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Border Effect Between Florida, Texas, and Oklahoma

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BORDER EFFECT BETWEEN FLORIDA, TEXAS, AND OKLAHOMA

by

Adam Pfaff

A Research Paper

Submitted in Partial Fulfillment of the Requirements for the

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INTRODUCTION

Research on the border effect of the law of one price has mainly examined the effect of international borders. Two explanations for this are the effect of non-tariff barriers and nominal exchange rate volatility. Engel and Rogers (1996) examine this issue using data from locations in the USA and Canada. Morshed (2003) examines these two factors using data from Bangladesh and India, which have high non-tariff barriers and nominal exchange rate volatility and shows that they may have not as much of an effect as was believed. This paper examines the border effect between the borders between three US states, which should have no non-tariff barriers to trade, and as they use the same currency there would be no nominal exchange rate effects. This will shed light on other potential factors behind observed "border effect", if any.

The three states that are examined in this paper are Texas, Oklahoma, and Florida. Florida and Texas were chosen as they both have very large economies and Oklahoma is chosen as the next-door neighbor of Texas. Data availability also plays a role in choosing these three states.

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LITERATURE REVIEW

The law of one price and related "border effect" have been discussed in several papers. The researchers have used different country samples to find the effect and to understand what causes it. Some papers also question if international borders do affect the law of one price, or if there are other affects that contribute to it.

Engel and Rogers' (1996) influential paper "How wide is the Border?" measures the effects the US Canadian border on commodity prices. This paper used data from Canada and the US as they are large market economies that share a border, so that there are large distances between cities within a country, so that there will be cities that are closer to a foreign country, than one within the same country. These countries have relatively free trade, so it is unlikely trade restrictions affects price difference at equidistant locations within a country or locations across the national border.

This paper uses consumer price index data of 14 categories of goods, and from 14 US cities, and from 9 US cities. The data is monthly, but some cities only have bimonthly data. The data runs from June 1978 to December 1994. The prices were converted into US dollars. The volatility of the prices is taken as the standard deviation of the difference of log of the relative price between two cities between time *t* and time *t-2*. A two-month difference is used to account for the fact that some cities have bimonthly data.

This data is used for a regression that estimates the volatility of prices using the log of the distance between cities, a dummy variable for whether the cities are in different countries, and a dummy variable for each city that the city pair includes. The regression shows that distance has a significant effect or price volatility, and it shows that the effect of the border is also significant

for all 14 goods. The results show that the price volatility due to the border being between two cities is equivalent to the cities being an additional 75,000 miles apart. Several extensions that included splitting the sample at 1985 to account for the swings in the value of the US dollar, and at 1990 to account for the Canadian-US Free Trade Agreement, both of which had little effect. Also, it was tested that distances beyond 1,700, which was arbitrarily chosen, does not add additional volatility, and this did not affect the results.

Several suggestions for why there is a border effect are given. One possibility is that labor markets may be more homogeneous within countries, so relative wage volatility, which was calculated similarly to price volatility, was included in the regression. The relative wage volatility was overall positive and significant, but it did not affect the border coefficient much. Another possible explanation is sticky-prices, as the nominal exchange rate may be the reason for the border effect. This was tested by using the relative real prices instead of the nominal prices. The real price was calculated by dividing the price of a good by the aggregate price index of that city. Sticky nominal prices did have a significant effect on the border coefficient, but the border coefficient is still positive and significant, so sticky nominal prices do not account for all the border effect. The real relative prices were also calculated by using a national producer price index, and these had similar results compared to using the city level prices. Overall this paper shows that there is a significant border effect of price volatility, and that sticky nominal prices explain some of this effect.

Parsley and Wei (2001) examine the border effect between the US and Japan. This paper uses quarterly data from 1976.1 to 1997.4. There are 48 Japanese cities, and 48 US cities. The Japanese data is from the *Annual Report on the Retail Price Survey*, and the American data is from the *Cost of Living Index.* 27 goods were used from these sources. Relative real prices were

calculated by dividing the included cities by two benchmark cities, Tokushima in Japan, and Louisville in the US. The price volatility was calculated by finding the standard deviation of the change of the log of the relative prices.

A regression was used to replicate the Engel-Rodgers analysis of the border effect, and estimate the price volatility by the log of the distance, a dummy variable for city pairs that are in different countries and dummy variables for individual cities, and goods, along with a constant. This regression shows that there is a positive and significant border effect, and that the effect is equivalent to 6.5 trillion miles. The paper notes that Engel and Rodgers regression may not have a good measurement for the border effect because the regression is log linear, and is not affected by changes in the units of measurement. This is dealt with by using a different method of finding the border effect distance. Rather than finding the distance by taking e to the power of the border coefficient divided by the distance coefficient, this paper finds the distance by taking e to the power of the border coefficient divided by the distance coefficient minus one and multiplying that by the average distance between US and Japan city pairs. Using this estimation, the US-Canada border effect is 101 million miles, and the US-Japan border effect is 43,000 trillion miles.

This paper looks at the change of the border effect over time, and tries to determine what economic factors influence it. A new variable was used to find yearly price dispersion for each city pair, which used the standard deviation of the residuals of a regression that regressed the original price volatility on dummy variables for each good. This price dispersion was used in a regression that estimated it using the log of the distance a border dummy variable, a constant, and city dummy variables. This regression shows that the border effect is equivalent to 15 billion miles.

Three possible explanations for this effect are nominal exchange rate volatility, unit transportation and insurance costs, and variability of the relative wage differential. To test for the effect of exchange rate volatility, the standard deviation of the changes in the log of the nominal exchange rate was added. This has a significant effect on price dispersion, but it does not fully account for the border effect. To test for the effect of unit transportation and insurance costs, the average shipping and insurance costs for US exports to Japan and Japanese exports to the US are added to the regression. This has a significant effect on price dispersion, and along with exchange rate volatility helps to account for a large portion of the border effect. To measure for relative wage variability, the standard deviation of the change in the log of the wage rates is added the regression. Alternatively, to measure for relative wage variability, the difference in national currency denominated wage inflation rates. This has a significant effect on price dispersion, but it increases the border coefficient.

This paper also examines the change in the border effect over time. To test this, a trend term, and a border and distance trend interaction term is added. This trend shows that there is a 0.4% decrease in the border effect per year. Adding nominal exchange rate volatility and unit shipping and insurance costs decrease the border coefficient. While adding variability of the relative wage has little effect on the border coefficient.

In conclusion, this paper shows that the border effect between the US and Japan is equivalent to 43,000 trillion miles to price volatility. Also, by using the method used to find the US and Canadian border effect's equivalent distance it results in 101 million miles, much greater than the 75,000 given by Engel and Rodgers. This paper also shows that nominal exchange rate volatility and unit transportation and insurance costs have an important effect on the border

effect, but variability of the relative wage differential does not. The paper also shows that the border effect is declining over time at a rate of about 0.4%

Morshed (2007) questions if there is a border effect caused by international borders. This paper looks at the border effect between Bangladesh and Pakistan. These nations are used because they were one country until 1971, when Bangladesh gained independence, and allows to see how the border effect changes when a border is created. This paper uses data that includes 14 different goods, and has 10 cities, 5 from Pakistan, and 5 from Bangladesh. This is annual data from 1950-1971, and from 1975-1993. The price variability is calculated by the standard deviation of the change in the relative price of the good relative to flour.

