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I've Been Everywhere (Except Mexico): Investor Responses to NAFTA's Cross-Border Trucking Provisions

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Abstract: We investigate the response of US trucking firms to the removal of barriers to cross-border trucking under NAFTA. This was done via a program implemented in 2007, cancelled in 2009, and reinstated in 2011. We find that, unsurprisingly, the program's start resulted in lower stock returns, particularly for border firms. However, later policy changes indicate that investors, and particularly those in US multinationals, viewed the pilot as beneficial. We use a model of endogenous exporting to show that this can arise from incorrect expectations of import competition.

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1. Introduction

A particularly controversial feature of NAFTA was a provision to allow cross-border trucking competition by 2000. Although trade negotiators tried to frame this as an opportunity for US firms due to the possibility to employ low-wage Mexican drivers for cross-border transport and, perhaps more importantly, by giving them access to sell (tariff-free) US manufactured and agricultural good in the US's second largest export market, the reaction by interests groups was vehemently negative. In short, groups such as the International Teamsters Union, felt that the competition from Mexican firms, with their low wage bills, would dominate any potential benefits. With this in mind, no cross-border trucking was permitted until the establishment of a pilot program called the "Demonstration Project" (henceforth the Project) in 2007 which allowed 100 operators to move in each direction. This paper uses event study methodology to examine the stock market reactions of 19 US trucking companies to the implementation of this pilot, its cancellation in 2009, and its eventual recommencement in 2011. Given the outcry prior to the Project, it is not surprising that we find that stock returns reacted negatively to its commencement. What is more interesting, however, is that the market also reacted negatively to its cancellation and then positively to its reinstatement. Such reversals in opinion could be linked to an inaccurate expectation of the ability of Mexican trucks to enter the US, expectations that are shown to be erroneous after the Project begins. This demonstrates the role that expectations and the lack of information has in attempts to reduce non-tariff barriers to trade, a feature at the forefront of contemporary trade negotiations.

In the initial provisions in 1994, NAFTA included a clause to allow cross-border trucking competition, first in border-states, and then in all of North America. Note that this only applied to cross-border trucking and not to trucking between locations in the other country; in fact, it is

still not permissible for a Mexican truck to pick up from one US location and deliver to another. Although the stated reason for the US's failure to comply with its NAFTA obligations was due to concerns over the safety of Mexican trucks, there is no denying the role of low Mexican wages in this.[1] Since the average wage of federally licensed Mexican drivers are as low as one-third that of US drivers, there was ample fuel in 2000 to feed the fire of anti-NAFTA forces.[2] Thus, while safety may have been one goal of continuing the barriers to Mexican trucks, it would be naïve to ignore the impact of wages on the Clinton administration's actions. Nevertheless, in 2001, a NAFTA dispute settlement panel found the US in violation of its NAFTA obligations, although Mexico nevertheless sought to assuage US safety concerns by incorporating US Congressionally mandated safety standards.[3] By November 2002, Mexico had successfully met the mandated safety conditions, but a suit over environmental compliance delayed cross-border trucking for another five years.[4] Finally, in September 2007, a trial period was initiated allowing up to100 Mexican carriers to operate in the US and 100 US operators in Mexico.[5] This pilot program, also known as the 'Demonstration Project,' was intended to calm critics still apprehensive over Mexican trucks in the US, and data collected during this trial period supported Mexico's claims that its trucks were safe.[6]

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[1] On December 17th, the day before the opening of cross-border trucking within border-states, President Clinton issued an executive order extending the moratorium on cross-border trucking (see MacDonald, 2009). Opponents of the open border provision, such as the International Brother of Teamsters union argued that Mexican Trucks were unsafe, polluted, and their drivers had insufficient training. See Edson (2010) for further discussion.

[2] See Frittelli (2010) page 20.

[3] These concerns were laid out in the FY2002 Department of Transportation Appropriations Act (P.L. 107-87) and included 22 safety-related pre-conditions established and evaluated by the US Department of Transportation (DOT).

[4] The suit claimed that DOT regulations did not prepare full environmental impact statements on the impact of Mexican trucks operating in the US, as required by the Clean Air Act (CAA). The US Supreme Court ultimately ruled that the DOT was not required to evaluate the environmental effects of Mexican truckers on US roads. See MacDonald (2009) for a description of the events involved in this dispute.

[5] Only 29 Mexican carriers actually participated during the first year of the demonstration project (see Frittelli, 2010). The program was renewed in September 2008 for a two year period in order to gather more data on Mexican truck safety, despite the high cost of monitoring Mexican Trucks.

[6] A report to the US Congress by the Congressional Research Service (CRS) stated that, "Mexican trucks are as safe as US trucks and that the [Mexican] drivers are generally safer than US drivers." See Frittelli (2010).

An important outcome of the Project, however, is that although 100 Mexican firms were permitted to operate in the US, uptake was remarkably low. As detailed by Fritelli (2010), only 29 out of 775 Mexican applications were approved. Further, out of these, two subsequently withdrew their applications and another two never actually crossed the border. Together, these firms made 12,516 border crossing, a mere .2% of the 4.8 million crossings in that year. Thus, opening the floodgates for Mexican trucks resulted in more trickle than torrent.[7] An oft-cited reason for this low uptake is that, in addition to the costly approval process, Mexican trucking firms also faced disadvantages when operating in the US, such as higher-priced and difficult to obtain US auto insurance, mandatory GPS installations to permit government tracking, required driver-training and trucks-improvements, and delays at the border due to gamma ray screenings and USDA food product examinations. Therefore these additional non-tariff barriers continued to act as a prohibitive challenge for most Mexican trucks even though the complete ban was reversed. Regardless of the reason, it is clear that the feared import competition failed to materialize. If the initial negative stock market reaction was based on import competition, then one would expect investors to be more positively (or at least less negatively) predisposed towards the Project *ex-post* than they were *a priori*.

