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Supplementary Materials for

Are cryptocurrencies currencies? Bitcoin as legal tender in El Salvador

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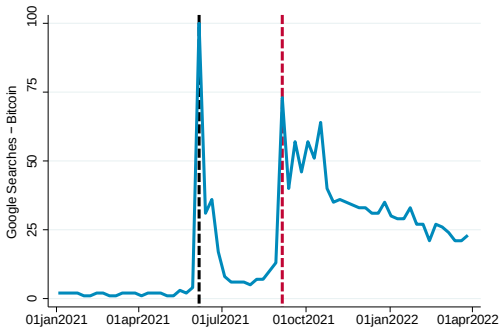
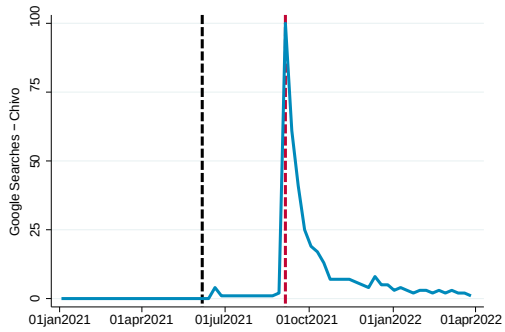
Figure S1: El Salvador - Google Trends

(a) "Bitcoin "

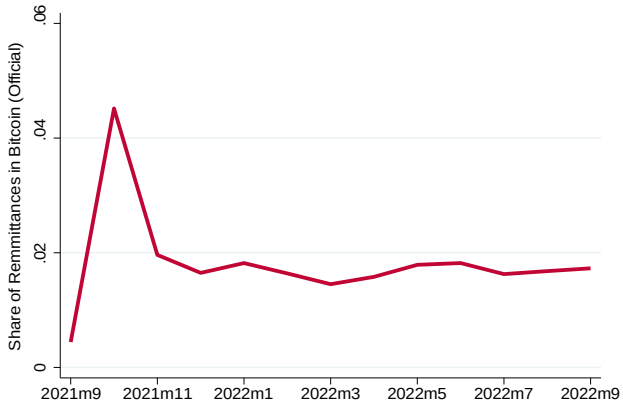


(b) "Chivo"



Notes: The graphs show the popularity of different words or phrases in Google Search (as measured by Google trends) in El Salvador before and after the introduction of Chivo Wallet. The vertical dashed lines denote the week Bitcoin was declared legal tender (in black) and the week Chivo Wallet was launched (in red).

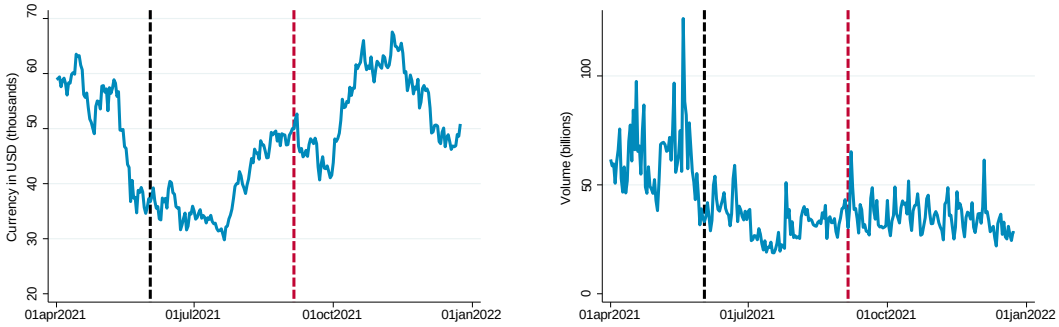
Figure S2: Remittances in Bitcoin (Share of Total)—Official Statistics



Notes: The figure shows the share of monthly remittances received in Bitcoin. The data come from the Central Bank of El Salvador (Banco Central de Reserva de El Salvador). Remittances amount for 572.64 millions (USD) in February 2022.

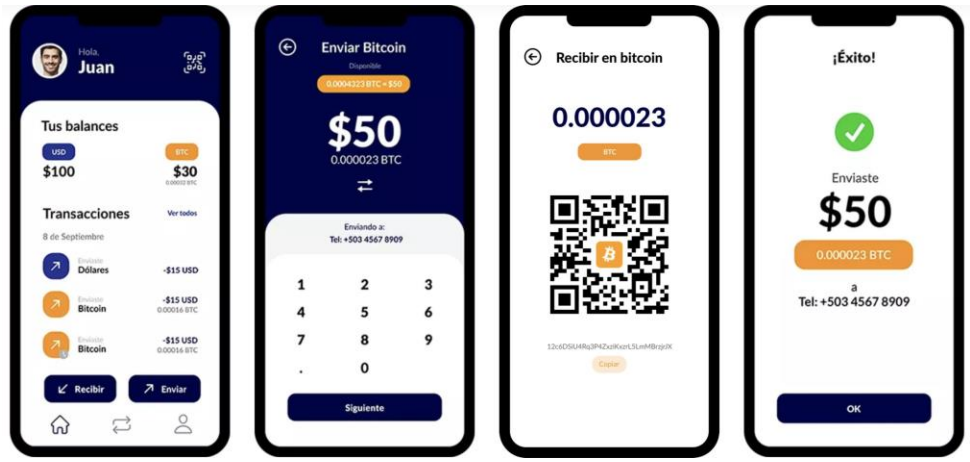
Figure S3: Bitcoin - Price and Volume

(a) Price (b) Volume



Notes: The graphs show the daily open price of Bitcoin and the volume of transactions. The vertical dashed lines denote the day Bitcoin was declared legal tender (in black) and the day Chivo Wallet was launched (in red). The source is Yahoo Finance.

Figure S4: The Chivo App



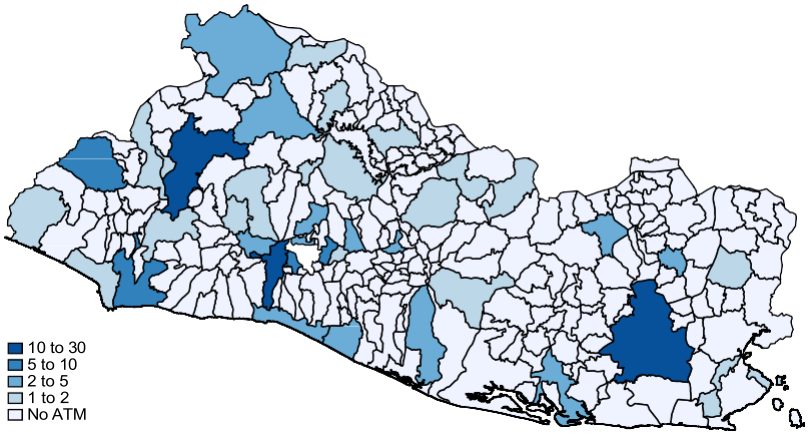
(a) (b) (c) (d)

Notes: The figure displays samples of screenshots of Chivo Wallet's interface. Panel (a) shows how the app displays balances both in dollars and in Bitcoin, and can carry-out transactions in both currencies. Panel (b) is an example of how a user can send $50 in Bitcoin (0.000023 BTC) to another user using the recipient's phone number. Panel (c) is an example of a user that received 0.000023 BTC. Panel (d) is the next step after Panel (b), and shows that the transaction was completed successfully. Source: https://chivowallet.com.

Figure S5: Chivo ATMs

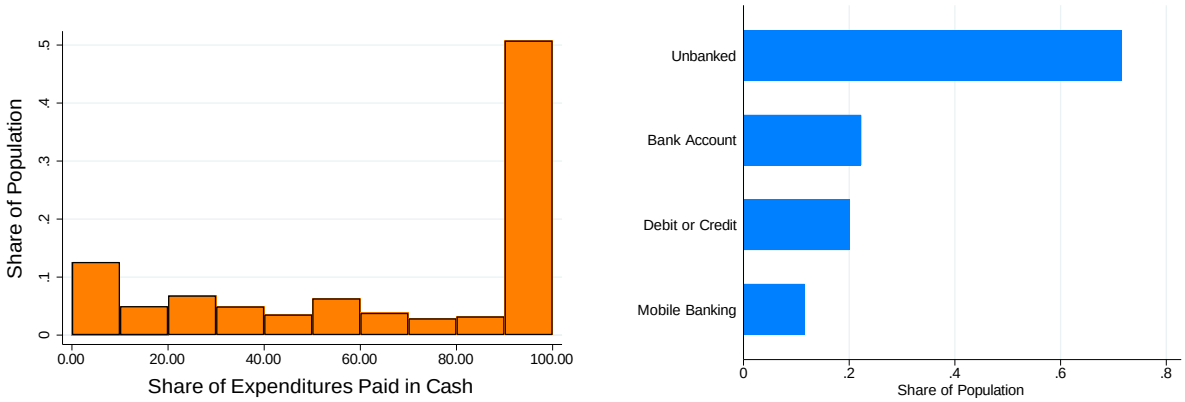
Notes: The figure shows the location of Chivo ATMs in San Salvador. Source: https://chivowallet.com.

Figure S6: Location of Chivo ATMs



Notes: The figure shows the location of the 201 Chivo ATMs in El Salvador at the municipality level.

Figure S7: Use of Cash and Financial Inclusion in El Salvador



(a) Share of cash expenditures

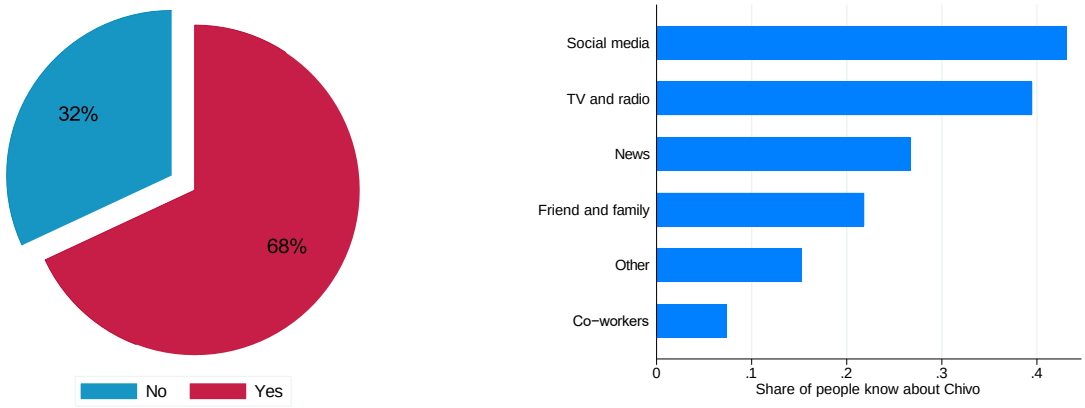
(b) Financial Inclusion

Notes: The figure shows the distribution of the share of expenditures paid in cash. Data were collected by the authors through a survey instrument.

Figure S8: Knowledge about Chivo

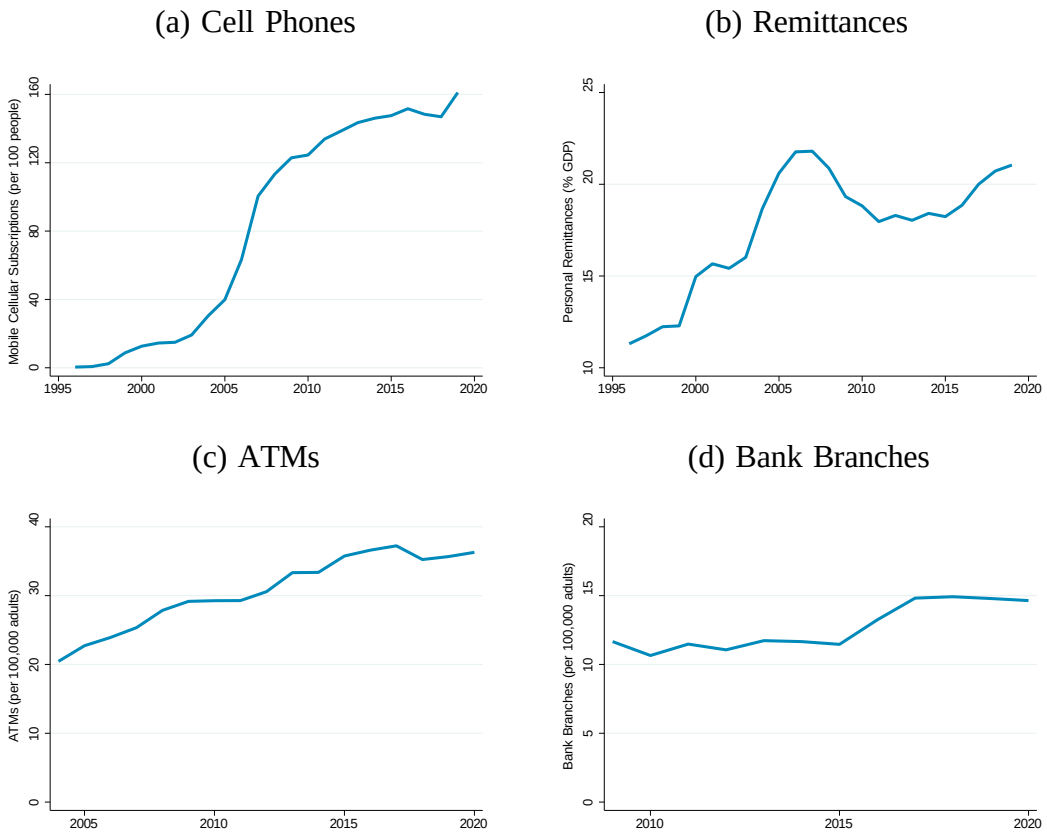
(a) "Do you know about Chivo?"

(b) "How did you find out?"



