Trade Liberalization and Industrial Restructuring through Mergers and Acquisitions[*]

Holger Breinlich[†]

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Abstract

This paper analyzes mergers and acquisitions (M&A) as a previously neglected channel of industrial restructuring in the face of trade liberalization. Using the Canada-United States Free Trade Agreement of 1989 as a source of exogenous variation in trade barriers, I show that trade liberalization leads to a significant increase in M&A activity. I also provide evidence that resources are transferred from less to more productive firms in the process and that the magnitude of the overall transfer is quantitatively important. Taken together, these results suggest that M&As are an important alternative to the previously studied adjustment channels of firm and establishment closure and contraction. This has strong implications for the design of competition policy in the wake of trade liberalizations since M&As may offer a more efficient way of transferring resources than contraction and closure of low productivity firms combined with internal growth of more efficient firms.

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JEL CLASSIFICATION: F12, F15, L2, L4.

1 Introduction

Recent economic research on the effects of trade liberalization has highlighted the importance of studying the firm- and establishment-level adjustment processes triggered by freer trade (a short and inexhaustive list of contributions includes Tybout et al., 1991; Tybout and Westbrook, 1995; Pavcnik, 2002; and Trefler, 2004). A central insight from these studies is that a substantial part of the impact of freer trade works through a reallocation of resources across individual plants and firms. In particular, the contraction and exit of low productivity establishments and the expansion of more productive ones can explain a sizeable share of aggregate productivity increases found in the wake of trade liberalizations (see Pavcnik, 2002; and Trefler, 2004).

While this literature has thus demonstrated the general importance of micro-level resource reallocation in understanding the effects of freer trade, the central issue of how resources are transferred between individual firms is still not sufficiently well understood. In particular, only scarce attention has been paid to resource transfers through the market for corporate control, i.e. through mergers and acquisitions (M&As). This is despite the fact that M&As can, in principle, play a similar role as the adjustment processes highlighted in the existing literature. Instead of closing down establishments, reducing output or exiting altogether, firms also have the option to search for buyers interested in parts or the whole of their operations. Similarly, expanding firms can buy and integrate other firms rather than expand production at existing plants or open new ones. Establishment-level studies which focus on plant-level contraction, exit or expansion implicitly ignore this potential margin of adjustment since they do not look at changes in ownership at continuing plants.[1]

The purpose of this paper is to investigate empirically whether M&As do indeed play a role in industrial restructuring in the face of trade liberalization. This is important for a number of reasons. First, studying M&As is necessary to obtain a more complete picture of the mechanisms firms use to adjust to freer trade and the extent of inter-firm resource transfers involved in this adjustment. Second, M&As are not just another way of transferring resources but are likely to be qualitatively different from the other adjustment forms in that they are swifter and potentially more efficient. Instead of workers and capital becoming unemployed for some period before being rehired,

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[1]Similarly, a smaller group of papers that use firms rather than plants or establishments as their unit of analysis focus on exit by bankruptcy as the principal form of adjustment and do not consider M&As (see for example Gu, 2003; or Baggs, 2005). Note that throughout this paper, I will use the words "establishment" and "plant" interchangeably to denote a unit of production within a firm.

acquisitions allow for an immediate transfer into new ownership. Also, M&As allow the takeover of entire production structures which may be most efficient if preserved as a whole. Finally, knowing whether or not M&As play an important role in firm adjustment to freer trade might also shed new light on results from previous plant-level studies. For example, reallocations of control rights at existing establishments and ensuing restructuring undertaken by the new management might be part of the reason for the important within-plant increases in productivity found in many studies (e.g. Tybout and Westbrook, 1995; Pavcnik, 2002).

The particular liberalization episode I will study in this paper is the Canada-United States Free Trade Agreement (CUSFTA) of 1989. As will be argued in more detail, CUSFTA provides an ideal setting for the purpose of this study. Most importantly, it represented a clear-cut and unanticipated policy experiment which was not introduced in response to macroeconomic shocks nor accompanied by other major economic reforms. Furthermore, the main policy instrument used (tariff cuts) is easily quantifiable and shows a large variation across sectors. Finally, the large size difference between the treaty partners and the implied variation in expected responses to the integration shock further increases the potential for convincing econometric identification.

Against this background, I will present three main sets of findings. In a first step, I examine whether there is evidence that CUSFTA led to more M&A activity. Using a difference-in-differences approach, I find a substantial increase in the number of domestic Canadian transactions which is positively correlated with the magnitude of tariff cuts across sectors. The impact on domestic U.S. M&A activity is much smaller and mostly statistically insignificant, consistent with the idea that CUSFTA presented a bigger shock for the smaller Canadian market. Cross-border transactions show substantial changes around the implementation of CUSFTA as well, although the link to tariff cuts is less clear cut.

In a second step, I examine firm-level characteristics of targets and acquirers in order to investigate whether acquisitions involve a transfer of resources from less to more productive firms, as seems to be the case for the previously studied channels of adjustment (exit and contraction). This is indeed what I find: acquirers tend to be bigger, more profitable and more productive.

In a final step, I look at the amount of inter-firm transfers of output and employment in North America that were due to M&As during my sample period 1985-1998. Comparing results to resource transfers via exit and contraction, I find that M&As were quantitatively important relative to these alternative channels of adjustment. Taken together, these results suggest that M&As are

an important alternative to the adjustment mechanisms of firm and establishment closure and contraction that have been emphasized in earlier research.

A number of recent theoretical contributions in International Trade have also studied firm-level reallocation processes triggered by trade liberalization (Melitz, 2003; Bernard et al., 2003; Bernard, Redding and Schott, 2006; and Falvey, Greenaway and Yu, 2004). Similar to the empirical literature on plant- and firm-level adjustment by which they were motivated, however, they do not examine M&As as a form of resource transfer. Another group of papers in International Trade does look at M&As but mostly in the form of cross-border transactions and in the context of foreign direct investment (e.g. Görg, 2000; Horn and Persson, 2001; Nocke and Yeaple, 2005; di Giovanni, 2005). Rather than analyzing M&As as a means of industry restructuring, they examine their role as an alternative form of foreign market access in addition to greenfield investment and exports. Bertrand and Zitouna (2006) and Neary (2007) present models in which M&As are a way of restructuring industries after trade liberalization, but they also restrict their analysis to cross-border mergers. In contrast, several theoretical contributions in Industrial Organization have directly focused on M&As as a mechanism for transferring resources between domestic firms. In particular, Jovanovic and Rousseau (2002, 2004) use models with heterogenous firms to show how M&As can serve as a complement to exit and internal adjustment to firm- and industry-specific shocks. However, they focus their attention on closed-economy settings and only analyze domestic shocks.

On the empirical side, contributions in Corporate Finance and Industrial Organization have since long pointed out that M&As can play a substantial role in restructuring industries and that their consequences go far beyond a mere change in ownership (e.g. Jensen, 1993; Kaplan, 2000; Copeland et al., 2003). Specifically related to the question at hand, authors like Jovanovic and Rousseau (2002) or Andrade and Stafford (2004) have shown that M&As are indeed frequently used as a way of firm expansion and complement or replace internal investment in that respect. Comparisons of empirical studies also show that acquisitions perform very similarly to other forms of investment in terms of abnormal stock market returns (Andrade et al., 2001). On the target's side, takeovers usually bring large abnormal gains in share prices and most acquired assets show significant increases in productivity (Maksimovic and Phillips, 2001; Andrade et al., 2001). Finally, a number of recent studies have succeeded in directly linking increases in M&A activity to domestic shocks like deregulation and financial innovation (Mitchell and Mulherin, 1996; Mulherin and Boone, 2000; Andrade and Stafford, 2004). The question of whether M&As also play a role in

the industrial restructuring necessitated by trade liberalization shocks, however, has not yet been addressed in a rigorous manner. While there is some descriptive and anecdotal evidence to the affirmative (Chudnovsky, 2000; OECD, 2001), no clear econometric results have been presented thus far.[2] This is the gap the present contribution tries to fill.

The remainder of this paper is structured as follows. Section 2 discusses empirical predictions on the link between trade liberalization and M&A activity based on insights from existing theoretical work. Section 3 provides additional background information on CUSFTA and section 4 describes the data. Section 5 proceeds to the empirical investigation of changes in M&A activity in the wake of CUSFTA, section 6 compares characteristics of targets and acquirers and section 7 provides evidence on the quantitative importance of M&As as a form of resource transfer. I conclude with a summary of findings and some potential implications for economic policy (section 8).

2   Theoretical Predictions

How might trade liberalization lead to an increase in M&A activity? In order to highlight a potential mechanism, the following discussion combines insights from closed-economy models of M&A activity (Jovanovic and Rousseau, 2002, 2004) with results from recent heterogenous firm models in International Trade (e.g. Melitz, 2003).[3]

The underlying assumption of models of M&A activity, such as the one by Jovanovic and Rousseau (2002), is that all firms possess assets that are of interest to other firms. These can be specific production skills, marketing capabilities or simply physical capital needed for production. Changes in demand and supply conditions will lead to changes in firm-specific demand for these assets, with expanding firms wanting to increase their stocks and contracting firms looking for potential buyers. While the necessary transfer of resources can take place via both M&As and internal investment or divestment, it is straightforward to derive empirically relevant conditions

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[2]An earlier study by Mitchell and Mulherin (1996) and a recent working paper by Greenaway et al. (2005) present (mixed) evidence on the link between import penetration rates and M&As. However, since there is no exogenous variation in this measure of exposure to trade, it is not obvious whether their results can be interpreted in favor or against a link between trade liberalization and M&A activity. For example, any negative productivity shock that triggers restructuring of a given industry is likely to involve M&As (see Andrade et al., 2001). At the same time, the decline in the sector's relative productivity as compared to the rest of the world will lead to more imports and a higher import penetration rate. Such issues are reminiscent of the problems which plagued earlier studies on the link between trade and mark-ups, firm size or productivity (as discussed in Tybout, 2001, or Fernandes, 2003).

[3]The focus here is on the basic intuition and empirical predictions. A formal derivation of some of the main results from a fully specified model is contained in an earlier working paper version of this paper (available at www.essex.ac.uk/economics).

under which both channels are active in equilibrium.[4]

Within this framework, the demand shock resulting from bilateral trade liberalizations such as CUSFTA is easily analyzed. The crucial effect of such liberalizations is their differential impact across domestic firms with different levels of productivity (see Melitz, 2003). As a number of studies have shown, setting up export activities is costly and requires an initial investment (see Roberts and Tybout, 1997; Bernard and Jensen, 2004). Thus, only more productive firms that can afford these setup costs will benefit from liberalization through increased exporting opportunities. Low productivity firms, in contrast, will suffer lower profits due to more intense product market competition from foreign firms while at the same time being unable to benefit from better access to the foreign market. Both effects will be stronger the bigger the extent of liberalization, i.e. the bigger the decrease in variable trade costs such as tariffs. Thus, while exporters need additional capital in order to expand operations, non-exporters attach less value to their existing capital stock. As before, M&As provide a mechanism through which the necessary transfers of assets can take place. Given that only the most productive firms will be exporters, a direct implication is that assets are transferred from less to more productive (and profitable) firms.

Note that the above is in essence a story about domestic within-sector adjustment to trade liberalization. While a within-sector analysis will be part of the empirical analysis below, the data reveal a number of features which require additional considerations. The first concerns the substantial size differences between the liberalization partners, with the U.S. market being about ten times the size of its Canadian counterpart. This suggests that trade liberalization should have a much stronger effect on M&A activity in Canada since increases in both import competition and exporting opportunities will be substantially bigger there.