There are three different regressions used. One is the standard with or without border regression used in Engel and Rodgers. One regresses price variation on a constant, a dummy variable for post 1971 data after Bangladesh became independent, the log of distance, a variable for the log of distance after 1971, a border dummy variable, a variable for the border after 1971, city dummy variables, and post 1971 city dummy variables. The third regression only looks at cross country city pairs, it regresses price variation on a constant the log of distance, a post 1971 dummy variable.

The results for the with or without border regression show that there is greater price variability from cross country pairs compared to within country pairs during the pre-and post-1971 periods, and that this effect is greater during the post-1971 period. The change in cross country price variability is mixed when comparing good between pre- and post-1971, suggesting the creation of a national border did not necessarily increase price variation. When the post 1971 border variable is included its effect is significant for only about half of the goods. When the third regression is used the independence dummy variable is significant in only in three goods,

and negative, and significant in five goods. This suggests that the creation of a national border may have no additional price variation effects.

These results suggest that the creation of a national border did not have a significant effect on cross border pairs. There was a higher price variation in cross-border city pairs then there was in within-country border pairs, but there was little evidence that this was changed by Bangladesh becoming independent.

Gorodnichenko and Tesar (2009) also questions the methodology of estimating the border effect. This paper reexamines the border effect identified by Engel and Rogers (1996) using the same data. One of the main issues they have with other border effect papers is that they do not account for price variability within a country, and differs country by country, and that this country heterogeneity border effect regressions do not accurately represent border frictions. They also say that because countries have different price volatility, the estimated border effect would depend on what country the cross-border pairs are compared to. They found a new regression to show the heterogeneity problem. This regression in the Engels and Rodgers regression, but it adds a dummy variable for city pairs with in Canada. Using this regression, the border effect from the US perspective is 47 kilometers, and the effect from the Canadian perspective is 108 million kilometers, which are explained that there is a higher price variation for the US compared to Canada, but this may not be a true measure of the border effect as this does not separate country heterogeneity with the border effect.

This paper states that to get a true measure for the border effect, country heterogeneity must be accounted. A structural model is needed with transportation costs, price structure, and production to get a good estimate of the border effect. They run an experiment that shows that previous methods used may get a border effect even when there is no border friction.

In conclusion, this paper shows that there are errors with the previous methodology used to measure the border effect, because there is country heterogeneity which causes the border effect to be overestimated. One solution this paper uses is to include a dummy variable for city pairs within Canada, so that the border effect can be calculated for each country separately. Using this method, the border effect from the US perspective is 47 kilometers, and the effect from the Canadian perspective is 108 million kilometers, but this does not show that there is a border effect because country heterogeneity is not accounted for. To account for country heterogeneity a structural model would need to be used.

Yilmazkuday (2011) examines the border effect between US states using Cost of Living Index data from the American Chamber of Commerce Researchers Associations which covers 48 goods in 52 cities in 28 states. This paper examines the price heterogeneity in the United States as this will allow for better understanding of the intranational price dispersion that according to Gorodnichenko and Tesar (2009) may be affecting international measures of price dispersion.

It takes two measures of price dispersion by using the standard deviation of the log of the relative price, and the standard deviation of the change of the log of relative prices. This uses two regressions, one like Engel and Rodgers, that uses distance, a border dummy, and city dummies, and one similar to Parsley and Wei, that adds city dummies. It also calculates the border distance equivalent by Parsley and Wei's method.

This method calculates the border distance equivalent to be 3,344 miles for all goods when using the change in relative prices, and by 3,343 miles when using the relative prices. Other goods give different measures of the border effect when using the different measures, with coffee at 958 miles when using relative prices, and 20,526 when using the change in relative

price. This measure may be off, as due to the large number of states being compared relative to cities, as there are less than two cities per state on average.

HEADING 3

DATA

This paper uses price data from the Cost of Living Index published by The Council for Community and Economic Research, previously published by the American Chamber of Commons Research Association. The data is collected for a metropolitan statistical area level, and by county level. There are specific instructions to determine what each good specifically should be. The prices are collected over a three-day period. The prices are an average taken from at least five different sources. The data is collected by volunteers from changers of commerce, and related organizations, and is compiled by The Council for Community and Economic Research.

It is quarterly data from 1990 to 2013. This paper chose 40 different goods that had data for each city used. The three states chosen were Florida, Texas, and Oklahoma. These states have large Gross State Products, and Florida and Texas would be in the top 20 of national GDP. Oklahoma was chosen as it had a good number of cities with data and it allows to test the effects of bordering and non-bordering states, 63 cities had enough data to be used, which allow for 1,968 city pairs. The distance between cities was calculated using Google Maps road data, as much of the trade between cities would be by road. As only one data set is used, the goods for each state are directly comparable to each other. Also, as this survey includes on prices in dollars, exchange rates are not an issue.

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METHODOLOGY

This paper uses a similar methodology to Engels and Rodgers (1996) to find a measure of price dispersion.

$$Q_{ij,k,t} = \ln\left[\frac{P_{i,k,t}}{P_{j,k,t}}\right]$$

The relative prices of good k at time t between cities i and j (Q) is calculated by taking the log of the relative prices of good k at time t of the cities I and j (P). One this is calculated the standard deviation of $Q_{ij,k}$ for all t is taken (V(Q)), and the average of $Q_{ij,k}$ for all t is taken A(Q). These measures of variability are regressed on the log of the distance between I and j, on a dummy variable that takes the value of one is the cities pairs cross a border. Separate regressions are done for the Texas-Florida border, the Texas-Oklahoma border, the Florida-Oklahoma border, and if it crosses any border.

A($Q_{ij,k,t}$) or V($Q_{ij,k,t}$)=β_1*ln(distance(I,j))+ β_2*Border dummy + city dummies. (1)

To allow for a quadratic function of distance, the following equation is estimated also.

A($Q_{ij,k,t}$) or V($Q_{ij,k,t}$)= π_1*ln(distance(I,j)+ π_2*ln(distance(I,j)+ π_3 Border dummy + city dummies. (2)

The border distance equivalence is calculated in a similar manner to Parsley and Wei (2001). It is calculated by multiplying the average distance of the city pairs that cross the border being calculated by e to the power of the effect of the border divided by the effect of the distance subtracted by one.

Border distance = average city pair distance*(e^(β of border/ β_1)-1)

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RESULTS

Tables 1.1 and 1.2 show the average price variability calculated using the average of the relative prices, and the standard deviation of the relative price. These show that for the most part the average relative price is larger for interstate city pairs compared to interstate border pairs, which suggests that there may be a border effect. This effect is less than what other papers, such as Morshed (2003) have shown, which suggests that the border effect with be smaller than other samples even if it is significant. The difference between intra- and interstate border pairs' price variance does not appear to change based on the category of good.

