Money and Barter in the Field: Evidence from a Digital Currency Experiment

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December 2025

Abstract

This paper studies how money and barter coexisted in a Toronto-based barter community that introduced a redeemable platform currency and later experienced a currency crisis. The platform enabled barter of used goods, while the digital token—redeemable at local stores at a fixed rate—facilitated exchange. Three unanticipated events provide quasi-experimental variation: a five-fold increase in token supply, a sharp restriction of redemption opportunities, and a complete halt of redemption. Using interrupted time-series designs, I show that the monetary expansion raised total trades by around 57 per cent, entirely via token-mediated trades, with barter unchanged. Restricting and then halting redemption reduced token acceptance and token-mediated trade, with the initial breach of trust also lowering barter, via reductions in platform use and new user entry. These results highlight that reputational enforcement not only helps sustain private currencies, but also magnifies the costs of currency crises.

Keywords: barter, money, medium of exchange
JEL: E42, E52, E65

*University of Hong Kong, Faculty of Business and Economics, Pokfulam Road. Email: mbwong@hku.hk. I am indebted to Suhas Vijaykumar and especially Donghee Jo for initial collaboration on this project. I thank Glen Weyl, who provided us with an introduction to Bunz. I thank the staff at Bunz for their generous help with this project, especially Sascha Mojtahedi, Perry Haldenby, and Jessica Brown. Tim Yeung Chan and especially Ningxi Song provided excellent research assistance. I thank Robert Townsend for inspiration, encouragement, and guidance, Baiyun Jing, Yang You, and Yulin Zhong for wonderful collaboration on related papers, as well as Martin Beraja, Jonathan Chiu, Pingyang Gao, Janet Jiang, Basil Halperin, Daniela Puzzello, David Rappoport, Robert Remuszka, Karthik Sastry, Takashi Shimizu, Zijian Wang, Ivan Werning, Randy Wright, Chris Wolf, Russell Wong, Anthony Zhang, Anson Zhou, and seminar participants at the Canadian Economics Association Conference 2023, the Econometric Society Meetings Beijing and Singapore 2023, the Search and Matching Workshop in Asia-Pacific, the Virtual East Asia Macroeconomics Seminar, the 2024 Summer Workshop on Money, Banking, Payments, and Finance, SED 2025, AMSE, HKU, HKUST, MIT, and Novi Economics for helpful comments.

1 Introduction

Why does money exist? How much does money matter for real economic activity? Canonical monetary models, dating back at least to Kiyotaki and Wright (1989, 1993), rigorously formalize the idea that money arises endogenously to overcome the double-coincidence-of-wants problem in barter economies (Clower, 1967; Lagos, Rocheteau and Wright, 2017). A growing experimental literature has used laboratory markets to test these theories (Duffy and Puzzello, 2014; Jiang et al., 2024; Camera, 2024). Yet, direct field evidence from economies where money and barter coexist at high frequency is remarkably scarce. Because barter is typically informal and unrecorded, transaction-level data are rarely available; most field evidence is based on historical anecdotes (Radford, 1945; Sweeney and Sweeney, 1977) or cross-sectional surveys (Colacelli and Blackburn, 2009).[1]

This lack of field evidence has fueled criticism from historians and anthropologists, who argue that formal models of barter and money misrepresent real-world economic systems and that informal credit-based theories—rather than formal theories of media of exchange—better explain observed patterns (Humphrey, 1985; Wray, 2004; Graeber, 2011). At the same time, a parallel empirical literature on digital currencies and payment systems has documented sizeable effects of digital payments on consumption and welfare (Jack and Suri, 2014; Beck et al., 2018; Alvarez and Argente, 2020*a*,*b*; Xu, Ghose and Xiao, 2024) and has studied the dynamics of currency runs and adoption (Iyer and Puri, 2012; Iyer, Puri and Ryan, 2016; Liu, Makarov and Schoar, 2023; Crouzet, Gupta and Mezzanotti, 2023; Alvarez et al., 2023). However, these studies focus almost exclusively on money-mediated transactions and do not observe barter.

This paper closes part of this gap by studying money and barter in the field, using transaction-level data from a naturally evolved barter community that adopted a redeemable digital currency and then underwent a currency crisis. The setting is the Bunz community in Toronto. Originating in

[1] Radford (1945) described the emergence of cigarettes as a medium of exchange in a prisoners-of-war camp. Sweeney and Sweeney (1977) recounted how a recession of babysitting in a co-op on the US Capitol Hill was averted by expanding the supply of scrip. Humphrey (1985) conducted an ethnography of barter among the Llomi of north-east Nepal, famously arguing that "[n]o example of a barter economy, pure and simple, has ever been described." To my knowledge, Colacelli and Blackburn (2009) provided the only existing quantitative field evidence by collecting survey responses during the 2002 Argentine crisis, finding that participation in fiat-issuing exchange clubs was associated with increased consumption among bartering populations in Argentina.

2013 as a Facebook-based barter network for cash-constrained young adults, Bunz migrated to a dedicated mobile app in 2016 and prohibited cash transactions, thereby encouraging "true trades" of used goods such as clothing, plants, groceries, books, and small household items. In 2018, the platform introduced BTZ, a privately issued digital token that could be transferred among users and redeemed at local "Shop Local" stores at a fixed rate of 100 BTZ = 1 Canadian dollar. The platform recorded token transfers, as well as rich metadata on items, messages, and user ratings.

Three unexpected monetary events provide quasi-experimental variation in this environment. First, between September and October 2018, Bunz increased daily BTZ issuance such that the token supply rose roughly five-fold. Second, in September 2019, facing cash-flow problems, Bunz abruptly restricted redemption to a narrow set of coffee shops and restaurants, effectively making many previously BTZ-accepting merchants illiquid. Third, in February 2020, the platform fully halted redemption, citing technical issues and "gaming" of the rewards program. These events were unanticipated by users, were sharply timed, and were driven by the platform's finances rather than by conditions in the broader economy, which remained stable over the sample period.

The paper makes three main contributions.

First, it provides, to my knowledge, the first transaction-level field evidence testing core predictions of search-theoretic models of money using an economy where barter and money coexist. To interpret the events, I develop a simple extension of the Kiyotaki–Wright framework (Kiyotaki and Wright, 1993) in which intrinsically worthless money can be redeemed for a consumption good at an exogenous rate. In the model, redeemability increases agents' willingness to accept money, can eliminate the non-monetary equilibrium, and implies two key predictions: (i) an increase in money supply, starting from a monetary equilibrium, raises money-mediated exchange and total trade without affecting barter; and (ii) a sufficiently large reduction in redeemability lowers money acceptance and money-mediated trade, with barter unchanged.

The data strongly support the first prediction. Using an interrupted time-series design with user fixed effects and controls for time since entry and seasonality, I show that the large increase in BTZ supply in late 2018 raised total trades by about 57 percent on a persistent basis. The increase is entirely accounted for by token-mediated trades: barter volumes are statistically unchanged. The expansion also increased offer messages sent and, with a short lag, items posted, consistent with

reduced search frictions. Token prices, measured from BTZ-denominated listings of gift cards with known Canadian-dollar face values, remained anchored at the official redemption rate, and the share of token expenditure devoted to redemption was stable. Token velocity declined as supply rose, indicating that the increase in supply relaxed transaction constraints. These patterns closely match the qualitative predictions of search-theoretic models and contradict the view that money is irrelevant in such environments.

Second, the paper shows that redeemability is critical for money acceptance and circulation in this real-world setting, thereby validating the second prediction in a nuanced way. The partial reduction in redeemability in September 2019 had three main effects. First, token acceptance—proxied by the share of new listings posted with a BTZ price—fell immediately by around 6–7 percentage points among existing regular users, from a baseline of about 35 percent. Second, token redemption spiked for roughly two weeks, especially among frequent traders, as users attempted to spend down their balances—a redemption run—in line with the idea that expectations of future redeemability affect current money demand. Because redemption was now limited to small-ticket food and coffee purchases, this run reduced the overall token stock only modestly, but it sharply raised short-run redemption velocity. Third, token-mediated trades gradually declined and stabilized about one month later at roughly 32 percent below their pre-event level.

Interestingly, barter volumes also declined by nearly one-quarter in the aggregate and by about 7–8 percent within existing regular users. This is not predicted by standard search-theoretic models, which typically assume that barter is the natural fallback when money becomes less useful. Qualitative evidence and event-time patterns suggest that this decline is driven by trust and reputational enforcement. Many users interpreted the abrupt policy change—and the lack of promised notice—as a breach of the platform's implicit contract. They reacted by leaving the platform or reducing their activity, and administrators of related Facebook groups publicly dissociated from Bunz and rebranded under the "PALZ" label. New user entry fell sharply. The resulting reduction in platform participation lowered both token-mediated and barter trade.

Third, the final halt of redemption in February 2020 further illuminates the roles of redeemability, expectations, and communication. After redemption was paused (and never restarted), token redemption dropped to zero and issuance also declined as users disengaged from BTZ-earning ac-

tivities. Token acceptance fell immediately by roughly 10 percentage points among existing regular users and then declined steadily, but did not collapse to zero. Token-mediated trades also decreased in the medium run and, even after Covid-19 restrictions were relaxed, did not return to pre-halt levels, whereas barter volumes fully recovered to their earlier plateau. Unlike the earlier reduction in redeemability, this halt was framed as a technical and temporary measure; it attracted no local media coverage, and there was little observable community backlash. The contrast between the two episodes suggests that the severity of reputational damage and retaliatory exit—and hence the collateral impact on barter—depends not only on the economic content of a policy change but also on how it is framed and communicated.

Beyond testing the qualitative predictions of search-theoretic models, the evidence reveals several features that existing models typically abstract from but that appear empirically important. First, money acceptance in Bunz was partial: even at the peak of BTZ usage, only about one-third of listings carried a BTZ price. Changes in redeemability affected this acceptance margin, consistent with models that allow for partial acceptability (Shevchenko and Wright, 2004). Second, redemption choices were endogenous and heterogeneous: the reduction in redeemability triggered a concentrated redemption run among frequent users, altering the money stock and velocity. Third, the persistence of BTZ acceptance—even after all redemption was halted—points to slow updating and adaptive learning about others' acceptance strategies (Selgin, 2003), echoing historical experiences with unbacked fiat currencies (Foote et al., 2004; Luther, 2015; Luther and White, 2016). Finally, the breach of the redemption promise led to community-level sanctions that reduced overall activity, underscoring the importance of trust and reputational enforcement in sustaining private currency systems (Kehoe and Levine, 1993; Gu et al., 2013*a*,*b*; Schnabel and Shin, 2018; Borio, 2019; Gorton and Zhang, 2023).

The remainder of the paper is organized as follows. Section 2 describes the Bunz platform, the introduction and design of BTZ, and the data. Section 3 presents the search-theoretic framework with redeemable money and derives the key qualitative predictions. Section 4 studies the effects of the monetary expansion. Section 5 analyzes the partial reduction in redeemability and the ensuing redemption run, focusing on money acceptance, trade, and the decline in barter. Section 6 examines the final halt of redemption in the shadow of Covid-19 and the differential recovery of barter and

token-mediated trades. Section 7 concludes.

2 Background

This section describes the history of the Bunz community, the mechanics of trade on the Bunz platform, and the features of the redeemable BTZ digital currency. It then introduces the data and presents descriptive statistics.

2.1 History and Description of the Bunz Community

The barter community Bunz began in 2013 as a discussion group name "Bumz" on the Facebook social media platform. In the group, community members published posts indicating that they were either in search of some item or were looking to get rid of some other item. The community was highly popular and grew rapidly among cash-constrained young adults in Toronto. Roughly 200 Facebook groups were eventually created, each dedicated to trading different types of items and discussion of different topics, some with thousands or even tens of thousands of members.

In early 2016, the community leaders decided to migrate the community's trading activities to a dedicated mobile app, designed specifically to enable users to post, search, and message each other about items to trade. The app had functionality similar to trading apps that later emerged, like Facebook Marketplace, and had been independently developed by a separate company (henceforth, "Bunz HQ"). The company was interested in growing their user base and profiting from the app, and had convinced the Bunz community leaders to migrate.

Because of the anti-capitalist spirit of its founder, the Bunz community had a rule: no cash. Instead, users were to transact through "true trades," i.e. barter.[2] Bunz HQ enforced this ban by taking down any item postings that requested cash, and the ban on cash was by and large observed by the app's users. According to textual analysis of messages sent between Bunz users, less than five percent of conversations mentioned cash or dollars.[3]

[2] See Bunz FAQ in Appendix B.1.

[3] Interviews with app users in May 2019 revealed a range of opinions about the ban on cash transactions among users. Many interviewees, especially those involved in the administration of the Facebook groups, expressed strong agreement with the cash ban. However, at least one frequent seller admitted that they prefer transacting in cash and sometimes tried to gently steer buyers towards paying in cash.

On the app, each user can post items for sale, maintain a public profile, which includes a short description of the user's trading interests, and provide an "ISO" (in search of) list, which indicates what types of items that user would be willing to accept. A posted item typically included a photo, a title, a description, and the location of the seller. If a user comes across an item she liked while browsing or searching, she would click a button to send an offer message to the seller, asking if he would be interested in any item that she posted ("Anything in mine?"). He would then browse her profile and message back to indicate whether there was any such item. If a possible trade was found, then the two would then message to arrange a time and location to meet. In the message screen, users are prompted to rate each other once they complete a trade.[4]

Due to the ban on cash, the need for double coincidence of wants posed an impediment to trade on the Bunz app. Interviews with users reveal that trades frequently failed because the buyer did not have an item that the seller desired. When a lack of double coincidence occurred, sellers often offered to complete the trade through alternative payments such as beer, gift cards, and transit tokens. These objects were typically procured by the buyer immediately before a trade and directly consumed or used by the seller soon after the trade. Such offers were occasionally rejected in favor of a "true trade" by users who prefer to barter.

Traders who met through the Bunz app were largely strangers who would not meet again. Trade was almost always bilateral and simultaneous.[5] Traders were incentivized against opportunistic behavior such as no-shows and scams by a system where users could publicly rate and review each other after they agreed to trade. In interviews, many users reported that other users were typically trustworthy and friendly. The high level of trust on the Bunz platform led them to prefer using Bunz over other popular platforms such as Craigslist and Kijiji, where scams were more common.

[4]Appendix Figures B1, B2, and B3 show photos of the mobile app and examples of typical in-app interactions.

[5]Credit among Bunz users was very rare. Interviewed users report receiving BTZ payments as deposit to secure a trade or because they anticipate that their cellular data will be wonky at the trading location. Users may also receive slightly deferred payment, when a new user cannot remember their digital wallet PIN, or when a reputable user who is low on BTZ promises to deliver BTZ after another imminent trade that has already been arranged. However, other than these very short-term credit arrangements, credit among Bunz users was not known. This absence of credit and banking in the Bunz economy is a departure from the macroeconomy that allows me to focus on the role of money as a medium of exchange.

2.2 Introduction of BTZ

In April 2018, Bunz HQ introduced "a brand new digital currency," BTZ, as part of a major app update. The stated purpose of BTZ was to facilitate trade within the app. At the time of BTZ introduction, each user was endowed with 1000 BTZ upon digital wallet activation inside the app. In addition to receiving BTZ from other users, users could earn extra BTZ directly from the app through the "Daily BTZ Drop" by opening the app and answering a survey. The goal of "Daily BTZ Drop" was to increase user traffic and BTZ adoption in the app. Users could also earn more BTZ by inviting friends to join the app or posting new items. Each item could now be posted with a BTZ price. BTZ could also be easily transferred among users by tapping on buttons on another user's profile or by scanning another user's QR code.

To promote the token and ensure price stability, Bunz HQ created the "Shop Local" program, which allowed users to redeem BTZ for retail goods at partner stores around Toronto, such as coffee shops and restaurants, at a fixed exchange rate of 100 BTZ to 1 Canadian dollar (CAD).[6] After accepting BTZ, the owners of local stores could then redeem BTZ for cash from Bunz HQ at the same fixed exchange rate. Other than token redemption through the Shop Local program, users could neither buy nor sell BTZ for cash in the Bunz app. As such, the total supply of tokens in the app was strictly determined by token issuance by the app and token redemption by users at local stores. Appendix Figure B4 graphically illustrates how tokens flow through the Bunz economy.

2.3 Data and Descriptive Statistics

The data provided by Bunz HQ are extraordinarily rich and comprehensive. I observe the universe of BTZ token transfers with timestamps, amounts, and the identities of the sender and receiver. The BTZ holdings of every user at any moment can therefore be inferred. I also observe the ratings that users submit to the platform after a trade, which allows me to identify barter trades. In addition, I observe all items that users post, along with descriptions and timestamps. The full text of the messages that one user sent to one another is also available. For each user, I observe a rich set of characteristics, including user geolocation and answers to the "Daily BTZ Drop" surveys, which ask for information such as demographics.

[6] In 2018, the average exchange rate was 1 CAD to 0.77 USD.

Despite their richness, these data have some limitations. First, the items traded on the platform are typically used and highly non-standardized. Moreover, barter trades feature no posted price, so it is often difficult to know the price or value of the traded goods. Because of this, my analysis focuses on the number of trades, as measured by ratings sent and received, rather than the terms of trade. Second, there is no centralized exchange between BTZ and other currencies. As explained further below, I measure the BTZ price level using a subset of gift cards that are posted on the platform that feature both a face value in Canadian dollars and a BTZ price.

The Bunz user base consisted primarily of young, female, college-educated adults. Roughly 75 percent of survey respondents were between 18 and 34 years old. More than half reported to have completed a university degree at the bachelors or higher level. Users also exhibited a wide range of annual incomes. While roughly 27 percent of users reported annual incomes of less than $20,000, nearly 40 percent reported annual incomes higher than $50,000 (Appendix Figure B5).

The types of goods transacted on the platform are highly heterogeneous. About 21 percent of items posted were clothing. Another 10 percent is jewelry. Other commonly posted items include home products, grocery, beauty products, electronics, and books. The median item on the platform has a posted price of roughly 10 Canadian dollars (see Appendix Table B1).

A small share of users account for a large share of trades on the platform. Because of this, part of the analysis below focuses on *regular users*—users who have at least 50 trades (as measured by ratings sent and received) during the entire sample period, have at most 70 percent of trades concentrated in one month, and were active for at least 6 months. Between September 2018 and August 2019, regular users accounted for 1 percent of active users, but 48 percent of trades, 36 percent of items posted, and 40 percent of peer-to-peer BTZ transfers (see Appendix Table B2). Among regular users, usage of the platform is highly persistent. During the week one year after their first message sent on the platform, more than 90 percent of regular users sent a message to another user (see Appendix Figure B6).

Part of the analysis below further focuses on subsets of regular users with different platform use intensity, as measured by their lifetime total number of trades. Appendix Table B3 shows that frequent users have broadly similar activity profiles as less frequent users. The barter share of trades, level of token acceptance, offer messages sent per trade completed, and mean size of BTZ flows

are similar for users with different levels of total trade volumes. Frequent users, however, receive fewer tokens from the platform, redeem fewer tokens, and post fewer items per trade completed.

3 Conceptual Framework

This section provides a stripped-down extension of Kiyotaki and Wright (1993) to organise the three Bunz events. The model is deliberately simple and used only to generate a small set of qualitative predictions that map directly into the empirical analysis.

3.1 Environment

Time is continuous and the economy is populated by a unit mass of infinitely-lived agents. Agents are randomly matched in pairs at Poisson rate α. Preferences and technology are as in Kiyotaki and Wright (1993): each agent consumes one type of indivisible good and produces another. Production is costly, consumption is beneficial, and agents discount at rate r. There is no commitment or enforcement beyond immediate trade, so credit is not feasible, and barter is subject to the double-coincidence-of-wants problem.

There is a fixed stock $M \in [0,1]$ of intrinsically worthless tokens ("BTZ"), initially held by a subset of agents. Tokens are indivisible, and each agent can hold either zero or one. In decentralised meetings, agents may trade. Let π denote the fraction of agents willing to accept tokens in exchange for their good.

Redeemability is modeled as follows. At an exogenous Poisson rate ρ, an agent can visit a "redemption outlet", where the platform commits to exchange tokens for the consumption good in exchange for a token. To keep total money supply constant, a token is randomly issued to any agent without money in the same instant that an agent redeems. When $\rho = 0$, the model collapses to the standard Kiyotaki–Wright environment with intrinsically worthless fiat money. When $\rho > 0$, tokens acquire a fundamental value from redemption.

3.2 Equilibrium and the Role of Redeemability

Following Wright (1999), I focus on stationary symmetric equilibria where all agents with the same money holdings behave identically and where acceptance decisions depend only on the share of agents that accept tokens.

In such equilibria, the value of holding one token, V_1, satisfies a Bellman equation of the form $rV_1 = (\text{gains from using the token in decentralized trade}) + (\text{gains from redemption})$. The key term is the expected capital gain from redemption: $\rho(u + V_0 - V_1)$, where u is the utility from consumption of the good and V_0 the value of holding no token. Thus V_1 is increasing in ρ.

An agent accepts tokens in a decentralised meeting if the value of producing and receiving a token weakly exceeds the value of refusing to trade. Since V_1 is increasing in ρ, higher redeemability makes it more likely that this acceptance condition holds. In particular, one can show:

Proposition 1 (Existence and elimination of the non-monetary equilibrium)**.** *There exists thresholds $\underline{\rho}$ and $\overline{\rho}$, where $\overline{\rho} > 0$ and $\overline{\rho} > \underline{\rho}$, such that:*

1. *For $\rho > \overline{\rho}$, only monetary equilibria, where $\pi = 1$, exists.*
2. *For $\rho < \underline{\rho}$, only non-monetary equilibria, where $\pi = 0$, exists.*
3. *For values of ρ inbetween $\underline{\rho}$ and $\overline{\rho}$, both monetary and non-monetary equilibria exist.*

Proof. Formal derivations are in Appendix A. □

This result captures the idea that reliable redemption can make BTZ widely acceptable on the platform, while insufficient redemption may cause the token to cease to circulate.

3.3 Empirical Predictions

This subsection derives two sets of empirical predictions that will be taken to the data. Crucially, in the framework here, money and barter are substitute forms of exchange. Following Section 3 of Rupert et al (2000), it is assumed for simplicity that agents who hold money never trade with money in double-coincidence meetings. Barter trade is therefore unaffected by the changes in the ease of money-mediated transactions.

First, consider an increase in M, holding ρ fixed, and starting from a monetary equilibrium, with M sufficiently small. A higher M raises the probability that a buyer arrives at a meeting with tokens and can trade whenever he meets an accepting seller.

Let T_M be the flow of token-mediated trades and T_B the flow of barter trades in steady state.

Prediction 1 (Effects of a monetary expansion)**.**

1.1 T_M *and total trade* $T = T_B + T_M$ *increase on a persistent basis;*

1.2 T_B *is unaffected, as* M *rises.*

Section 4 tests Predictions 1.1 and 1.2 using the September–October 2018 five-fold BTZ expansion, focusing on its impact on total trade and its decomposition into token-mediated and barter components.