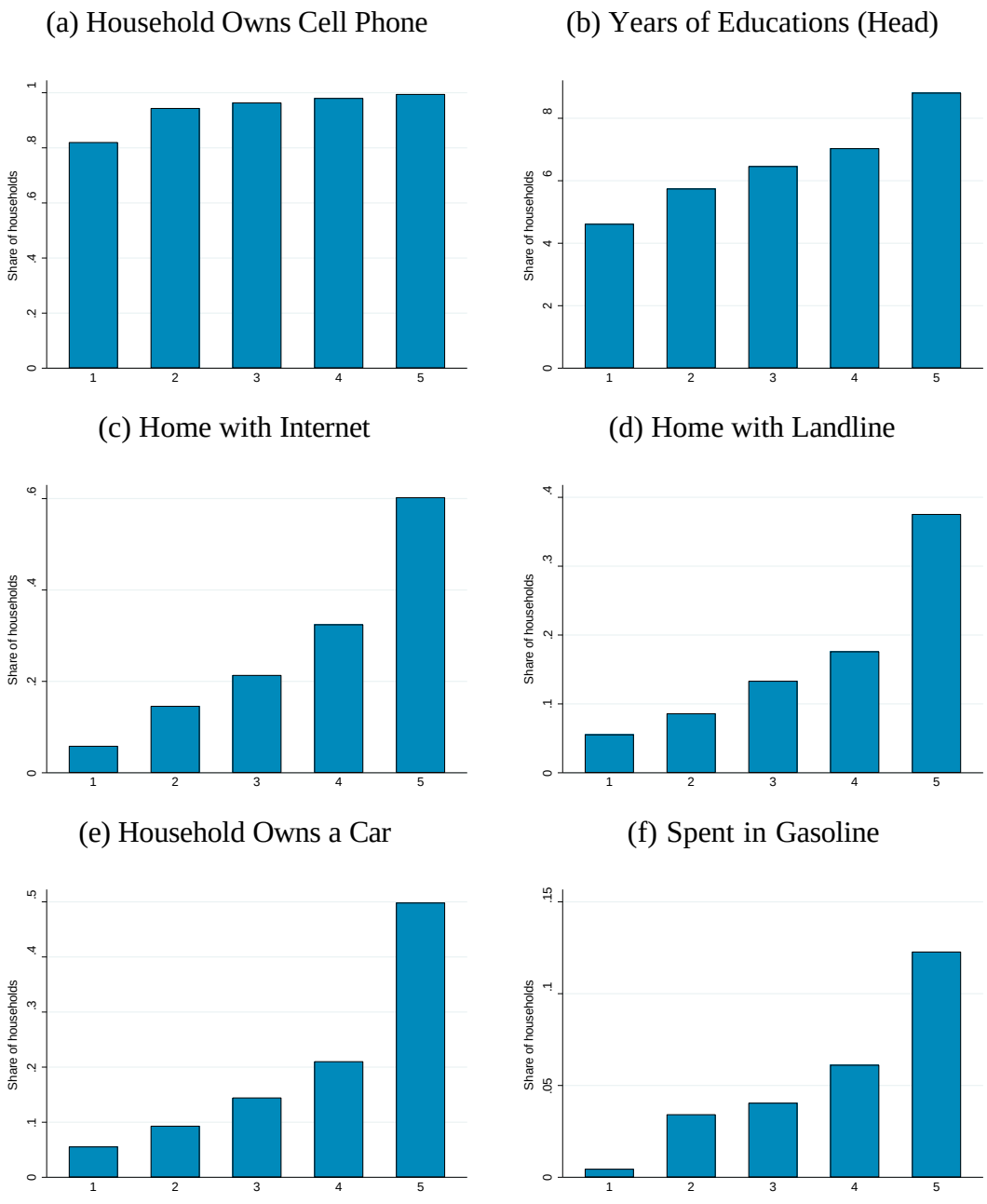
Notes: The figure summarizes responses to questions related to awareness about the Chivo App. Data were collected by the authors through a survey instrument.

Figure S9: El Salvador - Demographic Information



Notes: Panel (a) shows the number of mobile cellular subscriptions per 100 people and Panel (b) the share of GDP of personal remittances in El Salvador. Panel (c) shows the number of automated teller machines (ATMs) per 100,000 adults and Panel (d) the number of commercial bank branches per 100,000 adults. The source of the information is the World Bank, a detailed description can be found in Appendix D.

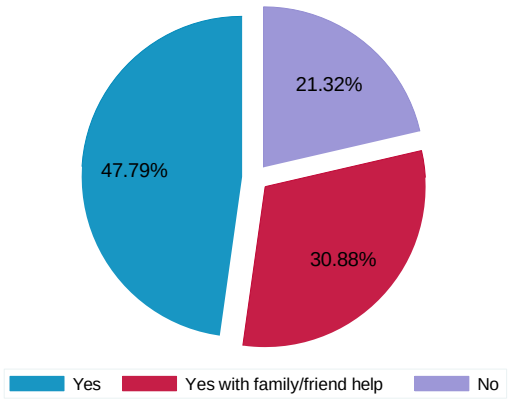
Figure S10: El Salvador - Demographic Information by Income Quintile



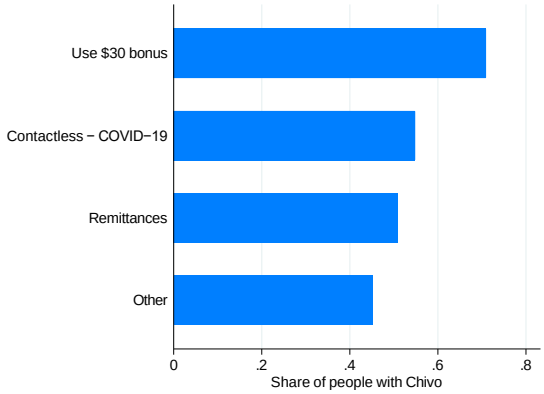
Notes: The figure shows the cross-sectional distribution of several variables by income quintiles. Panel (a) shows the fraction of households who own a cell phone. Panel (b) shows the years of education of the head of household Panel (c) the share of households that have internet at home. Panel (d) the share of households with a landline at home. Panel (e) the share of households that own a car. Panel (d) the share of households reporting having spent money in gasoline over the last month. The data comes from the 2020 Multipurpose Household Survey (EHPM), a detailed description can be found in Appendix D.

Figure S11: Adoption and Use of Chivo Wallet

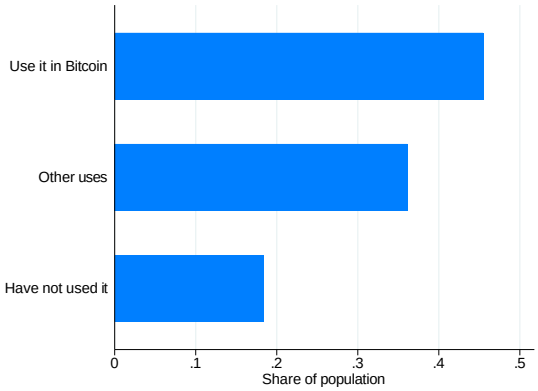
(a) "Have you tried to download Chivo?"



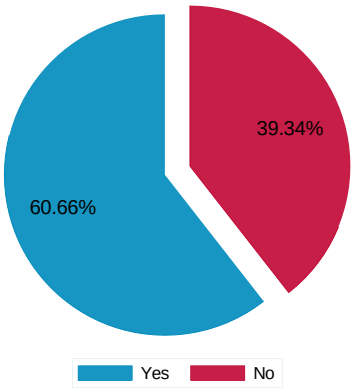
(b) "Why did you download Chivo?"



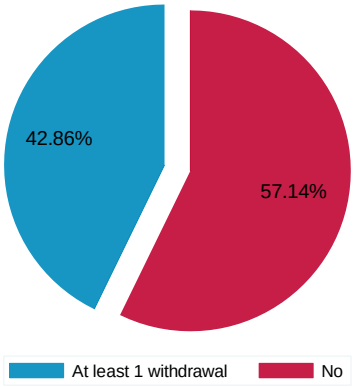
(c) "Main use of $30 bonus?"



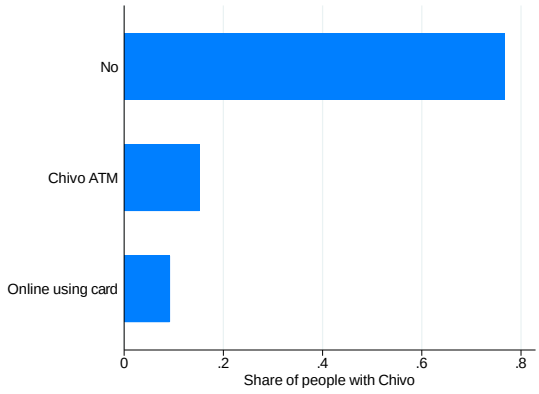
(d) "Use Chivo after spending the $30 bonus?"



(e) "Number of Chivo ATM withdrawals"

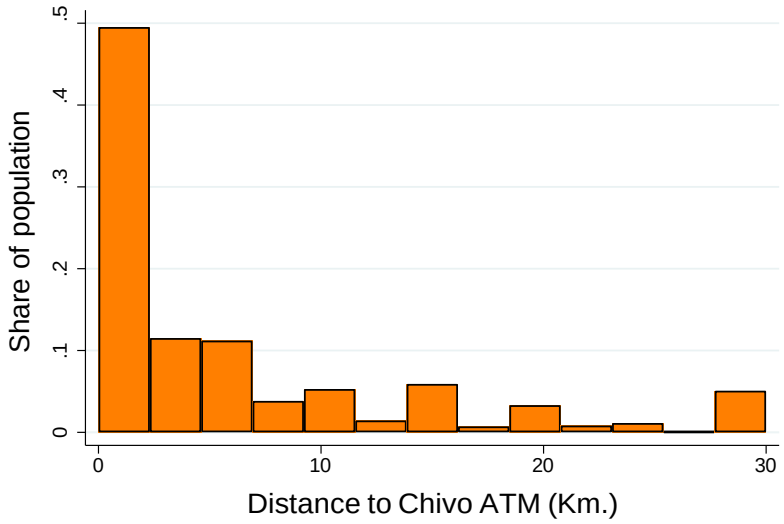


(f) "Load money into Chivo beyond the $30 bonus?"



Notes: The figure shows answers conditional on knowing about the existence of the Chivo App. Data were collected by the authors through a survey instrument.

Figure S12: Distance to a Chivo ATM

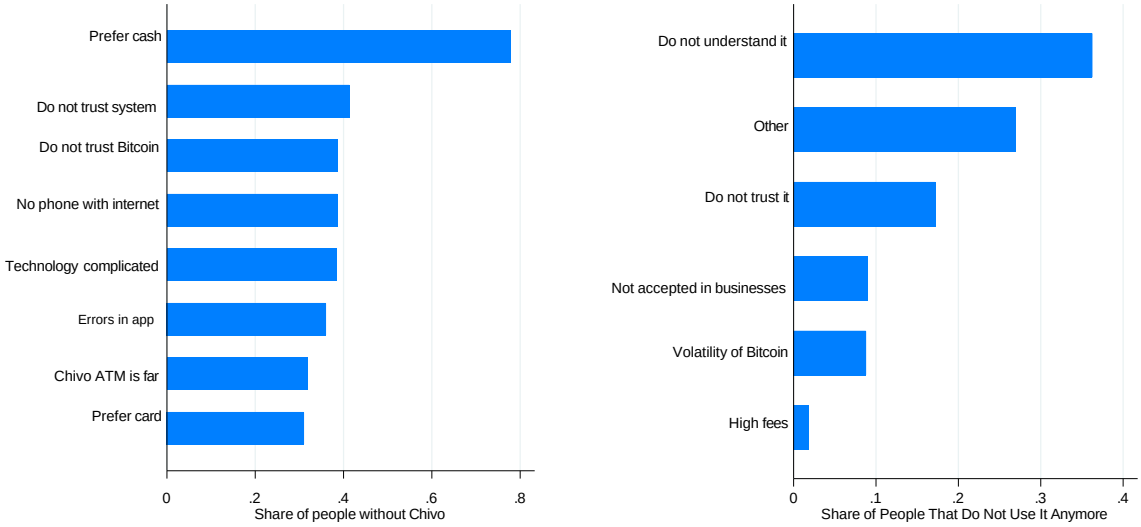


Notes: The figure shows the distance to a Chivo ATM for different shares of the population.

Figure S13: Reasons Not to Download Chivo

(a) "Which is a main reason why you didn't download Chivo?"

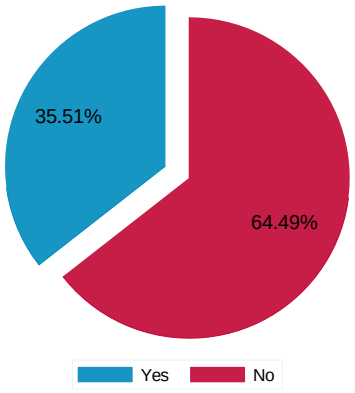
(b) "Which is a main reason why you don't use Bitcoin?"



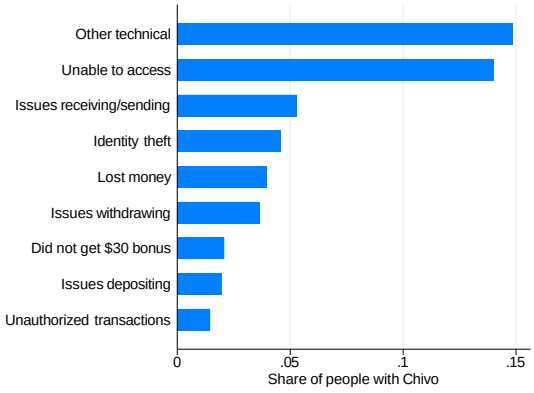
Notes: Respondents were allowed to choose more than one option deemed as most important. Data were collected by the authors through a survey instrument.

Figure S14: Problems Using Chivo

(a) "Did you have problems using Chivo?"



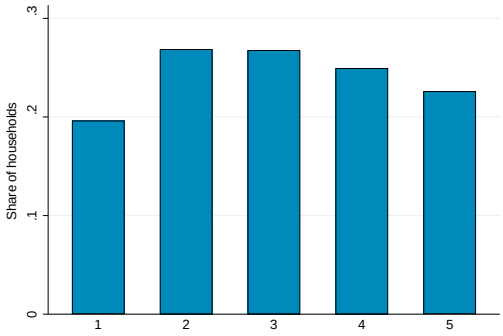
(b) "What were the main problems?"



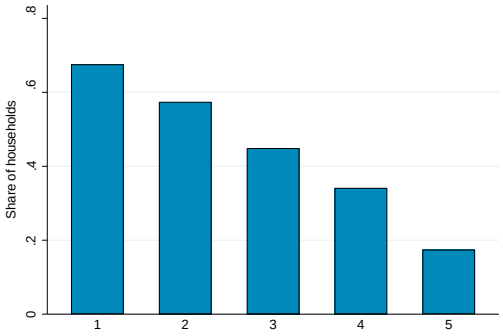
Notes: The table summarizes problems faced by respondents who tried to download Chivo, conditional on knowing about the existence of the Chivo App. Data were collected by the authors through a survey instrument.