Table 1.1

Average Price Variability of the Average of Relative Prices

Category	TX-TX	OK-OK	FL-FL	FL-TX	OK-TX	FL-OK
T-Bone Steak	0.133609	0.097727	0.077801	0.12013	0.169392	0.134222
Ground Beef	0.201351	0.162286	0.132656	0.191769	0.190258	0.204676
Frying Chicken	0.131678	0.118766	0.117208	0.135745	0.251294	0.206235
Tuna	0.15024	0.143082	0.129203	0.171875	0.20178	0.15104
Milk	0.096393	0.072254	0.042835	0.101588	0.140141	0.168837
Eggs	0.132713	0.116621	0.092249	0.142825	0.128573	0.150977
Margarine	0.206881	0.159531	0.142245	0.197135	0.204064	0.166675
Potato	0.171534	0.155866	0.141369	0.184644	0.332267	0.340488
Tissues	0.122123	0.095151	0.086004	0.14601	0.14388	0.093244
Detergent	0.096302	0.095446	0.08216	0.101507	0.12713	0.102762
Toothpaste	0.177802	0.1798	0.135608	0.17332	0.194957	0.183604
Shampoo	0.098424	0.102736	0.086909	0.111866	0.110628	0.094124
Men's Dress Shirt	0.177634	0.203552	0.166761	0.193458	0.177088	0.181063
Tennis Balls	0.169061	0.170618	0.154516	0.167609	0.178479	0.185447
Haircut	0.196323	0.149396	0.126333	0.18523	0.163549	0.141704
Salon	0.230625	0.202257	0.168714	0.287125	0.205842	0.320099
Dry Cleaning	0.156034	0.157846	0.166736	0.160075	0.220693	0.175051
Washer Repair	0.15303	0.208984	0.158104	0.184469	0.153412	0.196979
Bowling	0.176723	0.171426	0.105672	0.202299	0.145708	0.211601

Table 1.2

Standard Deviation of Relative Prices

	TX-TX	OK-OK	FL-FL	FL-TX	OK-TX	FL-OK
T-Bone Steak	0.166434	0.12119	0.096002	0.15	0.14475	0.116608
Ground Beef	0.204297	0.188065	0.152885	0.199184	0.18933	0.179514
Frying Chicken	0.154662	0.1524	0.150191	0.157477	0.161017	0.159592
Tuna	0.180568	0.162687	0.159512	0.175236	0.172912	0.168316
Milk	0.117738	0.090957	0.064828	0.117324	0.100466	0.089266
Eggs	0.166051	0.152197	0.124798	0.169386	0.153451	0.15279
Margarine	0.215167	0.208897	0.179295	0.212251	0.21013	0.208048
Potato	0.203157	0.200598	0.1846	0.2263	0.219709	0.198997
Tissues	0.134745	0.11373	0.107737	0.126992	0.126722	0.113575
Detergent	0.111766	0.116673	0.099832	0.114579	0.108391	0.107121
Toothpaste	0.203835	0.20256	0.155131	0.198392	0.184682	0.178293
Shampoo	0.115958	0.125114	0.10855	0.120492	0.120886	0.115567
Men's Dress Shirt	0.22109	0.208502	0.205954	0.224273	0.215514	0.204715
Tennis Balls	0.182963	0.17445	0.178446	0.178917	0.179098	0.176446
Haircut	0.156746	0.151871	0.088912	0.15099	0.128334	0.122645
Salon	0.205091	0.16341	0.149686	0.179108	0.182028	0.156729
Dry Cleaning	0.126369	0.084963	0.093459	0.108489	0.109514	0.093169
Washer Repair	0.176853	0.19327	0.161886	0.182333	0.166475	0.177535
Bowling	0.169859	0.119717	0.110964	0.143255	0.14068	0.110934

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REGRESSION RESULTS

The regression results show that there is evidence of a border effect. Most border dummy variables are statistically insignificant. The regressions where price variability is calculated by the standard deviation of the relative prices have fewer significant border dummies than when the price variability is calculated by the average of the relative prices. The number of significant border dummies goes from a low of 3, which is shared by five different types regression, to a high of 6, that calculates the border effect between Oklahoma and Florida, and uses a quadratic measure for distance. When the average is used to calculate the relative price, then the regressions calculating the Texas and Oklahoma Border effect when the natural log of the relative price is used. The lowest number of significant border dummies is seven, which occurs in regressions that examine each of the three border effects separately and uses the quadratic distance specification. These results suggest that the border effect is weaker between the states, so it is possible that exchange rate volatility and nontariff barriers, that are removed when examining US states may cause some of the border effect. As there does appear to be a border effect between the states, it is also possible that factors such as different wages also have an effect, but it may be less important.

Table 2.1 Regression Results
All Locations.
Dependent Variable
Average Deviation

	Border Dummy			ln (Distance)		
	Value	Std Error	P-Value	Value	Std Error	P-Value
T-Bone Steak	0.011478	0.004122	0.0056	0.004775	0.001117	0
Ground Beef	0.000954	0.007194	0.8946	0.011256	0.003722	0.0027
Frying Chicken	0.036055	0.006858	0	0.027573	0.003547	0
Tuna	0.039246	0.0061	0	0.004724	0.003155	0.1352
Milk	-5.17E-05	0.003949	0.9896	0.032423	0.002043	0
Eggs	0.001758	0.003127	0.5742	0.010399	0.001617	0
Margarine	0.010604	0.007144	0.1385	0.00834	0.003695	0.0246
Potato	0.027575	0.008434	0.0012	0.055357	0.004362	0
Tissues	0.04007	0.004757	0	-0.00083	0.002461	0.7366
Detergent	0.012131	0.003336	0.0003	0.008077	0.001726	0
Toothpaste	0.006235	0.007034	0.3759	0.008907	0.003638	0.0148
Shampoo	0.013705	0.00347	0.0001	0.000962	0.001795	0.5924
Men's Dress Shirt	0.011357	0.004271	0.0082	-0.00503	0.002209	0.0234
Tennis Balls	-0.001962	0.004095	0.6321	0.000786	0.002118	0.7109
Haircut	0.011482	0.008603	0.1828	-0.00332	0.00445	0.4559
Salon	0.001443	0.014967	0.9232	0.022313	0.007742	0.0042
Dry Cleaning	0.001439	0.003073	0.64	-0.00031	0.00159	0.8474
Washer Repair	-0.004271	0.007007	0.5425	0.003104	0.003625	0.3923
Bowling	-0.00459	0.010436	0.6603	0.013214	0.005398	0.0148

Table 2.2 Regression Results
All Locations.
Dependent Variable

Standard Deviation	Border Dummy			ln (Distance)
	Value	Std Error	P-Value	Value
T-Bone Steak	0.003392	0.002159	0.117	0.004775
Ground Beef	-0.00026	0.00339	0.9383	0.005241
Frying Chicken	0.001788	0.002101	0.3953	0.00328
Tuna	-0.00065	0.002951	0.8259	0.00263
Milk	0.006755	0.001989	0.0008	0.0028
Eggs	0.000298	0.002727	0.9129	0.005965
Margarine	0.000965	0.003392	0.7761	0.004393
Potato	0.027575	0.008434	0.0012	0.055357
Tissues	0.000909	0.002046	0.6569	0.002328
Detergent	-0.00055	0.001696	0.745	0.001498
Toothpaste	-0.00117	0.003658	0.749	0.001388
Shampoo	0.002091	0.002328	0.3696	0.001913
Men's Dress Shirt	0.01705	0.004332	0.0001	-0.00809
Tennis Balls	-0.00196	0.004095	0.6321	0.000786
Haircut	-0.00412	0.003269	0.2086	0.003971
Salon	-0.00315	0.004553	0.4902	0.002424
Dry Cleaning	0.001439	0.003073	0.64	-0.00031
Washer Repair	-0.00499	0.0037	0.1786	0.00148
Bowling	0.001695	0.003465	0.6251	-0.00151

