Simulated Losses, Exchange-App Activity, and Bitcoin Buy-and-Hold: A Methodological Re-Examination of BIS Working Paper No. 1049

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Abstract

Bank for International Settlements (BIS) Working Paper No. 1049 [Auer et al., 2022] builds a Sensor Tower panel of retail crypto-exchange app downloads and daily active users (DAUs) for 95 countries from August 2015 to June 2022. Price-led app entry is well documented. The BIS publication page summary states that around three-quarters of users "lost money on their Bitcoin investments", and the PDF introduction (printed p. 3) says "over 75%" and refers to cryptocurrencies. Those figures come from simulations that time Bitcoin purchases to downloads and mark a $100-per-month rule in 2022, after the late-2021 peak. Using the public Group of Twenty (G20) supplement and three public Bitcoin price series, I find buy-and-hold returns of about 69–71× (compound annual growth rate, CAGR, about 84–85%) over the authors' window. Download-weighted dollar-cost averaging (DCA) approximations can reach the paper's 81% loss rate; switching from monthly highs to averages changes that share only slightly. The G20 mean-DAU series has a power-law slope on Bitcoin age of about 7.8 (Bitcoin price-age about 7.3), with China and Japan as regulatory outliers. A slope-consumer price index (CPI) link using World Bank inflation is positive in the full G20 set and disappears without Argentina and Turkey. The entry evidence stands. The three-quarters figure measures a download-timed purchase rule valued in the 2022 drawdown. It is a different quantity from the sample-wide Bitcoin return.

1 Introduction

Retail participation in cryptocurrency markets expanded sharply after 2015, alongside repeated boom-bust cycles in Bitcoin and related assets. Auer et al. [2022], hereafter Auer et al. (2022/23), assemble a publicly linked database of crypto *exchange* application downloads and daily active users from Sensor Tower, covering 95 countries at daily frequency from August 2015

through June 2022. Their main statistical message is that rises in the Bitcoin price are followed by entry of new app users, especially among younger men, with corroboration from exogenous price shocks (the mid-2021 Chinese mining crackdown and early-2022 unrest in Kazakhstan) and from a panel vector autoregression (PVAR).

Alongside that contribution, the paper reports "back of the envelope calculations" suggesting that "around three-quarters of users have lost money on their Bitcoin investments" (BIS publication page summary, https://www.bis.org/publ/work1049.htm; the PDF introduction, printed p. 3, says "at the time of writing, about three-quarters of users had likely lost money on their investments in cryptocurrencies" and "over 75%"; see also §2.2 and Graphs 5–6). The PDF wording refers to cryptocurrencies, and the simulations price Bitcoin. The three-quarters sentence has circulated widely in policy and media discussion of retail crypto risk. Section 2.2 of the paper states plainly that the Sensor Tower database "does not contain information on the actual performance of crypto currency investments of individuals," so the authors "perform simulations to obtain an estimate" (printed pp. 9–10). The simulations assume Bitcoin purchases timed to app downloads (or a $100 monthly rule thereafter) and evaluate outcomes at a date in the 2022 bear market.

This note re-examines those simulations and related measurement choices against the paper's public G20 supplement and independent public price and inflation data. Price-led entry on crypto venues is not contested here, and this note leaves the entry regressions, event studies, and PVAR without re-estimation. The simulated-loss headline, and the way activity is measured, support a narrower claim than a general conclusion about Bitcoin investment outcomes over August 2015–June 2022.

