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Heterogeneous firm-level responses to trade liberalization: A test using stock price reactions☆

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ABSTRACT

This paper presents novel empirical evidence on key predictions of heterogeneous firm models by examining stock market reactions to the Canada–United States Free Trade Agreement of 1989 (CUSFTA). I derive testable predictions for a class of models based on Melitz (2003). Using the uncertainty surrounding CUSFTA's ratification, I show that the pattern of abnormal returns of Canadian manufacturing firms was strongly consistent with predictions related to export (U.S.) tariff reductions, but less so with predictions related to import (Canadian) tariff reductions. Lower Canadian tariffs did have an effect through the implied reduction in intermediate input tariffs, however.

1. Introduction

The last decade has seen a revolution in the theoretical analysis of trade liberalization episodes. Since the seminal contribution by Melitz (2003), models with heterogeneous firms have all but replaced traditional modeling approaches with homogeneous firms. The key innovation of Melitz and subsequent extensions was to show how trade liberalization leads to aggregate productivity gains through intra-industry reallocation. The mechanism underlying this reallocation is the differential impact of trade liberalization on exporting and non-exporting firms. While exporters benefit from increased access to foreign markets, non-exporters suffer lower profits due to increased product and factor market competition. Together with the assumption that exporters are more productive than non-exporters, the ensuing reallocation of market shares towards exporting firms raises aggregate productivity.

Many of the assumptions and predictions of heterogeneous firm models are consistent with evidence from a large empirical literature which has emerged over the years. The strongest evidence is available for the productivity advantage of exporters, and for the self-selection of more productive firms into export markets (e.g., Bernard et al., 2007).[1] Tybout (2001) summarizes several papers which show that trade liberalization episodes were accompanied by market share reallocations. A smaller literature also provides more direct evidence on the impact of lower trade costs on the reallocation of market shares between exporters and non-exporters (e.g., Trefler (2004), Bernard et al. (2006)).[2]

A common feature of all empirical studies to date is their ex-post character. That is, they track the firm- or sector-level variables of interest for a number of years and try to isolate the impact of trade policy changes from a large number of confounding factors. Depending on the specific setting of the liberalization episode, this can pose considerable econometric challenges (see, for example, Tybout, 2001).

In this paper, I take a different approach to providing evidence for the differential impact of trade liberalization across firms. I do so by using stock market reactions surrounding the implementation process of the Canada–United States Free Trade Agreement of 1989 (henceforth,

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[1] A few studies have also found productivity gains from exporting (e.g., De Loecker, 2007), or have noted that exporting and productivity-increasing investments are complementary activities (e.g., Bustos, 2011). But even in this literature, the consensus is that new and existing exporters are more productive to begin with than firms which remain non-exporters.

[2] See Burstein and Cravino (2014) and Breinlich and Cuñat (2013) for the predictions of trade models with heterogeneous firms with respect to *measured* productivity, i.e., productivity as measured in the data used by the empirical studies cited above.

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CUSFTA). Under the assumption that unanticipated changes in the likelihood of CUSFTA's implementation are sufficiently rapidly reflected in stock prices, price reactions contain information about changes in future profits and can be used to test heterogeneous firm models.

The key advantage of such an event study approach over traditional ex-post evaluations is that the number of confounding factors is much more limited. Only factors about which expectations change during my one- to two-day event windows will have the potential to contaminate the estimates. Secondly, from a conceptual point of view, event studies present an interesting alternative to ex-post tests of heterogeneous firm models. These models essentially make predictions about changes in future per-period profits brought about by trade liberalizations. To the extent that expectations about these changes will be reflected in stock prices, analyzing price reactions will be conceptually closer to the models' theoretical predictions than looking at realized firm-level variables ex-post.[3]

CUSFTA is particularly well suited for providing evidence on heterogeneous firm models in general, and for event study evidence, in particular. First, CUSFTA was a clearly defined policy experiment in the sense that it was neither introduced in response to a macroeconomic shock nor part of a larger package of reforms (Trefler, 2004). Second, the main instrument of liberalization – tariff cuts – is easily quantifiable and has a direct theoretical counterpart in heterogeneous firm models. In addition, CUSFTA was a reciprocal agreement and is as such suitable for analyzing the differential impact of domestic and foreign tariffs. This distinction is a key element of many of the more recent heterogeneous firm models such as Melitz and Ottaviano (2008) or Chaney (2008). Third, as I will discuss in more detail below, the cross-sectoral variation in tariff cuts was both substantial and largely exogenous, allowing for the implementation of a difference-in-differences estimation strategy within my event study framework. Finally, and more specifically relevant for an event study, CUSFTA was the main election issue in the Canadian federal election of November 1988. Both the election itself as well as a number of events in its run-up provide unanticipated changes in the likelihood of CUSFTA's implementation which is essential for the successful implementation of an event study.