Table 2.3
Regression Results
All Locations.
Dependent Variable
Average Deviation

	Border Dummy			Distance			Distance^2		
	Value	Std Error	P-Value	Value	Std Error	P-Value	Value	Std Error	P-Value
T-Bone Steak	0.005859	0.00391	0.1349	2.66E-05	8.85E-06	0.0029	1.60E-09	3.31E-09	0.6306
Ground Beef	-0.00284	0.007184	0.6929	-5.73E-06	1.63E-05	0.7248	1.12E-08	6.09E-09	0.0675
Frying Chicken	0.026119	0.005676	0	-2.32E-05	1.29E-05	0.0714	3.18E-08	4.81E-09	0
Tuna	0.0368	0.006147	0	-1.26E-05	1.39E-05	0.3675	9.64E-09	5.21E-09	0.0651
Milk	-6.23E-03	0.003203	0.0524	3.85E-05	7.25E-06	0	5.28E-09	2.72E-09	0.0526
Eggs	-0.00015	0.003134	0.9608	4.67E-05	7.10E-06	0	-1.39E-08	2.66E-09	0
Margarine	0.00646	0.007228	0.372	5.52E-05	1.64E-05	0.0008	-1.80E-08	6.13E-09	0.0035
Potato	0.011635	0.006492	0.0739	3.50E-05	1.47E-05	0.0178	2.52E-08	5.50E-09	0
Tissues	0.043028	0.00485	0	-4.59E-06	1.10E-05	0.676	3.09E-10	4.11E-09	0.9401
Detergent	0.010067	0.003372	0.003	1.96E-05	7.63E-06	0.0105	-3.01E-09	2.86E-09	0.2932
Toothpaste	0.002463	0.006908	0.7217	-2.87E-05	1.56E-05	0.067	2.01E-08	5.86E-09	0.0007
Shampoo	0.014103	0.003539	0.0001	8.65E-06	8.01E-06	0.2813	-3.49E-09	3.00E-09	0.2461
Men's Dress Shirt	0.010907	0.004361	0.0128	-2.11E-05	9.87E-06	0.0336	6.61E-09	3.70E-09	0.0746
Tennis Balls	-0.00182	0.006927	0.7933	-6.01E-06	1.57E-05	0.7019	7.06E-09	5.87E-09	0.2297
Haircut	0.009119	0.008769	0.2991	1.61E-05	1.99E-05	0.4194	-8.31E-09	7.43E-09	0.2642
Salon	-0.00279	0.015247	0.8548	8.74E-05	3.45E-05	0.0118	-2.39E-08	1.29E-08	0.0648
Dry Cleaning	0.022702	0.011687	0.0528	-1.08E-05	2.65E-05	0.6846	1.01E-08	9.91E-09	0.3104
Washer Repair	-0.00451	0.007137	0.5275	-8.20E-06	1.62E-05	0.6122	5.73E-09	6.05E-09	0.344
Bowling	-0.00703	0.01063	0.5086	2.46E-05	2.41E-05	0.3079	-1.90E-09	9.01E-09	0.8328

Table 2.4
Regression Results
All Locations.
Dependent Variable
Standard Deviation

	Border Dummy			Distance			Distance^2		
	Value	Std Error	P-Value	Value	Std Error	P-Value	Value	Std Error	P-Value
T-Bone Steak	0.002969	0.002201	0.1782	1.71E-05	4.98E-06	0.0007	-4.61E-09	1.87E-09	0.0139
Ground Beef	-0.00128	0.003444	0.7099	2.56E-05	7.80E-06	0.0011	-7.88E-09	2.92E-09	0.0072
Frying Chicken	0.002524	0.002152	0.2418	4.61E-06	4.87E-06	0.3448	-3.69E-10	1.82E-09	0.8399
Tuna	-0.00024	0.003016	0.9373	9.09E-06	6.83E-06	0.184	-2.66E-09	2.56E-09	0.2988
Milk	0.007493	0.002004	0.0002	1.89E-05	4.54E-06	0	-7.11E-09	1.70E-09	0
Eggs	0.000174	0.002742	0.9494	3.38E-05	6.21E-06	0	-1.16E-08	2.32E-09	0
Margarine	0.000614	0.003402	0.857	-8.28E-06	7.70E-06	0.2831	6.61E-09	2.88E-09	0.0224
Potato	0.024969	0.004045	0	1.51E-05	9.16E-06	0.1006	-6.69E-09	3.43E-09	0.0518
Tissues	0.001175	0.002085	0.5736	1.17E-05	4.72E-06	0.0139	-3.95E-09	1.77E-09	0.026
Detergent	6.43E-05	0.001735	0.9705	3.25E-06	3.93E-06	0.4086	-8.05E-10	1.47E-09	0.5843
Toothpaste	-0.00117	0.003712	0.7531	-1.02E-05	8.40E-06	0.2237	5.49E-09	3.15E-09	0.0818
Shampoo	0.00163	0.002373	0.4927	1.01E-05	5.37E-06	0.062	-3.17E-09	2.01E-09	0.1159
Men's Dress Shirt	0.017067	0.00443	0.0001	-2.19E-05	1.00E-05	0.0299	4.88E-09	3.75E-09	0.195
Tennis Balls	-0.00165	0.004183	0.6928	3.38E-06	9.47E-06	0.7211	-1.18E-09	3.55E-09	0.7404
Haircut	-0.00388	0.003341	0.2465	1.41E-05	7.57E-06	0.0639	-4.00E-09	2.83E-09	0.1582
Salon	-0.00251	0.004606	0.5859	-1.63E-05	1.04E-05	0.1186	8.61E-09	3.90E-09	0.028
Dry Cleaning	0.00144	0.003137	0.6466	2.14E-06	7.10E-06	0.7629	-1.16E-09	2.66E-09	0.663
Washer Repair	-0.00456	0.00378	0.2283	2.21E-06	8.56E-06	0.7962	-2.65E-10	3.20E-09	0.9341
Bowling	0.00099	0.003541	0.7799	-2.61E-06	8.02E-06	0.7447	5.47E-10	3.00E-09	0.8554

Table 2.5 Regression Results
Locations in Texas and Florida.
Dependent Variable
Average Deviation

	Border Dummy			ln (Distance)		
	Value	Std Error	P-Value	Value	Std Error	P-Value
T-Bone Steak	0.049313	0.007288	0.0056	0.007557	0.003334	0
Ground Beef	0.028854	0.011827	0.0155	-0.00294	0.00541	0.5869
Frying Chicken	0.125155	0.010944	0	0.000892	0.005007	0.8587
Tuna	0.056097	0.010538	0	0.003134	0.004821	0.5163
Milk	4.54E-02	0.005542	0	0.013198	0.002536	0
Eggs	0.004913	0.004963	0.3232	0.005877	0.00227	0.0103
Margarine	0.008944	0.014392	0.5349	0.010808	0.006584	0.1021
Potato	0.173044	0.011332	0	0.001457	0.005184	0.7789
Tissues	0.01994	0.008145	0.0151	0.01045	0.003726	0.0055
Detergent	0.022614	0.005882	0.0002	0.008036	0.002691	0.0031
Toothpaste	0.040913	0.011917	0.0007	-0.0014	0.005452	0.7977
Shampoo	0.007129	0.006007	0.2365	0.005695	0.002748	0.0393
Men's Dress Shirt	0.012159	0.006459	0.0611	-0.00382	0.002955	0.1973
Tennis Balls	0.014436	0.010432	0.1678	0.001185	0.004772	0.8041
Haircut	-0.00156	0.01496	0.9172	0.001986	0.006844	0.7719
Salon	0.001932	0.008429	0.8189	0.001423	0.003856	0.7124
Dry Cleaning	0.055533	0.019076	0.004	0.001984	0.008727	0.8203
Washer Repair	-0.00164	0.009766	0.8672	-0.00027	0.004468	0.9512
Bowling	-0.00418	0.013512	0.7572	0.004571	0.006182	0.4604

Table 2.6 Regression Results
Locations in Texas and Florida.
Dependent Variable
Standard Deviation