The Project was cancelled, however, in March 2009 after Congress failed to renew its funding which was needed to carry out the inspection of Mexican trucks seeking entry to the US.[8] This, in turn, led to immediate Mexican retaliatory duties. In July 2011, the Obama administration announced plans to restart the Project. This finally occurred in October 2011, at which point Mexican trucks were finally again granted access to the US market and Mexican

[7] Similarly, only 10 US trucks took the opportunity to export to Mexico in the Project's first year, amounting to 2,245 trips. As discussed by MacDonald (2009), there was debate in Congress about limiting Mexican entry to ensure a balance in the number of firms moving in each direction.

[8] It was canceled on March 11, 2009 following passage of the Omnibus Appropriations Act (P.L. 111-8), which contained a provision to discontinue funding for the cross-border trucking pilot program.

duties were removed.[9] It is worth noting that in 2011 uptake by Mexican trucks was again low, with only thirteen Mexican firms operating in the US market since the Project's reinstatement (Dibble, 2014). Again, if investors had changed their perceptions based off of information revealed during the initial phase of the Project, then even those who were against it initially might also be against its cancellation as they revise their beliefs. Finally, as the first phase of the project revealed information about the likely (low) extent of Mexican competition, then investors would be more favorable to the recommencement of the Project than they were to its initial introduction.

Our empirical examination of investor responses uses an event study methodology which tests for abnormal returns in high-frequency data (stock returns in our case). Although not the most common approach to examining the impacts of trade policies, examples in the literature do exist. For example, Ries (1993) investigated the 1981 US auto voluntary export restraint (VER) with Japan, finding that share returns for Japanese carmakers and some parts suppliers rose in response to protection. Hughes et al. (1997) examined the effects of US trade policy governing semiconductors, analyzing the share returns of both the semi-conductor producers and their downstream consumers, such as computer and electronics firms. Empirical results suggest that, due to the existence of dynamic economies of scale linking semiconductor producers and their consumers, trade relief for semiconductor firms ultimately aided downstream users, and was therefore viewed favorably by their shareholders.[10] In addition, several papers, including and Liebman and Tomlin (2007, 2008), estimate the impacts of steel safeguards, both on steel firms

[9] Mexico implemented retaliatory duties on 89 US products on March 18, 2009. On August 18, 2010, Mexico extended its retaliatory list to 99 products. However, On July 6th, 2011, the US and Mexico signed an agreement allowing Mexican trucks to resume operations in the US as part of pilot program similar to the initial demonstration project. Following the signing of the agreement, Mexican retaliatory duties were reduced by 50%, and removed entirely on October 21, 2011, after the first Mexican truck was permitted into the US.

[10] Mahdavi and Bhagwati (1994) also use event study methodology to analyze the consequences of trade protection in the US semiconductor industry. They find that shareholders reacted negatively to AD investigations and positively to the Semiconductor Agreement of 1986.

and their downstream consumers. Desai and Hines (2004) look at the impact of retaliatory threats on beneficiaries of the US export subsidy program known as the Foreign Sales Corporation, which allowed firms to exempt profits generated from exports. Finally, Liebman and Tomlin (2012) study shareholder response to events related to the so-called Byrd Amendment (Continued Dumping and Subsidy Offset Act), which allowed dumping and countervailing duties to be distributed to the US firms that supported the original AD/CVD orders, finding that Byrd Amendment beneficiaries experienced greater reward in comparison to the share declines experienced by the US firms targeted with retaliation. Although, like our present study, all of these examine the effect of non-tariff barriers, it is worth noting that they focus on manufacturing. In contrast, to our knowledge, ours is first to study shareholder response to protectionism in a service industry. Given the relatively swift growth of trade in services and concerns over barriers to that trade, this is an additional contribution of our study.[11]

In the next section we present a simple model of the trucking industry intended to highlight why one might expect differences between *a priori* and *ex-post* attitudes to the removal of non-tariff barriers. Section 3 presents our methodology and the data, whereas Section 4 contains our results. Section 5 concludes.

2. A Simple Model of Trucking under NAFTA

In order to develop some hypotheses for our empirical section, here we present a simple model to illustrate how the pilot program which allowed cross-border trucking can affect the valuation of US firms. In particular, we want to show how investors' initially negative perceptions of the pilot's initial implementation can be quite different to those regarding its suspension and reinstatement. In order to match the four events examined in the empirics, we

[11] See Borchert, Gootiiz, and Mattoo (2013) for a recent review of the literature on barriers to services trade.

consider four periods: period 1 which is before the pilot program began, period 2 under the initial run of the pilot, period 3 when the pilot was suspended, and period 4 where it was reinstated.

Consider a set of firms, N of which reside in the US, and N^* of which reside in Mexico.[12] Each firm is exogenously endowed with two characteristics. The first of these is the quality of truck they operate.[13] Trucks can be high quality, which are approved for transport in both countries, or low quality, which can only be driven in Mexico. A fraction γ (γ^*) of US (Mexican) trucks are of high quality. By assumption $\gamma = 1 > \gamma^*$, i.e. all US trucks are eligible to drive in Mexico but the reverse is not true. The extent of this, however, is *a priori* unknown. Instead, all that is known by firms is that γ^* is distributed according to the cumulative distribution function $C^*(\gamma^*)$ with associated pdf $c^*(.)$. It is only once the pilot program commences and the market shifts to its new equilibrium that γ^* becomes clear to firms. Each truck can make at most one delivery, which can be either to the border (which is the only option without the pilot) or, when the pilot is in effect, to the ultimate destination in the other country. Note that since under the pilot firms are forbidden from carrying cargo from one location in the other country to another in the same country, we abstract from domestic shipping and concentrate only on international deliveries.