Figure S15: El Salvador - Remittances by Income Quintile

(a) Households Receiving Remittances



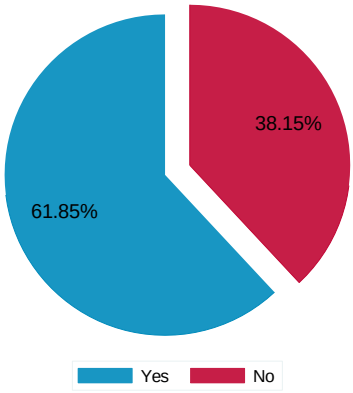
(b) Share of Income from Remittances



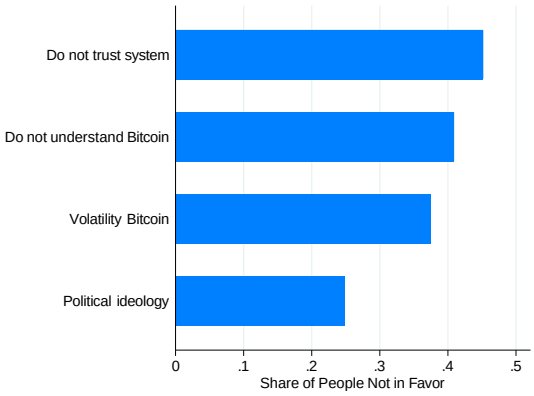
Notes: The figure shows the cross-sectional distribution of several variables by income quintiles. Panel (a) shows the fraction of households who receive remittances. Panel (b) shows the fraction of total households' income from remittances, conditional on receiving remittances over the last month. The data come from the 2020 Multipurpose Household Survey (EHPM), a detailed description can be found in Appendix D.

Figure S16: Attitude Towards the Chivo App

(a) "Do you agree with the use of Chivo?"



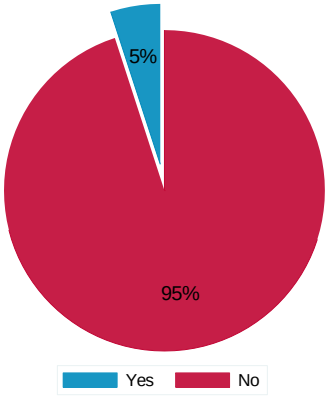
(b) "Which is a main reason you don't agree?"



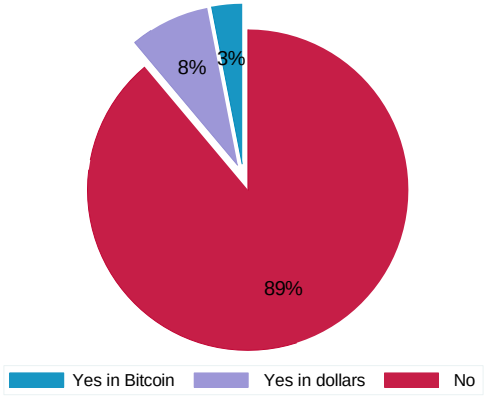
Notes: The table summarizes the main reasons why respondents do not agree with Chivo, conditional on knowing about the existence of the Chivo App. Data were collected by the authors through a survey instrument.

Figure S17: Chivo, Taxes, and Remittances

(a) "Did you use Chivo to pay taxes?"



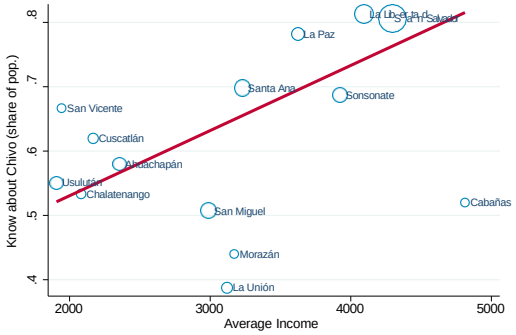
(b) "Did you receive remittances through Chivo?"



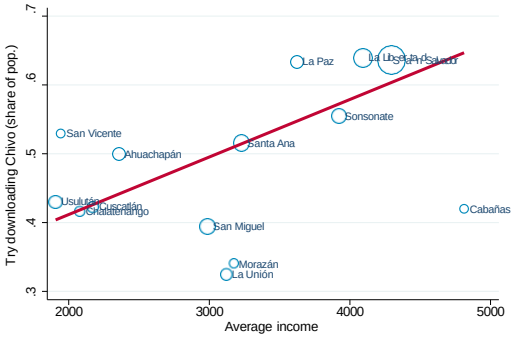
Notes: The figure shows answers conditional on having downloaded the Chivo App. Data were collected by the authors through a survey instrument.

Figure S18: Awareness and Use of Chivo Wallet by Department - Income

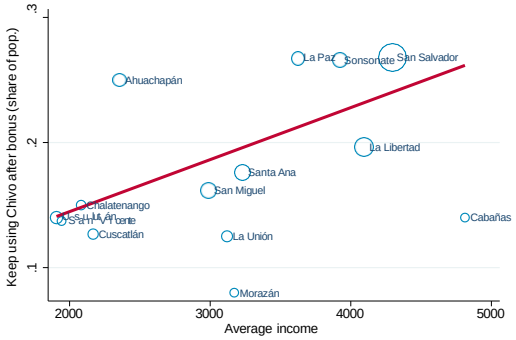
(a) Know about Chivo



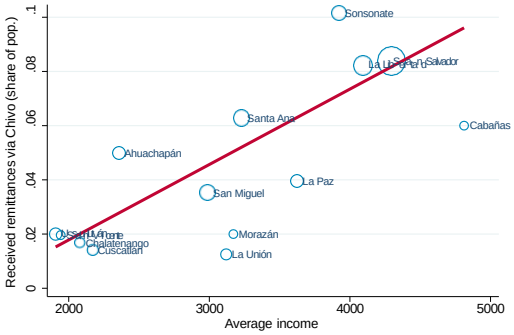
(b) Try to us Chivo



(c) Use Chivo after $30



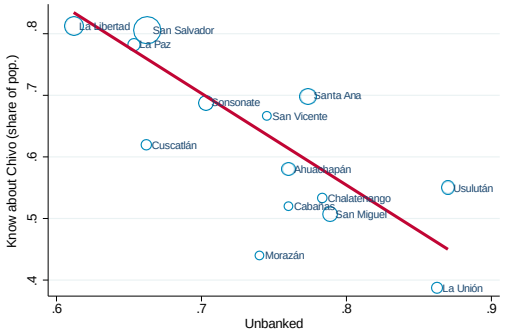
(d) Remittances via Chivo



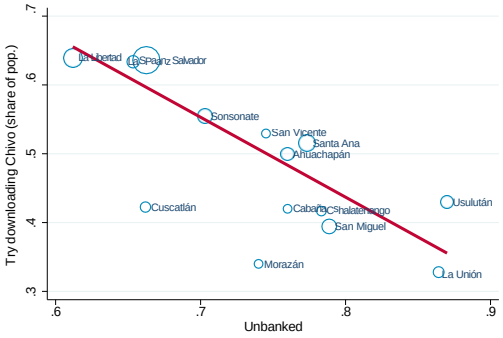
Notes: The figure shows the level of awareness and use of Chivo Wallet according to the average income per capita in each department (county) of El Salvador. Panel (a) shows the share of people that know about Chivo. Panel (b) shows the fraction of people that has tried to use Chivo. Panel (c) shows the fraction of people that continued using Chivo after spending the $30 dollar bonus. Panel (d) shows the fraction of people that received remittances via Chivo.

Figure S19: Awareness and Use of Chivo Wallet by Department - Banking Services

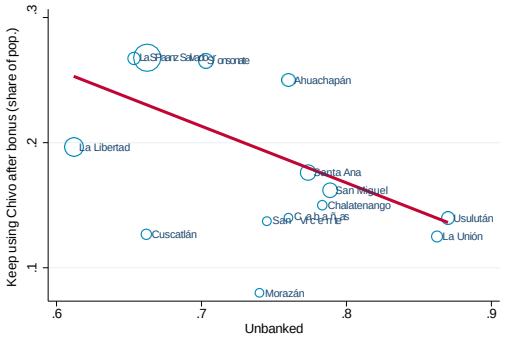
(a) Know about Chivo



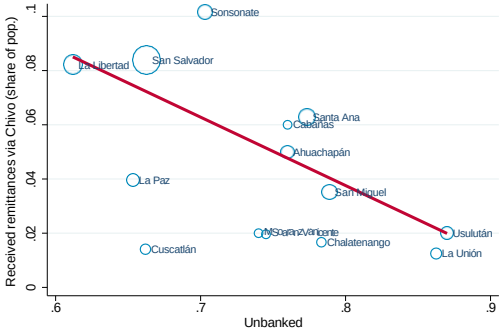
(b) Try to us Chivo



(c) Use Chivo after $30

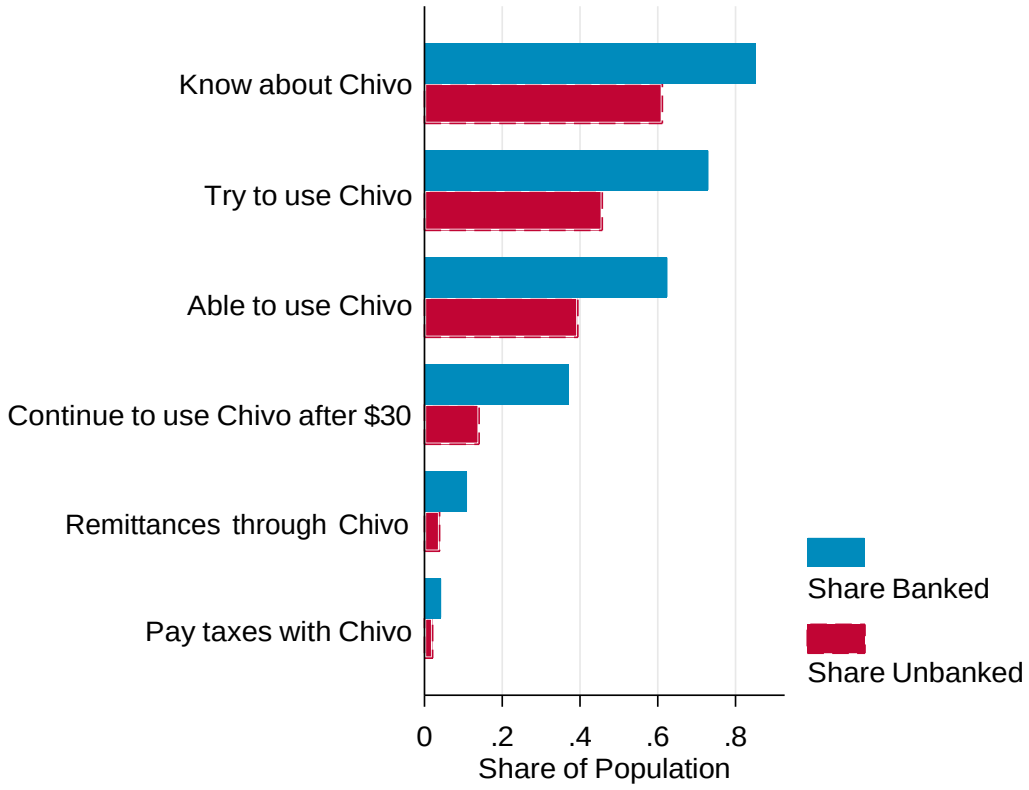


(d) Remittances via Chivo



Notes: The figure shows the level of awareness and use of Chivo Wallet according to the fraction of people who do not have access to a bank account in each department of El Salvador. Panel (a) shows the share of people that know about Chivo. Panel (b) shows the fraction of people that has tried to use Chivo. Panel (c) shows the fraction of people that continued using Chivo after spending the $30 dollar bonus. Panel (d) shows the fraction of people that received remittances via Chivo.

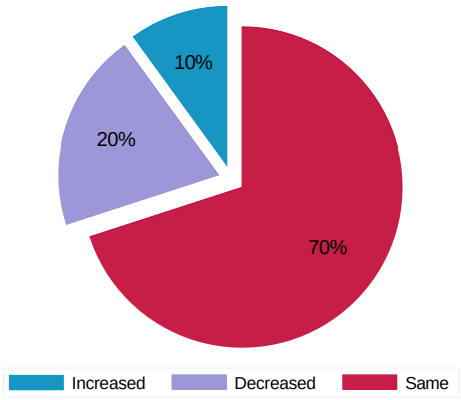
Figure S20: Taking Stock: Decomposition Between Banked and Unbanked Population



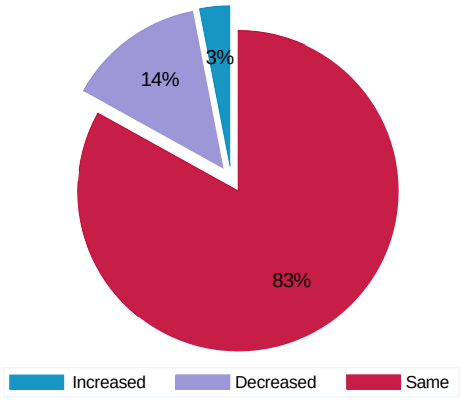
Notes: The figure shows shares with respect to the share of Salvadorians banked and unbaked. Figure 2 shows the corresponding shares for the total population.

Figure S21: Changes in Use of Cash and Cards

(a) "Has your use of cash changed since you downloaded Chivo?"



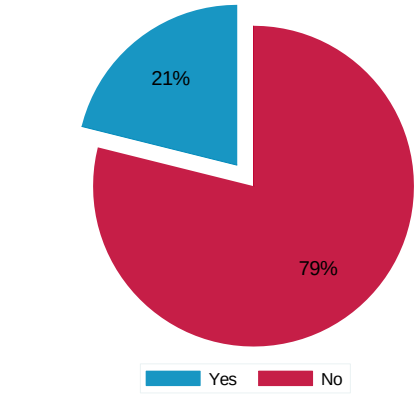
(b) "Has your use of debit or credit cards changed since you downloaded Chivo?"



