Title

Un- and Underbanked Transit Passengers and the California Integrated Travel Project

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Publication Date

2022-03-01

DOI

10.7922/G2F47MFN

Data Availability

The data associated with this publication are available at: https://doi.org/10.25338/B8R04T

Un- and Underbanked Transit Passengers and the California Integrated Travel Project

February 2022

A Research Report from the National Center for Sustainable Transportation

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National Center for Sustainable Transportation

ITS UCDAVIS INSTITUTE OF TRANSPORTATION STUDIES

TECHNICAL REPORT DOCUMENTATION PAGE

1. Report No. NCST-UCD-RR-22-08	**2. Government Accession No.** N/A	**3. Recipient's Catalog No.** N/A
4. Title and Subtitle Un- and Underbanked Transit Passengers and the California Integrated Travel Project		**5. Report Date** February 2022 **6. Performing Organization Code** N/A
7. Author(s) Susan Pike, PhD, https://orcid.org/0000-0001-6558-3479 Mollie D'Agostino, https://orcid.org/0000-0002-3689-9471 Kailey Flynn, https://orcid.org/0000-0001-8333-7183		**8. Performing Organization Report No.** UCD-ITS-RR-22-18
9. Performing Organization Name and Address University of California, Davis Institute of Transportation Studies 1605 Tilia Street, Suite 100 Davis, CA 95616		**10. Work Unit No.** N/A **11. Contract or Grant No.** Caltrans 65A0686 Task Order 047 USDOT Grant 69A3551747114
12. Sponsoring Agency Name and Address U.S. Department of Transportation Office of the Assistant Secretary for Research and Technology 1200 New Jersey Avenue, SE, Washington, DC 20590 California Department of Transportation Division of Research, Innovation and System Information, MS-83 1727 30th Street, Sacramento, CA 95816		**13. Type of Report and Period Covered** Final Report (October 2020 – September 2021) **14. Sponsoring Agency Code** USDOT OST-R

15. Supplementary Notes
DOI: https://doi.org/10.7922/G2F47MFN
Dataset DOI: https://doi.org/10.25338/B8R04T

16. Abstract
Transit agencies are looking for ways to save costs and improve transit rider experiences. One strategy to accomplish this is to replace legacy payment systems that accept cash and in-network agency-issued tickets or cards with fully digital open-loop payments systems, which accept all debit, credit, and mobile payments and are more readily interoperable between different transit agencies and shared mobility operators. This transition will not come without confronting a number of equity and logistical challenges to ensure all riders benefit from this transition. The state of California's California Integrated Travel Project (Cal-ITP) aims to help transit agencies make this digital payment transition. Researchers at UC Davis partnered with Cal-ITP to explore this question: how can California transit agencies modernize fare payment while ensuring transit systems are open and accessible to un- and underbanked riders? Researchers collected 200+ intercept surveys in the Davis-Sacramento-Woodland area of California to assess the potential for un- and underbanked passengers to use digital payment tools, such as contactless cards, and smartphone-based apps. This research finds that among unbanked riders who typically pay with cash, more than half of respondents would be open to paying with a prepaid debit card or a prepaid government-issued debit card, and about a third are open to paying with a mobile phone.

17. Key Words Public transportation, un- and underbanked, open payments, transit payments, transit equity, transit access	**18. Distribution Statement** No restrictions.		
19. Security Classif. (of this report) Unclassified	**20. Security Classif. (of this page)** Unclassified	**21. No. of Pages** 39	**22. Price** N/A

Form DOT F 1700.7 (8-72) Reproduction of completed page authorized

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Disclaimer

Acknowledgments

This study was funded, partially or entirely, by a grant from the National Center for Sustainable Transportation (NCST), supported by the U.S. Department of Transportation (USDOT) and the California Department of Transportation (Caltrans) through the University Transportation Centers program. The authors would like to thank the NCST, the USDOT, and Caltrans for their support of university-based research in transportation, and especially for the funding provided in support of this project. The authors would like to thank their collaborators at the California Integrated Travel Project for their input throughout the duration of the project and assistance with survey outreach and recruitment. They also thank staff and leadership at Unitrans, YoloBus and SacRT for their advice on survey recruitment, as well as the Yolo County Foodbank for allowing the team to conduct surveys at their distribution sites. Finally, the undergraduate research assistants Anthony Llorens and Aurora Schuneman for all their hard work conducting surveys in the field.

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EXECUTIVE SUMMARY

Throughout California, there are many barriers to using public transit. Among them is a confusing set of payment options, which may differ by agency, station, or vehicle. This makes purchasing tickets or transit cards cumbersome. Some agencies may require exact change payment on board, which costs passengers time. Cash collection is also costly administratively. In retail industries, processing, auditing, and securely depositing cash costs vendors between 4.7% to over 15% of the amount collected (Buzek 2018). Different payment mediums and scheduling specifications for passengers moving between operators can make transit even less desirable. Some metropolitan regions offer integrated payment options across many operators, but most of these systems still require a transit agency issued card and/or account.

The California Department of Transportation (Caltrans) launched the California Integrated Travel Project (Cal-ITP) to improve the transit user payment experience and identify strategies to save agencies time and resources. A key strategy identified by Cal-ITP is a transition towards universal digital *open-loop* payments, which are a cost-saving alternative to cash or the *closed-loop* ticketing systems offered by a single transit operator or a regional group of agencies. Closed-loop systems only work in limited settings and may only accept a limited set of payment options (e.g., only credit cards and cash).

Open-loop systems accept all modern card-based payments, as well as digital mobile payments. Importantly open-loop systems break down boundaries. They make payment systems interoperable between transit agencies, shared mobility operators, or other vendors. Most open-loop systems currently include payments with contactless (tap-based) credit and debit cards, prepaid debit cards, app-based wallet systems including apple-pay and google pay, and peer-to-peer accounts such as Venmo and the Cash App. Peer-to-peer accounts also increasingly offer linked debit cards and other financial services to people without banking access. If a rider has any of these options in their pocket, they can easily board the bus, train, or light rail. No special ticket required. No exact change required.

However, there are logistical and equity challenges for implementing open-loop payments systems among the 350+ transit agencies in California. For passengers who rely on cash payments, or who are un- or underbanked, will these open-loop payment systems be accessible? To assess whether un- and underbanked passengers will benefit from open payments systems, we gathered insights from transit passengers about these issues, through an intercept survey at transit stops and other public locations in the Davis-Sacramento-Woodland area of California.

Surveys were conducted during July and August of 2021, in person with transit passengers. We gathered responses from approximately 200 individuals. Among our respondents, 57 participants (31%) are unbanked, and an additional 40 participants (22%) have only a checking

or savings account, but not both. All respondents rode transit and nearly half of the sample reported using transit two or more days a week.