Second, a large share of M&A activity consists of diversifying or conglomerate M&A transactions that go across industry boundaries. The basic intuition outlined above still applies, however. Firms want to acquire production capacity in other industries through acquisitions both because of improved exporting opportunities there or because increased import competition has made assets cheaper. Since the target's capital is likely to be sector specific in the vast majority of cases, this argument also makes clear that the relevant reductions in variable trade costs in such a multi-sector model are the ones facing the acquisition target. This is because the acquirer will have to use the

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[4]For example, Jovanovic and Rousseau (2002) assume that M&As require a fixed cost investment but (in equilibrium) incur lower costs per unit of capital acquired. The resulting prediction, that large expansions take place via M&As and smaller ones via internal investment, is consistent with empirical results presented by these authors.

new production capacity to produce the target industry's goods.

Finally, acquisitions also take place across national borders. For example, expanding foreign exporters may want to acquire import competing domestic firms in addition to non-exporters in their own home market. A growing body of theoretical research suggests that additional considerations come into play for this category (see Bertrand and Zitouna, 2006; Bjornvatn, 2004) As before, the decrease in the domestic firms' asset reservation price will encourage acquisitions. However, there will now also be a counterbalancing effect for horizontal M&As arising from tariff-jumping considerations: decreases in variable trade costs make it easier to serve the foreign market via exports and reduce the incentives to establish production capacity there via acquisitions. The overall effect of trade liberalization on M&A activity is thus not clear cut.

To summarize, the above discussion suggests addressing the following questions in the empirical analysis:

1. Do reductions in variable trade costs (tariff cuts) lead to more takeovers of firms in the affected sectors? Is this effect stronger in industries with larger tariff cuts?

2. Is the effect similar for within- and cross-industry acquisitions? Is it similar for domestic and cross-border transactions?

3. Is there a stronger impact on the M&A activity in the smaller Canadian market?

4. Are acquirers more productive and profitable than targets? Again, does this difference vary across the different M&A categories (within- vs. between-industry and domestic- vs. cross-border)?

Answers to these questions will shed light on the qualitative characteristics of M&As as an adjustment mechanism in the face of trade liberalization. A further interesting question that arises is whether resource transfers via M&As are also quantitatively important. While the nature of my dataset does not allow a definitive answer to this question, I will provide some evidence that the overall amount of transfers is indeed likely to be large (section 7).

3   The Case of CUSFTA

The particular liberalization episode I use for my empirical investigation is the Canada-United States Free Trade Agreements (CUSFTA) of 1989. The idea of abolishing trade barriers between

Canada and the U.S. had been around for some time before CUSFTA but strong opposition in Canada had led to the eventual failure of all prior attempts at implementing free trade. Against this background and again against substantial political opposition, negotiations for CUSFTA started in May 1986, were finalized in October 1987 and the treaty was signed in early 1988. The agreement came into effect on 1 January 1989 which was also the date of the first round of tariff cuts. Tariffs were then phased out over a period of up to ten years with some industries eventually opting for a swifter phase-out.

In terms of economic analysis, CUSFTA presents several advantages over other trade liberalizations. First, the main instrument of liberalization - tariff cuts - is easily quantifiable and shows a large variation across sectors which allows for the implementation of a difference-in-differences estimation strategy. Secondly, CUSFTA was a clearly defined policy experiment in the sense that it was neither part of a larger packet of market reforms nor was it introduced in response to a macroeconomic shock, two factors that have made the identification of trade reform effects extremely difficult in other settings (Rodriguez and Rodrik, 2001; Trefler, 2004). In this sense, the reductions in tariff rates triggered by CUSFTA can to a large extent be regarded as exogenous - indeed, Trefler (2004) performs formal statistical tests for a wide range of specifications and dependent variables but finds little evidence to the contrary.

In the context of studying the impact of trade liberalization on M&A activity, CUSFTA has two additional advantages. First, its ratification by the Canadian parliament was highly uncertain as late as November 1988.[5] The fact that its eventual implementation was thus far from being a foregone conclusion reduces concerns about anticipatory M&A activity and makes the years before 1989 a suitable control period. In addition, CUSFTA was a liberalization agreement between industrialized countries with developed financial markets and few restrictions on mergers and acquisitions, at least in comparison to most other developing and developed countries. Indeed, although there exists, to my knowledge, no econometric evidence to date, there is some anecdotal evidence that CUSFTA has led to an increase in M&A activity (OECD, 2001). Given that a number of

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[5] See Brander (1991) and Morck et al. (1998) for a chronology of the events leading up to the eventual ratification of CUSFTA. During the entire process, ratification was considered uncertain given both the prior history of failed attempts to negotiate free trade with the U.S. and the strength of the opposition to CUSFTA in Canada. This opposition involved strong factions within the oppositional Liberal Democrats, the New Democratic Party as well as various organizations and trade unions. Indeed, the Liberal Democrats' leader, John Turner, publicly vowed as late as October 1988 that he would dismantle CUSFTA in case of victory in national elections scheduled for 21 November 1988. Opinion polls during the month leading up to the elections suggested that a victory for his Liberal Party was a distinct possibility (for example, Gallup indicated a 10% lead as late as November 7). However, the Canadian Conservative Party party managed to reverse public opinion in the final weeks before the election and the government was returned with a parliamentary majority sufficient to ratify CUSFTA.

existing studies have shown that there has also been a substantial impact on economic variables other than M&A activity (e.g. Trefler, 2004, on productivity and employment; or Head and Ries, 1999, on plant scale and number of plants), it does thus not seem unreasonable a priori to expect an effect of CUSFTA on the acquisition behavior of firms.

4 Data and Descriptive Statistics

In line with existing studies, my empirical analysis of CUSFTA's impact on M&A activity focuses on the manufacturing sector which still represents the bulk of tradable goods in an economy and is thus the sector most directly affected by trade liberalization. The start data of the analysis is 1985, the date from which onward I have data on M&A activity and firm-level characteristics of targets and acquirers. For most of the analysis I focus on the period up to 1998, the year in which the last round of tariff reductions took place. Section 5.3, however, also considers the post-implementation period 1999-2003 as a further robustness check.

Tariffs and M&A Activity. I use annual three-digit U.S. and Canadian tariff data (140 industries) as my measure of the extent of trade liberalization.[6] While CUSFTA also included provisions on non-tariff barriers, reductions of tariffs were the main instrument of liberalization. As has been pointed out among others by Trefler (2004) and Topalova (2004), tariff cuts also have the advantage of being a direct policy instrument and are as such less susceptible to endogeneity problems. This is in contrast to other more indirect measures like import penetration rates which are the result of a complex interaction process with a large number of additional factors.[7]

Data on M&A activity in the manufacturing sector comes from Thomson Financial's Worldwide M&A database. The principal sources of information used by Thomson are over 200 English and foreign language news sources, SEC filings and their international counterparts, trade publications and proprietary surveys of investment banks, law firms and other advisors. The database includes all corporate transactions involving at least 5% ownership of a company and a transaction value of one million U.S. dollars or more or where the value of the transaction is undisclosed. In line with the

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[6]The data are the same as those described in Head and Ries (1999). I would like to thank Keith Head for making them available to me. Appendix A.1 provides some additional details on their construction.

[7]Compare footnote 2 and Rodriguez and Rodrik (2001) for a more general discussion of the pitfalls of various other indirect measures. Of course, tariff rates are at the discretion of policy makers and as such subject to different endogeneity problems. However, as argued in the previous section, such concerns have less weight in the case of CUSFTA where tariff cuts were unexpected and largely exogenous (at least once one controls for the variation in initial tariff levels - as I will do by using industry fixed effect, see below).

discussion in the previous sections, I use all M&A deals involving acquisitions of U.S. or Canadian manufacturing targets by other U.S. or Canadian firms, yielding approximately 26,000 transactions in the main period under study (1985-1998). I define "M&As" broadly to include sales of individual business segments and divisions as well as of entire companies. This is consistent with the idea from the discussion in section 2 that M&As can both be a form of contraction and total firm exit. For most of the analysis, I exclude acquisitions of minority interests from my sample and focus on transactions that raise the acquirer's share above 50%.[8] Transactions are classified into three-digit industries and matched with the tariff data according to the primary activity of the target company or the acquired business segment (see Appendix A.1 for details). For the main part of this paper, I will use the number of mergers and acquisitions in a given period as my principal indicator for M&A activity. Using numbers rather then aggregate deal volumes has two principal advantages. First, it is the much more readily available indicator since for the majority of deals, transaction values are not published (this is the case for 55% of deals in my dataset). Second, value measures are extremely sensitive to the treatment of very large deals which often make up significant proportions of the total deal volume despite representing only a few out of several thousand transactions every year.[9] However, since count data might overestimate the importance of smaller transactions, section 5.3 also presents some results for transaction values which address the problems posed by missing data and outliers in different ways.

Tables 1 and 2 provide some descriptive statistics on M&A activity and manufacturing tariffs in North America over the period 1985-1998. I start with an analysis of target firms. The first four columns of table 1 show the number of M&A transactions in the U.S. and Canada at the two-digit level of the U.S. Industrial Classification of 1987. As seen, domestic M&A activity (columns 1 and 4) is more common than cross-border transactions (columns 2 and 3), even for the smaller Canadian market. Looking across industries, it becomes apparent that there is substantial variation in the number of deals. One simple reason for this is that different industries have very different numbers of firms and establishments and thus more or less "potential" for takeovers. Sectors

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[8]There is some evidence that the threshold for effective control lies below 50%. For example, Morck et al. (1998) cite evidence that the threshold for effective control lies on average at about 20% in the U.S. Similarly, the Canadian Competition Bureau (2002) considers all acquisitions of more than 10% of control rights as potentially anti-competitive, with the corresponding figure for the U.S. being 15% (Brealey and Myers, 2000, chapter 33). In any case, minority acquisitions comprise only about 15% of the transactions in my sample. See section 5.3 for robustness checks which include this category.

[9]In my sample, for instance, the three biggest deals on average make up about 20% of the aggregate deal volume in a given year. Within three-digit industries (the aggregation level of my empirical analysis), the biggest transaction alone accounts on average for over 30% of the entire industry volume during 1985-1998.

with more players usually also have lower concentration ratios and face less scrutiny by antitrust authorities. Columns 5-6 which list the average number of establishments per industry confirm these conjectures: industries with more establishments have more M&A activity - the correlation coefficient between the number of establishments and total M&A transactions is +53% for the U.S. and +65% for Canada.[10] More subtly, there also seems to be a connection between M&A activity and initial tariff rates (columns 7-8): industries with higher import tariffs in 1988 also experience less takeovers during the entire period 1985-1998 (the correlation coefficient is -32% for the U.S. and -48% for Canada). This seems in part to be a direct consequence of the relation between M&A activity and the number of establishments: highly protected industries are usually industries in decline which already have experienced shakeouts and have relatively few remaining players.

The next question is who the buyers of U.S. and Canadian manufacturing firms are. Table 2 provides some information on this by listing the principal field of activity of acquiring firms. As the figures show, slightly more than 60% of acquirers are also manufacturing firms, both in the U.S. and in Canada. Moreover, about a third of all transactions occur within the same three-digit sector and another 11% within the same two-digit sector, so that within-industry resource tranfers via M&As seem to be an important phenomenon. Around 17% of acquirers of U.S.-firms (22% for Canada) have their principal field of activity outside manufacturing (SIC-codes 2-3) although this figure probably overestimates the incidence of diversifying or conglomerate M&As. This is since about one quarter of non-manufacturing acquirers actually possess secondary fields of activity in manufacturing, with the figure being as high as 58% in some categories (see columns 3 and 7).[11]

The second to last line of table 2 lists a category of acquirers that deserves special attention. The group "Investors, n.e.c." (SIC 6799) represents an amalgamation of different types of acquirers that are not easily classifiable elsewhere. The main subgroups of SIC 6799 are private equity and venture capital firms, investor groups, and individual investors. In all cases, it seems likely that acquisitions by these groups represent a significant reallocation of resources in the sense that targets will be exposed to substantial changes in management practices, restructuring etc. Also, among

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[10]The sources for the number of establishments are the U.S. Census Bureau and Statistics Canada. I use the number of establishments rather than the number of firms since my definition of M&As includes both acquisition of entire firms and of individual subdivisions and possibly plants.