	Border Dummy			ln (Distance)		
	Value	Std Error	P-Value	Value	Std Error	P-Value
T-Bone Steak	0.003879	0.003979	0.3307	0.005075	0.00182	0.0057
Ground Beef	-0.00052	0.005907	0.9296	0.005921	0.002702	0.0295
Frying Chicken	0.001711	0.003857	0.6577	0.003617	0.001765	0.0415
Tuna	0.000199	0.004682	0.9661	0.001405	0.002142	0.5125
Milk	-0.00382	0.003402	0.2622	0.006838	0.001556	0
Eggs	-0.0119	0.004865	0.0152	0.010479	0.002226	0
Margarine	0.010415	0.005916	0.0797	0.001306	0.002707	0.63
Potato	0.018063	0.006839	0.0088	0.004084	0.003129	0.1931
Tissues	-0.00281	0.003795	0.4606	0.004356	0.001736	0.0128
Detergent	-0.00402	0.002815	0.155	0.003474	0.001288	0.0075
Toothpaste	0.00697	0.005827	0.2329	-0.00093	0.002666	0.727
Shampoo	0.001455	0.003434	0.6723	0.003774	0.001571	0.0171
Men's Dress Shirt	0.011549	0.007682	0.1341	-0.00503	0.003514	0.1541
Tennis Balls	-0.00583	0.005869	0.3219	0.002218	0.002685	0.4095
Haircut	-0.00284	0.005227	0.5881	0.004385	0.002391	0.068
Salon	0.001932	0.008429	0.8189	0.001423	0.003856	0.7124
Dry Cleaning	0.001439	0.003073	0.64	-0.00031	0.00159	0.8474
Washer Repair	-0.00479	0.006155	0.4374	0.000996	0.002816	0.7239
Bowling	0.002547	0.005451	0.6408	-0.0012	0.002494	0.6314

Table 2.7
Regression Results
Locations in
Texas and Florida.
Dependent Variable
Average Deviation

	Border Dummy			Distance			Distance^2		
	Value	Std Error	P-Value	Value	Std Error	P-Value	Value	Std Error	P-Value
T-Bone Steak	0.038844	0.012123	0.0015	3.00E-05	1.25E-05	0.0171	-6.13E-09	4.16E-09	0.1418
Ground Beef	-0.00126	0.019553	0.9486	-1.09E-05	2.02E-05	0.5905	1.08E-08	6.71E-09	0.1081
Frying Chicken	0.075873	0.017287	0	-2.51E-05	1.78E-05	0.1605	2.35E-08	5.93E-09	0.0001
Tuna	0.017367	0.017182	0.3132	1.80E-06	1.77E-05	0.9193	1.07E-08	5.89E-09	0.0702
Milk	-1.06E-03	0.008363	0.8995	3.42E-05	8.63E-06	0.0001	4.13E-09	2.87E-09	0.1516
Eggs	0.003663	0.008072	0.6504	3.49E-05	8.33E-06	0	-1.13E-08	2.77E-09	0.0001
Margarine	0.006929	0.023578	0.7691	7.68E-05	2.43E-05	0.0018	-2.62E-08	8.09E-09	0.0014
Potato	0.134599	0.018139	0	-2.92E-05	1.87E-05	0.1205	2.27E-08	6.22E-09	0.0003
Tissues	-0.01404	0.013232	0.29	1.77E-05	1.37E-05	0.1968	6.46E-09	4.54E-09	0.1557
Detergent	0.023553	0.009743	0.0164	3.46E-05	1.01E-05	0.0007	-1.07E-08	3.34E-09	0.0015
Toothpaste	0.01697	0.019601	0.3875	-2.35E-05	2.02E-05	0.2472	1.52E-08	6.72E-09	0.0244
Shampoo	0.001141	0.01	0.9093	2.32E-05	1.03E-05	0.0253	-5.35E-09	3.43E-09	0.1201
Men's Dress Shirt	0.016782	0.010761	0.1203	-1.66E-05	1.11E-05	0.1353	3.88E-09	3.69E-09	0.2948
Tennis Balls	0.014988	0.017324	0.3879	-2.01E-05	1.79E-05	0.2622	8.80E-09	5.94E-09	0.14
Haircut	0.00756	0.024642	0.7593	4.61E-05	2.54E-05	0.0713	-2.05E-08	8.45E-09	0.0158
Salon	-0.06797	0.031631	0.0327	3.18E-05	3.26E-05	0.3303	5.77E-09	1.08E-08	0.5952
Dry Cleaning	0.080414	0.031763	0.012	-3.24E-05	3.28E-05	0.3243	8.06E-09	1.09E-08	0.4602
Washer Repair	-0.01977	0.016179	0.223	-7.08E-06	1.67E-05	0.6717	7.47E-09	5.55E-09	0.1796
Bowling	-0.04484	0.022265	0.0452	1.45E-05	2.30E-05	0.5275	6.61E-09	7.64E-09	0.3872

Table 2.8
Regression Results
Locations in
Texas and Florida.
Dependent Variable
Standard Deviation

	Border Dummy			Distance			Distance^2		
	Value	Std Error	P-Value	Value	Std Error	P-Value	Value	Std Error	P-Value
T-Bone Steak	-0.00175	0.006613	0.7917	2.05E-05	6.82E-06	0.0029	-4.63E-09	2.27E-09	0.0426
Ground Beef	0.000619	0.009731	0.9493	3.14E-05	1.00E-05	0.002	-1.05E-08	3.34E-09	0.0019
Frying Chicken	-0.00133	0.006456	0.8366	8.35E-06	6.66E-06	0.2115	-9.28E-10	2.21E-09	0.6757
Tuna	-0.00783	0.007784	0.3156	7.47E-06	8.03E-06	0.3533	-3.63E-10	2.67E-09	0.8918
Milk	-0.01046	0.005635	0.0649	2.71E-05	5.81E-06	0	-6.23E-09	1.93E-09	0.0015
Eggs	-0.02058	0.007931	0.0101	4.75E-05	8.18E-06	0	-1.24E-08	2.72E-09	0
Margarine	-0.00115	0.009783	0.9066	-2.51E-06	1.01E-05	0.8038	4.65E-09	3.36E-09	0.1671
Potato	0.020586	0.011426	0.0729	1.23E-05	1.18E-05	0.2993	-3.76E-09	3.92E-09	0.3385
Tissues	-0.00437	0.006342	0.4911	1.53E-05	6.54E-06	0.0204	-3.83E-09	2.18E-09	0.0793
Detergent	-7.43E-03	0.004711	0.116	1.01E-05	4.86E-06	0.0396	-1.62E-09	1.62E-09	0.3184
Toothpaste	0.009321	0.009687	0.337	-1.28E-05	9.99E-06	0.2004	4.28E-09	3.32E-09	0.1985
Shampoo	0.004878	0.005581	0.3831	2.18E-05	5.76E-06	0.0002	-8.12E-09	1.91E-09	0
Men's Dress Shirt	0.024631	0.012778	0.0552	-1.55E-05	1.32E-05	0.2409	6.43E-10	4.38E-09	0.8836
Tennis Balls	-0.00634	0.009795	0.5182	7.16E-06	1.01E-05	0.4793	-1.77E-09	3.36E-09	0.5995
Haircut	-0.00068	0.008713	0.9383	1.69E-05	8.99E-06	0.0613	-5.45E-09	2.99E-09	0.0695
Salon	-0.00904	0.013938	0.5172	-1.16E-05	1.44E-05	0.4188	8.36E-09	4.78E-09	0.0817
Dry Cleaning	0.002729	0.009215	0.7674	-4.22E-06	9.51E-06	0.6573	9.55E-10	3.16E-09	0.7628
Washer Repair	-0.00726	0.010268	0.4805	3.92E-06	1.06E-05	0.7115	-5.14E-10	3.52E-09	0.8842
Bowling	0.009105	0.009077	0.3169	-3.37E-06	9.36E-06	0.7189	-8.63E-10	3.11E-09	0.7819