One of the key findings from the survey is that the clear majority (78%) of the 57 unbanked respondents are interested in using alternatives to cash payment for transit. We did have 13 unbanked respondents (making up 22% of the unbanked in our sample) and an additional 16 banked respondents who reported they "would not use", for transit, any of the payment means presented in the survey. Although not all of these respondents are unbanked, nor do all of them usually pay for transit with cash, more research is needed to gain a deeper understanding of these results.

When unbanked respondents were asked what alternative to cash they would like to use, a majority (57% of unbanked) selected a government issued prepaid debit card. Second was the prepaid debit card (55% of unbanked) and third was a tie among the remaining choices (credit card, debit card, and mobile phone), with 32-33% of the unbanked indicating they would like to use each of these options.

For banked respondents, of which there were 112, the leading alternative to cash was mobile phone payment (48% of banked) and second, a debit card (47% of banked), followed by prepaid government issued debit card (42% of banked). Additional analysis of socio demographic data showed that respondents who would not use credit cards were more likely to have low income and educational levels. Those who use transit more frequently, and presumably have fewer other transportation options available, are more likely to want to use prepaid debit cards and less likely to want to use credit cards.

Our results suggest that banked and unbanked alike want to pay for transit with the same means of payment they already use for other things. Further, for the most part the unbanked are not deterred from using digital payments for transit. As digital currencies become more prevalent and the use of cash declines, both transit agencies and passengers are likely to benefit by moving away from closed-loop agency specific payment systems and costly cash-collection, and towards open systems that allow passengers, including the unbanked to pay with the various options they already use.

Introduction

In 2004, the California legislature recognized the importance of seamless payment network integration for transit services in California, adding the following claim to statute:

> *Use of a single payment mechanism makes existing mass transportation services easier to use, by eliminating the need for familiarity with multiple complex tariffs and the need for correct change. (California Law 2015)*

Following the passage of this 2004 legislation to establish integrated payments for California transit, the state initiated the California Integrated Travel Project (Cal-ITP), which developed a multi-phased approach for studying and implementing integrative and open payment solutions among the 350 transit agencies in California. The goals of Cal-ITP include identifying and implementing an *open-loop payment system* across all transit operators in California. One that can seamlessly take whatever payment medium you have in your wallet or your pocket, rather than requiring a ticket. Cal-ITP has established that open-loop digital payments are the path toward payment integration for California transit agencies.

Open-loop payment systems have the potential to provide a number of benefits to passengers and transit agencies alike. First, cash is costly to collect. The cost of operating cash payment systems is estimated to cost large retail businesses between 4.7% to over 15% of the collected amount due to the labor costs associated with processing, auditing, and securely depositing cash (Buzek 2018). These high costs, together with trends in consumer preference, are contributing to a shift away from cash (Prasad 2021). Indeed, the International Monetary Fund is heralding a new era of digital currency, claiming that the lower costs of digital payments "open the door to financial services for 1.7 billion people without traditional bank accounts" (Adrian and Mancini-Griffoli 2021). Replacing magnetic striped printed tickets also produces less waste, given that these tickets are rarely recyclable, and on-board cash collection slows board and dwell times, (Ritchie 2021) likely resulting in higher emissions. At the same time, reducing the inconveniences associated with cash and closed-loop payment systems may have a positive impact on overall ridership. There are numerous examples of regions and states internationally and domestically where improving payment integration resulted in increased ridership (Cal-ITP 2020b).

The COVID-19 pandemic has also shed light on a number of issues related to public transportation. First and foremost, the pandemic caused significant declines in transit service and ridership. To come out of this crisis, agencies will need to innovate and consider strategic investments to make transit service more competitive. This will include instituting safety precautions to reduce touch points for payment when entering and exiting vehicles and stations. During the height of the pandemic, some agencies provided fare-free service to protect drivers and riders from exposure (Pike and Kazemian forthcoming). But to bring back fares safely, agencies will likely need to consider touchless systems. The crisis does present an opportunity to improve the transit network by building an inclusive, integrated safe payment system that can integrate transit operations across the state.

However, the preference and ability of passengers to utilize digital means of payment varies. For some subset of people without a credit card or debit card, i.e., the un- and underbanked, digital transit payment systems may not be accessible. One solution employed by agencies introducing digital payment systems has been to provide options for converting cash into digital payment, which is necessary to serve un- and underbanked passengers (e.g., at cash kiosks, or through card purchase in participating retail outlets).

How well these cash-to-digital conversions work for the un- and underbanked, in the context of public transportation is an open question. When cash-to-digital payment conversion options are offered in closed-loop systems, they typically require the use of agency-issued cards. Passengers must then take extra steps or make trips to specific transit stops or retail locations in order to maintain funds on their card. Lower income passengers are also more likely to add small amounts more frequently, rather than one large amount every week or month; thereby spending even more time "topping-up" their cards.

Open-loop systems do not remove the cash-to-digital challenges completely, although they do offer greater flexibility in the payment options that are accepted. This allows passengers to use means of payment already available and familiar to them and does not restrict them to using one means of payment (e.g. an agency issued card) for all trips. Whether this is enough to make open-loop payment systems accessible for all transit riders; specifically, those that are un- and underbanked is the focus of this study. Working with Cal-ITP and a small set of transit operators, we investigate the benefits and barriers for un- and underbanked passengers to use digital open-loop payment systems for transit.

Background

Un- and Underbanked Populations

According to the most recent household survey of the Federal Deposit Insurance Corporation (FDIC), in 2019 5.4% of US households were unbaked; down 1.1 percentage points since 2017 (FDIC 2020). Although this is a fairly small portion of households, those that are unbanked tend to be lower income, lower education levels and are more likely to be Black or Hispanic (Federal Reserve 2021). The top two reasons for not having a bank account are not having enough money to meet a minimum balance, and a distrust of banks (FDIC 2020). These reasons were also supported by another group of researchers, who worked in a check cashing service to gain insights and collect data on the check-cashing sector, finding that 8% of the population were un- or underbanked (Servon 2017). Servon (2017) found that those who do not have bank accounts do not because it saved them money, and improved predictability associated with overdraft fees. Cash and alternative financial services also allowed them to have funds immediately available. Other reasons included difficulty determining available balances and a lack of transparency. Further, alternative financial services are more personable than banks, and people develop relationships with the employees (Servon 2017). Perhaps one of the more poignant and surprising findings related to check-cashing and other alternative financial services is that it is not accurate to deem these services as predatory (Servon 2017).