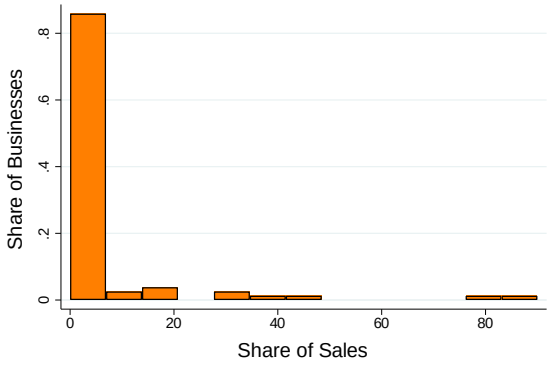
Notes: The figures show the changes in the use of cash and cards since the implementation of Chivo Wallet, considering responses of users who have downloaded the app. Data were collected by the authors through a survey instrument.

Figure S22: Bitcoin, Prices, and Sales

(a) "Have you encountered firms with higher prices since Bitcoin became legal tender?"

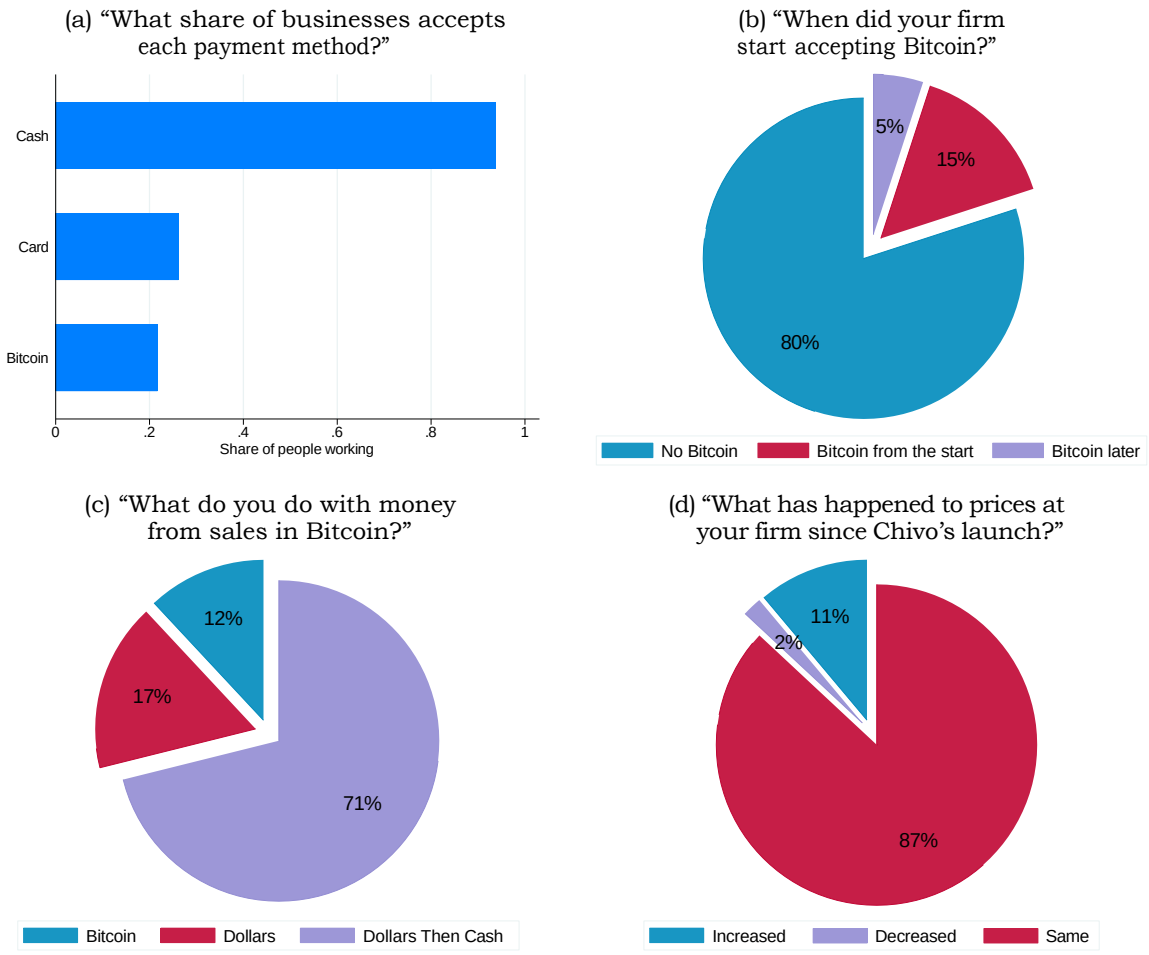


(b) "What is the share of sales in Bitcoin at your firm?"



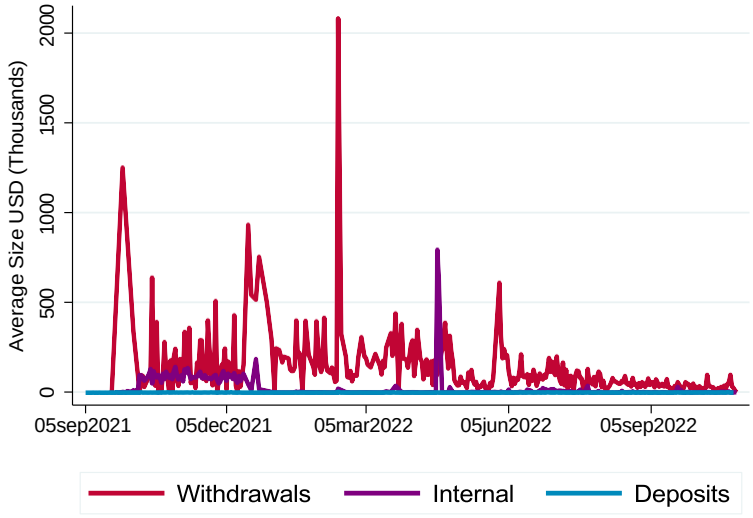
Notes: Panel (a) is based on responses of all individuals. Panel (b) is based on responses of a subsample of individuals who identified themselves as owners of firms, or employees at firms who knew about the accepted methods of payment of their employer. Data were collected by the authors through a survey instrument.

Figure S23: Bitcoin Acceptance by Firms



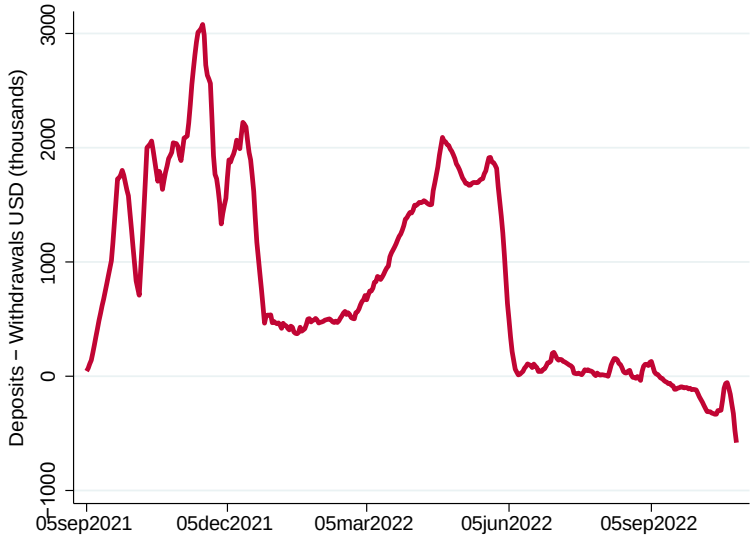
Notes: The figures are based on responses of a subsample of individuals who identified themselves as owners of firms, or employees at firms who knew about the accepted methods of payment of their employer. Data were collected by the authors through a survey instrument.

Figure S24: Chivo's Blockchain Transaction Size by Type



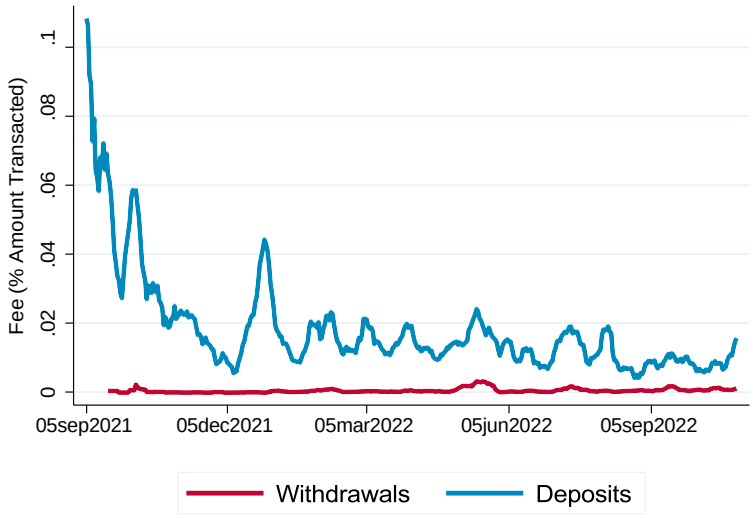
Notes: The figure shows the average transaction size involving Chivo Wallet from blockchain data, by type.

Figure S25: Chivo's Blockchain Net Balance (Deposits Minus Withdrawals)



Notes: The figure shows Chivo Wallet's net balance (deposits minus withdrawals), based on blockchain data.

Figure S26: Average Fee of Chivo's Blockchain Transactions, by Type



Notes: The figure shows the average transaction fee involving Chivo Wallet from blockchain data, by type.

B Supplementary Tables

Table S1: Financial Inclusion

	% age 15+ (2017)
Account	30.4
Borrowed any money in the past year	22.6
Credit card ownership	5.7
Debit card ownership	18.9
Financial institution account	29.3
Made digital payments in the past year	18.2
Mobile money account	3.5
Used a mobile phone or the internet to access an account	6.3

Notes: The table shows several indicators of financial inclusion for El Salvador. Indicators are reported as the share of adults (age 15+) in the country in 2017. The source of the data is the Global Financial Inclusion data set gathered by the World Bank. The indicators of financial inclusion measure how people save, borrow, and make payments.

Table S2: Sample Validation

	(1) Total Sample	(2) Share Sample	(3) Share Population (2021)
Gender			
Male	846	47%	47%
Female	954	53%	53%
Age			
18-24	307	17%	20%
25-34	417	23%	25%
35-44	347	19%	17%
45-54	320	18%	14%
55+	409	23%	24%
Education			
Elementary School	947	53%	58%
Middle School	620	34%	30%
High School	233	13%	12%
Districts			
Ahuachapán	100	5.6%	5.7%
Cabañas	50	2.8%	2.4%
Chalatenango	60	3.3%	2.9%
Cuscatlán	71	3.9%	4.2%
La Libertad	219	12.2%	12.6%
La Paz	101	5.6%	5.6%
La Unión	80	4.4%	3.7%
Morazán	50	2.8%	3.1%
San Miguel	142	7.9%	7.4%
San Salvador	489	27.2%	27.4%
San Vicente	51	2.8%	2.8%
Santa Ana	159	8.8%	8.9%
Sonsonate	128	7.1%	7.9%
Usulután	100	5.6%	5.5%

Note: Column (1) reports the total number of interviews; Column (2) the share of interviews by category; Column (3) the same share in the total population of El Salvador, as reported by the General Directorate of Statistics and Censuses (DIGESTYC) in their 2021 projections. Districts correspond with the 14 "departamentos" in the country.

Table S3: Knowledge about Chivo and Respondent Characteristics

Dependent variable: Do you know about Chivo?				
	(1)	(2)	(3)	(4)
Unbanked	-0.2033***			-0.0834**
	(0.024)			(0.029)
Phone with Internet		0.3093***		0.1901***
		(0.016)		(0.015)
Middle School			0.1973***	0.1670***
			(0.027)	(0.033)
High School+			0.2525***	0.2012***
			(0.041)	(0.046)
Age 25-34			-0.0346	-0.0324*
			(0.020)	(0.017)
Age 35-44			-0.1088***	-0.0921***
			(0.022)	(0.026)
Age 45-54			-0.1888***	-0.1527***
			(0.037)	(0.027)
Age 55+			-0.3319***	-0.2616***
			(0.028)	(0.023)
Female			-0.0763***	-0.0480**
			(0.018)	(0.017)
Single			-0.0238	-0.0176
			(0.020)	(0.017)
Observations	1,800	1,800	1,800	1,800
R-squared	0.180	0.120	0.251	0.292
Department Fixed Effects	Y	Y	Y	Y

Notes: The table shows the characteristics of respondents who knew about the existence of the Chivo App. Standard errors are clustered by department. Standard errors are clustered by department. Data were collected by the authors through a survey instrument.

Table S4: Help Downloading Chivo

Dependent Variable: Did you need help downloading the Chivo App?

	(1)	(2)	(3)	(4)
Unbanked	0.1676***			0.0743*
	(0.043)			(0.037)
Phone with Internet		-0.1334***		-0.0313
		(0.036)		(0.037)
Middle School			-0.1593***	-0.1455***
			(0.033)	(0.031)
High School+			-0.2665***	-0.2395***
			(0.031)	(0.036)
Age 25-34			-0.0018	-0.0013
			(0.042)	(0.041)
Age 35-44			0.1540***	0.1574***
			(0.045)	(0.044)
Age 45-54			0.4079***	0.4049***
			(0.055)	(0.050)
Age 55+			0.4305***	0.4337***
			(0.072)	(0.068)
Female			0.1906***	0.1753***
			(0.025)	(0.025)
Single			-0.0224	-0.0247
			(0.048)	(0.047)
Observations	963	963	963	963
R-squared	0.050	0.035	0.286	0.291
Department Fixed Effects	Y	Y	Y	Y

Notes: The table shows the characteristics of respondents who tried to download Chivo with help from a family member or friend, conditional on knowing about the existence of the Chivo App. Standard errors are clustered by department. Data were collected by the authors through a survey instrument.

Table S5: Views with Respect to Chivo Wallet

Dependent Variable: Do you agree with the use of Chivo Wallet?