[12] We assume that this set of active firms is exogenous for simplicity. In a more general setting, we could allow the number of active firms to be endogenous. As is well established, the ability to export will drive the highest cost firms from the market, altering the equilibrium payoffs from exporting and thus the equilibrium increase in competition. This, while adding complications to the model, does not alter the qualitative result we are interested in. Further, as the number of active trucking firms in our sample is nearly constant (we have one firm enter the sample between the cancellation and restart of the pilot), this assumption may be fairly innocuous in light of our data.

[13] In a more complicated model, we consider the endogenous choice of truck with the cost of being linked to the fixed cost type. As discussed by Berwick and Farook (2003), the cost of the truck is a major component of a firm's cost and that this cost varies considerably across firms due to differential access to credit financing. This complication, although adding considerable length, does not alter the fundamental predictions of our model which is that firms with lower costs choose exporting and can benefit from the pilot program. Since the purpose of the model is to frame our hypotheses for the empirical section, we omit it for brevity.

The second item differentiating firms is the fixed cost of entering the other country. For US firm i , this is $F(i)$ which is distributed according to a cdf $G(.)$ with associated pdf $g(.)$. The index of firms is such that $F(i)$ is increasing in i. This cost represents the regulatory obstacles that must be satisfied to operate in the other country, examples of which include proof of language proficiency and the installation of GPS technology which permits the tracking of the vehicle.[14] Such heterogeneity can be driven by differences in familiarity with the region and its language, access to funding to implement the technical changes needed to cross the border, or simply heterogeneity in the ability to navigate the red tape surrounding cross-border firms. Those familiar with the Melitz (2003) literature on heterogeneous firms and trade will note that this heterogeneity is in the fixed cost component, however, given that each firm produces one unit of output, the two are comparable here.[15]

For each country that a US-based truck operates in, it incurs a cost w . This represents wages, fuel, and other costs. Thus, if the firm operates its truck only in the US, its cost is w, but if it exports its services and operates in both countries, it incurs $2w$. Similarly, a Mexican-based truck has a cost of $w^* < w$ for each country it operates in. As discussed by Berwick and Farooq (2003), wage costs are the dominant component of the variable costs of trucking. Thus, this ranking is driven by the prevailing low wage of Mexican drivers, which is one of the primary concerns for US firms lamenting Mexican competition.

Finally, in addition to the firm-specific trade costs, there is a second border cost. If a firm delivers to or picks up from the border, it incurs *B* which represents the time and other costs

[14] See Fritelli (2010) for a discussion of these regulations.
[15] That said, despite the predominance of variable cost heterogeneity in the literature, examples using fixed cost heterogeneity include Cole and Davies (2011) and Jørgensen and Schröder (2008), both of which have heterogeneous fixed export costs.

associated with processing the cargo for crossing the border.[16] Note that if the firm stops at the border, this will include unloading and reloading the cargo as the shipment switches hands. On the other hand, if the firm delivers to the ultimate destination, it has a border cost $b < 2B$. This border cost is less than the total border cost when the cargo switches carriers because it is no longer necessary to unload and reload.

The price of shipping within a given country is $p(n_t)$ in the US, where n_t is the number of firms active in the US in period *t*. This price is declining in n_t . Likewise, the price of shipping in Mexico is $p^*(n^*_t)$. In period 1, prior to the implementation of the pilot program, $n_1 = N$ and $n^*_1 = N^*$. The same is true during the expiration of the pilot. Under the pilot, however, these numbers can rise as trucks begin to cross the border.

When the pilot is not in force, there is no cross border competition. Thus, profits for US-based firms are:

$$\pi_1 = p(N) - w - B \tag{1}$$

while those for Mexican firms are:

$$\pi^*_1 = p^*(N^*) - w^* - B \tag{2}$$

When the pilot program commenced, it became possible for firms to operate on both sides of the border. If a US firm that chooses to do so, it will earn:

$$\pi_2^X(i) = p(n_2) + p^*(n_2^*) - 2w - b - F(i) \tag{3}$$

Likewise, a Mexican exporter would earn:

[16] Note that for brevity, we assume that this border cost is symmetric for US and Mexican firms. In practice, this cost often represents the hiring of a third firm which specializes in transporting the good from one side of the border to the other, a distance which is geographically short, but long in bureaucracy. See MacDonald (2009) for a discussion of this process.

$$\pi^{*X}_{2}(i) = p(n_2) + p^*(n^*_2) - 2w^* - b - F^*(i). \quad (4)$$

If a firm does not export, however, its profits are:

$$\pi_1 = p(n_2) - w - B \text{ or } \pi^*_2 = p^*(n^*_2) - w^* - B \quad (5)$$

depending on whether it is American or Mexican.

Thus, a firm will export as long as the benefits from doing so exceed the added costs. In the US, there is a cutoff value of the fixed cost $\overline{F}$ where a firm with this fixed cost is indifferent between exporting and not. This determined by $\pi^X_2(i) = \pi_2$, or:

$$\overline{F} = p^*(n^*_2) - w - (b - B). \quad (6)$$

American firms with costs below $\overline{F}$ strictly benefit from being able to export. Those with costs above this level do not export. As such, a fraction $G(\overline{F})$ of American firms will export in equilibrium. As a result in the pilot's equilibrium:

$$n^*_2 = N^* + G(\overline{F})N \ . \quad (7)$$

A comparable analysis for Mexican firms results in a Mexican cutoff $\overline{F^*}$ determined by:

$$\overline{F^*} = p(n^*_2) - w^* - (b - B) \quad (8)$$

with firms with fixed costs below this choosing to export. Recalling that only high-quality truck firms can operate in the US and assuming that the distribution of γ and $F^*(i)$ are independent (which is more palatable when you recall that γ describes the *industry* whereas $F^*(i)$ is firm specific), then the number of firms operating in the US during the pilot is:

