The Texas Sales Tax Rebate Program

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THE TEXAS SALES TAX REBATE PROGRAM

JOSE ANGEL MORENO

Master’s Program in Economics and Finance

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Jose Angel Moreno

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THE TEXAS SALES TAX REBATE PROGRAM

by

JOSE ANGEL MORENO, BBA

THESIS

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Abstract

The sale tax rebate program has existed in states along the U.S. – Mexico border for over 60 years and, in Texas, it has been the subject of much debate regarding both its legitimacy and its efficacy in stimulating real retail sales particularly in border cities. No empirical research exists, though, that provides insight into the statistical relationships between the Texas retail sector and total certificates issued by Private Customs Brokers (PCBs) in border cities. This study fills this research gap by creating a model that tests the statistical significance of real retail sales on total certificates issued in Texas. Data in this thesis suggest that, in border cities, an increase in real retail sales dollars does not suggest an increase of sales tax rebate certificates issued by Private Custom Brokers (PCBs) in these cities. The history and the current state of legislation for the program is also discussed, which provides the sufficient context for the behavioral model discussed within.
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Chapter 1: Introduction

The Sales Tax Rebate (STR) program has existed in states along the U.S. – Mexico border for over 50 years. In Texas, this program has been the subject of much debate regarding both its legitimacy and its effectiveness in stimulating cross-border retail trade activity along the Texas – Mexico border. The total amount of sales tax rebate certificates – commonly known as ‘manifiestos,’ issued by Private Custom Brokers (PCBs) in Brownsville, El Paso, Laredo, and McAllen (border cities) – have declined in the past decade. And certificates issued in non-border cities such as, Austin, Dallas, Houston, and San Antonio have increased significantly during the same since 2004.

The larger proportion of retail trade activity in Texas takes place in non-border cities, and more than half of all STR transactions, historically, have happened in border cities. So the recent simultaneous decrease in border certificates in border cities, and the increase in real retail sales in non-border cities has resulted in what data suggest is a negative relationship between the two. (Figure 1.1)

![Figure 1.1: Aggregate Sales Tax Rebate Certificates Issued in Texas and Real Retail Sales](image)

---

1 Data for this graph has been seasonally adjusted using the X-12 Method.
Real retail sales, particularly for border cities, are affected by other factors. Recently, the U.S. dollar has appreciated significantly relative to the Mexican peso, and data presented in this study proposes that this may have an effect on real retail sales in border cities, and so on total certificates issued by PCBs there. (Figure 1.2)

Figure 1.2: Border City Aggregate Real Retail Sales and the Exchange Rate (FIX)

No empirical research exists, though, that analyzes these trends, failing to provide insight on how real retail sales activity affects the total amount of sales tax rebate certificates issued by PCBs in Texas, and particularly in border cities over time. State representatives suggest that Mexican nationals are abusing the current system, costing the city of El Paso for example, and the state millions of dollars (Avila, 2010). But data show a decrease in *manifiesto* transactions not only for the city of El Paso, but also for the other three border cities analyzed in this study. In fact, in the past decade only non-border cities have seen an increase in *manifiesto* transactions and not border cities.

The sales tax rebate program was first a federally regulated program, and it is now regulated by the Texas Comptroller (Texas Comptroller, 2003). The U.S. constitution prohibits any state from placing duties on imports or exports. (U.S.C.A. Const. Art. I § 10, cl. 2). So because of this

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2 See Appendix for real retail sales and sales tax rebate certificate data specifically for each border and non-city.
import and export clause, as long as physical personal property retains its character as an export, property is exempt from taxation. (Tex. Tax Code. §151.307; §151.330). The original Texas sales tax law exempts exports of tangible personal property as long as the retailer delivered the goods purchased to a federal forwarding agent, common carrier, or retailer for delivery outside the state (Texas Comptroller, 2003).

Buyers of the merchandise exported may not take delivery if they want a sales tax rebate (34 Tex. Admin Code § 3.360). In 1969, though, U.S. custom officials discontinued the practice of verifying exports, and buyers found it too difficult to obtain import documentation from Mexican authorities (Texas Comptroller, 2003). So, in the 1970s, numerous complaints that this rule was too strict led the Comptroller’s office to create a proof of export form that could be certified by forwarding agents to ease access to the service. These forwarding agents were not regulated by any state or federal agencies at this time though (Texas Comptroller, 2003).

Not much thereafter, in 1985, local city official began claiming that freight forwarders were fraudulently certifying exports, costing their cities potential sales tax revenues (Texas Comptroller, 2003). In an attempt to reduce fraud, the Texas legislature amended the sales tax law to replace export verification by freight forwarders with export certification by Private Custom Brokers (PCBs). These brokers were first licensed by the federal government. The Texas Comptroller did not yet oversee their work (Texas Comptroller, 2003).

Complains regarding fraud did not stop however, eventually resulting in the 1993 Legislature passing House Bill 2413, which requires that PCBs now be licensed by the Comptroller’s office instead of the federal government. PCBs receive comptroller stamps that they attached to documentation of export forms provided by the Comptroller’s Office (manifiestos). Further complaints led to a law in 1999 mandating a waiting period of 24 hours and seven days in border
cities and non-border cities, respectively. These waiting periods allowed enough time for goods to be exported before the buyers apply for a rebate (Texas Comptroller, 2003). Although Comptroller investigations found that PCBs operating in border cities would front the customer their rebate and collect the cash from the retailer 24 hours later Texas Comptroller, 2003).

Since the Comptroller began overseeing PCBs operations, the agency has found that the STR program exhibits a pattern of fraud, and argues that this costs state and local border city governments’ potential sales tax revenues (Texas Comptroller, 2003). Since the Comptroller’s investigation began in 1996, the agency has suspended many licenses of PCBs operating along the Texas – Mexico border (Texas Comptroller, 2003). In most cases, these licenses were revoked because PCBs failed to verify that merchandise had left the country. The Comptroller licensed more than 200 PCBs in Texas in 2003. Currently however, only 35 PCBs operate in the four major Texas border cities analyzed in this study. (Table 1.1)

Table 1.1: Total Private Customs Brokers Operating in Texas Border Cities

<table>
<thead>
<tr>
<th>Year</th>
<th>Brownsville</th>
<th>El Paso</th>
<th>Laredo</th>
<th>McAllen</th>
</tr>
</thead>
<tbody>
<tr>
<td>2004</td>
<td>12</td>
<td>12</td>
<td>13</td>
<td>10</td>
</tr>
<tr>
<td>2005</td>
<td>11</td>
<td>10</td>
<td>12</td>
<td>10</td>
</tr>
<tr>
<td>2006</td>
<td>10</td>
<td>10</td>
<td>14</td>
<td>10</td>
</tr>
<tr>
<td>2007</td>
<td>10</td>
<td>10</td>
<td>12</td>
<td>9</td>
</tr>
<tr>
<td>2008</td>
<td>12</td>
<td>13</td>
<td>15</td>
<td>12</td>
</tr>
<tr>
<td>2009</td>
<td>14</td>
<td>13</td>
<td>13</td>
<td>11</td>
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<tr>
<td>2010</td>
<td>10</td>
<td>13</td>
<td>12</td>
<td>10</td>
</tr>
<tr>
<td>2011</td>
<td>8</td>
<td>13</td>
<td>11</td>
<td>10</td>
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<tr>
<td>2012</td>
<td>8</td>
<td>12</td>
<td>10</td>
<td>10</td>
</tr>
<tr>
<td>2013</td>
<td>7</td>
<td>11</td>
<td>9</td>
<td>9</td>
</tr>
</tbody>
</table>
Sales tax rebate certificates have historically been issued in border cities. Recently though, the demand for the *manifestos* service in border cities seems to have decreased since 2009. (Figure 1.3) Data show that the demand of *STR* certificates has shifted from border cities to non-border cities.