These reasons for choosing alternative financial services are confirmed by others. Xiaoyan Xu (2019) finds that minimum balances, high account fees, and uncertainty related to fees are reasons to avoid traditional banking institutions. Other factors correlated with not using traditional banks include lack of regular employment and immigrant status (King and Saldarriaga 2017). There are also spatial patterns to the locations of un- and underbanked households (King and Sanldarriaga 2017).

Demographics of Un- and Underbanked

Patterns of use for bill payment services are similar to the patterns for money orders and check cashing. The FDIC reports that younger households, less-educated households, and Black, Hispanic, and American Indian or Alaska Native households are more likely to use these transaction services, as well as lower-income households and households with volatile income (FDIC 2020). Xu (2019) finds that being unbanked in the U.S. is associated with households with the same racial characteristics and education levels, as well as households with larger families and disabilities (Xu 2019 p.386).

There are financial burdens associated with choosing not to, or not being able to use traditional banking services, and there may be impacts to individual health outcomes (Eisenberg Guyot et al. 2018). Study participants who self-reported poor or fair health, versus those who reported good health status, were more likely to use loans and check cashing services and to be unbanked (Eisenberg-Guyot et al. 2018).

Rhine and Greene (2013) find that the likelihood of becoming unbanked (after previously having a bank account) is more likely for minority racial groups, those with lower levels of education, and those whose income has decreased and/or who have lost health insurance. In addition, their results suggest that these same groups were less likely to have bank accounts in the initial period of the study (Rhine and Greene 2013). Though other studies suggest a preference for unbanked people to use alternative financial services, this study is not counter to those results; that is, this study identifies characteristics that are more likely related to becoming unbanked, while other studies identify reasons individuals and households choose to forego traditional banking.

Cash, Banking, and Financial Alternatives

When households or individuals do not have bank accounts, there are a growing number of alternatives they may turn to for financial transactions. These do include cash; however, the use of cash is decreasing in general. Cash continues to be used more by lower income individuals, and more by those without credit or (non-prepaid) debit cards (Greene 2020). Other payment options include reloadable prepaid cards, which can carry high fees. These cards are used more by un- and underbanked households, and included 8.5% of households in 2019, though this is down from “9.7 percent in 2017 and 10.2 percent in 2015” (FDIC 2020).

Cash is used more frequently for taxi trips in New York City among the Green Taxis (specifically introduced to serve the boroughs other than Manhattan [Brooklyn, Queens, the Bronx, Staten

Island]); the use of cash to pay for taxi trips is highly correlated to the proportion of un- and underbanked residents within geographic areas (King and Saldarriaga 2017).

Other financial alternatives used by un- and underbanked households are bill payment services, such as Western Union and MoneyGram as well as person-to-person (P2P) financial services such as the Cash App, PayPal and Venmo (FDIC 2020). While small percentages of households do use money orders and check cashing (around 5%), up to 31.1% use P2P services (FDIC 2020).

Transit Payment Mechanisms

This study focuses on what payment mechanisms work best for un- and underbanked populations. A variety of transit payment options currently exist and are available for use on some of California's transit systerms. Those identified in the 2021 Cal-ITP/CARB Market Sounding include:

> Retail payment service providers such as Square and PayPal, payment networks like Visa and Mastercard, and public transit-focused payment companies like Cubic, Init, Bytemark, or Masabi offer another source for understanding accounts (California Department of Transportation 2021).

As mobile smartphones become widespread, mobile payments for transit service payment is becoming a more realistic option. However, while 85% of U.S. population has a smartphone, only 76% of low-income populations (earning less than $30k) have smartphones (Pew 2021).

There are also privacy concerns regarding the information sharing with transit agencies and companies involved in the tracking of customer's movements through the phone. Therefore, there is a 2017 proposal to use a system of signatures to simultaneously verify and anonymize identities (Kang and Nyang 2018).

Despite these challenges, open-loop payments are recognized as an opportunity to save costs and modernize the transit fare system and are likely to replace legacy closed-loop payment systems, which can only accept specific payment mediums. Closed-loop card-based systems (e.g., Clipper, Connect, Tap) may operate across multiple agencies, but there are still costs associated with managing these systems that could be avoided with open-loop systems (Ritchie 2021; Elliot and Laker 2019).

As early as 2015, integrated transit payment systems were planned or underway in several areas of the US, including New York City, NY; Salt Lake City, UT; Chicago, IL; and Philadelphia, PA (Tavilla 2015). And, as of 2020, approximately 20% of U.S. agencies accepted open-loop payment, including New York City and Chicago (Daly 2020).

EMV is a secure form of open-loop payment, defined by the payment application Square as "a global standard for credit cards that uses computer chips to authenticate (and secure) chip-card transactions." (EMV originally was an acronym for "Europay, Matercard and Visa," the three companies that originated the standard.) The history of EMV based payment applications in public transit is shown in Figure 1 (Elliot and Laker 2019).

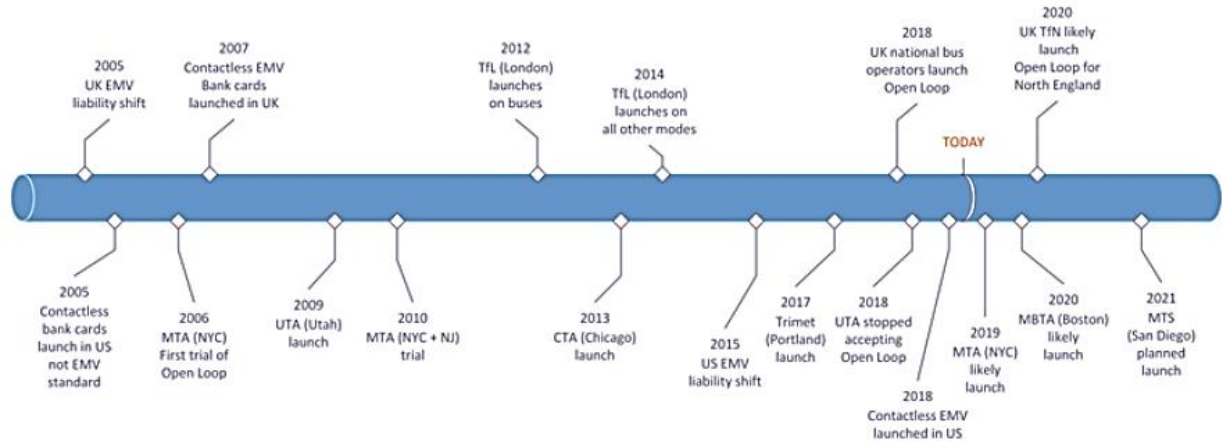

Figure 1. History of EMV payments for use in transit (Elliot and Laker 2019)

There is considerable literature that aims to evaluate the preferences and needs of un- and under-banked populations in the U.S. A growing number of open-loop EMV payment alternatives for use in transit are also available. In this study we examine the potential for un- and underbanked to utilize these payment alternatives to access public transportation.