Table 2.9 Regression Results
Locations in Texas and Oklahoma.
Dependent Variable
Average Deviation

	Border Dummy			ln (Distance)		
	Value	Std Error	P-Value	Value	Std Error	P-Value
T-Bone Steak	-0.00372	0.003149	0.2389	0.009256	0.002096	0
Ground Beef	0.015174	0.007943	0.0575	-0.00591	0.005288	0.265
Frying Chicken	0.007749	0.004321	0.0744	0.00314	0.002877	0.2764
Tuna	0.014406	0.00577	0.0133	0.012228	0.003842	0.0017
Milk	8.91E-03	0.002623	0.0008	0.009451	0.001746	0
Eggs	0.009458	0.003901	0.0162	0.009845	0.002597	0.0002
Margarine	-0.00495	0.009029	0.5843	0.021358	0.006011	0.0005
Potato	0.014165	0.004747	0.0032	0.007669	0.00316	0.0161
Tissues	0.022999	0.005575	0.0001	0.016264	0.003712	0
Detergent	-0.00161	0.00296	0.5861	0.008199	0.00197	0
Toothpaste	-0.00329	0.006714	0.6242	-0.00247	0.00447	0.5805
Shampoo	0.004992	0.004403	0.2582	0.007121	0.002931	0.016
Men's Dress Shirt	0.011357	0.004271	0.0082	-0.00503	0.002209	0.0234
Tennis Balls	-0.0026	0.006817	0.7027	0.007566	0.003526	0.0325
Haircut	0.011482	0.008603	0.1828	-0.00332	0.00445	0.4559
Salon	-0.00688	0.005515	0.2135	0.001968	0.003672	0.5925
Dry Cleaning	-0.00388	0.012419	0.7548	0.007941	0.008268	0.338
Washer Repair	0.000528	0.008237	0.949	0.00332	0.005484	0.5456
Bowling	0.022406	0.013572	0.1003	0.006584	0.009036	0.4671

Table 2.10 Regression Results
Locations in Texas and Oklahoma.
Dependent Variable
Standard Deviation

	Border Dummy			ln (Distance)		
	Value	Std Error	P-Value	Value	Std Error	P-Value
T-Bone Steak	-0.00068	0.002693	0.8006	0.007772	0.001793	0
Ground Beef	0.000493	0.004218	0.907	0.00284	0.002808	0.3131
Frying Chicken	0.000944	0.002489	0.705	0.003397	0.001657	0.0417
Tuna	-0.0006	0.003726	0.8713	0.004767	0.00248	0.056
Milk	0.00638	0.002623	0.0159	0.007463	0.001747	0
Eggs	0.00029	0.003643	0.9367	0.011283	0.002426	0
Margarine	-0.00126	0.00386	0.7449	0.00167	0.00257	0.5164
Potato	0.012883	0.004646	0.0061	0.013056	0.003093	0
Tissues	-0.001	0.002518	0.6922	0.004246	0.001677	0.0121
Detergent	-0.00241	0.002167	0.2671	0.003136	0.001443	0.0309
Toothpaste	-0.00508	0.004407	0.2504	0.000309	0.002934	0.9162
Shampoo	-0.00306	0.002811	0.2779	0.00341	0.001871	0.0699
Men's Dress Shirt	0.01705	0.004332	0.0001	-0.00809	0.002241	0.0003
Tennis Balls	-0.00196	0.004095	0.6321	0.000786	0.002118	0.7109
Haircut	-0.00412	0.003269	0.2086	0.003971	0.001691	0.0194
Salon	-0.00688	0.005515	0.2135	0.001968	0.003672	0.5925
Dry Cleaning	0.002502	0.004147	0.547	0.000364	0.002761	0.8954
Washer Repair	-0.00407	0.004487	0.365	0.001523	0.002988	0.6107
Bowling	0.000284	0.004348	0.948	-0.00206	0.002895	0.4785

Table 2.11
Regression Results
Locations in Texas and Oklahoma.
Dependent Variable
Average Deviation

	Border Dummy			Distance			Distance^2		
	Value	Std Error	P-Value	Value	Std Error	P-Value	Value	Std Error	P-Value
T-Bone Steak	-0.00513	0.00313	0.1029	2.37E-05	1.40E-05	0.0916	3.80E-09	1.07E-08	0.7235
Ground Beef	0.013426	0.008082	0.0982	6.32E-06	3.61E-05	0.8614	-1.56E-08	2.77E-08	0.5736
Frying Chicken	0.00694	0.00439	0.1154	1.65E-05	1.96E-05	0.4003	-5.91E-09	1.50E-08	0.6948
Tuna	0.011703	0.005709	0.0416	1.30E-05	2.55E-05	0.6101	2.48E-08	1.96E-08	0.2064
Milk	7.68E-03	0.002608	0.0036	3.02E-05	1.17E-05	0.0103	-2.40E-09	8.93E-09	0.7882
Eggs	0.007101	0.00387	0.068	2.93E-05	1.73E-05	0.0924	2.56E-09	1.33E-08	0.8471
Margarine	-0.01058	0.008805	0.2307	1.99E-05	3.94E-05	0.6133	4.85E-08	3.02E-08	0.1091
Potato	0.012426	0.004677	0.0085	-1.14E-05	2.09E-05	0.5861	3.43E-08	1.60E-08	0.0332
Tissues	0.021208	0.005607	0.0002	5.37E-05	2.51E-05	0.0335	-6.67E-09	1.92E-08	0.7289
Detergent	-0.00129	0.003021	0.6697	4.55E-05	1.35E-05	0.0009	-2.43E-08	1.03E-08	0.0198
Toothpaste	-0.003	0.006825	0.6608	4.94E-07	3.05E-05	0.9871	-7.31E-09	2.34E-08	0.7549
Shampoo	0.003931	0.004463	0.3795	3.63E-05	2.00E-05	0.0704	-1.44E-08	1.53E-08	0.3487
Men's Dress Shirt	0.016782	0.010761	0.1203	-1.66E-05	1.11E-05	0.1353	3.88E-09	3.69E-09	0.2948
Tennis Balls	0.014988	0.017324	0.3879	-2.01E-05	1.79E-05	0.2622	8.80E-09	5.94E-09	0.14
Haircut	0.00756	0.024642	0.7593	4.61E-05	2.54E-05	0.0713	-2.05E-08	8.45E-09	0.0158
Salon	0.039399	0.016744	0.0196	-3.70E-05	7.49E-05	0.6221	1.21E-07	5.73E-08	0.0354
Dry Cleaning	0.001606	0.012634	0.899	4.88E-05	5.65E-05	0.389	-4.23E-08	4.33E-08	0.3295
Washer Repair	-0.00178	0.008366	0.8321	2.52E-05	3.74E-05	0.502	-9.56E-09	2.87E-08	0.739
Bowling	0.01771	0.013661	0.1963	-3.49E-05	6.11E-05	0.5686	6.22E-08	4.68E-08	0.1849

Table 2.12
Regression Results
Locations in Texas and Oklahoma.
Dependent Variable
Standard Deviation

