International Bridges Crossborder Survey

Background, Methodology and Survey



City of El Paso International Bridges Department

Acknowledgement: The research is undertaken by the City of El Paso International Bridges Department under agreement with El Colegio de la Frontera Norte. Primary contacts for questions: Carlos Olmedo, PhD (olmedocx@elpasotexas.gov) and Cesar M. Fuentes, PhD (cfuentes@colef.mx).

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BACKGROUND

The International Bridges Crossborder Survey (IBCS) is a collaboration between the City of El Paso International Bridges Department (IBD) and El Colegio de la Frontera Norte (COLEF) to quantify crossborder activities from personal crossings through the El Paso-Ciudad (Cd.) Juárez ports of entry. The objectives are three-fold. First, repeated data collection to document travel behavior profiles, including quantifying direct expenditures to provide a measure of how much of El Paso's retail trade is attributed to Mexican visitors. Second, the longitudinal nature of the database allows the City to capture within year seasonality, in addition to any effects of external shocks to the bridge system.[1] Lastly, the surveys capture spending by economic activity (goods and services), allowing for input- output analysis to estimate the economic impact of Mexican resident spending across the El Paso economy.

PARTNERSHIP

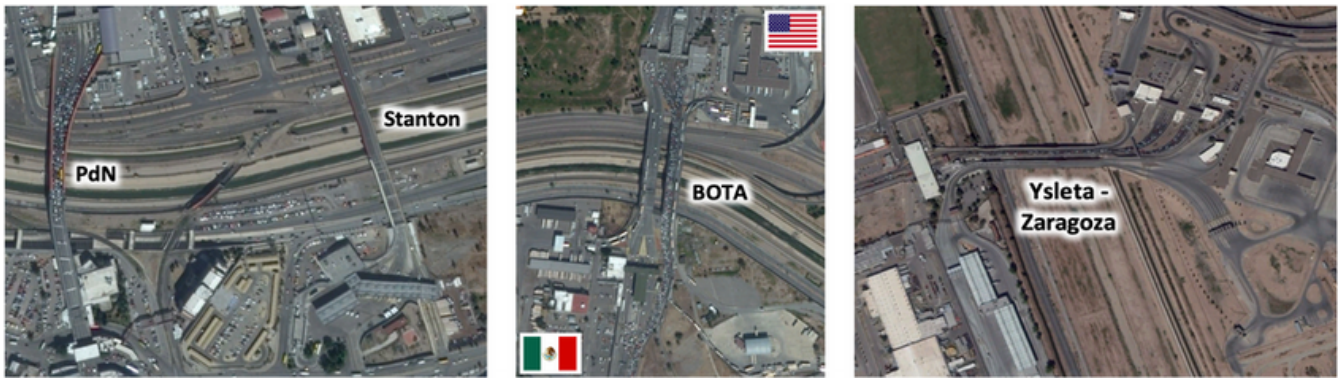
IBD initially signed an international cooperation agreement with COLEF to conduct the IBCS.[2] Surveys started in October 2019 but the project was paused in March 2020 due to the COVID-19 pandemic. In Technical Report IBD- 2020-01, policymakers and the public were provided with social and expenditure crossborder profiles during this 24-week time period. Post-COVID, the parties consequently signed a second agreement and the IBCS resumed in November 2023.

METHODOLOGY

Persons in vehicles and pedestrians are interviewed through face-to-face interviews using tablets – almost entirely in Spanish – on the Mexican side as they cross northbound into El Paso at three of the region's principal ports of entry – Paso del Norte (PdN), Bridge of the Americas (BOTA) and Ysleta (see map and picture montages). Stanton is excluded because it is a SENTRI vehicle-only bridge in the northbound direction and the fast flow of traffic hinders the application of the survey, a limitation also witnessed at the PdN SENTRI lane opened in December 2023, as well as during certain times of the day at BOTA where there is no toll to create a vehicle queue. Respondents that indicate their primary place of residence is Mexico are given an "entry" survey (entering to visit the United States) while those that say the United States are given an "exit" survey (returning after visiting Mexico). The distinction is that the former captures planned activities and expenditures while the latter captures activities and expenditures already made. The minimum age to participate is 16 years and all respondents are read a short script that the survey responses are confidential and voluntary.