	(1)	(2)	(3)	(4)	(5)	(6)
Download Chivo	0.3113***	0.3009***	0.2818***			
	(0.038)	(0.036)	(0.034)			
Download Chivo with Help				-0.1740***	-0.1672***	-0.1068***
				(0.038)	(0.038)	(0.029)
Unbanked		-0.0228	-0.0122		-0.0267	-0.0253
		(0.035)	(0.029)		(0.018)	(0.018)
Phone with Internet		0.0591*	0.0182		0.0249	0.0090
		(0.028)	(0.029)		(0.041)	(0.040)
Middle School			0.0049			0.0187
			(0.027)			(0.022)
High School+			-0.0280			-0.0164
			(0.035)			(0.037)
Age 25-34			-0.1037***			-0.0586*
			(0.033)			(0.028)
Age 35-44			-0.2321***			-0.1580***
			(0.042)			(0.046)
Age 45-54			-0.2819***			-0.1926***
			(0.040)			(0.042)
Age 55+			-0.2060***			-0.1068***
			(0.037)			(0.032)
Female			-0.0777**			-0.0568**
			(0.034)			(0.024)
Single			0.0385			0.0240
			(0.030)			(0.040)
Observations	1,224	1,224	1,224	963	963	963
R-squared	0.079	0.082	0.137	0.048	0.049	0.074
Department Fixed Effects	Y	Y	Y	Y	Y	Y

Notes: The table shows the characteristics of respondents who agree with the use of Chivo Wallet, conditional on knowing about the existence of the Chivo App. Columns (3), (4), and (6) consider only respondents who have downloaded the app. Standard errors are clustered by department. Data were collected by the authors through a survey instrument.

Table S6: Determinants of Whether Users Remain Active After Spending the Bonus

	(1)	(2)	(3)	(4)
Problems using app.	-0.0146		-0.0016	0.0171
	(0.018)		(0.016)	(0.015)
> median distance to ATM		0.0121	0.0138	-0.0029
		(0.024)	(0.026)	(0.022)
Unbanked			-0.1859***	-0.1428***
			(0.035)	(0.035)
Phone with Internet			0.1141**	0.0642
			(0.042)	(0.042)
Middle School				0.0605
				(0.040)
High School+				0.1241**
				(0.041)
Age 25-34				-0.0438
				(0.045)
Age 35-44				-0.1496***
				(0.037)
Age 45-54				-0.2043***
				(0.048)
Age 55+				-0.2946***
				(0.049)
Female				-0.1243***
				(0.031)
Single				-0.0433
				(0.033)
Observations	943	943	943	943
R-squared	0.018	0.018	0.063	0.129
Demographic Controls	Y	Y	Y	Y
Department Fixed Effects	Y	Y	Y	Y

Notes: The table shows the relationship between user characteristics and the likelihood of using Chivo after spending the $30 bonus. The variable "Problems using the app" is a dummy equal to one if the user faced problems using the app. Standard errors are clustered by department.

Table S7: Self-reported adoption cost of Chivo Wallet (in USD)

	(1) Mean	(2) Std. Dev.	(3) 10th	(4) 25th	(5) Median	(6) 75th	(7) 90th
Adoption cost	30.0	69.5	0.0	5.0	20.0	30.0	50.0

Notes: The table shows the distribution of the self-reported adoption cost of Chivo Wallet in US dollars. Estimates based on answers from users that know about Chivo Wallet, approximately 68% of respondents. We exclude users who had not downloaded Chivo but report numbers below $30, as well as users who downloaded Chivo and report values over $30, and re-weight the sample accordingly.

Table S8: Willingness to Pay for withdrawals and transfers

	(1) Mean	(2) Std. Dev.	(3) 10th	(4) 25th	(5) Median	(6) 75th	(7) 90th
Max fee to withdraw 100 USD	3.3	9.1	0.0	0.0	1.0	5.0	8.0
Max fee to convert BTC to USD	2.9	9.8	0.0	0.0	0.05	2.0	5.0

Notes: The table shows distribution of responses to two questions: i) What would be the maximum fee you would be willing to pay to withdraw 100 dollars? and ii) What would be the maximum fee you would be willing to pay to convert Bitcoin to dollars? Both answers are in USD. The sample of users include those that know about Chivo Wallet.

Table S9: Bitcoin Acceptance and Firm Size

Dependent Variable: Does the firm accept Bitcoin?				
	(1)	(2)	(3)	(4)
2nd Quantile	0.0058	0.0098	-0.0219	-0.0309
	(0.045)	(0.046)	(0.069)	(0.075)
3rd Quantile	0.0634	0.0641	0.1112	0.1022
	(0.056)	(0.058)	(0.075)	(0.076)
4th Quantile	0.0316	0.0364	0.1156*	0.1188*
	(0.023)	(0.025)	(0.058)	(0.059)
5th Quantile	0.1192*	0.1203	0.1860**	0.1849*
	(0.061)	(0.069)	(0.078)	(0.085)
Observations	513	513	258	258

Notes: This regression is based on responses of a subsample of individuals who identified themselves as owners of firms, or employees at firms who knew about the accepted methods of payment of their employer. Standard errors are clustered by sector. Data were collected by the authors through a survey instrument.

C Lessons Beyond Chivo

Strategic Complementarities This section tests for the presence of strategic complementarities in the adoption of Chivo Wallet using information on the share of an individual's relatives and close friends who have downloaded Chivo (*92*). As awareness about the app might depend on the network itself, this analysis includes respondents who know about Chivo, but excludes those who found out about the app from family and friends. The latter aims to isolate the effect of strategic complementarities from a learning story. We find evidence of complementarities both in the decision to adopt the app and on how intensively people use it, as reported in Table C1 using a linear probability model. Columns (1) and (2) show that users whose share of friends and family who have downloaded Chivo is one are 25% more likely to have tried to download it. Columns (3) and (4) document that if friends and relatives regularly use Chivo, users are 30% more likely to engage with the app after spending their bonus. These results are unlikely to be driven by sorting, as coefficients remain statistically equal when excluding demographic controls (Table C2). Results are also robust to using alternative specifications; Columns (2) and (4) of Table C3 show that marginal effects using a logit model are consistent and very close to our baseline results.

Table S10: Impact of Relatives and Close Friends on Usage of Chivo Wallet

	(1)	(2)	(3)	(4)
	Have you tried to download Chivo?		Did you keep using Chivo after spending the $30 bonus?	
Share of friends with Chivo	0.2515***	0.2532***		
	(0.030)	(0.026)		
Share of friends who use Chivo regularly			0.3136***	0.3078***
			(0.032)	(0.037)
Phone with internet		0.0702*		0.0855
		(0.039)		(0.056)
Unbanked		-0.0550		-0.1157**
		(0.036)		(0.047)
Demographic Controls	Y	Y	Y	Y
Observations	792	792	609	609
R-squared	0.099	0.108	0.153	0.170
Department Fixed Effects	Y	Y	Y	Y

Notes: The table shows the relationship between the number of friends and relatives who have adopted Chivo, and the likelihood of adopting it. We only consider users who know about the app, but who did not find out about it through family or friends. Demographic controls include: education, age, gender, and marital status. Standard errors are clustered by department.

Table S11: Impact of relatives and close friends on usage of Chivo (no controls)

	(1)	(2)	(3)	(4)
	Have you tried to download Chivo?		Did you keep using Chivo after spending the $30 bonus?	
Share of friends with Chivo	0.2577***	0.2577***		
	(0.038)	(0.038)		
Share of friends who use Chivo regularly			0.3658***	0.3658***
			(0.063)	(0.063)
Demographic controls	N	N	N	N
Observations	792	792	609	609
R-squared	0.063	0.063	0.057	0.057
Department Fixed Effects	N	N	N	N

Notes: The table shows the relationship between the number of friends and relatives who have adopted Chivo, and the likelihood of adopting the digital wallet. We consider only responses of users who know about the existence of the app, but who did not find out about it through family or friends. Robust standard errors are reported in parenthesis.

Table S12: Marginal Effect (Logit) for Tables 1 and 3

	(1)	(2)	(3)	(4)
	Have you tried to download Chivo?		Did you keep using Chivo after spending the $30 bonus?	
Share of friends with Chivo		0.2325***		
		(0.020)		
Share of friends who use Chivo regularly				0.2944***
				(0.032)
Unbanked	-0.0891***	-0.0576	-0.1350***	-0.1097**
	(0.029)	(0.039)	(0.031)	(0.046)
Phone with Internet	0.0663**	0.0692*	0.0684	0.0879
	(0.029)	(0.037)	(0.046)	(0.058)
Demographic controls	Y	Y	Y	Y
Observations	1,224	792	943	600
Department Fixed Effects	Y	Y	Y	Y

Notes: The table shows the marginal effect, under a logit model, of different variables on the likelihood of adopting the digital wallet and keep using it. We consider only responses of users who know about the existence of the app, but who did not find out about it through family or friends. Robust standard errors are reported in parenthesis.

Elasticity of Substitution We construct two groups: a treatment group composed of those who know about the gas discount, and a control group which includes those who do not know about the gas discount (*93*).

Following (*84*), we first define the share of gas (g) expenditures paid with Chivo as

$$s_{chivo} \equiv \frac{p^g_{chivo}\, g}{p^g_{chivo}\, g + p^g_{other}\, g}$$

We then define α as the share of expenditures paid with Chivo under no discount (i.e. for the control group). We linearize the optimal choice of share of expenditures paid with Chivo Wallet, under a CES function, as a function of the relative prices $\frac{p^g_{chivo}}{p^g_{other}}$, such that the first-order approximation around $\frac{p^g_{chivo}}{p^g_{other}} = 1$ is given by

$$s_{chivo} = \alpha - (\eta - 1)\alpha(1-\alpha)\ln\frac{p^g_{chivo}}{p^g_{other}}$$

where η is the elasticity of substitution. Results are presented in Table C4. We find that the estimate of the elasticity of substitution between Chivo Wallet and other payment methods ranges from 12.9 to 17.1 across different specifications; a magnitude larger than the elasticity of substitution between cash and cards (*84*). This implies that the welfare costs of policies disincentivizing payment methods (such as cash) are lower if digital payment methods are available. Nonetheless, our estimates are only suggestive and must be interpreted with caution, as they are based on a very small and specific subsample of users who are likely to be more elastic than the average person in El Salvador.

Table S13: Elasticity of Substitution Between Chivo Wallet and Other Payment Methods

Dependent variable: Share of gas expenditures paid with Chivo Wallet

	(1)	(2)	(3)	(4)
η	-14.478***	-13.931***	-14.292**	-17.180**
	(3.713)	(3.934)	(5.621)	(7.241)
Unbanked		-0.022		-0.094
		(0.084)		(0.099)
Phone with Internet		0.065		0.088
		(0.059)		(0.086)
Demographic Controls	N	N	Y	Y
Observations	49	49	49	49
R-squared	0.060	0.067	0.130	0.260

Notes: The table shows the estimates of the elasticity of substitution using a subsample of individuals who owned a car, had gas expenditures, and had downloaded Chivo Wallet. Robust standard errors are reported in parenthesis. Data were collected by the authors through a survey instrument.

D Data Description

Multipurpose Survey on Households (EHPM)

The Multipurpose Survey on Households (EHPM in Spanish) is conducted annually and is gathered by the General Directorate of Statistics and Censuses (DIGESTYC). The survey gathers data on the socioeconomic and demographic characteristics of households and covers individual households in the entire country (both urban and rural areas, and both the formal and informal sectors). It also contains questions covering topics such as education, household expenses, agriculture, employment, living conditions, and health. The survey is collected through in-person interviews. We use the latest survey corresponding to 2020. The sample size for this survey is 37,030 persons and 10,755 households.

World Bank Open Data

Here we describe the indicators shown in Figure A9. Mobile cellular subscriptions (per 100 people) for El Salvador are subscriptions to a public mobile telephone service that provides access to the PSTN using cellular technology. The indicator includes (and is split into) the number of postpaid subscriptions, and the number of active prepaid accounts (i.e., that have been used during the last three months). The indicator applies to all mobile cellular subscriptions that offer voice communications. It excludes subscriptions via data cards or USB modems, subscriptions to public mobile data services, private trunked mobile radio, telepoint, radio paging and telemetry services. The source is the International Telecommunication Union (ITU). Personal remittances received (% of GDP) comprise personal transfers and compensation of employees. Personal transfers consist of all current transfers in cash or in-kind made or received by resident households to or from nonresident households. Personal transfers thus include all current transfers between resident and nonresi- dent individuals. Compensation of employees refers to the income of border, seasonal, and other short-term workers who are employed in an economy where they are not resident and of residents employed by nonresident entities. Data are the sum of two items defined in the sixth edition of the IMF's Balance of Payments Manual: personal transfers and compensation of employees. The source is the World Bank, which based the estimates on the IMF balance of payments data, and World Bank and OECD GDP estimates. Automated teller machines (ATMs) (per 100,000 adults) are computerized telecommunications devices that provide clients of a financial institution with access to financial transactions in a public place. The source is the International Monetary Fund, Financial Access Survey. Commercial bank branches (per 100,000 adults) are retail locations of resident commercial banks and other resident banks that function as commercial banks that provide financial services to customers and are physically separated from the main office but not organized as legally separated subsidiaries. The source is the International Monetary Fund, Financial Access Survey.

Global Financial Inclusion

The data are gathered by the World Bank and provides over 800 country-level indicators of financial inclusion summarized for all adults (age 15+). The indicators of financial inclusion measure how people save, borrow, make payments and manage risk. The data cover more than 150 economies. The most current data for El Salvador are that of 2017, which we use in our baseline calculations.

E Details on Blockchain Data

Data Source Transactions on the blockchain are grouped into blocks of a few thousand transactions which appear in the ledger every 10 minutes, on average (*94*). On the ledger, each transaction details the amount of Bitcoin s transmitted, a time stamp, and the sender and receiver under pseudonymous addresses. To undertake our examination, we use blockchain data downloaded through the Crystal Blockchain Platform and verified by Bitfury Crystal Blockchain, a leading provider of anti-money laundering tools and analytic solutions. We then leverage a database which groups addresses with the same owner into clusters, which are then connected to real-world entities (*19*).

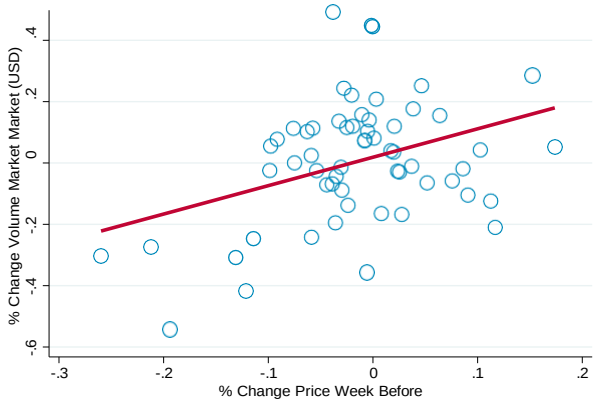
Additional Results Using our data, we verify that trading volumes in Chivo Wallet are uncorrelated with Bitcoin prices; instead, trading volumes in the Chivo Wallet seem be driven by idiosyncratic reasons. Panel (a) of Figure E1 shows the correlation between trading volumes in the market and Bitcoin prices over our sample period. The panel shows a positive correlation, which has been documented in prior work such as Gemici and Polat (2019) and El Alaoui, Bouri, and Roubaud (2019).