Second, consider a fall in ρ from above $\bar{\rho}$ to below $\bar{\rho}$, holding M fixed, starting from a monetary equilibrium and transitioning to a non-monetary equilibrium, with M sufficiently small. This lowers V_1 and thus the incentive to accept tokens:

Prediction 2 (Effects of reductions in redeemability)**.**

2.1 Token acceptance π *persistently decreases;*

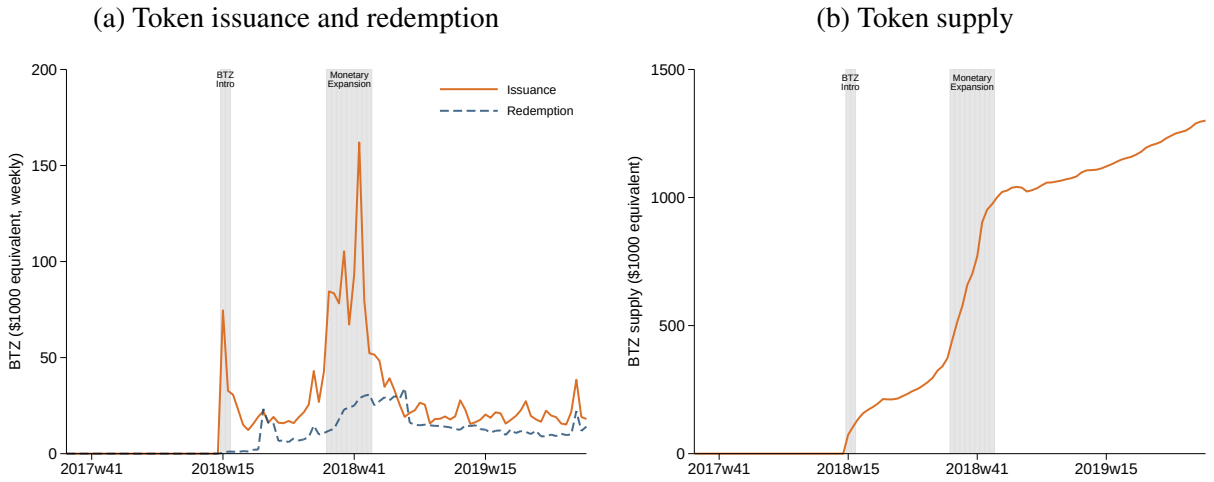
2.2 T_M *and* T *persistently decreases;*

2.3 T_B *is unaffected, as redeemability* ρ *falls.*

Section 5 uses the September 2019 "partial freeze" of BTZ redemption to test Predictions 2.1-2.3. The observed fall in barter after this event violates Prediction 2.3 and motivates an interpretation in terms of trust, reputation damage, and exit, which are outside the baseline model.

Section 6 studies the February 2020 halt of redemption. Consistent with Predictions 2.1-2.3, token acceptance drops but does not collapse, declines further over time, and BTZ-mediated trades do not fully recover. In contrast to the 2019 episode, barter returns to its previous plateau, suggesting that this halt inflicted less reputational damage and triggered little exit.

Figure 1: Token issuance, redemption, and supply, before and after monetary expansion



Notes: Panel (a) shows the weekly trend in BTZ issuance, the total amount of tokens sent from Bunz directly to users, and BTZ redemption, total amount of tokens sent from users to local stores. Panel (b) shows BTZ supply, the cumulative sum of BTZ issued minus the cumulative sum of BTZ redeemed. All numbers are denominated in the Canadian dollar (CAD) at the fixed exchange rate: 1 CAD = 100 BTZ. Gray bars indicate the first and second wave of monetary expansion.

Remark. Since the model presented here is deliberately simple, it fails to explain several empirical findings below. The key discrepancy already mentioned is that the first reduction in redeemability *reduced* barter trade. Further differences—including partial acceptance (a la Shevchenko and Wright 2004), slow moving expectation (a la Selgin 2003), and redemption-run dynamics—will be discussed in the following sections.

4 Effects of Monetary Expansion

This section empirically tests Prediction 1.1 and 1.2 by estimating the effects of a large monetary expansion on trade on the Bunz platform. Consistent with the predictions, it is found that monetary expansion increased token-mediated trade, but did not detectably affect barter trade.

4.1 Timeline of Events

Between September and October 2018, roughly half a year after the initial introduction of the token, Bunz HQ increased the amount of Daily BTZ Drop to 100 BTZ per day from 10 BTZ

per day, in hopes of increasing use of the token. To the best of my knowledge, this increase was unanticipated by users. After roughly eight weeks of increased token issuance, Bunz HQ realized that the resulting pace of token redemption would be financially unsustainable, and reverted to Daily BTZ Drops of 10 BTZ per day.

The orange line in Figure 1 Panel (a) plots weekly token issuance, defined as the sum of tokens transferred from Bunz HQ to users, excluding local stores and Bunz employees. It shows a small wave of token issuance in April (Week 15), when each user who activated their BTZ wallet received 1000 BTZ (which is equivalent to 10 CAD).[7] A large wave of token issuance, which led to the monetary expansion that is the focus of this section, occurred six months later (in Weeks 36-42).

Despite the sharp increase in issuance, token redemption did not increase proportionally. The blue line in Figure 1 Panel (a) plots weekly redemption, defined as the amount of BTZ transferred from users to Shop Local stores to purchase goods. In May 2018, there was a short but sharp increase in token redemption after the initial BTZ introduction. From October to December 2018, there was another wave of heightened token redemption, after the surge in issuance. After Christmas Day that year, BTZ redemption fell back toward its initial level.

Since issuance greatly exceeded redemption, token supply persistently increased by about five times. Figure 1 Panel (b) plots the total supply of tokens in circulation, defined as the cumulative sum of BTZ issued minus the cumulative sum of BTZ redeemed. After the first wave of monetary expansion in April and May 2018, the total value of tokens in circulation stabilized at roughly 20 million BTZ (equivalent to 0.2 million CAD). In September 2018, BTZ supply grew rapidly due to increased token issuance. It stabilized after November 2018 at a level of roughly 100 million BTZ (equivalent to 1 million CAD).

4.2 Empirical Strategy

How did monetary expansion affect trade? To measure trade volume, the ratings that users provide each other are counted. This measure is the best available proxy for the volume of goods exchanged on the bartering app, since trades occur offline and are not directly recorded. The value of goods

[7] As mentioned in Section 2, the "Daily BTZ Drop", wherein some quantity of the token was transferred from Bunz HQ to a user after the user answered a survey question each, was the primary method for Bunz HQ to change the amount of the token in circulation.

traded is also difficult to know, since barter trades are not associated with any prices, and the goods are typically used and highly heterogeneous. Though this measure is likely an underestimate of the actual trade volume, as users may not always provide a rating for their trade partner upon completion of a trade, it is likely to be highly correlated with completed trade. Most importantly, these data are available both before and after the introduction of BTZ, whereas token trades are only available after token introduction. Token-mediated trades are then distinguished from barter trades by examining whether a token transfer occurred between the same pair of users within 7 days of a user rating.

To study the impact of the monetary expansion, I focus on data from two years prior to the monetary expansion to one year after, thereby excluding the impacts of subsequent events. The trends in total trade volume among all users are first examined, with changes in levels computed by comparing averages during the two years prior to monetary expansion to those during the year after. However, aggregate changes could be due to changes in the composition of active platform users. To analyze the effects of monetary events at the individual level, I construct a monthly panel of regular users. I exclude regular users who entered the platform after the expansion (as measured by first messages sent), and regress:

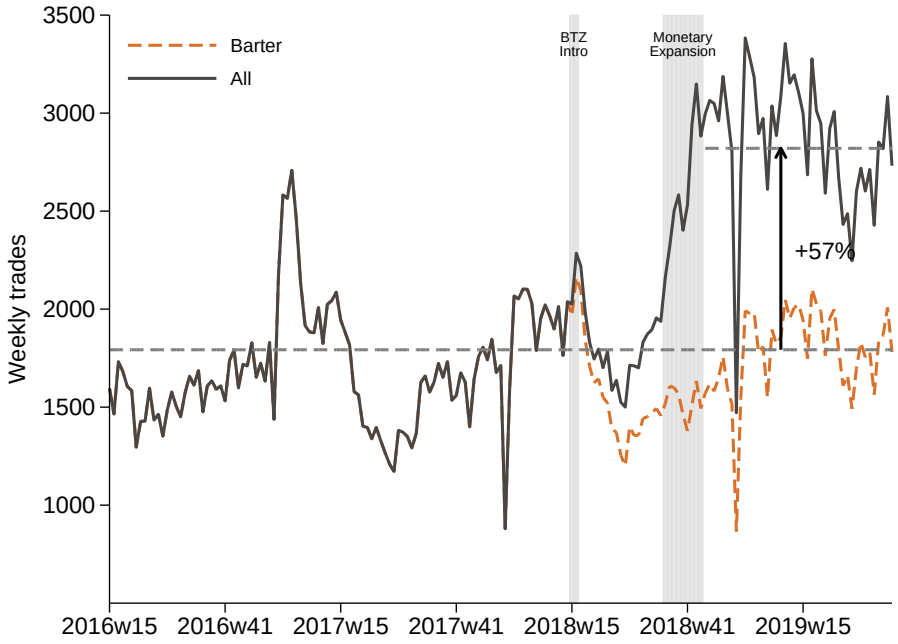
$$y_{it} = \beta PostExpansion_t + \delta_i + \delta_{c(t)} + f(t - \tau(i)) + \varepsilon_{it}, \tag{1}$$

where y_{it} indicate user-level outcomes, $PostExpansion_t$ indicates that month t is after September 2018, δ_i are user fixed effects, $\delta_{c(t)}$ are calendar month fixed effects, $f(t-\tau_i)$ indicate controls for time since user entry, and ε_{it} is an error term. Standard errors are clustered at the user level.

The coefficient β recovers the causal effect of monetary expansion on user-level outcomes under the assumption that user outcomes would have followed parallel trajectories to previous entry cohorts in the absence of monetary expansion. In my baseline specification, linear controls for time since entry are used. Two robustness exercises are conducted. First, I use more flexible controls for time since entry (e.g., linear splines and fixed effects). Second, I examine subsets of users with different platform use intensity, as measured by their lifetime total number of trades. As shown below, the estimated impacts of monetary expansion on trade are highly similar.

A key concern for the interrupted time-series design used here is that macroeconomic or policy

Figure 2: Effect of monetary expansion on trade volume, all users



Notes: Figure shows the weekly trend in the number of peer-to-peer trades, as measured by user reviews. Barter traders are the subset of trades that did not coincide with a token transfer between the same user pair within 7 days. Gray bars indicate the first and second wave of monetary expansion.

changes globally, in Canada, or in Toronto that occurred around the same time could explain the results. To address this concern, Appendix Figure C2 reports quarterly consumption data in Ontario throughout our study period. Very little change in aggregate consumption patterns was found over time. It is therefore unlikely that the large and persistent impacts reported below are attributable to unrelated shocks in the broader economy. There were also no contemporaneous changes in platform design that may confound the estimates.

4.3 Main Results

Total trade persistently increased.

The black line in Figure 2 shows the first major result: In the two years before the introduction of BTZ, the aggregate peer-to-peer trade volume was largely stable. After the monetary expansion in September 2018, the number of trades completed persistently increased by 57 percent, and

Table 1: Effects of monetary expansion on trade volume, existing regular users

	(1)	(2)	(3)	(4)
	Asinh total trades		Asinh barter trades	
Post expansion	0.296**	0.199**	0.028	-0.048*
	(0.023)	(0.028)	(0.022)	(0.027)
Calendar-month FE		X		X
Observations	49942	49942	49942	49942
Users	1815	1815	1815	1815
R^2	0.293	0.299	0.303	0.308
Pre-event mean	1.232	1.232	1.207	1.207

Notes: Table reports the effects of monetary expansion on the asinh total trades and asinh barter trades of existing regular users. Sample includes all observations between October 2016 and September 2019 at the month-user level for regular users whose first message sent was before the monetary expansion. "Post expansion" is defined as months after September 2018. Controls for user fixed effects and months after user entry are included. Controls for calender month fixed effects are added in Columns (2) and (4). Standard errors are clustered at user level. * and ** indicate statistical significance at the 10 and 5 percent level, respectively.

remained significantly elevated for a year. Intriguingly, however, after the introduction of BTZ in April 2018, there was a small dip in completed trades. This dip suggests a need to control for seasonal trends, as a dip of similar magnitude was seen during the year before.

Table 1 reports regression results. The estimates reveal that the increases in trade were substantially driven by increases within users, and are not explained by the entry of new users. Column (1) shows that the effect of monetary expansion on total trades among existing regular users is positive and statistically significant, at nearly 30 asinh points, after controlling for user fixed effects and time since entry. Column (2) adds controls for seasonality, and shows that the increase is attenuated but still significant, at 20 asinh points. These estimates confirm Prediction 1.1, and suggest that the overall increase is not accounted by changes in user composition.

Barter trade did not change.

The orange line in Figure 2 shows that monetary expansion did not change the overall level of barter trades (i.e., trades not associated with a contemporaneous token transfer) among all users.

The rise in total trade volume is instead accounted for by the emergence of token-mediated trades. These token-mediated trades began to emerge almost immediately following BTZ introduction, but substantially grew during the monetary expansion.

Table 1 Columns (3) and (4) show that barter trades among existing regular users did not significantly change, even after controlling user fixed effects, time since entry, and seasonality. These estimates confirm that the lack of response in barter trade is not due to changes in user composition, thus validating Prediction 1.2.

4.4 Robustness and Mechanisms

The above main results are highly robust to alternative regression specifications. Similar results are found with more flexible controls for the time since user entry (see Appendix Table C1), as well as for subsets of users with different levels of activity intensity (see Appendix Table C2).

The observed impacts are also not attributable to changes in user composition. The results are robust to the inclusion of user fixed effects. Moreover, the rate of entry by regular users onto the Bunz platform did not change during the monetary expansion (see Appendix Figure C2).

What explains the increase in trade? To investigate mechanisms, the impacts of monetary expansion on additional outcome variables are now examined. The results support the theorized mechanism that monetary expansion reduced transaction frictions.

First, a large increase in bargaining initiation and a comparatively smaller increase in bargaining success are found. Specifically, the observed increase in trade volume is decomposed into two components: the change in offer messages sent and the change in trades completed per offer sent. Appendix Figure C3 shows that the total number of offer messages sent immediately increased by 41 percent following the monetary expansion, while the number of trades completed per offer message increased only by 11 percent. Appendix Table C3 confirms that among existing regular users, monetary expansion increased offer messages sent by 25-39 percent, even after controlling for user fixed effects, time since entry, and seasonality—a magnitude similar to the aggregate increase in total trades. These estimates suggest that monetary expansion induced buyers to more actively respond to seller posting, thus increasing buyer-seller match probabilities. Meanwhile, the probability of bargaining success after bargaining initiation only mildly increased.

Second, the observed increase in trade is found to coincide with a substantial, though more gradual, increase in good supply on the platform. Appendix Figure C4 shows that new items posted on the platform increased, but with some lag. Appendix Table C3 uses a regression specification to confirm that items posted on average increased among existing regular users, even after controlling for user fixed effects, time since entry, and seasonality. These observed effects suggest that sellers increased the supply of items to the platform after learning of increased demand. This finding is consistent with the idea that monetary expansion reduced transaction frictions.

Third, the effects of monetary expansion on token price, acceptance, use, and velocity are documented. The findings suggest that monetary expansion did not meaningfully alter token prices, acceptance, or beliefs about the value of the token.

To measure token prices, I focus on store gift cards that are frequently transacted on the platform and take the ratio of their posted BTZ price to their dollar-denominated face value.[8] Since BTZ was not freely exchangeable with other currencies, this measure is the best available proxy for the BTZ token price, as perceived by Bunz users. To measure token acceptance, I use the share of items posted with a BTZ price, which signals to Bunz users the willingness of the seller to accept the BTZ token. As an additional measure of user confidence in the token, the share of user token expenditure used for redemption (instead of peer transfers) is examined. Since token data are not available before the introduction of BTZ, a shorter time period is examined.

Token prices are found to remain anchored to the fixed exchange rate of the redemption program despite the monetary expansion. Appendix Figure C5 Panel (a) shows the median posted exchange rate for gift cards by month, which hovered unchangingly from July 2018 until June 2020 around the official fixed exchange of 100 BTZ to 1 CAD. Panel (b) plots the relative token price for all available gift card postings over time. This plot shows that there was considerable dispersion in gift card exchange rates, as might be expected in an app where exchange is subject to search frictions. For a large fraction of gift cards, however, the posted token prices were exactly 100 BTZ to 1 CAD, the official exchange rate for token acceptance at local stores.

Token acceptance also did not discontinuously change during the monetary expansion. Ap-

[8]Specifically, I focus on gift cards for five large sellers that are frequently sold in the app: Starbucks Coffee, Indigo Books and Music (a Canadian bookstore chain), Apple iTunes, LCBO (the Canadian government-run liquor retailer), and Amazon.

pendix Figure C6 shows that token acceptance steadily increased from the day that users were able to post BTZ prices until the end of the monetary expansion, when it stabilized at around 35 percent. The increase in token acceptance is correlated with the increasing number of redemption stores, which also stops to grow at the end of the monetary expansion. This finding suggests that changes in token acceptance cannot explain the sudden increase in trade completions.

Consistent with stable beliefs about the token's value, Appendix Figure C7 shows that the share of user token expenditure used on redemption was stable throughout the monetary expansion.

Meanwhile, token velocity—the volume of token flows divided by token supply (i.e., the speed at which token change hands)—persistently fell at the end of 2018, roughly two months after the monetary expansion. Appendix Figure C8 shows that tokens changed hands between users around three times per year during the second half of 2018. During the first three months of 2019, transfers per token supply fell to lower levels of 1.7 times per year, respectively. This reduction indicates that monetary expansion increased money supply more than it increased token-mediated trade. The finding is also consistent with a relaxation in transaction frictions.

5 Effects of Reduced Redeemability

This section estimates the effects of the first reduction in redeemability on transaction behavior on the Bunz platform. The estimates confirm Predictions 2.1 and 2.2, which state that reduced redeemability should cause token acceptance and token-mediated trade to persistently decline. In violation of Prediction 2.3, however, barter is found to have declined, partly due to reduced user entry. This result highlights the empirical relevance of trust and reputational enforcement of redemption promises for privately issued currencies.

5.1 Timeline of Events

The reduction in redeemability was prompted by cash flow difficulties. After introducing BTZ, Bunz HQ worked on developing other new features to drive user and revenue growth, including introducing a community discussion feature and selling in-app advertising. As 2019 progressed, however, Bunz HQ's financial position became increasingly untenable. There were roughly 18 em-

ployees on its payroll, token redemption continued to drain its coffers, and its budding advertising sales were insufficient to offset the cash outflow. Though Bunz HQ worked to raise funds, it soon became clear that neither new investment nor an acquisition was forthcoming (Galang 2019).

There were two instances of unusual redemption activity by a small number of users at a single redemption store in the weeks *before* the announcement by Bunz HQ to reduced redeemability. As shown in the light lines in Figure 6 Panel (a), the spike in BTZ issuance and redemption on August 13 and 14 reflects fraudulent activity wherein some user created numerous accounts and then immediately redeemed these BTZ through some Shop Local store. The data show a sudden increase in new user sign-ups and referrals, which were rewarded by Bunz HQ with 1000 BTZ and 500 BTZ, respectively. The spike on August 30 is due to a large redemption of 304778 BTZ by a single user. According to Bunz's CEO, this behavior contributed to the platform's decision to prevent a larger run by reducing redeemability.

On September 9, 2019, Bunz HQ announced that tokens would henceforth only be redeemable at local partner stores selling coffee or food. In a letter sent to Shop Local partner businesses, Bunz HQ wrote, "Effectively immediately, you will no longer be able to accept BTZ and convert them into CAD currency. We will be locking your wallets, and everyone will be paid up to September 10th inclusive" (see Appendix D.1).

Shocked and disgruntled, Shop Local partners took to announcing these changes on the app to the wider Bunz community, criticizing Bunz HQ for the abruptness of the decision, their lack of transparency, and their reneging on a promise to provide a 30-day notice of changes to the Shop Local program. One wrote, "While I respect their decision to end the program, more notice would have been nice. This was literally [zero] notice and not professional. I now have customers that can no longer support me on this platform, many who saved BTZ for months. And now their BTZ is no longer of use to them."

The next day, Bunz HQ provided an update to the broader community in a blog post. The post confirmed that it would no longer accept BTZ except at coffee shops and restaurants. Apologizing for "any inconvenience and disappointment this may have caused", the blog post went on to explain that Bunz HQ also had to make the difficult decision to lay off 15 employees that same day.[9]

[9] Appendix D.2 provides the full text. The digital wallets of employees were also suddenly locked (Galang 2019).

There was tremendous uncertainty about the viability of the BTZ token in the following days. In an interview, a frequent seller of used books recounted that he stopped accepting BTZ after the announcement. He then spent down his stock of tokens at local restaurants by "eating like a king". Two weeks after, however, he realized that BTZ now traded among users at a discount. Since Bunz HQ still redeemed tokens at restaurants, this made it profitable for him to accept BTZ again. As of October 18, 2019, he was willing to accept BTZ at 85-90% of its face value in exchange for books, but would immediately redeem the tokens for food at token-accepting stores. This way he kept only a small balance of tokens and minimized his exposure to the risk that the token might eventually become worthless.[10] Interestingly, however, Appendix Figure C5 shows that the posted token price—as measured using the ratio between BTZ price and the face value of gift cards posted on the platform—remained largely anchored to the exchange rate of the token redemption program despite reduced redeemability.

5.2 Empirical Strategy

To estimate the impact of reduced redeemability, I focus on data from 11 weeks before the reduction until 15 weeks after. As before, aggregate trends are first examined. Then, I estimate the effects of reduced redeemability on existing regular users using an interrupted time series design at the user level. I construct a weekly panel of regular users, but exclude users who enter after reduced redeemability, and regress:

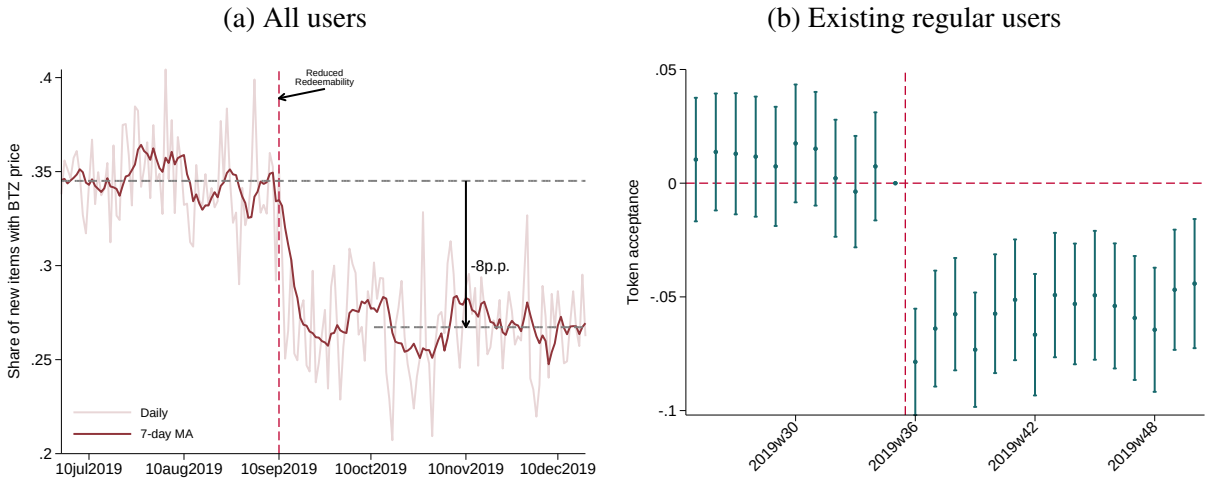
$$y_{it} = \sum_{k=-11}^{15} \beta_k I_{t-t^*=k} + \delta_i + \varepsilon_{it}, \tag{2}$$

where y_{it} indicate user-level outcomes, $I_{t-t^*=k}$ are dummies indicating each week relative to when redeemability was reduced, δ_i are user fixed effects, and ε_{it} is an error term. Standard errors are clustered at the user level.

