University of Essex

Department of Economics

Discussion Paper Series

No. 619 October 2006

Trade Liberalization and Industrial Restructuring Through Mergers and Acquisitions

Holger Breinlich

Note : The Discussion Papers in this series are prepared by members of the Department of Economics, University of Essex, for private circulation to interested readers. They often represent preliminary reports on work in progress and should therefore be neither quoted nor referred to in published work without the written consent of the author.

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

Holger Breinlich[†]

October 2006

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.

KEY WORDS: Mergers and Acquisitions, Trade Liberalization, International Trade, Canada-United States Free Trade Agreement.
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,

---

[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 et al., 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 reductions) 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 reductions 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 the international trade literature have also studied firm-level reallocation processes triggered by trade liberalization (Melitz, 2003; Bernard et al., 2003; Bernard, Redding and Schott, 2007; and Falvey, Greenaway and Yu, 2004). As 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, 2007; di Giovanni, 2005). Rather than analyzing M&As as a means of industry restructuring, these authors 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 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). Moreover, authors like Jovanovic and Rousseau (2002) or Andrade and Stafford (2004) have demonstrated that M&As are indeed frequently used as a means 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 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, potential implications for economic policy, and directions for future research (section 8). Formal derivations of the main predictions of section 2 and details on data construction are contained in two separate appendices.

2   Empirical 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). The focus here is on the basic intuition and empirical predictions. A formal derivation of the main results from a fully specified model is contained in Appendix A.

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

---

[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).

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 under which both channels are active in equilibrium.[3]

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

---

[3]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.

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 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 reductions?

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 uncertain as late as November 1988.[4] The fact that CUSFTA's 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

---

[4]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 certainly suggested that a victory for his party was a distinct possibility (the high point for the Liberal Democrats was a predicted 10% lead in a Gallup poll of November 7). However, the Canadian Conservative Party party succeeded in reversing public opinion in the final weeks before the election and the government was returned with a parliamentary majority sufficient to ratify CUSFTA.

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 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.[5] 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.[6]

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

---

[5]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 B.1 provides some additional details on their construction.

[6]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).

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 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%.[7] 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 B.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.[8] 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

---

[7]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.

[8]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.

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 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.[9] 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 57% in some categories (see columns 3 and 7).[10]

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

---

[9]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.

[10]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 four percentage 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.

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 restructuring and changes in management practices. Also, among 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 but also 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 for 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 in section 5 for analyzing changes in M&A activity 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%.[11] 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 are measures of pretax income, stock market returns and total factor productivity. I also look at net sales to give an impression of the size differences between targets and acquirers. These measures are available for between 8,500 to 14,500 out of the 52,000 company-year combinations in my data (some companies

---

[11] 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.

are involved in several transactions in the sample period).[12]

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 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 to identify firms which exit through M&A, bankruptcy or liquidation (see appendix B.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 363 Canadian and 6584 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   Graphic Analysis

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 M&A 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

---

[12]See appendix B.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).

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 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. The impression from the initial graphs thus holds up to this difference-in-differences analysis. M&A activity in Canada rose sharply after 1989 and the magnitude of this increase is 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 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_{it} 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 absolute change in tariff levels from the year prior to CUSFTA (1988) to the last year of tariff reductions (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.[13] Thus, my initial count data specification is given by:

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

where d_i are industry fixed effects, d_{pre} and d_{post} are time fixed effects denoting the pre- and post-CUSFTA period, and dt_i is the absolute change in tariffs from 1988 to 1998. Since all tariffs decreased after 1988, we have $dt_i = \text{tariff}_{1988} - \text{tariff}_{1998} \geq 0$. Note that measuring tariff reductions in this way implies that β is positive if trade liberalization leads to increases in M&A activity.[14]

---

[13]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 85%). 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.

[14]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

The identifying assumption I will initially make (but later relax) is that all other determinants 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).[15] 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.

---

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?). In any case, 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. See appendix B.1 for a brief discussion of the very similar results obtained when using tariff reductions pre and post CUSFTA

[15] 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.

5.3 Robustness Checks

Control Variables   As a first robustness check, I introduce European Union M&A activity in the same period as an additional regressor. This will help controlling for time- and industry-varying M&A determinants besides tariff cuts which would not have been picked up by the fixed effects in my first specification. 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).[16]

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%.[17]

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. $dt_i = \log(\text{tariff}_{1988} - \text{tariff}_{1998})$ rather than $dt_i = \text{tariff}_{1988} - \text{tariff}_{1998}$.[18] The second measure is a

---

[16] 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.

[17] Note that it would be inappropriate to directly include industry-level variables like output, employment, the number of firms, capacity utilization 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 tariff reductions (see Trefler, 2004, and Head and Ries, 1999). I have however experimented with business cycle controls as in Trefler (2004). That is, I ran sector-level regressions of M&A activity on present and past business cycle conditions (GDP growth, real exchange rates) and used the predicted values as additional controls in my regressions. While these predicted values have themselves strong explanatory power, their correlation with tariff reductions is low and their inclusion does not affect any of the conclusions presented here (results available from the author).

[18] A log specification is indeed what one obtains from a fully specified model of M&A activity and trade liberalization (see Appendix A). I focus on the absolute tariff change in the following since results from this approach are more

binary indicator taking the value one if an industry is among the 50% of industries with the highest tariff cuts, i.e. $dt_i = 1(|dt_{it}| > dt_{50\%})$. 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 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, block 4 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 15.5% increase in M&A activity per percentage point tariff cut compared to 11.1% above). Estimates for

---

easily interpreted. The qualitative results of the following robustness checks hold equally for both log changes and the binary indicator (results available from the author upon request).

the other M&A categories remain insignificant although the point estimates for Canadian acqui-sitions 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 2 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 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, d_t are period-specific intercepts and $dt_i = \text{tariff}_{1988} - \text{tariff}_{1998}$ as before.

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.[19]   Point estimates do remain relatively large, however, and statistically significant for the 1994-1998 period. One potential explanation is that acquirers tend to space acquisitions over time since M&A involves substantial (convex) adjustment costs. Combined with the fact that over 50% of acquirers made more than one acquisition in 1985-2003, this might help explain the stretched-out response observed. 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 if discount rates for future profits are positive).