$$n_2 = N + \gamma^* G^*\left(\overline{F^*}(\gamma^*)\right)N^*. \quad (9)$$

Thus, for a given realization of γ^*, (6) through (9) represent the equilibrium. Note that in this, $\overline{F^*}$ is a function of the realization of γ^*, although we will suppress this functional notation for cleanliness. From this equilibrium, note two things. First, $\frac{d\overline{F^*}}{dw^*} = -\frac{1}{1 - p'\gamma^* g^*\left(\overline{F^*}\right)N^*} < 0$ which implies that $\frac{d\pi_2}{dw^*} = \frac{d\pi_2^X(i)}{dw^*} = \frac{p'\gamma^* g^*\left(\overline{F^*}\right)N^*}{1 - p'\gamma^* g^*\left(\overline{F^*}\right)N^*} > 0$. This means that as the Mexican wage falls, more Mexican firms enter the US under the pilot reducing US-generated profits for American firms. This gives credence to the concerns of US truckers who argue against cross-border trucking due to the wage disparity. Second, $\frac{d\overline{F^*}}{d\gamma^*} = \frac{p'G^*\left(\overline{F^*}\right)N^*}{1 - p'\gamma^* g^*\left(\overline{F^*}\right)N^*} < 0$. Thus, when the share of Mexican firms with trucks suitable for use on US roads rises, more Mexicans choose to do so. As a consequence, $\frac{d\pi_2}{d\gamma^*} = \frac{d\pi_2^X}{d\gamma^*} = p'N^*G^*\left(\overline{F^*}\right)\left(1 + \frac{\gamma^* g^*\left(\overline{F^*}\right)}{1 - p'\gamma^* g^*\left(\overline{F^*}\right)N^*}\right) < 0$, meaning that US firm profits fall.

This in and of itself, however, does not mean that the total profits of a given US firm or for the US trucking industry as a whole must fall under the pilot as this ignores the additional profits earned by their exports. For firms with $F(i) < \overline{F}$, the losses from inbound competition are at least partially offset by the increased profits from exporting.

We can now describe how expectations and a range of realizations for γ can result in particular patterns of firm valuations. In period 1, prior to the revelation of precisely how many Mexican trucks are legally permitted to enter the US, and thus how many seek to, the expected profits under the pilot program for US non-exporters are:

$$E(\pi_2) = \int p\left(N + \gamma^* G^*\left(\overline{F^*}\right) N^*\right) c\left(\gamma^*\right) d\gamma^* - w - B < \pi_1 \qquad (10)$$

while for exporters, they are:

$$E\left(\pi_2^X\right) = E\int p\left(N + \gamma^* G^*\left(\overline{F^*}\right) N^*\right) c\left(\gamma^*\right) d\gamma^* + p^*\left(N^* + G\left(\overline{F}\right) N\right) - 2w - b - F(i). \quad (11)$$

Thus, non-exporters anticipate a reduction in profits since the extent of competition in the US can only rise. The degree of this, however, will depend on the actual realization of γ^*. For firms that export under the pilot, if $F(i) = \overline{F}$ the firm earns no additional profit from its ability to export under the pilot, therefore again profits will only fall when the program begins. For firms with $F(i) < \overline{F}$, however, there is a trade-off between the additional profits generated by exporting and the additional competition from Mexico, with firms with sufficiently low fixed costs benefitting from the pilot. If these costs are particularly low for US firms with Mexican subsidiaries (both because of the potential for an easier entry into Mexico due to prior experience and the potential profit from using Mexican trucks in the US), then even in comparison to exporters, we might expect such firms to anticipate a smaller decline in profits (or even an increase) following the commencement of the pilot.

Hypothesis 1: *US multinationals operating in Mexico will be more likely to view the pilot as positive (or at least less negative). Therefore the stock market reaction will be more positive (less negative) for these firms.*

A key component of (11) is, even for exporters, the degree to which Mexican firms enter and compete in the firm's US market. If, as was widely expected prior to the pilot and has proven to

be true, Mexican trucks will not penetrate deep into the US, then one might expect the increase in competition to be greater for firms operating near the border.[17] This leads to Hypothesis 2.

Hypothesis 2: *US firms in states bordering Mexico will anticipate a greater decline in profits during the pilot than the average firm. Therefore the stock market reaction will be more negative (less positive) for these firms.*

In period 2, the value of γ^* , and thus the extent of competition from Mexico has been revealed, resulting in an updating of beliefs about the extent of competition and profits under the pilot. If the realized value, denoted by $\overline{\gamma^*}$, is unexpectedly low, meaning that there is less competition than initially feared, then:

$$p\left(N+\overline{\gamma^*}G^*\left(\overline{F^*}\right)N^*\right) > \int p\left(N+\gamma^* G^*\left(\overline{F^*}\right)N^*\right)c\left(\gamma^*\right)d\gamma^*$$

Thus, although our model leaves out many aspects of the trucking industry, it does serve to demonstrate how expectations about the extent of competition can explain both why some firms might change their minds about the pilot program and why the extent of the reactions may vary by location and multinational status. With this in mind, we turn to our data analysis.

3. Methodology and Data

3.1 Cumulative Abnormal Returns

We use event study methodology that estimates the abnormal returns for the US trucking firms in response to legislation involving the US Cross Border Pilot Program. Assuming efficient markets, we estimate the traditional market model:

[17] See MacDonald (2009) for discussion on this. One method of incorporating this into the model is to allow for multiple US prices, one for firms that do not face increased Mexican competition due to distance from the border and one for firms that do. In an alternative model with such a complicating feature, unsurprisingly, those closer to the border who face Mexican competition will find the pilot less attractive *ceteris paribus*. However, as this point is rather obvious, we omit this complication in our model.

$$R_{it} = \alpha_i + \beta_i R_{mt} + \varepsilon_{it} \tag{12}$$

where R_{it} is the return on security i on day t, R_{mt} is the market return on day t, and ε_{it} is the zero mean disturbance term. R_{mt} is the broad-based stock index for the market portfolio, CRSP-weighted index. As is standard, we estimate (12) using daily returns 301 days before the event through 46 days before the event, a 255-day estimation window.