The coefficients β_k recover the causal effect of reduced redeemability on user-level outcomes under the assumption that user outcomes would have followed trajectories parallel to previous entry cohorts. This identifying assumption is tested by examining pre-event β_k coefficients. As before,

[10] Appendix F provide the transcript of this interview.

Figure 3: Effects of reduced redeemability on token acceptance



Notes: Panel (a) shows the trends in the share of new items with a posted BTZ price. The dark lines show the 7-day moving average, while the light lines show the daily trend. The red dashed line indicates September 10, the day of partial cessation of Shop Local program. The pre-crisis spikes in token velocity of peer transfer and redemption reflect unusual activity by a small number of users. In dark lines, unusual activity is removed by excluding users who received sign-up bonus and only made redemption during the spikes, excluding stores that cooperated with these users, and performing 0.1% winsorization to remove extreme values.

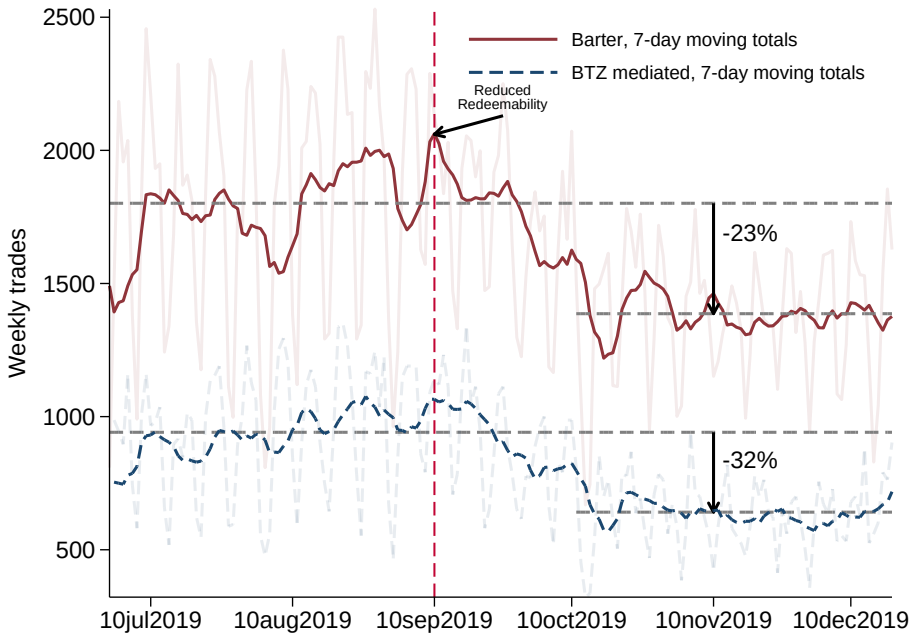
Appendix Figure C2 shows that quarterly consumption levels in Ontario were once again stable, suggesting that impacts reported below are not attributable to unrelated shocks in the broader economy. There were also no contemporaneous changes in platform design that may confound the estimates.

5.3 Main Results

Token acceptance immediately fell.

Figure 3 shows the impact of reduced redeemability on token acceptance. Panel (a) shows that during the two months before the announcement, token acceptance—as measured by the share of new items with a posted BTZ price—hovered around 35 percent. After the announcement, the share immediately plunged to roughly 27 percent. Panel (b) reports regression coefficients for Equation (2), with share of items with BTZ price at the individual level as the outcome. It is shown that token acceptance immediately fell by 6-7 p.p. among existing regular users, conditional on their posting new items, even after controlling for user fixed effects and time since entry. The

Figure 4: Effects of reduced redeemability on trade volumes, all users



Notes: Figure shows the trend in the number of transactions decomposed by whether a token transfer occurred between the same user pair within 7 days. The dark lines show the 7-day moving average, while the light lines show the daily trend. The red dashed line indicates September 10, the day of partial cessation of Shop Local program.

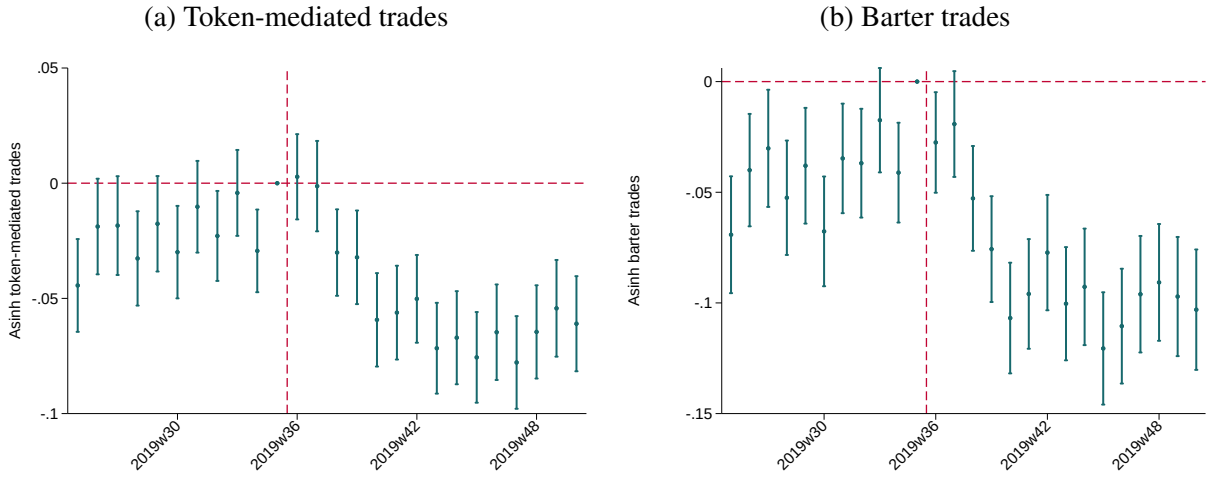
decline is unconfounded by the presence of pre-event trends.[11] This finding confirms Prediction 2.1.

Token-mediated trade persistently fell.

The dashed blue line in Figure 4 shows that before redeemability was reduced, the number of token-mediated peer-to-peer transactions, as measured by user ratings associated with a concurrent token transfer, was largely stable. However, after the announcement, it began to decline gradually, stabilizing at 32 percent lower, roughly one month after the announcement. Panel (a) of Figure 5 reports individual-level regression estimates, showing that among existing regular users,

[11] Appendix D.4 provides documentary evidence of reluctance to accept the token from the Bunz platform. One users wrote that "I don't accept BTZ anymore due to uncertainty. I believe BTZ & BUNZ will cease to exist shortly." Another wrote, "I'm paused on BTZ for now, until we get some stability." Yet another wrote, "I will only be doing TRUE TRADES from now on. I no longer believe that BTZ is a sustainable form of currency because of the lack of choices that the users have, and the fluctuating rate at which they are rewarded."

Figure 5: Effects of reduced redeemability on trade volumes, existing regular users



Notes: Figure reports coefficients from regressions of (a) asinh token-mediated trades and (b) asinh barter trades on week fixed effects, with controls for user fixed effects and months after user entry. The sample includes only existing regular users. Standard errors are clustered at user level. 95% confidence intervals are shown.

token-mediated trade eventually fell by roughly 6-8 percent. The declines are persistent and unconfounded by the presence of pre-event trends. This finding confirms Prediction 2.2.

Barter trade persistently fell.

More surprisingly, barter transactions persistently fell. The solid red line in Figure 4 shows that before the reduction in redeemability, barter transaction volume was largely stable. Immediately after the announcement, however, it began to fall, with a trend break around the date of the announcement, eventually stabilizing at 23 percent lower roughly a month later. Panel (b) of Figure 5 shows individual-level regression estimates, revealing an average longer-run decline of roughly 7-8 percent, even after controlling for user fixed effects and time since entry. This finding violates Prediction 2.3 and will be discussed below.

5.4 Robustness and Further Evidence

Alternative regression specifications reveal that the above results are highly robust. Estimates are similar both when more flexible controls for time since entry are used (see Appendix Table D1),

and when subsamples of users with different trade intensities are used (see Appendix Table D2).

Regression results for additional outcomes reveal that platform usage fell along other dimensions. First, bargaining initiation and bargaining success both declined. Appendix Figure D1 shows that in offer messages sent among all users persistently fell, by roughly 15 percent, after a short-run increase that is attributable to increased desire to spend down token holding. The estimated reduction in offer messages sent among existing regular users, however, is only roughly 11 percent, after controlling for individual fixed effects and time since entry. Appendix Figure D2 shows that aggregate trades per offer among all users declined, by roughly 12 percent.

Second, the number of new items posted in the platform persistently fell. Appendix Figure D3 shows that the overall long-run decline among all users was roughly 29 percent, but the decline in new items posted among existing regular users was only roughly 17 percent, after controlling for individual fixed effects.

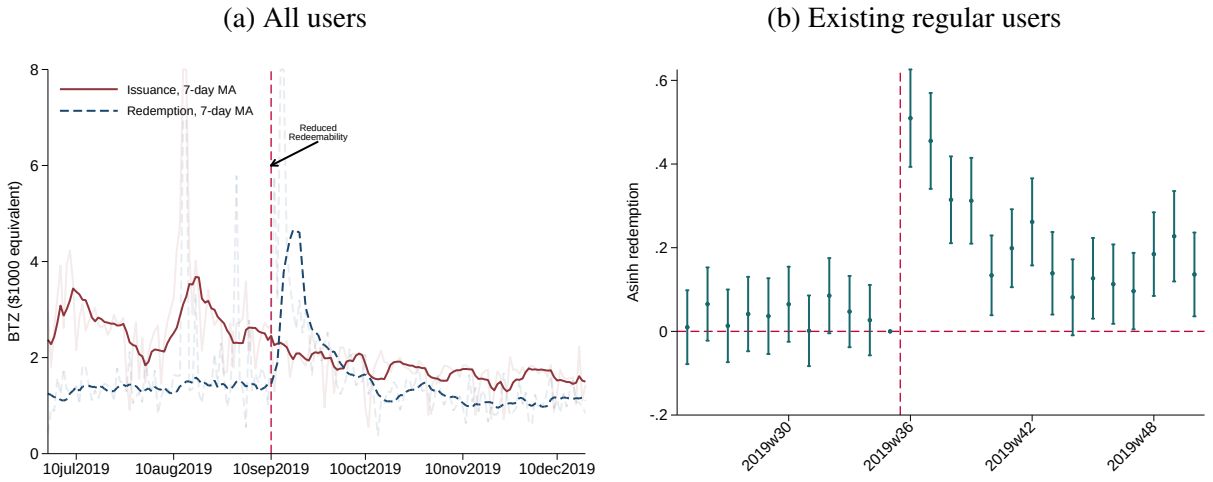
Part of the aggregate reduction in trade and platform usage is attributable to reduced entry of users onto the platform. Appendix Figure C1 shows that the average number of regular users who entered each month during the year prior to the reduction in redeemability fell by roughly two thirds thereafter. This finding is consistent with the previous finding that the aggregate reductions in token-mediated trade and barter are both larger than the corresponding individual-level reductions among existing regular users.

The estimated impacts of reduced redeemability on token redemption, supply, and velocity confirm that confidence in the token was compromised.

Figure 6 shows a spike in realized token redemptions after redeemability was reduced. The dark lines in Panel (a) display 7-day moving averages after removing unusual redemption activity. It shows that BTZ redemption immediately increased for several days, and continued to be elevated above the pre-event level for almost two weeks, before falling below the initial level. After four weeks, the overall level of token redemption stabilized at roughly 30 percent lower than the pre-event level. Meanwhile, token issuance remained constant and was largely unaffected.

Panel (b) reports regression estimates of the impacts on existing regular users. It shows that token redemption increased on average by roughly 40 percent in the first four weeks, even after controlling for user fixed effects and time since entry. Interestingly, while as previously shown

Figure 6: Effects of reduced redeemability on token redemption



Notes: Panel (a) shows the trend in BTZ issuance, defined as the total amount of tokens sent from Bunz directly to users, and the trend in BTZ redemption, defined as total amount of tokens sent from users to local stores. Panel (b) shows the trend in BTZ supply, defined as the cumulative sum of BTZ issued minus the cumulative sum of BTZ redeemed. The dark lines show the 7-day moving average, while the light lines show the daily trend. The red dashed line indicates September 10, the day of partial cessation of Shop Local program. The pre-crisis spikes in issuance and redemption reflect unusual activity by a small number of users (see text for details). In dark lines, unusual activity is removed by excluding users who received sign-up bonus and only made redemption during the spikes, excluding stores that cooperated with these users, and performing 0.1% winsorization to remove extreme values.

token redemption fell in the longer run, token redemption stabilized at roughly 16 percent higher among regular users.

The increase in redemption was not only much larger in the short term, but also much larger for more frequent users. Appendix Figure D4 plots the trend in token redemption within subgroups of users with different total trades, showing that token redemption was broadly stable prior to the reduction. However, the proportional increase was much larger for frequent users.

Appendix Figure D5 shows a short-run increase in peer-to-peer token velocity, attributable to a large number of users attempting to reduce their token balances. A month after the redemption reduction, however, token velocity fell to a steady-state level that was lower than the initial level.

Despite the spike in redemption, there was only a small reduction in the token supply. Appendix Figure D6 show that token issuance exceeded redemption, so token supply was steadily increasing before redeemability was reduced. Token redemption spiked immediately thereafter, while token issuance remained similar, so token supply fell. The magnitude of the spike was small relative to the total token supply. Before the redemption run, token supply peaked at 130.5 million BTZ,

while token supply bottomed out at 127.5 million BTZ after the run. In other words, the restriction of token redemption to small-value and perishable items at coffee shops and restaurants made redemption highly frictional and succeeded in preventing a larger reduction in token supply.

5.5 Discussion

The evidence above shows that reduced redeemability persistently reduced token acceptance, and persistently both token-mediated and barter trade, as well as token velocity. The findings confirm Predictions 2.1 and 2.2, but reject Prediction 2.3. The evidence reveals the presence of several theoretically interesting mechanisms that will now be discussed.

Partial acceptability. The first theoretically interesting finding is that token acceptance was partial in the Bunz economy. Even at the height of BTZ token usage, only roughly a third of Bunz users accepted tokens. This finding is important, since recent search-theoretic literature largely takes money acceptance for granted. For instance, in the workhorse Lagos-Wright (2005) framework and many of its variants, there are only equilibria where agents either all accept or all do not, so partial acceptability does not arise. Kiyotaki and Wright (1993) derive an equilibrium with partial acceptance, but Wright (1999) shows that this equilibrium is not robust to perturbations. To my knowledge, the only work to seriously model partial acceptability is Shevchenko and Wright (2004), who show that partial acceptability can robustly arise when individual-level heterogeneity is incorporated into the Kiyotaki-Wright (1993) model.

Importance of redeemability. The second theoretically interesting finding is that changes in redeemability had significant impacts on the degree of acceptability. This result is notable since recent search-theoretic literature largely ignores the possibility that redeemability affects money acceptability. Existing models typically focus on *fiat* or *commodity* money rather than *redeemable* money.[12] Yet the evidence and framework provided in this paper show that redeemability may be

[12]Here, I define *fiat money* as an intrinsically valueless medium of exchange, *commodity money* as a medium of exchange that can be used directly for consumption or production, and *redeemable money* as an intrinsically valueless medium of exchange that can be exchanged into a valued good from a trusted party. In the New Monetarist literature, most canonical models focus on fiat money, including Kiyotaki and Wright (1993); Trejos and Wright (1995); Shi (1995, 1997); Lagos and Wright (2005). Commodity money is studied in Kiyotaki and Wright (1989) and Bur-

necessary for encouraging money acceptance and circulation. This result corroborates historical evidence that currencies emerged from redemption promises (Wray 2004; Graeber 2011), revealing a need for theoretical work that further explores the roles of redeemability and partial acceptability in currency systems.

Endogenous redemption dynamics. The third theoretically interesting finding is that reduced redeemability not only reduced acceptance, but also triggered a redemption-run that reduced total money supply. Moreover, it was found that redemption increases were especially large among frequent users. Yet, to my knowledge, few existing search-theoretic models explicitly consider how redemption-run dynamics affects money holdings and thereby influence the function of money as a medium of exchange. The findings from Bunz thus suggest a need to study the impact of redemption-run dynamics—as well as policies that shape redemption-run dynamics, such as redemption frictions—on the long-run performance of currency systems.

Trust and reputational enforcement. The final and perhaps most important finding from the data is that barter persistently declined in response to reduced redeemability. This finding not only contradicts Prediction 2.3, but also is difficult to reconcile more broadly with models that purely feature search frictions, since they generally predict that users should substitute from token-mediated exchange towards barter exchange when token-mediated trade is hampered. Why then did barter decline? As widely reported in local news, users were angry that the platform reneged on its promise of redemption.[13] Some announced that they would depart from the platform. Many Bunz Facebook administrators also announced that they would sever their affiliation with Bunz.[14] Users therefore may have punished the platform's breach of trust by leaving it or tarnishing its

dett, Trejos and Wright (2001). Townsend and Wallace (1987) and Kiyotaki and Moore (2002) provide models of redeemable money in a Walrasian setting. Berentsen, Camera and Waller (2007) study circulating demand deposits issued by banks in a framework with search frictions.

[13]One article emphasized the disappointment of users, some of whom had been saving up their BTZ for bike repairs, records and other large purchases. For example, an administrator for several Bunz-related Facebook groups was to quoted to say that the announcement "felt like a punch in the gut," since she had amassed roughly $600 worth of BTZ, and treated her stockpile as a sort of safety net, in case she ran out of money and needed to buy something for her two-year-old son, but 'Now, it's worthless,' She said. 'He doesn't drink coffee"' (Posadzki 2019).

[14]As shown in Appendix D.3, this group renamed their Facebook groups as "PALZ", writing, "Today, we would like to reclaim our communities. We would like to bring Bunz back to what it once was. We want our groups to remember why they exist. We do not want to profit. We do not want your app sign-ups. We do not want you to buy into an online currency that will let you down."

reputation, thereby reducing new entry, as well as its rents from seigniorage and advertising sales.[15]

These findings support institutionalist views that emphasize the presence of social contracts involving credit originators in the proper governance of monetary systems (Graeber 2011; Schnabel and Shin 2018; Borio 2019; Gorton and Zhang 2023). They also highlight the relevance of theoretical models in which redeemable currency issuers are disciplined by the threat of reputational damage (e.g., Kehoe and Levine 1993; Gu et al. 2013*a*,*b*). Importantly, the evidence reveals that reputational enforcement in the Bunz economy did not simply operate in the background to prevent moral hazard; it significantly reduced trade by eliciting retaliatory behavior during a currency crisis, leading to wider economic disruption. In other words, social contracts not only facilitated trade in good times, but also amplified the real costs of a currency crisis.

6 Effects of Redemption Halt

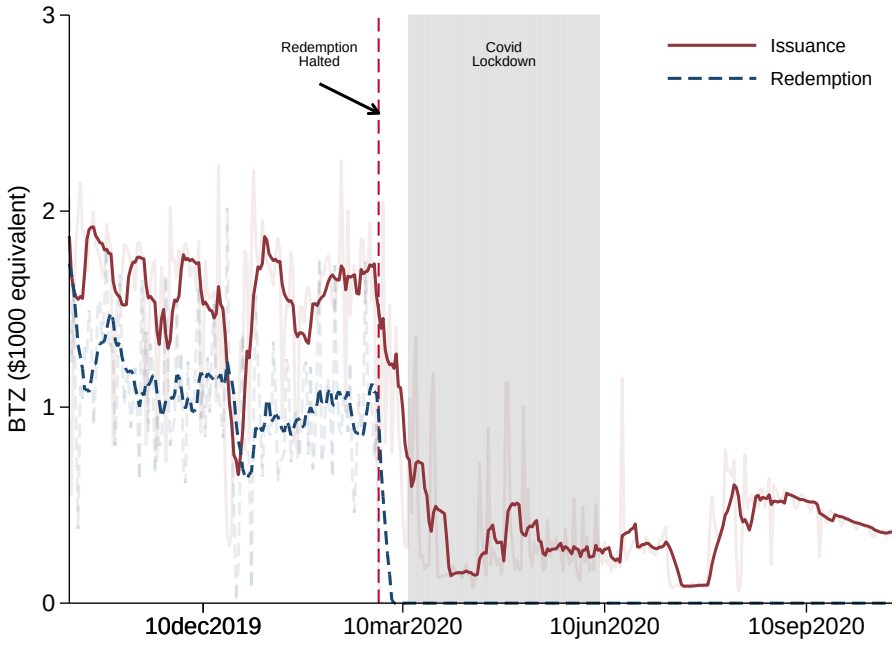
This section provides a second test of Predictions 2.1-2.3 by estimating the effects of the final halt of redemption by Bunz HQ on trade. Consistent with theory, I find an immediate reduction in token acceptance, and a more gradual reduction in token-mediated trade volume. After the Covid lockdown, a full recovery of barter was found, suggesting that unlike the first reduction in redeemability, the long-term damage was limited to token-mediated trade.

6.1 Timeline of Events

The final halt in the redemption was caused by continued cash flow difficulties. Even with its scaled-down Shop Local program, Bunz HQ suffered cash outlays from token redemption. Having laid off almost all of its employees, Bunz's CEO departed from the company and only one employee, the Bunz community manager, remained. Management was transferred to one of the company's investors, who continued to operate the app by selling in-app digital advertising.

[15] To rationalize this finding formally, suppose that the platform earns rents from transactions. Further suppose that agents trust the platform to honor its redemption promise, but become aggrieved if redeemability is reduced, and so they either exit the platform or tarnish the platform's reputation in retaliation to the breach of trust. A reduction in ρ would then result in a persistent reduction in barter trade volume, as observed. This mechanism can be formalized using a behavioral assumption following Hart and Moore (2008). It can also be micro-founded as a repeated "trust" game between the platform and the agents, where bad behavior by the platform triggers agents to "punish" the platform (a la Kreps 1990).

Figure 7: Token issuance and redemption, before and after redemption halt



Notes: Figure shows the trend in BTZ issuance, defined as the total amount of tokens sent from Bunz directly to users, and BTZ redemption, defined as the total amount of tokens sent from users to local stores. The dark lines show the 7-day moving average, while the light lines show the daily trend. The red dashed line indicates February 28, the day of full cessation of Shop Local program.