[1] External shocks include factors like abrupt changes in consumer demand (e.g., a recession) or the peso/dollar exchange rate, safety concerns in Cd. Juárez, and increased security at bridge inspection points. [2] COLEF is a Northern Mexico university system of Masters and PhD graduate programs in the social sciences with foci on border issues. Its institutions have an established methodology for conducting migration flow surveys along the northern and southern border of Mexico. This research expertise makes it an ideal partner for repeated data collection for the El Paso-Cd. Juarez bridge system.

Map Montage. El Paso-Cd. Juárez International Bridges



Picture Montage. Vehicle and pedestrian surveys at PdNM





Sampling Design

The IBCS strategy involves a spatial and temporal dimension that uses **stratified random sampling** to minimize sampling error and make statistical inferences; that is, to be able to say with high confidence that the sample of persons surveyed is representative of the larger population of personal crossings. In this design context, stratification involves dividing the pedestrian and vehicle population counts into strata such that each represents an independent sample from which to draw on. The strata are constructed from the sampling frame of historical quarterly hourly crossings by bridge, mode and shift obtained from U.S. Customs and Border Protection. More so, the strata are used to distribute the budgeted primary sampling units (PSUs) that are determined a priori. The following steps provide detail about the selection process:

1) combining bridge with mode generates seven bridge-mode points – PdN pedestrians, PdN vehicles, BOTA pedestrians, BOTA vehicles, Ysleta pedestrians, Ysleta vehicles, and Yselta SENTRI;[1]

2) shifts are divided into a morning (7 a.m. to 3 p.m.) and afternoon (3 to 11 p.m.) shift so in total there are 7 X 2 = **14 bridge-mode-shift strata** (these are spatial dimensions of the design, see Figure 1);[2]

3) using historical quarterly data, the number of crossings for each stratum is calculated;

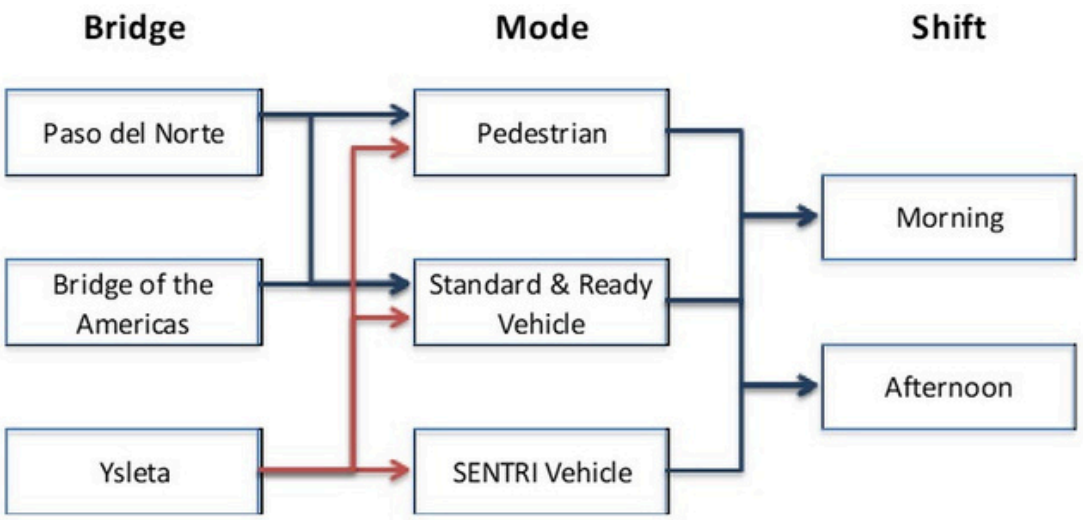
4) the percent of crossings for each stratum is calculated by dividing the individual stratum crossings by the total crossings from the combined 14 strata (this percent represents a distribution weight);

5) the distribution weights from step 4 are used to determine the total number of days to survey for each stratum during a quarterly period (e.g., if the budget calls for 174 bridge-mode-shifts to conduct interviews for the quarter, and the distribution weight for the PdN pedestrian morning stratum is 0.12, then 174 X 0.12 = 21 morning shifts of surveys are allotted for PdN pedestrians);[3] lastly,

6) the stratum shifts in step 5 are selected using **simple random sampling without replacement** for a quarterly period to form the PSUs for surveys (e.g., for the temporal dimension of the sample design, if there are 92 days in a quarter, each day has a 21 / 92 = 23% chance of being selected for surveys).