![Figure 1.3: Aggregate Sales Tax Rebate Certificates Issued by PCBs in Border Cities](image)

Certificates issued in non-border have actually increased since 2009, although most sales tax rebate certificates are still issued in border cities. (Figure 1.4)

![Figure 1.4: Aggregate Sales Tax Rebate Certificates Issued by PCBs in Non-Border Cities](image)
Aggregate real retail sales have increased constantly since 2009 in Texas. Most of the recent growth in retail trade activity though, has occurred in non-border cities, such as Austin, Dallas, Houston, and San Antonio. (Figure 1.5) (Figure 1.6)

The overall demand for certificates in Texas, and particularly in border cities, for STR certificates has decreased significantly in the past decade, and real retail sales seem unaffected by this drop in sales tax rebate certificates.

Similarly, the recent increase in real retail sales in Texas does not seem to have impacted total certificates issued by PCBs in Texas’ border cities. Fewer shoppers are taking advantage of the sales tax rebate service it seems, and less certificates are being issued in cities along the Texas –
Mexico border every year. No empirical research has been conducted to understand the relationship between real retail sales and the total amount of certificates issued by PCBs in Texas.

No STR data exists before 2004, but now that data are available, and a decent amount of observations exist, this study fills this research gap by creating a model explaining the relationship between the Texas retail industry and the total amount of STR certificates (manfiestos) issued by PCBs in Texas, and particularly in the Brownsville, El Paso, Laredo, McAllen border cities. By creating a panel data set, and using the Fixed Effects estimation method, results from this study suggest that real retail sales have little effect on certificates issued in Texas, but less so in border cities. Also, only certain retail industries affect total certificates and, after controlling for other factors, real retail sales affect certificates issued in Texas, and border and non-border cities only slightly.

The following literary review section provides a summary of previous studies relevant to this work and applicable studies. The empirical analysis sections deals with the data gathered for testing the proposed theoretical model, which is discussed in the subsequent theoretical framework section. Lastly, the results and conclusion section will provide all results and interpretations found in this study.
Chapter 2: Literary Review

The Texas – Mexico border region welcomes an influx of visitors who cross regularly from Mexico to shop (Ghaddar and Brown, 2005). On their way back to Mexico from Texas, many these visitors take goods they have purchased back with them. The U.S. constitution prohibits any state to lay any duties on imports or exports. (U.S.C.A. Const. Art. I § 10, cl. 2). Texas, like other states bordering Mexico, must, therefore, grant sales tax exemptions or rebates for goods sold in the U.S. that are subsequently taken to Mexico. The Comptroller has found that the sale tax rebate program exhibits a pattern of fraud (Texas Comptroller, 2003).

The Comptroller investigations began in 1996. Since then, it has suspended the licenses of many PCBs operating along the Texas – Mexico border. This has resulted in a decrease in the availability of the service particularly in border cities. (Texas Comptroller, 2003)

The History and Current State of the Sales Tax Rebate Program in Texas

In September 1961, the Fifteenth Texas Legislature stopped taxation of goods exported to Mexico (U.S. Cost. art I, § 10). During the 1970’s, U.S. customs officials discontinued verifying that exports were in fact leaving the country, and Mexican shoppers found it too difficult to obtain the required import documentation from corresponding Mexican authorities (Texas Comptroller, 2003). So the Comptroller created a proof of export form (manifiesto) that facilitates processing a sales tax rebate. The Comptroller was not given statutory authority over the succeeding forwarding agents though, and no federal agency oversaw their work either (The Texas Comptroller, 2003).

In 1985, local city officials expressed their discontent with the sales tax rebate program, claiming that freight forwarders were fraudulently certifying exports, which were costing their cities potential sales tax revenue. So, the sales tax law was amended, replacing freight forwarder with a private firm called Private Custom Brokers (PCBs). These brokers were first licensed by the federal government (The Texas Comptroller, 2003). Local officials’ allegations of fraud continued now directed toward these federally licensed PCBs. This resulted in the 1993 Texas
legislature passing House bill 2413, which gave the Comptroller the responsibility of overseeing PCBs operations.

Under this new system, which still exists today, PCBs receive Comptroller stamps (certificates) that they attach to Comptroller export forms (manifiestos) (TAC, Title 34, Part 1, Chapter 3). There is a $2.10 fee for each stamp, and stamps are non-transferable, they are void if transferred to another person other than the PCB to whom the comptroller originally issued the stamp.

According to the Texas Administrative Code, the following proof of export must generally be provided by the customer in order to obtain a rebate:

A. A copy of a bill of lading issued by a licensed and certificated carrier of persons or property that shows a delivery point outside the U.S.;
B. Documentation provided by a licensed PCB certifying that the property will be exported to a point outside the U.S.;
C. For the country of Mexico, the formal entry document would be the *pidimento de importaciones* document with a computerized, certified number issued by Mexican customs officials.

Only a *PCB* licensed by the United States Customs Service that also holds a Texas Customs Broker License issued by the Comptroller, may fully prepare, issue, and sign a valid export certification (34 Tex. Admin Code § 3.360).

Under the current sales tax rebate system, a licensed PCB, or an authorized PCB employee, may issue an export certification form under the following conditions:

A. Personally witnesses, or a verification contractor personally witnesses, the transportation of property across the border of the United States;
B. Personally witnesses the property being placed on a common carrier for delivery outside the territorial limits of the United States; or
C. Verifies by performing all of the following actions that the purchaser is transporting the property to a destination outside the territorial limits of the United States:
   a. Examines a passport, laser visa identification card, or picture foreign voter registration identification that proves that purchaser of the property resides in a foreign country;
   b. Requires that the purchaser produce the property and the original sales receipt for the property so the customs broker or authorized employee can verify that the property is the same property as described in the purchaser’s sales receipt. The comptroller shall limit to six the number of receipts for which a single proof of export documentation may be issued under this section;
   c. Requires that the purchaser state the foreign country of destination, which must be the foreign country in which the purchaser resides, the date and time the property is expected to arrive in the foreign country destination, the date and time the property was purchased, the name and address of the retailer from whom the purchaser bought the property, the sales prices and quantity of the property, and description of the property.

Nevertheless, the current sales tax rebate program in Texas is relatively easily accessed by Mexican shoppers. According to the Comptroller, in most manifiestos transactions for example, PCBs employees generally establish that the customer is a foreign national, and then proceed to prepare a document stating that the goods have been exported over a particular bridge (Texas Comptroller, 2013).

The PCBs employee then attaches the manifiestos stamp and charges a fee for the service. In most cases, the previously mentioned pedimento de importaciones document issued by Mexican customs officials is not provided by the customer (The Texas Comptroller, 2013). And rarely do
PCB employees personally witnesses, or verify the transportation of property across the border. Customers usually take possession of the merchandise in Texas (Texas Comptroller, 2003).

**A Case For Fraud**

In 1996, the Comptroller carried out investigations and found that PCBs failed to verify, 95 percent of the time in cases examined, that merchandise was being exported out of the State. This led to, in 1999, a law requiring a 24-hour and a seven day waiting period for sales tax rebates processed in Texas’ border cities, and non-border cities, respectively. In some locations though, the Comptroller found that PCBs would provide the buyer of goods a rebate, and subsequently collect the refund from the store owner (Texas Comptroller, 2013).