Panel (b) shows the same figure using trading volumes in the Chivo Wallet (i.e., deposits plus withdrawals). It shows that in the Chivo Wallet there is no correlation between volume and prices (*95*). This contrasts with the same relationship in other exchanges. Panel (c) shows the same correlation when we focus on volumes traded on Coinbase.[4] This panel shows the correlation between volume and prices is again positive. In fact, Panel (d) shows that the trading volumes in Coinbase and trading volumes in Chivo Wallet using Coinbase are uncorrelated despite the fact that Chivo Wallet transacts mostly with well known exchanges such as Coinbase. Overall, we find that the activity in Chivo Wallet is mostly idiosyncratic features of El Salvador and not driven by Bitcoin market prices.

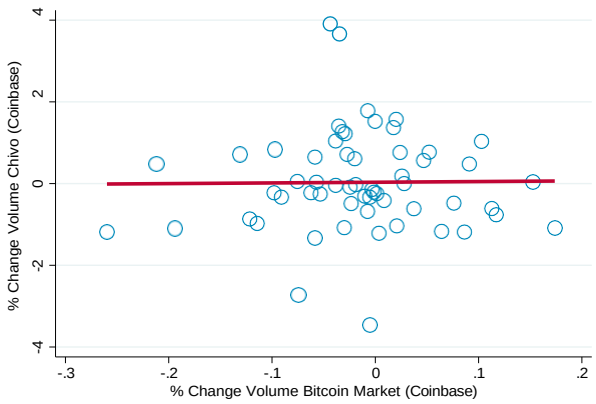
[4]The data source is https://data.bitcoinity.org.

Figure S27: Change in Volume vs Change in Price

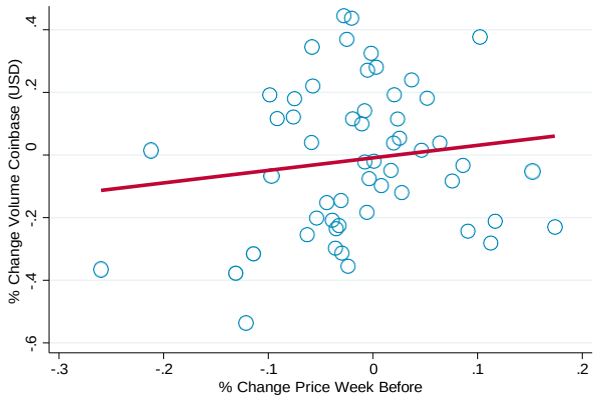
(a) Market: ΔVolume vs Δ Price



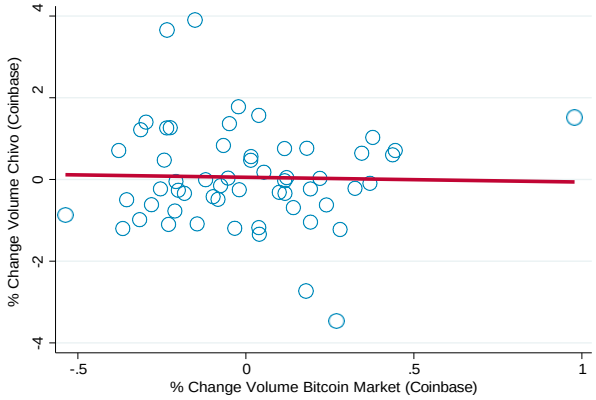
(b) Chivo: ΔVolume vs Δ Price



(c) Coinbase: ΔVolume vs Δ Price



(d) Coinbase vs Chivo (Coinbase): Δ Volume



Notes: Panel (a) shows the change in total volume of Bitcoin traded and the change in bitcoin prices the week before. Panel (b) shows the change in total volume of Bitcoin traded in Chivo and the change in bitcoin prices the week before. Panel (c) shows the change in total volume of Bitcoin traded in Coinbase and the change in bitcoin prices the week before. Panel (d) shows the change in total volume of Bitcoin traded in Coinbase and the change in total volume of Bitcoin traded in Chivo using Coinbase. Both Panels (c) and (d) leverage data from https://data.bitcoinity.org. Our sample period is from September 2021 to November 2022.

F Survey Details

The survey aims to measure Chivo usage, both at the extensive and intensive margins, and to understand the demographics of users. The original survey was conducted in Spanish and can be found at the end of this section. The survey had a response rate of one out of every eight participants.

Among the collected demographic characteristics, respondents were asked about their gender, location, marital status, age, educational attainment, income, and household size. They were also asked if they had access to internet at home, and if they had access to a cellphone with an internet connection. Regarding information on financial inclusion, respondents were asked if they had a bank account, a credit or debit card, checks, online banking, or any other payments app (besides Chivo). They were also asked what share of their total expenditures was spent as cash in a typical month.

With respect to Chivo, the survey asked if the respondent knew about Chivo Wallet, and if so, how they found out. They were also asked about the share of their friends and relatives who downloaded and regularly use Chivo. Respondents also answered whether they agreed with the use of Chivo Wallet and, if not, why. For our exercise on the estimation of the elasticity of substitution between methods of payment, the survey inquired about car usage and knowledge about the gas subsidies offered by the government. Respondents also answered how many kilometers there were between their residence and the closest Chivo ATM, as well as the maximum fee they would be willing to pay for a $100 withdrawal from a Chivo ATM and for exchanging Bitcoins and dollars.

The survey then asks different questions to respondents who had not downloaded Chivo and those who had. Respondents who had not downloaded Chivo ranked the main reasons why they did not do it. They also informed us about how big the bonus would have to be for them to download the app (a number which is above $30). People who had already downloaded Chivo were asked the date when the download occurred, and they ranked the main reasons why they downloaded it. They were also asked what would have been the minimum bonus that would have convinced them to download (a number which is $30 or less). These respondents also indicated if they had had any problems using the app, what was the main use of their $30 bonus (or if they had not spent it), and whether they kept using the app after spending their bonus. In case they kept using the app, we ask about the average withdrawals, deposits, and transfers related to the app. In case they did not keep using the app, we ask them to rank the main reasons why. We also ask about whether the user has loaded money to the app, and if so, how many times. More related to Bitcoin specifically, we ask if the user had used Bitcoin before downloading Chivo, and if they use it now. If they do not use Bitcoin, then we ask the main reason why. We also ask if the respondent has received remittances through Chivo, in which currency, and from where; and if the user has ever used the app to pay taxes. To explore the substitution between means of payment, we ask if the usage of cash and cards has increased, decreased, or stayed the same since the user downloaded the app.

Our final questions are related to firms. We ask, since the user downloaded the app, what percentage of businesses which they have visited do not accept Bitcoin and whether the user perceives prices have increased for goods and services paid in Bitcoin. Users are then asked if they are a business owner or an employee whose job is related to sales or payments, the size and sector

of the firm, which methods of payment are accepted by the firm (Bitcoin, cards, cash, other crypto), and what share of sales is paid via each method. The respondents always have the option to answer that they do not know or recall. If the firm accepts Bitcoin, then they are asked if prices were increased as a consequence of the adoption of Bitcoin, and if sales have changed in general, and if sales paid in cash and card have changed. If a sale is paid in Bitcoin, we ask whether this Bitcoin is kept in Chivo as Bitcoin, exchanged into dollars and kept in Chivo, exchanged into dollars and transferred out of Chivo, or a combination of these three options which assigns a percentage of the sale to each. If the firm does not accept Bitcoin as a means of payment, then we ask if sales have changed, and if sales paid in cash and card have changed.

Start of Survey

1. ¿Cuál es su género?
    - Hombre
    - Mujer
    - Prefiero no contestar

2. ¿En dónde vive (indique su departamento, distrito, y municipio)?
   _____, _____, _____

3. ¿Cuál es su estado civil?
    - Soltera(o)
    - Casada(o)
    - Divorciada(o)
    - Unión Libre
    - Otro_____

4. ¿En qué día, mes y año nació?_____, _____, _____

5. ¿Cuál es el nivel de estudios más alto que completó?
    - Menos de primaria completa
    - Primaria
    - Secundaria
    - Preparatoria o carrera técnica

- Licenciatura
- Posgrado

6. ¿Cuántas personas, incluyéndolo a usted, viven en su hogar?_____

7. ¿Cuál fue el ingreso total anual del hogar en un año típico antes de la pandemia COVID-19? (marque NS/NR si no lo sabe)_____

8. ¿Cuál fue el ingreso total anual del hogar el año pasado?_____

9. ¿Tiene acceso a Internet para su uso personal (correo electrónico, redes sociales, búsqueda de información, etc.) en su hogar o celular/teléfono móvil? (marque todas las que apliquen)
   - Sí, en casa
   - Sí, en celular/teléfono móvil propio
   - No tengo celular/teléfono móvil propio, pero a veces uso el de un amigo o familiar
   - No, no tengo acceso

10. Indique todo lo que esté a su disposición
    - Cuenta bancaria
    - Tarjeta de débito
    - Tarjeta de crédito
    - Cheques
    - Banca por internet en casa o en su celular/teléfono móvil
    - Alguna otra aplicación para pagos (por ejemplo Xoom, Zelle, PayPal, Venmo, Apple Pay, etc).
    - Ninguno

11. Considerando el monto total de gastos que normalmente pagaba en un mes típico antes de la pandemia Covid-19, ¿puede decirme que porcentaje de sus gastos pagaba con dinero en efectivo?_____

12. ¿Conoce Chivo Wallet?
    - Sí

- No

Si respondió que no pase a la pregunta 15

13. Si conoce Chivo Wallet, ¿cómo se enteró de la existencia de la aplicación?
    - Periódico/Noticias
    - Redes sociales (Twitter, Facebook, etc) o Internet
    - Televisión
    - Radio
    - Publicidad en otros medios
    - Le contaron sus amigos
    - Le contó algún familiar
    - Se enteró por medio de sus compañeros de trabajo
    - Otro:_____

14. ¿Ya intento bajar Chivo Wallet?
    - Sí, lo intenté yo mismo
    - Sí, un amigo o familiar lo hizo por mí
    - No

15. ¿Cuántos amigos y familiares cercanos (con los que te hayas comunicado en los últimos 3 meses) tiene en total?_____

16. ¿Cuántos de sus amigos y familiares cercanos (con los que te hayas comunicado en los últimos 3 meses) han intentado descargar Chivo Wallet?_____

17. ¿Cuántos de sus amigos y familiares han descargado Chivo Wallet y lo *utilizan regularmente* como método de pago?_____

18. ¿A cuántos de sus amigos y familiares les han suplantado su identidad en Chivo Wallet?_____

19. ¿Está de acuerdo con el uso generalizado de Chivo Wallet?

- Sí
- No

20. Si respondió que no a la pregunta 19, enumere del 1 al 3 (siendo la 1 la más importante) las principales razones por las que está en desacuerdo con el uso de Chivo Wallet

___Ideología política
___Desconfío de la seguridad del sistema
___Desconozco cómo funciona Bitcoin
___Me preocupa la volatilidad de Bitcoin
___Otro: _____

21. ¿Cuántos autos tiene? _____

22. Si tenía auto antes de que se lanzara Chivo Wallet, ¿cuánto gastaba en gasolina en dólares en un mes promedio? (indique NS/NR si no tenia auto) _____

23. Del monto que gastaba en gasolina antes de que se lanzara Chivo Wallet, ¿qué fracción o porcentaje pagaba en….(nota: la suma de las 3 opciones debe dar 100%)
    - Efectivo_____%
    - Tarjeta_____%
    - Otro_____%

24. ¿Esta enterado de que hay descuentos en gasolina si paga con Chivo Wallet?
    - Si
    - No

25. Si tiene auto, desde de que se implementaron los descuentos en gasolina con Chivo Wallet, ¿cuánto gasta en gasolina en dólares en un mes promedio? (indique NS/NR si no tenia auto y pase a la pregunta 27)_____

26. Del monto que gasta en gasolina desde de que se implementaron los descuentos en gasolina con Chivo Wallet, ¿qué fracción o porcentaje paga en…? (nota: la suma de las 5 opciones debe dar 100%)
    - Efectivo_____%
    - Tarjeta_____%
    - Chivo Wallet en Bitcoin_____%
    - Chivo Wallet en dólares_____%
    - Otro_____%

Si respondió que no a la pregunta 14 (es decir, si no ha intentado descargar Chivo Wallet), responda las preguntas 27 y 28 y luego pase a la 53, si respondió que sí a la pregunta 14 pase a la pregunta 29.

27. Si no ha descargado Chivo Wallet, ¿podría enumerar del 1 al 3 las razones principales por las que no lo descargó (siendo la 1 la más importante y 3 la menos importante)? Enumere máximo tres opciones.
    ___La tecnología es muy complicada de usar
    ___La aplicación tuvo fallas técnicas
    ___No tengo celular con internet
    ___Vivo muy lejos de algún cajero Chivo Wallet
    ___Desconfío del sistema
    ___Desconfío de Bitcoin
    ___Prefiero utilizar efectivo
    ___Prefiero utilizar tarjeta de crédito
    ___Prefiero utilizar tarjeta de débito
    ___Otra_____

28. Si no ha descargado Chivo Wallet a pesar del bono de 30 dólares, ¿que tan grande tendría que ser el bono en dólares para convencerle de bajar Chivo Wallet?_____

29. ¿Indique la fecha aproximada en que descargo Chivo Wallet (día, mes y año)? _____, _____, _____

30. Si ya intentó descargar Chivo Wallet, ¿podría enumerar del 1 al 3 las razones principales por las que lo descargó (siendo la 1 la más importante y 3 la menos importante)? Enumere máximo tres opciones.

___Retirar en efectivo los $30 de bono (mediante algún intermediario o conocido)
___Utilizar los $30 en Bitcoin a través de Chivo Wallet para realizar transacciones *con mis amigos y familiares*
___Utilizar los $30 en Bitcoin a través de Chivo Wallet para realizar transacciones en *comercios*
___La hubiera descargado aún sin el bono de $30, para recibir remesas
___La hubiera descargado aún sin el bono de $30, por ser un método de pago sin contacto durante la pandemia COVID-19
___La hubiera descargado aún sin el bono de $30, por otras razones

31. Si ya descargó Chivo Wallet, usted debió haber recibido un bono de 30 dólares. Imaginando que el bono hubiera sido menor, ¿cuál es el monto *mínimo* del bono que lo hubiera convencido de bajar Chivo Wallet? $_____ (esta cantidad debe ser menor o igual a 30 dólares).

