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Abstract

This paper examines the acceptance of peso payments, or currency substitution reverse dollarization, by U.S retail firms near the international border with Mexico. Survey data are drawn from a stratified random sample of 586 retailers located in El Paso, Texas, situated across the border from Ciudad Juarez, Chihuahua, Mexico. Approximately 13 percent of the participant firms accept Mexican pesos in exchange for goods and services. Empirical results indicate that factors such as a firm's percentage of Spanish speaking employees and distance to the nearest international bridge significantly influence the decision to accept or reject Mexican pesos.

Keywords: Currency Substitution; Mexican Peso; Border Economics; Probit Models
JEL Classifications: M21, Business Economics; R11, Regional Economic Activity

Resumen

El trabajo investiga la aceptación del peso Mexicano como medio de pago, pesoficación o dolarización inversa, por empresas Estadounidenses que operan en cercanía de la frontera internacional con México. Datos de encuesta se obtienen de una muestra de 586 empresas de El Paso, Texas, ciudad adyacente a Ciudad Juárez, Chihuahua, México. Aproximadamente 13 por ciento de las compañías que participan en la encuesta aceptan el peso como medio de pago. Resultados empíricos de un modelo probit indican que variables como el porcentaje de empleados que entienden Castellano y la distancia al puente internacional más cercano influyen la decisión de aceptar o rechazar al peso como medio de pago.

1. Introduction

The sister cities of El Paso, Texas, and Ciudad Juarez, Chihuahua, Mexico jointly form a metropolitan economy with more than two million inhabitants. On a daily basis, substantial volumes of international bridge traffic travel from the southern half of the borderplex into the city of El Paso. These northbound traffic flows include large numbers of Mexican consumers seeking to purchase goods and services from El Paso retailers. In some cases, certain goods and services can be purchased at lower prices in El Paso than in northern Mexico. In other cases, a better variety of merchandise, and/or better quality goods, is available at stores on the north side of the border. Also, some visitors come to El Paso for reasons other than shopping (business meetings, medical appointments, school enrollment, etc.) and visit stores either as a convenience or to kill time between appointments.

There is widespread recognition of the importance of El Paso retail sales to customers from Mexico (Fullerton 2007). The extent to which Mexican shoppers can utilize their home country currency at El Paso retailers is not well known. Are Mexican pesos widely accepted within El Paso's retail sector? What influences the decision to accept or reject pesos? This study examines these questions regarding peso transactions on the north side of the border with Mexico. In contrast to earlier studies (Yoskowitz and Pisani 2002), an on-site survey of retail businesses is conducted.

Subsequent sections of the paper are arranged as follows. A brief overview of related studies is provided next. A discussion of the survey procedure follows. Empirical results are then summarized. Implications and suggestions for future research are provided in the final section.

2. Literature Review

Studies examining currency substitution and dollarization at the macroeconomic level abound. Countries generally define dollarization as the proportion of transactions conducted in U.S. dollars relative to those conducted in a domestic currency (Ortiz 1983). Dollarization ratios are frequently monitored by monetary authorities of nearby trading

partners (Rogers 1992). The demand for U.S dollars within a foreign country is often bolstered by uncertainty regarding future prospects for a domestic currency (Tandon 2003).

Prock, Soydemir, and Abugri (2003) note that poor monetary policies increase the likelihood that multiple currencies are used for payments within a single market. Chau, Rodriguez and Turner (2003) provide evidence that a high volume of U.S dollars circulates throughout Mexico. The presence of Mexican pesos within the El Paso retail sector indicates that peso acceptance, partial "pesofication," or reverse dollarization can also occur in higher income economies.

Although not universal, currency substitution is common in relatively small economies. Selçuk (2003) reports varying, but substantial, degrees of "hard" currency substitution of domestic currencies within seven different economies: Turkey, Jordan, Poland, Slovak Republic, Israel, Hungary, and the Czech Republic. In Australia, economic conditions in Germany, Japan, and the United States are all found to affect demand for the local currency (Kingston and Melecky 2007). Despite proximity to the United States, Murray and Powell (2003) conclude that the Canadian economy is comparatively un-dollarized.