Using the estimated parameters from the market model, α, a constant, and, β, the systematic risk of security i, we estimate the abnormal returns denoted as, $AR_{i\tau}$, given as:

$$AR_{i\tau} = R_{i\tau} - \hat{\alpha}_i - \hat{\beta}_i R_{m\tau} \tag{13}$$

where τ measures time relative to the event date, $\tau = 0$. $AR_{i\tau}$, represents the market's valuation of the change in the firm's current and future expected profitability due to the announced events on day τ. We estimate abnormal returns for three event windows: 3-day (-1, +1), 9-day (-7, +1) and 23-day (-21, +1) event windows. Fama et al. (1969) notes that information is potentially released to the market during a period before the official announcement. Hence, to capture information leakages prior to the official announcement, we include the two anticipatory windows (-21, +1) and (-7, +1).[18]

For each event window, we average over all firms to obtain the cumulative abnormal returns (CAR) for each firm (security) i and event j:

$$CAR_{ij} = \sum_{\tau=\tau_1}^{\tau_2} AR_{ij\tau} \tag{14}$$

where τ_1 is the first day in the event window and τ_2 is the last day in the event window. We test the null hypothesis that $CAR = 0$, i.e. that returns do not respond to the event.[19] Serial correlation

[18] MacKinlay (1997) also controls for the anticipatory nature of event announcements.

[19] We initially ran the SUR specification to obtain the cumulative abnormal returns; however, specification tests favor the traditional OLS parameter method. We run the conventional method as described above. Karafiath (1988)

may occur given that all the abnormal returns use the same intercept and slope parameters. Following Hartigan et al. (1986) and Ruback (1982), our variance estimate includes an adjustment for serial autocorrelation.[20] The CAR's are computed in the first-stage for our four events of interest.

3.2 Data

Our sample includes all publically traded firms classified in SIC categories 4210 (Trucking and Courier Services, excluding air), and 4213 (Trucking, excluding local). The stock returns and market return data were obtained from the Center for Research in Security Prices (CRSP). The 19 firms that comprise our sample are listed in Table 1. Table 2 contains the four events that comprise our study, including, 1) the initiation of the Project on July 6, 2007, 2) the cancelation of the Project following President Obama's signing of the Omnibus Appropriations Act of 2009 that explicitly removed the Demonstration Project's funding, on March 11, 2009, 3) the agreement by President Obama and Mexican President Calderon to resume a Project, on July 6, 2011, and 4) the actual resumption of the Project on October 21, 2011.

4. Results

Table 3 presents estimated CARs in response to the initiation of the Cross-Border Trucking Pilot Program, its cancellation in 2009, and its resumption in 2011.[21] The first two columns use all the firms. The second two columns report results using US multinational firms with Mexican subsidiaries, while the final set include only border state firms. To interpret the numbers, in a

notes that in many instances the dummy variable approach (OLS parameter method) yields similar results as the conventional method.

[20] Z-statistics are constructed to analyze the statistical significance of our CAR's. The Z-statistic is distributed as a normal variable with a variance equal to the number of observations and has the formula:

$Z = \sum_{n=1}^{N} \frac{CAR_n}{\sqrt{VAR(CAR_n)}} \Big/ \sqrt{N}$ where CAR_n is the cumulative abnormal return for event (n), VAR indicates "variance" and N is the number of events. This method controls for observations with high standard errors and get less weight in the Z-statistic.

[21] We display CARs weighted by the market value of our sample's firms, although results are similar when we weight each trucking firm equally.

given event window, the first number presents the size of the abnormal return in percentage terms whereas the latter presents the number of firms with positive abnormal returns and the number with negative returns. We indicate in these latter columns whether the difference between firms with positive returns and negative returns is statistically significant.

Beginning with the 2007 initiation of the Project, we see that in all cases, the average CAR is negative, indicating that investors believed that the Project would lower profits. The magnitude of the CARs of the six US multinationals was similar to the overall sample. However, the two firms located on the US-Mexican Border, Frozen Food Express and Knight Transportation, experienced negative CARs around three times as large as the full set of firms in the 9-day (-7 +1) and 23-day (-21 +1) anticipatory windows. This suggests that closer proximity to the anticipated Mexican competition was viewed as an especially serious threat, consistent with Hypothesis 2 above.

The cancellation of the pilot program, which followed from President Obama's signing of the Ominibus Appropriations Act in March 2009, however, was not greeted favorably by shareholders of trucking firms. In fact, we find negative and significant CARs for the 23-day anticipatory window when using all firms as well as with the set of multinational firms. While the CAR from the 3-day window for the full set of firms is statistically significant and positive, its magnitude (4.66%) is substantially smaller than the negative CAR in the 23-day window (-7.88%), suggesting that the sum effect was a negative response to cancellation of the pilot program. Elsewhere the results were insignificant and equally split between negative and positive point estimates. Thus, in general, the response to the cancellation of the pilot program was clearly not positive. As suggested by our model, this may well be due to a downward revision of the beliefs about the potential damages from Mexican competition.

The final two events signaling the renewal of the pilot program produce positive and significant CARs. In response to the agreement between Presidents Obama and Calderon in July 2011, the overall sample of trucks generates a highly significant CAR in the 23-day window of about 9.84%. Interestingly, the CAR for the US multinationals in the same event-window is about twice as large, with a CAR of about 20.8%. In the final event, in which cross-border trucking actually resumed, the response continued to be positive, with a highly significant CAR in the 23-day window of about 3.5%. Once again, the response of the six US MNEs with Mexican subsidiaries was even more positive, with a positive and significant CAR of about 5.9%. This larger multinational response is then consistent with Hypothesis 1, as it was the US multinationals in particular who viewed the Project as a beneficial opportunity.