32. Si ya descargó Chivo Wallet, ¿cuál es el monto máximo en dólares que estaría dispuesto a pagar *mensualmente* para mantener la aplicación activa? $_____

33. Descargar Chivo Wallet es gratuito. Imaginando que existiera un costo para descargar la aplicación, ¿cuál sería el precio máximo que estaría dispuesto a pagar para descargar la aplicación en su teléfono? $_____

34. Si ya intentó descargar Chivo Wallet, ¿tuvo algún problema usando la aplicación? Marque todas las opciones que apliquen
    - Sí tuve problemas, no he podido ingresar a la aplicación
    - Sí tuve problemas, se registró otra persona en Chivo Wallet con mis datos personales sin mi autorización
    - Sí tuve problemas, se han realizado transacciones en mi cuenta sin mi autorización
    - Sí tuve problemas, he tenido problemas recibiendo pagos/transferencias
    - Sí tuve problemas, he tenido problemas enviando pagos/transferencias
    - Sí tuve problemas, he tenido problemas retirando dinero
    - Sí tuve problemas, he tenido problemas depositando dinero

- Sí tuve problemas, no recibí mi bono de $30
- Sí tuve problemas, he perdido dinero
- Sí tuve otros problemas técnicos. ¿Cuales? _____
- No he tenido ningún problema

35. Si ya descargó Chivo Wallet, ¿Cuál fue el uso principal del bono de $30?
    - No lo he usado porque no sé cómo
    - No lo he usado por otra razón
    - Retirarlo en efectivo (mediante algún intermediario o conocido)
    - Cambiarlo a dólares (mediante algún intermediario o conocido) y dejarlo en Chivo Wallet
    - Pago en comercio usando Bitcoin
    - Transferencia a familiares/amigos en Bitcoin
    - Transferencia a familiares/amigos en dólares
    - Transferencia a otra Wallet que no sea Chivo Wallet
    - Transferencia a mi cuenta de banco

36. Si ya descargó Chivo Wallet, ¿ha seguido usando Chivo Wallet después de usar su bono de $30?
    - Sí
    - No

Si respondió no a la pregunta 36 pase a la pregunta 41.

37. Si ya descargó Chivo Wallet y ha seguido usando Chivo Wallet después de usar su bono de $30, ¿Cuántos retiros de efectivo *realiza* al mes usando cajeros Chivo? _____

38. Si ya descargó Chivo Wallet y ha seguido usando Chivo Wallet después de usar su bono de $30, ¿Cuál es el monto promedio de sus retiros en efectivo usando cajeros Chivo? _____

39. Si ya descargó Chivo Wallet y ha seguido usando Chivo Wallet después de usar su bono de $30, ¿Ha transferido Bitcoin a otra Wallet (que no sea Chivo Wallet)? _____

40. Si ya descargó Chivo Wallet y ha seguido usando Chivo Wallet después de usar su bono de $30, ¿Cuál es el monto promedio de sus transferecias a otras Wallet (que no sean Chivo Wallet)?_____

41. Si ya descargó Chivo Wallet y ha seguido usando Chivo Wallet después de usar su bono de $30, ¿aproximadamente cuántos pagos o transferencias *realiza* al mes usando Chivo Wallet?
    - En Bitcoin_____
    - En dólares_____

42. Si ya descargó Chivo Wallet y ha seguido usando Chivo Wallet después de usar su bono de $30, ¿cuál es el monto promedio de sus pagos o transferencias?
    - En Bitcoin_____
    - En dólares_____

43. Si ya descargó Chivo Wallet y ha seguido usando Chivo Wallet después de usar su bono de $30, ¿aproximadamente cuántos pagos o transferencias *recibe* al mes usando Chivo Wallet?
    - En Bitcoin_____
    - En dólares_____

44. Si ya descargó Chivo Wallet y ha seguido usando Chivo Wallet después de usar su bono de $30, ¿cuál es el monto promedio de los pagos o transferencias que *recibe*?
    - En Bitcoin_____
    - En dólares_____

45. Si ya descargó Chivo Wallet y no ha seguido usándolo, ¿podría enumerar del 1 al 3 las razones principales por las que no lo ha seguido utilizando (siendo la 1 la más importante y 3 la menos importante)? Enumere máximo tres opciones.
    ___No lo se usar o no lo entiendo
    ___No es aceptado en comercios o establecimientos
    ___No es seguro (existe la posibilidad de robo de dinero o identidad)

___Mis transacciones no son privadas (existe la posibilidad de que otros sepan de mis transacciones)
___Fiscalización (existe la posibilidad de que las autoridades me cobren impuestos al efectuar pagos)
___Fallas o errores en el sistema
___Otra razón_____

46. ¿Ha cargado dinero a su Chivo Wallet? Marque todas las opciones que apliquen
    - Sí, a través de depósito en efectivo por Cajeros Chivo
    - Sí, a través de la página web con tarjeta de crédito
    - Sí, a través de la página web con tarjeta de débito
    - No

Si respondió que no, pase a la pregunta 48

47. ¿Cuántas veces ha cargado dinero a su Chivo Wallet desde que la descargó?
    - Bitcoin_____
    - Dólares_____

48. Si ya descargó Chivo Wallet, marque todas las opciones que apliquen:
    - Utilizaba Bitcoin antes de descargar Chivo Wallet
    - No utilizaba Bitcoin antes de descargar Chivo Wallet, pero ahora lo utilizo sólo *dentro* de Chivo Wallet
    - No utilizaba Bitcoin antes de descargar Chivo Wallet, pero ahora lo utilizo *dentro y fuera* de Chivo Wallet
    - No utilizaba Bitcoin antes de descargar Chivo Wallet y aún no lo utilizo

49. Si ya descargó Chivo Wallet y no usa Bitcoin, ¿Por qué no usa Bitcoin para pagos o transferencias?
    - No lo entiendo
    - Le tengo desconfianza
    - Las comisiones por pagos son altas
    - Volatilidad del precio

- No lo aceptan en comercios o establecimientos
- Otro motivo_____

50. Si ya descargó Chivo Wallet, ¿Ha recibido dinero del exterior (remesas) a través de Chivo Wallet?
    - Si, en Bitcoin
    - Si, en dólares
    - No

51. Si ha recibido dinero del exterior (remesas) a través de Chivo Wallet, ¿De donde las ha recibido?
    - EEUU (indique el Estado de EEUU)_____
    - Europa (indique el país)_____
    - América Latina (indique el país)_____
    - Otro lugar_____

52. Desde que descargó Chivo Wallet y sin considerar el bono de $30, su uso de efectivo ha
    - Aumentado
    - Disminuido
    - Mantenido

53. Desde que descargó Chivo Wallet y sin considerar el bono de $30, su uso de tarjetas de débito o crédito ha
    - Aumentado
    - Disminuido
    - Mantenido

54. Desde que descargó Chivo Wallet, ¿has utilizado la aplicación para pagar tus impuestos?
    - Sí
    - No

55. Desde que descargó Chivo Wallet, ¿que porcentaje de negocios ha encontrado que no acepten Bitcoin? _____%

56. Desde que descargó Chivo Wallet, ¿has encontrado negocios que han subido los precios (o cobrado alguna comisión) por los bienes/servicios pagados en Bitcoin?
    - Sí
    - No

57. ¿A cuantos kilómetros de su casa queda el cajero Chivo mas cercano (si desea puede incluir decimales)? _____

58. Retirar Bitcoin en cajeros Chivo Wallet es gratuito. Imaginando que existiera una comisión cada vez que retire dinero del cajero, ¿cuál sería la comisión máxima que estaría dispuesto a pagar por un retiro de 100 dólares? $_____

59. Cambiar Bitcoin a dólares y viceversa es gratuito en Chivo Wallet. Imaginando que existiera una comisión cada vez cambiara Bitcoin a dólares o viceversa, ¿cuál sería la comisión máxima que estaría dispuesto a pagar por cada transacción de este tipo? $_____

60. Indique la opción que mejor corresponda a su situación durante los últimos 6 meses:
    - Soy trabajador remunerado
    - Soy trabajador independiente
    - Soy dueño de mi propia empresa
    - No estoy trabajando u otro

Si en la pregunta 60 respondió que "No estoy trabajando u otro", aquí termina la encuesta, de lo contrario pase a la pregunta 61.

61. Es usted:
    - Dueño de la empresa (total o en parte)
    - Empleado de una empresa relacionado con ventas o pagos
    - Empleado de una empresa en otra posición

- Otro

62. Indique el número de empleados que tiene la empresa donde trabaja: _____

63. ¿En qué sector está su empresa?
    - Manufactura
    - Servicios
    - Comercio
    - Construcción
    - Agricultura
    - Transporte
    - Otro: _____
    - No se/No aplica

64. En la empresa donde trabaja, ¿qué métodos de pago aceptan? (marque todas las que apliquen)
    - Bitcoin
    - Tarjeta de crédito o débito
    - Dólares en efectivo
    - Otras cryptomonedas
    - No se/No aplica

65. Responda las siguientes preguntas (escriba NS/NR si no sabe la respuesta). En la empresa donde trabaja, en el mes pasado:
    a. ¿qué porcentaje de ventas se realizaron en Bitcoin a través de Chivo Wallet?_____
    b. ¿qué porcentaje de ventas se realizaron en Bitcoin a través de una aplicación diferente a Chivo Wallet?_____ (Indique el nombre de la aplicación más común:_____)
    c. ¿qué porcentaje de ventas se realizaron en efectivo?_____
    d. ¿qué porcentaje de ventas se realizaron con tarjeta?_____

66. Responda las siguientes preguntas. En la empresa donde trabaja, de las ventas que realizan en Bitcoin, ¿cuánto conservan en Bitcoin, y cuánto pasan a dólares o efectivo? (elija sólo una opción)
    - Dejamos todo en Bitcoin y lo conservo en Chivo Wallet
    - Pasamos todo a dólares pero lo conservo en Chivo Wallet
    - Pasamos todo a dólares y lo saco en efectivo
    - Dejamos _____ % en Bitcoin, _____% en dólares en Chivo Wallet, y saco _____% en efectivo (Nota: debería sumar a 100%)
    - No lo se/No aplica

67. En la empresa donde trabaja, desde septiembre 2021, ¿aceptan Bitcoin como método de pago en su negocio? (marque todas las opciones que apliquen)
    - Sí, desde septiembre 2021 o antes
    - Sí, pero no fue adoptado inmediatamente, sino hasta ___día ,____mes, ____año
    - Aún no aceptamos Bitcoin como método de pago
    - No lo se/No aplica

Si en la empresa donde trabaja ya acepta Bitcoin como método de pago pase a la pregunta 68, de lo contrario, pase a la pregunta 72

68. ¿En qué porcentaje han cambiado sus precios en respuesta a la adopción de Bitcoin?
    - Subí mis precios ____%
    - Baje mis precios ____%
    - Mis precios no cambiaron
    - No lo se/No aplica

69. Desde que acepta Bitcoin como método de pago y en comparación con un año promedio:
    - Sus ventas totales han subido en ____%
    - Sus ventas totales han bajado en ____%
    - Sus ventas totales se han mantenido igual

- No lo se/No aplica

70. Desde que acepta Bitcoin como método de pago y en comparación con un año promedio:
    - Sus ventas pagadas con efectivo han subido en ____%
    - Sus ventas pagadas con efectivo han bajado en ____%
    - Sus ventas pagadas con efectivo se han mantenido igual
    - No lo se/No aplica

71. Desde que acepta Bitcoin como método de pago y en comparación con un año promedio:
    - Sus ventas pagadas con tarjeta de crédito o débito han subido en ____%
    - Sus ventas pagadas con tarjeta de crédito o débito han bajado en ____%
    - Sus ventas pagadas con tarjeta de crédito o débito se han mantenido igual
    - No lo se/No aplica

Si en la empresa donde trabaja, aún no acepta Bitcoin como método de pago:

72. Desde septiembre 2021 y en comparación con un año promedio:
    - Las ventas totales han subido en ____%
    - Las ventas totales han bajado en ____%
    - Las ventas totales se han mantenido igual
    - No lo se/No aplica

73. Desde septiembre 2021 y en comparación con un año promedio:
    - Las ventas pagadas con efectivo han subido en ____%
    - Las ventas pagadas con efectivo han bajado en ____%
    - Las ventas pagadas con efectivo se han mantenido igual
    - No lo se/No aplica

74. Desde septiembre 2021 y en comparación con un año promedio:

- Las ventas pagadas con tarjeta de crédito o débito han subido en ____%
- Las ventas pagadas con tarjeta de crédito o débito han bajado en ____%
- Las ventas pagadas con tarjeta de crédito o débito se han mantenido igual
- No lo se/No aplica

End of Survey

References and Notes

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2. N. Kiyotaki, R. Wright, Acceptability, means of payment, and media of exchange. *Fed. Reserve Bank Minneap. Q. Rev.* **16**, 18 (1992). doi:10.21034/qr.1632

3. D. Yermack, *Handbook of Digital Currency* (Elsevier, 2015), pp. 31–43.

4. Although a means of payment is an object used to make purchases and settle debts, the concept of medium of exchange is broader; it is an object that is taken in exchange for something to then be exchanged for something else, without the "prerequisite" of an existing debt (*8*).

5. A. Kosse, I. Mattei, "Gaining momentum: Results of the 2021 BIS survey on central bank digital currencies" (Bank for International Settlements, 2022); https://www.bis.org/publ/bppdf/bispap125.htm.

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13. For instance, Adam Smith describes that "A prince who should enact that a certain proportion of his taxes should be paid in paper money of a certain kind might thereby give a certain value to this paper money" (*10*).

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26. Detailed literature reviews on CBDCs can be found in (*80*) and (*25*).

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32. The app that we studied differs in important aspects from other mobile payment technologies. First, it was launched and sponsored by the central government and allows for payments both in a cryptocurrency and in the local currency (USD); thus, it shares features with CBDCs. Second, the app was launched nationwide along with generous incentives to adopt and no fees, which allows us to provide statistics on the distribution of adoption costs while isolating the fees' impact. Our work also relates to recent work studying the degree of substitutability between payment methods (*81*–*84*). We quantified the degree of substitutability between mobile payments and other payment methods and found it to be larger than the substitutability between cash and cards.