Turning to the remaining categories, results are again insignificant for all periods although the

---

[19]A simple F-test rejects the hypothesis $\beta_1 = \beta_3$ at the 2% level. I have also experimented with using 1999-2003 as my control period in addition to, or in place of, the original 1985-1988 period. While using 1999-2003 as a control period is problematic for reasons discussed below, results are qualitatively robust to this change (estimates for 1989-1993 are always statistically significant at at least the 2% level).

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.

Transaction Value Regressions   I now present additional results using total transaction values instead of 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 to 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):

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

Despite the use of value data rather than counts, Poisson is still the preferred estimation method (Wooldridge, 2002). This is since Poisson can accomodate zero values of the dependent variable while only requiring the conditional mean to be correctly specified for consistent estimation.[20]

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 the sample used (value data availability is significantly better for this subgroup). 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). 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

---

[20]Results for Tobit regressions - which also address the issue of frequent zeros on the left-hand side - yielded qualitatively similar results (point estimates were around 50% larger in absolute terms but significance levels comparable to the Poisson results). I prefer the Poisson estimates reported below since consistency of Tobit relies on normality of the underlying latent variable and is likely to be affected by the inclusion of my industry fixed effects (Wooldridge, 2002; also see Santos-Silva and Tenreyro, 2006, on additional advantages of Poisson estimation in a similar setting).

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 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.

Alternative Explanations for the Increase in Domestic Canadian M&A? I conclude my robustness checks by briefly discussing two alternative explanations for the strong increase in domestic Canadian M&A activity.

First, there might have been a relaxation in Canadian competition policy which was correlated with Canadian tariff reductions (e.g. because competition authorities took these reductions into account in their definition of the relevant market). Since the number of blocked acquisitions in Canada is very small compared to the number of completed transactions, however, this is unlikely to a quantitatively important factor. Also, while the stance of competition policy might in theory deter M&As without actually blocking many deals, documents and statements published by the Canadian Competition Bureau do not give any indication of significant post-CUSFTA changes.[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. Finally, even if CUSFTA had led to a substantial change in competition policy, this would not neccessarily be 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.

---

[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.

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

Another potential explanation for the surge in domestic Canadian M&A activity are sell-offs by U.S. multinationals of their local affiliates in Canada. This is again related to the tariff-jumping argument outlined earlier. With lower Canadian tariff barriers, the incentives for U.S. firms to maintain production capacity in Canada are reduced. Since their affiliates in Canada would be listed as Canadian firms in Thomson, a sell-off of these affiliates to other Canadian firms would show up as domestic Canadian M&A activity. Again, however, this explanation is unlikely to be quantitatively important. This can be directly verified in my data given that Thomson provides the nationality of a target's ultimate parent. Indeed, only about 7% of Canadian targets have ultimate parents in the U.S., i.e. are affiliates of U.S. based multinationals. Excluding these targets from the analysis leaves my results unchanged.

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 (see Appendix B.2 for details on the construction of these variables).

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.[23] 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 income and returns to shareholders (columns 2 and 3). 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. This is consistent with findings by Baggs and Brander (2006) who show that CUSFTA reduced profits for import competing Canadian firms but raised profits for exporters. Finally, acquirers are estimated to be 4.3% more productive than targets, with this difference again being highly statistically significant.

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:

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

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

---

[23] 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).

shareholders are again lower for acquisition targets, although the difference is much smaller and not significant for Canada-by-U.S. acquisitions. Most interesting, 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 36% more productive, respectively). For domestic U.S. transactions, the productivity advantage of acquirers is somewhat lower (4.5%) but still highly statistically 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 change any of the above conclusions.

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 363 Canadian and 6584 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.

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 companies. The resulting figures show that while reductions at existing firms are the most important channel, M&As are responsible for about 25-35% of job transfers 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.[24] 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

---

[24]These figures are likely to be underestimates of the true extent of resource transfers through both M&A and bankruptcy/liquidation. For example, sell-offs and closures of individual plants will show up under the "reduction at continuing firms" category (exit through M&As or bankruptcy/liquidation in Compustat only occurs if the entire firm is acquired or goes bankrupt). See appendix B.2 for details.

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 estimate 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 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.[25]

The findings presented in this paper suggest a number of important areas for further research. A particularly promising extension would be to investigate in more detail how M&As compare to the alternative adjustment channels of exit and internal expansion or contraction. For example, what firm and industry characterstics determine whether adjustment takes place through M&A

---

[25]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).

or factor markets? Is it the least profitable firms that go bankrupt while slightly more profitable ones are acquired? What happens after takeover and how significant is the ensuing restructuring process? Secondly, the complex nature of the results shown here also represent a challenge for future theoretical work. To my knowledge, no existing theoretical framework is capable of accomodating all or even most of the salient features of international M&A activity highlighted in this study (in particular, the different reactions of domestic vs. cross-border M&A, the importance of both inter- and intraindustry M&A, the role of asymmetric country size or the dynamic aspects of M&A activity in response to trade shocks). Modelling these features would be of great help in improving our understanding of the underlying mechanisms, their welfare implications as well as their relevance in other settings (e.g. in developing countries).

References

[1] Andrade, G., M. Mitchell and E. Stafford (2001), "New Evidence and Perspectives on Mergers", Journal of Economic Perspectives, 15, 103-120.

[2] Andrade, G. and E. Stafford (2004), "Investigating the Economic Role of Mergers", Journal of Corporate Finance, 10, 1-36.

[3] Baggs, J. (2005), "Firm Survival and Exit in Response to Trade Liberalization", Canadian Journal of Economics, 38(4), 1364-1383.

[4] Baggs, J. and J.A. Brander (2006), "Trade Liberalization, Profitability, and Financial Leverage", Journal of International Business Studies, 37(2), 196-211.

[5] Bernard, A.B., J. Eaton, J.B. Jensen and S.S. Kortum (2003), "Plants and Productivity in International Trade", American Economic Review, 93(4), 1268-1290.

[6] Bernard, A. and J.B. Jensen (2004), "Why some firms export", Review of Economics and Statistics, 86, 561-569.

[7] Bernard, A., S. Redding and P. Schott (2007), "Comparative Advantage and Heterogeneous Firms", Review of Economic Studies, 74, 31-66.