Methods

Over an eight-week period, we conducted an intercept survey of public transportation passengers among three transit service providers in the Sacramento area of California: Unitrans (based in Davis), Yolobus (based in Woodland), and Sacramento Regional Transit (SacRT; based in Sacramento). The survey was developed in coordination with Cal-ITP and was designed to assess transit use and payment methods for all passengers with a focus on un- and underbanked passengers. Prior to implementing the survey, we worked with the three transit operators to identify key areas (bus stops, food distribution sites, and other public services locations) where intercept surveys might be most effective.

Among the transit agencies targeted in the survey, SacRT is the largest operator and has the most robust digital payment options. SacRT now has contactless EMV-based tap payment systems for all light rail vehicles, which accept all contactless payment methods, including tap-to-pay credit/debit card, smartwatch, or smart phone. SacRT has a new digital payment app, ZipPass, available for android and apple smart phones, which allows riders to use their phone to tap for payment on the light rail and bus system. SacRT also has a microtransit app, SmaRT Ride, which is operated by Via, and accepts two options for payment to board the shuttle: cash or a Connect Card.

Both SacRT and its smaller Yolo County neighbor, Yolobus, participate in the Sacramento regional Connect Card, which is a contactless closed-loop system that allows riders to use the same card for nine of the area's transit agencies. The Connect Card can be purchased online or in-person at about a dozen sales locations in the region (ConnectCard 2021). Yolobus allows the Connect Card but does not have any open-loop tap-to-pay options aboard their buses-only

system. Unitrans is the smallest operator in the survey. It is a bus-only system operated by the Associated Students at UC Davis in partnership with the City of Davis, and all drivers are UC Davis students. Unitrans offers limited digital payment methods and does not accept the Connect Card. This may be linked to the extensive free-fare options provided to all UCD undergraduate students, all public school students, seniors (60+), consumers with disabilities, and Medicare recipients.

Recruitment

Outreach was informed by contacting the transit agencies, community organizations, social services, etc. This type of community outreach was necessary to gain permissions to survey the public outside properties along with relevant information about locations, potential participants, and adequate times to survey. Communicating with community organizations and social services allowed for more access to participants that may have been unbanked or underbanked. A relationship based on mutual aid was established based upon the fact that this survey data would be addressing the preferences of the public and informing efforts to improve local public transit.

We conducted surveys at transit stops, at food bank distribution sites, and at some other public services locations, (e.g. libraries, social services administrative offices). The survey was translated from English into six languages identified by SacRT as the languages used when conducting SacRT surveys. These are Arabic, Hmong, Traditional Chinese, Russian, Spanish, and Vietnamese. Unfortunately, we did not obtain responses in any of these languages other than Spanish, and this was limited to only 8 responses.

During the intercept survey implementation, research assistants approached transit passengers and offered them the option of taking the 10–15 minute survey at that time in exchange for $5 in cash or taking the survey online at their convenience and being entered into a drawing to win a $50 gift card. The vast majority of participants opted to take the survey in person, and surveys were conducted on phones and tablets, mainly on the personal devices of the research assistants. If participants preferred to take the survey on their own, they were given a survey recruitment postcard that contained background information on the study and what it aimed to accomplish. The postcard also contained contact information for the research team, information about the incentives, a QR code that could be scanned to access the survey, and a website through which to access the survey.

Limitations of Sampling Strategy

Members of the survey team spoke English and Spanish or Chinese, but recruiting in other languages proved challenging, and may explain the lack of representation among the language groups not represented in the sample. Furthermore, this survey was a “convenience” sample and therefore not intended to be representative of the general population, nor the un- and under-banked population. This limitation is due to the small scope and budget of the study (which was originally funded to be a digital survey) and the short time period to complete the intercepts with only 3 research assistants.

Survey Content

The survey was designed to be short, but as complete as possible (See appendix for full survey instrument). The survey had four sections that covered the following topic areas. The first section asked about frequency of using public transportation, payment options, and discount eligibility. The second section inquired about financial products and services used, as well as preferences and challenges associated with the use of mobile phones and government debit cards for payments. The third section asked about demographics and gathered information about household makeup, employment, gender, and other individual and household characteristics. The last section asked for permission to contact in the case of a follow-up survey along with a section for participants to add any additional comments.

Analysis and Results

The focal question of the study is: what it will take to allow un- and underbanked passengers the same level of access that banked passengers have to transit, in an open payment system, a goal of Cal-ITP. To address this question, we analyze survey data related to the payment tools respondents would be willing to use. We examine what factors are related to that willingness, including how often they use transit, how they pay for transit, socio-demographic characteristics, challenges with various payment tools, and banking status.

We first present characteristics of the sample, then descriptive statistics related to the interest in using different means of payment, as well as how un- and underbanked participants differ across a variety of characteristics. Throughout this section, sample sizes reflect the number of participants that provided a response to each question.

Sample Characteristics

We had 204 participants in the survey, with approximately 186 providing information for most of the relevant questions. Since we administered the survey in person, we consider unanswered questions or unchecked boxes on multiple choice questions to represent true “no” responses, since each question was asked to each respondent, in person. However, for some questions we included “yes” and “no” as answer options and so we only count those that have actually checked “no” as a true reporting of “no”. This is the case for banking tools and services, as well as the reasons reported for not having a bank account.

About one third, 31% (57 participants), of the sample is unbanked, and an additional 40 participants have only a checking or savings account, but not both (22%). The remaining 47% (86 participants) of the sample reports having both a checking account and a savings account. Our sample intentionally overrepresents individuals from un- and underbanked groups, because we are primarily interested in the payment tools used by these groups, and the payment preferences they have for public transportation.

As we might expect from the largely unbanked sample, and the intercept sample of those who use transit, the majority of our sample falls into lower income groups; approximately two-thirds (65%) have an annual income of less than $25,000 (Table 1). An additional 21% have an income

in the range of $25,000 to $49,999. The remaining 13% have an income of $50,000 or more and are pooled into one category since very small portions of the sample fall into each income range above $50,000. At the same time our sample is made up of individuals without college degrees. Our sample is fairly evenly split between male and female respondents, with some also declining to report.