Further, in 2000, the Comptroller found that, in some cases, PCBs were providing certificates for sales receipts regarding goods that were never purchased. The comptroller’s investigations continued discovering in 2001 that in the cities of Brownsville, McAllen, San Antonio, San Marco and El Paso, PCBs provided certificates without verification that goods were exported to Mexico (Texas Comptroller, 2013). Comptroller visits to El Paso, Laredo, Hidalgo, McAllen, Brownsville and San Marcos the following year, also found a system riddled with fraud.

During these visits, the Controller also found that PCBs not only failed to verify that goods were exported, but also they provided certificates for hypothetical items never purchased by anyone (The Texas Comptroller, 2003). Only licensed customs brokers, or their employees may sell manifiestos stamps. But back in 2002, the comptroller has evidence that unlicensed PCBs operated by buying the stamps from licensed PCBs. Comptroller enforcement staff described incidents in El Paso for example, where PCBs and retail store employees plotted and created fraudulent refunds.

Problems were also uncovered in visits to McAllen and Brownsville. Internal Revenue System (IRS) agents contacted the Comptroller during these visits with information about a series of large furniture purchases totaling $145,000 made over a few weeks by a person that the IRS suspected of money laundering. In this particular case, the furniture in question was delivered to a Texas
address, and an individual attempted to obtain more than $11,000 in tax rebates from the store, claiming Mexican citizenship, despite the fact the furniture was delivered to a Texas address (Texas Comptroller, 2013). That’s not all, according to the Comptroller, some PCBs in McAllen said that manifestos with attached Comptroller stamps are available over the border in Reynosa. In Hidalgo, one custom broker whose license had been suspended by the Comptroller’s office, displayed a sign offering manifestos anyway. In Brownsville, employees of a major retailer said they rebate more than $1,000 per day in sales taxes. These receipts, however, were obviously collected from nearby dumpsters, or off the ground in the parking lot.

Since the Comptrollers investigations began in 1996, the agency has suspended the licenses of many PCBs operating along the Texas – Mexico border. In most case, these licenses were revoked for failing to verify that merchandise left the country. Opinions about the sales tax rebate system are divided. Some retailers for example, say that rebates are a vital part of cross border retail trade. Others question the fairness of the system to U.S. citizens, and the local communities that need tax revenue to fund basic services. According to a Comptroller survey of 40 retailers from El Paso to Brownsville in 2003, 60 percent thought the system was unfair to locals that pay the sales tax (Texas Comptroller, 2003).

Some retailers argue that elimination of the sales tax rebate would drastically reduce retail sales to Mexican shoppers. Any proposal however, should not eliminate the program, but reduce fraud associated with an already ineffective system (Texas Comptroller, 2003). The way that goods are exported must be modernized. Authorities on both sides of the border must enforce the legitimacy of the STR program by providing proper oversight over retail exports. However, if PCBs decided to operate closer to the border – in order to better verify that goods purchased by Mexican nationals are actually leaving the country – U.S. customs official will not allow them to do so (Texas Comptroller, 2003). And corresponding Mexican Customs officials often fail to identify and tax goods coming into Mexico that were purchased in Texas.
As in El Paso, retailer’s employees interviewed in Brownsville said they suspect that many of the receipts they see are not legitimate. Over 10 years ago the sales tax rebate program seemed ineffective and prone to fraud. Moreover, sales tax rebate data are not available before 2004. Currently less than 10 PCBs operate in the cities of Brownsville, El Paso, Laredo, and McAllen on average. According to Comptroller quarterly sales tax rebate data for the 2004 – 2015 time period, fewer sales tax rebates are being issued every year.

**REVIEW OF APPLICABLE RESEARCH ON RELATED TOPIC**

Nevertheless, Mexican visitors constitute an important component of the economy of the communities along the Texas – Mexico border (Ghaddar and Brown, 2005). Mexican visitors enter the U.S. frequently for shopping – in the process, a considerable amount of money is spent on various items and services. In 2004 for example, Mexican shopper’s expenditures generated approximately 1.7 billion in sales (Ghaddar and Brown, 2005). In 2005, Texas exports to Mexico reached $46.9 billion, making it the largest exporter state to Mexico (Coronado and Phillips, 2007). Moreover, during the same year, there were more than 45 million non-commercial international border crossings at the bridges along the Texas – Mexico border, many of which were individuals coming to purchase goods to take back to their home country (Coronado and Phillips, 2007).

In 2005, S. Ghaddar and C.J. brown created an input-output model, which estimated that Mexican visitors’ expenditures result in an increase of over $3 million in sales in the Texas border area (excluding the Val Verde, Maverick, Presidio and Starr Texas Counties).

The importance that Mexican shoppers have on Texas border cities’ retail sectors cannot be overstated. Given the decrease in the availability of certificates since the early-2000s, and the overall demand of the service, the retail sector continues to expand. Therefore, do real retail sales, after controlling for certain factors, affect the total number of sales tax rebate (*manifiesto*) certificates issued by PCBs in Texas, and particularly in Border cities? The following section describes these question more precisely.

13
Chapter 3: Theoretical Framework

The Comptroller has suspended the licenses of many PCBs operating along the border since its investigations began in 1996. These licenses, according to the Comptroller, were generally suspended for failing to verify that merchandise bought by Mexican nationals had left the country. Sales tax rebate data, provided by the Comptroller, are not available before 2004, so we cannot observe trends in STR and real retail sales data before then.

![Figure 3.1: Texas Aggregate Sales Tax Rebate Certificates and Real Retail Sales](chart.png)

We can analyze more than a decade’s worth of sales tax rebate data now, which suggest that total sales tax rebate certificates, issued by PCBs in Texas’s border cities, have decreased since 2008.\(^4\) (Figure 3.1) After this year, certificates have yet to recover, and real retail sales have increased since then.

Few factors have an effect on the amount of certificates issued in Texas. A manifesto transaction requires a sales receipt. Mexican nationals present sales receipts to PCBs in order to acquire a sales tax rebate. Also, the sales tax rebate amount is stated on the sales receipt, and PCBs

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3 Data used for this graph has been seasonally adjusted using the X-12 Method.  
4 Refer to appendix for sales tax rebate and real sales data figures for each Texas City analyzed in this study.
attach sales receipts to manifestos export forms and comptroller certificate stamps, which are then provided to retailers for a sales tax rebate. A sales transaction must first occur for a STR certificate to exist.

Therefore, we assume that as real retail sales increase, so should sales tax rebate certificates. But this is not the case in border cities. (Figure 3.2)

![Figure 3.2: Border City Aggregate Certificates and Real Retail Sales](image)

New sales receipts, data show, have not resulted in more STR transactions, which always involve a manifestos export form and a Comptroller certificate. In cities farther away from the border, though, manifestos certificates issued have actually markedly increased. (Figure 3.3)

---

5 Data used for this graph has been seasonally adjusted using the X-12 method.
The opposite seems true, data show, for cities farthest from the border. An increase in real retail sales should result in an increase in sales tax rebate certificates, particularly in cities closer to the border. So why is this only the case in non-border cities?

Historically, most sales tax rebate certificates are issued by PCBs operating in cities along the Texas – Mexico border. Yet, the recent increase in real retail sales did not result in more certificates issued along the border, but rather in more certificates issued by PCBs in non-border cities. (Figure 3.2 and Figure 3.3) Although, the recent aggregate increase in real retail sales in Texas occurred mostly in non-border cities.

Non-border certificates have steadily made up a greater share of all certificates issued in Texas after 2008. (Figure 3.4) After this date, manifiestos certificates issued by PCBs in non-border began to make up a larger portion of total manifiestos transactions in Texas.

---

6 Data used for this graph has been seasonally adjusted using the X-12 method.
Certificates issued in border cities make up just over 60% of all certificates issued in Texas in 2015, down from 90% in 2004.