[8] Bertrand, O. and H. Zitouna (2006), "Trade Liberalization and Industrial Restructuring: The Role of Cross-Border Mergers and Acquisitions", Journal of Economics and Management Strategy, 15(2).

[9] Bjornvatn, K. (2004), "Economic Integration and the Profitability of Cross-Border Mergers and Acquisitions", European Economic Review, 48, 1211-1226.

[10] Brander, J. (1991), "Election Polls, Free Trade and the Stock Market: Evidence from the 1988 Canadian General Election", Canadian Journal of Economics, 24(4), 827-843.

[11] Brealey, R. and S. Myers (2000), "Principles of Corporate Finance", McGraw-Hill.

[12] Canadian Competition Bureau (1991), "Merger Enforcement Guidelines 1991", available at http://www.competitionbureau.gc.ca.

[13] Canadian Competition Bureau (2002), "Merger Enforcement Guidelines 2002", available at http://www.competitionbureau.gc.ca.

[14] Chudnovsky, D. (2000): "Industrial restructuring through mergers and acquisitions: The case of Argentina in the 1990s," Transnational Corporations, 9, 33-58.

[15] Copeland, T., F. Weston, K. Shastri (2003), "Financial Theory and Corporate Policy", Addison-Wesley, Boston.

[16] Davis, S., J. Haltiwanger, and S. Schuh (1996), "Job creation and destruction", MIT Press, Cambridge, Mass.

[17] di Giovanni, J. (2005), "What Drives Capital Flows? The Case of Cross-Border M&A Activity and Financial Deepening", Journal of International Economics, 65, 127-149.

[18] Dutz, M. (1989), "Horizontal Mergers in Declining Industries - Theory and Evidence", International Journal of Industrial Organization, 7, 11-33.

[19] Falvey, R., D. Greenaway and Z. Yu (2004), "Intra-Industry Trade between Asymmetric Countries with Heterogeneous Firms", GEP Research Paper 2004/05, University of Nottingham.

[20] Fernandes, A. (2003), "Trade Policy, Trade Volumes and Plant Level Productivity in Colombian Manufacturing Industries", World Bank Policy Research Working Paper 3064.

[21] Görg, Holger (2000), "Analysing Foreign Market Entry: The Choice between Greenfield Investment and Acquisitions", Journal of Economic Studies, 27(3), 473-486.

[22] Government of Canada, Department of Finance (1988), "Trade Barriers Between Canada and the United States", Department of Finance Working Papers.

[23] Greenaway, D., J. Gullstrand and R. Kneller (2005), "Surviving Globalisation", GEP Research Paper 2005/19, University of Nottingham.

[24] Gu, W., G. Sawchuk and L. Whewell (2003), "The Effect of Tariff Reductions on Firm Size and Firm Turnover in Canadian Manufacturing", Economic Analysis Research Paper 014, Statistics Canada.

[25] Head, K. and J. Ries (1999), "Rationalization Effects of Tariff Reductions", Journal of International Economics, 47(2), 295-320.

[26] Horn, H., and L. Persson (2001): "The Equilibrium Ownership of an International Oligopoly," Journal of International Economics, 53, 307-333.

[27] Jensen, M. (1993), "The Modern Industrial Revolution, Exit, and Control Systems", Journal of Finance, 48, 831-880.

[28] Jovanovic, B. and P. Rousseau (2002), "The Q-Theory of Mergers," American Economic Review, 92, 198-204.

[29] Jovanovic, B. and P. Rousseau (2004), "Mergers as Reallocation", mimeo, Vanderbilt University.

[30] Kaplan, S. (ed., 2000), "Mergers and productivity", NBER Conference Report, University of Chicago Press, Chicago.

[31] Lester, J. and T. Morehen (1987), "New Estimates of Canadian Tariff Rates by Industry and Commodity", Canadian Department of Finance Working Paper No. 88-2.

[32] Maksimovic, V. and G. Phillips (2001), "The Market for Corporate Assets: Who Engages in Mergers and Asset Sales and Are There Efficiency Gains?", Journal of Finance, 56(6), 2019-2065.

[33] Melitz, M.J. (2003), "The Impact of Trade on Intra-Industry Reallocations and Aggregate Industry Productivity", Econometrica, 71, 1695-1725.

[34] Melitz, M.J. and G.I.P. Ottaviano (2005), "Market Size, Trade, and Productivity", mimeo, Harvard University.

[35] Mitchell, M. and J. Mulherin (1996), "The Impact of Industry Shocks on Takeover and Restructuring Activity", Journal of Financial Economics, 41, 193-299.

[36] Morck, R., D. Strangeland and B. Yeung (1998), "Inherited Wealth, Corporate Control and Economic Growth: The Canadian Disease?", NBER Working Paper 6814.

[37] Mulherin, J. and A. Boone (2000), "Comparing Acquisitions and Divestitures", Journal of Corporate Finance, 6, 117-139.

[38] Neary, P.J. (2007), "Cross-Border Mergers as Instruments of Comparative Advantage", forthcoming, Review of Economic Studies.

[39] Nocke, V. and S. Yeaple (2007), "Cross-Border Mergers and Acquisitions versus Greenfield Foreign Direct Investment: The Role of Firm Heterogeneity", Journal of International Economics, 72(2), 336-365.

[40] OECD (2001), "New Patterns of Industrial Globalisation: Cross-border mergers and acquisitions and strategic alliances", Organisation for Economic Co-operation and Development, Services and Trade group, Paris.

[41] Pavcnik, N, (2002), "Trade Liberalization, Exit, and Productivity Improvements: Evidence from Chilean Plants", Review of Economics and Statistics, 69, 245-276.

[42] Roberts, M.J. and J.R. Tybout (1997), "What Makes Exports Boom?", Directions in Development Series, World Bank, Washington D.C.

[43] Rodríguez, F. and D. Rodrik (2001), "Trade Policy and Economic Growth: A Skeptic's Guide to the Cross-National Evidence", Macroeconomics Annual 2000, eds. Ben Bernanke and Kenneth S. Rogoff, MIT Press for NBER, Cambridge, MA.