The pause to the Shop Local program was announced on February 28, 2020. Unlike the partial reduction in redeemability, the platform said that the complete halt in redemption was due to technical difficulties and would be "temporary." During this time, the platform would address "the gaming of BTZ rewards" by "implementing additional checks and controls, which [they] will communicate out once those controls are in place" (see Appendix E.1). This wording was likely carefully chosen to avoid the backlash and bad publicity when Bunz HQ partially halted redemption. The Shop Local program was never restarted thereafter.

Figure 7 confirms that after the redemption halt, token redemption immediately and persistently dropped to zero. Token issuance also dropped immediately, indicating that users were much less likely to answer the "Daily BTZ Drop" surveys or take other actions on the platforms that were rewarded users with tokens. Appendix Figure C5 shows that there was no detectable change in

token prices even after redemption was halted.

6.2 Empirical Strategy

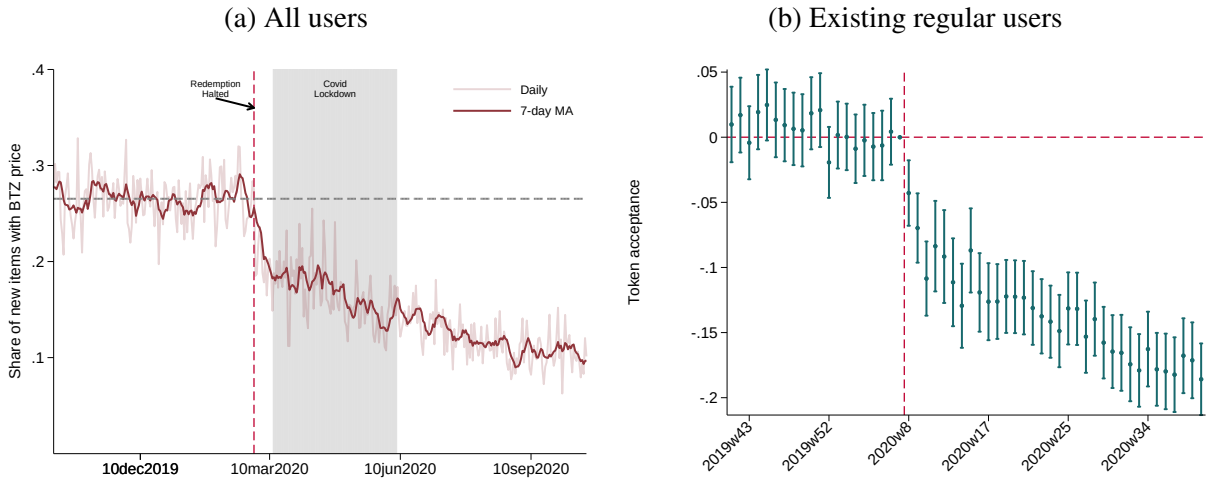
Measurement of the long-term impact of the end of redemption on trade is complicated by the arrival of the Covid-19 pandemic two weeks later. On March 12, Ontario Premier Doug Ford announced that publicly funded schools across the province will be closed for two weeks following March break. Prior to that date, public transit usage in Toronto had not deviated from normal levels. Immediately after, public transit usage began to fall and reached 60% below baseline within five days (TTC Board 2020). On March 17, Ford declared a state of emergency in Ontario and orders business including daycares, bars and restaurants, theaters and private schools to be closed. In late April, Covid-related deaths peaked. In mid-May, relaxation of stringent social distancing rules and business closures gradually began (Nielsen 2020).

Because of the above, the effect of redemption halt cannot be separated from the effects of the Covid-19 pandemic except in the first two weeks. Following previous sections, aggregate trends for all users are first examined. Then, I estimate the effects of the redemption halt on existing regular users using an interrupted time series design. Specifically I construct a weekly panel of regular users, spanning the 20 weeks before the event until 34 weeks after, but excluding users who enter after the halt, and regress:

$$y_{it} = \sum_{k=-20}^{34} \beta_k I_{t-t^*=k} + \delta_i + \varepsilon_{it}, \tag{3}$$

where y_{it} indicate user-level outcomes, $I_{t-t^*=k}$ are dummies indicating each week relative to when redeemability was halted, δ_i are user fixed effects, and ε_{it} is an error term. Standard errors are clustered at the user level. As before, there were no contemporaneous changes in platform design that may confound the estimates. However, since these estimates are contaminated by the impact of Covid-19, the estimates below should be viewed as descriptive rather than causal.

Figure 8: Effects of redemption halt on token acceptance



Notes: Panel (a) shows the the share of new items with a posted BTZ price. The dark lines show the 7-day moving average, while the light lines show the daily trend. The red dashed line indicates February 28, the day of full cessation of Shop Local program. Panel (b) reports coefficients from regressions of token acceptance on week fixed effects, with controls for user fixed effects and months after user entry. The sample includes only existing regular users. Standard errors are clustered at user level. 95% confidence intervals are shown.

6.3 Results

Token acceptance immediately fell.

Figure 8 Panel (a) shows that token acceptance immediately fell after redeemability was halted. The share of new items with a posted BTZ price hovered around 26 percent during the two months before the halt. After the halt, the share immediately plunged to roughly 17 percent. Importantly, this reduction occurred *before* the onset of Covid-19, so it is attributable to the redemption halt. Thereafter, the share continued to slowly slide downward without any interruption from Covid-19. By the end of 2020, only about 10 percent of item posts had a BTZ price.[16]

Panel (b) shows that token acceptance among existing frequent users fell immediately, by roughly 10 p.p., conditional on posting items, even after controlling for user fixed effects and time since entry. There was not only a complete absence of pre-event trends and a sharp drop in token acceptance, but token acceptance among existing users did not recover, and the decline then deepened over time. This result is robust to flexible controls for time since user entry, and is

[16] As of June 2021, it was exceedingly rare for items to still be posted with a BTZ price. Once while using the app, I encountered a user who was willing to accept BTZ in exchange for a used book. But upon further inquiry, I learned that this was because he had hoped to give the item to someone who could use it, since "BTZ right now has $0 value."

similar for users with different levels of activity intensity (see Appendix Table E1). The finding is consistent with Prediction 2.1.

Token-mediated trades fell in the long run.

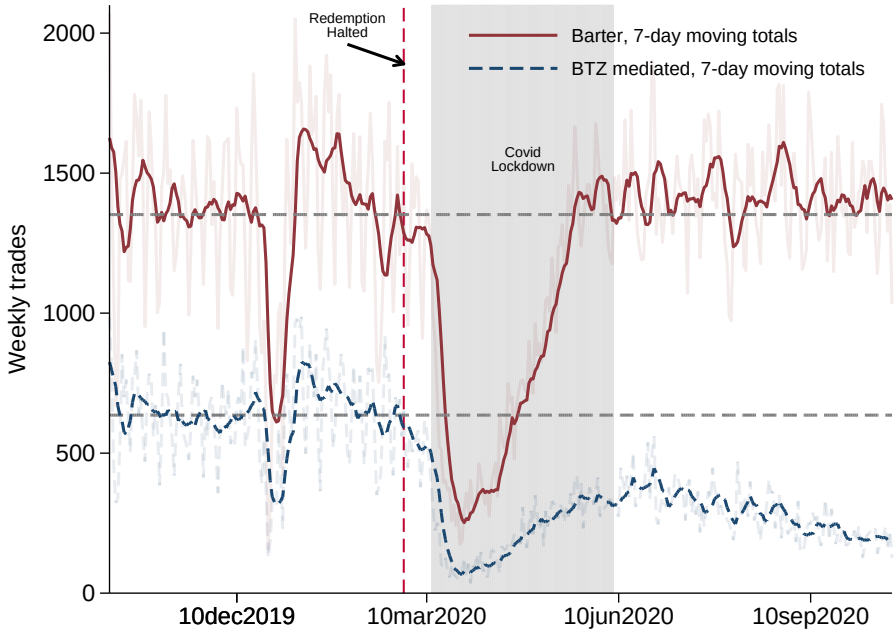
The dashed blue line in Figure 9 shows a slight decline in token-mediated trades in the weeks following the redemption halt. This gradual decline was interrupted by the arrival of the Covid pandemic, which led trades to dramatically fall, to less than one fifth of the pre-halt level. As the Covid lockdown eased over the next few months, however, token-mediated trades substantially recovered, reaching in June roughly two-thirds of the level prior to the redemption halt. However, token-mediated trades soon began to decline again. By the end of 2020, it was only one-third of the pre-halt level. Panel (a) in Figure 10 suggests that the estimated long-run reduction in token-mediated trades among existing regular users is highly significant, even after controlling for individual fixed effects and time since entry. Although a strict causal interpretation of these estimates is not possible, the estimates clearly indicate that token-mediated trade never fully recovered. Correspondingly, Appendix Figure E1 shows that token velocity declined and did not fully recover. These findings are consistent with Prediction 2.2.

Barter trade was unchanged in the long run.

Unlike the first reduction in redeemability, this time barter trade did not persistently fall. The solid red line in Figure 9 shows that, after Covid restrictions lifted in May 2020, barter trades returned to the same level prior to the full halting of redemption. It then remained highly stable at that level. Figure 10 Panel (b) reports regression coefficients, showing that for a period many months after the end of the Covid lockdown, the effects of the redemption halt on existing regular users are statistically indistinguishable from zero. This finding is consistent with Prediction 2.3.

Other measures of platform usage also substantially recovered after the end of the Covid lockdown. Appendix Figure E2 shows that offer messages sent substantially recovered, though not fully. By contrast, Appendix Figure E3 shows that trades per offer fully recovered. Appendix Figure E4 shows that the total number of new items posted among all users also fully recovered, but some persistent decline is found among existing regular users, after controlling for user fixed

Figure 9: Effects of redemption halt on trade volumes, all users



Notes: Figure shows the daily trend in the number of peer-to-peer trades as measured by user reviews, decomposed by whether a token transfer occurred between the same user pair within 7 days. Gray bars indicate the period within covid lockdown. The dark lines show the 7-day moving average, while the light lines show the daily trend. The red dashed line indicates February 28, the day of full cessation of Shop Local program.

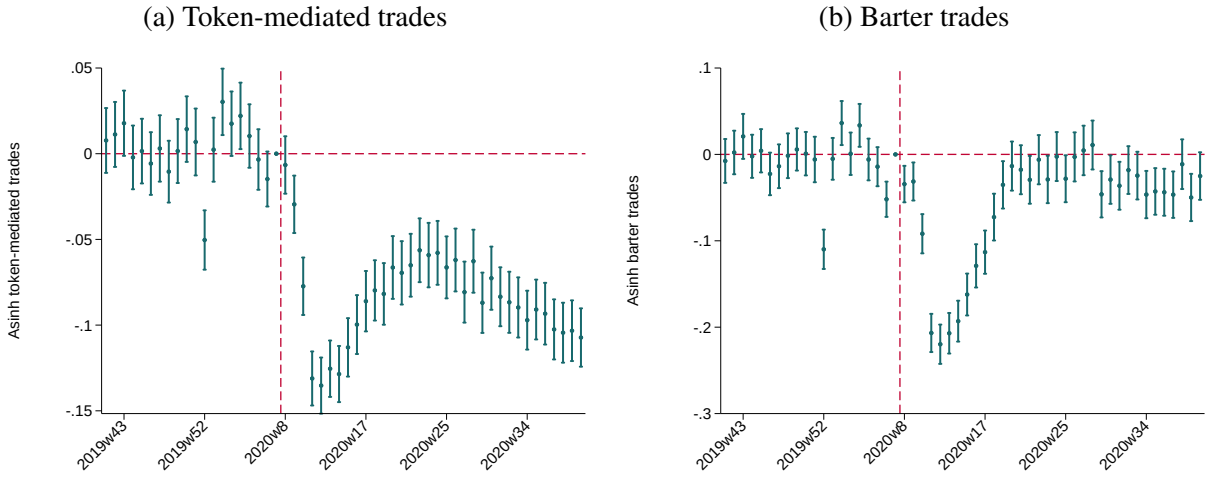
effects and time since entry.

6.4 Discussion

The evidence above shows that the redemption halt reduced token acceptance and token-mediated trade, but left the volume of barter unchanged in the long run. These findings validate Predictions 2.1-2.3. However, two empirical puzzles demand further discussion, as they reveal potential roles for adaptive learning and public relations management in currency systems.

Adaptive learning. After redemption stopped, BTZ was accepted at a significantly *lower* rate. This finding is consistent with the idea that unbacked fiat money functions less well than redeemable money as a medium of exchange. However, it is perhaps puzzling that even though BTZ acceptance immediately fell, it continued to be partially accepted. Moreover, token accep-

Figure 10: Effects of redemption halt on trade volumes, existing regular users



Notes: Figure reports coefficients from regressions of (a) asinh token-mediated trade and (b) asinh barter trade on week fixed effects, with controls for user fixed effects and months after user entry. The sample includes only existing regular users. Standard errors are clustered at user level. 95% confidence intervals are shown.

tance very gradually fell thereafter, suggesting slow learning and expectations dynamics that are absent in existing models. This finding differs from the conceptual framework, where agents either all accept money or all do not. However, it corroborates laboratory results showing that currencies that were once functional can continue to circulate after becoming unbacked fiat (Duffy and Ochs 2002). It is also consistent with historical case studies, which show that the Swiss dinar in Iraq (Foote et al. 2004; King 2004) and the Somali shilling (Luther 2015; Luther and White 2016) continued to circulate after it was no longer backed. The finding provides suggestive validation for the presence of adaptive learning, as formally proposed by Selgin (2003), wherein money acceptance choices that agents select reflect static expectations concerning other agents' preferred strategies.

Public relations management. Section 5 showed that the initial reduction in redeemability persistently lowered barter volumes. It is therefore puzzling that unlike the first reduction, the final reduction in redeemability caused no detectable long-term damage to barter on the platform. A plausible explanation for this difference is that whoever lost trust in the platform had already left. The users that were left in the platform were mostly the ones who wanted to use it for bartering purposes and did not care about redeeming them. Another is that, as explained above, this time the

platform said that the halt was due to technical problems and promised that it would be temporary, so users did not interpret the halt as a breach of trust. Consistent with the latter hypothesis, the redemption halt received much less public attention and was not reported in any local news media, indicating that users generally did not feel aggrieved. As a result, much less reputational damage was done, and user entry was less severely impacted (see Appendix Figure C2). This finding suggests that public relations management may mitigate the severity of reputational enforcement of redemption promises, and may thus be a tool for limiting the negative impact of currency crises.

7 Conclusion

The literature on the micro-foundations of money has made significant strides by simulating money and barter in theoretical models and in controlled laboratories. Yet, critics have long contended that the formal economic approach to money and barter suffers from a lack of grounding in real-world evidence. This paper uses newly obtained field data on money and barter to build a stronger bridge between theory and evidence. A simple search-theoretic model of redeemable money was constructed to generate qualitative predictions. The predictions were then tested by combining unusually detailed high-frequency barter transaction data with three unexpected monetary natural experiments. As predicted, an unexpected five-fold increase in money supply was found to have persistently increased trade. Sudden and unanticipated reductions in money redemption were also found to have sharply reduced money acceptance and trade.

The findings highlight how private currencies are disciplined by trust and reputational enforcement, but this same mechanism can amplify the real costs of crises when trust is broken. First, the empirical findings support the basic idea that money overcomes the inefficiencies of barter. Second, they confirm the importance of redeemability for money circulation. Third, they reveal how aggrievement can amplify economic damage during currency crises, when redemption promises are broken. Finally, they highlight the empirical relevance of partial acceptability, endogenous redemption dynamics, reputational enforcement, and adaptive learning. In providing a case study with uniquely detailed data, this work closes the evidence-theory gap and illustrates how the search-theoretic lens can be used to understand the behavior of real-world currencies.

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Online Appendix

A Model Details

Each agent either holds one unit of money or nnone. Agents choose whether to accept various commodities and money in order to maximize their expected discounted utility from consumption, taking as given the strategies of others. The Bellman equations are as follows:

$$rV_1 = \alpha xy(u-c) + \alpha x(1-y)(1-M)\pi(u+V_0-V_1) + \rho(u+V_0-V_1) \quad (4)$$

$$rV_0 = \alpha xy(u-c) + \alpha x(1-y)\pi M(V_1-V_0-c) + \sigma(V_1-V_0) \quad (5)$$

where V_1 is the value of holding one unit of money while V_0 is the value of not holding money. The first term in the two equations denotes the utility flow from barter, the second that from monetized exchange, and the final that from money redemption or issuance. Appendix Figure A1 provides a graphical illustration of the state transitions.

The variables are defined as follows: $u > c$ is consumption utility, $c > 0$ is production cost, $x \in (0,1)$ is the probability that an agent is able to consume the other agent's product, and xy is the probability that the pair has "double coincidence of wants", so they are able to consume each other's commodity, with $y \in (0,1)$. $M \in [0,1]$ the fraction of agents endowed with money. ρ denotes the rate of arrival of redemption opportunities. The rate of money issuance to agents without money is thus $\sigma = \frac{M}{1-M}\rho$. This assumption that money supply is held constant roughly matches the empirical setting, where token supply was largely stable except for two short periods of monetary expansion. Agents discount utility with time preference $r > 0$.

To rule out the unrealistic possibility that agents without money to prefer to wait for money issuance rather than accept money, we assume that $M < \overline{M} \equiv 1 - c/u$. This possibility arises because agents can accumulate at most one unit of money, so only those without money can receive a helicopter drop. Accepting money therefore comes at the potential opportunity cost of receiving money for free. This opportunity cost is especially large when a large share of agents hold money,

so M must be bounded from above.

Proof of Proposition 1

Denote π_0 as the probability of agents accepting money in exchange for commodity and π_1 as the probability of agents willing to pay money for commodity. It follows that $\pi = \pi_0\pi_1$. Let $\Delta_0 = V_1 - V_0 - c$ and $\Delta_1 = u + V_0 - V_1$. It follows that:

$$\pi_j = \begin{cases} 1 \\ \in [0,1] \\ 0 \end{cases} \iff \Delta_j \begin{cases} > 0 \\ = 0 \\ < 0, \end{cases} \tag{6}$$

where

$$\Delta_0 = \frac{\alpha x(1-y)(1-M)\pi(u-c) + \rho(u-c) - (r+\sigma)c}{r+\rho+\sigma+\alpha x(1-y)\pi}, \tag{7}$$

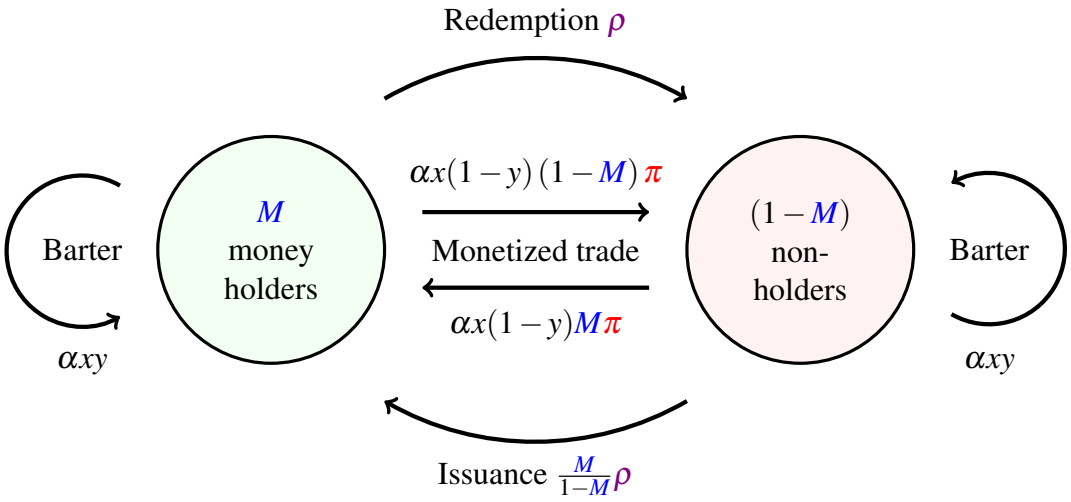
$$\Delta_1 = \frac{(r+\sigma+\alpha x(1-y)M\pi)(u-c) + (r+\sigma)c}{r+\rho+\sigma+\alpha x(1-y)\pi}. \tag{8}$$

It is always the case that $\Delta_1 > 0$. Let $\overline{\rho} = \frac{rc(1-M)}{u(1-M)-c}$ and $\underline{\rho} = \frac{rc(1-M)-\alpha x(1-y)(1-M)^2(u-c)}{u(1-M)-c}$. It is easy to check that $\overline{\rho} > \underline{\rho}$ and $\overline{\rho} > 0$. If $\rho > \overline{\rho}$, then $\Delta_0 > 0$ regardless of π. If $\rho < \underline{\rho}$, then $\Delta_0 < 0$ regardless of π.

Proof of Predictions 1 and 2

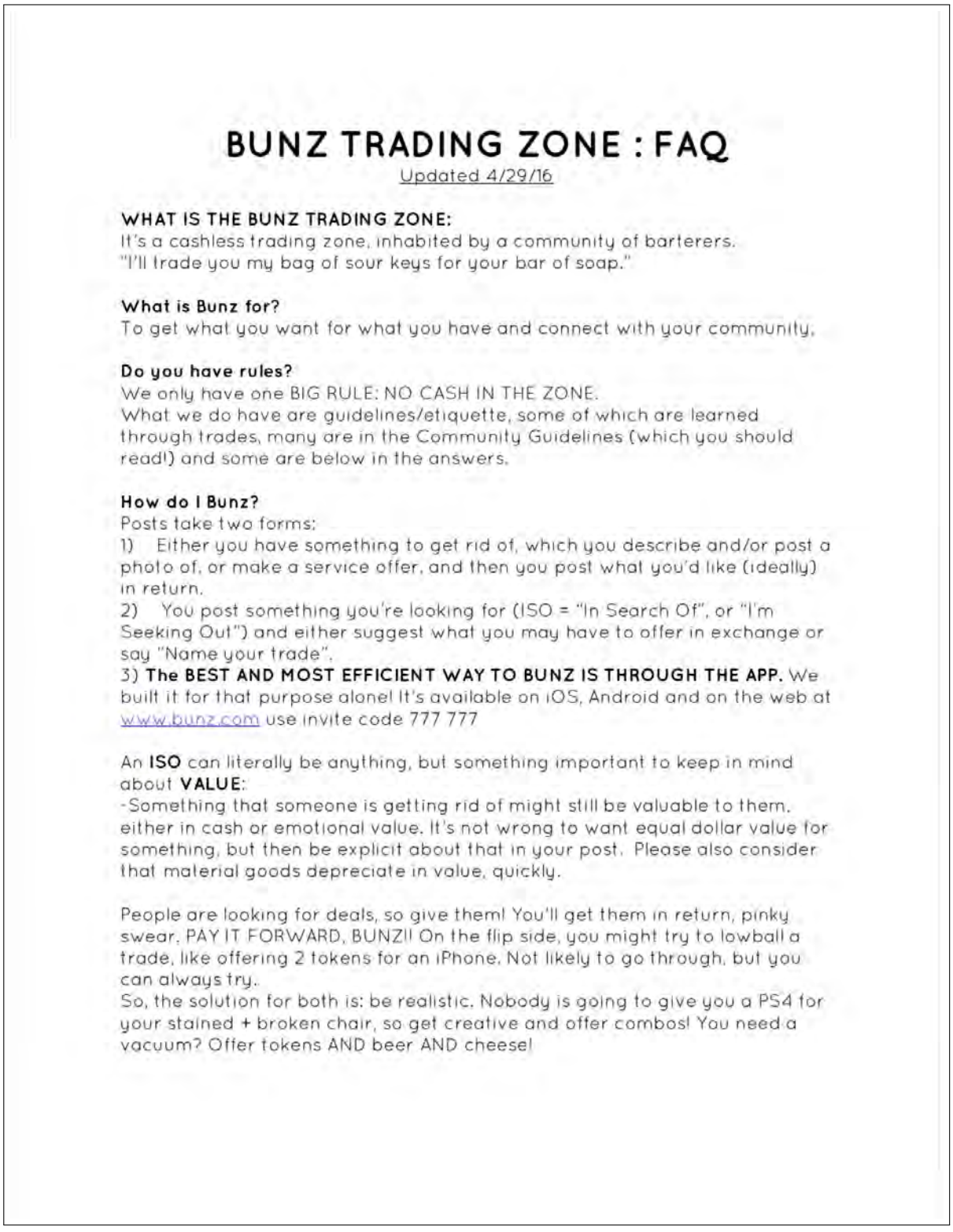
Peer-to-peer barter trade volume is given by $T_B = \frac{1}{2}\alpha xy$, while peer-to-peer monetized trade volume is given by $T_M = (1-M)M\alpha x(1-y)\pi$. Total peer-to-peer trade volume is $T = T_B + T_M$. Prediction 1 follows from assuming that $\rho > \overline{\rho}$ and $M < \min\{\overline{M}, \frac{1}{2}\}$. Prediction 2 follows from assuming that $M \in (0, \overline{M})$.