For border firms, however, neither the Project's restart events resulted in a significant CAR, implying that these were viewed as non-events. However, it appears that this was due to the extremely negative CAR of Frozen Food Express, which was around -29%. The other border firm, Knight Transportation, generated a significant CAR in the 23-day window of about 8.6%. Other firm-specific CARs can be found in table 5.

Finally, Table 4 presents the CAR results for a single firm – Swift Transportation, which entered the sample after the first two events. Swift, which is both a border firm and also a multinational with Mexican subsidiaries, produced positive but insignificant CARs in response to the agreement similar in magnitude to the overall sample. Overall, the reaction to the agreement to renew the cross-border trucking was insignificant, comparable to the results for the other border state firms. However, similar to what was found for the other multinationals, the actual restart of the Project was significantly positive. Therefore, this firm which falls into both the

border and multinational categories seems to display CARs somewhere in between those two groups.

It is important to note that the apparent reassessment of the net-benefits of open-border trucking may better reflect the outlook of larger, publicly traded firms that comprise our dataset, rather than smaller, owner-operated trucking companies. We note that the American Trucking Association publicly supported the resumption of cross-border trucking, while the Owner Operator Independent Drivers Association (OOIDA), which represents the interests of small-business trucking and the Teamsters Union continued to publicly oppose the policy.[22] The legal challenges posed by the OOIDA and the Teamsters faced a major blow in January 2014, when the US Supreme Court chose not to hear the petition to overturn the pilot program. This divergent reaction to cross-border trucking held by large trucking firms compared to smaller trucking firms helps explain the positive CARs generated in response to resumption of cross-border trucking. It may be the case that cross-border trucking may have been viewed by the larger, publicly traded US firms that comprise out dataset as a way to shake out some of their smaller domestic rivals.[23] This too would be consistent with the literature following Melitz (2003) in which liberalization drives out low productivity (and typically small) firms.

[22] Following the 2011 agreement to resume cross-border trucking, Bill Graves, president of the American Trucking Association stated that, "We hope this agreement will be a first step to increasing trade between our two countries, more than 70 percent of which crosses the border by truck." In contrast, Todd Spencer, executive vice president of Owner-Operator Independent Drivers Association, stated that, "For all the President's talk of helping small businesses survive, his administration is sure doing their best to destroy small trucking companies and the drivers they employ." The Teamsters continued to argue that Mexican trucks were less safe, with Teamsters President James Hoffa stating that "This agreement caves in to business interests at the expense of the traveling public and American workers," and that "Mexican trucks simply don't meet the same standards as US trucks. Medical and physical standards for Mexican trucking firms are lower than for US companies." (see http://www.bloomberg.com/news/2011-03-03/mexico-u-s-are-said-to-reach-agreement-on-end-to-border-trucking-dispute.html)

[23] We perform a second-stage analysis to test for the impact of firm-heterogeneity, such as revenues, assets, number of employees and location on the US-Mexican border. None of these factors was significantly significant, although our data do not include smaller, non-publically traded firms that were more likely to oppose the pilot program.

5. Conclusion

This paper investigates shareholder response of US trucking firms to a Cross Border Demonstration program which opened competition between Mexican and US carriers. Since the program simultaneously provided US operators with access to potential profits from the Mexican market, the predicted shareholder response to an open-border policy is somewhat ambiguous. Our results indicate that shareholders of US trucking firms, especially those located in border-states, initially viewed cross-border competition as more of a threat than an opportunity. However, after eighteen months of the trial 'pilot program,' shareholders apparently became convinced that the potential gains from cross-border trucking, which provided access to the US's second largest export market, outweighed the competitive threat from low-wage Mexican carriers in the US. Moreover, response by firms with Mexican subsidiaries showed an especially favorable response to the renewal of the pilot program. This may well have been the result of imperfect information regarding the extent of entry into the export market as non-tariff barriers are removed.

Given the large public outcry to the potential removal of barriers via trade agreements such as the Transatlantic Trade and Investment Partnership currently being negotiated, this highlights the importance of obtaining – and disseminating – estimates of changes in the degree of competition. Further, just as other studies indicate that manufacturers respond to changes in non-tariff barriers, our estimates give evidence that service providers do as well.

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Table 1. US publicly traded trucking firms

Company	Revenue ($ mil)	Market Value ($ mil)
Arkansas Best Corp	1,908	490
Con-Way Inc	5,290	1,621
Frozen Food Express Inds	388	23
Hunt (Jb) Transprt Svcs Inc	4,527	5,270
YRC Worldwide Inc	4,869	68
Werner Enterprises Inc	2,003	1,756
P.A.M. Transportation Svcs	359	83
Marten Transport Ltd	604	396
Heartland Express Inc	529	1,236
Patriot Transn Holding Inc	120	188
Old Dominion Freight	1,883	2,328
USA Truck Inc	519	81
Celadon Group Inc	568	314
Knight Transportation Inc	866	1,242
Covenant Transportation Grp	653	44
Quality Distribution Inc	746	269
Saia Inc	1,030	199
Universal Truckload Services	700	282
Swift Transportation Co	3,334	1,149

Table 2. Events

Event	Data	Description
1. Initiation of the Trucking Pilot Program	September 6, 2007	A trial period was initiated allowing up to100 Mexican carriers to operate in the US and 100 US carriers in Mexico
2. Cancellation of Trucking Pilot Program	March 11, 2009	The pilot program was canceled following passage of the Omnibus Appropriations Act of 2009 (P.L. 111-8), which contained a provision to discontinue funding for the cross-border trucking pilot program.
3. Agreement to renew Trucking Pilot Program	July 6, 2011	The US and Mexico signed an agreement allowing Mexican trucks to resume operations in the US as part of the initiation of a pilot program similar to the initial demonstration project. Following the signing of the agreement, Mexican retaliatory duties were reduced by 50%.
4. Restart of Pilot Program	October 21, 2011	The first Mexican truck was permitted into the US, causing Mexico to cancel all remaining retaliatory duties.