Over the authors' sample window, buy-and-hold Bitcoin returned about 69–71 times the initial outlay on standard public United States dollar (USD) price series, or about 84–85 percent CAGR (Section 4.1). Approximate DCA experiments that weight entry by G20 downloads reach loss shares near the paper's 81 percent; substituting monthly average prices for monthly highs changes that share only from 83.2 percent to 81.7 percent (Section 4.2). DAU growth versus Bitcoin age in the G20 file follows steep power laws for most countries; the slope of the G20 mean DAU series on Bitcoin age is 7.76, and individual country slopes range from 4.1 to 13.0 (mean 8.09, median 8.1), with China and Japan as exceptions consistent with regulatory breaks; Bitcoin's own price-age slope over the window is about 7.3–7.4 (Section 4.3). Cross-country associations between those slopes and average CPI inflation are positive in the full G20 set ($R^2 = 0.245$, $p = 0.031$) and vanish without Argentina and Turkey ($R^2 = 0.016$, $p = 0.629$; Section 4.4). Related discussion of exchange-app power laws and of buy-and-hold as a counterfactual appears in Perrenod [2026]; a mechanistic treatment of Bitcoin price power laws is given by Santostasi and Perrenod [2026].

Auer et al. (2022/23) state that Graphs 5–6 are simulations. The publication page summary, the introduction, and the body still summarise those cohorts in language that ordinary readers parse as a census of Bitcoin investors. The same transparency the paper applies to price-led entry should apply to the step from Sensor Tower timestamps to portfolio outcomes. This note supplies that audit trail for the public materials.

Section 2 summarises WP 1049's sample, simulations, and other claims. Section 3 separates

exchange-app activity from Bitcoin ownership and states why the loss simulations and the omitted buy-and-hold path matter. Section 4 reports the re-examination. Section 5 states limitations. Section 6 concludes.

2 What Working Paper 1049 does

2.1 Sample, apps, and the public supplement

Auer et al. [2022] obtain Apple App Store and Google Play statistics from Sensor Tower for applications identified with crypto *exchanges*, drawing on the CCData (formerly CryptoCompare) exchange list ("more than 200" apps in the paper's description; printed p. 5 and Graph 7 note, p. 11). Metrics include downloads and DAUs, with some age and gender splits. The analysis panel comprises **95 countries at monthly frequency over August 2015–June 2022**. Country location is based on the provider's Internet Protocol (IP)-based attribution.

The file released with the paper provides **G20** country-month series only: monthly average DAUs and downloads per 100,000 inhabitants for 19 economies, plus the data underlying Graphs 1–9 [Bank for International Settlements, 2022]. The broader 95-country daily panel used for some figures and for the global download histogram in Graph 5 is only partly reproduced in that public file. The daily download microdata are not public, and the supplement provides the binned histogram data behind Graphs 5 and 6 (Section 4.2).

Bitcoin prices in the paper's graphs are sourced to CCData/CryptoCompare. The main regression (equation (1)) uses the log of the monthly average of DAUs as the dependent variable and the log of the Bitcoin price in month t as the principal independent variable. The authors write: "We choose the maximum, rather than the average, as it generally attracts the greatest attention of investors" (printed p. 11). Thus the monthly **maximum** enters the adoption regression with an explicit attention rationale.

2.2 Simulated investment outcomes (§2.2)

Section 2.2 ("Simulating returns on crypto investments") contains two exercises (printed pp. 9–10; Graphs 5–6).

Graph 5. A histogram of the share of daily downloads by Bitcoin price at the time of first download. The paper reports that **73 percent** of users downloaded an app when Bitcoin was above **$20,000**, above the October 2022 price level. The caption states that loss/gain estimates assume users purchased Bitcoin on the **same day** as the download. The binned data behind Graph 5 in the public supplement sum to 72.7 percent of downloads above **$20,000** (27.3 percent below).

Graph 6. A second simulation: "assuming that each new user bought $100 of Bitcoin in the month of the first app download and in each subsequent month, **81 percent** of users would have lost money… The median investor would have lost **48 percent** of their total **$900** in funds invested." The BIS publication page summary says "around three-quarters" of users lost money on their Bitcoin investments. The PDF introduction (printed p. 3) says "over 75%", and the conclusion says "73–81% of global investors have likely lost money on their crypto investment." The binned loss data behind Graph 6 in the public supplement sum to 81.0 percent. The $900

median stake implies a median accumulation horizon on the order of nine months at $100 per month, consistent with downloads concentrating late in the 2020–21 bull market, and much shorter than the tenure of a holder who entered early in the sample.