Figure A1: Illustration of state transitions in conceptual framework



B Descriptive Evidence

B.1 Bunz FAQ (April 6, 2016)



BUNZ TRADING ZONE : FAQ

Updated 4/29/16

WHAT IS THE BUNZ TRADING ZONE:
It's a cashless trading zone, inhabited by a community of barterers.
"I'll trade you my bag of sour keys for your bar of soap."

What is Bunz for?
To get what you want for what you have and connect with your community.

Do you have rules?
We only have one BIG RULE: NO CASH IN THE ZONE.
What we do have are guidelines/etiquette, some of which are learned through trades, many are in the Community Guidelines (which you should read!) and some are below in the answers.

How do I Bunz?
Posts take two forms:
1) Either you have something to get rid of, which you describe and/or post a photo of, or make a service offer, and then you post what you'd like (ideally) in return.
2) You post something you're looking for (ISO = "In Search Of", or "I'm Seeking Out") and either suggest what you may have to offer in exchange or say "Name your trade".
3) **The BEST AND MOST EFFICIENT WAY TO BUNZ IS THROUGH THE APP.** We built it for that purpose alone! It's available on iOS, Android and on the web at www.bunz.com use invite code 777 777

An **ISO** can literally be anything, but something important to keep in mind about **VALUE**:
-Something that someone is getting rid of might still be valuable to them, either in cash or emotional value. It's not wrong to want equal dollar value for something, but then be explicit about that in your post. Please also consider that material goods depreciate in value, quickly.

People are looking for deals, so give them! You'll get them in return, pinky swear. PAY IT FORWARD, BUNZ!! On the flip side, you might try to lowball a trade, like offering 2 tokens for an iPhone. Not likely to go through, but you can always try.
So, the solution for both is: be realistic. Nobody is going to give you a PS4 for your stained + broken chair, so get creative and offer combos! You need a vacuum? Offer tokens AND beer AND cheese!

Either way, we really like a concept floated by our community called **#TRUETRADES:**

The #truetrades principle is simple: it's when the person looking to get rid of something is willing to take something you already have around (as opposed to buying things just to trade with) - on principal of paying things forward and being a good bun. You'll sometimes see posts tagged this way, and that's what it means.

Where can I trade?
As long as you and the other person agree on a place, you can trade anywhere in the city. Many Bunz will include the neighbourhoods they live / work in somewhere in their posts so that others get a sense of how far they will be traveling for the exchange. If you do set up a trade with someone on the other side of town, we recommend picking a midway point that works for both of you. TTC Stations are a great, safe place to meet.
Many people are more than happy to do trades from their homes, but for those who may not be comfortable giving out their address, we have been partnering up with local coffee shops and bars around Toronto to create actual Bunz Trading Zones! These places are all run by Bunz and will have your back! There's 7 now but there will be dozens by the fall, stay tuned as our listings grow, and check out the Bunz blog for featured zones:

What are common trade 'currencies', if we can't use cash?
The most common currencies in the zone is booze, TTC tokens, houseplants and consumables.

What's a consumable?
Things you consume - food mostly, but may include things like toiletries.

I lost my bike or pet! Can I post it here?
Sure. But if you get it back, please update the thread and celebrate your reunion with the group.

Someone broke my heart! Can I post ISO good vibes and pictures of cats?
No, please don't. It clogs up the feed and there's Bunz Helping Zone for things like that.

A bun flaked on me like a day-old croissant! I want to yell about it!
Well, the trading zone isn't the best place for that. It happens. People forget, things come up, people miscommunicate, etc.

It helps to BE FIRM with times and places and make sure you're on the same page. It happens to everyone, and it's rarely malicious flakey-ness. In the app, we have the 'review' feature which helps keeps people accountable to each other.

Hey, where'd my post go?
Probably deleted because it didn't have a place in the zone. Please read the Community Standards document to see where you may have gone wrong. Maybe explore the BUNZ MULTIVERSE and you can find a better home for your post.

Is there a list of groups in the BUNZ MULTIVERSE?
YEP: HERE! There are also many 'secret' groups which you can learn about by just engaging with the community - there's a zone for everything!

Can I make a new Bunz group for whatever I want?
Short answer: We kindly ask you **not to.** There's over 100 Bunz groups, and chances are that one exists for what you want - ask about it in BTZ, or in Helping Zone. If you think a niche or geographic area is being underserved, please message an admin!

How can I make my BunzLyfe EVEN BETTER?
Get social with us!! Come to events, meet-ups and trade parties. Follow us on Twitter @bunztradingzone / Instagram @bunztradingzone / Snapchat @bunztradingzone

Bottom line: trade culture is fun, exciting and addictive. Be the best Bunz you can be! Trade right, and your life will improve, 100% guaranteed.

B.2 Screenshots of the Bunz Mobile App

Figure B1: App interface before introduction of BTZ

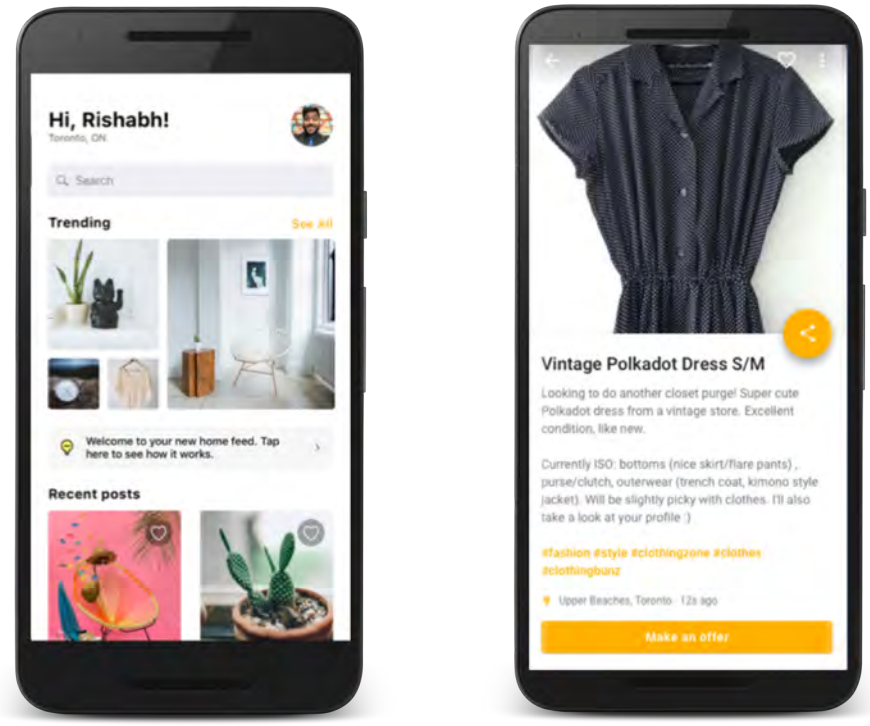


Figure is from an official blog post by Bunz, published on September 1, 2017, before BTZ introduction, available at https://blog.bunz.com/back-to-bunz-basics-dbcef3810c8e.

Figure B2: App interface after introduction of BTZ

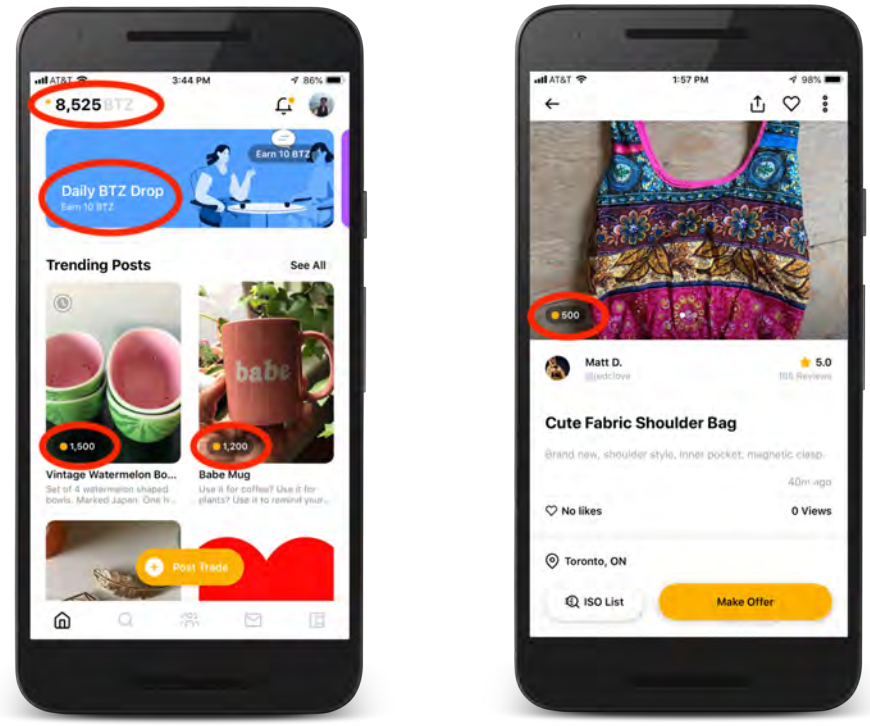
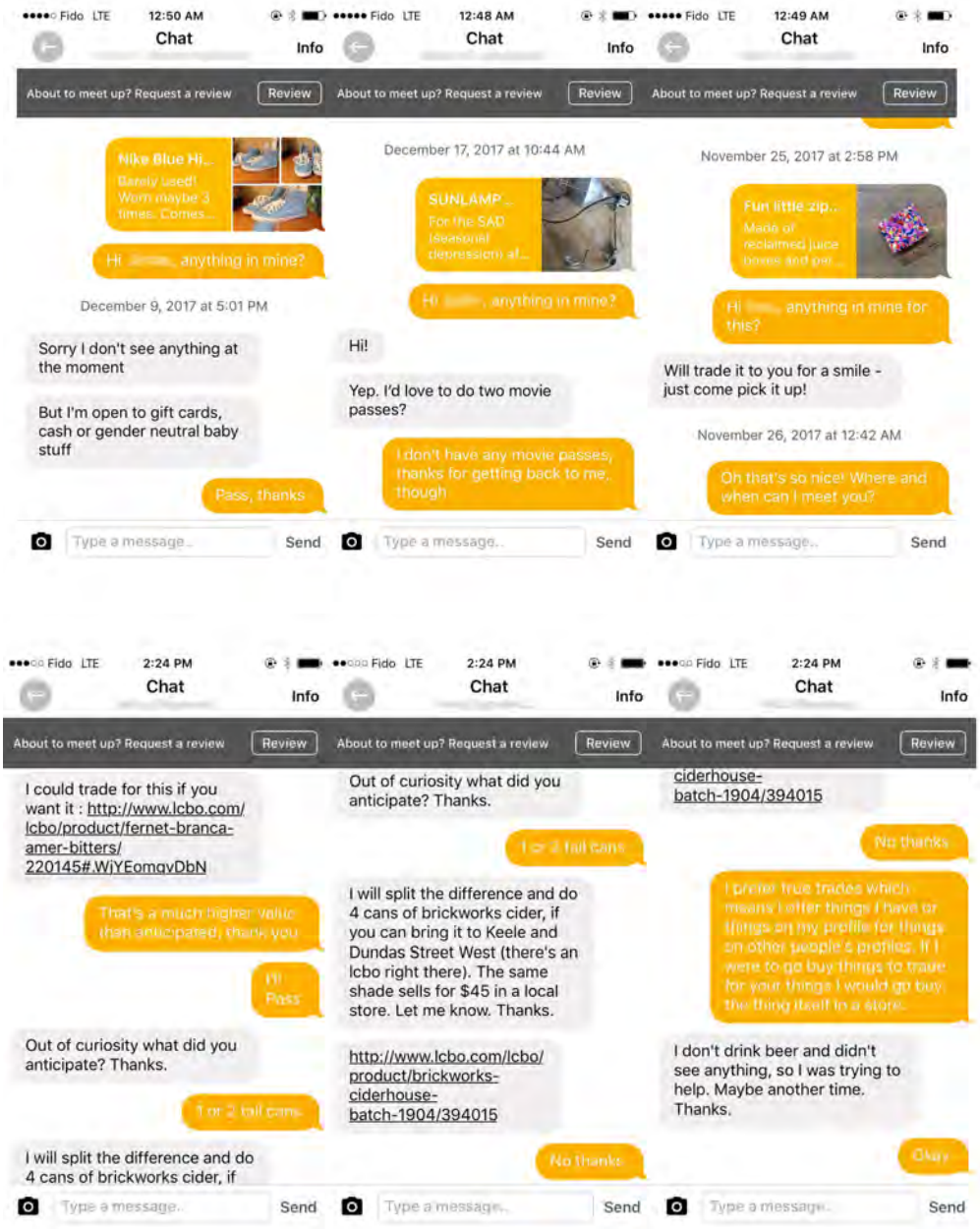


Figure is taken by the author on June 18, 2019, after BTZ introduction, with red circles added. These images are taken from a blog post from Bunz. More information about the app's early days is available at: https://rishabh.ca/work/bunz

Figure B3: Examples of in-app message exchanges



Examples of in-app interactions are from a weekly local free newspaper providing tips for Bunz traders, published on December 28, 2017 (Kaur 2017).

Figure B4: Illustration of token and goods flow in the Bunz economy

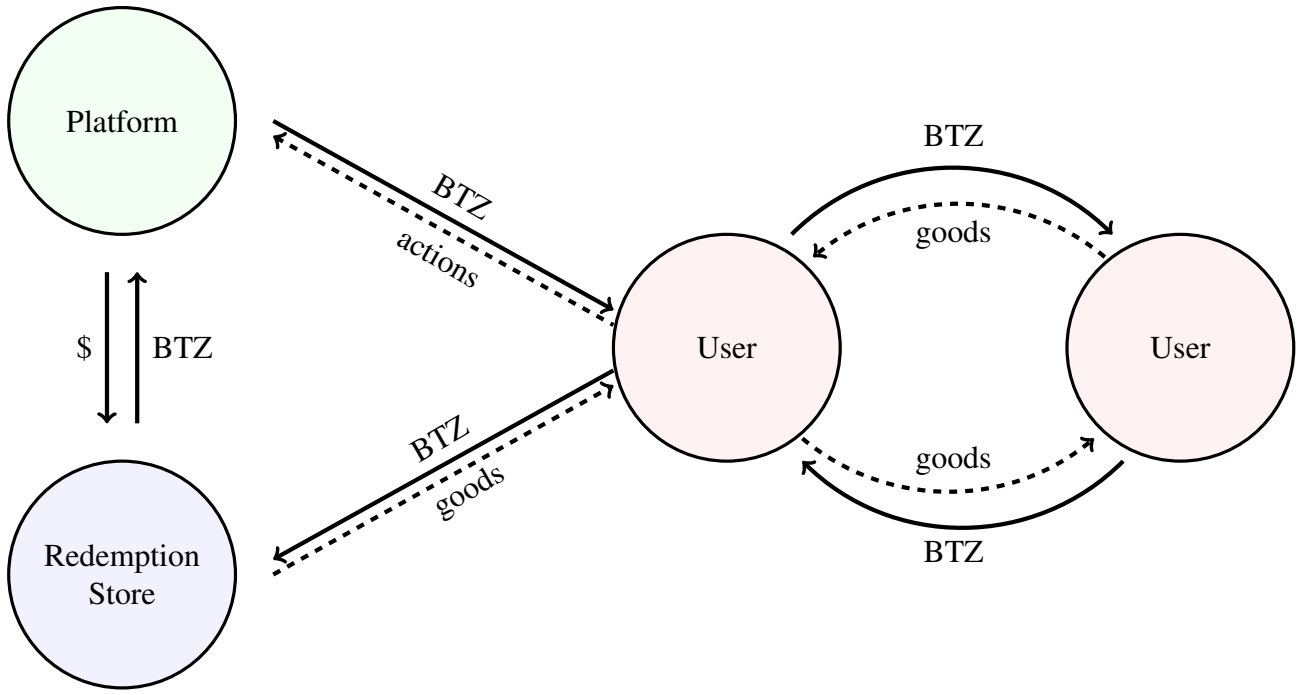
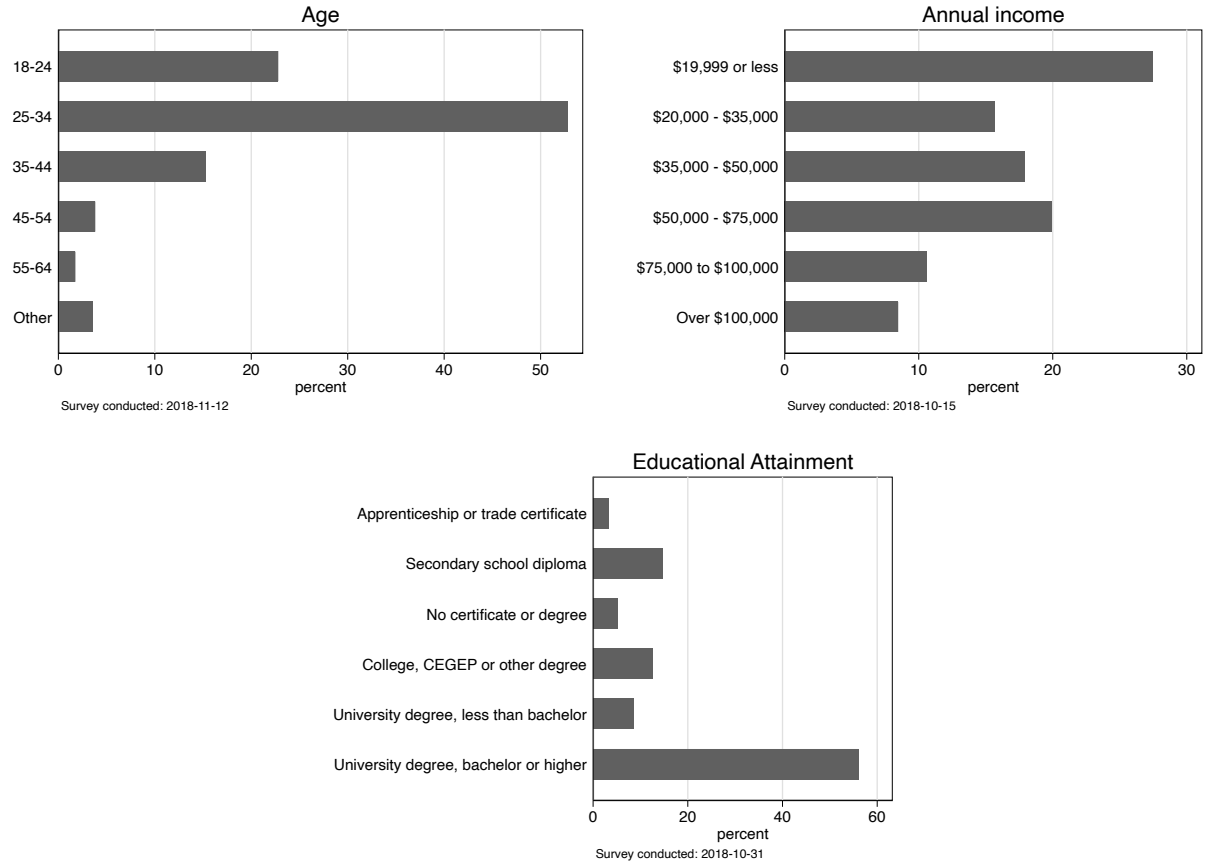


Figure B5: User demographics: Survey responses



Source: User response from BTZ drop survey.

Table B1: Summary statistics, item posted, by category

Category	Items	Share with	BTZ price (CAD)		
	(% of total)	BTZ price	p10	p50	p90
Clothing (uncategorized)	11.0%	38.8%	3	10	40
Jewelry	9.9%	37.1%	2	9	40
Home	9.5%	33.3%	2	10	40
Women's clothing	9.4%	39.7%	4	10	40
Grocery	5.7%	33.2%	1.5	6.5	25
Beauty	4.2%	39.1%	2	9.5	32
Electronics	3.4%	34.7%	2	11	85
Books	3.3%	31.0%	1.5	5	20
Health	3.3%	35.8%	1.5	6	25
Footwear	3.0%	36.3%	4.5	15	60
Toys and baby	2.4%	36.7%	2	8.5	30
Art/handmade	2.1%	37.4%	2	10	50
Plants	1.9%	37.6%	2.5	8	25
Music	1.3%	34.6%	2	10	50
Men's clothing	0.8%	38.6%	4	15	60
Movies	0.6%	35.2%	1	5	25
Gift cards	0.6%	21.9%	7.5	28.8	100
Video games	0.6%	34.0%	4	15	90
Pets	0.5%	32.7%	2	8	35
Uncategorized	26.5%	31.9%	1.5	8	40
Total Items	1129440				

Notes: This table summarizes items posted on the Bunz platform, by category, between September 1, 2018 and August 31, 2019. Share with BTZ price indicates the share of items where the seller signals that they accept tokens. The distribution of BTZ prices within each category is also reported, where each price is denominated in the Canadian dollar (CAD) at the fixed exchange rate: 1 CAD = 100 BTZ.