Consider the following total certificate index for border and non-border cities, created in order to see the growth in sales tax rebate certificates issued in border and non-border cities along with real retail sales after 2009. (Figure 3.5) It is clear that for border cities, *manifiestos* transactions have constantly decreased, and the demand of the service has shifted from border cities to non-border cities. Still, the larger share of total sales tax rebate certificates issued in Texas still happen in border cities.
The availability of the sales tax rebate service and the overall demand of the service in cities along the border have decreased significantly. This may be because of the recent drop in certificates, which happened almost exclusively in border cities, where most certificates have been issued since 2004. And most retail trade activity has taken place in non-border cities. So data suggest that the general trend in Texas, therefore, is a negative relationship between real retail sales and certificates issued by PCBs. But other factors continue to have an effect on retail trade activity in border cities that do not have an affect non-border cities, the U.S. dollars (USD) per Mexican Peso (MXN) exchange rate, for example (Phillips and Coronado, 2005).

Mexican nationals represent a substantial portion of the total number of international visitors to Texas (Mogab, Pisani, 2005). Real retail sales in border cities can be attributed to Mexican nationals (Cañas and Coronado, 2011). Because the population in northern Mexican border cities is significantly larger than in their U.S. counter parts (Phillips and Coronado, 2005). And because border cities are a relatively short drive from industrial cities across the border. Larger populations on the Mexican side create a strong consumer base for retail stores in U.S. border cities (Phillips and Coronado, 2007). In 2015, there 82.7 million non-commercial international border crossings.

---

7 Data used for this graph has been seasonally adjusted using the X-12 method.
Many of these visitors crossed the border to go shopping, and spend money on leisure activities during their stay.

The Office of the Governor for the State of Texas conducted research in 2009 to better understand the movement of visitors between Mexico and Texas. This study found that, among other things, shopping is the main reason for overnight visit to Texas by Mexican visitors (Eslinger, 2009). There is perhaps something more interesting happening here than Mexican shoppers simply wanting less to do with the sales tax rebate program in Texas.

The decrease in border city certificates has pushed the overall trend in Texas downward. Data in this study suggests that the total amount of certificates has decreased since 2009, and certificates in non-border cities are making up a larger part of total certificates issued. Perhaps there is not a decrease in the demand for the service in Texas, but a shift in the demand where certificates are issued because of other factors that may affect retail trade activity as well. In 1983, Diehl estimated the effects of the early 1980s Mexican peso devaluation on Texas border cities. His research indicates that the 1982 Mexican peso devaluation cut retail sales by more than 80%. More recently, in 2005, there is evidence that the U.S. Dollar per Mexican peso exchange rate affects retail trade activity in border cities (Phillips and Coronado, 2005). Data in this study suggest that the U.S. Dollar per Mexican peso exchange rate may affect total certificates issued. (Figure 3.6)
To further show how the exchange rate affects total certificates issued, consider real sales per certificates issued and the exchange rate, particularly after 2013. (Figure 3.7)
As illustrated above, data suggest that the exchange rate seems to affect the sales volume per certificate issued. As the cost of all goods increase because of the appreciation of the U.S. dollar relative to the Mexican peso, this not only has a negative effect on real retail sales in border cities, but it may also affect retail sales in non-border cities. (Figure 3.8) In non-border cities, real retail sales continue to grow regardless of the increase in the exchange rate, but in the past year, data show suggest a negative relationship.

Clearly not all maniﬁestos transactions involve Mexican nationals in cities like Austin, Dallas, Houston, and San Antonio where retail trade activity is overwhelmingly larger than it is in border cities. Nevertheless, given the large portion that Mexican nationals make up of total international visitors to Texas, the exchange rate does seem to have somewhat of an effect on retail trade activity in non-border cities, but not enough to negatively impact retail sales over all, or the total amount of certificates issued.

In 2003, the sales tax rebate program, as the Comptroller argued, was ineﬀicient and riddle with fraud. Now that many PCBs licenses were revoked for failing to verify that goods were leaving the country, STR certificates have decrease signiﬁcantly, particularly in border cities. This may be due to the decrease in the availability of STR certificates due to the revoking of PCBs licenses in border cities because of fraud.
Advocates of the STR program argue that it incentivizes legitimate Mexican shoppers to buy more than they would otherwise (Texas Comptroller, 2003). The next section presents a static model that will simply provide some insight into the statistical relationship between the retail trade industry in Texas and total sales tax rebate certificates issued in border.

**DEVELOPMENT OF A BEHAVIORAL MODEL ILLUSTRATING PROBLEM**

According to STR Comptroller data, from 2004 to 2015, total certificates issued by PCBs have decreased from 2.8 million certificates to 2.2 million certifies in Texas. Fewer Mexican shoppers are taking advantage of the sales tax rebate service every year in Texas’ border cities. Real retail sales have increased substantially since the 2008-2009 recession, but total certificates have decreased particularly in border cities since then. No empirical research has been conducted to understand the relationship between real retail sales and the total amount of certificates issued by PCBs in Texas, particularly in border and non-border cities. For every dollar increase in real retail sales dollars, does this suggest an increase of total certificates issued in Texas?

Retail activity in border cities is affected more so by the exchange rate, which may affect real retail sales in these cities. And this perhaps impacts negatively the total amount of manifiesto certificates issued in border cities. Fewer sales receipts – resulting from less retail activity, decreases the probability manifiestos transactions occurring in border cities. Sales tax rebate data are not available before 2004. But now that data are available, and a decent amount of observations exists, this study fills this research gap by creating a model explaining the relationship between the Texas retail industry and the total amount of sales tax rebate certificates (manifiestos) issued by PCBs in Texas, and particularly in the Brownsville, El Paso, Laredo, McAllen border cities. A panel data set was created for this study, and the Fixed Effects estimation method was used to obtain the results discussed within. It is hypothesized that, judging from sales tax rebate and retail sales data, an increase in real retail sales dollar does not suggest an increase in manifiesto transactions.
The purpose of this research is not to measure or expose any fraud associated with the sales tax rebate program. Instead, creating a model that explains movements in total certificates as a function of real retail sales and control variables such as, the USD per MXN exchange rate, and personal vehicle international border crossings, and total active retail outlets. After controlling for these factors, does real retail sales have a significant impact on the amount of total sales tax rebate certificates issued in Texas, and particularly in border cities. This way, the current state of the sales tax rebate regimen can be better understood. And perhaps better decisions may be made regarding the enforcement of the legitimacy and efficiency of this service.

In order to understand if an increase in real retail sales represent a significant impact on the amount of sales tax rebate certificates in Texas, consider the following static model:

Model 3.1: Total Certificates Explained by Each Texas Retail Industry

\[
\ln y_{it} = \varnothing_{it} + \beta_1 \ln X_{1it} + \beta_2 \ln X_{2it} + \beta_3 \ln X_{3it} + \beta_3 \ln X_{4it} + \ln u_{it}
\]

Where \( \ln y_{it} \) represents the total amount of sales tax rebate certificate issued in city \( i \) in time \( t \). The \( X_{1it} \) variable is real retail sales index created for this study to measure the variation in real retail sales for Texas for city \( i \) for time \( t \). The, \( X_{2it} \) variable signifies the total amount of international personal vehicle passenger border crossings for city \( i \) for time \( t \). The U.S. dollar per Mexican peso exchange rate is represented by the, \( X_{3it} \) variable for city \( i \) for time \( t \). Lastly, the, \( X_{4it} \) variable stands for total retail outlets active in Texas for city \( i \) for time \( t \).