[44] Santos Silva, J. and S. Tenreyro (2006), "The Log of Gravity", forthcoming, Review of Economics and Statistics.

[45] Topalova, P. (2004), "Trade Liberalization and Firm Productivity: The Case of India", IMF Working Paper 04/28.

[46] Trefler, D. (2004), "The Long and Short of the Canada-U.S. Free Trade Agreement", American Economic Review, 94(4), 870-895.

[47] Tybout, J.R., J. de Melo and V. Corbo (1991), "The Effects of Trade Reforms on Scale and Technical Efficiency", Journal of International Economics, 31(3-4), 231-50.

[48] Tybout, J.R. and Westbrook, M.D. (1995), "Trade Liberalization and the Dimensions of Efficiency Change in Mexican Manufacturing Industries", Journal of International Economics, 39(1-2), 53-78.

[49] Tybout, J. (2001=, "Plant and Firm-Level Evidence on New Trade Theories", in E. Kwan Choi and James Harrigan (ed.), Handbook of International Trade, Oxford: Basil-Blackwell, and NBER Working Paper 8418.

[50] Wooldridge, J.M. (1999), "Distribution-free Estimation of some nonlinear Panel Data Models", Journal of Econometrics, 90, 77-97.

[51] Wooldridge, J.M. (2002), "Econometric Analysis of Cross Section and Panel Data", MIT Press, Cambridge, Massachusetts.

A A Simple Model of Trade Liberalization and M&A Activity

This appendix formalizes the key insights of the discussion in section 2. I start with the simplest modelling framework (within-industry adjustment following a trade liberalization between two symmetric countries). I then move on to discuss the various extensions mentioned in section 2.

A.1 Model Setup and Initial Equilibrium

Following Melitz (2003) and Jovanovic and Rouseau (2002), I analyze a setting with two symmetric countries in which M&As are used to transfer capital between firms with different productivity levels. I start in an initial steady state equilibrium in which firms have already acquired the optimal capital stocks associated with the prevailing level of trade costs. I then shock this equilibrium by an unanticipated lowering of trade barriers which triggers a transfer of capital via M&As from non-exporters to exporters (i.e. from less productive to more productive firms).

In each of the two countries, firms produce differentiated varieties under monopolistic competition. Constant per-period demand in the initial steady state is generated by standard CES preferences:

$$u(q) = \left[\int_{\gamma \varepsilon \Gamma} q(\gamma)^{\frac{\sigma-1}{\sigma}} d\gamma \right]^{\frac{\sigma}{\sigma-1}}$$

where Γ is the set of varieties available (both domestically produced and imported) and $q(\gamma)$ is consumption of any given variety. Utility maximization by consumers yields demand (q) and expenditure levels (r) of any variety γ as $q(\gamma) = p(\gamma)^{-\sigma} P^{\sigma-1} E$ and $r(\gamma) = p(\gamma)^{1-\sigma} P^{\sigma-1} E$. In these expressions, $p(\gamma)$ is the price of variety γ, $\sigma > 1$ the elasticity of substitution between any

two varieties and P the CES price index defined as $P = \left[\int_{\gamma \varepsilon \Gamma} p(\gamma)^{1-\sigma} d\gamma\right]^{\frac{1}{1-\sigma}}$. Total expenditure E consists of aggregate profits only which I normalize to one in the following.

Turning to the supply side, I assume for simplicity that varieties are produced using non-depreciating capital (k) as the only factor of production. Firms are heterogenous in productivity levels (φ) and the amount of capital required to produce a given amount of output (q) is given by $k = \frac{q}{\varphi} + F$. This production function implies a minimum capital stock of F which firms need to acquire in order to enter the market.

Both economies are endowed with a fixed capital stock of K which is owned by firms. Capital is traded on an M&A market at a price of $i/(1 - \delta)$ where δ is the exogenously given and time-invariant discount factor (and i is thus the amortized per-period cost of acquiring one unit of capital). Writing the M&A price in this way facilitates the comparison of lifetime revenues and costs needed below for the firms' optimization problem. Capital acquired on the M&A market takes on the acquirer's productivity φ after acquisition but I assume that the target's variety cannot be used.[26] Note that it would be straightforward to allow for internal investment or a market for used capital as additional channels through which firms can adjust their capital stocks. Since none of the principal findings would be changed by these extensions, however, I prefer to stick to the more tractable model outlined here.[27]

As said, I consider an initial steady state equilibrium in which no firm has an incentive to exit or enter the market or change its capital stock level. First consider the determination of the optimal capital stock of active firms in this equilibrium. With every unit of capital firms hold in addition to F, they can generate per-period revenues of $p\varphi$ but face opportunity costs of $i/(1 - \delta)$ since they could also offer their capital for sale on the M&A market. Since every firm is a monopolist for its variety, it chooses a price-output combination that maximizes total discounted profits, given by $\pi_T(\varphi) = \frac{pq}{1-\delta} - \left(\frac{q}{\varphi} + F\right)\frac{i}{1-\delta}$. The optimal levels of prices and per-period output are thus $p(\varphi) = \frac{\sigma}{\sigma-1}\frac{i}{\varphi}$ and $q(\varphi) = \left[\frac{\sigma}{\sigma-1}\frac{i}{\varphi}\right]^{-\sigma} P^{\sigma-1}$, requiring a capital stock of $k_d(\varphi) = \left[\frac{\sigma}{\sigma-1}i\right]^{-\sigma} \varphi^{\sigma-1}P^{\sigma-1} + F$.