Table 1. Sample Characteristics

Characteristic	Count	Percent
Income		
Less than $25,000	112	65.5%
$25,000 to $49,999	36	21.1%
$50,000 or more[1]	23	13.4%
Education		
No formal education	2	1.15%
Grade school, junior high school or some high school	28	16.1%
High school diploma or equivalent	66	37.9%
Associates degree or technical school certificate	28	16.1%
Undergraduate student or degree	44	25.3%
Graduate student or degree	6	3.45%
Gender		
Male	89	50.1%
Female	80	45.4%
Non-Binary/other	3	1.7%
Prefer not to say	4	2.27%
Employment		
Unemployed	95	60.1%
Stay at home/homemaker	1	0.64%
Management and Administrative	5	3.2%
Professional or technical	6	3.8%
University faculty or staff	8	5.1%
Clerical and Administrative	3	1.9%
Services or repair	14	9.0%
Sales or marketing	15	9.6%
Production/construction or crafts	4	2.6%
Education (K-12)	5	3.2%
Trip Frequency		
Less than once a week	29	16.6%
Two days a week	17	9.7%
Three days a week	24	13.7%
Four days a week	22	12.6%
Five days a week	39	22.2%
Six or seven days a week	44	25.1%
Means of Paying for Transit[2]		
Transit Agency Card	55	28.2%

Characteristic	Count	Percent
Mobile phone	18	0.92%
Contact-less payment	12	0.62%
Cash	104	53.3%
Benefits Programs Enrollment[2]		
Calfresh	79	38.7%
WIC	5	0.25%
Medical	84	41.2%
Healthy families	5	0.25%
Calworks	12	5.8%
Housing	22	10.8%

[1] The survey included the following options for income: Less than $25,000, $25,000 to $49,999, $50,000 to $74,999, $75,000 to $99,999, $100,000 to $149,999, and $150,000 or more. The highest four categories were combined into "$50,000 or more" due to the low numbers of respondents selecting each of these income categories.

[2] We present the count of respondents using each means of payment for transit, and enrolled in each benefits program (remaining sample does not use/is not enrolled)

Survey participants use transit regularly, except for a small group that reported that they did not use transit since the beginning of COVID, and a few who said they use transit less than once a week. We had no respondents who use transit about once a week, with nearly half or the sample reporting they use transit two or more days a week.

Our participants pay for transit using prepaid cards, and in the case of Unitrans, the card takes the form of a student ID. The most frequently reported means of payment though is cash. This is in line with what we might expect from the largely un- and underbanked and lower income sample that we have. About half of the sample is enrolled in some form of public assistance or benefits program, largely CalFresh (a grocery assistance program) and Medi-Cal.

In addition to the characteristics presented in Table 1, we also reviewed the age of the participants. The sample is fairly spread out with a mean age of 44.6 years and standard deviation of 17.38 years. The youngest reported age was 18 years, and the oldest was 91 years.

Descriptive Statistics

The two key questions here include how un- and underbanked passengers differ from other transit passengers in their use of transit, use of payment tools, and socio-demographic characteristics. At the same time, we are exploring the payment preferences of all of the participants and what factors, including whether individuals are un- and underbanked, are important to those preferences. Here we present a sample of characteristics and their relationship to these two key outcomes, as well as how they relate to one another.

Table 2 highlights how the banked and unbanked differ. The unbanked respondents tend to have lower levels of income on average, though only 6% of our sample (10 of those who answered the question) have an income at or above California's 2020 median income of $75,235 (US Census Bureau)

Table 2. Characteristics of banked vs. unbanked participants

Characteristic	Banked	Unbanked
Income (p = 0.0321)	N = 115	N = 55
Less than $25,000	59.1%	78.2%
$25,000 to $49,999	23.5%	16.4%
$50,000 or more	17.4%	5.45%
Education (p < .05)	N = 118	N = 55
No formal education	0.85%	1.81%
Grade school, junior high school or some high school	11.9%	25.4%
High school diploma or equivalent	31.4%	50.9%
Associates degree or technical school certificate	16.9%	14.5%
Undergraduate student or degree	33.9%	7.27%
Graduate student or degree	5.08%	0.00%
Gender (p = 0.3827)	N = 129	N = 57
Male	44.9%	38.6%
Female	46.5%	42.9%
Non-Binary/other	1.57%	1.81%
Employment (p = 0.3353)	N = 105	N = 50
Unemployed	53.3%	76.0%
Stay at home/homemaker	0.95%	0.00%
Management and Administrative	3.81%	2.00%
Professional or technical	4.76%	2.00%
University faculty or staff	6.67%	2.00%
Clerical and Administrative	2.86%	0.00%
Services or repair	8.57%	10.0%
Sales or marketing	12.4%	4.00%
Production/construction or crafts	2.86%	2.00%
Education (K-12)	3.81%	2.00%
Trip Frequency (p = 0.4055)	N = 117	N = 49
Less than once a week	15.4%	16.3%
Two days a week	8.55%	14.3%
Three days a week	11.1%	16.3%
Four days a week	12.8%	14.3%
Five days a week	26.5 %	12.2%
Six or seven days a week	25.6%	26.5%

[1] Chi-squared tests were conducted for each variable and p-values are shown

Next, we look at the payment tools and preferences, first with respect to whether individuals are unbanked, and then in relation to other factors. This survey question asked participants whether they would use a selection of payment tools for public transit. The question is shown in Figure 2, below. Not all options are currently available on the transit systems included in this study, so “already use” is not expected to be selected by high proportions of participants.

When you are **boarding a public transportation vehicle,** for each of these payment options please tell us if you have already used it, would like to use it, or wouldn't use it.

	Already use	Would like to use	Would not use
Credit card	○	○	○
Pay with my phone (Apple Pay, Google Pay or Samsung Pay)	○	○	○
Prepaid debit card	○	○	○
Debit card from my bank account	○	○	○
Government issued prepaid debit card	○	○	○

Figure 2. Public transportation payment preferences survey question

Most participants indicated they "would like to use" at least one of the payment options presented in the survey, as shown in Table 3. These include credit card, debit card, mobile phone, prepaid debit card, and government issued prepaid debit card. There are 29 participants who selected "would not use" for all of the options presented in the survey, this represents 15.5% of the sample. Of these 29 individuals, 20 of them reported they usually pay for transit with cash, though only 13 of them are unbanked (of total 57 unbanked). In short, approximately 22% of unbanked respondents report they would not use any of the alternative digital payment options presented. It is possible that for these individuals, the non-cash options are not seen as viable. There is also limited overlap among the individuals who selected each payment option. The only options that may serve as proxies for each other are prepaid debit cards, and prepaid government-issued cards—those who would like to use one would like to use the other, and similarly, those who would not like to use prepaid debit cards would also not like to use government-issued prepaid cards.