Table 3. Results

Event and Window	CARs All Trucking Firms	Pos: Neg sign	CARs Trucking Firms w/ Mexican subsidiaries	Pos: Neg sign	CARs Border State Trucking Firms	Pos: Neg sign
September 6, 2007 - Initiation of the Trucking Pilot Program	(N=18)		(N=6)		(N=2)	
(-21,+1)	-4.55%** (-1.900)	4:14**	-1.97% (-0.710)	0:6***	-13.94%** (-1.935)	0:2*
(-7,+1)	-2.82%** (-1.998)	5:13*	-2.15% (-1.012)	1:5*	-11.71%*** (-2.629)	0:2*
(-1,+1)	-2.37%** (-2.270)	1:17***	-3.05%* (-1.561)	1:5*	-3.32%* (-1.307)	0:2*
March 11, 2009 - Cancellation of Truck Pilot Program	(N=18)		(N=6)		(N=2)	
(-21,+1)	-8.61%** (-2.220)	4:14**	-7.88%* (-1.282)	2:4	-9.35% (-0.509)	1:1
(-7,+1)	0.34% (0.056)	13:5**	1.23% (-0.057)	5:1**	-4.04% (-0.207)	1:1
(-1,+1)	4.66%*** (2.686)	13:5**	5.14% (1.082)	4:2	-1.11% (0.014)	1:1
July 6, 2011 - Agreement to renew Pilot program	(N=19)		(N=6)		(N=2)	
(-21,+1)	9.84%*** (2.885)	17:2***	20.79%*** (2.377)	6:0***	7.45% (0.837)	2:0*
(-7,+1)	2.59% (0.668)	11:8	4.48% (-0.060)	2:4	6.20% (0.875)	2:0*
(-1,+1)	1.50%* (1.137)	13:6**	-0.11% (0.573)	4:2	5.08% (1.201)	2:0*
October 21, 2011- Restart of Pilot Program	(N=19)		(N=6)		(N=2)	
(-21,+1)	3.53%*** (3.007)	14:5**	5.91%* (1.362)	5:1**	-10.37% (-0.108)	1:1
(-7,+1)	0.63% (0.597)	10:9	-0.95% (0.502)	3:3	-0.108 (0.570)	1:1
(-1,+1)	0.63% (1.127)	9:10	-0.47% (0.295)	3:3	0.30% (0.056)	1:1

Patell Z-statistics in parentheses below coefficients.
***, **, * indicate statistical significance at the 1 percent, 5 percent, and 10 percent level

Table 4. Swift Transportation (Border Multinational Firm)

Event and Window	**CARs**
July 6, 2011 - Agreement to renew Pilot program	
(-21,+1)	4.65% (0.383)
(-7,+1)	-5.03% (-0.663)
(-1,+1)	-0.54% (-0.123)
October 21, 2011- Restart of Pilot Program	
(-21,+1)	19.74%** (1.756)
(-7,+1)	13.31%** (1.877)
(-1,+1)	9.81%*** (2.400)

Patell Z-statistics in parentheses below coefficients.
***, **, * indicate statistical significance at the 1 percent, 5 percent, and 10 percent level.

Table 5. Firm-Specific CARs

	Firm Type	Event Window	September 6, 2007 - Initiation of Pilot Program	March 11, 2009 - Cancellation Pilot Program	July 6, 2011 - Agreement to renew Pilot program	October 21, 2011 - Restart of Pilot Program
Arkansas Best Corp	Domestic	(-21,+1) (-7,+1) (-1,+1)	-0.56% (-0.066) -0.16% (-0.032) -2.36% (-0.713)	-25.89%* (-1.303) 3.07% (0.247) 0.73% (0.103)	18.72% ** (1.866) 9.66%* (1.541$ 8.20%** (2.267)	2.76% (0.275) 10.50%* (1.622) 10.50%* (1.622)
Con-Way Inc	Domestic	(-21,+1) (-7,+1) (-1,+1)	1.99% (0.307) -0.50% (-0.112) -0.29% (-0.110)	-20.81%* (-1.339) 12.65%* (1.292) 18.40%*** (3.254)	7.55% (0.875) 0.86% (0.161) 2.56% (0.824)	8.97% (0.941) 7.32% (1.222) 5.15%* (1.489)
P.A.M. Transportation Svcs	Domestic	(-21,+1) (-7,+1) (-1,+1)	5.69% (0.446) 4.15% (0.530) 1.45% (0.316)	-6.83% (-0.239) 3.01% (0.170) 27.40%*** (2.653)	-7.17% (-0.653) -3.56% (-0.520) -4.53% (-1.144)	-8.59% (-0.720) -4.99% (-0.667) -3.14% (-0.728)
Marten Transport Ltd	Domestic	(-21,+1) (-7,+1) (-1,+1)	15.04% (1.186) 3.47% (0.431) 3.71% (0.819)	-3.48% (-0.214) -2.30% (-0.226) 2.85% (0.486)	5.40% (0.618) -2.29% (-0.419) 0.05% (0.017)	-1.08% (-0.141) -4.13% (-0.869) -0.60% (-0.216)
Heartland Express Inc	Domestic	(-21,+1) (-7,+1) (-1,+1)	-1.45% (-0.209) -0.77% (-0.154) -0.05% (-0.016)	-2.12% (-0.175) 3.97% (0.513) 1.67% (0.376)	6.24% (1.052) 2.00% (0.540) 1.74% (0.815)	2.74% (0.474) -4.41% (-1.250) -1.12% (-0.547)
Patriot Transn Holding Inc	Domestic	(-21,+1) (-7,+1) (-1,+1)	3.94% (0.377) 0.68% (0.103) -1.70% (-0.476)	-35.60%*** (-2.392) -22.97% (-2.469) 3.42% (0.618)	16.31% (1.110) 8.21% (0.894) 8.86%** (1.674)	13.18% (1.012) 5.27% (0.648) -1.82% (-0.387)
USA Truck Inc	Domestic	(-21,+1) (-7,+1) (-1,+1)	-7.85% (-0.894) 0.52% (0.090) 0.20% (0.063)	-2.37% (-0.145) -4.13% (-0.405) 0.88% (0.154)	0.73% (0.057) 9.53% (1.225) -0.71% (-0.159)	23.35%** (2.094) -16.32%*** (-2.343) -0.53% (-0.138)