[3] The term “vehicles” refers to crossings via both standard and ready lanes. Ready lanes provide an expedited inspection process for travelers with a radio frequency identification or RFID-enabled travel ID. Over time, almost all travelers will have ready lane access as persons update their ID and this technology becomes norm. SENTRI refers to the Secure Electronic Network for Travelers Rapid Inspection which allows expedited clearance in stand-alone lanes for pre-approved, low-risk travelers. Applicants go through a rigorous background check and in-person interview. [4] The hours from 11 p.m. to 7 a.m. are excluded from the sampling frame because of interviewer security concerns. Although a small percent of the overall crossings take place during these hours, some interesting characteristics are lost from weekend travelers that anecdotally are crossing early in the morning for social and entertainment reasons. [5] Historical quarterly crossings (e.g., 2023:Q1) are a good proxy for the strata distribution in the same future quarter (e.g., 2024:Q1) period since it accounts for seasonality (all that matters is a good distribution weight estimate, not the exact number of crossings).

Figure 1. Sampling frame



Note: Stanton and PdN SENTRI lanes not included due to fast flow.

A next level of **random selection** is applied in multiple stages during the implementation of the survey interviews. In the case of vehicles, the interviewers begin the start of their shift at a pre-determined imaginary line set by the survey coordinator during the IBCS project design phase and selects the first vehicle in the lane leading to the international border (prior to the toll booth at PdN and Ysleta; there is no toll at BOTA). In the following step, if the vehicle selected has a lone driver, that person is asked to participate after verbally verifying he/she is 16 years or older; if there are multiple persons 16 years and older, in order to reduce the bias of selecting only the driver, the interviewer enters the group number into the tablet and activates a random number generator that determines who to ask to participate – the driver is person 1 followed by the front passenger and so forth in a clockwise direction. Interviewers are permitted to follow the vehicle up to the international boundary to administer the survey.[6] Once a survey is finished, the interviewer returns to the imaginary line. In the third stage, the interviewer switches to the adjacent lane if there is more than one lane and repeats the process. This demonstrates that the unit of analysis is the personal bridge crosser, not the vehicle.

The process for pedestrians is similar with some variation. For the tolled bridges, the imaginary line begins immediately after the turnstiles after a toll is paid. At this point, the interviewer obtains a randomly generated number from the tablet then counts the people crossing this line and asks the selected person to participate (16 years and older). The questionnaire is applied from that start point up to the top of the bridge if need be, then returns to the imaginary line and repeats the process. In the case of BOTA where tolls are not collected, the imaginary line starts from the cyclonic chain-linked fence of the pedestrian walkway at the bottom of the bridge. Otherwise, the process is the same.

[6] During the IBCS development phase, IBD and COLEF received official permission from Fideicomiso (the tolling agency in Cd. Juárez) and Mexican Aduanas to allow interviewers to survey within the tolling spaces and up to the top or mid-point of the international bridges (interviewers are instructed not to cross into the United States).

Quality Control

All tablet information of complete and incomplete surveys is uploaded to a COLEF server on a daily basis where a dedicated supervisor performs data quality control, including identifying and working with interviewers on potential data entry or response error that needs clarification or correction (e.g., spending shows $10,000 so confirmation is asked if it was verified that it was in dollars and not pesos). Monthly datasets are consequently sent to IBD staff for its own in-house round of quality control (e.g., assisting with properly classifying Spanish open ended responses into English categories, identifying out of range numerical answers, etc.). This back-and- forth collaboration leads to the final quarterly datasets subject to the sample weighting for analysis.