Table 3. Payment preferences of banked vs. unbanked[1]

Payment Method	Banked (N =129)	Unbanked (N = 57)
Credit Card (p = 1)		
Already use	11.2%	10.7%
Would like to use	34.4%	33.9%
Would not use	54.4%	55.4%
Debit Card (p = 0.0184)		
Already use	15.3%	5.36%
Would like to use	46.8%	32.1%
Would not use	37.9%	62.5%
Prepaid Debit Card; n = 170 (p = 0.0221)		
Already use	6.40%	9.09%
Would like to use	36.8%	54.5%
Would not use	56.8%	36.4%
Prepaid Government Card (p = 0.0609)		
Already use	1.61%	3.57%
Would like to use	41.9%	57.1%
Would not use	56.5%	39.3%
Mobile Phone (p = 0.0249)		
Already use	11.2%	5.36%
Would like to use	48.0%	32.1%
Would not use	40.8%	62.5%

[1] Chi-squared tests were conducted for each variable and p-values are shown, but the "Already Use" responses were excluded from those tests, since there are very few respondents in those groups

There are some differences between the unbanked and banked in terms of their preferences. Table 3 shows that credit cards would be used by 34% of the sample regardless of unbanked status. A debit card would be used by approximately 47% of those with bank accounts and 32% of those without bank accounts. (Presumably, they interpreted this to mean "Would you use a debit card if you had one?") A much higher percentage (54.5%) of unbanked participants would use a prepaid debit card, and this is higher than the percentage (36.8%) of banked participants that would use a prepaid debit card. Similarly, those who are unbanked are more likely to respond that they would use a government issued prepaid card (57.1%) than those with bank accounts (41.9%). Finally, those who are unbanked are somewhat more reluctant to pay with a mobile phone app or wallet (32.1%) as opposed to those with bank accounts, of which 48% would pay with their mobile phone app or wallet.

Table 4, Table 5, and Table 6 show the payment preferences for subgroups within the sample as they relate to the characteristics income, education level, and frequency of transit use. Credit card payment preferences differ with respect to income levels; those who would not use credit cards are on average lower income; with 77% of this group in the less than $25,000 income category, compared to only 56.9% in this category among those who would like to use credit card for transit payments. Though the numbers seem to reflect a preference for credit card payments skewed towards those with higher levels of education these differences were not

found to be statistically significant. As far as transit use, the patterns are interesting; the highest frequency users (those who use transit six or seven days a week) are more prevalent in the would not use group. However, similar proportions of those who would like to use and those who would not use credit cards use transit five or more days a week. The would like to use group is somewhat split into those who use transit almost every day, and those who use it less frequently, whereas those in the would not use group are more frequent transit users on average.

Table 4. Individual characteristics and credit card payment preferences

Sample Characteristic	Already use[1]	Would like to use	Would not use
Income (p = 0.0064)	N = 16	N = 58	N = 96
Less than $25,000	25%	56.9%	77.1%
$25,000 to $49,999	50%	20.7%	16.7%
$50,000 or more	25%	22.4%	6.25%
Education (p = 0.2041)	N = 17	N = 57	N = 99
No formal education	0%	3.51 %	0%
Grade school, junior high school or some high school	5.88%	17.5%	17.2%
High school diploma or equivalent	47.1%	28.1%	41.4%
Associates degree or technical school certificate	11.8%	15.8%	17.2%
Undergraduate student or degree	35.3%	31.6%	20.2%
Graduate student or degree	0%	3.51%	4.04%
Trip Frequency (p = 0.0070)	N = 16	N = 55	N = 91
Less than once a week	43.8%	10.9%	13.2%
Two days a week	18.8%	20.0%	3.30%
Three days a week	6.25%	12.7%	14.3%
Four days a week	0%	5.45%	19.8%
Five days a week	25%	18.2%	23.1%
Six or seven days a week	6.25%	32.7%	26.4%

[1] Chi-squared tests were conducted for each variable and p-values represent the results of those analyses. The "Already Use" responses were excluded from chi-squared tests

There are not significant differences between the income or education levels of those who would like to use compared to those who would not use prepaid debit cards (Table 5). However, a higher proportion of those who would like to use them use transit more frequently than who would not. This is somewhat distinct from the transit use of those who do not want to use credit cards, where there are higher levels of ridership for those who do not want to use credit cards.

Table 5. Individual characteristics and prepaid debit card preferences

Sample Characteristic	Already use[1]	Would like to use	Would not use
Income (p = 0.6994)	N = 11	N = 71	N = 88
Less than $25,000	63.6%	67.6%	63.6%
$25,000 to $49,999	27.3%	21.1%	20.4%
$50,000 or more	9.09%	11.3%	15.9%
Education (p = 0.3142)	N = 11	N = 72	N = 90
No formal education	0%	1.39 %	1.1%
Grade school, junior high school or some high school	0%	19.4%	15.6%
High school diploma or equivalent	54.5%	31.9%	40.0%
Associates degree or technical school certificate	9.09%	23.6%	11.1%
Undergraduate student or degree	36.4%	20.8%	27.8%
Graduate student or degree	0%	2.78%	4.44%
Trip Frequency (p = 0.0396)	N = 11	N = 65	N = 85
Less than once a week	9.09%	9.23%	21.2%
Two days a week	18.8%	10.8%	9.41%
Three days a week	9.09%	7.69%	16.5%
Four days a week	9.09%	16.9%	10.6%
Five days a week	27.3%	18.5%	23.5%
Six or seven days a week	27.3%	36.9%	18.8%

[1] Chi-squared tests were conducted for each variable and p-values represent the results of those analyses. The "Already Use" responses were excluded from chi-squared tests

There are no differences in the trip frequency of those who would like to pay with their phone and those who would not. However, a higher proportion of those who would not pay with their phone have lower income and education levels than those who would like the option to pay with their phones.

Table 6. Individual characteristics and phone-based payments preferences

Sample Characteristic	Already use[1]	Would like to use	Would not use
Income (p = 0.0527)	N = 16	N = 72	N = 83
Less than $25,000	43.8%	59.7%	74.7%
$25,000 to $49,999	37.5%	20.8%	18.0%
$50,000 or more	18.8%	19.4%	7.23%
Education (p = 0.0426)	N = 16	N = 72	N = 86
No formal education	0%	1.39 %	1.1%
Grade school, junior high school or some high school	6.3%	11.1%	22.1%
High school diploma or equivalent	31.3%	33.3%	43.0%
Associates degree or technical school certificate	12.5%	15.3%	17.4%
Undergraduate student or degree	43.8%	34.7%	13.9 %
Graduate student or degree	6.25%	4.17%	2.33%
Trip Frequency (p = 0.4325)	N = 16	N = 68	N = 78
Less than once a week	18.8%	13.2%	16.7%
Two days a week	6.25%	13.2%	9.00%
Three days a week	6.25%	10.3%	16.7%
Four days a week	6.25%	10.3%	16.7%
Five days a week	50.0%	23.5%	14.1%
Six or seven days a week	12.5%	29.4%	26.9%

[1] Chi-squared tests were conducted for each variable and p-values represent the results of those analyses. The "Already Use" responses were excluded from chi-squared tests

Conclusions and Recommendations

We examine the payment preferences for public transit of those without traditional banking services; namely those without checking or banking accounts, the un- and underbanked. We do not find substantial differences in how those with and without bank accounts currently pay for transit, nor how frequently they use transit. However, we do see differences in the preferences for various payment methods that could be incorporated into open-loop payment systems.