33. The former currency is no longer circulated; therefore, prices, accounts, and transactions were converted into USD (*85*).

34. For instance, in terms of job generation, as a way to encourage investments from bitcoin entrepreneurs, the government offered permanent residency to anyone who spends three bitcoin in the country and explained that, since bitcoin is legal tender, foreigners would not have to pay capital gains tax in El Salvador on profits made if bitcoin's value goes up. Moreover, remittances make up 22% of El Salvador's GDP, and bitcoin could potentially be a channel to send these remittances while paying lower fees.

35. Consejo Nacional de Inclusión y Educación Financiera, "Politica nacional de inclusion financiera para El Salvador (PNIF-SLV)" (BCR, 2021); https://www.bcr.gob.sv/bcrsite/uploaded/content/category/387473516.pdf..

36. More details on financial inclusion in El Salvador are provided in table S1.

37. We collected data on access to a cell phone with internet ourselves, because information on cell phone and internet access was only available for each one separately in household surveys. Fig. S9 and Fig. 10 provide details on these measures separately and other demographics relying on survey data.

38. Article 1 reads: " The purpose of this law is to regulate bitcoin as unrestricted legal tender with liberating power, unlimited in any transaction, and to any title that public or private natural or legal persons require carrying out."

39. In El Salvador, "chivo" is a slang term meaning "cool."

40. El Salvador established a trust fund, which is known to have a limit of $150 million, to allow for the automatic conversion of bitcoin into USD without fees. Official details on the trust fund or Salvadoran bitcoin purchases have not been disclosed. Hitherto, the only sources of information have been the president's Twitter posts, which indicate that the country had acquired approximately ,800 bitcoin as of April 2022.

41. Users can withdraw USD from their wallet either by doing a transfer from their bank account or by withdrawing cash from a Chivo Wallet ATM without a fee. As of September 2021, there were 200 Chivo Wallet ATMs in El Salvador (see figs. S5 and S6), and 51 in the US. Similarly, users can load money into their wallets through an official website using a credit or debit card or with cash through Chivo Wallet ATMs. Although funds remain in Chivo Wallet, they represent a claim to either USD or bitcoins, which is not uncommon in payment platforms. In other words, both USD and bitcoins are a parallel digital asset with a fixed exchange rate. In Chivo Wallet, the price of bitcoin is adjusted in real time to its market price. For instance, a customer could pay a firm or another user the USD price of an item in bitcoins, and the app would use the real-time exchange rate to charge her.

42. The Lightning Network is a protocol that uses temporary payment channelsoperating off-chain. After a channel is closed, payments are validated on the blockchain.

43. World Bank, "GDP per capita (current US$)" (2020); https://data.worldbank.org/indicator/NY.GDP.PCAP.CD.

44. Major gas stations dropped the gallon price by $0.20 for customers who paid with Chivo Wallet between September and October, and another drop of $0.30 per gallon was announced in November.

45. For instance, during the 2001–2002 Argentinean crisis, several provinces introduced low-denomination bonds ("quasi money") and used them to pay wages and other inputs (*86*). It is worth noting that El Salvador is relatively small and is therefore a bitcoin price-taker; indeed, fig. S3 shows there were no large changes in the (global) price of bitcoin after the Bitcoin Law or Chivo Wallet's launching. Thus, the experiment speaks about whether bitcoin is used as a means of payment given the above-described incentives despite the fact that it has a given resale value.

46. Panama and CAF are benchmarked against regions in El Salvador in Fig. 1B.

47. Bill SB 1341 was introduced by state Sen. Wendy Rogers.

48. Most information comes from the president's Twitter account. We tried, unsuccessfully, to contact multiple government entities, including Chivo Wallet customer service, El Salvador's Superintendency of the Financial System, Central Bank, and Casa Presidencial, to receive more quantitative information.

49. In terms of the timing of the survey, information was collected across several weeks always including weekends; weekends were important in reaching a representative sample of profiles.

50. CID-Gallup has been conducting surveys in Latin America for >40 years. It has an office in El Salvador that periodically conducts large-scale surveys.

51. Total population shares match the General Directorate of Statistics and Censuses' 2021 projections.

52. Approximate survey length was 27 min. To obtain candid responses, respondents were guaranteed confidentiality and notified that the survey aimed to inform academic research.

53. Table 1 relies on a linear probability model. Results are robust to other specifications, in particular, columns (1) and (3) of table S12 show the marginal effects under a logit model.

54. According to Chivo Wallet's regulations, users must spend their bonus in bitcoins to incentivize its usage. Some people found ways to circumvent this restriction; for instance, sending the bonus to a family member and asking her to withdraw the money from a Chivo Wallet ATM.

55. These findings regarding the prominence of young adoption is consistent with (*87*).

56. Table S6 shows no evidence of technical issues with the app being a concern by constructing a dummy equal to one if the user faced problems using the app.

57. Figs. S5 and S6 show Chivo Wallet ATM locations. Fig. S12 displays mean distances to a Chivo Wallet ATM across population shares.

58. In general, extending income adoption relations requires caution, as countries with higher income, such as Panama, may have higher adoption of digital payments (e.g., card or mobile) and, thus, lower incentives to adopt a Chivo Wallet type of service (*88*). However, the adoption of digital payments in Panama was similar to that in El Salvador; in Panama, 13.3% of people over 15 years of age report having borrowed from a financial institution or used a credit card, whereas 11.5% is the corresponding percentage in El Salvador. Moreover, in both countries, 6.5% of people over 15 years of age have made a payment using their mobile phone or internet according to the World Bank's G20 Financial Inclusion Indicators.

59. Fig. S2 reports official monthly data on remittances in bitcoins, and fig. S17 summarizes our results.

60. Mistrust is also the main reason not to agree with the use of Chivo Wallet (fig. S16).

61. Note that, in the US, apps to trade bitcoin are required to gather information on the identity of the trader, so bitcoin is not associated with anonymity in the US, just as in El Salvador's case.

62. D. G. Baur, K. Hong, A. D. Lee, Bitcoin: Medium of exchange or speculative assets? *J. Int. Financ. Mark. Inst. Money* **54**, 177–189 (2018). doi:10.1016/j.intfin.2017.12.004

63. J. Bagnall, D. Bounie, K. P. Huynh, A. Kosse, T. Schmidt, S. D. Schuh, H. Stix, "Consumer cash usage: A cross-country comparison with payment diary survey data" (Tech. Rep., Social Science Research Network Electronic Journal, 2014); http://dx.doi.org/10.2139/ssrn.2436365.

64. Source: "Chivo Wallet registra un promedio de 6,000 transacciones por d´ıa, segu´n experto argentino," Diario El Mundo, November 2021. Estimate obtained based on an adult population of 4.3 million.

65. F. Alvarez, D. Argente, F. Lippi, E. M´endez, D. Van Patten, "Strategic complementarities in a dynamic model of technology adoption: P2P digital payments" (Working Paper 31280, National Bureau of Economic Research, 2023); https://doi.org/10.3386/w31280.

66. The diffusion of many technologies is also shaped by learning; this mechanism, however, does not necessarily create an externality or room for policy interventions to improve outcomes.

67. More details are reported in fig. S21.

68. Businesses that refuse to accept bitcoin are operating in violation of local regulations and exposed to sanctions under the Consumer Protection Law; our survey points to enforcement on firm adoption being imperfect.

69. The share that accepts cards is only a little over 25%. Even among firms that accept bitcoin, prices were quoted in USD and the Chivo Wallet app provided real-time bitcoin equivalents.

70. First, a survey ran by the Salvadoran Foundation for Economic and Social Development (FU- SADES) toward the end of 2021 indicates that 10% of businesses have made sales in bitcoin ("Institutional Position N.106," FUSADES, December 2021). Second, the Chamber of Commerce and Industry of El Salvador (Camarasal) conducted a survey in February 2022 reporting that 13.9% of businesses have made sales in bitcoin ("First Business Survey 2022," Camarasal, March 2022).

71. The Chamber of Commerce and Industry of El Salvador reports a similar estimate of firms that have not changed their sales, and (91.7%) the Salvadoran Foundation for Economic and Social Development estimates that the share of sales paid in bitcoin is between 1 and 5%.

72. Table S9 shows results robust to controlling for the sector of the firm. Findings are very similar if only including responses from the firm's owner or from an employee who reports to work in sales.

73. Fig. S22 shows (i) a summary of the results on prices from the consumer's perspective (21% have encountered higher prices at some businesses) and (ii) the full distribution of shares of sales in bitcoin across firms. Fig. S23 summarizes findings on firms.

74. Although it can be verified faster, this extra speed incurs an additional cost.

75. Although one entity can own several addresses, these are not transactions between Chivo Wallets owned by individuals.

76. Thus, this figure considers transactions that involve an address that can be identified as Chivo Wallet and another address.

77. The fees paid for these deposits tended to be higher closer to Chivo Wallet's launch (see fig. S26), which would be consistent with more urgency from bitcoiners trying to pay for goods and services when Chivo Wallet's hype was at its peak. Throughout the period, fees for deposits into Chivo Wallet tended to be higher than those paid for withdrawals, which also points to more urgency on the deposits' front compared with withdrawals. The data indicate that Chivo Wallet mostly transacted with well-known exchanges; the main one being Binance (12% of all the volume transacted), followed by Bitso, OKX, and Coinbase.

78. Flows from the blockchain data have a standard deviation of 184,300. To calculate these flows using our survey, we focused on inflows of bitcoin into Chivo Wallet from other wallets, because these are the transactions recorded on the blockchain. Thus, our population of interest consists of individuals who have deposited bitcoin into Chivo Wallet and have transferred bitcoins to wallets other than Chivo Wallet, ~2% of the adult population of El Salvador. For this sample, we computed total deposits per day as the difference between the total amount sent per day and the total amount received per day in the app, including transactions in both USD and bitcoins, because convertibility across currencies is free within the app. To estimate the total deposits in bitcoins per day, we multiplied total deposits times the share of deposits in bitcoins (17.3%).

79. The CAF has an income per capita of ~$418 USD and Panama of approximately $12,172 USD, and as in El Salvador, the alternative to bitcoin is a stable currency. Approximately 13.7% of the population in the CAF has access to a bank account, whereas in Panama this number is ~46.5% (Fig. 1B).

80. F. Carapella, J. Flemming, "Central bank digital currency: A literature review" (Tech. Rep., Social Science Research Network Electronic Journal, 2020); https://doi.org/10.17016/2380-7172.2790.

81. A. Deviatov, N. Wallace, Optimal inflation in a model of inside money. *Rev. Econ. Dyn.* **17**, 287–293 (2014). doi:10.1016/j.red.2013.06.003

82. F. Alvarez, F. Lippi, Cash burns: An inventory model with a cash-credit choice. *J. Monet. Econ.* **90**, 99–112 (2017). doi:10.1016/j.jmoneco.2017.07.001

83. F. Alvarez, D. Argente, On the effects of the availability of means of payments: The case of Uber. *Q. J. Econ.* **137**, 1737–1789 (2022). doi:10.1093/qje/qjac008

84. F. Alvarez, D. Argente, "Consumer surplus of alternative payment methods: Paying Uber with cash" (Working Paper 28133, National Bureau of Economic Research, 2022); http://dx.doi.org/10.2139/ssrn.3462480.

85. A. J. Swiston, "Official dollarization as a monetary regime: Its effects on El Salvador" (Working Paper 2011/129, International Monetary Fund, 2008); https://ssrn.com/abstract=1864432.

86. G. B. Gorton, E. W. Tallman, *Fighting Financial Crises: Learning from the Past* (Univ. of Chicago Press, 2018).

87. M. Brown, N. Hentschel, H. Mettler, H. Stix, The convenience of electronic payments and consumer cash demand: Causal evidence from the staggered introduction of contactless debit cards" (Research Paper 2020/02, University of St. Gallen School of Finance, 2022); http://dx.doi.org/10.2139/ssrn.3582388.

88. Z. Wang, P. Han, "Technology adoption and leapfrogging: Racing for mobile payments" (Working Paper 21-5, Federal Reserve Bank of Richmond, 2021); http://dx.doi.org/10.21144/wp21-05.

89. S. Meiklejohn, M. Pomarole, G. Jordan, K. Levchenko, D. McCoy, G. M. Voelker, S. Savage, "A fistful of bitcoins: Characterizing payments among men with no names," in *Proceedings of the 2013 Conference on Internet Measurement Conference (IMC '13)*, Barcelona, Spain, 23 to 25 October 2013 (Association for Computing Machinery, 2013), pp. 127–140; https://doi.org/10.1145/2504730.2504747.

90. D. Ermilov, M. Panov, Y. Yanovich, "Automatic bitcoin address clustering," in *2017 16th IEEE International Conference on Machine Learning and Applications (ICMLA)*, Cancún, Mexico, 18 to 21 December 2017 (IEEE, 2017), pp. 461–466; https://doi.org/10.1109/ICMLA.2017.0-118.

91. S. Foley, J. R. Karlsen, T. J. Putnins, Sex, drugs, and bitcoin: How much illegal activity is financed through cryptocurrencies? *Rev. Financ. Stud.* **32**, 1798–1853 (2019). doi:10.1093/rfs/hhz015

92. Data and code for: F. Alvarez, D. Argente, D. Van Patten, Are cryptocurrencies currencies? Bitcoin as legal tender in El Salvador, Dryad (2023); https://doi.org/10.5061/dryad.z8w9ghxjm.

93. We first asked about their network size including only close friends and relatives with whom they had contact in the past 3 months. We then asked how many of these relatives and friends had downloaded Chivo Wallet.

94. Fig. S10, E and F, include details on car ownership and gas expenditures by quintile.

95. The dataset was obtained from Bitfury Crystal Blockchain and was also used by Makarov and Schoar (2021), who described the company as "one of the leading providers of anti-money laundering tools and analytic solutions in the crypto space" and the dataset as a "state- of-the-art database of crypto entities." The company processes blockchain data, including the addresses associated with each transaction (both senders and receivers). The addresses are grouped into clusters with an algorithm using two heuristics: "common spending" (*89*) and "one-time change" (*90*), which although imperfect are commonly used methods for clustering blockchain addresses (*91*). The company also collects information on entities and determines cluster ownership using data on single addresses collected from several websites and online manual registration.

96. We used weekly data to make sure that the correlation was not driven by outliers, but we verified that these relationships held using daily data.