The model above will describe the variation in total certificates by the movements in the retail sector in Texas, controlling for explanatory variables relevant to cross-border shopping. The following section describes the data involved in Model 1.1, and the estimation method used to obtain the results discussed. Before we estimate the equation above, the data involved in this study is described in detail and we begin in Chapter 4. The models described in Chapter 5 analyze first the effects of real retail sales activity on total certificates and gradually introduce the control variables to the equation.
Chapter 4: Empirical Analysis

SUMMARY OF DATA GATHERED

The retail sector in Texas encompasses 12 industries. The model in this study was created using data from 10 principal retail industry described below in table 1. Non-store retailers and gasoline station stores were omitted from this model. Retail sales industry data are provided by the Comptroller, and it involves three principal variables, nominal quarterly retail sales, nominal dollar amount subject to tax, and the total number of active retail outlets. This data are collected for the 2004 – 2015 time period for the Texas cities of Austin, Brownsville, Dallas, El Paso, Houston, Laredo, McAllen, and San Antonio. (Table 4.1)

Table 4.1: Texas Retail Industries by North American Identification Code (NAIC)

<table>
<thead>
<tr>
<th>NAIC</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>441</td>
<td>Motor Vehicle and Parts Dealers</td>
</tr>
<tr>
<td>industries in the Motor Vehicle and Parts Dealers subsector retail motor vehicles and parts from fixed point-of-sale locations. Establishments in this subsector typically operate from a showroom and/or an open lot where the vehicles are on display.</td>
<td></td>
</tr>
<tr>
<td>442</td>
<td>Furniture and Home Furnishings Stores</td>
</tr>
<tr>
<td>Industries in the Furniture and Home Furnishings Stores subsector retail new furniture and home furnishings from fixed point-of-sale locations. Establishments in this subsector usually operate from showrooms and have substantial areas for the presentation of their products. Many offer interior decorating services in addition to the sale of products.</td>
<td></td>
</tr>
<tr>
<td>443</td>
<td>Electronics and Appliance Stores</td>
</tr>
<tr>
<td>Industries in the Electronics and Appliance Stores subsector retail new electronics and appliances from point-of-sale locations.</td>
<td></td>
</tr>
<tr>
<td>444</td>
<td>Building Material and Garden Stores</td>
</tr>
<tr>
<td>Industries in the Building Material and Garden Equipment and Supplies Dealers subsector retail new building material and garden equipment and supplies from fixed point-of-sale locations. Establishments in this subsector have display equipment designed to handle lumber and related products and garden equipment and supplies that may be kept either indoors or outdoors under covered areas.</td>
<td></td>
</tr>
<tr>
<td>445</td>
<td>Food and Beverage Stores</td>
</tr>
<tr>
<td>Industries in the Food and Beverage Stores subsector usually retail food and beverage merchandise from fixed point-of-sale locations. Establishments in this subsector have special equipment (e.g., freezers, refrigerated display cases, refrigerators) for displaying food and beverage goods.</td>
<td></td>
</tr>
<tr>
<td>446</td>
<td>Health and Personal care Stores</td>
</tr>
<tr>
<td>Industries in the Health and Personal Care Stores subsector retail health and personal care merchandise from fixed point-of-sale locations. Establishments in this subsector are characterized principally by the products they retail, and some health and personal care stores may have specialized staff trained in dealing with the products.</td>
<td></td>
</tr>
<tr>
<td>448</td>
<td>Clothing and clothing Accessories Stores</td>
</tr>
<tr>
<td>Industries in the Clothing and Clothing Accessories Stores subsector retail new clothing and clothing accessories merchandise from fixed point-of-sale locations.</td>
<td></td>
</tr>
</tbody>
</table>
451: Sporting Goods, Hobby, Book and Music
Industries in the Sporting Goods, Hobby, Musical Instrument, and Book Stores subsector are engaged in retailing and providing expertise on the use of sporting equipment or other specific leisure activities, such as needlework and musical instruments. Book stores are also included in this subsector.

452: General Merchandise Stores
Industries in the General Merchandise Stores subsector retail new general merchandise from fixed point-of-sale locations. Establishments in this subsector are unique in that they have the equipment and staff capable of retailing a large variety of goods from a single location.

453: Miscellaneous Store Retailers
Industries in the Miscellaneous Store Retailers subsector retail merchandise from fixed point-of-sale locations (except new or used motor vehicles and parts; new furniture and home furnishings; new appliances and electronic products; new building materials and garden equipment and supplies; food and beverages; health and personal care goods; gasoline; new clothing and accessories; and new sporting goods, hobby goods, books, and music). Establishments in this subsector include stores with unique characteristics like florists, used merchandise stores, and pet and pet supply stores as well as other store retailers.

Source: Texas Comptroller of Public Accounts and U.S. Census Bureau

The Comptroller also provides the sales tax rebate data used in this report for the same cities mentioned above. It involves three variables as well, total sales tax rebate certificates issued by PCBs in Texas, and the dollar amount and tax amount these manifesto transactions represent for the 2004 – 2015 time period. (Table 4.2)

Table 4.2: Sales Tax Rebate Program Data

<table>
<thead>
<tr>
<th>Total Sales Tax Rebate Certificates Issued (manifiestos)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Certificates Issued Sales Amount</td>
</tr>
<tr>
<td>Total Certificates Issued Tax Amount</td>
</tr>
<tr>
<td>Source: Texas Comptroller of Public Accounts</td>
</tr>
</tbody>
</table>

Aggregate Quarterly personal vehicle passenger, and pedestrian international border crossing data was gathered from the U.S. Department of Transportation’s Bureau of Transportation Statistics (BTS) for 11 international bridges in Texas for the 2004 – 2015 time period. (Table 4.3)

Table 4.3: Texas International Bridge Border Crossing Data

<table>
<thead>
<tr>
<th>Brownsville</th>
<th>Laredo</th>
</tr>
</thead>
<tbody>
<tr>
<td>Del Rio</td>
<td>Presidio</td>
</tr>
<tr>
<td>Eagle Pass</td>
<td>Progreso</td>
</tr>
<tr>
<td>El Paso</td>
<td>Rio Grande City</td>
</tr>
<tr>
<td>Fabens</td>
<td>Roma</td>
</tr>
</tbody>
</table>
Lastly, in order to control for Texas resident consumption, real quarterly wage data, provided by the Federal Reserve, St. Louis Fed Branch, was gathered for the 2004 – 2015 time period for the cities involved in this study. Lastly, the Mexican Peso per U.S. dollar ‘FIX’ exchange rate was acquired through the Mexican Central Bank (BANXICO).

**Empirical Specification and Estimation**

A panel data set was used for this study, which relative to conventional cross-sectional or time series data sets, provides major advantages for researchers (Hsiao, Cheng 2014). For example, a panel data set provides a larger number of data points, which increases the degrees of freedom and reduces the collinearity among explanatory variables. This, therefore, improves the efficiency of econometric estimates. Longitudinal data also permit a researcher analyze a number of import questions that cannot be addressed using cross-sectional or time series data sets (Hsiao, Cheng 2014).