Old Dominion Freight	Domestic	(-21,+1) (-7,+1) (-1,+1)	-1.41% (-0.147) -2.13% (-0.331) -0.35% (-0.094)	-9.94% (-0.574) -0.24% (-0.020) 5.36% (0.862)	5.85% (0.891) 0.52% (0.128) 2.84% (1.201)	10.14%* (1.503) 3.58% (0.855) 1.91% (0.790
Covenant Transportation Grp	Domestic	(-21,+1) (-7,+1) (-1,+1)	-6.97% (-0.754) 6.18% (1.076) -2.11% (-0.628)	21.87% (0.684) 1.27% (0.064) -9.66% (-0.833)	-22.61%** (-1.669) -14.65%** (-1.728) -3.24% (-0.663)	-31.02%** (-2.285) -12.86%* (-1.512) -3.17% (-0.648)
Saia Inc	Domestic	(-21,+1) (-7,+1) (-1,+1)	-0.86% (-0.061) -3.12% (-0.372) -3.88% (-0.792)	-3.09% (-0.186) 9.25% (0.899) -1.57% (-0.259)	11.62% (1.036) 4.63% (0.662) 3.76% (0.929)	17.94%* (1.883) 5.85% (0.983) 1.41% (0.412)
Universal Truckload Services	MNE	(-21,+1) (-7,+1) (-1,+1)	7.13% (0.461) 3.62% (0.365) -0.58% (-0.100)	2.87% (0.151) -0.10% (-0.013) -4.43% (-0.671)	9.40% (0.781) -1.86% (-0.247) 0.79% (0.183)	9.21% (0.879) -2.13% (-0.326) 1.49% (0.396)
Celadon Group Inc	MNE	(-21,+1) (-7,+1) (-1,+1)	3.75% (0.334) -3.85% (-0.579) -0.25% (-0.061)	-22.08% (-1.093) 0.24% (0.015) 16.09%** (2.190)	8.04% (0.843) -2.23% (-0.375) 2.43% (0.707)	6.23% (0.712) 4.94% (0.885) 3.46% (1.076)
Quality Distribution Inc	MNE	(-21,+1) (-7,+1) (-1,+1)	17.52% (1.101) 11.16% (1.116) -2.04% (-0.360)	-45.57%** (-1.369) -28.50%* (-1.364) -25.34%** (-2.095)	8.79% (0.676) -9.29% (-1.143) -4.07% (-0.868)	5.60% (0.423) -4.46% (-0.538) -1.18% (-0.244)
Hunt (Jb) Transprt Svcs Inc	MNE	(-21,+1) (-7,+1) (-1,+1)	1.38% (0.179) -5.29% (-1.063) -3.29% (-1.149)	-10.06% (-0.777) 0.15% (0.024) 1.81% (0.396)	4.57% (0.754) -0.56% (-0.147) 1.30% (0.595)	8.90%* (1.502) 4.46% (1.205) -0.27% (-0.128)
YRC Worldwide Inc	MNE	(-21,+1) (-7,+1) (-1,+1)	-7.18% (-0.925) -4.49% (-0.923) -3.50% (-1.251)	34.49% (0.941) 33.57%* (1.460) 39.15%*** (2.947)	89.94%** (2.134) 39.84%* (1.512) -3.41% (-0.224)	-4.64% (-0.108) -10.06% (-0.411) -6.46% (-0.459)

Werner Enterprises Inc	MNE	(-21,+1) (-7,+1) (-1,+1)	-6.21% (-0.921) -0.91% (-0.211) -1.25% (-0.498)	-10.52% (-0.766) -0.37% (-0.038) 1.52% (0.312)	3.97% (0.635) 0.99% (0.253) 2.28% (1.011)	4.30% (0.727) 1.53% (0.416) 0.17% (0.081)
Knight Transportation Inc	Border	(-21,+1) (-7,+1) (-1,+1)	-0.29% (-0.066) -4.07% (-0.797) -1.16% (-0.391)	0.32% (0.022) 3.32% (0.381) 1.72% (0.343)	5.14% (0.759) 2.25% (0.532) 1.64% (0.672	8.64%* (1.417) -2.37% (-0.623) -0.03% (-0.010)
Frozen Food Express Inds	Border	(-21,+1) (-7,+1) (-1,+1)	-15.76%* (-1.629) -14.06%*** (-2.327) -2.80% (-0.803)	-24.84% (-1.298) -13.31% (-1.108) -4.12% (-0.592)	9.77% (0.424) 10.16% (0.706) 8.53% (1.025)	-29.38%* (-1.570) 16.84% ** (1.430) 0.63% (0.089)
Swift Transportation Co	MNE Border	(-21,+1) (-7,+1) (-1,+1)			4.65% (0.383) -5.03% (-0.663) -0.54% (-0.123)	19.74%** (1.756) 13.31%** (1.877) 9.81%*** (2.400)

Patell Z-statistics in parentheses below coefficients.
***, **, * indicate statistical significance at the 1 percent, 5 percent, and 10 percent level.

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