A subset of this literature examines currency substitution within United States firms that operate near Mexico. Telephone surveys conducted by Yoskowitz and Pisani (2007) indicate that just over 25 percent of border retailers accept pesos. Pisani, Yoskowitz, and Brusa (2008) also utilize a combination of telephone surveys of border region businesses in Canada and on-site surveys in Mexico to examine U.S. dollar acceptance. The responses indicate that the dollar is accepted by all Mexican firms and nearly all Canadian firms surveyed.

An earlier study (Yoskowitz and Pisani 2002), indicates that roughly 13 percent of El Paso businesses accept pesos as a medium of exchange. That study relies upon a telephone survey carried out during one week in May 2002 by one research assistant. It utilizes a random survey of 300 firms from three border regions. The survey is conducted over 6 retail categories. Economic and business surveys not conducted in person are sometimes subject to problems such as non-response, uninformed, and self-selection biases (Graeff 2002; Hudson et al. 2004). It would be helpful to examine whether the peso acceptance results reported in prior telephone surveys are supported by in-person surveys.

Due to budgetary constraints, on-site surveys of firms have not previously been conducted in El Paso on this topic. This study attempts to partially fill that gap in the empirical literature. To do so, a questionnaire survey was administered by 7 bilingual graduate research assistants and one supervisor. The interviews were conducted in one large border metropolitan economy between July and December 2008. To allow for potential business sector heterogeneity, it covers 10 separate retail categories.

3. Survey Methodology

To gauge the degree of peso acceptance in El Paso retail transactions, a stratified random sample of 586 firms taken from ten retail categories is employed. Those categories are: bakeries and tortillerias (tortilla makers); beer and liquor stores; beauty salons; convenience stores and gasoline stations; restaurants; grocery stores; pharmacies; clothing retailers; hotels and motels; and general and discount merchandisers. Businesses in these categories engage in numerous cash transactions, potentially leading them to engage in dual-currency operations (Yoskowitz and Pisani 2007). To define the universe of companies in El Paso, more than 2,800 firms were identified using the www.yellowpages.com internet site in July 2008. Each stratum of firms includes local, regional, national, and international businesses. The firms approached were selected randomly and those interviewed are distributed proportionally across the population of known retailers in El Paso. Among the businesses visited, the non-response rate is approximately 48 percent.

In-person surveys were administered by a team of salaried and trained bilingual graduate research assistants between July and December 2008. The questionnaires covered firm demographics, questions specific to peso-accepting companies, and questions specific to businesses that refuse pesos. Distance to the nearest international bridge is also included for each location where the surveys were administered. To help insure survey accuracy, the questionnaires were administered in either English or Spanish depending on the preferences of the company respondent (Marín and Marín 1991; Webster 1996). The instruments were designed so that each on-site interview required 10 minutes or less.

Participants that accept Mexican pesos answered 22 "Yes" questions. Those questions include the dollar conversion rate used on the date of the survey plus weekly hours spent exchanging and disposing of pesos. Firms that reject payment in pesos answered 13 "No" questions. Those questions indicate whether a firm has considered accepting pesos, whether they believe accepting pesos is too complicated, and where the decision to reject Mexican pesos originates.

4. Empirical Results

Table 1 reports the distribution of survey responses by retail category. The majority of firms surveyed reject pesos. Although many customers from Mexico patronize pharmacies in El Paso, none of the pharmacies surveyed accept pesos. Respondents at 27 of the 30 pharmacies indicated that peso acceptance had never been considered and there is no demand for that payment option by their customers. The remaining three pharmacies asserted that accepting pesos is too risky due to currency instability in Mexico. Grocery stores and apparel retailers exhibit the highest rates of peso acceptance. Customer convenience is cited as the primary reason, potentially reflecting the competitive nature of this low-margin sector of the economy.

Collectively, just over 13 percent of participant businesses accept Mexican pesos. That is similar to the acceptance rate reported in the Yoskowitz and Pisani (2002) telephone survey of El Paso firms. It is substantially smaller than a more recent telephone survey of Texas border companies, but still reflects a fairly substantial level of peso acceptance in this market and confirms the inroads of the foreign currency in this market (Yoskowitz and Pisani, 2007). Reflective of that, eight stores post signs on their premises to notify customers that pesos can be used for purchases, while another three companies use paid advertising of this practice to attract clients.