In addition to selling domestically, active firms can also export to the foreign market. However, they incur variable "iceberg"-type trade cost in doing so, i.e. for every unit they ship only $1/\tau$ units arrive while the rest melts during transport. The corresponding export price is thus $p_x(\varphi) = \frac{\sigma}{\sigma-1}\frac{\tau i}{\varphi}$ and per-period exports are $q_x(\varphi) = \left[\frac{\sigma}{\sigma-1}\frac{\tau i}{\varphi}\right]^{-\sigma} P^{\sigma-1}$. In addition to incurring the variable trade costs measured by τ, exporters also have to make a one-time capital investment of F_x in order to serve the foreign market. Thus, total capital demand for export production is $k_x(\varphi) = \left[\frac{\sigma}{\sigma-1}i\tau\right]^{-\sigma} \varphi^{\sigma-1}P^{\sigma-1} + F_x$. Note that the investment F_x is needed in addition to the domestic setup capital F and can be thought of as adapting products to foreign standards, establishing local

---

[26] The assumption that productivity is owner-specific is standard in the theoretical literature on M&As to assure the profitability of mergers (e.g. Bjornvatn, 2004; Jovanovic and Rousseau, 2002). It is consistent with empirical observations for the U.S. that plant productivity increases after acquisitions by more productive owners and decreases if the acquirer's plants are less efficient on average (Maksimovic and Phillips, 2001). On the other hand, ruling out use of a target's variety eliminates incentives for the most productive firm to take over all remaining firms. This should be thought of as the limiting case of a model where firms face increasing costs for integrating new products or varieties into their operations.

[27] Internal investment could be introduced, for example, by allowing firms to employ labor from an additional sector to produce new capital. Distinguishing a market for used capital from the M&A market would be possible by introducing variable costs for adapting capital for sale. These additional forms of adjustment would put upper and lower bounds on the M&A price but would not eliminate resource transfers via M&As in reaction to trade liberalization.

distribution networks etc. (see Roberts and Tybout, 1997).

Given active firms' optimal capital stocks, it remains to determine the set of active firms. In each market, there is a large number (M_e) of potential entrants. Firm productivities are initially drawn at random from a cumulative distribution $V(\varphi)$ but all firms acquire knowledge about their productivity parameter φ before entry, i.e. before acquiring the minimum capital amount F or any additional capital.[28] Thus, only those firms will produce for which the sum of discounted future operating profits given by $\frac{pq}{1-\delta} - \frac{q}{\varphi}\frac{i}{1-\delta}$ is at least equal to the setup costs $Fi/(1-\delta)$. Similarly, only firms that can cover the fixed exporting cost $F_x i/(1-\delta)$ through future exporting profits will enter the export market. These two entry conditions can be used to obtain expressions for the threshold productivities at which production for the domestic and foreign market becomes profitable (denoted φ^* and φ_x^*, respectively). Here, however, my interest here is on the resulting levels of capital demand for domestic and export production (derivations and results on φ^* and φ_x^* are available from the author).

Demand for capital for domestic production (k_d) comes from all firms with $\varphi \geq \varphi^*$ while firms with $\varphi \geq \varphi_x^*$ need additional capital (k_x) to produce for the export market. To obtain explicit solutions for φ^*, φ_x^*, k_d, and k_x, I choose a specific distributional form for $V(\varphi)$. In line with other contributions in the heterogeneous firm literature (e.g. Melitz and Ottaviano, 2005), I let φ be Pareto-distributed, i.e. with cumulative density $V(\varphi) = 1 - \left(\frac{\kappa}{\varphi}\right)^a$, where $\kappa > 0$, $a > \sigma - 1 > 0$, and $\varphi \geq \kappa$. With these assumptions, I can determine the market clearing price $i/(1-\delta)$ and derive total capital stocks used for exporting and domestic production:

$$K_d = \int_{\varphi=\varphi^*}^{\infty} k_d(\varphi) M_e v(\varphi) \, d\varphi = K \left[1 + \tau^{-a}\left(\frac{F_x}{F}\right)^{\frac{\sigma-1-a}{\sigma-1}}\right]^{-1} \tag{5}$$

and

$$K_x = \int_{\varphi=\varphi_x^*}^{\infty} k_x(\varphi) M_e v(\varphi) \, d\varphi = K \left[1 + \tau^{a}\left(\frac{F_x}{F}\right)^{-\frac{\sigma-1-a}{\sigma-1}}\right]^{-1} \tag{6}$$

where $\frac{\sigma-1-a}{\sigma-1} < 0$ since by assumption $a > \sigma - 1 > 0$.

A.2 Bilateral Trade Liberalization

Now consider an unanticipated decline in variable trade costs τ. Similar to Melitz (2003), I focus on a comparison of the old and the new steady state equilibrium and in particular on the changes in capital allocation between the two equilibria. It is clear from (5) and (6) that the amount of capital used for domestic and export production will be different in the new equilibrium, with K_x increasing and K_d decreasing. Intuitively, increased presence of foreign exporters will lower revenues for local firms from production for the domestic market, implying lower returns to a firm's existing capital stock. Consequently, import competing firms offer part of their capital stock for sale on the M&A market and any firm with φ below the new entry threshold φ^* will use M&As to exit the market altogether. While trade liberalization thus leads to an increase of supply in M&A capital, it also increases capital demand for export production. This is since lower costs for accessing the

---

[28]Introducing uncertainty of potential entrants about their future productivity levels combined with an exogenous probability of firm death as in Melitz (2003) would allow generating continuous entry and exit of firms and steady state M&A activity (in the sense that entrants with insufficient productivity would want to immediately resell their assets). However, the basic intuition of trade liberalization leading to a reshuffling of resources to more productive firms can equally well be captured in the simpler model presented here.

foreign market imply larger market shares for exporters who in turn demand additional capital. Better access to foreign markets also lowers the minimum productivity level required for profitable exporting (φ_x^*), leading to an increase in the number of exporters.

Since the total capital stock per country is fixed at K, the price of capital will adjust such that any increase in export capital demand is offset by an equal decrease in capital demand for domestic production. Thus, the total amount of reallocation of capital into export production can be determined by differentiating either of expressions (5) or (6) with respect to τ. Opting for (5), I obtain:

$$dK_d = \frac{a\lambda K}{[1+\lambda]^2 \tau} d\tau > 0$$

where I defined $\lambda = \tau^{-a} \left(\frac{F_x}{F}\right)^{\frac{\sigma-1-a}{\sigma-1}} > 0$ as an overall measure of initial trade costs. The total amount of capital transfers is simply the absolute value of this derivative, i.e. $T = |dK_d|$. Since a, K, λ and τ are all positive, T can be written as:

$$T = \frac{a\lambda K}{[1+\lambda]^2 \tau} |d\tau| \tag{7}$$

That is, the amount of resource transfers via M&As is increasing in the magnitude of trade liberalization (as captured by $|d\tau|$).[29] Also note that capital is channelled from non-exporters to exporters. Since the presence of fixed exporting costs means that only the most productive among the active firms will export, the transfer of capital is in effect from less to more productive firms. Finally, note that revenues (r) and per-period profits net of capital costs (that is, $(1-\delta)\pi_T$) are increasing functions of productivity φ in this model. This implies that acquiring firms are also larger (in terms of sales) and more profitable than targets.