Unbanked and lower income individuals are more likely to indicate they would use prepaid cards (government issued or otherwise), and less likely to use other means. Whereas those who are banked are more likely to indicate they would use mobile phone-based payments and debit cards. This is in contrast to the preferences of the unbanked and the lowest income participants in our survey and is also reflected in the results related to trip frequency. Those who use transit more frequently, and presumably have fewer other transportation options available, are more likely to want to use prepaid debit cards and less likely to want to use credit cards.

Considering the 29 respondents who reported they "would not use", for transit, any of the payment means presented in the survey, there remains a need to further explore how individuals with these needs or preferences may be served by an open-loop, digital payment

system for public transit. Although not all of these respondents are unbanked, nor do all of them usually pay for transit with cash, we have not identified a means of payment that they would like to use.

Our results suggest that banked and unbanked alike want to pay for transit with the same means of payment they already use for other things. Further, for the most part, the unbanked are not deterred from using digital payments for transit. As digital currencies become more widely used and the use of cash declines, both transit agencies and passengers are likely to benefit by moving away from closed-loop agency specific payment cards and costly cash-collection, and towards open systems that allow passengers, including the unbanked to pay with the various options they already use.

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Data Summary

Products of Research

The data collected for this study consist of intercept survey data gathered in July and August of 2021 at transit stops and community locations in the Sacramento, Davis, and Woodland areas. The data were recorded using the Qualtrics survey platform on the mobile phones of research assistants and downloaded from Qualtrics into csv files. Data were also collected online through Qualtrics from those participants who chose to do the survey online.

Data Format and Content

The data for this project that are made available are in csv files, with a description of the data in a text file. We also provide a csv file that serves as a codebook for the data explaining the variables and the possible values.

Data Access and Sharing

The data is publicly accessible at https://doi.org/10.25338/B8R04T.

Reuse and Redistribution

There are not restrictions on the sharing of the data.

Pike, Susan (2021), Un and Underbanked Transit Passengers, Dryad, Dataset, https://doi.org/10.25338/B8R04T

Appendix A

Transit Rider Survey

Start of Block: Default Question Block

Q1.1 Welcome to the Transit Riders Survey!

Thank you for your interest! This survey is part of a study exploring new ways for California residents to pay for and access public transportation throughout the state. Your participation will help ensure that new payment methods are equitable and accessible to all transit users throughout California.

Para hacer la encuesta en español, haga clic aquí

中文版調查點擊此處

لإجراء الاستبيان باللغة العربية، انقر هنا

Để làm khảo sát bằng tiếng Việt, hãy nhấp chuột vào đây

Нажмите здесь, чтобы пройти опрос на русском языке

Txhawm rau ua qhov kev ntsuam xyuas no ua lus Hmoob nyem ntawm no

Participation in this survey will take 10 to 15 minutes. As a small thank you for your participation, you will be entered into a drawing for one of 20 $50 Visa gift cards! If you are unable to complete the survey but would like to be included in the drawing, please email Dr. Susan Pike at scpike@ucdavis.edu to be entered. Please review the following Visa Gift Virtual Account Cardholder Agreement.

All of your responses will be confidential, and your participation is entirely voluntary. You can decline to answer any questions and you can stop taking part at any time. Whether or not you choose to participate, answer any question, or stop participating, there will be no penalty to you or loss of benefits to which you are otherwise entitled. If you have any questions about this study, please contact Dr. Susan Pike at scpike@ucdavis.edu.

By clicking NEXT below, you acknowledge you have read the above information and agree to participate in this study.

Thank you for your participation!

Susan Pike

Q1.2
First, we'd like to learn a little about your use of public transit.

Thinking of your usual use of public transportation over the past 12 months, in a typical week about how many days do you make trips using any form of public transportation?

- I haven't used public transportation in the past 12 months (9)
- I haven't used any public transportation in the past 12 months, but I did before COVID-19 (8)
- Less than once a week (1)
- About once a week (2)
- Two days a week (3)
- Three days a week (4)
- Four days a week (5)
- Five days a week (6)
- Six or seven days a week (7)

End of Block: Default Question Block

Start of Block: Contact Info

Q2.1
Thank you for your interest in our survey! Since you have not used public transportation in the past 12 months, we don't need any additional information from you at this time. If you would like to be entered into the drawing to win a gift card, please provide your contact information, below.

If you have any questions about this study or future surveys please contact Dr. Susan Pike at scpike@ucdavis.edu.

Q2.2 Please provide us with one or more means to contact you:

- Name (1) _____
- Email address (2) _____
- Phone number (6) _____

End of Block: Contact Info

Start of Block: Transit Use and Payment

Q3.1
Which payment options do you use when boarding public transit?

(Select all that apply)

- ☐ Cash (1)
- ☐ Prepaid card from transit agency (2)
- ☐ Mobile phone (QR Code, digital wallet, mobile ticket, etc.) (3)
- ☐ Contact-less/tap payment with a credit card or prepaid debit card (4)
- ☐ Other (please write in) (6) _____

Q3.2 You noted you use a prepaid card from your transit agency. How do you usually add value to your card? Please select the **payment method you use most often**.

- ○ **Cash** at card kiosks or vending machines in transit stations/at stops (1)
- ○ **Credit card** at card kiosks or vending machines in transit stations/at stops (2)
- ○ At local businesses that can add value (3)
- ○ Through an online transit agency account that is connected to my card (4)
- ○ Other (please write in) (5) _____

Q3.3 Are you eligible for any discounts on transit services? (Check all that apply)

- ☐ Yes, senior citizen discount (1)
- ☐ Yes, veteran discount (2)
- ☐ Yes, student discount (3)
- ☐ Yes, another discount (please write in) (4)
  _____
- ☐ No, I am not eligible for any of these discounts (5)
- ☐ I don't know (6)

Q3.4 Do you receive this discount?

	Definitely yes (1)	Probably yes (2)	Might or might not (3)
Yes, senior citizen discount (x1)	○	○	○
Yes, veteran discount (x2)	○	○	○
Yes, student discount (x3)	○	○	○
Yes, another discount (please write in) (x4)	○	○	○
No, I am not eligible for any of these discounts (x5)	○	○	○
I don't know (x6)	○	○	○

End of Block: Transit Use and Payment

Start of Block: Payment Tools and Preferences

Q4.1
Next, we will ask about the financial products or services you have used in the past 12 months.