Table 1: Distribution of responses by retail category

Firm Category	Sample Size		Accept Mexican Pesos		Do not accept Mexican Pesos	
(1) Bakeries & Tortillerierías	30	5.12%	4	13.33%	26	86.67%
(2) Beer & Liquor Stores	30	5.12%	2	6.67%	28	93.33%
(3) Hair Salons	112	19.11%	10	8.93%	102	91.07%
(4) Gas Stations & Convenience Stores	50	8.53%	8	16.00%	42	84.00%
(5) Restaurants	139	23.72%	13	9.35%	126	90.65%
(6) Grocery Stores	50	8.53%	14	28.00%	36	72.00%
(7) Pharmacies	30	5.12%	0	0.00%	30	100.00%
(8) Clothing Retailers	53	9.04%	14	26.42%	39	73.58%
(9) Hotels & Motels	45	7.68%	4	8.89%	41	91.11%
(10) General &Discount Merchandisers	47	8.02%	8	17.02%	39	82.98%
Total	586	100.00%	77	13.14%	509	86.86%

Table 2 provides descriptive statistics for all peso-accepting retailers. Results indicate that the average size of these companies is relatively small, 9 employees or less, but the range is from 1 to 138 with a standard deviation of approximately 19. Proximity to the border crossings seems to be associated with greater peso acceptance. Some of these firms are located within 0.05 miles of the nearest international bridge. The average distance from the ports of entry is 3.6 miles and none of the firms who accept pesos are located more than 11 miles from the nearest international bridge. Minimal time is spent preparing for and disposing of Mexican pesos. On average, peso transactions account for less than 5 percent of total sales for these businesses.

One of the more interesting features in Table 2 is how long some of these companies have accepted pesos. Experience with peso denominated sales ranges from 2 months to 100 years, with a mean of 14 years. The latter figures stand out because large numbers of Texas border companies began disallowing peso transactions subsequent to the September 1976 and February 1982 devaluations (Beltran del Rio 1977; Black and Staples 1984). During the late 1970s, it was a common practice for retailers to place signs that read "No Aceptamos Pesos" in their storefronts to notify customers that pesos were not accepted.

Table 2: Descriptive Statistics for Mexican Peso-Accepting Firms (N=77)

	Mean	Minimum	Maximum	Std. Dvn.
Number of Employees	8.87	1.00	138.00	18.55
Years in community	16.28	0.17	100.00	18.65
Conversion Rate (on survey day)	11.57	9.70	16.00	1.23
Years accepting Mexican pesos?	14.00	0.17	100.00	17.78
Percentage of Sales in Pesos	4.60	0.00	50.00	8.00
Distance to nearest border crossing	3.60	0.05	10.90	3.40
Weekly hours spent disposing pesos	1.10	0.00	24.00	2.97
Weekly hours preparing for pesos	0.38	0.00	8.00	1.31

How the conversion rate is set:	Newspaper	Bank or Exchange House	Corporate Office	Fixed	Other
	23	24	10	13	6

Relative to the firm exchange rate, when pesos are exchanged, the rate firm receives is:	Above it	Below it	Equal
	31	8	38

How Mexican pesos are disposed:	U.S Bank	18	Mexican Bank	1
	Exchange House	24	Mexican Internal Operations	1
	U.S. Internal Operations	0	Money Changer (Itinerant)	0
	Don't Exchange	25	Other	8

Reason disposal method selected:	Convenience	Proximity	Habit	Other
	41	12	11	13

Peso acceptance increases sales:		Yes	No
		47	30

Whether a premium is used:	Yes	No	Average Premium
	10	67	20%

Whether a discount is used:	Yes	No
	0	77

When conversion occurs:	Same day	1-2 days	3-4 days	Week or more	Don't convert
	19	12	8	21	17

Peso acceptance decision:	Owner	Manager	Other
	71	4	2

Advertise Peso acceptance:		Do advertise	No advertising
		16	61

Form of advertisement:	Word of Mouth	Store signage	Paid advertising	Flyers	Other form
	4	8	3	0	1