A.3   Econometric Specification

Before discussing different extensions to this baseline model, I will briefly show how the log-specification used as a robustness check in section 5.3 can be immediately derived from (7). First define proxies for T and $|d\tau|$ in accordance with section 5.2. That is, I use the number of M&A transactions (MA) as proxy for T. Next, variable trade costs τ are of the iceberg-type in the model. They thus relate to tariffs tar as $\tau = 1 + tar$ which implies $d\tau = dtar$. Accordingly, my measure for $|d\tau| = |dtar|$ will be the absolute change in tariffs from the pre-CUSFTA year of 1988 to the last year of tariff cuts (1998). As $dtar \leq 0$ for all sectors, this absolute change is $|dtar| = -dtar = $ tariff$_{1988}$-tariff$_{1998} = dt$ (the measure used in section 5.2). With these choices of proxies, I can write my specification as:

$$MA = \frac{a\lambda K}{[1+\lambda]^2 \tau} dt \tag{8}$$

Next, rewrite the right-hand side of this equation in exponential form:

---

[29]Note that interpreting the whole of T as M&A activity assumes that the export and domestic production unit of a firm sell or acquire all of their capital through the M&A market. Alternatively, one could assume that exporters reallocate capital internally from domestic to export production and acquire only the shortfall on the M&A market. While this assumption considerably complicates the analysis, the principal results on which I will rely for my empirical analysis will remain unchanged: M&A activity is increasing in $|d\tau|$, and $|d\tau|$ enters the reallocation volume T multiplicatively (results available from the author upon request).

$$MA = \exp(\ln a + \ln K + \ln \frac{\lambda}{[1+\lambda]^2 \tau} + \ln dt) \tag{9}$$

Finally, assume that the various components of (9) besides dt are either time or industry invariant and can thus be captured by time and industry fixed effects (d_i, d_{pre} and d_{post} as before). This then yields a conditional mean identical to the log-specification used in section 5.3:

$$E(MA_{it}|dt, d_i, d_t) = \mu_{it} = \exp(d_i + d_{pre} + d_{post} + \beta \times d_{post} \ln dt_{it})$$

A.4 Extensions

The most straightforward extension of the above model is to allow for asymmetric countries. The only adjustment necessary is the introduction of a freely tradable numeraire good to fix the price of capital and to allow the derivation of closed form solutions (compare, for example, Melitz and Ottaviano, 2005).

Allowing for cross-sector acquisitions is more intricate since it requires the introduction of at least one additional sector. The easiest framework here is a two sector model in which firms can use production capacity in the other sector at their own productivity level φ but first have to make an investment I to acquire the necessary sector-specific production know-how (this would be in addition to F). If the productivity of an acquirer from the non-liberalizing sector is high enough to be an exporter in the liberalizing sector, a lowering of trade costs can raise its potential profits above the threshold I and trigger entry.

Finally, allowing for cross-border acquisitions as well requires formalizing the trade-off between decreased reservation prices of target firms and better export access to the foreign market. This is conceptually straightforward in that it only requires comparison of the net present values of exporting vs. acquisition. The exact predictions, however, can be sensitive to assumptions about market structure and the functional form of variable and fixed trade costs (see Bertrand and Zitouna, 2006, and Bjornvatn, 2004, for two recent modelling approaches).

B Data Appendix

B.1 Linking Tariff and M&A Data

The tariff data in this paper were provided to me by Keith Head and were 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 since the above publications do not contain data for 1985 and 1986, tariffs for these years are interpolated from earlier years in my data. Similar to other studies (e.g. Gu et al., 2003), my interpolated data indicate that changes in 1985-1988 are 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. This also avoids problems with the low time variation of the binary tariff-reduction measure and the appropriate time structure of the impact of tariff cuts in the post-adjustment analysis (compare section 5.3 and footnote 15). In any case, using my interpolated data in regressions with absolute tariff reductions pre and post CUSFTA yields very similar results to the ones presented in this paper (point estimates are around 10% bigger in absolute terms with almost identical significance levels; for example, the estimated effect of a one percentage point tariff cut on Canadian M&A activity in my baseline specification is 12.05% as opposed to 11.06% in the reported results).

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. Aggregation also reduces the likelihood of misclassification of M&A transactions into the wrong industries due to differences in primary and secondary activities (most secondary 4-digit SIC codes fall into the same 3-digit category as a target's primary activity).

B.2   Compustat Data

Comparison of Targets and Acquirers   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 under the accounting principles used in Compustat, 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, labor 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.

Quantitative importance of M&As   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 (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", "exit by bankruptcy (chapter 11)", or "exit by liquidation (chapter 7)" 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/liquidation).

Note that sell-offs and closures of individual plants will show up under the "reduction at continuing firms" category since exit through M&As or bankruptcy/liquidation in Compustat only occurs if the entire firm is acquired or goes bankrupt. Also, companies which are granted bankruptcy protection (chapter 11) will remain in Compustat if they continue to file public financial reports. On the other hand, firms that reemerge from chapter 11 protection after at least 15 months without financial reporting will be fully counted as "transfers via bankruptcy/liquidation" (even though the firm will usually keep a significant part of its workforce and total sales). Taken together, these considerations suggest that the figures presented in section 7 are a lower bound for transfers via M&A and probably for bankruptcy/liquidation as well.

C   Figures and Tables

Table 1: Descriptive Statistics on Target Industries (1985-1998)

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 (1985-1998)

Sector	(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 (%)
		United States				Canada		
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 (1985-1998)

	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-CUSFTA period (d_{post}) and the absolute change in industry tariffs 1988-1998 ($\Delta tariff$), interacted with the post-CUSFTA period-dummy. 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 (1985-1998)

	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(Δtariff)	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 ($\Delta tariff$), interacted with the post-CUSFTA period dummy: line 2 uses logs of absolute changes, i.e. log($\Delta tariff$), 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 (1985-1998)

	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.
1) Exclud. 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)
2) Includ. 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)
3) 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)
4) 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)

Regressor	Dependent Variable: Number of Takeovers			
	(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. +, * and ** indicate statistical significance at the 10%, the 5% and the 1%-level, respectively.