Sample Weights

For a survey to be considered in the analysis, the decision rule is that respondents answer question 7 of the survey asking their main reason for crossing (questions 1 through 6 capture demographics and residence). The surveys remaining after applying this constraint represents the ***unweighted*** sample size.

Sampling weights are next generated using bridge, mode and shift information from 1) the actual number of crossings for the respective quarterly period from CBP[7] and from 2) the individual and group number of persons captured by surveys. Additionally, 3) a temporal factor is created so that the spatial information from steps 1 and 2 is adjusted to represent information across the study period. These weights are applied to create a ***weighted*** sample representative of the population size of personal crossings during the quarterly period. Statistically, the **number of crossings is synonymous with crossers with replacement** since persons can take multiple trips. Applying weights is the final step of the sampling design to make statistical inferences and generalize the results from the sample to a population.

[7] Recall that historical crossings are used to generate the sampling frame for the application of surveys. But once surveys are administered, the actual crossings for the respective period are known from the same CBP source.

ENTRY SURVEY [EXIT SURVEY ASKS QUESTIONS IN PAST TENSE]

1. Information captured by tablet: ID, shift, date, time, bridge, mode

2. Sex

3. Age

4. How many persons are crossing with you?

5. What is your country of primary residence?

6. What is your city or town of primary residence?

7. What is the main reason why you are crossing today?

8a. Do you plan on spending any money on this trip in El Paso? (Did you spend in Juarez?)

8b. If yes – What do you plan on spending on and how much on each?

9. How long will you be staying on this trip?

10. In the past 30 days, how many times have you crossed?

11. Does the exchange rate influence your decision to spend money in El Paso?

12. Do bridge wait times to enter El Paso influence your decision to cross?

13. Do bridge wait times to return to Juarez influence your decision to cross?

14. Pedestrians only – How are you getting to your destination once you cross into El Paso?

15a. Do you know about the pre-paid E-Fast Pass to cross into Juarez? [for IBD operation purposes]

15b. If yes – Are you enrolled in the pre-paid E-Fast Pass?

15c. If no – Why are you not enrolled in the pre-paid E-Fast Pass?

16a. Are you employed, unemployed, retired, homemaker, or student? (answer all that apply)

16b. If employed or unemployed – What is your job occupation or profession?

17. Approximately how much do you receive in wages, salaries, pensions and other income?

ENCUESTA DE ENTRADA [LA ENCUESTA DE SALIDA HACE LAS PREGUNTAS EN TIEMPO PASADO]

1. Información capturada por la tableta: ID, turno, fecha, hora, puente, modo
2. Sexo
3. Edad
4. ¿Cuántas personas están cruzando contigo?
5. ¿Cuál es tu país de residencia principal?
6. ¿Cuál es tu ciudad o localidad de residencia principal?
7. ¿Cuál es la razón principal por la que estás cruzando hoy?
8a. ¿Planeas gastar dinero en este viaje en El Paso? (¿Gastaste en Juárez?)
8b. Si es así, ¿en qué planeas gastar y cuánto en cada uno?
9. ¿Cuánto tiempo te quedarás en este viaje?
10. En los últimos 30 días, ¿cuántas veces has cruzado?
11. ¿El tipo de cambio influye en tu decisión de gastar dinero en El Paso?
12. ¿Los tiempos de espera en los puentes para entrar a El Paso influyen en tu decisión de cruzar?
13. ¿Los tiempos de espera en los puentes para regresar a Juárez influyen en tu decisión de cruzar?
14. Solo para peatones – ¿Cómo llegarás a tu destino una vez que cruces a El Paso?
15a. ¿Sabes sobre el E-Fast Pass prepagado para cruzar a Juárez? [para propósitos operativos del IBD]
15b. Si es así, ¿estás inscrito en el E-Fast Pass prepagado?
15c. Si no, ¿por qué no estás inscrito en el E-Fast Pass prepagado?
16a. ¿Estás empleado, desempleado, retirado, ama de casa o eres estudiante? (responde todo lo que aplique)
16b. Si estás empleado o desempleado, ¿cuál es tu ocupación o profesión?
17. Aproximadamente, ¿cuánto recibes en salarios, sueldos, pensiones u otros ingresos?