A large portion of Mexican shoppers commute to Texas via personal vehicle. (Eslinger, 2009). In 2015, there were 82.7 million non-commercial international border crossings, of which 97.5% were personal vehicle passengers. Therefore, this model assumes that Mexican shoppers, generally, use personal vehicles as the main source of transportation when traveling to Texas to shop. With this in mind, using the data gathered and described in Chapter 4, a panel data set was created encompassing aggregate retail sales using NAIC codes, and total sales tax rebate certificate data for the 2004 – 2015 time period. Once we control for international personal vehicle border crossing, real Texas wages, total active retail outlets, and the U.S. dollar per Mexican peso exchange rate, do real retail sales have a significant effect on total sales tax rebate certificates issued by PCBs in Texas, and particularly in border and non-border cities? A series of models, which together describe the relationship between real retail sales and total certificates issued by PCBs were created and estimated using the Fixed Effects (FE) estimation method.
Given what the data show, we suspect a somewhat positive relationship between retail sales and total certificates issued in non-border cities. Judging from the recent trend in total certificates issued in border cities, a negative or no affect is expected on total certificates coming from real retail sales. This is also expected to be observed for Texas overall.
Chapter 5: Results

Presentation of and Interpretation of Empirical Results

The following models were estimated using the Fixed Effects (FE) estimation method with robust errors, and controlling for time FE for Texas, and for border and non-border cities. The first model, model 1, establishes the relationship between real retail trade activity in Texas and total certificates issued by PCBs in Border and non-border cities without considering the control variables discussed in chapter 4. The sample in this study was split in half in order to observe the effects for border and non-border cities’ real retail sales on total STR certificates issued.

The subsequent models in this chapter describe how retail trade activity – after controlling for factors such as the Mexican peso per U.S. dollar exchange rate, international personal vehicle border crossings, and active retail outlets – affects the total amount of sales tax rebate certificates issued by PCBs in Texas, and particularly in border and non-border cities. Model 1 is then modified to include each retail trade industry that makes up the Texas retail sector and their effect on total certificates. This identifies key industries relevant to certificate activity, and control variables are included.

These model provide evidence that an increase in retail trade activity in Texas does not necessary represent an increase in total certificates issued by PCBs. We might assume that given the nature of the sales tax rebate program, an increase in retail trade activity in border cities result in more sales tax rebate certificates issued by PCBs. This research also finds that not all of the ten retail industries – analyzed in this study, have a significant or positive affect on total certificates issued either. And once we control for factors previously describes, most retail industry fail to have a significant impact on total certificates.

\[ y_{it} = \phi_{it} + b_1X_{1it} + u_{it} \]

Model 5.1: Total Sales Tax Rebate Certificates issued by PCBs as a Function of Real Retail Sales Index
Where $y$ represents the total amount of sales tax rebate certificates issued by PCBs in Texas during the 2004Q1 – 2015Q4 time period. The variable, $X$, represents the real retail sales index created for this study to measure real retail activity for Texas, and specifically for border and non-border cities. (Table 5.1)

Table 5.1: Total Certificates as a Function of the Real Retail Sales Index

<table>
<thead>
<tr>
<th></th>
<th>Texas</th>
<th>Border</th>
<th>Non-Border</th>
</tr>
</thead>
<tbody>
<tr>
<td>r_index</td>
<td>0.0099</td>
<td>0.0087</td>
<td>0.0018</td>
</tr>
<tr>
<td></td>
<td>(0.2923)</td>
<td>(0.5848)</td>
<td>(0.0932)</td>
</tr>
<tr>
<td>Adj R-Squared</td>
<td>0.0836</td>
<td></td>
<td>0.9430</td>
</tr>
<tr>
<td>N. of Quarters</td>
<td>384.0000</td>
<td>192.0000</td>
<td>192.0000</td>
</tr>
<tr>
<td>F-Stat</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>vce</td>
<td>cluster</td>
<td>cluster</td>
<td>cluster</td>
</tr>
</tbody>
</table>

Note: Controlling for Time Fixed Effects

The results above suggest that there is no significant effect on total certificates issued because of movements in the real retail sales index in Texas and in border cities. Real retail sales in non-border cities seem to have a negative effect on total certificates issued in these cities. This is unexpected because the recent rise in certificates issued by PCBs in Texas has been in non-border cities. (Figure 3.3) The adjusted r-squared statistic is significantly higher for border cities. Perhaps because real retail sales in cities across the border explain more of the variation in total certificates issued by PCBs than for non-border cities. The next series of models introduce the control variables discussed in Chapter 4.

$$y_{it} = \phi_{it} + b_1X_1 + b_2X_2 + u_{it}$$

Model 5.2: Total Sales Tax Rebate Certificates issued by PCBs as a Function of Real Retail Sales Index and Other Controls

The model above is similar to the previous model, but here one of the control variables, $X_2$, is introduced, which represents international personal vehicle passenger border crossings.
The results did not change after introducing the first of the control variables. It is interesting, nevertheless, to see that personal vehicle border crossings are significant for border and non-border cities, but not for Texas over all. Also, for non-border cities, both the real retail sales index and personal vehicle international border crossings, have a negative impact on total certificates. This suggests that as more border crossings occur, less certificates are issued in non-border cities. The opposite holds for border cities, as more persons cross the border, results suggest that the amount of sales tax rebate certificates issued decrease. The following model includes the Mexican peso per U.S dollar (\(\text{FIX}\)) exchange rate, which is known to negatively affect cross-border shopping (Coronado and Phillips, 2005).

\[
y_{it} = \emptyset_{it} + b_1X_1 + b_2X2 + b_3X3 + u_{it}
\]

Model 5.3: Total Sales Tax Rebate Certificates issued by PCBs as a Function of Real Retail Sales Index and Controls

This model includes the U.S. dollar per Mexican Peso exchange rate, provided by the Banxico as the “\(\text{FIX}\)” exchange rate. The results are presented below.

### Table 5.2: Total Certificates Issued as a Function of Retail Sales Index and Other Controls

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>(r_{index})</td>
<td>0.0099</td>
<td>0.0087</td>
<td>0.0020</td>
<td>0.0023</td>
<td>-0.0105</td>
<td>0.0043</td>
</tr>
<tr>
<td></td>
<td>(0.2937)</td>
<td></td>
<td>(0.4510)</td>
<td></td>
<td>(0.0932)</td>
<td></td>
</tr>
<tr>
<td>(\ln_vechile)</td>
<td>0.3884</td>
<td>1.2738</td>
<td>0.5923</td>
<td>0.1476</td>
<td>-1.5507</td>
<td>0.1602</td>
</tr>
<tr>
<td></td>
<td>(0.7693)</td>
<td></td>
<td>(0.0278)</td>
<td></td>
<td>(0.0023)</td>
<td></td>
</tr>
</tbody>
</table>

Note: Controlling for Time Fixed Effects
The FIX exchange rate, as expected, has a negative and significant impact on the amount of total certificates issued by PCBs in border and non-border cities. If the cost of purchasing goods in retail outlets in Texas goes up, less money will potentially be spent by Mexican national for shopping activities in retail outlets not only in Texas, but in cities closer to the border. There is evidence that suggest that the exchange rate significantly affects cross-border retail activity (Coronado and Phillips, 2005). According to results from this model, as the exchange rate increases, less certificates are issued in border cities. Because the exchange has increased, less real retail sales activity potentially may occur, and this may results in less certificates issued. The subsequent model includes the last of the control variables.

\[ y_{it} = \phi_{it} + b_1 X_1 + b_2 X_2 + b_3 X_3 + b_4 X_4 + u_{it} \]

Model 5.4: Total Sales Tax Rebate Certificates issued by PCBs as a Function of Real Retail Sales Index and Controls

This model includes all of the control variables, and provides evidence that after controlling for factors affect total certificates issued by PCBs in Texas, real retail sales activity does not affect total certificates as we would expect.