[11]Looking at secondary fields of activity also increases the numbers of transactions that are potentially of within-industry nature. Columns 4 and 8 show the fraction of acquirers that have at least one manufacturing 3-digit SIC code that matches the primary or any secondary manufacturing SIC code of the target. If one counts all these transactions as intra-industry, the share of this reallocation type rises to 35% (38% for Canada) which represents only a modest increase of about 4%-points. Since this is clearly an upper bound, classification according to primary fields of activity seems to be a good approximation in determining the within- or between-industry nature of M&As.

investor groups, alliances of different manufacturing firms are not uncommon so that part of SIC 6799 are indeed within-manufacturing acquisitions. For these reasons, I keep transactions involving SIC 6799 as part of my sample though I will present robustness checks excluding this category.

Target and Acquirer Characteristics.   For the comparison of target and acquirer characteristics in section 6, I match the transaction parties from the Thomson M&A database to Compustat North America and Compustat Global using the CUSIP identifier common to both datasets. Thomson Financial itself also provides financial data on a small number of targets and acquirers which I use to complement the information from Compustat.

Note that the use of Compustat implies that the sample or comparing target and acquirer characteristics consists mainly of publicly traded firms (although around 5% of firms are privately held due to the additional use of data from Thomson Financial). This is in contrast to the full sample of transaction parties used for analyzing changes in M&A activity (section 5) which also includes private companies and subsidiaries. However, I believe that this does not pose major problems for the analysis. First, publicly traded firms make up a substantial fraction of the full sample (about 35%, with private companies and firm subsidiaries making up the remaining 65% in the Thomson M&A database). Second, as I will show in the next section, the impact of CUSFTA on publicly traded firms was if anything slightly stronger than for the full sample of firms. Third, although the number of publicly traded firms is small relative to the overall number of companies in Canada and the U.S., their overall share of output and employment is above 80%.[12] Thus, even if target-acquirer differences for non-publicly traded firms were very different, the findings presented in section 6 would still have strong economic relevance.

My indicators of firm performance taken from Compustat and Thomson will be measures of pre-tax income, stock market returns and total factor productivity. I will also look at net sales to give an impression of the size differences between targets and acquirers. These measures are available for between 9,000 to 14,500 out of the 52,000 company-year combinations in my data (some companies are involved in several transactions in the sample period).[13]

Quantitative Importance of M&As: For the comparison of the amount of firm-level resource transfers through M&As, contraction and exit (section 7), I will again rely on information

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[12]This figure is based on a comparison of aggregate production and employment in Compustat North America and Compustat Global with comparable data from the UNIDO database.

[13]See appendix A.1 for details on data sources. The relatively low data availability results from the fact that Compustat only includes publicly traded firms which make up around 35% of all transaction parties in my sample (compare the earlier discussion).

for publicly traded firms from Compustat Global and Compustat North America. In addition to data on output (net sales) and employment, I use information on the reason for deletion of companies from the Compustat files (see appendix A.2 for details). I include all manufacturing firms listed as active in either Compustat North America or Compustat Global at some point during the period 1985-1998. After dropping some smaller Canadian firms for which no exit information is available, this yields a sample of 365 Canadian and 6662 U.S. firms which again represent over 80% of manufacturing output and employment in North America.

5 Trade Liberalization and M&A Activity

5.1 A First Look at the Figures

How has M&A activity in North America evolved over time and what was the impact of CUSFTA? Figure 1 plots the number of yearly manufacturing M&A transactions over the period 1985-1998 for four different categories, all expressed as indices relative to 1988: domestic U.S. transactions, domestic Canadian transactions, acquisitions of U.S. firms by Canadian firms and acquisitions of Canadian firms by U.S. firms. The graphs also indicate the start date of CUSFTA (1 January 1989) by a vertical line and have linear splines fitted to the data points pre- and post CUSFTA.

The figures do not reveal any clear effect for both U.S. domestic activity and Canada-U.S. takeovers. Takeovers of Canadian firms, however, both by other Canadian and U.S. firms, show a marked increase in 1989, the first year after the implementation of CUSFTA. At the same time, all graphs display a general strong upward trend in the number of M&A deals over the entire period. This points to a common problem of descriptive studies that comment on M&A activity in the wake of CUSFTA (such as OECD, 2001): the strong increases in transactions in the 1990s might simply reflect an underlying long-run trend. The before-after comparisons undertaken here do not have this problem although it could still be that changes around 1989 were due to other economy-wide factors contemporaneous to the first round of tariff cuts (for example, CUSFTA also contained a general liberalization agreement on cross-border capital flows).

To provide stronger evidence that the observed changes in M&A activity are indeed due to the tariff cuts implemented through CUSFTA, I thus split transactions within each of the four categories into two groups (figure 2). Those from the 50% of target industries that faced the steepest tariff cuts and those from the remaining 50%. I choose tariffs levied by the target's country for this

classification. In practice, U.S. and Canadian tariff reductions are very highly correlated so that results are similar when using the other tariff measure. From these figures, a slightly different picture emerges. For the two domestic categories, the index of M&A activity is very similar across the two groups in the pre-CUSFTA period. From 1989 onwards, however, M&A activity in Canada increases by substantially more in the most affected group. For the U.S., there is also a slightly more pronounced increase for this group although the difference to the least affected group is much smaller than in Canada. It thus seems that the impression from the initial graphs holds up to this difference-in-differences analysis. M&A activity in Canada rose sharply after 1989 and the magnitude of this increase seems to be related to the extent of tariff cuts across sectors. The impact on the U.S. is much smaller, consistent with the notion that the liberalization shock was substantially bigger in Canada which integrated with a market ten times her own size.

Turning to the cross-border categories (the two right hand side panels), the picture is less clear. The lines for both most and least affected industries move relatively closely together over the whole period. One potential explanation for this is that tariff-jumping motives as an additional determinant for horizontal cross-border M&A transactions are at work here. That is, in industries with stronger tariff reductions, U.S. (Canadian) firms were less dependent on acquiring local production capacity to serve the Canadian (U.S.) market. Instead, they could serve the foreign market directly through exports. This additional factor might have helped to offset the increased incentives for acquisitions working through decreases in the domestic firms' asset reservation prices (compare the discussion in section 2 on this point).

5.2 Econometric Specification and Baseline Results

This section evaluates whether the impressions from the graphs of the last section carry over to a formal econometric analysis. Among other things, the results obtained so far have drawn attention to two potential pitfalls such an analysis faces. First, M&A activity shows strong inter-industry variation and is negatively related to initial tariff levels (see section 4). Since all tariffs were eventually eliminated under CUSFTA, higher initial levels also meant stronger subsequent cuts, implying a potentially spurious correlation of tariff changes and M&A activity. Second, the strong increase in the number of mergers and acquisitions over the whole period 1985-1998 suggests the presence of a general economy-wide trend in M&A activity. Since all tariffs came down after 1989 this could again lead to a spurious correlation with tariff cuts. To address these issues, I

14

will implement a difference-in-differences approach by controlling for both industry and time fixed effects.

As discussed, my indicator for M&A activity will be the number of transactions in a given time period and industry (denoted MA henceforth). The prevalence of small integer values and zeros suggests the use of count data models for the estimation. In order to smooth the data and reduce the number of zero observations, I aggregate numbers over the pre- and post CUSFTA-period (1985-1988 and 1989-1998). This yields a panel with two time periods and 140 industries. For measuring the extent of trade liberalization, I use the change in tariff levels from the year prior to CUSFTA (1988) to the last year of tariff cuts (1998). Because CUSFTA was a bilateral liberalization agreement and the treaty partners tended to protect the same sectors, the magnitude of U.S. and Canadian tariff cuts is very similar across industries. In line with previous empirical studies of trade liberalizations - which mostly look at unilateral tariff reductions by a particular country - I opt for domestic tariffs. That is, I use Canadian tariff cuts when analyzing the impact of CUSFTA on takeovers of Canadian firms and U.S. tariffs cuts for transactions involving U.S. targets.[14] Thus, my initial count data specification is given by:

$$E(MA_{it}|dt, d_i, d_{pre}, d_{post}) = \mu_{it} = \exp(d_i + d_{pre} + d_{post} + \beta \times d_{post} \times dt_i \qquad (1)$$

where d_i are my industry fixed effects and d_{pre} and d_{post} are time fixed effects denoting the pre- and post-CUSFTA period, respectively. The change in tariffs is $dt_i =$ tariff$_{1988}-$ tariff$_{1998}$. Since all tariffs decreased after 1988, this expression is always non-negative. Note that measuring tariff reductions in this way implies that β is positive if trade liberalization leads to increases in M&A activity.[15]

The identifying assumption I will initially make (but later relax) is that all other determinants

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[14]Robustness checks using foreign tariff reductions as regressors yielded similar results which is unsurprising given the very high correlation of tariff cuts (in excess of 80%). An interesting area for future work would be to study more asymmetric liberalization agreements with sufficient independent variation in tariff cuts. Such agreements would allow to separately identify the effects of import- and export-promoting policies on M&A activity.

[15]Alternativley, one could use the (absolute) level of tariff cuts in the pre- and post-CUSFTA period in specification (1). However, this approach yielded a number of problems for the subsequent analysis. First, the binary tariff cut measure introduced in the next subsection shows little variation pre- and post-CUSFTA. Second, using per-period tariff cuts is problematic when looking at several post-CUSFTA periods (as parts of section 5.3 do). This is because once ratification was certain, the time structure of the impact of tariff cuts is less clear (i.e. do future, present or past tariff cuts matter for M&A activity?). Finally, my dataset does only contain extrapolated U.S. tariffs for 1985 and 1986. In any case, as shown for example in Gu et al. (2003) and as is also evident in my Canadian tariff data, tariff changes in 1985-1988 were very small both in absolute terms and compared to the subsequent cuts. Thus, assuming a zero-change - as is implicitly done in specification (1) - seems to be a good approximation. Also see Appendix A.1 for a brief discussion of the very similar results obtained by using the Canadian tariff data pre and post CUSFTA.

of M&A activity besides tariff cuts are either time or industry invariant (and as such controlled for by my industry and time fixed effects) or uncorrelated with tariff cuts. Under this assumption, consistent estimates of the parameters in (1) can be obtained via fixed effects Poisson estimation. I opt for Poisson rather than a negative binomial model since the former has the desirable robustness property that consistency of estimates will be achieved as long as the conditional mean (1) is correctly specified - irrespective of whether MA_{it} actually follows a Poisson distribution (see Wooldridge, 1999 and 2002; Santos Silva and Tenreyro, 2006). Standard errors will be affected by deviations from the Poisson assumption but computation of variance-covariance matrices robust to overdispersion, heteroskedasticity and within-group correlation is straightforward (Wooldridge, 1999 and 2002).

Table 3 reports results for my baseline Poisson fixed effects model (1) for the full sample of acquirers, i.e. manufacturing firms from the same three-digit sector as the target, manufacturing firms from other sectors and firms with principal activities outside manufacturing. Columns 1-4 show coefficient estimates of β and d_{post} for each of the four subgroups of M&As (domestic and cross-border transactions).[16] As seen, the strongest impact of CUSFTA seems to be on domestic Canadian M&A activity which is consistent with the earlier graphical analysis. The coefficient estimates indicate that every percentage point decrease in tariffs increased the number of takeovers of firms in the affected industries by on average 11.1%. Given that the mean decline in Canadian tariffs at the three-digit level was about 7%, this suggests that CUSFTA increased M&A activity by approximately 78%. The corresponding coefficient for the U.S. is actually slightly negative but far from statistically significant (the t-statistic is only 0.60). This again highlights the differential impact of CUSFTA on the two markets. For the two cross-border categories, coefficient estimates are insignificant as well which again confirms the impressions from the earlier graphic analysis.

5.3 Robustness Checks

Control Variables As a first robustness check, I introduce EU M&A activity in the same period as an additional regressor. This helps controlling for any time- and industry-varying determinants besides tariff cuts which would not have been picked up by the fixed effects in my first specification.