Q4.2 In the past 12 months, did you (or anyone in your household) use any of these financial products or services? (Select all that apply)

	Yes (23)	No (24)
Checking account at a bank (2)	○	○
Savings account at a bank (3)	○	○
Prepaid or reloadable debit card (4)	○	○
Credit card (Visa, MasterCard, etc.) (5)	○	○
Check cashing somewhere other than a bank (6)	○	○
Payday loan or advance service somewhere other than a bank (10)	○	○
Peer to peer payments (Venmo, CashApp, etc.) (8)	○	○
Wire transfer (such as Western Union) (1)	○	○
Mobile wallet (Apple Pay, Google Wallet, Samsung Pay, etc.) (9)	○	○
Other services (write in) (7)	○	○

Q4.3 Are you interested in having a bank account of any kind?

- ○ Very interested (1)
- ○ Somewhat interested (2)
- ○ Not very interested (3)
- ○ Not at all interested (4)
- ○ Don't know (5)

Q4.4
There are different reasons people might not have a checking or savings account. Do any of the following reasons apply to you?

	Yes (1)	No (2)
Bank hours are inconvenient (1)	○	○
Bank locations are inconvenient (2)	○	○
Bank account fees are too high (3)	○	○
Bank account fees are too unpredictable (4)	○	○
Banks do not offer products and services you need (5)	○	○
Don't trust banks (6)	○	○
Don't have enough money to meet minimum balance (7)	○	○
Avoiding banks gives me more privacy (8)	○	○
Cannot open an account due to personal identification problems (9)	○	○
Another reason (please write in) (10)	○	○

Q4.5 You noted that you have used a prepaid card in the past 12 months. In this question, please tell us where the prepaid card that your household used in the past 12 months was from.

- ○ From a website or other that is not a bank (1)
- ○ From a bank branch or website (2)
- ○ From an employer (3)
- ○ From a government agency (4)
- ○ From a family member, friend, or other personal acquaintance (5)
- ○ From somewhere else (please write in) (6)

_____

End of Block: Payment Tools and Preferences

Start of Block: Integrated Transit Payments

Q5.1
California transit agencies are considering the introduction of a single payment method for all public transportation throughout the state. In these next questions we would like to hear about what payment methods might work for you.

Q5.2
When you are **boarding a public transportation vehicle,** for each of these payment options please tell us if you have already used it, would like to use it, or wouldn't use it.

	Already use (1)	Would like to use (2)	Would not use (3)
Credit card (1)	○	○	○
Pay with my phone (Apple Pay, Google Pay or Samsung Pay) (2)	○	○	○
Prepaid debit card (3)	○	○	○
Debit card from my bank account (4)	○	○	○
Government issued prepaid debit card (5)	○	○	○

Q5.3 Would any of the following be a challenge for you to pay with your phone? (Select all that apply)

- ☐ Not having wifi access (1)
- ☐ Ways to add money (2)
- ☐ Identity concerns (3)
- ☐ Monthly fees (4)
- ☐ Knowing the balance (5)
- ☐ Other (please write in) (6) _____

Q5.4 Would any of the following be a challenge for you to pay with a government issued prepaid debit card? (Select all that apply)

- ☐ Places to get it (1)
- ☐ Ways to add money (2)
- ☐ Sharing the card with family members (3)
- ☐ Identity concerns (4)
- ☐ Monthly fees (5)
- ☐ Knowing the balance (6)
- ☐ Other (please write in) (7)

End of Block: Integrated Transit Payments

Start of Block: Demographics

Q6.1
In this section we will ask a little more about you.

With which gender do you identify?

- ○ Male (1)
- ○ Female (2)
- ○ Non-binary / other gender (3)
- ○ Prefer not to say (4)

Q6.2 What is your birth year? (please enter the 4 digits of the year you were born)

_____

Q6.3 Which race/ethnicity do you most closely identify with (select all that apply)?

- ○ Asian/Pacific Islander/Hawaiian (1)
- ○ Black/African American (2)
- ○ Hispanic/Latino (3)
- ○ Native American (4)
- ○ White/Caucasian (5)
- ○ Other (please write in) (6) _____

Q6.4 Which of the following categories contains your approximate annual household income before taxes? (*Your household includes you and the people you share income with, and **does not include roommates or housemates** with whom you don't share income*).

- ○ Less than $25,000 (1)
- ○ $25,000 to $49,999 (2)
- ○ $50,000 to $74,999 (3)
- ○ $75,000 to $99,999 (4)
- ○ $100,000 to $149,999 (5)
- ○ $150,000 or more (6)

Q6.5 What is the highest level of education you have completed?

- ○ No formal education (1)
- ○ Grade school, junior high school or some high school (2)
- ○ High school diploma or equivalent (3)
- ○ Associates degree or technical school certificate (4)
- ○ Current undergraduate student (5)
- ○ Four-year bachelor's degree(s) (6)
- ○ Current graduate student (7)
- ○ Graduate degree(s) (8)

Q6.6 Are you or is anyone in your household enrolled in any benefits programs? (Select all that apply)

- ☐ CalFresh or SNAP (1)
- ☐ WIC (2)
- ☐ Medi-Cal (3)
- ☐ Healthy Families Program (6)
- ☐ CalWORKS (4)
- ☐ Housing Assistance Program (5)
- ☐ Other (Please write in) (7) _____

Q6.7 Which of the following best describes your current employment?

- ○ Unemployed (10)
- ○ Stay at home/homemaker (11)
- ○ Management or administrative (1)
- ○ Professional or technical (2)
- ○ University faculty or staff (9)
- ○ Clerical and administrative support (3)
- ○ Services or repair (4)
- ○ Sales or marketing (5)
- ○ Production/construction or crafts (6)
- ○ Education (K-12) (7)
- ○ Other (please write in) (8) _____

Q6.8
Which of the following most closely resembles your work schedule?

- ○ Part time (less than 35 hours per week) (1)
- ○ Conventional full time (2)
- ○ Alternative or variable full time (3)
- ○ Other (please write in) (4) _____

Q6.9 Can we contact you....

	Yes (1)	No (0)
If you win one of the gift cards? (1)	○	○
If we have questions about your survey responses? (3)	○	○
To invite you to participate in a follow-up survey? (2)	○	○

Q6.10 Please provide us with one or more means to contact you:

- ○ Name (1) _____
- ○ Email address (2) _____
- ○ Phone number (6) _____

Q6.11 Is there anything else you would like to tell us about the financial tools and services you use, and what tools or services would be most helpful or useful to you?
We welcome any additional comments in the space below.

_____

_____

End of Block: Demographics