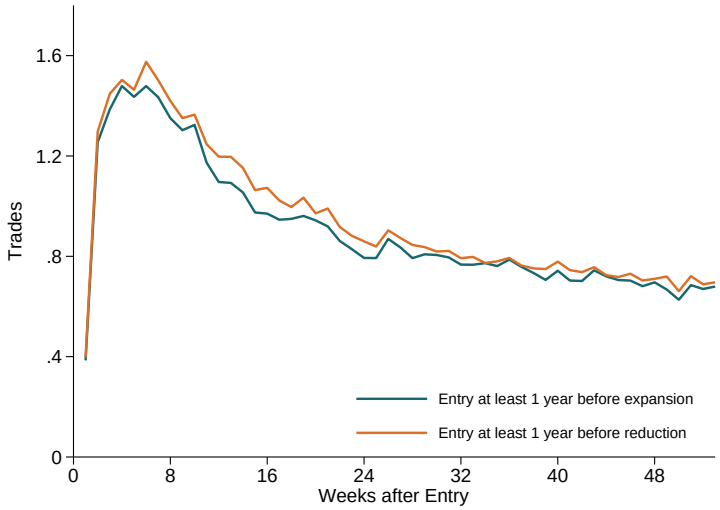
Table B2: Total weekly activity, all and regular users

	All users	Regular users	Percentage
	(1)	(2)	(3)
Trades	2802	1352	48.2%
Barter trades	1732	812	46.8%
Token-mediated trades	1070	540	50.5%
Items posted	21969	8002	36.4%
Token acceptance	.35	.41	
Offer messages sent	40408	17311	42.8%
Offer messages received	40439	12970	32.1%
Number of BTZ flows			
Issuance	108990	19644	18%
Redemption	963	168	17.5%
Transfer from peer	2183	865	39.6%
Transfer to peer	2183	795	36.4%
BTZ volume per flow			
Issuance	.32	.25	
Redemption	17.11	24.05	
Transfer from peer	15.11	15.15	
Transfer to peer	15.11	15.44	
Number of users	215271	2281	1.1%

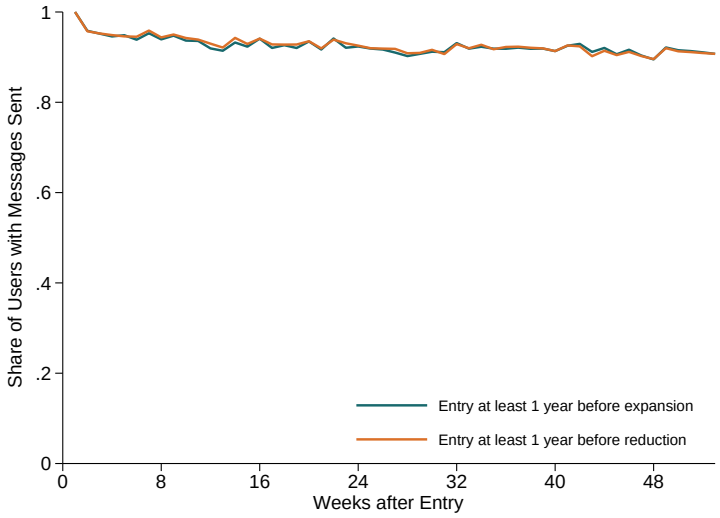
Notes: This table displays total weekly activity, averaged between September 2018 and August 2019, for all and regular users, respectively. Barter and token-mediated trades indicate the number of ratings sent and received, without and with an associated token transfer between the users. Token acceptance refers to the share of items posted with a BTZ price. The number of token transfers indicate the average weekly incidence of token transfer, in four categories: issuance (i.e. from the Bunz platform), redemption (i.e. to redemption stores), from peer (i.e. received from other Bunz users), and to peer (i.e. sent to other Bunz users). Token amount per transfer indicates the average value of token transferred, for each subcategory, denominated in the Canadian dollar (CAD) at the fixed exchange rate: 1 CAD = 100 BTZ.

Figure B6: User activeness, by week after entry

(a) Transactions



(b) Any message sent



Notes: Figure shows the weekly trend after entries for regular users who entered at least 1 year before expansion/reduction in (a) total transactions per week and (b) share of users with messages sent.

Table B3: Summary statistics: users decomposed by user transaction intensity

Variables	10-49	50-99	100-199	200+
	(1)	(2)	(3)	(4)
Barter trades / total trades	.61	.6	.6	.61
Token-mediated trades / total trades	.39	.4	.4	.39
Items posted / total trades	7.12	6.27	5.95	5.1
Share of items with BTZ price	.37	.41	.43	.4
Offer messages sent / total trades	13.09	11.89	13.71	12.91
Offer messages received / total trades	12.27	10.57	9.62	7.27
Number of BTZ flows / total trade				
Issuance	25.58	17.5	13.6	9.17
Redemption	.21	.15	.12	.09
Transfer from peer	.74	.68	.68	.53
Transfer to peer	.66	.61	.6	.53
BTZ volume per flow				
Issuance	.23	.24	.25	.24
Redemption	20.72	22.03	29.46	21.17
Transfer from peer	14.52	14.33	15.98	15.6
Transfer to peer	15.74	14.73	16.64	15.09
Number of users	3721	1194	520	168

Notes: This table displays user averages between September 2018 and August 2019 for users separately grouped by their lifetime trades, as measured by total ratings received between 13jan2016 and 19nov2021. Sample excludes users who made less than five trades during the analyzed subperiod, who conducted more than 70% of their trades in a single month, or who were active for less than 6 months. Barter and token-mediated trades indicate the number of ratings sent and received, without and with an associated token transfer between the users, divided by total number of ratings. Items posted indicate the number of items posted, divided by total number of ratings. Token acceptance refers to the share of items posted with a BTZ price. Offer messages sent and received indicate the number of offer messages sent and received, divided by total number of ratings. The number of token transfers indicate the average weekly incidence of token transfer, in four categories: issuance (i.e. from the Bunz platform), redemption (i.e. to redemption stores), from peer (i.e. received from other Bunz users), and to peer (i.e. sent to other Bunz users). Token amount per transfer indicates the average value of token transferred, for each subcategory, denominated in the Canadian dollar (CAD) at the fixed exchange rate: 1 CAD = 100 BTZ.

C Effects of Monetary Expansion

Table C1: Effects of monetary expansion on total trade, alternative controls

	(1)	(2)	(3)	(4)	(5)	(6)
	Asinh total trades			Asinh barter trades		
Post expansion	0.296**	0.269**	0.273**	0.028	-0.003	0.000
	(0.023)	(0.024)	(0.025)	(0.022)	(0.022)	(0.023)
Controls for time since entry:	Linear	Splines	FEs	Linear	Splines	FEs
R^2	0.293	0.297	0.305	0.303	0.310	0.317

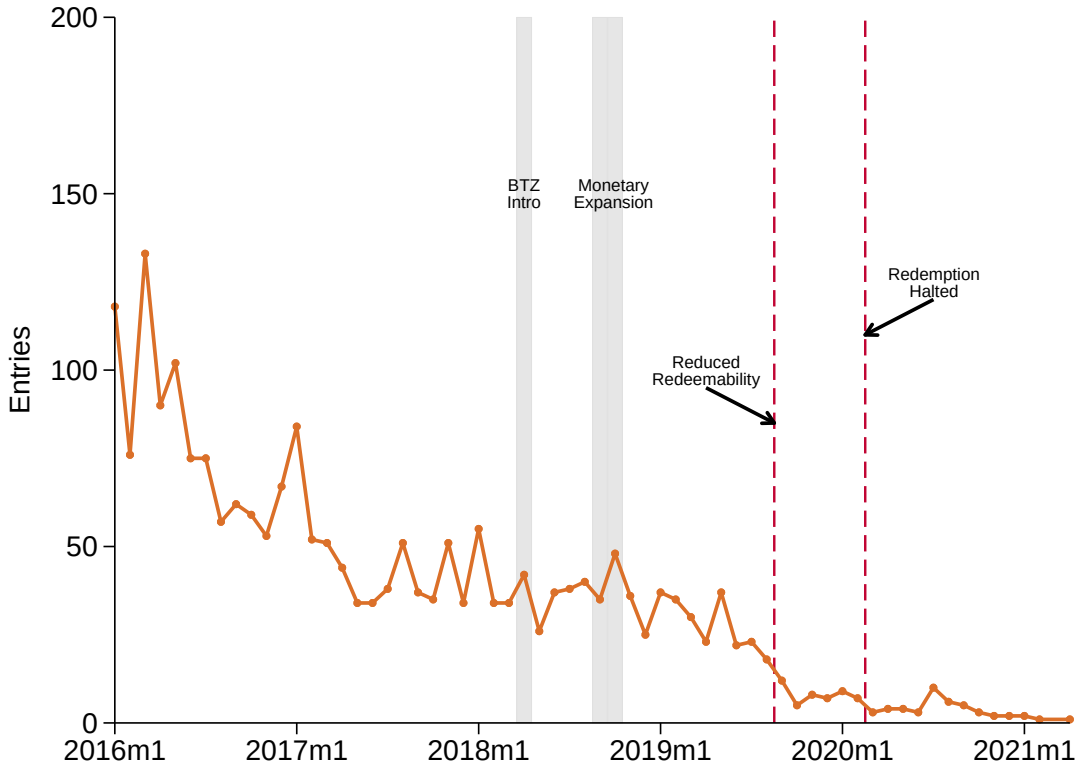
Notes: Table reports the effects of monetary expansion on the asinh total trades and asinh barter trades of existing regular users, but uses different controls for month since entry. "Linear" refers to linear controls. "Splines" refers to 3-month linear splines. "FEs" refers to fixed effects for each month after entry.

Table C2: Effects of monetary expansion on trade, low vs. high-frequency regular users

	(1)	(2)	(3)	(4)	(5)	(6)
	Asinh total trades			Asinh barter trades		
Post expansion	0.284**	0.329**	0.290**	0.049*	0.017	-0.063
	(0.028)	(0.049)	(0.078)	(0.026)	(0.046)	(0.077)
Subsample	50-99 trades	100-199 trades	200+ trades	50-99 trades	100-199 trades	200+ trades
Observations	31278	13929	4735	31278	13929	4735
Users	1188	472	155	1188	472	155
R^2	0.164	0.162	0.244	0.172	0.186	0.250
Pre-event mean	0.979	1.461	2.171	0.956	1.432	2.134

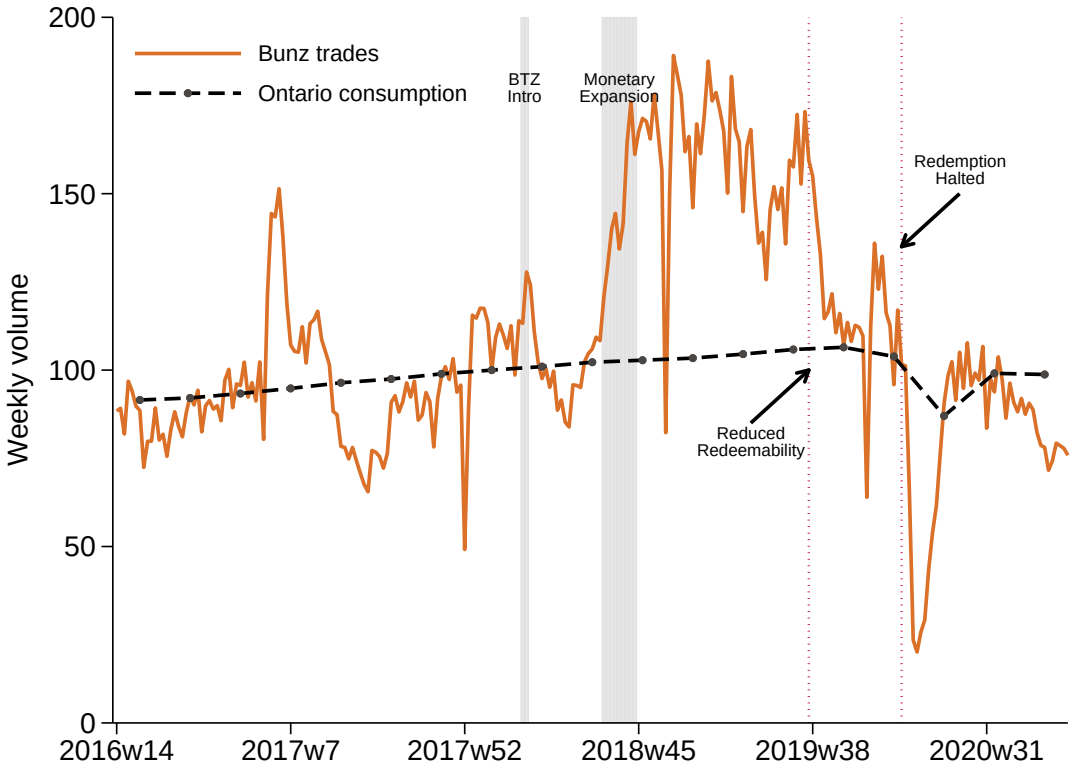
Notes: Table reports the effects of monetary expansion on the asinh total trades and asinh barter trades of existing regular users, but uses different subsamples of users with different numbers of total trade in the available data, as measured by ratings received.

Figure C1: Trend in regular user entry



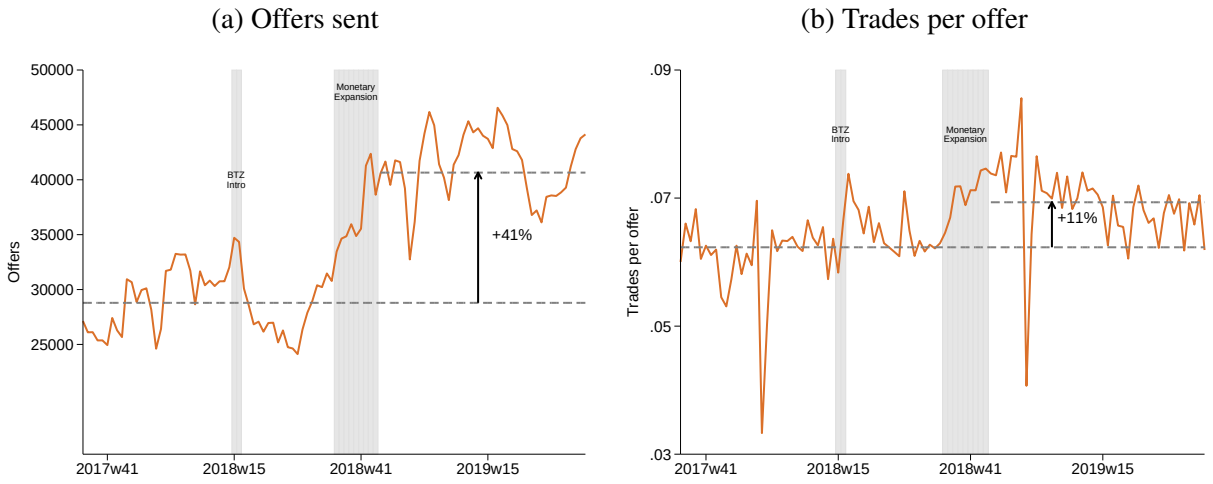
Notes: This figure shows the trend in new entry of regular users onto the Bunz platform, as measured by the first message sent.

Figure C2: Trends in Bunz trade and Ontario consumption



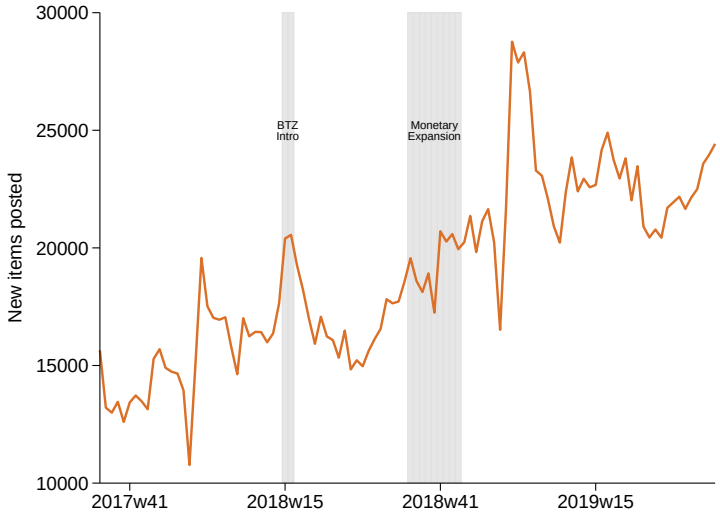
Notes: This figure shows the trend in total trades on the Bunz platform compared with the trend in household consumption in Ontario, with 2018 Q1 normalized to be 100.

Figure C3: Effects of monetary expansion on offers and trades per offer, all users



Notes: Figure shows the weekly trend in (a) offer messages sent and (b) trades per offer sent. Gray bars indicate the first and second wave of monetary expansion.

Figure C4: Trend in items posted, before and after monetary expansion



Notes: Figure shows the weekly trend in items posted. Gray bars indicate the first and second wave of monetary expansion.

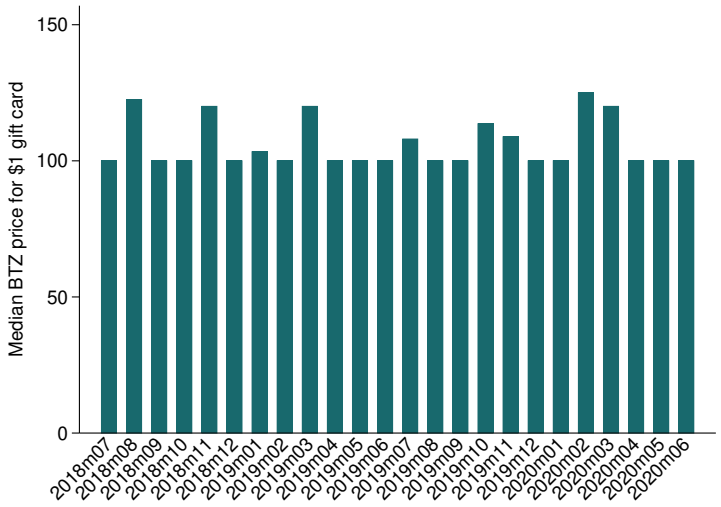
Table C3: Effects of monetary expansion on offers sent and items posted, existing regular users

	(1)	(2)	(3)	(4)
	Asinh offer messages sent		Asinh items posted	
Post expansion	0.389**	0.250**	0.223**	0.089**
	(0.038)	(0.046)	(0.035)	(0.042)
Calendar-month FE		X		X
Observations	49942	49942	49942	49942
Users	1815	1815	1815	1815
R^2	0.418	0.422	0.305	0.309
Pre-event mean	3.187	3.187	2.435	2.435

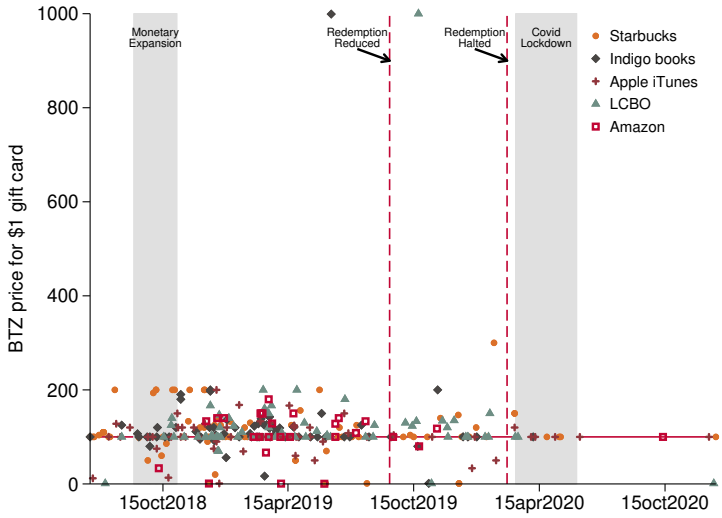
Notes: Table reports the effects of monetary expansion on the asinh offer messages sent of existing regular users. "Post expansion" is defined as months after September 2018. Controls for user fixed effects and months after user entry are included. Controls for calender month fixed effects are added in Column (2). Sample includes all observations between October 2016 and September 2019 at the month-user level for regular users whose first message sent was before the monetary expansion. Standard errors are clustered at user level. * and ** indicate statistical significance at the 5 and 1 percent level, respectively.

Figure C5: Trend in posted token prices, all available data

(a) Median posted token price

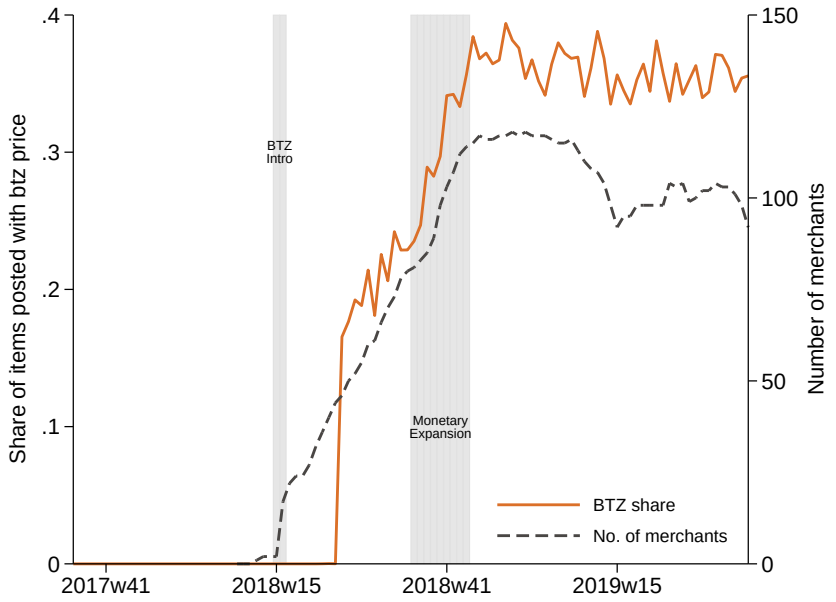


(b) All posted token prices



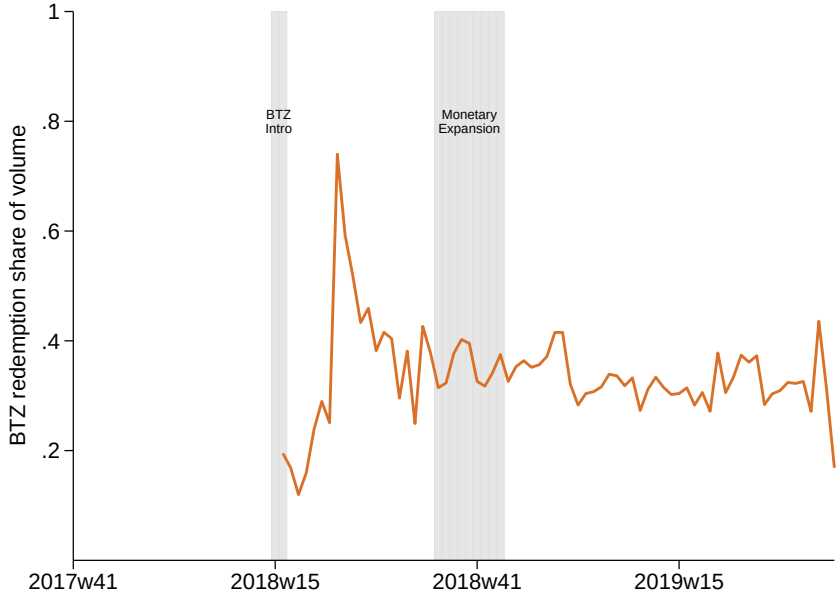
Source: The sample is all posted gift cards issued by Starbucks, Indigo books, Apple iTunes, LCBO, and Amazon with an associated BTZ value and a discernible gift card value in the post title or description. Panel (a) shows the median exchange rate for each month. Panel (b) plots every posted gift card as a dot.