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[16] d_{pre} is the excluded category so that d_{post} gives the average relative increase of M&A activity in comparison to the pre-CUSFTA period that is not explained by tariff cuts. Note that contrary to what is sometimes asserted in the literature, there is no incidental parameter problem with the fixed effects Poisson regressions (see Cameron and Trivedi (1998) for a proof). That is, conditional maximum likelihood estimation (using total industry transactions $MA_i = \sum_t MA_{it}$ as the sufficient statistic) yields identical results to simple QML Poisson estimation with a set of industry dummies.

More specifically, I use the number of domestic M&As in the UK, France and (West) Germany as the control for the two regressions on domestic M&A activity and the number of all cross-border M&As with targets in one of these three countries as the control for the cross-border categories (excluding acquisitions by U.S. or Canadian firms).[17] The idea behind this approach is that these countries were largely unaffected by CUSFTA and changes in takeover activity there should thus pick up any general industry-level trends in underlying M&A determinants. Since many factors which might potentially influence takeover rates are highly correlated across developed countries, these trends are likely to be similar in Europe and in North America. Examples include oil price shocks, low sales growth and low capacity utilization combined with large amounts of free cash flow in declining industries, or strongly increasing price-earnings ratios in times of stock market bubbles. Indeed, the simple correlation between the number of European and U.S. or Canadian M&A transactions per-period and industry is on average about 70%.[18]

Columns 4-6 of table 3 show the results for my initial specification with the controls in place. As seen, the coefficient estimates are very similar to the earlier results, consistent with the idea that industry and time fixed effects already captured most of the influence of non-tariff related determinants of M&A activity.

Different Functional Forms I next examine the effect of using different functional forms for my tariff reduction variable. The first alternative measure uses the log of the absolute tariff change, i.e. $d_{post} \times \log(\text{tariff}_{1988} - \text{tariff}_{1998})$ rather than $d_{post} \times (\text{tariff}_{1988} - \text{tariff}_{1998})$. The second measure is a binary indicator taking the value one if an industry is among the 50% of industries with the highest tariff cuts, i.e. $1(|dt_{it}| > dt_{50\%})$. This measure is thus similar to the one used in the graphic analysis from the last section.

Table 4 show the corresponding results which yield a qualitatively similar picture to the baseline estimates. Again, the strongest and most significant effect of CUSFTA is on domestic Canadian

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[17]The UK, France and (West) Germany are the three developed countries besides Canada and the U.S. for which M&A coverage in Thomson Financial is reasonably complete back to 1985.

[18]Note that it would be inappropriate to include industry-level variables like employment, output, the number of firms or productivity growth as additional controls. Besides likely endogeneity problems, the common concern with these variables is that there is ample evidence that they are themselves strongly influenced by trade liberalization (for the effects of CUSFTA see in particular Trefler, 2004, and Head and Ries, 1999). Since it is indeed through their influence on such variables that tariff cuts change incentives for M&As, controlling for them would invalidly attribute less of the increase in takeover activity to freer trade. A similar criticism applies to a number of determinants that have been proposed in the Corporate Finance literature on M&A activity, like capacity utilization, sales growth, free cash flow or relative price-earnings ratios (Mitchell and Mulherin, 1996; Mulherin and Boone, 2000; Andrade and Stafford, 2004; Gugler et al., 2004).

M&A activity. The impact on U.S.-by-U.S. acquisitions is marginally significant for the binary indicator but magnitudes are again much smaller. Estimates for the cross-border acquisitions remain insignificant as before.

Results for Different Subsamples   I perform further robustness checks by looking at specific subsamples of M&A transactions (see table 5). I start by excluding the acquirer SIC-code 6799 ("Investors, n.e.c."). As discussed earlier, a large fraction of this category is made up by private equity and venture capital firms as well as private investors, groups which do not neatly fit into the earlier theoretical framework. Next, I include acquisitions of minority interests in my sample, i.e. transactions at the end of which the acquirer holds less than 50% of control rights or held more than 50% to begin with. Block 3 of table 5 only uses M&A transactions taking place within identical three-digit manufacturing industries. A comparison with results for the full sample will shed some light on the relative importance of cross- vs. within-industry acquisitions discussed in section 2. Finally, the last block of table 5 restricts the sample to transactions involving publicly traded firms. This is of interest since the following sections, which look at target and acquirer characteristics and the quantitative importance of M&As as a form of reallocation, will almost exclusively rely on data for publicly traded firms. It is thus useful to check whether the qualitative results found so far also apply to this particular subsample of firms. In addition, publicly traded firms tend to be bigger and are more likely to be exporters which suggests that CUSFTA's impact may indeed have been different for this group.

As is evident from table 5, the main conclusions from the previous sections are unaffected by changes in sample composition. The impact of tariff cuts on domestic Canadian M&A activity is always positive and statistically significant and the coefficient magnitudes remain close to the baseline specification. If anything, the impact seems to be larger for publicly traded firms (a 15% increase in M&A activity per percentage point tariff cut compared to 11% above). Estimates for the other specifications remain insignificant although the point estimates for Canadian acquisitions in the U.S. are quite large for within-industry acquisitions and the subsample of publicly traded firms.

Comparison with Post-Adjustment Period   An alternative control group to EU transactions is post-1998 M&A activity in North America itself. The theoretical background discussed in section 3 suggests that the increase in M&As after CUSFTA should be a one-off phenomenon. That is,

once ratification by the Canadian parliament was certain, the full schedule of tariff reductions was known. One might thus expect a relatively fast reallocation of assets from import-competing firms to exporters and a subsequent decline in liberalization-related M&A activity. To investigate this issue, I divide my post-liberalization period into two subperiods, 1989-1993 and 1994-1998, and also add a "post-adjustment" period with M&A transactions in 1999-2003. I then estimate the impact of post-1989 tariff cuts separately for each period. The corresponding specification is:

$$E(MA_{it}|.) = \mu_{it} = \exp(d_i + d_t + \beta_1 \times d_{1989} \times dt_i + \beta_2 \times d_{1994} \times dt_i + \beta_3 \times d_{1999} \times dt_i) \quad (2)$$

where d_i are industry fixed effects as before and d_t are period-specific intercepts.

As the results in table 6 indicate, the impact of CUSFTA on domestic Canadian M&A activity was indeed strongest in the period 1989-1993. After that coefficient estimates come down and become insignificant for 1999-2003. Note, however, that the point estimates remain relatively large and statistically significant for the 1994-1998 period. One potential explanation for this stretched-out response is that M&A activity involves substantial adjustment costs for the acquirer, combined with the fact that over 50% of acquirers make more than one acquisition in 1985-2003. Secondly, in most sectors tariff cuts took place over the entire period 1989-1998. Since both exporting opportunities and import competition only increased after tariffs had actually been cut, M&A incentives might not have been strong enough before that reduction (this will hold true if discount rates for future profits are sufficiently high). Finally, the beginning of the 1999-2003 period coincided with a major stock market boom and an M&A wave in technology stocks (the "dot-com bubble") which might contaminate the estimates for this period.[19]

Turning to the remaining categories, results are again insignificant for all periods although the point estimates for Canadian-U.S. acquisitions are again large. Interestingly, however, the largest impact is in the period 1999-2003 while point estimates for 1989-1993 are close to zero. Since such a late impact of CUSFTA seems unlikely, this is further evidence that the liberalization agreement did not have a major impact on cross-border M&A transactions.

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[19]This would lead to a stronger estimated effect of CUSFTA for the 1999-2003 period because coincidentally, sectors such as Computers (SIC 357), Communication Equipment (SIC 366), or Electronic Components (SIC 367) also were in the 50% of industries with the largest tariff cuts. Indeed, excluding these three industries reduces the point estimate for 1999-2003 by over 30%, with only minor reductions for the other periods.

Transaction Value Regressions   I now present additional results using total transaction values rather than counts. As mentioned in section 4, the use of value data suffers from substantial problems with outliers and missing values. On the other hand, count data might unduly give too much weight too smaller transactions so that looking at results for value data will still be instructive.

I start by re-estimating my baseline equation (1) but replace counts with the aggregate value of transactions in a given industry and period (pre- and post-CUSFTA):

$$E(value_{it}|dt, d_i, d_{pre}, d_{post}) = v_{it} = \exp(d_i + d_{pre} + d_{post} + \beta \times d_{post} \times dt_i)$$

Despite the use of value data rather than counts, Poisson is still the preferred estimation method (Wooldridge, 2002, and Santos-Silva and Tenreyro, 2006). This is since consistent estimation only requires the conditional mean to be correctly specified and does not rely on v_{it} actually following a Poisson distribution.

Columns 1-4 of table 7 present results for the "raw" value data, i.e. without deletion of outliers nor imputation of any of the 55% of missing transaction values. For the cross-border categories, point estimates and significance levels are quite similar to the baseline specification. The coefficient estimate for domestic Canadian M&As is about 50% higher than before but this seems to be due to the overrepresentation of publicly traded companies in this sample.[20] The one significant difference to the baseline count specification is found for domestic U.S. M&A activity where the point estimate drops to -17.3 and is now highly statistically significant. However, this change can be traced to the presence of only three to four massive outliers, representing less than 0.02% of all U.S. transactions. Once these deals are dropped (in particular the $20 billion acquisition of RJR Nabisco by Kohlberg, Kravis and Roberts in 1988), the coefficient estimate again becomes insignificantly different from zero.

To control more generally for the presence of outliers, columns 5-8 exclude all transactions with values bigger than 75 times the median value in a given industry. Furthermore, I impute missing transaction values at the industry mean to alleviate problems arising from missing data.[21] As seen, this brings results much closer in line with the original baseline specification, in particular for

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[20]This group of companies is overrepresented since data availability for transaction values is roughly twice as good for this group as for private companies and subsidiaries (the other two principal groups in the data). Indeed, the point estimate in column 1 (18.8) is not far from the estimate for the subsample of publicly traded firms (15.5, see table 5).

[21]The 75×median rule drops around 0.5% of all transactions. This particular threshold was chosen since results are broadly stable to the exclusion of further outliers beyond this point. Imputing values at the median rather than the mean also does not change any of the findings.

domestic U.S. M&As.

Finally, I also replicate my analysis of the post-adjustment period 1999-2003 using transaction values. That is, I estimate specification (2) replacing counts with total transaction values per industry and period. As the results in table 7b indicate, the picture is again similar to the use of count data. If anything, the impact of CUSFTA domestic Canadian M&A activity seems to decline even more rapidly than before. Estimates for the remaining categories are again insignificant and the coefficient estimates are broadly in line with the count data results.

Changes in Competition Policy as an Alternative Explanation? Could a relaxation of Canadian competition policy in response to stronger import competition from the U.S. be an alternative explanation for my results so far? If this relaxation of supervision was correlated with the extent of Canadian tariff cuts (e.g. because the competition authorities took them into account in their definition of the relevant market), we would expect it to also lead to an increase in domestic Canadian M&A activity.

While plausible at first sight, I do not think that this a plausible alternative explanation for my findings. First, it is inconsistent with the fact that the number of blocked acquisitions in Canada is very small compared to the number of completed acquisitions. Also, while a change in the stance of competition policy might in theory have deterred M&As without actually blocking many deals, documents and statements published by the Canadian Competition Bureau do not show any support for this possibility.[22] Third, if a looser competition policy was responsible for the surge in Canadian M&A activity one would expect to see a far stronger effect for within-industry transactions which is not the case.[23] Finally, even if a policy change had been responsible for increases in M&A activity, this is not neccessarily incompatible with M&As as a means of resource transfer: the need for industrial restructuring after CUSFTA could have been the underlying cause for increased M&A activity and a more lenient stance from the competition authorities may have merely facilitated the adjustment.

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[22]See http://www.competitionbureau.gc.ca/ and in particular the revised "Merger Enforcement Guidelines" from 1991.