---

Table 5.3: Total Certificates Issued as a Function of Retail Sales Index and Other Controls

<table>
<thead>
<tr>
<th></th>
<th>Texas</th>
<th>Border</th>
<th>Non-Border</th>
</tr>
</thead>
<tbody>
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<td>r_index</td>
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<td>0.0020</td>
</tr>
<tr>
<td></td>
<td>(0.2937)</td>
<td>(0.4510)</td>
<td>(0.0932)</td>
</tr>
<tr>
<td>ln_vechile passangs</td>
<td>0.3884</td>
<td>1.2738</td>
<td>0.1476</td>
</tr>
<tr>
<td></td>
<td>(0.7693)</td>
<td>(0.0278)</td>
<td>(0.0072)</td>
</tr>
<tr>
<td>fix</td>
<td>0.0491</td>
<td>0.1404</td>
<td>-0.0711</td>
</tr>
<tr>
<td></td>
<td>(0.7367)</td>
<td>(0.0137)</td>
<td>(0.0058)</td>
</tr>
<tr>
<td>Adj R-Squared</td>
<td>0.0829</td>
<td>0.9572</td>
<td>0.6336</td>
</tr>
<tr>
<td>N. of Quarters</td>
<td>384.0000</td>
<td>192.0000</td>
<td>192.0000</td>
</tr>
<tr>
<td>P-Stat</td>
<td>.</td>
<td>.</td>
<td>.</td>
</tr>
<tr>
<td>vce</td>
<td>cluster</td>
<td>cluster</td>
<td>cluster</td>
</tr>
</tbody>
</table>

Note: Controlling for Time Fixed Effects
None of the control variables seem to be significant for Texas, but specifically for border and non-border cities though, only the exchange rate and personal vehicle border crossings seem significant affect total certificates issued. This is also observed for non-border cities, except here real retail sales activity continues to have a significant negative impact on total certificates. It is also interesting to continue to observe a negative affect for non-border cities regarding most control variables. This is unexpected because the recent rise in sales tax rebate certificates is observed for non-border cities. (Figure 3.3) So we would expect, at the very least, a positive relationship between real retail sales activity and certificate activity exist for non-border cities.

The following model consider all of the retail industries that make up the Texas retail sector in order to establish which retail industries significantly affect total certificates issued in Texas.

\[ y_{it} = \phi_{it} + b_1X_1 + b_2X_2 + b_3X_3 + b_4X_4 + b_5X_5 + b_6X_6 + b_7X_7 + b_8X_8 + b_9X_9 + b_{10}X_{10} + u_{it} \]

Model 5.5: Total Sales Tax Rebate Certificates issued by PCBs as a Function of Each Real Industry Real Sales

This model includes all retail industries in order to establish which industries are the most relevant to total certificates issued in Texas by PCBs.

Table 5.4: Total Certificates Issued as a Function of Retail Sales Index and Other Controls

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>r_index</td>
<td>0.0099</td>
<td>0.0088</td>
<td>0.0019</td>
<td>0.0023</td>
<td>-0.0105</td>
<td>0.0043</td>
</tr>
<tr>
<td>ln_vehicle passes</td>
<td>0.3679</td>
<td>1.2976</td>
<td>0.5872</td>
<td>0.1465</td>
<td>-1.0470</td>
<td>0.1640</td>
</tr>
<tr>
<td>fix</td>
<td>0.0200</td>
<td>0.1666</td>
<td>-0.0833</td>
<td>0.0129</td>
<td>0.3160</td>
<td>0.0731</td>
</tr>
<tr>
<td>ln_retail outlets</td>
<td>0.3624</td>
<td>0.6065</td>
<td>0.1586</td>
<td>0.1781</td>
<td>-0.2782</td>
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Adj R-Squared: 0.0825
N. of Quarters: 384,000
F-Stat: -

Note: Controlling for Time Fixed Effects
According to the results above, not all retail industries significantly affect the total amount of sales tax rebate certificates issued by PCBs in Texas or border and non-border cities. For Texas, only the following industries have a significant affect:

- **Furniture stores (NAIC CODE 442)**
- **Electronic appliance stores (NAIC CODE 443)**
- **Food and beverage stores (NAIC CODE 445)**
- **Health and personal care stores (NAIC CODE 446)**
- **Clothing and clothing accessories stores (NAIC CODE 448)** and,
- **Miscellaneous stores (NAIC CODE 453)**

For border cities only the following retail industries have an either positive or negative significant affect:

- **Health and personal care stores (NAIC CODE 446)** and

For non-border cities only the following industries significantly affect certificates issued by PCBs:

---

8 Please refer to table 4.1 for a full description of each retail industry
- Health and personal care stores (NAIC CODE 446)
- Sporting Goods and Hobby Stores (NAIC CODE 451) and,
- Miscellaneous stores (NAIC CODE 453)

The following model includes only the key retail industries assumed be affecting the total amount of certificates issued by PCBs in Texas and the control variables discussed in the previous models presented in this chapter.

\[ y_{it} = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + \beta_6 X_6 + \beta_7 X_7 + \beta_8 X_8 + \beta_9 X_9 + u_{it} \]

Model 5.6: Total Certificates Issued as a Function of Each Retail Industry Real Sales and Controls

The nature of the sales tax rebate program suggest that the greater the price of a purchased item, the more likely a person is to seek a rebate with a PCBs. This is because the rebate is a fixed 8.25% of the total, or the sales tax in Texas. Therefore, as more money is spent, the potential rebate amount increase. With this in mind, the following retail industries with high price ticket items were included in this model along with the control variables.
Table 5.6: Total Certificates Issued as a Function of Each Retail Industry Real Sales and Controls

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<td>0.4266</td>
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</tr>
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</table>

Note: Controlling for Time Fixed Effects

Results suggest that furniture store real retail sales are positively and significantly affecting the amount of sales tax rebate certificates issued in border cities. Clothing and clothing accessories stores also have both a positive and significant effect on certificates. Out of all the controls though, only the number of active retail stores has a very small and statistically insignificant impact on total certificates.

The results above provide evidence that only few retail industries have a statistically significant effect on total certificates issued. This suggests that an increase in real retail trade activity in border cities does not necessarily reflect an increase in sales tax rebate certificates. However, when we observe the effects of each retail industry, we learn that not all industries are resulting in an increase of certificates. We include key industries relevant to certificate activity in Texas to the model, and once we include the control variables, we see that only certain industries have a positive effect on certificates. Particularly in border cities, it seems that real retail sales has a minor affect, but statistically significant nevertheless on total sales tax rebate certificates. As expected, the USD per
MXN exchange rate, according to results above, have a negative effect on total certificates in all localities. This is because of the importance that Mexican consumer have on retail trade activity in Texas, and as the costs of shopping across the border increases, less sales tax rebate certificates are issued.

The results above suggest that aggregate real retail sales in border, after controlling certain factors, have a small but statistically significant impact on total sales tax rebate certificates issued by PCBs in Brownsville, El Paso, Laredo, and McAllen. Also, the exchange rate seem to influence negatively real retail sales in border cities, which could explain the recent decrease in sales tax rebate certificates issued in these cities. Not all retail industry have the same effect on total certificates in Texas, and particularly in border and non-border cities. (Table 5.2)

**CONCLUSION**

After 2009, real retail sales in Texas began to recover from the recent recession. Real retail sales particularly in border cities have increased since 2009, but less so relative to retail activity in non-border cities. And perhaps because of the recent increase in the U.S. dollar per Mexican peso exchange rate, real retail sales in border cities have declined. Sales tax rebate certificates issued in border cities by PCBs have decreased significantly. Real retail sales in cities along the Texas – Mexico border are more sensitive to variables such as, the exchange rate and international border crossings. Results for this study suggest that real retail sales have little effect on border city certificates.

If the sales tax rebate program is a magnet for Mexican nationals seeking to shop in Texas’ retail outlets across the border, than why are most sales tax rebate transactions occurring in non-border cities? Perhaps because other factors affect border sales, which then decrease the probability of STR certificates issued by PCBs in border cities. Eliminating the program would provide new sales tax revenue for the state and local government, suggests the Texas Comptroller. A modernization of the sales tax rebate regimen is desperately needed along the Texas – Mexico border nevertheless.
Texas law clearly states that a STR rebate may not be issued by a PCB if the merchandise has not left the country. Mexican nationals must provide the proper Mexican customs documentation to PCBs in order to process any manifiesto transactions successfully. Yet, this is rarely the case in most STR transactions.