Table 8: Comparison Acquirers – Targets (1985-1998)

Specifi-cation	Regressors	(1) Net sales (logs)	(2) Pretax income per net sales (USD)	(3) Return to shareholders (% points)	(4) TFP (logs)	Industry dummies?
(1)	Target dummy	-1.657	-0.432	-12.500	-0.043	No
		(37.90)**	(5.95)**	(8.75)**	(2.53)*	
	R-squared	0.17	0.02	0.03	0.01	
(2)	Target CAN by CAN	-1.417	-0.256	-13.511	-0.144	No
		(10.59)**	(2.57)*	(2.85)**	(2.33)*	
	Target U.S. by U.S.	-1.657	-0.446	-12.418	-0.045	
		(35.70)**	(5.77)**	(8.34)**	(2.56)*	
	Target U.S. by CAN.	-1.582	-0.426	-23.605	0.206	
		(7.97)**	(2.50)*	(2.63)**	(2.34)*	
	Target CAN by U.S.	-2.209	-0.389	-1.587	-0.357	
		(11.10)**	(2.43)*	(0.16)	(3.53)**	
	R-squared	0.17	0.03	0.03	0.03	
(3)	Target CAN by CAN	-1.447	-0.286	-12.142	-0.087	Yes
		(11.35)**	(2.90)**	(2.51)*	(2.29)*	
	Target U.S. by U.S.	-1.676	-0.420	-11.102	-0.030	
		(39.52)**	(6.32)**	(7.24)**	(2.48)*	
	Target U.S. by CAN.	-1.597	-0.385	-20.350	0.115	
		(8.48)**	(2.21)*	(2.19)*	(1.80)+	
	Target CAN by U.S.	-2.33	-0.375	-0.065	-0.131	
		(13.29)**	(2.48)*	(0.01)	(1.69)+	
	R-squared	0.31	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	363		6584		6947	
Firms exiting via bankruptcy or M&A (number and % of active firms)	59	16.3%	1802	27.3%	1861	26.8%
- Bankruptcy/Liquidation (number and % of total exit)	5	8.5%	315	17.5%	320	17.2%
- M&A (number and % of total exit)	54	91.5%	1487	82.5%	1541	82.8%

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)	1051.2	16732.8	17784.0
(2) Gross job reductions at continuing firms ('000s)	52.7	860.9	913.6
(3) Job reductions through bankruptcy/liquidation ('000s)	0.5	14.0	14.5
(4) Job transfers through M&A ('000s)	15.7	333.1	348.8
(5) Total job transfers ('000s) – sum of (2)-(4)	68.9	1208.0	1276.8
(6) Total job transfers as % of employment – (5)/(1)	6.6%	7.2%	7.2%
(7) M&A as % of total job transfers – (4)/(5)	22.8%	27.6%	27.3%
(1) Total output (mill. 1995 USD)	170,721	3,321,319	3,492,040
(2) Gross output reductions at continuing firms (mill. 1995 USD)	8,457	118,082	126,538
(3) Output reductions through bankruptcy/liquidation (mill. 1995 USD)	93	1,728	1,821
(4) Output transfers through M&A (mill. 1995 USD)	3,858	63,725	67,583
(5) Total output transfers (mill. 1995 USD) – sum of (2)-(4)	12,408	183,535	195,942
(6) Total output transfers as % of output – (5)/(1)	7.3%	5.5%	5.6%
(7) M&A as % of total output transfers – (4)/(5)	31.1%	34.7%	34.5%

Notes: Table shows the amount of job and output transfers via contraction at continuing firms and via exit by bankruptcy/liquidation and M&A in 1985-1998. "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 data sources and construction).