[23]A bigger increase would be expected for this category since horizontal M&As are the main focus of the competition authorities. According to the Canadian Competition Bureau (1991) vertical and conglomerate M&A transactions were rarely the object of regulatory restrictions.

6   Comparison of Acquirers and Targets

The last sections have provided evidence that CUSFTA led to an increase in M&A activity, in particular in Canada and both within and between industries. This section looks in more detail at the characteristics of acquirers and targets in order to determine whether the resulting inter-firm transfer of resources is similar in nature to the one involved in firm and establishment exit and contraction. The existing literature has shown that it is usually the less productive firms and plants that contract or exit. While it is typically not possible to track the employment of factors of production in these studies, the parallel expansion of high productivity establishments seems to indicate that they re-employ at least part of the freed-up resources. The question thus arises whether M&As similarly lead to a channeling of resources towards more productive owners. This also has important implications for M&A-induced changes in aggregate productivity since existing studies have demonstrated that post-takeover gains in the target's productivity depend crucially on a superior efficiency of the acquiring firm (e.g. Maksimovic and Phillips, 2001).

A simple way of comparing targets and acquirers is to regress proxies for firm size and performance on dummies for whether a company is a target or an acquirer in a transaction. For this, I use data from Compustat North America and Compustat Global as described in section 4. I start by looking at net sales to get an impression of the size difference between targets and acquirers. Next, I analyse performance differences by looking at levels of profitability, returns to shareholders and total factor productivity.[24]

The basic econometric specification I estimate is:

$$y_{tj} = \alpha + d_t + \beta_1 \times target_{tj} + \varepsilon_{tj} \tag{3}$$

where y_{tj} is the size or performance indicator of interest for company j at time t (where t denotes the last completed fiscal year prior to the takeover announcement). The d_t represent time fixed effects and $target_{tj}$ is a dummy that takes the value one if the company in question is a target.[25]

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[24]"Returns to shareholders" are defined as share price (t) + dividends (t) divided by share price (t-1) (expressed in percentage points). See appendix A.2. for details on data sources and construction.

[25]Note that specification (3) pools all available data for targets and acquirers rather than calculating a target-acquirer difference for each merger and estimating the mean difference. This is necessary since for most mergers I do not have financial data on both parties. Note that for a given sample of mergers without missing data these two approaches are identical. Also, while pooling data increases the number of acquirers relative to targets (because data availability is generally better for larger firms and acquirers tend to be larger), the resulting bias is likely to work against and not in favor of finding significant differences. This is since it is the smaller targets that get excluded from the sample (and since - at least in my sample - smaller size in terms of net sales is associated with lower profitability and productivity).

The coefficient of interest is thus β_1 which gives the mean difference between targets and acquirers (which are the omitted category).

Block 1 of table 8 shows results for these baseline regressions. Acquirers are found to be significantly bigger in terms of net sales (column 1). In addition, they show significantly lower levels of pretax profits and returns to shareholders (columns 3 and 4). Interestingly, using estimates of α, d_t and β_1 for these specifications, one finds for most years of the sample that targets were on average making losses prior to takeover. Finally, acquirers are estimated to be 4.8% more productive than targets, with this difference again being signficant at the 1% level.

My baseline estimate of β_1 is an average across all four M&A categories, i.e. U.S. and Canadian domestic transactions and the two cross-border categories. Next, I allow for acquirer-target differences to vary across these groups by estimating separate intercepts and slopes for all four types of M&A transactions:

$$y_{tj} = \alpha_{CAT} + d_t + \beta_1 \times tarUU_{tj} + \beta_2 \times tarCC_{tj} + \beta_3 \times tarUC_{tj} + \beta_4 \times tarCU_{tj} + \varepsilon_{tj} \quad (4)$$

where α_{CAT} are the category specific intercepts and $tarUU_{tj}$, $tarCC_{tj}$, $tarUC_{tj}$, and $tarCU_{tj}$ are binary variables indicating whether a company is a target in one of the four types of transactions (for example, $tarUC_{tj}$ equals one if company j is the U.S. target of a Canadian acquirer).

Results on the four target dummy coefficients are shown in block 2 of table 8. Target-acquirer differences for net sales and pretax income are broadly similar across all categories. Returns to shareholders are always lower for acquisition targets as before, although the difference is much smaller and not significant for Canada-by-U.S. acquisitions. Most interestingly, however, are the differences revealed by the productivity estimates. First, differences in total factor productivity seem to be considerably more pronounced for domestic Canadian and Canada-by-U.S. acquisitions (acquirers are 14% and 37% more productive, respectively). For domestic U.S. transactions, the productivity advantage of acquirers is somewhat lower (5%) but still highly significant. In contrast, the productivity difference for U.S.-by-Canada acquisitions is actually significantly positive. One potential explanation might be that there are gains for Canadian firms that go beyond a pure reallocation story where acquirers improve the target firm's productivity (e.g. access to superior technology in the U.S. market). For all other categories, however, it seems that resources are transferred from less to more profitable and productive firms.

In a last step, I augment specification (4) with industry fixed effects to control for possible

variations in company characteristics across sectors. As shown in block 3 of table 8, this does not affect results by much.

7   The Quantitative Importance of the M&A Channel

The findings so far are supportive of the view that CUSFTA triggered an increase in resource transfers via M&As, especially in the smaller Canadian market. It also seems that these transfers were in most cases from less to more profitable and productive firms, similar to the channels analyzed in the previous literature (i.e. contraction and closure). A question that naturally arises from these observations is how important inter-firm resource transfers through M&As are *quantitatively*, both in absolute terms and relative to the two other forms of adjustment to freer trade.

While the absence of a control group of firms not engaging in M&As in the Thomson Financial dataset prevents me from giving a definitive answer to this question, some progress can be made in a more indirect way. In particular, the available data allow an analysis of how important resource transfers via M&As are in general, i.e. not necessarily linked to trade liberalization. Against this baseline, the earlier estimates of CUSFTA's impact on M&A activity can be judged on their quantitative importance.

To evaluate this quantitative importance, I rely again on information for publicly traded firms from Compustat North America and Compustat Global as described in section 4. Of the 365 Canadian and 6662 U.S. firms contained in the Compustat sample, about a quarter exits during the period 1985-1998 due to M&As or bankruptcy related reasons with M&As accounting for 83% of all exits (see table 9). That is, M&As seem to be by far the most important exit form for publicly traded firms in North America.[26]

Table 10 delves deeper by quantifying the average annual amount of jobs and production (net sales) transferred through the two exit forms. In addition, I also look at the third form of moving resources away from contracting firms, i.e. decreases in employment and sales at continuing com-

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[26] An alternative to the approach taken here would be to use the Compustat sample to estimate the impact of trade on the three adjustment channels, e.g. using a multinomial probit model. However, this would only give an estimate of the impact of trade liberalization on the relative incidence of the channels rather than the magnitude of the resource transfer involved. More importantly, there are some important limitations of the Compustat sample which prevent such a more detailed analysis. Most importantly, the focus on publicly traded firms means the number of Canadian firms is too small for the level of disaggregation used here (I have 140 sectors but only have exit information on 347 firms in Canada). In addition, I have no information on acquirers so that I cannot perform splits into the impact of CUSFTA on cross-border and domestic activity which was found to be very different. Finally, there are some issues related to the timing of exit and M&A's since the date of deletion from Compustat need not correspond exactly to the actual transaction date.

panies. The resulting figures show that while reductions at existing firms are the most important channel, M&As are responsible for about 30% of job- and sales volume redeployment. These figures are similar for both the U.S. and Canada and demonstrate that M&As are indeed a quantitatively important way of transferring resources between firms. For the publicly traded companies analyzed here, it also far outweighs exit via bankruptcy as the third adjustment channel.[27] It is likely that exit by bankruptcy will be more important among smaller, non-publicly traded companies and that turnover at continuing firms will also be higher for this group (see Davis et al., 1996). On the other hand, it has already been pointed out that publicly traded firms account for over 80% of manufacturing output and employment in North America. Thus, the overall quantitative importance of M&As is unlikely to decrease by much in a more comprehensive sample. Combined with the earlier findings that CUSFTA led to large increases in domestic M&A activity in Canada (over 70% according to my estimates), these results suggest that the amount of resource transfer involved was indeed substantial.

8 Conclusions

This paper examined the empirical relevance of mergers and acquisitions (M&A) as a channel of firm-level adjustment to trade liberalization. In a first step, I used the Canada-U.S. Free Trade Agreement (CUSFTA) of 1989 to estimate the impact of freer trade on M&A activity. I argued that CUSFTA provided an ideal setting for this purpose in many ways. It was a liberalization agreement between industrialized countries with comparatively few restrictions on takeovers; it represented a source of unanticipated and largely exogenous variation in trade barriers; and its main instrument - tariff reductions - was a direct and easily quantifiable trade policy measure with substantial sectoral variation. Implementing a difference-in-differences identification strategy, I found a rich set of results. While there does not seem to be a robust link between cross-border M&As and trade liberalization, resource transfer through M&As between domestic firms is an empirically relevant phenomenon. This is particularly true for Canada, where I estimated a tariff cut-related increase in domestic M&A activity of over 70%. The effect on domestic U.S. transactions is essentially negligible which is consistent with the idea that CUSFTA presented a much less important trade

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[27] Note that sell-offs or closures of individual divisions or plants will show up under the "reduction at continuing firms" category (exit through M&As or bankruptcy in Compustat only occurs if the entire firm is acquired or goes bankrupt). Insofar, the results for the two exit categories can be seen as the lower bound to what would be obtained from a plant-level analysis.

shock for the large American market.

In order to compare resource transfers through M&As to adjustment via firm- and establishment contraction and exit, I further presented evidence on the nature and quantitative importance of the M&A channel. Using a large sample of publicly traded firms, I found that M&As involved a rechannelling of resources from low to high productivity firms and that the magnitude of the resource transfer is likely to have been quantitatively important. Taken together, these results suggest that for firms adapting to freer trade, M&As represent an important alternative to adjustment via closure, contraction, or internal expansion.

There are a number of interesting implications arising from these findings. In particular, they highlight the fact that adjustment to freer trade can take less drastic forms than firm and plant closure and the associated mass layoffs of workers and liquidation of capital. Indeed, if M&As do represent a swifter and more efficient way of transferring resources between firms, this would have important implications for competition policy. In particular, one would like antitrust authorities to facilitate the necessary transfer of resources by reducing restrictions on acquisitions in the wake of trade liberalizations. Given the generally higher level of restrictions imposed on M&A activity in developing countries, this proposition could be of particular relevance there. This line of thought is reminiscent of certain strands in the Corporate Finance literature (in particular Jensen, 1993) which argue that takeovers represent a far superior way of restructuring industries than internal adjustments or bankruptcy and as such should not face unnecessary legal restrictions.[28]

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[28]Some tentative evidence supporting the efficiency of the M&A channel comes from the observation that M&As seem to lead to overall efficiency gains in most periods and settings (see Andrade et al., 2001, for a detailed survey). In contrast, liquidation costs are usually found to be substantial, with asset values decreasing by over 50% (see Jovanovic and Rousseau, 2004).

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A Data Appendix

A.1 Linking Tariff and M&A Data

The tariff data are constructed as described in Head and Ries (1999). U.S. tariffs prior to CUSFTA are taken from Government of Canada (1988), Canadian tariffs from Lester and Morehen (1987). These publications provide tariffs for around 100 industries, roughly corresponding to the 3-digit level of the Canadian industry classification of 1980 (CAN-SIC80). Tariff reductions after 1988 are calculated by determining to which so-called 'staging' category an industry had been assigned under CUSFTA. The staging category agreed upon determined the rate by which tariff protection was being phased out. Most industries had their tariffs reduced in equal parts from 1989 to 1998. A smaller number were placed on a five year phase-out and a handful opted for immediate elimination. Note that the above two publications do not provide data for 1985 and 1986. However, Lester and Morehen (1987) does contain Canadian tariffs for 1979 which I interpolate to 1987 to get an impression of tariff changes in that period. As other studies (e.g. Gu et al., 2003), I find changes in 1985-1988 to be small both in absolute terms and compared to the subsequent cuts implemented via CUSFTA. In my econometric analysis (sections 5.2 and 5.3), I thus implicitly set the pre-CUSFTA change in tariffs equal to zero by interacting the 1988-1998 change with a post-CUSFTA time dummy. Using my interpolated data for the regressions involving Canadian tariff cuts yields very similar results to the ones presented in this paper (with the exception of the binary measure for most-least affected industries which shows too little variation over time - 80% of industries stay in the same group pre and post CUSFTA).