Figure C6: Trend in token acceptance, before and after monetary expansion



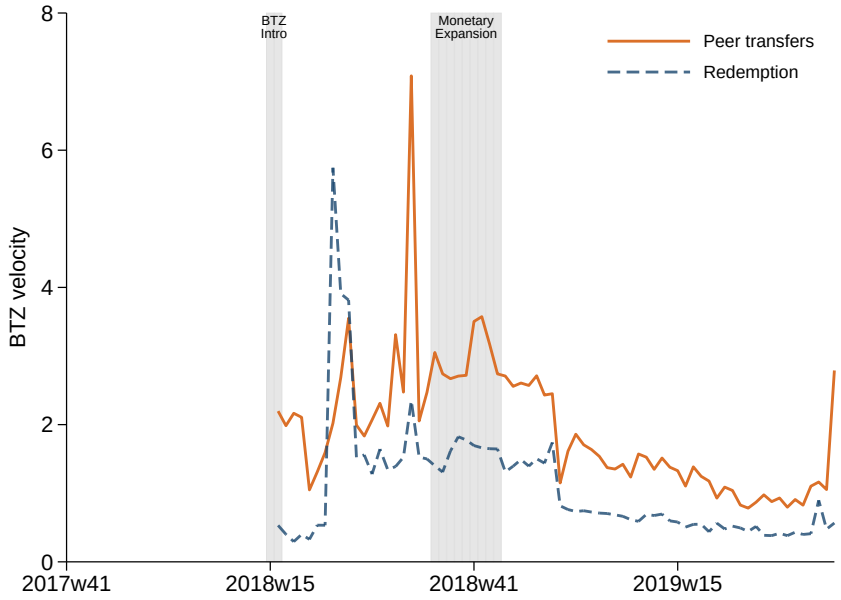
Notes: Figure shows the weekly trend in token acceptance—defined as share of items post that eventually have a posted BTZ price—and number of active local stores available for BTZ redemption, which have been active for at least two weeks. Gray bars indicate the first and second wave of monetary expansion.

Figure C7: Trend in redemption share of expenditure, before and after monetary expansion



Notes: Figure shows the trends in share of token expenditure used on redemption.

Figure C8: Trend in token velocity, before and after monetary expansion



Notes: Figure shows the weekly trend in BTZ redemption and peer transfer divided by the total BTZ supply (multiplied by weeks in a year). Gray bars indicate the first and second wave of monetary expansion.

D Effects of Reduced Redeemability

D.1 Letter to Shop Local Partners (September 9, 2019)

Dear Makers and Shop Local Businesses –

I send this email with a heavy heart, as we could not have become the platform we are without the love and support from each and every single one of you.

After a deep dive into our company priorities, Bunz will only be running the Shop Local Program revolving around food and coffee, as this is where our focus will be moving forward.

Effective immediately, you will no longer be able to accept BTZ and convert them into CAD currency.

We will be locking your wallets, and everyone will be paid up to September 10th inclusive, so please don't worry about any revenue that you brought in through the program as we will be settling your account with you and removing you from the application.

If you have any questions or concerns, please don't hesitate to reach out. I will be by within the week to come and collect the Bunz assets in your possession, so please do not throw them away!

Notes: Email from Bunz to Shop Local partners announcing immediate cessation of token redemption except for coffee shops and restaurants. Taken from item post by Alisa Yao on September 10, 2019.

D.2 Bunz blog post after reducing redemption (September 10, 2019)

Bunz,

As you may have noticed, yesterday we had to make the very difficult decision to reduce the merchants and makers who accept BTZ to just coffee and food. We are sorry for any inconvenience and disappointment this may have caused and want to keep you informed as to why we had to make this decision.

Trying new ideas is really hard. There are very few examples of companies that have attempted to share their revenue with its community like Bunz. We are still learning and adjusting the platform as we learn more about how it's used. This requires us to make hard choices at times and this, unfortunately, was one of them. This change to the program is not an ideal outcome and we are sorry for any difficulty this may cause to individuals, merchants, and the community. As a start up trying to do things differently, this was a necessary change we had to make on short notice for sustainability reasons.

In addition to this, we made another difficult decision today that allows us to sustain Bunz and BTZ going forward. This was having to say goodbye to 15 members of our team. This decision was equally difficult because a number of us have been working on Bunz since day one. I'm sad to see them go, but also know they have great things ahead of them.

The reality we face is that it's expensive to build and maintain a platform that hundreds of thousands of people use every day. It gets more expensive when you try to ensure those people see material benefits from using it. Reducing the merchant list was necessary to continue Bunz and BTZ for the community. We believe that these changes put us in the best position possible to allow you continue to use BTZ day-to-day.

Having said all this, we've still achieved something amazing over the last 14 months — since first launching BTZ. Our community of users and local businesses have earned and spent over $1.4 million because of this program. This is something we can all be proud of.

As a result of these decisions, we are able to continue to make Bunz and BTZ a community-focused platform in a more sustainable way. We admire our community for caring so much — you are the reason why Bunz exists and the reason we get up every day to try and change who benefits from platforms.

To the merchants and makers we've had to part ways with, we appreciate everything we achieved together through the Shop Local program and we wish you nothing but success.

Thank you for your understanding.

Sascha + Bunz HQ

D.3 Palz statement after reducing redemption (September 11, 2019)

Hey everyone,

Former Bunz Admins here. We wanted to reach out to our community(ies) and talk a little bit about what happened today.

Here's a background:

- Yesterday, September 11th, Bunz HQ announced that its BTZ (in-app currency) would no longer be accepted by vendors or makers that are not coffee shops, restaurants, or bars.
    - This means that small businesses that relied on BTZ to bring in new business, or even vendors who started facilitating their goods and services through the Bunz app and by accepting BTZ as a form of currency, are now out of luck.
    - These vendors and makers were not informed about these changes within the appropriate time frame which, as per their contracts, was to be informed of any changes within two weeks.
    - As a result, makers specifically have now been shut out of the previous Bunz app/BTZ system of trade and had no time to inform consumers of this change. They haven't only lost potential customers and clients, but have also lost income streams that are crucial to the survival of small businesses in Toronto.
- On top of changes to BTZ, Bunz announced that they have fired 15 of their staff. We estimate that this is approximately three-quarters of people whose livelihood depended on the Bunz brand.

Here's what we have to say about it:

- Makers, innovators, artists, creatives, activists, advocates, and regular, everyday people are the backbone of what was once the Bunz community. We all came together several years ago as people who believed in the value of the little things. The value of a half-eaten pizza, an old cassette tape, a joint, a tall boy, a jar of spaghetti. Most of us didn't have much money, and none of us had the means to create apps, or profit off of our relationships with one another.
- Monetizing our communities completely contradicts the barter system that birthed the Bunz lifestyle, as well as the anti-capitalist practices that have shaped our collective communities.
- Today, we would like to reclaim our communities. We would like to bring Bunz back to what it once was. We want our groups to remember why they exist. We do not want to profit. We do not want your app sign-ups. We do not want you to buy into an online currency that will let you down.
- By returning Bunz to its original form, as a pushback against the absolute exhaustion—financial, emotional, and physical—that goes hand in hand with living in cities that are dynamic, fast-paced, expensive, and ever-changing.
- We fundamentally love our communities. As admins of Bunz, and the people who have spearheaded the growth of our communities, and of the app alongside you all, we have a vested interest in your wellbeing. Only your wellbeing. No app sign-ups, no growth, no "buy-

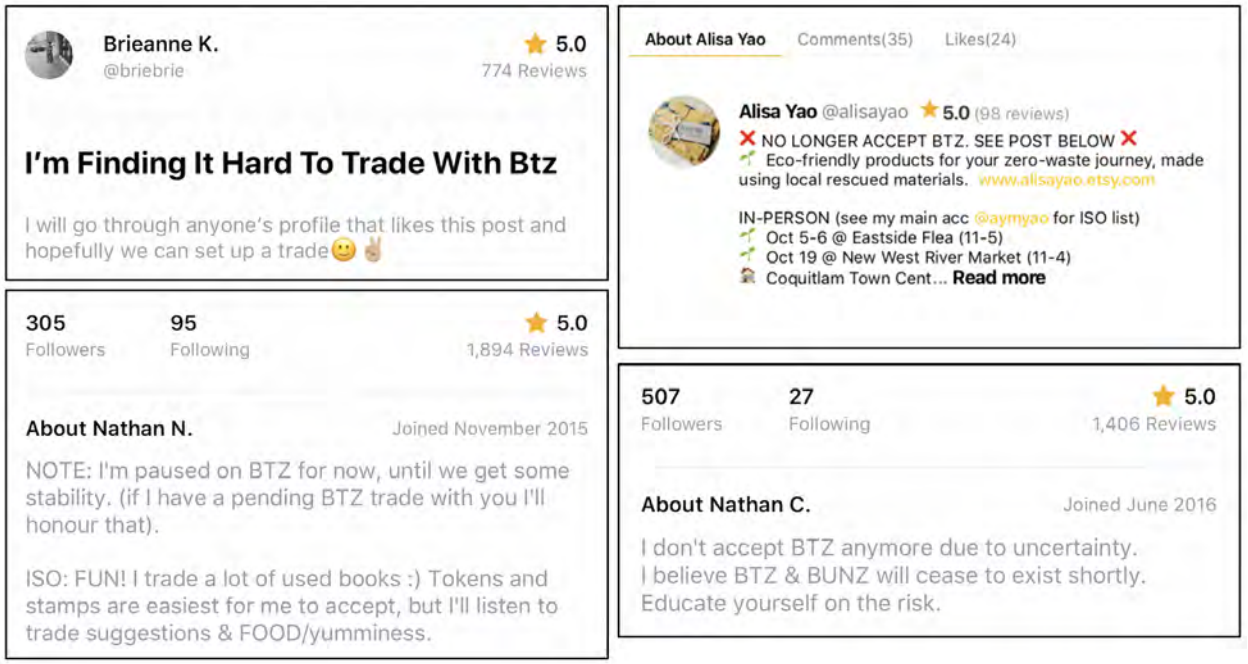
in," only genuine human connections and a commitment to kindness, compassion, and community-building.

With all that said and done, we want to introduce *Palz*, a collective comprised of former Bunz admins who believe in something bigger than profit.

Our groups will stay the same, our values will stay the same with a commitment to hearing from you, a commitment to existing outside of the scope of trademarks, corporations, advertisements, and the monetization of human connections. We hope that this new chapter can sustain our community's health, growth, and compassion.

With Love,
Your Palz

D.4 Response to Scaling Back of Shop Local program among Users



Notes: Item posts and user profiles after partial cessation of Shop Local program on September 10, captured by author on September 23, 2019.

Table D1: Effects of reduced redeemability, existing regular users, alternative controls

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	Token acceptance			Asinh token-mediated trades			Asinh barter trades		
First four weeks	-0.075**	-0.075**	-0.076**	0.001	0.001	0.002	-0.015*	-0.015*	-0.012
	(0.008)	(0.008)	(0.008)	(0.007)	(0.007)	(0.007)	(0.008)	(0.008)	(0.008)
After four weeks	-0.058**	-0.059**	-0.059**	-0.052**	-0.052**	-0.050**	-0.080**	-0.081**	-0.077**
	(0.012)	(0.012)	(0.012)	(0.009)	(0.009)	(0.009)	(0.012)	(0.012)	(0.012)
Controls for time since entry:	Linear	Splines	FEs	Linear	Splines	FEs	Linear	Splines	FEs
R^2	0.584	0.584	0.589	0.306	0.306	0.310	0.363	0.364	0.369

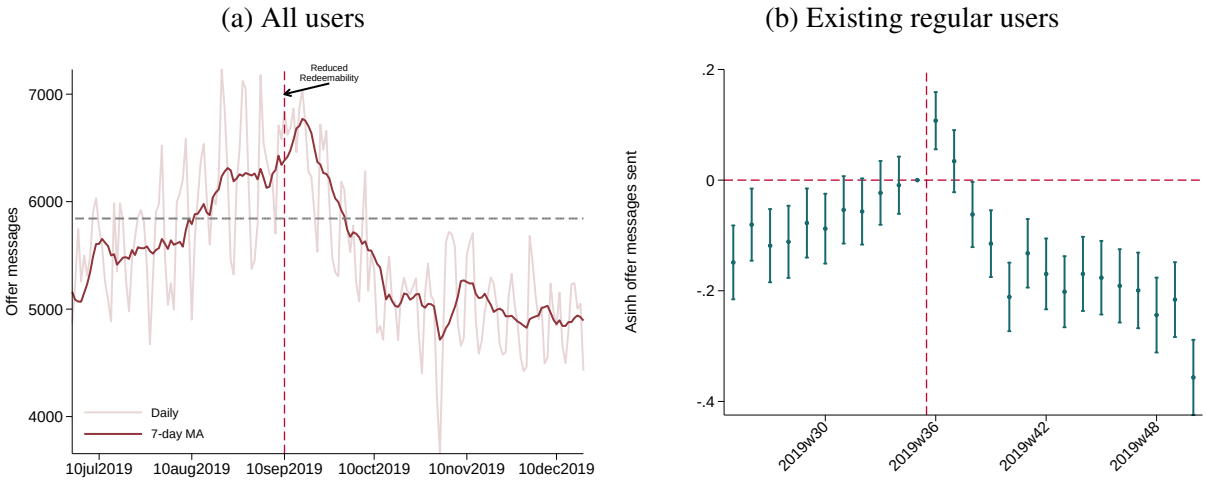
Notes: Notes: Tables reports the effects of reduced redeemability on token acceptance, asinh token-mediated trade, and asinh barter trade of existing regular users, but uses different controls for month since entry. "Linear" refers to linear controls. "Splines" refers to 12-week linear splines. "FEs" refers to fixed effects for each week after entry.

Table D2: Effects of reduced redeemability, existing regular users, subsamples

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	Token acceptance			Asinh token-mediated trades			Asinh barter trades		
First four weeks	-0.074**	-0.091**	-0.039**	0.001	-0.001	0.011	-0.011	0.005	-0.104**
	(0.011)	(0.015)	(0.018)	(0.007)	(0.014)	(0.039)	(0.010)	(0.017)	(0.043)
After four weeks	-0.051**	-0.092**	-0.011	-0.039**	-0.059**	-0.124**	-0.064**	-0.053**	-0.284**
	(0.016)	(0.020)	(0.029)	(0.010)	(0.020)	(0.046)	(0.013)	(0.023)	(0.057)
Subsample	50-99 trades	100-199 trades	200+ trades	50-99 trades	100-199 trades	200+ trades	50-99 trades	100-199 trades	200+ trades
Observations	13184	6684	2927	32547	13446	4314	32547	13446	4314
Users	1366	539	167	1366	539	167	1366	539	167
R^2	0.556	0.606	0.674	0.242	0.250	0.368	0.276	0.303	0.390
Pre-event mean	0.400	0.411	0.382	0.139	0.214	0.418	0.235	0.337	0.756

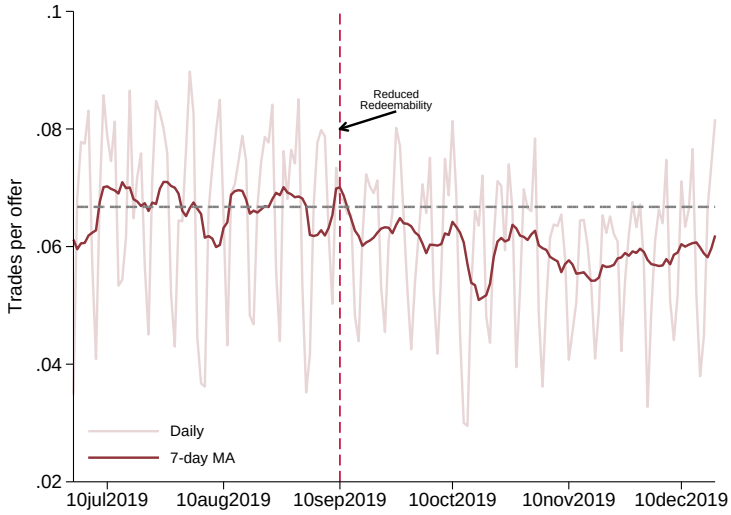
Notes: Table reports the effects of reduced redeemability on token acceptance, asinh token-mediated trade, and asinh barter trade of existing regular users, but uses different subsamples of users with different numbers of total trade in the available data, as measured by ratings received.

Figure D1: Effects of reduced redeemability on offer messages sent



Notes: Panel (a) shows the aggregate trend in offer messages. The dark lines show the 7-day moving average, while the light lines show the daily trend. Panel (b) reports coefficients from regressions of asinh offer messages sent on week fixed effects, with controls for user fixed effects and months after user entry. The sample includes only existing regular users. Standard errors are clustered at user level. 95% confidence intervals are shown.

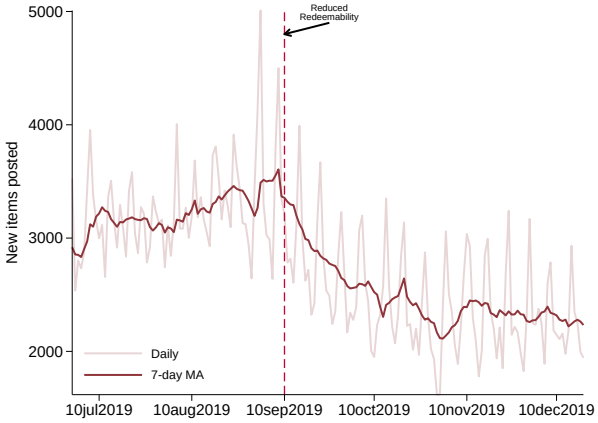
Figure D2: Trend in trades per offer, before and after reduced redeemability



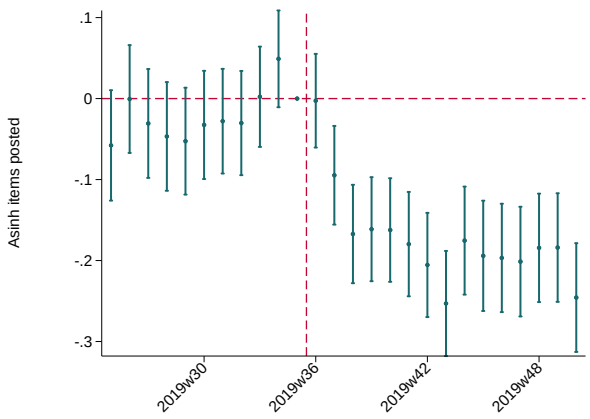
Notes: Figure shows the trend in trades per offer message. The dark lines show the 7-day moving average, while the light lines show the daily trend.

Figure D3: Effects of reduced redeemability on new items posted

(a) All users



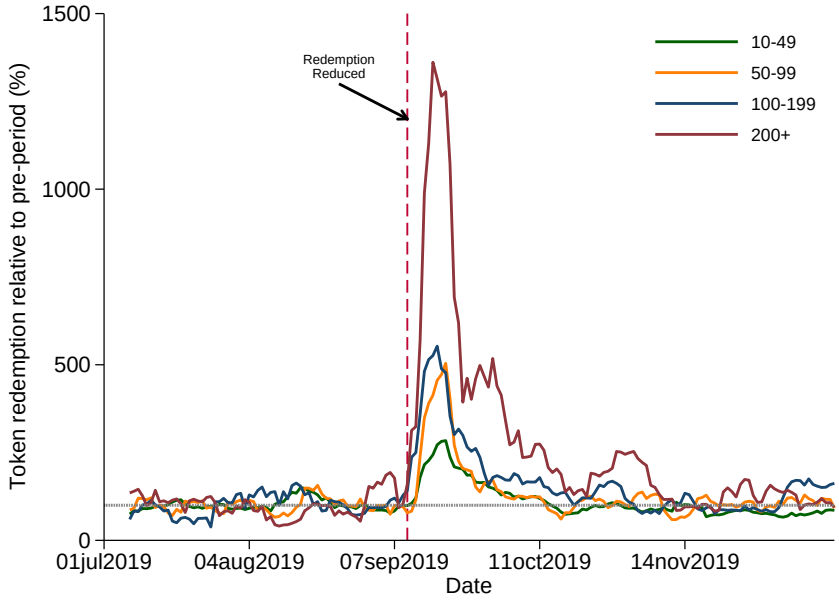
(b) Existing regular users



Notes: Panel (a) shows the aggregate trend in new items posted. The dark lines show the 7-day moving average, while the light lines show the daily trend. Panel (b) reports coefficients from regressions of asinh new items posted on week fixed effects, with controls for user fixed effects and months after user entry. The sample includes only existing regular users. Standard errors are clustered at user level. 95% confidence intervals are shown.

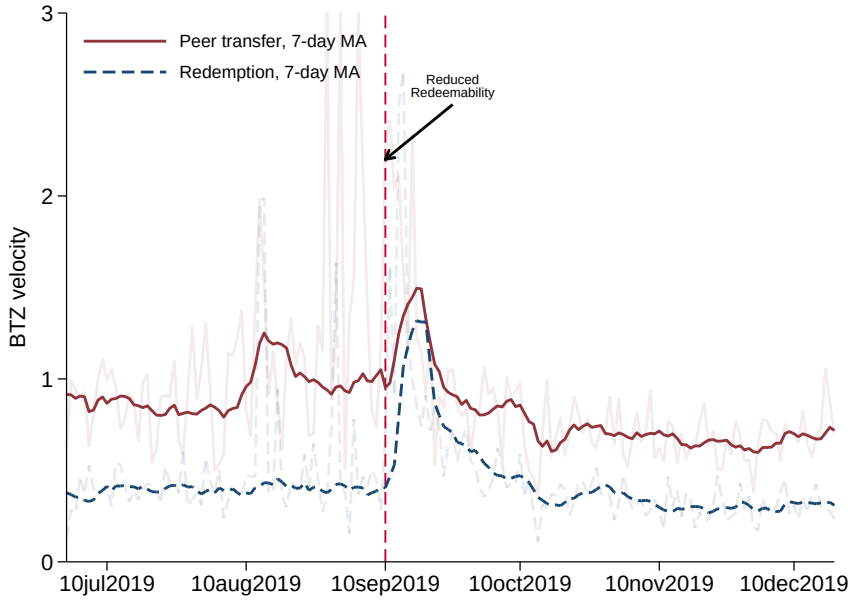
3

Figure D4: Trend in token redemption, before and after reduced redeemability, by user trade intensity



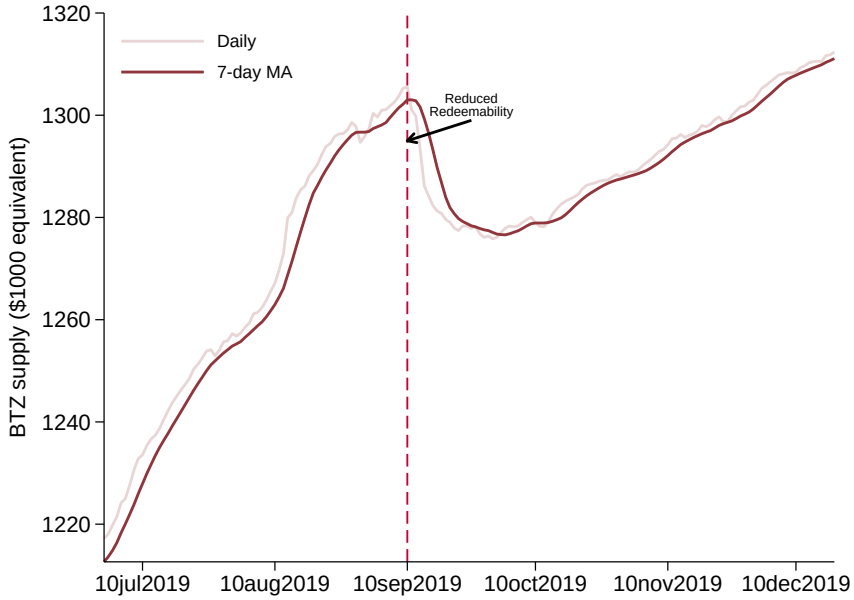
Notes: Figure shows the trends in redemption, separately for users grouped by their trade intensity. User trade intensity is measured by total ratings received between 13jan2016 and 19nov2021. All values are normalized based on the average value during the months before the event, defined as July 1 to September 9, 2019. Users with more than 70% of trades concentrated in one month and were active for less than 6 months are excluded. All lines show the 7-day moving average.

