / total assets. Treatment refers to those widely-held firms that were acquired by a Canadian owner. Unmatched Control refers to the sample statistics for the group of firms that did not experience a change in ownership. Difference Unmatched is the difference between the Treatment group of firms and the control group of Unmatched Control firms for the respective measures of performance. Matched Control refers to the sample statistics for the group of firms that is produced by implementing matching methods. Difference Matched is the difference between the Treatment group of firms and the Matched Control group of firms. Matching refers to simple nearest neighbour matching. Trimming (X) eliminates the left and right X% of the distribution of firms by propensity score. NN (X) matches each treatment firm to control firms within a radius of X of the propensity score of the treatment firm. * and ** indicates statistical significant at the 10 and 5% levels respectively.

Variable	Treatment	Unmatched Control	Unmatched Difference	Matched Control	Matched Difference
Tobin's Q					
Matching	0.147	-0.012	0.159	-0.186	0.333
Trimmed(2), NN(2)	0.147			-0.240	0.387**
Trimmed(5), NN(5)	0.123			-0.231	0.353**
ROA					
Matching	-0.019	-0.001	-0.018	-0.009	-0.010
Trimmed(2), NN(2)	-0.019			-0.025	0.007
Trimmed(5), NN(5)	-0.020			-0.013	-0.007
Leverage					
Matching	-0.012	-0.004	-0.008	-0.013	-0.001
Trimmed(2), NN(2)	-0.012			-0.003	-0.001
Trimmed(5), NN(5)	-0.011			-0.009	-0.002

Table 5: Difference-in-differences matching estimator, change to Foreign controlled

This table reports the results of the matching method differences-in-differences estimator when there is a change in ownership from widely-held to foreign owned. The sample is 613 Canadian firms from 1998 to 2005. Tobin's q is (total assets + market value of equity -book value of equity)/ total assets. ROA is operating earnings / total assets. Financial leverage is total debt / total assets. Treatment refers to those widely-held firms that were acquired by a foreign owner. Unmatched Control refers to the sample statistics for the group of firms that did not experience a change in ownership. Difference Unmatched is the difference between the Treatment group of firms and the control group of Unmatched Control firms for the respective measures of performance. Matched Control refers to the sample statistics for the group of firms that is produced by implementing matching methods. Difference Matched is the difference between the Treatment group of firms and the Matched Control group of firms. Matching refers to simple nearest neighbour matching. Trimming (X) eliminates the left and right X% of the distribution of firms by propensity score. NN (X) matches each treatment firm to control firms within a radius of X of the propensity score of the treatment firm. * and ** indicates statistical significant at the 10 and 5% levels respectively.

Variable	Treatment	Unmatched Control	Unmatched Difference	Matched Control	Matched Difference
Tobin's Q					
Matching	-0.358	-0.012	-0.347**	-0.045	-0.313
Trimmed(2), NN(2)	-0.258			0.101	-0.459*
Trimmed(5), NN(5)	-0.362			0.044	-0.407**
ROA					
Matching	-0.035	-0.001	-0.034	0.009	-0.044
Trimmed(2), NN(2)	-0.035			0.024	-0.060
Trimmed(5), NN(5)	-0.028			0.002	-0.030
Leverage					
Matching	-0.029	-0.004	-0.025	-0.013	-0.016
Trimmed(2), NN(2)	-0.036			0.014	-0.049**
Trimmed(5), NN(5)	-0.036			0.014	-0.050**

Table 6: Difference-in-differences matching estimator, change to widely held

This table reports the results of the matching method differences-in-differences estimator when there is a change in ownership from closely-held to widely-held. The sample is 613 Canadian firms from 1998 to 2005. Tobin's q is (total assets + market value of equity -book value of equity)/ total assets. ROA is operating earnings / total assets. Financial leverage is total debt / total assets. Treatment refers to those closely held firms that became widely-held. Unmatched Control refers to the sample statistics for the group of firms that did not experience a change in ownership. Difference Unmatched is the difference between the Treatment group of firms and the control group of Unmatched Control firms for the respective measures of performance. Matched Control refers to the sample statistics for the group of firms that is produced by implementing matching methods. Difference Matched is the difference between the Treatment group of firms and the Matched Control group of firms. Matching refers to simple nearest neighbour matching. Trimming (X) eliminates the left and right X% of the distribution of firms by propensity score. NN (X) matches each treatment firm to control firms within a radius of X of the propensity score of the treatment firm. * and ** indicates statistical significant at the 10 and 5% levels respectively.

Variable	Treatment	Unmatched Control	Unmatched Difference	Matched Control	Matched Difference
Tobin's Q					
Matching	0.029	-0.012	0.041	-0.291	0.320*
Trimmed(2), NN(2)	0.020			-0.249	0.269*
Trimmed(5), NN(5)	0.058			-0.161	0.129*
ROA					
Matching	-0.003	-0.001	-0.002	-0.024	0.022
Trimmed(2), NN(2)	0.001			-0.010	0.010
Trimmed(5), NN(5)	0.001			-0.010	0.010
Leverage					
Matching	-0.032	-0.004	-0.029**	0.002	-0.034**
Trimmed(2), NN(2)	-0.031			-0.004	-0.027*
Trimmed(5), NN(5)	-0.028			-0.008	-0.020