The corresponding authorities must make sure fraud associated with the program is minimized, and that it allows only those who qualify for a STR rebate to obtain one from a legitimate PCB. This is a double sided effort though, both the U.S. and the Mexican customs must collaborate to insure that proper documentation is presented to PCBs by qualifying customers, and that taxes are paid when they are lawfully due.

The sales tax rebate program in Texas has gone through phases of heavy regulation and a more recent privatization of the program, and it seems that fraud has not decreased in either case. Nevertheless, less and less Mexican national are taking advantage of the service in border cities. However, because the service is not as popular as before does not mean that the service is not appealing to Mexican nationals. Other factors affect retail trade activity in border cities, and if less sales receipts occur because of this, then less potential STR certificates are issued by PCBs. Further research should be conducted, and the data set here should be broaden to include other control variables when more observations become available.
References

Appendix

Table 6.1: Total Certificates Issued as a Function of Real Retail Sales Index

<table>
<thead>
<tr>
<th></th>
<th>Texas Coef./P</th>
<th>Std. err.</th>
<th>Border Coef./P</th>
<th>Std. err.</th>
<th>Non-Border Coef./P</th>
<th>Std. err.</th>
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</thead>
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Note: No Control for City or Time Fixed Effets

Table 6.2: Total Certificates Issued as a Function of Retail Sales Index and Other Controls

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<th>Texas Coef./P</th>
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<th>Border Coef./P</th>
<th>Std. err.</th>
<th>Non-Border Coef./P</th>
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Note: No Control for City or Time Fixed Effets
Table 6.3: Total Certificates Issued as a Function of Retail Sales Index and Other Controls

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Adj R-Squared 0.1350 0.8025 0.4562
N. of Quarters 384.0000 192.0000 192.0000
F-Stat 23.2648 260.6777 55.4043
vce conventional conventional conventional

Note: No Control for City or Time Fixed Effets

Table 6.4: Total Certificates Issued as a Function of Retail Sales Index and Other Controls

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Adj R-Squared 0.1474 0.8885 0.6236
N. of Quarters 384.0000 192.0000 192.0000
F-Stat 19.3088 382.3729 7.5191
vce conventional conventional conventional

Note: No Control for City or Time Fixed Effets
Table 6.5: Total Certificates Issued as a Function of Each Retail Industry Real Sales

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Adj R-Squared               | 0.3496        |           |                |           | 0.6551             |           |
N. of Quarters              | 384.0000      |           |                |           | 192.0000           |           |
F-Stat                      | 22.2902       |           |                |           | 33.9829            |           |
| vce                        | conventional  |           |                |           | conventional       |           |

Note: No Control for City or Time Fixed Effects
Table 6.6: Total Certificates Issued as a Function of Each Retail Industry Real Sales and Controls

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<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
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<td>0.0501</td>
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Note: Controlling for Time Fixed Effects
Figure 6.1: Austin Total Certificates and Real Retail Sales

Figure 6.2: Austin Real Certificate Sales and Retail Sales

9 Data used for this graph has been seasonally adjusted using the X-12 method.
10 Data used for this graph has been seasonally adjusted using the X-12 method.
Figure 6.3: Austin Real Certificate Tax and Sales Tax\textsuperscript{11}

Figure 6.4: Brownsville Total Certificates and Real Retail Sales\textsuperscript{12}

\textsuperscript{11} Data used for this graph has been seasonally adjusted using the X-12 method.

\textsuperscript{12} Data used for this graph has been seasonally adjusted using the X-12 method.
Figure 6.5: Brownsville Real Certificate Sales and Retail Sales\textsuperscript{13}

Figure 6.6: Brownsville Real Certificate Tax and Sales Tax\textsuperscript{14}

\textsuperscript{13} Data used for this graph has been seasonally adjusted using the X-12 method.

\textsuperscript{14} Data used for this graph has been seasonally adjusted using the X-12 method.
Figure 6.7: Dallas Total Certificates and Real Retail Sales\textsuperscript{15}

Figure 6.8: Dallas Real Certificate Sales and Real Retail Sales\textsuperscript{16}

\textsuperscript{15} Data used for this graph has been seasonally adjusted using the X-12 method.
\textsuperscript{16} Data used for this graph has been seasonally adjusted using the X-12 method.
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Figure 6.11: El Paso Real Certificate Sales and Real Retail Sales\textsuperscript{19}

Figure 6.12: El Paso Real Certificate Tax and Sales Tax\textsuperscript{20}

\textsuperscript{19} Data used for this graph has been seasonally adjusted using the X-12 method.
\textsuperscript{20} Data used for this graph has been seasonally adjusted using the X-12 method.
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Data used for this graph has been seasonally adjusted using the X-12 method.
Figure 6.15: Houston Real Certificate Tax and Sales Tax

Figure 6.16: Laredo Total Certificates and Real Retail Sales

Data used for this graph has been seasonally adjusted using the X-12 method.

Data used for this graph has been seasonally adjusted using the X-12 method.
Figure 6.17: Laredo Real Certificate Sales and Retail Sales\textsuperscript{25}

![Graph showing Laredo Real Certificate Sales and Retail Sales over time.]

Figure 6.18 Laredo Real Certificate Tax and Sales Tax\textsuperscript{26}

![Graph showing Laredo Real Certificate Tax and Sales Tax over time.]

\textsuperscript{25} Data used for this graph has been seasonally adjusted using the X-12 method.

\textsuperscript{26} Data used for this graph has been seasonally adjusted using the X-12 method.
Figure 6.19: McAllen Total Certificates and Real Retail Sales

Figure 6.20: McAllen Real Certificate Sales and Retail Sales

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27 Data used for this graph has been seasonally adjusted using the X-12 method.

28 Data used for this graph has been seasonally adjusted using the X-12 method.
Figure 6.21: McAllen Real Certificates Tax and Sales Tax\textsuperscript{29}

Figure 6.22: San Antonio Total Certificates and Real Retail Sales\textsuperscript{30}

\textsuperscript{29} Data used for this graph has been seasonally adjusted using the X-12 method.

\textsuperscript{30} Data used for this graph has been seasonally adjusted using the X-12 method.
Data used for this graph has been seasonally adjusted using the X-12 method.

Data used for this graph has been seasonally adjusted using the X-12 method.
Figure 6.25: Brownsville Real Sales and Sales Tax Rebate Certificates Index move with USD per MXN Exchange Rate.

Figure 6.26: Total Active Private Customs Brokers in Texas Border Cities.
Vita

José Angel Moreno acquired his Bachelors degree in Business Administration in Economics in 2014. He has a Master’s of Science in Economics (MSE) and successfully defended his Master’s Thesis Dissertation on the Texas’s sales tax rebate program and cross-border retail activity.

During graduate school, he acquired a Graduate Research Assistant position at the Hunt Institute for Global Competitiveness, a regional think tank at the University of Texas at El Paso, where he studies regional economic trends for the Paso del Norte binational region, which brings together three key urban areas along the U.S. – Mexico border. Also, as a graduate research assistant, José Angel coordinated the creation of not only the infographics found in many of the Institute’s economic reports, but also of all of the trans boundary Paso del Norte energy sector asset maps found in the Institute’s recent Energy Sector Review. He continues to research the regulatory structure governing financial institution in the Paso del Norte Region.

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This thesis was typed by Jose Angel Moreno.