In order to link the tariff data to the data on M&A transactions, I assign each M&A deal to a 4-digit category of the 1987 U.S. industry classification (US-SIC87) based on the primary field of activity of the target company or division. In order to determine the tariff facing that industry, I use a correspondence between CAN-SIC80 and US-SIC87 provided by Statistics Canada. The mapping was unique in about 70% of cases in the sense that a U.S.-industry was matched to a single tariff rate. For the remaining 30%, I used averages of tariffs weighted according to the average number of establishments in the CAN-SIC80 category (this arguably captures the "M&A potential" of an industry better than e.g. value added or output weights would do: ceteris paribus, a transaction is more likely to occur in an industry with more establishments; however, using simple averages does not qualitatively affect my results). Finally, I aggregated the U.S. data up to the 3-digit level (140 industries), again using the number of firms in a 4-digit category as tariff weights. This aggregation was done in order to reduce the number of zero-transaction industries (thus mitigating problems of an excess number of zeros in the fixed effects Poisson regressions) and to reflect more accurately the less disaggregated nature of the underlying tariff data.

A.2 Compustat Data

The exact sources from Compustat North America used for the calculation of the size and performance measures described in section 4 and 6 are data items 12 and 117 (net sales), 122 and 170 (pretax income), 29 and 146 (employees), 8 and 141 ("net property, plants and equipment", used as proxy for net capital stocks), as well as 26, 27 and 199 (stock market prices and dividends used for calculating returns to shareholders). For Compustat Global, data are contained in items 1 (net sales), 21 (pretax income), 162 (employees), 76 ("net tangible fixed assets", used as proxy for net capital stocks), as well as items prcadj, dvpsxi and cfacshr from Computstat Global Issues (for returns to shareholders). I use 4-digit sectoral deflators to convert nominal values to 1987 values. I then convert entries in Canadian dollars to US dollars by using the exchange rate for the base year 1987. Capital stocks are deflated using investment price deflators for the U.S. and Canada. This is appropriate since the use of balance sheet data implies that capital stocks are valued at current market prices.

Returns to shareholders for company i in period t are calculated as

$$r_{it} = \left(\frac{price_{it} + dividends_{it}}{price_{it-1}} - 1 \right) \times 100$$

where prices and dividends are adjusted for share splits. I compute total factor productivity from a three-factor Cobb-Douglas production function under the assumption of constant returns to scale and perfect competition on product and factor markets. The shares for the three factors capital, labour and intermediate inputs are calculated at the 4-digit level from sectoral manufacturing data provided by Statistics Canada and the Bureau of Economic Analysis. Note that since Compustat does not provide information on intermediate inputs, I assume that their cost share in total shipments (net sales) is the same as in the sectoral data used for the construction of factor shares. This assumes that intermediate input intensity is not systematically related to target or acquirer status.

The data for the evaluation of quantitative importance of M&As are also from Compustat North America and Compustat Global. For Compustat North America, the exact sources are data items 12 and 177 (output/net sales) and 29 and 146 (employees). Date and reason for deletion are provided in data footnotes AFTNT33-AFTNT35. For Compustat Global, sales and employee data are contained in items 1 and 162, and reason and date of deletion in the variables INCO and INCOD. To compute the amount of employment and output (net sales) transfers in table 7, I proceed as follows. For companies present in two adjacent periods t and t+1, I compute reductions in sales and employment at individual firms (set to zero for expanding firms), aggregate these for every year in the sample and then take the yearly average. Firms present in t but not in t+1 are classified as "exit by M&A" or "exit by bankruptcy" according to the information provided in Compustat. The total resource transfers via M&A in a given year t+1 are then simply the sum of employment and sales in period t across all firms exiting via M&A between the two periods (likewise for exit via bankruptcy).

B   Figures and Tables

Table 1: Descriptive Statistics on Target Industries

U.S.-SIC87 (2-digit)	Industry Name	Total No. of Acquisitions 1985-1998				(5) #Establishments (U.S.)	(6) #Establishments (Canada)	(7) Avg. U.S. import tariff in 1988	(8) Avg. Can. import tariff in 1988
		(1) U.S. by U.S.	(2) U.S. by CAN	(3) CAN by U.S.	(4) CAN by CAN				
20	Food and kindred products	1651	54	53	242	21,556	3,449	3.9%	5.9%
21	Tobacco manufactures	41	1	0	2	114	20	20.7%	14.4%
22	Textile mill products	422	12	16	43	5,886	758	8.7%	13.5%
23	Apparel and other textile products	509	9	13	21	23,093	2,604	9.4%	15.8%
24	Lumber and wood products	305	16	16	99	22,744	3,112	2.2%	4.5%
25	Furniture and fixtures	357	5	3	41	11,658	1,928	2.2%	10.7%
26	Paper and allied products	568	38	29	134	6,416	815	3.4%	8.8%
27	Printing and publishing	2137	74	38	227	63,392	5,421	0.5%	2.0%
28	Chemicals and allied products	2760	81	72	157	12,004	1,205	3.8%	6.2%
29	Petroleum and coal products	235	9	9	22	2,124	139	0.7%	0.8%
30	Rubber and misc. plastics products	901	29	37	67	15,642	1,609	4.5%	8.8%
31	Leather and leather products	128	1	2	4	2,040	321	7.5%	12.6%
32	Stone, clay, glass, and concrete products	430	18	24	48	16,254	1,609	1.8%	3.9%
33	Primary metal industries	845	22	46	76	6,401	515	3.4%	4.5%
34	Fabricated metal products	1201	42	41	93	36,429	3,217	2.2%	7.0%
35	Industrial machinery and equipment	3122	80	107	209	53,956	4,534	2.6%	5.2%
36	Electrical and electronic equipment	2940	86	99	173	16,922	988	3.5%	6.3%
37	Transportation equipment	1095	26	43	98	11,287	1,258	0.9%	5.5%
38	Instruments and related products	2598	32	44	69	11,354	981	4.2%	7.0%
39	Miscellaneous manufacturing industries	683	19	18	23	17,035	1,723	3.8%	6.2%
	Total (sum or mean)	22928	654	710	1848	356,307	36,206	4.5%	7.5%

Notes: Columns 1-4 show the total number of takeovers of firms with primary activity in manufacturing (SIC 20-39) during 1985-1998. The columns give figures by two-digit industry for four different M&A categories: 1) Takeovers of U.S. firms by other U.S. firms; 2) takeovers of U.S. firms by Canadian firms; 3) takeovers of Canadian firms by U.S. firms; and 4) takeovers of Canadian firms by other Canadian firms. Acquirers can have primary activity within or outside manufacturing (see table 2 for a breakdown of acquirers' primary industries). Columns 5 and 6 display the average number of establishments in 1985-1998 for the U.S. and Canada. Columns 7 and 8 show two-digit average import tariffs levied by the U.S. and Canada on each other's manufacturing products in 1988.

Table 2: Descriptive Statistics on Acquirer Industries

Sector	United States				Canada			
	(1) Number	(2) % of total manufacturing M&A	(3) secondary SIC in manuf. (%)	(4) at least one 3-digit SIC-code in common with target (%)	(5) Number	(6) % of total manufacturing M&A	(7) secondary SIC in manuf. (%)	(8) at least one 3-digit SIC-code in common with target (%)
Manufacturing firms (SIC 2-3)	14654	62.1%	100.0%	55.1%	1615	63.1%	100.0%	58.9%
- Same 3-digit industry	7269	30.8%	100.0%	100.0%	867	33.9%	100.0%	100.0%
- Same 2-digit industry but not same 3-digit industry	2486	10.5%	100.0%	14.1%	297	11.6%	100.0%	16.8%
- Different 2-digit industries	4899	20.8%	100.0%	9.2%	451	17.6%	100.0%	7.8%
Non-manufacturing firms	4002	17.0%	24.1%	2.8%	549	21.5%	22.6%	2.6%
- Agriculture, Fishing & Hunting (sic 1)	68	0.3%	57.4%	7.4%	14	0.5%	50.0%	7.1%
- Mining (sic 10-14)	286	1.2%	29.4%	1.7%	70	2.7%	10.0%	0.0%
- Construction (sic 15-17)	111	0.5%	31.5%	2.7%	11	0.4%	45.5%	0.0%
- Transportation, communicat. and utilities (sic 4)	476	2.0%	27.3%	2.1%	71	2.8%	45.1%	0.0%
- Wholesale trade (sic 50-51)	778	3.3%	29.8%	5.1%	90	3.5%	26.7%	6.7%
- Retail Trade (sic 52-59)	237	1.0%	16.9%	3.0%	24	0.9%	20.8%	4.2%
- Finance, insurance, and real estate (sic 60-67)	722	3.1%	5.0%	0.3%	150	5.9%	0.0%	0.0%
- Services industry (sic 7/8)	1308	5.5%	28.1%	3.1%	113	4.4%	38.9%	5.3%
- Government (sic 9)	16	0.1%	0.0%	0.0%	6	0.2%	0.0%	0.0%
Investors, n.e.c (sic 6799)	4926	20.9%	0.0%	0.0%	394	15.4%	0.0%	0.0%
Total number of manufacturing M&A	23582	100.0%			2558	100.0%		

Notes: Columns (1) and (5) show the total number of M&A transactions involving manufacturing targets in the U.S. and Canada with acquirers having their principal activity in the SIC-code listed on the left. Columns (2) and (6) express these numbers as % of the total number of manufacturing M&A transaction in the respective country. Columns (3) and (7) list the fraction of acquirers from a given SIC code that have a primary OR secondary three-digit SIC-code in manufacturing. Columns (4) and (8) similarly list the fraction of acquirers that have at least one three-digit manufacturing SIC-code (primary or secondary) in common with the target.

Table 3: Baseline Specification, EU M&A controls

	Dependent Variable: Number of Takeovers							
Regressor	(1) Can. by Can.	(2) U.S. by Can.	(3) U.S. by U.S.	(4) Can. by U.S.	(5) Can. by Can.	(6) U.S. by Can.	(7) U.S. by U.S.	(8) Can. by U.S.
d_{post}	1.087	0.508	0.586	1.691	0.976	0.212	0.591	1.867
	(5.17)**	(1.29)	(9.13)**	(3.90)**	(2.22)**	(0.50)	(5.20)**	(3.51)**
Δtariff	11.055	9.679	-0.956	-3.282	11.479	9.024	-0.991	-3.207
	(2.70)**	(0.81)	(0.60)	(0.52)	(2.40)**	(0.82)	(0.56)	(0.49)
EU controls?	No	No	No	No	Yes	Yes	Yes	Yes
Observations	280	280	280	280	280	280	280	280

Notes: Table shows coefficient estimates from fixed effects Poisson regressions with conditional mean $\mu_{it}=\exp(d_i+d_{pre}+d_{post}+\beta*d_{post}*\Delta tariff)$. Figures in brackets below coefficient estimates are t-stats based on standard errors clustered at the 3-digit industry level. The dependent variable (μ_{it}) is the number of takeovers of manufacturing firms per 3-digit industry and time period (pre-CUSFTA and post-CUSFTA). The regressors include a period dummy for the post-FTA period (d_{post}) and the absolute change in industry tariffs 1988-1998, interacted with a post-CUSFTA period-dummy (Δtariff). All regressions also include industry fixed effects (d_i). The excluded category is the pre-CUSFTA period dummy d_{pre}. Columns 5-8 additionally contain the number of takeovers in the EU in the same industry and time period (see text for details). +, * and ** indicate statistical significance at the 10%, the 5% and the 1%-level, respectively.