My analysis proceeds in two steps. I first show how stock price reactions can be used to test heterogeneous firm models, and use a simple model of this class based on Chaney (2008) to derive testable predictions for the remaining sections. I then proceed to a test of these predictions, using unanticipated changes in the likelihood of CUSFTA's implementation to analyze within-sector differences in abnormal stock market returns. In practice, my estimation strategy will compare the stock returns of firms which vary along a number of characteristics. I use firm size (as measured by sales) in most specifications but also look at employment, productivity and export status. In addition to improving data availability, such a broad-based approach has several advantages. First, heterogeneous firm models make predictions about stock market reactions of small vs large and less vs more productive firms, in addition to reactions of new and existing exporters vs non-exporting firms. As I explain below, using sales (or employment or productivity) in addition to export status also helps addressing the difficulty of identifying new exporters in the data and provides more direct evidence for the intra-industry reallocation predicted by models in the tradition of Melitz (2003).

My findings are broadly supportive of the predictions of heterogeneous firm models. The election victory of the ruling Progressive Conservatives (a strong supporter of CUSFTA) led to significant stock market gains of large relative to small firms (and of more productive relative to less productive, and exporting relative to non-exporting firms). In contrast, opinion polls in the run-up to the election showing a substantial lead for the oppositional Liberal Party (who were opposed to CUSFTA) resulted in the opposite stock market return differences.

In order to address the possibility that a Conservative election victory may have affected different types of firms differently through channels other than CUSFTA, I compare between-firm return differences across industries with different extents of tariff cuts. Consistent with theoretical predictions, I find that the relative gains and losses of larger (and more productive and exporting) firms were indeed significantly higher in sectors with larger U.S. tariff cuts. These results are robust to including a number of control variables such as changes in intermediate input tariffs and firms' multinational status.

As a further check on my results, I also examine stock market reactions to two earlier events which were directly related to CUSFTA but not the election itself: the reaching of an agreement on CUSFTA after difficult negotiations between the U.S. and Canada in October 1987; and the refusal of the Canadian Senate to ratify the agreement in July 1988. I again find that stock prices of larger firms increased relative to those of smaller firms in reaction to the first event, and decreased in response to the second event. As before, reactions were stronger in sectors with higher future U.S. tariff cuts. Finally, I also perform placebo checks by looking at stock market reactions on dates on which no new information about CUSFTA was revealed. Consistent with theoretical predictions, I do not find significant effects in these additional regressions.

My results are less conclusive with respect to the effects of reductions in Canadian import tariffs. Most results suggest that larger Canadian firms also gained relative to smaller firms in response to such tariff cuts. However, the corresponding coefficient estimates are generally small and have the wrong sign for some specifications and events. Interestingly, as I discuss below, these weaker results correspond to less clear-cut theoretical predictions of heterogeneous firm models with respect to import tariff liberalization (as opposed to export tariff reductions), in the sense that the predictions of existing models seem to partially depend on specific modeling assumptions such as demand and cost structures. Some of my results suggest, however, that Canadian tariff cuts *did* matter for differential profit responses through other channels, in particular through reductions in the intermediate input tariffs industries face.

While my main results are all of a qualitative nature, I also try to provide a sense of the quantitative importance and plausibility of the estimated return differences. To this end, I calculate the CUSFTA-induced change in the expected future profits of active firms implied by my estimates. Based on assumptions about the change in the likelihood of CUSFTA's implementation brought about by the Conservative election victory, I estimate that CUSFTA increased the within-industry difference in per-period profits of smaller and larger firms by around 6%–7% in the most plausible scenarios, and up to 14% under more extreme assumptions.

While stock market event studies are frequently employed in the corporate finance literature, they have rarely been used to test theories of international trade. Exceptions include Grossman and Levinsohn (1989), who use stock market returns to provide evidence in favor of the specific-factors model of trade, and a small number of papers which analyze stock market reactions to trade policy announcements concerning specific industries, such as the imposition of antidumping duties (e.g., Bloningen et al., 2004; Hartigan et al., 1986, 1989; Hughes et al., 1997).[4] To the best of my knowledge, the present paper is the first to analyze stock market reactions to a broad-based trade liberalization episode and link the results to recent theories of international trade.

[3] Looking at stock price reactions also brings additional challenges as compared to traditional ex-post approaches. By construction, my sample consists of publicly traded firms which are relatively large. The accounting data available for these firms is also incomplete as far as export status is concerned. A final concern is that stock market event studies present a joint test of both the theory in question and the efficient markets hypothesis (e.g., Campbell et al., 1997). Below, I present detailed arguments as to why none of these issues is likely to affect my results qualitatively, although they might make a quantitative interpretation more challenging.

[4] There are also a few studies which look at stock market movements during the Canadian election campaign from 1988 in different contexts. Together with the press coverage of the campaign and a number of political science studies, these inform my choice of events and are cited in more detail in Section 3 below.

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