Figure 1: Distribution of 151 Changes in Control from 1998-2005

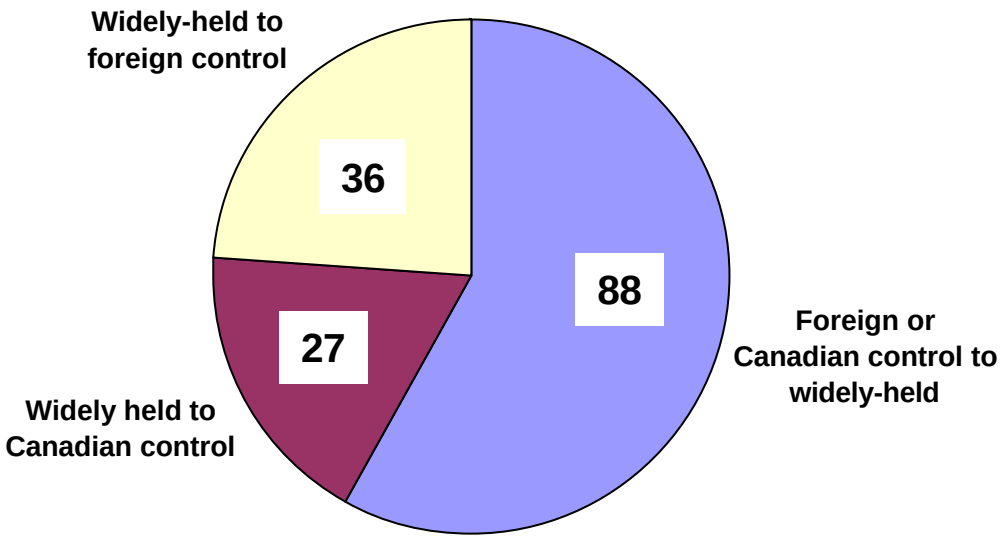

Figure 2: Average and cumulative average abnormal returns for change in control from widely-held to controlled, 1998-2005.

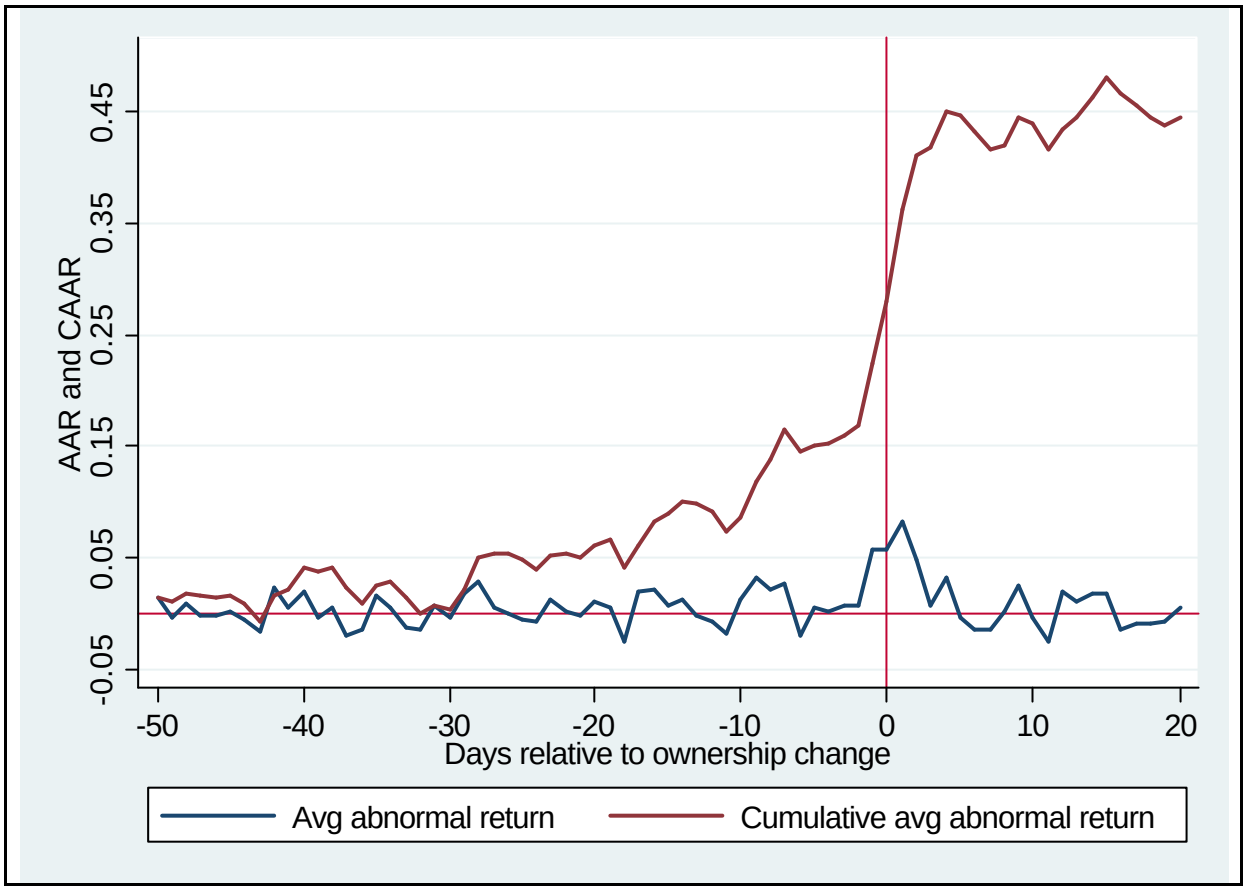

Figure 3: Average and cumulative average abnormal returns for change in control from controlled to widely-held, 1998-2005.