	Border Dummy			Distance			Distance^2		
	Value	Std Error	P-Value	Value	Std Error	P-Value	Value	Std Error	P-Value
T-Bone Steak	-0.00157	0.002706	0.5622	2.46E-05	1.21E-05	0.043	-2.13E-09	9.27E-09	0.8188
Ground Beef	-0.00054	0.004273	0.8999	3.18E-05	1.91E-05	0.0979	-2.05E-08	1.46E-08	0.1619
Frying Chicken	0.001312	0.002523	0.6038	2.70E-05	1.13E-05	0.0177	-1.85E-08	8.64E-09	0.0338
Tuna	-0.00155	0.003777	0.6812	2.22E-05	1.69E-05	0.1905	-6.93E-09	1.29E-08	0.5926
Milk	0.00581	0.002659	0.03	3.26E-05	1.19E-05	0.0067	-1.13E-08	9.11E-09	0.2147
Eggs	-0.00136	0.003581	0.7051	1.93E-05	1.60E-05	0.2286	1.36E-08	1.23E-08	0.2699
Margarine	-0.00225	0.00392	0.5664	1.54E-05	1.75E-05	0.3793	-7.93E-09	1.34E-08	0.5556
Potato	0.0115	0.004525	0.0118	9.26E-07	2.02E-05	0.9635	3.47E-08	1.55E-08	0.0261
Tissues	-0.00156	0.002552	0.5415	1.61E-05	1.14E-05	0.1586	-3.51E-09	8.74E-09	0.6883
Detergent	-2.11E-03	0.002211	0.3416	1.48E-05	9.89E-06	0.1349	-7.35E-09	7.57E-09	0.3326
Toothpaste	-0.0052	0.004483	0.2478	5.74E-06	2.00E-05	0.7748	-4.40E-09	1.54E-08	0.7745
Shampoo	-0.00379	0.002835	0.1833	3.61E-06	1.27E-05	0.7761	6.86E-09	9.71E-09	0.4804
Men's Dress Shirt	0.024631	0.012778	0.0552	-1.55E-05	1.32E-05	0.2409	6.43E-10	4.38E-09	0.8836
Tennis Balls	-0.00634	0.009795	0.5182	7.16E-06	1.01E-05	0.4793	-1.77E-09	3.36E-09	0.5995
Haircut	-0.00068	0.008713	0.9383	1.69E-05	8.99E-06	0.0613	-5.45E-09	2.99E-09	0.0695
Salon	-0.00577	0.005607	0.3046	1.69E-05	2.51E-05	0.5003	-1.44E-08	1.92E-08	0.4537
Dry Cleaning	0.002825	0.004217	0.5037	-7.78E-06	1.89E-05	0.6803	7.42E-09	1.44E-08	0.6082
Washer Repair	-0.00392	0.004554	0.3903	2.19E-05	2.04E-05	0.2827	-1.76E-08	1.56E-08	0.2596
Bowling	-1.13E-05	0.004422	0.998	-1.60E-05	1.98E-05	0.418	1.11E-08	1.51E-08	0.464

Table 2.13 Regression Results
Locations in Oklahoma and Florida
Dependent Variable
Average Deviation

	Border Dummy			ln (Distance)		
	Value	Std Error	P-Value	Value	Std Error	P-Value
T-Bone Steak	0.044876	0.009944	0	0.000652	0.003902	0.8679
Ground Beef	0.071905	0.023842	0.0037	-0.00605	0.009356	0.5201
Frying Chicken	0.086264	0.012867	0	0.000817	0.005049	0.872
Tuna	0.000522	0.015979	0.9741	0.005918	0.00627	0.3489
Milk	1.20E-01	0.008783	0	-0.00362	0.003446	0.2975
Eggs	0.042169	0.007643	0	0.0018	0.002999	0.5505
Margarine	0.006786	0.010438	0.518	0.003705	0.004096	0.3692
Potato	0.18359	0.014249	0	0.003408	0.005591	0.5443
Tissues	-0.00351	0.007304	0.6328	0.002541	0.002866	0.3786
Detergent	0.008617	0.009062	0.3453	0.002199	0.003556	0.5385
Toothpaste	0.063093	0.024421	0.0121	-0.01531	0.009583	0.1151
Shampoo	-0.01929	0.009567	0.048	0.007653	0.003754	0.0457
Men's Dress Shirt	0.016727	0.017744	0.3494	-0.00857	0.006963	0.2229
Tennis Balls	0.006579	0.032176	0.8386	0.00671	0.012626	0.597
Haircut	0.050063	0.027325	0.0717	-0.01903	0.010722	0.0808
Salon	0.02213	0.014636	0.1355	-0.00904	0.005743	0.1207
Dry Cleaning	0.006377	0.04238	0.8809	0.002627	0.01663	0.875
Washer Repair	0.041834	0.039237	0.2904	-0.01169	0.015396	0.4505
Bowling	0.112603	0.041147	0.0081	-0.01628	0.016146	0.3172

Table 2.14 Regression Results
Locations in Oklahoma and Florida
Dependent Variable
Standard Deviation

	Border Dummy			ln (Distance)		
	Value	Std Error	P-Value	Value	Std Error	P-Value
T-Bone Steak	-0.00256	0.006149	0.6791	0.00435	0.002413	0.0762
Ground Beef	0.002927	0.010971	0.7905	0.002516	0.004305	0.561
Frying Chicken	-0.00558	0.009098	0.5416	0.005714	0.00357	0.1145
Tuna	-0.02512	0.01286	0.0552	0.013312	0.005046	0.0105
Milk	0.010072	0.005895	0.0925	0.000536	0.002313	0.8176
Eggs	0.001312	0.008688	0.8805	0.005343	0.003409	0.1221
Margarine	0.001535	0.011362	0.893	0.005111	0.004458	0.2559
Potato	-0.00153	0.010839	0.8883	0.003263	0.004253	0.4458
Tissues	-0.00904	0.007983	0.2616	0.004892	0.003133	0.1234
Detergent	-0.01005	0.006615	0.1339	0.00367	0.002596	0.1624
Toothpaste	0.002913	0.015507	0.8516	-0.00143	0.006085	0.8154
Shampoo	-0.0228	0.010268	0.03	0.008866	0.004029	0.0315
Men's Dress Shirt	0.017721	0.012976	0.1769	-0.00833	0.005092	0.1069
Tennis Balls	-0.00627	0.017923	0.7278	0.002579	0.007033	0.7151
Haircut	-0.00546	0.009887	0.5828	0.003175	0.00388	0.4163
Salon	0.02213	0.014636	0.1355	-0.00904	0.005743	0.1207
Dry Cleaning	0.016476	0.009813	0.0981	-0.00515	0.00385	0.1856
Washer Repair	-0.00542	0.014161	0.703	0.002215	0.005557	0.6916
Bowling	0.003511	0.018392	0.8492	-0.00326	0.007217	0.6531

Table 2.15
Regression Results
Locations in
Oklahoma
and Florida
Dependent Variable
Average Deviation