Figure D5: Trend in token velocity, before and after reduced redeemability



Notes: Figures shows the trends in BTZ redemption and peer transfer divided by the total BTZ supply. The dark lines show the 7-day moving average, while the light lines show the daily trend. The red dashed line indicates September 10, the day of partial cessation of Shop Local program. The pre-crisis spikes in token velocity of peer transfer and redemption reflect unusual activity by a small number of users (see text for details). In dark lines, unusual activity is removed by excluding users who received sign-up bonus and only made redemption during the spikes, excluding stores that cooperated with these users, and performing 0.1% winsorization to remove extreme values.

Figure D6: Trend in token supply, before and after reduced redeemability



Notes: Figure shows the trend in BTZ supply, defined as the cumulative sum of BTZ issued minus the cumulative sum of BTZ redeemed. The dark lines show the 7-day moving average, while the light lines show the daily trend. The red dashed line indicates September 10, the day of partial cessation of Shop Local program. The pre-crisis spikes in issuance and redemption reflect unusual activity by a small number of users (see text for details). In dark lines, unusual activity is removed by excluding users who received sign-up bonus and only made redemption during the spikes, excluding stores that cooperated with these users, and performing 0.1% winsorization to remove extreme values.

E Effects of Redemption Halt

E.1 Bunz announcement (February 28, 2020)

BTZ Shop Local Redemption - Gaming Update

Please note that as of today, we will be temporarily pausing the Shop Local Program. An internal audit and review has been conducted of the BTZ rewards program and the Shop Local program, and despite many people using the program properly, several critical issues were flagged around the gaming of BTZ rewards. Our engineering team will be implementing additional checks and controls, which we will communicate out once those controls are in place. Any shops that participate in our Shop Local program will be paid up in full for any amounts owed up to the pause, and we will communicate with both the Shops and with the community once the protective changes are in place and the pause is lifted. We apologize for the short notice, and we appreciate your patience while we work. -Bunz

Notes: Public announcement by Bunz HQ on the Bunz website and app on February 28, 2020.

Table E1: Effects of redemption halt on token acceptance, existing regular users, alternative controls

	(1)	(2)	(3)
	Token acceptance		
Post halt	-0.040**	-0.040**	-0.042**
	(0.009)	(0.009)	(0.009)
Post covid	-0.101**	-0.101**	-0.100**
	(0.012)	(0.012)	(0.012)
Controls for time since entry:	Linear	Splines	FEs
R^2	0.528	0.528	0.531

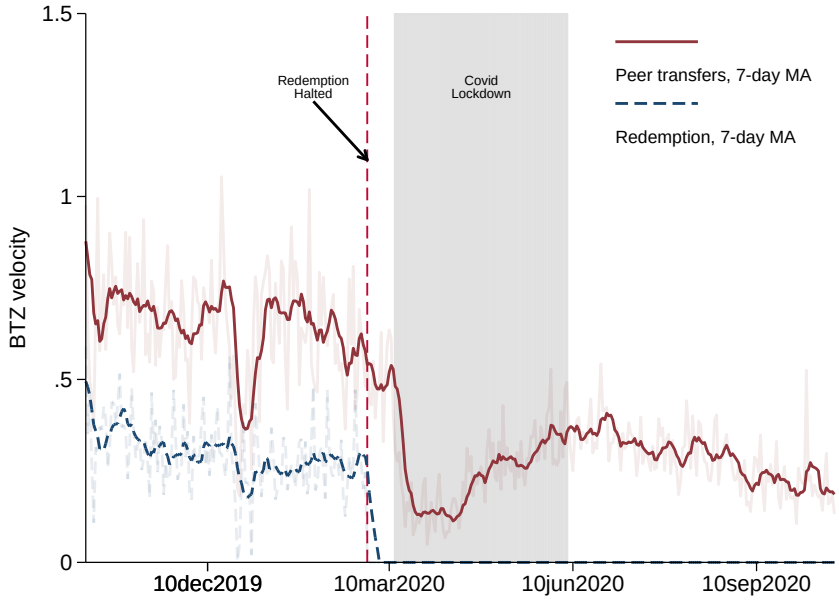
Notes: Figure reports the effects of redemption halt on token acceptance of existing regular users, but uses different controls for month since entry. "Linear" refers to linear controls. "Splines" refers to 12-week linear splines. "FEs" refers to fixed effects for each week after entry.

Table E2: Effects of redemption halt on token acceptance, existing regular users, low vs. high-frequency users

	(1)	(2)	(3)
	Token acceptance		
Post halt	-0.026**	-0.069**	-0.038
	(0.012)	(0.015)	(0.024)
Post covid	-0.091**	-0.112**	-0.115**
	(0.017)	(0.022)	(0.030)
Subsample	50-99 trades	100-199 trades	200+ trades
Observations	21643	11314	5164
Users	1367	536	169
R^2	0.507	0.533	0.607
Pre-event mean	0.317	0.337	0.342

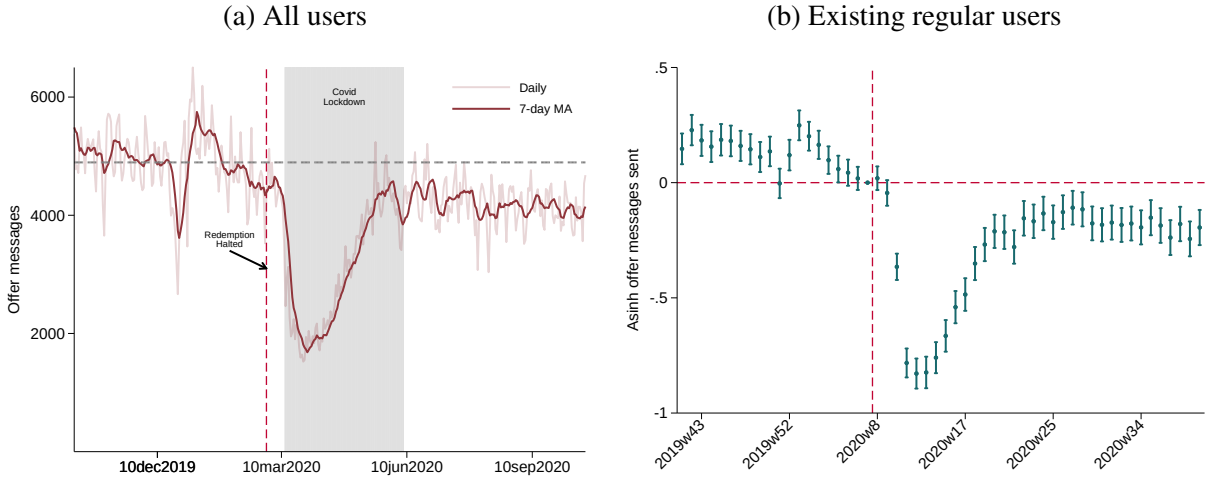
Notes: Figure reports the effects of redemption halt on token acceptance of existing regular users, but uses different subsamples of users with different numbers of total trade in the available data, as measured by ratings received.

Figure E1: Trend in token velocity, before and after redemption halt



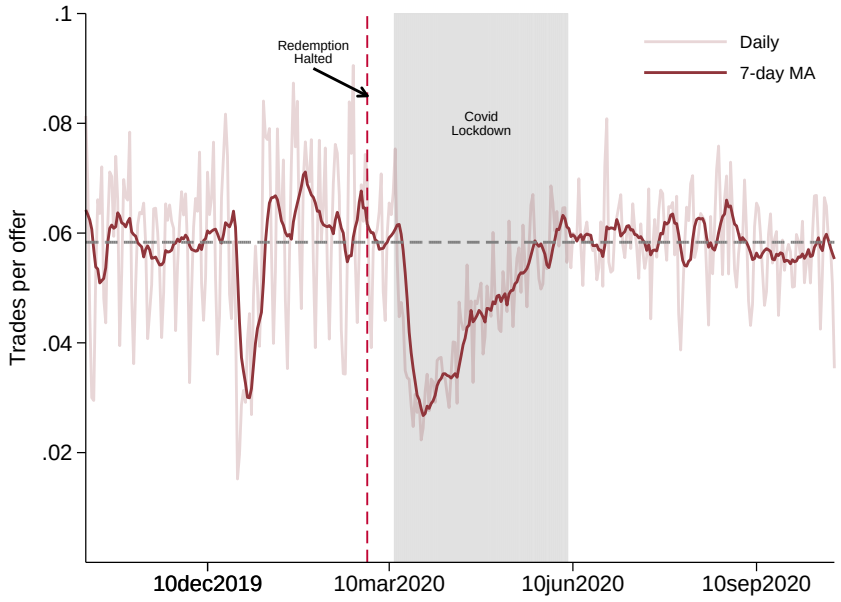
Notes: Figure shows the trends in (a) peer-to-peer token velocity, and (b) redemption token velocity.

Figure E2: The effects of redemption halt on offer messages sent



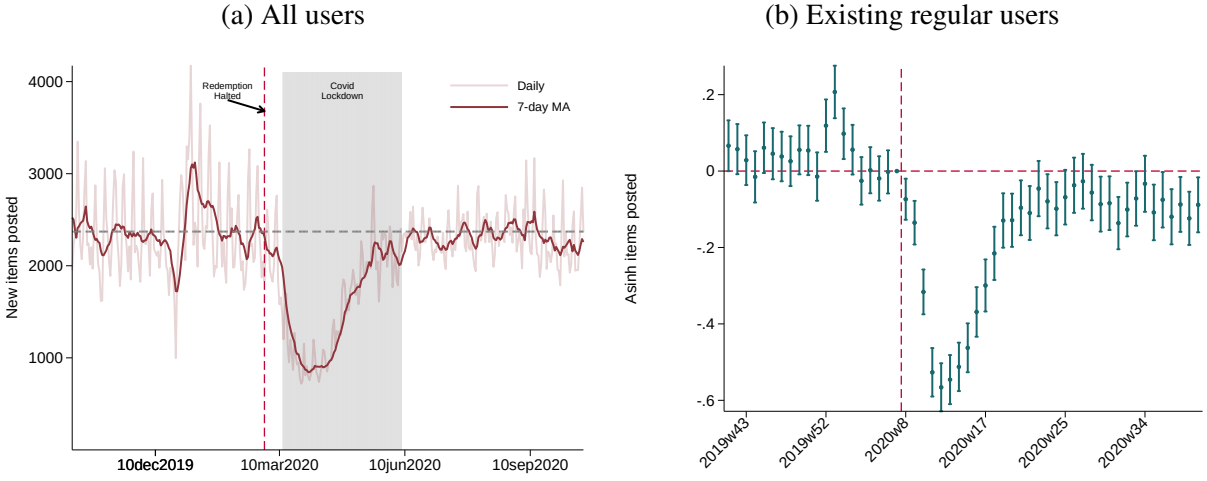
Notes: Panel (a) shows the weekly trends in offer messages sent. The dark lines show the 7-day moving average, while the light lines show the daily trend. Panel (b) shows the event studies of redemption halt on offer messages sent.

Figure E3: Trend in trades per offer, before and after redemption halt



Notes: Figure shows the weekly trends in trades per offer message sent. The dark lines show the 7-day moving average, while the light lines show the daily trend.

Figure E4: Effects of redemption halt on items posted



Notes: Panel (a) shows the weekly trends in new items posted. The dark lines show the 7-day moving average, while the light lines show the daily trend. Panel (b) shows the event studies of redemption halt on new items posted.

F Interviews with a frequent user

First interview: May 28, 2019

On May 28, 2019, the Bunz staff introduced me to a self-described "power user," who specialized in trading vintage books and had completed more than a thousand trades on the platform. Because of his deep engagement with the app, he had many insights about the mechanics of trade on the app. His observations therefore provide useful context for understanding the quantitative results in this paper. For this reason, I provide a partial transcript of the interview, which is reconstructed from handwritten notes and reorganized for clarity.

Author: How did you learn about Bunz?

User: I learned about it from Reddit. I've been on Bunz for four years now. I started when Bunz was still entirely on Facebook. I started trading because my friends had to give away their book collections, so I had two libraries to get rid of.

Author: How is the app different from the Facebook groups?

User: The Facebook groups are more chatty. The app provides a more durable posting. I can optimize for search visibility and time my posts. When app was new, about half of the trades in the community happened on Facebook, so sometimes I would post on both. Now 90% of trades happen on the app. I don't post on Facebook for transactions anymore. I post on Facebook only for discussion.

Author: What do you trade on Bunz? Do you face competition on the platform?

User: I focus on vintage books. Books that don't have ISBN codes, hence cannot be fulfilled by Amazon (FBA). I source books from garage sales, library sales, Craigslist, and other platforms. I don't really have any competition on the platform. I'm the only "predator" bookseller on Bunz platform. My real competition is mass market book sellers like Amazon. I cannot make that much money on Bunz because of competition from FBA.

Author: Why you do trade on Bunz?

User: Here are my options: Bunz, donate, or sell. I enjoy trading on Bunz, much more so than Craigslist. I can have conversations with the people I trade with. There is a feeling of community.

Author: How often do you trade?

User: I complete on average 2 trades per day. This is much more than most users, for sure. The value of trade is $3-25 per transaction. This is on the low end for users. Each day, I post 3 or 4 sets of books. There are many subcommunities on Bunz trading different things. The clothing subcommunity is totally different from books, for example.

Author: Do you have repeat customers?

User: Yea sometimes, up to 4-5 transactions. Sometimes I'd message them to market products.

Author: Do you prefer certain currencies?

User: BTZ and tokens are preferred. BTZ are useful, but it is like a hot potato. I also take cash or food. Sometimes, I'll take books to use as currency at a later date or sell them to used book store. I put hints into postings as to what is wanted (BTZ and token). I take BTZ for probably a third to a half of my transactions. The main thing is I want something that holds value. Gift cards are not personally useful for me, and I don't want to flip it for a loss. For BTZ, there is default risk. You don't want to accumulate it, so pass it around like a hot potato. The problem with BTZ is there's no exchange anywhere.

Author: Who pays in BTZ?

User: Two types: New users. They get a free book from opening a new Bunz wallet. Also heavy users who accumulate and then use BTZ.

Author: What do you do with your BTZ?

User: If I've accumulated BTZ, I mostly spend it down by eating at local merchants.

Author: How do trades happen?

User: About half of the time, the first message I get from an interested buyer is "I'll give you X tokens or X BTZ." The other half of the time, the first message I get is "I'm interested." I'll respond with "What can you offer?" I'll scan their profiles, but 90% of the time I'll steer towards BTZ or token. There are important breakpoints in conversation, where a buyer might drop out, such as when arranging a location. I don't typically negotiate much, since books are pretty low value.

Author: Do you choose whom to trade with / care about buyer reviews or reputation?

User: Reviews are not a super informative signal of buyer reliability. Many people will not review informatively. Number of reviews is more likely to be a reliable signal. For users with <20 reviews, I'll take a different approach. I'm less flexible and won't travel to trade. The main issue is flakiness and ghosting.

Author: Do you ever receive delayed payments or payments in advance?

User: Majority of time, trades are simultaneous. Occasionally, I may get advanced payment as deposit or because cellular data is wonky. Occasionally, I get deferred payment. Sometimes it's a new user who can't remember PIN, or bad cell data; sometimes it's repeat user who is low on cash but can deliver BTZ later (pre-arranged before meeting). I'm usually nice and forgiving to new users because I want to be a good representative for the platform. Bunz's "Have fun" ethos is important to me. Building a good platform requires building a good culture: If everyone on the platform is nice, eventually you will be nice as well. I'm not sure you can replicate this culture anywhere else. Cool people were participating on Bunz at its start. That matters a lot.

Author: Has the introduction of BTZ changed the platform over time?

User: The original demographic was impoverished art students. Trades that are unequal in value were part of the appeal of Bunz. The lack of double coincidence of wants was a real thing. People can get lucky with a deep discount occasionally. This feels like magic. The introduction of BTZ cut

down on this "magic." It's not as fun anymore. Over time, people on the platform care much more about monetary value of items. They moved more towards a Craigslist view of the world. After introduction of BTZ, frictions are lower, so margins are lower, but I make this up with volume.

Second interview: October 18, 2019

About five weeks after the currency crisis, I spoke with User to hear his perspective. Below is a transcript of the interview, which is reconstructed from handwritten notes and reorganized for clarity.

Author: Tell me what happened.

User: It was about a month ago now. It was like a very little miniature demonstration of what a crisis of confidence in a currency looks like. It was like Venezuela trying to impose capital controls on spending. You could almost predict what would happen.

From the users' perspective, there was a reduction of the scope of the Shop Local program. The change was that you can now only redeem at restaurants instead of the full set of merchants. This was seen as a serious reduction in the utility of BTZ. Coupled with the layoffs, this change put into people's minds the question of the viability of the whole operation. This is something, apparently, many people had not considered. A large majority of users had never thought about the underlying financials and economics of what's going on.

A lot of the outrage is understandable but also manufactured. A lot of people had balances of BTZ, and were saving up for some service. For example, tattoos. Some lady saved up a hundred dollars for wedding gifts but could no longer buy those items. The CEO had commented that they would commit to a 30 days notice, but they did not do so. People discovered at the shops. The merchants just got this notice that their relationship was terminated. Not ideal management. But they needed to close the gate before everyone went running for the exit.

What's interesting is they have continued to operate restaurants. There still was a rush to the exit. I've been eating like a king. At some point, these BTZ may become valueless. So people are driven to spend.

Things have kind of stabilized now. BTZ are still being accepted at the reduced number of merchant. There were interesting effects on liquidity of BTZ. Lots of people stopped accepting BTZ. But at the same time there's a weird little force in the other direction. If you were to accept BTZ, then transactions are temporarily really fluid.

Author: How were you personally affected?

User: I've managed my BTZ very well, so it wasn't so bad. I held only about a hundred dollars of BTZ at the time. Others may be in a different economic strata too. For a period of time, I stopped taking BTZ. Took a trip away for two weeks. I've turned on the tap again now. Started about a week ago. Balance is low enough that I don't care about the risk. It is a fortuitous coincidence: I

always spent my BTZ mostly by eating. So I'm still able to cash out in the same way. And actually, trading is easier now, since people really want to get rid of their BTZ.

Author: Has the nominal BTZ price of books gone up?

User: Yes! Absolutely. There is a premium. People are just making up whatever premium for the risk. I'll add on 10-15%. What's the actual risk premium is quite unclear. No one knows what the risk is.

Author: At what price did BTZ trade after the announcement?

User: Immediately someone decided to profit off of this situation. They tried to sell TTC tokens at a rate of 10 to 1. The reaction to that post was very interesting. Lots of people reacted negatively to it, saying he was profiteering from the situation. But this is hypocritical because they themselves are no longer taking BTZ. They would say: Capitalism is terrible. And they piled on this guy. Somehow he crossed a social norm.

There is premium for taking BTZ, but market consensus regarding the exchange rate has not occurred. There's no public record of trades. You cannot look up a price. So the valuation of BTZ is opaque. You can see the posted prices, so you don't know what the final trades are.

Author: Did your personal transaction volume change?

User: Things were somewhat unchanged for me, since I sell books. For larger value items, liquidity is more impaired. For trading with someone who might have been willing to take BTZ before, you would now have to use a different currency. Some people are still taking BTZ, but the premia are all over the place. Some even at face value. But immediately, 50% of sellers stopped taking BTZ.

Author: Have people left the platform?

User: Yes. The noisiest departures were for ideological reasons. This is related to the historical genesis of the Bunz community, which has a communist/hippie mindset, utopian ideals. So the Facebook groups decided to disassociate with Bunz. Renamed themselves to PALZ. Whether this will affect the trading on the app, I don't know.

Author: Were most people on the app aware of what happened to the Shop Local program?

User: It was widely known because there are people who stopped taking BTZ. You see this on people's profiles and in the messages. It's unfortunate, because the currency was operating smoothly. Adoption was pretty decent. Currency was circulating before it "leaked" out through people like me. The problem in fact is more that people could not get BTZ readily. Even if someone wanted a thousand dollars of BTZ, they could not get it. There was a liquidity crunch in the other direction.

Author: Have sentiments shifted in the month after the initial shock?

User: Things have settled down. More people accepting BTZ and risk premia is now lower. All the outraged people have just left. The only people left are the pragmatic people and newbies who don't know better. They think platform still works, so I'll post my armchair here. People have

short memories. But overall confidence in the currency is still low because no one knows whether they can continue to operate the shop local program. Nobody knows what their runway is. For sure, trade volume has decreased.

It could also be good for the platform to get rid of the ideologues. A lot of emotions flying around. They have a certain mental model for how the company should behave, but the company sort of had to do what they had to do. They chose not to shut down. Bunz is still perfectly usable in terms of functionality. Shop Local still operates. It's effectively like going back to launch time. They started out at just a handful of coffee shops. But the perception has now changed. Lots of cynical people knew this was going to happen.

Author: Do you know how the Shop local merchants were affected?

User: Merchants were redeemed up to some date. Everybody was made whole. They didn't receive their 30 days notice. If accepting BTZ had been part of your sales/marketing, e.g. 10% more sales due to accepting BTZ, then suddenly there's a revenue decrease. Negative is future cash flow is shut off. Negative reputation effects of that.

Some restaurants stopped accepting BTZ as well. Over the course of history, restaurants and stores have joined and left, but this was never a problem. There was a lot of confusion in terms of what was happening. IQ foods was still taking BTZ, but they temporarily froze on taking BTZ. But presumably this uncertainty was resolved and they began to take BTZ again.

Author: Is the pressure of money flowing out through redemption still the same?

User: It is definitely harder to spend a thousand dollars at once if the valve is coffee.

Author: Do you know what Bunz HQ's plans for the future are?

User: Listing BTZ on an exchange seemed like a long-term intention, like they would eventually allow the currency to float. But it ended up working more like corporate loyalty points. People are still using it because its convenient to do so. But this is much more limited now. Rumors are the pause was driven by a failure to find financing. They could take the code and re-brand, try to launch elsewhere. There is no news, so nobody knows where the company is.