Figure 1: Aggregate Number of M&A Transactions, 1985-1998
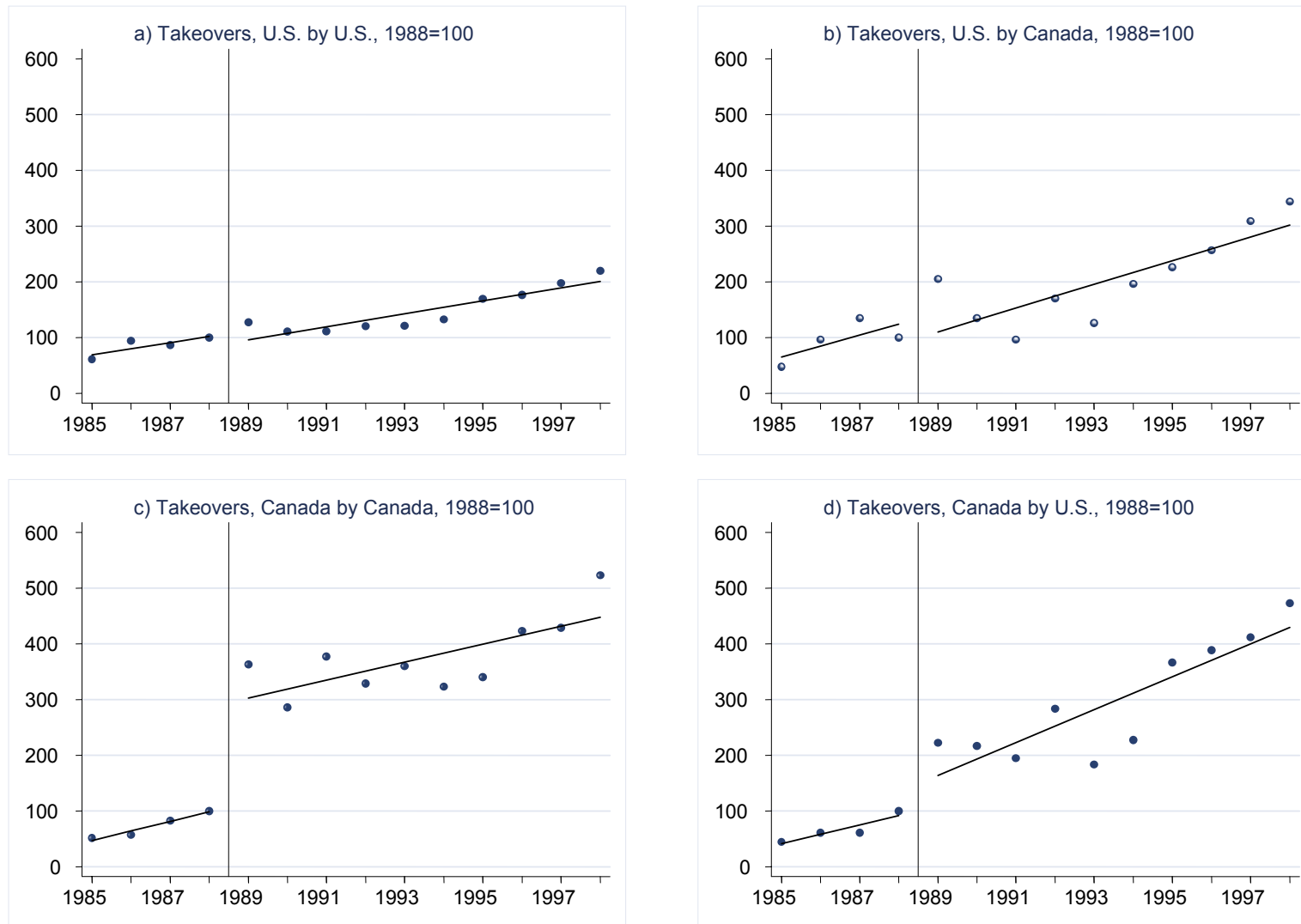
Notes: Figures show the number of takeovers of firms with primary activity in manufacturing, expressed as indices relative to 1988. Acquirers can have primary activities within or outside manufacturing (see table 2 for a breakdown of acquirers' primary industries). The four graphs give numbers for four 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
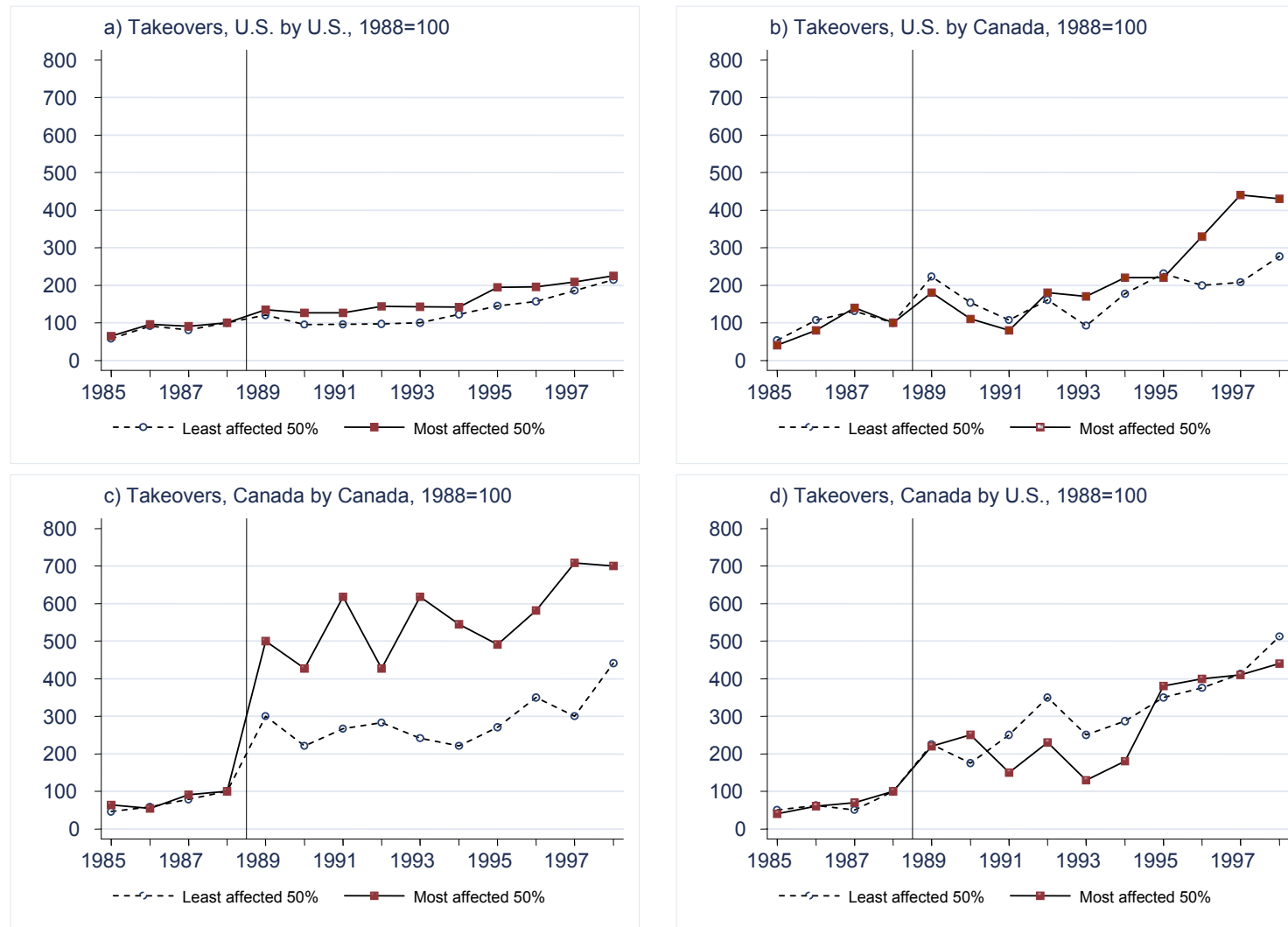
Notes: Figures show the number of takeovers of firms with primary activity in manufacturing, expressed as indices relative to 1988. Acquirers can have primary activities within or outside manufacturing (see table 2 for a breakdown of acquirers' primary industries). Each graph shows numbers for two groups of target industries: the 50% of industries with the highest and the 50% of industries with the lowest cuts in domestic tariffs from 1988-1998. 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.