	Border Dummy			Distance			Distance^2		
	Value	Std Error	P-Value	Value	Std Error	P-Value	Value	Std Error	P-Value
T-Bone Steak	0.05331	0.027015	0.0529	-1.21E-05	2.87E-05	0.676	3.69E-09	1.11E-08	0.7405
Ground Beef	-0.04051	0.060821	0.5078	-9.03E-05	6.47E-05	0.1677	6.37E-08	2.50E-08	0.0132
Frying Chicken	-0.01198	0.030264	0.6937	-3.51E-05	3.22E-05	0.2801	3.98E-08	1.24E-08	0.0021
Tuna	-0.0559	0.042749	0.1958	1.87E-05	4.55E-05	0.682	8.85E-09	1.76E-08	0.6158
Milk	1.02E-01	0.023564	0.0001	-3.07E-05	2.51E-05	0.2253	1.59E-08	9.68E-09	0.1051
Eggs	0.057501	0.020701	0.0072	9.12E-06	2.20E-05	0.68	-6.70E-09	8.50E-09	0.4335
Margarine	-0.01957	0.028018	0.4875	-5.75E-06	2.98E-05	0.8476	1.11E-08	1.15E-08	0.3376
Potato	0.145148	0.036964	0.0002	-5.15E-05	3.93E-05	0.195	3.42E-08	1.52E-08	0.028
Tissues	0.000449	0.019954	0.9821	9.73E-06	2.12E-05	0.6482	-3.78E-09	8.19E-09	0.6463
Detergent	-0.03099	0.02363	0.1946	-8.77E-06	2.51E-05	0.7284	1.48E-08	9.70E-09	0.1328
Toothpaste	0.071987	0.065118	0.2732	-1.54E-04	6.93E-05	0.03	5.71E-08	2.67E-08	0.0367
Shampoo	-0.04214	0.025875	0.1085	5.78E-05	2.75E-05	0.0398	-1.56E-08	1.06E-08	0.1475
Men's Dress Shirt	0.063362	0.047935	0.1911	-6.23E-05	5.10E-05	0.2263	1.13E-08	1.97E-08	0.5684
Tennis Balls	0.125605	0.085101	0.145	6.77E-05	9.05E-05	0.457	-5.49E-08	3.49E-08	0.121
Haircut	0.026843	0.074693	0.7205	-1.18E-04	7.95E-05	0.1409	4.70E-08	3.07E-08	0.1308
Salon	0.532543	0.175074	0.0034	-1.99E-04	1.86E-04	0.2899	-8.26E-09	7.19E-08	0.9089
Dry Cleaning	-0.19254	0.108272	0.0803	-1.08E-04	1.15E-04	0.3506	9.78E-08	4.45E-08	0.0316
Washer Repair	-0.0791	0.102903	0.445	-1.53E-04	1.09E-04	0.1673	9.02E-08	4.23E-08	0.0366
Bowling	0.268156	0.109924	0.0176	-6.74E-05	1.17E-04	0.5663	-1.74E-08	4.51E-08	0.7016

Table 2.16
Regression Results
Locations in
Oklahoma
and Florida
Dependent Variable
Standard Deviation

	Border Dummy			Distance			Distance^2		
	Value	Std Error	P-Value	Value	Std Error	P-Value	Value	Std Error	P-Value
T-Bone Steak	-0.02094	0.016693	0.2144	2.51E-05	1.78E-05	0.1633	-4.10E-09	6.85E-09	0.5524
Ground Beef	-0.00873	0.029812	0.7707	8.02E-07	3.17E-05	0.9799	3.95E-09	1.22E-08	0.7481
Frying Chicken	-0.05345	0.023888	0.0289	4.79E-05	2.54E-05	0.0643	-6.26E-09	9.81E-09	0.5254
Tuna	-0.05797	0.035524	0.1078	7.26E-05	3.78E-05	0.0594	-1.64E-08	1.46E-08	0.2655
Milk	-0.01752	0.015283	0.2561	-7.95E-06	1.63E-05	0.6265	1.05E-08	6.28E-09	0.0985
Eggs	0.017741	0.024014	0.4628	1.17E-05	2.55E-05	0.6483	-6.03E-09	9.86E-09	0.5433
Margarine	-0.05587	0.02973	0.0649	1.21E-05	3.16E-05	0.7025	1.15E-08	1.22E-08	0.3483
Potato	-0.00019	0.029567	0.995	1.48E-05	3.15E-05	0.6403	-4.95E-09	1.21E-08	0.6847
Tissues	-0.00594	0.021928	0.7875	2.48E-05	2.33E-05	0.2919	-8.87E-09	9.00E-09	0.3286
Detergent	-3.38E-02	0.017784	0.0617	2.12E-05	1.89E-05	0.2674	-1.46E-09	7.30E-09	0.8421
Toothpaste	0.013028	0.041961	0.7572	-3.73E-05	4.46E-05	0.407	1.32E-08	1.72E-08	0.4454
Shampoo	-0.0506	0.027991	0.0755	5.58E-05	2.98E-05	0.0654	-1.28E-08	1.15E-08	0.2693
Men's Dress Shirt	0.038641	0.035268	0.2775	-5.97E-05	3.75E-05	0.1169	1.65E-08	1.45E-08	0.2594
Tennis Balls	0.0144	0.048718	0.7685	-2.38E-05	5.18E-05	0.648	7.05E-09	2.00E-08	0.7256
Haircut	0.001112	0.026882	0.9671	2.15E-05	2.86E-05	0.4551	-9.25E-09	1.10E-08	0.405
Salon	0.041157	0.038469	0.2888	-1.08E-04	4.09E-05	0.0106	3.79E-08	1.58E-08	0.0195
Dry Cleaning	0.057087	0.026166	0.0329	-1.81E-05	2.78E-05	0.519	-4.87E-09	1.07E-08	0.6521
Washer Repair	-0.07155	0.037126	0.0585	7.81E-07	3.95E-05	0.9843	1.70E-08	1.52E-08	0.2697
Bowling	0.005002	0.050091	0.9208	-8.57E-07	5.33E-05	0.9872	-1.90E-09	2.06E-08	0.9267

Table 3: Summary of Results
Number of Significant border coefficients

Border	Distance Measure	Average	Std. Deviation
All	Ln Distance	8	3
	Quadratic Distance	9	3
TX-FL	Ln Distance	11	3
	Quadratic Distance	7	4
TX-OK	Ln Distance	8	3
	Quadratic Distance	7	3
OK-FL	Ln Distance	10	4
	Quadratic Distance	7	6

There have also been other possible causes for the border effect that would be different for the states examined. It is possible that wages may contribute to the border effect.

HEADING 7

CONCLUSION

This paper examines the border effect in the law of one price between the US states of Texas, Oklahoma, and Florida. It includes the quarterly prices for 19 goods from 16 cities in Texas, 6 cities in Oklahoma and 7 cities in Florida from third quarter 1997 to third quarter 2013. Two measures of distance were used, the natural log of distance, and the quadratic function of distance. Price dispersion was also calculated two ways using the average of the relative prices over time and the standard deviation of the prices over time.

The results show evidence that there is a border effect between US states. When average relative price is used there are more significant border coefficients compared to when standard deviation is used. There is less of a difference between distance measures. This shows that the border effect is not caused by non-tariff barriers to trade or nominal exchange rate effects. It is possible that the border effect is caused by differences in wages or though transportation costs.

APPENDIX A

Goods and Services Used

Ground Beef, Bowling, Chicken, Detergent, Dry cleaning, Eggs, Haircut, Margarine, Milk, Potato, Washer Repair, Salon, Shampoo, Shirt, T-bone steak, Tennis, Tissues, Toothpaste, Tuna

APPENDIX B

Cities Used

Texas: Amarillo, Austin, Beaumont, Conroe, Dallas, Houston, Lubbock, McAllen, Midland, Odessa, San Angelo, San Antonio, San Marcos, Tyler, Waco, Weatherford

Oklahoma: Ardmore, Muskogee, Oklahoma City, Pryor Creek, Stillwater, Tulsa

Florida: Bradenton, Cape Coral-Fort Myers, Jacksonville, Orlando, Sarasota, Tampa, Vero Beach-Indian River

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