Table 4: Different Functional Forms

	Dependent Variable: Number of Takeovers							
Regressor	(1) Can. by Can.	(2) U.S. by Can.	(3) U.S. by U.S.	(4) Can. by U.S.	(5) Can. by Can.	(6) U.S. by Can.	(7) U.S. by U.S.	(8) Can. by U.S.
d_{post}	3.062	0.927	0.523	2.501	1.448	0.354	0.494	1.733
	(5.39)**	(1.42)	(3.31)**	(1.95)+	(4.64)**	(1.22)**	(7.70)**	(4.91)**
$\log(\Delta$tariff$)$	0.458	0.082	-0.003	0.272				
	(2.95)**	(0.51)	(0.08)	(0.70)				
$1(\Delta$tariff$>\Delta_{50\%})$					0.582	0.298	0.139	-0.129
					(2.18)*	(1.15)	(1.76)+	(0.36)
EU controls?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	276	276	276	276	280	280	280	280

Notes: Table shows coefficient estimates from fixed effects Poisson regressions with conditional mean $\mu_{it}=\exp(d_i+d_{pre}+d_{post}+\beta*d_{post}*\Delta)$. Figures in brackets below coefficient estimates are t-stats based on standard errors clustered at the 3-digit industry level. The dependent variable (μ_{it}) is the number of takeovers of manufacturing firms per 3-digit industry and time period (pre-CUSFTA and post-CUSFTA). The regressors include a period-dummy for the post-FTA period (d_{post}) and transformations of the absolute change in industry tariffs 1988-1998, interacted with a post-CUSFTA period dummy ($d_{post}*\Delta$): line 2 uses logs of absolute changes and line 3 uses a binary indicator (= 1 if an industry is among the 50% of industries with the highest tariff cuts). All regressions also include industry fixed effects (d_i) as well as the number of takeovers in the EU in the same industry and time-period (see text for details). The excluded category is the pre-CUSFTA period dummy d_{pre}. +, * and ** indicate statistical significance at the 10%, the 5% and the 1%-level, respectively.

Table 5: Subsamples

	Regressor	Dependent Variable: Number of Takeovers			
		(1) Canada by Canada	(2) U.S. by Canada	(3) U.S. by U.S.	(4) Canada by U.S.
Excluding SIC6799 (n.e.c.)	d_{post}	0.796	0.210	0.763	1.722
		(1.78)+	(0.46)	(6.52)**	(2.96)**
	Δtariff	13.521	9.103	-1.197	0.262
		(2.50)*	(0.78)	(0.60)	(0.04)
Including acqu. of minority interest	d_{post}	1.206	0.160	0.542	2.158
		(3.08)**	(0.43)	(4.87)**	(4.16)**
	Δtariff	10.559	7.956	0.210	-7.848
		(2.40)*	(0.85)	(0.13)	(1.29)
Within-industry acqu. Only	d_{post}	0.924	-0.815	1.028	1.579
		(1.92)+	(0.95)	(4.62)**	(1.74)+
	Δtariff	11.400	22.233	-0.263	-2.200
		(2.05)*	(0.83)	(0.07)	(0.17)
Publicly traded companies only	d_{post}	1.247	-0.030	0.690	1.482
		(2.63)**	(0.06)	(5.17)**	(2.18)*
	Δtariff	15.483	18.124	-1.347	4.323
		(2.60)**	(1.24)	(0.62)	(0.43)
	EU controls	Yes	Yes	Yes	Yes
	Observations	280	280	280	280

Notes: Table shows coefficient estimates from fixed effects Poisson regressions with conditional mean $\mu_{it}=\exp(d_i+d_{pre}+d_{post}+\beta*d_{post}*\Delta tariff)$. See text and table 3 for specification details. Figures in brackets below coefficient estimates are t-stats based on standard errors clustered at the 3-digit industry level. The table displays results for four different subsamples of manufacturing targets (see first table column and text for details). The excluded category is the pre-CUSFTA period dummy d_{pre}. +, * and ** indicate statistical significance at the 10%, the 5% and the 1%-level, respectively.

Table 6: Estimates including post-adjustment period (1985-2003)

	Dependent Variable: Number of Takeovers			
Regressor	(1) Can. by Can.	(2) U.S. by Canada	U.S. by U.S.	Canada by U.S.
d_{8993}	0.872	0.399	0.287	1.394
	(3.81)**	(0.86)	(4.21)**	(3.00)**
d_{9498}	1.192	0.551	0.822	1.943
	(5.02)**	(1.14)	(11.42)**	(4.12)**
d_{9903}	1.519	0.742	0.673	2.199
	(5.10)**	(1.50)	(6.21)**	(5.25)**
Δtariff * d_{8993}	13.404	1.351	1.212	-3.299
	(2.94)**	(0.09)	(0.72)	(0.46)
Δtariff * d_{9498}	10.707	16.913	-2.554	-3.645
	(2.30)*	(1.11)	(1.40)	(0.54)
Δtariff * d_{9903}	7.368	17.669	-1.991	-9.201
	(1.32)	(1.16)	(0.79)	(1.43)
Observations	560	560	560	560

Notes: Table shows coefficient estimates from fixed effects Poisson regressions with conditional mean $\mu_{it}=\exp(d_i+d_t+\beta_t*d_t*\Delta tariff)$. See text for specification details. Figures in brackets below coefficient estimates are t-stats based on standard errors clustered at the 3-digit industry level. The excluded category is the pre-CUSFTA period dummy d_{8588}. +, * and ** indicate statistical significance at the 10%, the 5% and the 1%-level, respectively.

Table 7a: Value regressions – 1985-1998

Regressor	Dependent Variable: Total transaction value							
	(1) Can. by Can.	(2) U.S. by Can.	(3) U.S. by U.S.	(4) Can. by U.S.	(5) Can. by Can.	(6) U.S. by Can.	(7) U.S. by U.S.	(8) Can. by U.S.
d_{post}	-0.086	0.563	0.308	2.471	0.534	0.186	0.276	1.852
	(0.27)	(0.79)	(1.82)+	(1.84)+	(2.53)*	(0.44)	(3.65)**	(3.31)**
$\Delta tariff * d_{post}$	18.786	6.883	-17.297	-2.340	12.560	6.460	-2.305	-8.305
	(1.78)+	(0.31)	(4.28)**	(0.11)	(2.62)**	(0.59)	(1.15)	(1.03)
Drop outliers?	No	No	No	No	Yes	Yes	Yes	Yes
Impute values?	No	No	No	No	Yes	Yes	Yes	Yes
Observations	280	280	280	280	280	280	280	280

Notes: Table shows coefficient estimates from fixed effects Poisson regressions with conditional mean $v_{it}=exp(d_i+d_{pre}+d_{post}+\beta*d_{post}*\Delta tariff)$. Figures in brackets below coefficient estimates are t-stats based on standard errors clustered at the 3-digit industry level. The dependent variable (v_{it}) is the aggregate value of takeovers of manufacturing firms per 3-digit industry and time-period (pre-CUSFTA and post-CUSFTA). The excluded category is the pre-CUSFTA period dummy d_{pre}. See text for specification details. Columns 5-8 drop all transactions with values > 75 times the corresponding 2-digit industry median and impute missing values at the 2-digit industry mean. +, * and ** indicate statistical significance at the 10%, the 5% and the 1%-level, respectively.

Table 7b: Value regressions – 1985-2003

Regressor	Dependent Variable: Total transaction value			
	(1) Canada by Canada	(2) U.S. by Canada	U.S. by U.S.	Canada by U.S.
d_{8993}	0.413	0.166	-0.028	1.731
	(1.45)	(0.29)	(0.33)	(2.54)*
d_{9498}	0.798	0.047	0.556	1.927
	(3.79)**	(0.10)	(7.16)**	(3.43)**
d_{9903}	0.936	0.845	0.465	2.061
	(2.41)*	(1.72)+	(4.60)**	(4.64)**
$\Delta tariff * d_{8993}$	12.584	-5.867	-1.536	-9.592
	(2.13)*	(0.35)	(0.79)	(0.96)
$\Delta tariff * d_{9498}$	8.947	18.244	-4.429	-6.855
	(1.79)+	(1.38)	(2.24)*	(0.83)
$\Delta tariff * d_{9903}$	4.737	5.528	-2.874	-8.575
	(0.65)	(0.39)	(1.16)	(1.22)
Drop Outliers?	Yes	Yes	Yes	Yes
Impute values?	Yes	Yes	Yes	Yes
Observations	560	560	560	560

Notes: Table shows coefficient estimates from fixed effects Poisson regressions with conditional mean $v_{it}= exp(d_i+ d_t +\beta_t* d_t *\Delta tariff)$. Figures in brackets below coefficient estimates are t-stats based on standard errors clustered at the 3-digit industry level. The dependent variable (v_{it}) is the aggregate value of takeovers of manufacturing firms per 3-digit industry and time-period. The excluded category is the pre-CUSFTA period dummy d_{8588}. See text for specification details. Columns 5-8 drop all transactions with values > 75 times the corresponding 2-digit industry median and impute missing values at the 2-digit industry mean. +, * and ** indicate statistical significance at the 10%, the 5% and the 1%-level, respectively.

Table 8: Comparison Acquirers – Targets

Specifi-cation	Regressors	(1) Net sales (logs)	(2) Pretax income per net sales (USD)	(5) Return to shareholders (% points)	(6) TFP (logs)	Industry dummies?
(1)	Target dummy	-1.651	-0.398	-12.413	-0.048	
		(38.49)**	(5.97)**	(8.60)**	(2.92)**	No
	R-squared	0.17	0.02	0.03	0.01	
(2)	Target CAN by CAN	-1.432	-0.252	-12.719	-0.139	
		(10.63)**	(2.51)*	(2.66)**	(2.25)*	
	Target U.S. by U.S.	-1.650	-0.410	-12.381	-0.050	
		(36.28)**	(5.74)**	(8.28)**	(2.94)**	
	Target U.S. by CAN.	-1.603	-0.412	-23.828	0.216	No
		(7.99)**	(2.41)*	(2.62)**	(2.44)*	
	Target CAN by U.S.	-2.179	-0.352	-0.641	-0.371	
		(10.96)**	(2.29)*	(0.07)	(3.66)**	
	R-squared	0.17	0.02	0.03	0.02	
(3)	Target CAN by CAN	-1.437	-0.281	-11.35	-0.088	
		(11.20)**	(2.81)**	(2.33)*	(2.30)*	
	Target U.S. by U.S.	-1.674	-0.381	-11.075	-0.030	
		(40.01)**	(6.68)**	(7.15)**	(2.54)*	
	Target U.S. by CAN.	-1.589	-0.351	-20.626	0.118	Yes
		(8.37)**	(1.99)*	(2.19)*	(1.83)+	
	Target CAN by U.S.	-2.312	-0.325	1.511	-0.130	
		(13.17)**	(2.18)*	(0.16)	(1.68)+	
	R-squared	0.17	0.11	0.08	0.52	
	Observations	14254	8376	9461	9768	

Notes: Table shows results for OLS regressions (robust t-values in parentheses are based on standard errors clustered at the 3-digit industry level). The dependent variables are the company characteristics listed across the top of columns 1-4. "Return to shareholders" is calculated as share price (t) + dividends (t) divided by the share price in t-1 (expressed in percentage points). See appendix A.2 for details on data sources and construction. Regressors in specification (1) include a constant and a dummy for whether a company is a target. Specifications (2) and (3) include separate intercepts and target dummy terms for all four M&A categories (see text for full specification). The table shows coefficient estimates for the four target dummies: "Target CAN by CAN" (targets in takeovers of Canadian firms by other Canadian firms), "Target U.S. by U.S." (targets in takeovers of U.S. firms by other U.S. firms), "Target U.S. by CAN" (targets in takeovers of U.S. firms by Canadian firms), and "Target CAN by U.S." (targets in takeovers of Canadian firms by U.S. firms). Also included are year fixed effects (all specifications) and 3-digit industry fixed effects (specification 3 only). +, * and ** indicate statistical significance at the 10%, the 5% and the 1%-level, respectively.