Accept Mexican credit cards:	Do Accept	Don't Accept
	46	31

If accepts Mexican credit cards, are pesos preferred:	Credit Cards	Cash
	22	24

Payment method offering better exchange rate for firm:	Credit Cards	Cash
	15	17

Average weekly sales in U.S dollars:	$0 to $5,000	$5,000 to $25,000	$25 to $100,000	$100K+	Unsure
	22	16	4	1	34

Approximately 32 percent of the companies in the sample that accept pesos do not exchange them and use them for internal operating purposes. Firms that allow peso transactions are generally careful not to exchange them at less than the rates provided to customers, a surprising outcome since relatively little time is spent preparing for peso denominated transactions each week. More than half of the peso accepting firms indicated that doing so increases sales. Less than 15 percent of the firms that accept pesos assess premium charges to clients for the option of doing so. When premia are charged, customers pay a fairly stiff penalty as the average exchange rate is 20 percent higher than the market rate.

Table 3: Descriptive Statistics for Mexican Peso-Rejecting Firms (N = 509)				
	Mean	Min	Max	Std. Dvn.
Number of Employees	17.82	1.00	600.00	40.59
Years in the community	14.04	0.03	91.00	13.61
Distannce from nearest border crossing	6.41	0.40	16.80	3.15
Has firm ever considered accepting pesos?	Yes	No		
	66	443		
If yes, what are reasons for not doing so?	Lack of experience	Too Risky	No Demand	
	16	7	36	
	Client Backlash	Other		
	1	6		
Is accepting pesos too complicated of a process?	Yes	No		
	329	180		
Is there a company policy that prevents acceptance of Mexican pesos?	Yes	No		
	169	340		
Is accepting Mexican pesos inconvenient?	Yes	No		
	299	210		
Would accepting Mexican pesos potentially increase sales?	Yes	No		
	218	291		
Would the firm potentially lose money by accepting Mexican pesos?	Yes	No		
	139	370		
If yes, why?	Costly to exchange currency	Exchange rate uncertainty		
	15	93		
	Mexican peso doesn't buy much	Other		
	10	17		
Decision maker in choice to reject Mexican peso	Owner	Manager	Other	
	385	27	95	
Average weekly sales in U.S. dollars	$0 to $5,000	$5,000 to $25,000	$25,001 to $100,001	
	144	147	67	
	$100,001 or more	Unsure or Don't know		
	10	135		

Reflecting the status of the peso as a soft currency, none of the businesses that permit peso denominated sales offer discounts. That differs from Ciudad Juarez where firms sometimes wish to accumulate dollars and use discount currency rates to do so. It also marks a substantial change from the discounts that El Paso and other Texas border retailers frequently used during the 1970s and 1980s to attract customers from Mexico (Black and Staples 1984).

The majority of firms surveyed, 87 percent, reject Mexican pesos (Table 3). The establishments that do not allow peso transactions employ twice as many employees, on average, than those that do. They also tend to have operations that are located farther away from the international bridges. Most of these respondents, 443 of 509, have never considered accepting pesos. Official policies against peso transactions do not exist in most of these firms. Although many companies indicate that allowing peso sales would increase volumes, complexity and inconvenience are identified as reasons for not doing so. Among businesses that fear monetary losses would result from accepting pesos, currency market uncertainty is the most commonly cited reason. Even though proximity to the border provides multiple options for disposing of any pesos that accumulate on any given day, respondents indicated that the added revenues would not justify the additional effort required to administer foreign currency sales at these firms.

To more formally analyze the responses, a probit equation is also estimated (Table 4). Regressors include interview language (LANG), number of employees (EMPL), years within the community (YRS), whether the firm is local, regional, national, or international (FTYPE: 1 = local, 2 = regional, 3 = national, and 4 = international), percentage of Spanish speaking staff (SPAN), presence of cross border operations (CBRDR), and distance to the nearest border crossing (MAPDIST). Three of the parameter estimates for the seven explanatory variables are significant at the 5-percent level: FTYPE, SPAN, and MAPDIST.