Table 9: Firm exit via M&A and Bankruptcy

|	Canada		United States		Total	
Firms active in part or all of 1985-1998	365		6662		7027	
Firms exiting via bankruptcy or M&A (number and % of active firms)	59	16.2%	1795	26.9%	1854	26.4%
- Bankruptcy/Liquidation (number and % of total exit)	5	8.5%	311	17.3%	316	17.0%
- M&A (number and % of total exit)	54	91.5%	1484	82.7%	1538	83.0%

Notes: Table shows numbers of publicly traded manufacturing firms active in all or part of 1985-1998 and total occurrences of exit via M&A or bankruptcy among these firms.

Table 10: Resource Transfer via Contraction, M&A and Bankruptcy

| Yearly Sample Averages 1985-1998	Canada	United States	Total
(1) Total employment ('000s)	774.5	15554.9	16329.4
(2) Gross job reductions at continuing firms ('000s)	34.3	756.3	790.5
(3) Job reductions through bankruptcy/liquidation ('000s)	0.5	10.8	11.3
(4) Job transfers through M&A ('000s)	13.9	287.7	301.6
(5) Total job transfers ('000s) – sum of (2)-(4)	48.7	1054.7	1103.4
(6) Total job transfers as % of employment – (5)/(1)	6.3%	6.8%	6.8%
(7) M&A as % of total job transfers – (4)/(5)	28.5%	27.3%	27.3%
(1) Total output (mill. 1995 USD)	151,397	3,056,144	3,207,540
(2) Gross output reductions at continuing firms (mill. 1995 USD)	7,962	105,801	113,763
(3) Output reductions through bankruptcy/liquidation (mill. 1995 USD)	102	1,329	1,430
(4) Output transfers through M&A (mill. 1995 USD)	3,635	52,591	56,226
(5) Total output transfers (mill. 1995 USD) – sum of (2)-(4)	11,700	159,720	170,489
(6) Total output transfers as % of output – (5)/(1)	7.7%	5.2%	5.3%
(7) M&A as % of total output transfers – (4)/(5)	31.1%	33.0%	33.0%

Notes: Table shows the amount of job and output transfers via contraction at continuing firms and via exit by bankruptcy/liquidation and M&A. "Total employment" and "Total output" are obtained by summing over all firms active in a given year. "Gross job/output reductions at continuing firms" are the sum over all employment/output reductions at continuing firms as compared to the previous year. "Job/output reductions through bankruptcy/liquidation" and "Job/output transfers through M&A" are the sum over the last available employment/sales figures for firms exiting the dataset in a given year due to bankruptcy/liquidation or M&A (see text and appendix A.2 for details on the sample construction).

Figure 1: Aggregate Number of M&A Transactions, 1985-1998
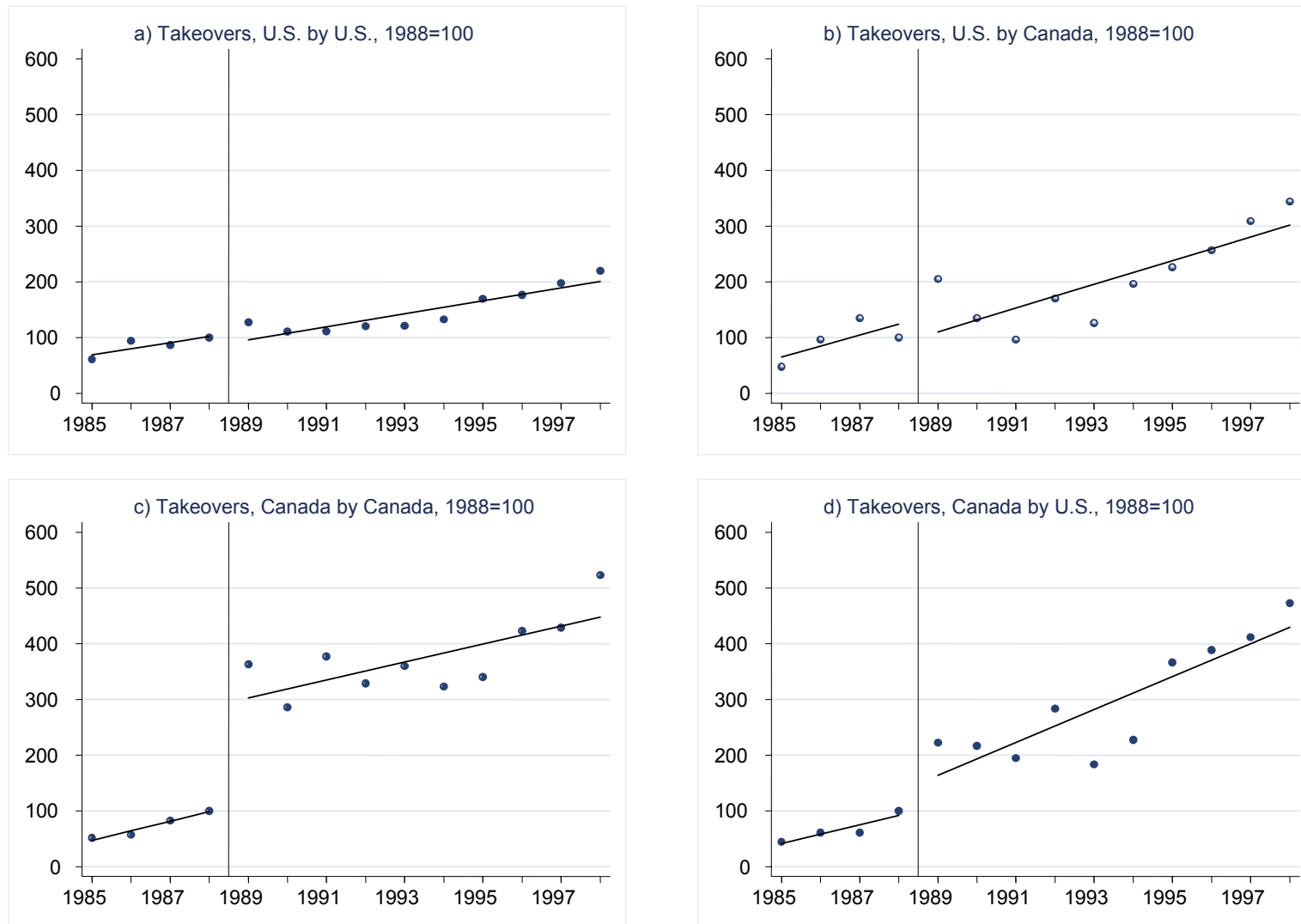
Notes: Figures show the number of takeovers of firms with primary activity in manufacturing, expressed as indices relative to 1988. Acquirers can have primary activities within or outside manufacturing (see table 2 for a breakdown of acquirers' primary industries). The four graphs give numbers for four M&A categories: a) U.S. firms taken over by other U.S. firms, b) U.S. firms taken over by Canadian firms, c) Canadian firms taken over by other Canadian firms, and d) Canadian firms taken over by U.S. firms.

Figure 2: Aggregate Number of M&A Transactions, Most vs. Least Affected Industries
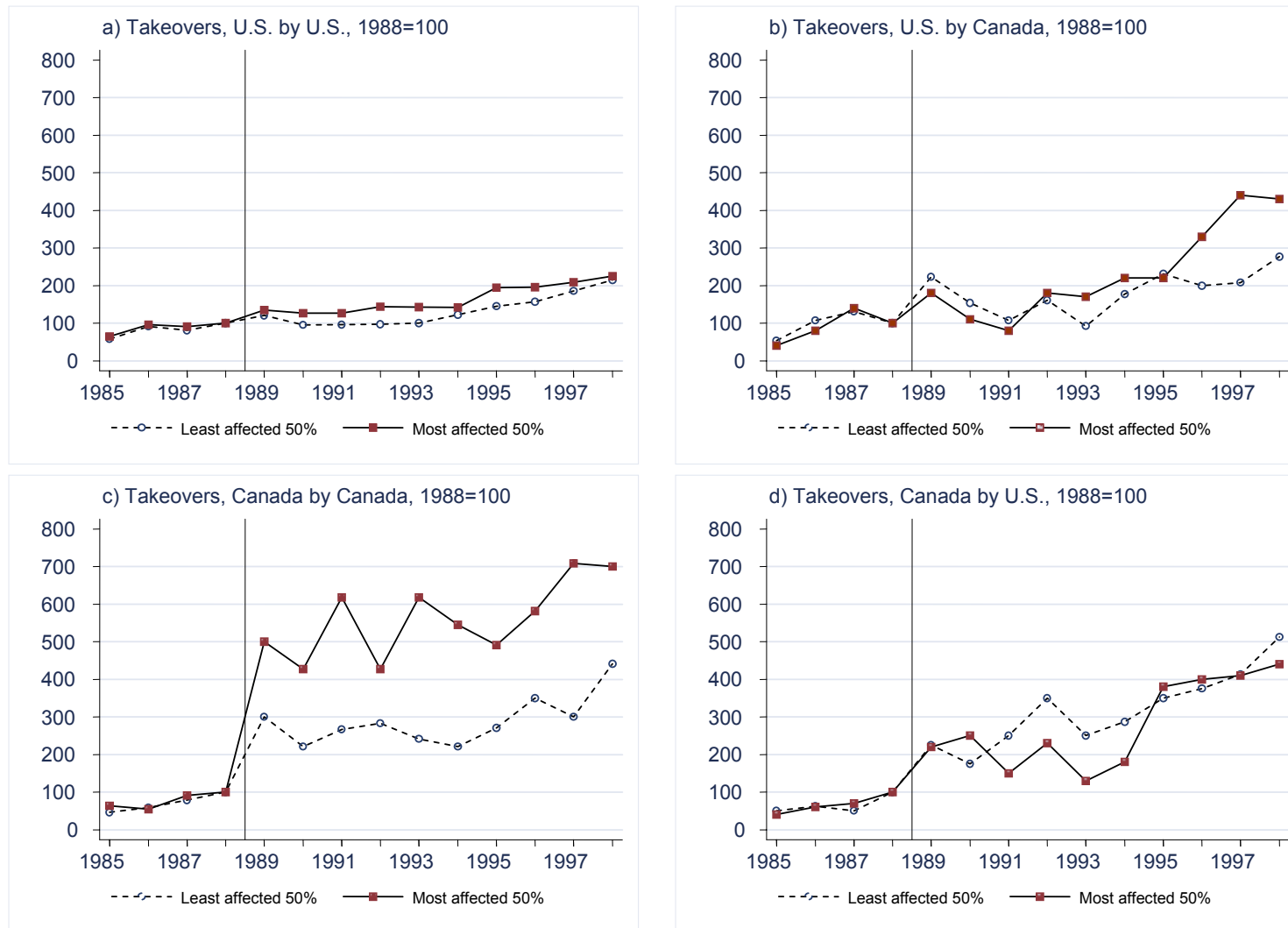
Notes: Figures show the number of takeovers of firms with primary activity in manufacturing, expressed as indices relative to 1988. Acquirers can have primary activities within or outside manufacturing (see table 2 for a breakdown of acquirers' primary industries). Each graph shows numbers for two groups of target industries: the 50% of industries with the highest and the 50% of industries with the lowest cuts in domestic tariffs from 1988-1997. The four graphs give numbers for four M&A categories: a) U.S. firms taken over by other U.S. firms, b) U.S. firms taken over by Canadian firms, c) Canadian firms taken over by other Canadian firms, and d) Canadian firms taken over by U.S. firms.