The negative sign of the FTYPE coefficient suggests that as operations expand beyond the border region, the likelihood of peso acceptance declines. Not surprisingly, as distance from the nearest international bridge increases, peso acceptance also falls. The MAPDIST coefficient indicates that the probability of permitting peso sales drops by roughly 13 percent for each additional mile of separation from the ports of entry. That result implies that peso incursions into the U.S. retail economy at large are likely to be fairly limited once visitors go outside the border zone of counties adjacent to Mexico. The SPAN parameter estimate suggests that the likelihood of peso acceptance by El Paso retailers increases by 1.1 percent for every percentage point gain in Spanish speaking staff. That may be due to some percentage of the customers using pesos to make purchases potentially being monolingual Spanish speakers who require assistance in that language.

Table 4. Probit Regression Output

Variable	Coefficient	Std. Error	z-Statistic	Prob.
Constant	-0.901	0.515	-1.747	0.081
LANG	-0.286	0.158	-1.810	0.070
EMPL	-0.004	0.004	-0.906	0.365
YRS	-0.001	0.005	-0.126	0.900
FTYPE	-0.154	0.075	-2.047	0.041
SPAN	0.011	0.005	2.255	0.024
CBRDR	-0.018	0.054	-0.334	0.738
MAPDIST	-0.129	0.024	-5.358	0.000

McFadden R-squared	0.167	Mean dependent variable	0.133	
Sum squared residuals	54.669	S.D. dependent variable	0.339	
S.E. of regression	0.309	Log likelihood	-189.272	
Restr. Log likelihood	-227.269	Avg. log likelihood	-0.326	
LR statistic	75.994	Prob(LR statistic)	0	

The coefficients for FTYPE and MAPDIST suggest that the demand for Mexican pesos is greater at retailers in close geographic proximity to the border. Although not significant at the 5-percent level, conducting the survey in English (LANG) is associated with a substantially lower incidence of peso transactions. Payroll size (EMPL) and enterprise age (YRS) are not found to influence currency substitution among El Paso commercial entities. Surprisingly, whether or not a firm has operations in Mexico (CBRDR) also plays no appreciable role in the decision to allow peso sales.

5. Conclusion

This research examines currency substitution in El Paso, Texas. Surveys conducted at 586 retail firms confirm earlier telephone survey results that approximatley 13 percent of El Paso businesses are willing to accept Mexican pesos in exchange for goods and services. On average, peso-denominated transactions represent approximately 4.6 percent of total sales at those companies. Other empirical results obtained are largely as hypothesized. Parameter estimates from a probit analysis indicate that the distance to the nearest border crossing and a firm's percentage of Spanish speaking employees significantly influence a company's decision to accept or reject Mexican pesos. Whether a retailer is a local, regional, national, or international company is also a significant predictor.

El Paso is the second largest metropolitan economy in the United States located along the border with Mexico. Similar to what is observed in this market, pesos also have achieved inroads against the dollar in other border retail markets. Additional studies of other regional retail markets such as San Diego, Calexico, or Nogales would be helpful in ascertaining the extent of currency substitution in the land of the greenback. In particular,

the impact of distance to ports of entry on peso acceptance in other regions would be interesting to examine. Results for this market seem clear, however, that reverse dollarization currency substitution is a fairly common commercial practice.

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Angel Luis Molina, Jr. is an Associate Economist at the University of Texas at El Paso Border Region Modeling Project. Mr. Molina holds an M.S. in Economics from the University of Texas at El Paso. In 2007, he received a faculty research award from the International Academy of Business & Public Administration Disciplines. He has published several papers on cross-border regional growth patterns, infrastructure tolls, short-term cyclical economic fluctuations, and long-term structural economic trends.

Michael J. Pisani is a Professor of International Business at Central Michigan University. His research interests focus primarily on Latin American and U.S.-Mexican border business and economic phenomena, including: labor informality; entrepreneurship; microfinance and microenterprise development; regional integration; cross-border business interactions; currency substitution; sustainability; and international business. Professor Pisani has conducted field research in Mexico, the U.S.-Mexico borderlands, Nicaragua, Belize, El Salvador, Costa Rica, Guatemala, and Canada. Dr. Pisani has also published widely in academic journals in both latinAmerica and North America. Dr. Pisani is currently completing a collaborative book on economic informality in South Texas, entitled *Under and Around: The Informal and Underground Economy of the South Texas Border* (University of Texas Press).