The text then states that "the vast majority of Bitcoin investors has lost money, with the exception of a few players who made substantial large gains" (p. 10). That formulation moves from *simulated download-timed Bitcoin DCA cohorts* to *Bitcoin investors* as a class.

2.3 Other empirical claims

The remainder of the paper documents: (i) a high time-series correlation between DAUs and Bitcoin prices, with user entry lagging price rises (Graph 7); (ii) demographic concentration among men under 35 (about 40 percent of users); (iii) panel regressions of DAUs on prices with macro controls and country fixed effects; (iv) event studies around China and Kazakhstan; (v) suggestive evidence that larger on-chain holders sell into rising prices; and (vi) a PVAR in Appendix B. Those results motivate the paper's policy discussion of consumer protection and procyclical retail entry. They are summarised here for context; this note omits re-estimation of the event studies or PVAR. The paper's causal and descriptive sections about *entry* can stand. The separate simulation section still needs to be checked against the loss language in the publication page summary and the introduction. The sections that follow take up that narrower question with the public materials.

3 Methodological issues

The points below ask how far the simulated-loss headline and related measurement choices support the paper's stronger interpretive claims. Order runs from measurement object to counterfactual.

3.1 Exchange-app activity differs from Bitcoin ownership

The Sensor Tower sample draws on crypto **exchange** apps from the CCData list and is not designed to capture Bitcoin-only wallets or general brokerage apps. A DAU is an account that opens an app at least once on a day; users may check prices, trade altcoins, use multiple apps, or never buy Bitcoin. Footnote 7 of the paper notes that cumulative download totals likely overstate unique persons because the same users hold multiple apps. CoinGecko Research's published yearly averages of Bitcoin's share of total crypto market capitalisation range from 86.3 percent in 2015 to 39.3 percent in 2022; a month-weighted average of those yearly figures over August 2015–June 2022 is about **60 percent** (author's calculation from CoinGecko Research yearly averages; accessed 31 October 2026) [CoinGecko Research, n.d.]. Bitcoin was therefore the largest single cryptoasset but far from the whole market for much of the window, especially around the 2017 Initial Coin Offering (ICO) boom and the 2021–22 altcoin cycle. Evaluating outcomes solely in Bitcoin, with activity measured across multi-asset venues, mixes two objects.

If many downloaders primarily traded altcoins, stablecoins, or never funded an account, Bitcoin mark-to-market simulations overstate their Bitcoin exposure. If many did buy Bitcoin

but also held more volatile tokens, Bitcoin-only marks may understate trading risk. The Sensor Tower object is **venue attention**; the loss narrative is written as **Bitcoin investment performance**. Those labels should stay distinct when the three-quarters figure enters a policy argument.

3.2 Losses are simulated

Section 2.2 is explicit: individual returns are unavailable, so the authors simulate. Graph 5 uses same-day Bitcoin purchases; Graph 6 uses a $100 monthly rule. Neither recovers actual holding periods, position sizes, leverage, fees, or non-Bitcoin portfolios. The paper values positions "at the time of writing" and compares download-time prices with the October 2022 price, and the approximations in this note mark positions on 30 June 2022. Both dates sit in a deep drawdown after the late-2021 peak near $69,000 (paper, p. 7). Simulated underwater marks at that date speak to *timing relative to the cycle*. Realised investor welfare over the full sample, and a strategy that held Bitcoin from 2015, remain outside those marks.

Two further design features amplify trough marking. First, Graph 5 conditions on the Bitcoin price at download and then compares to a later, lower reference price; by construction, downloads that occurred above $20,000 look like losers on the initial lot. Second, Graph 6's monthly $100 rule, combined with download mass in 2021, implies that the median simulated investor had a short tenure (the paper's $900 median stake). Short-tenure, late-cycle DCA is a useful stress scenario for consumer-protection analysis. Outcomes for Bitcoin investors as a whole across 2015–22 remain a separate question.

3.3 Monthly maximum prices in the regression

Equation (1) uses the monthly maximum Bitcoin price. The paper states a reason (attention; p. 11). Graph 5 uses daily prices at download. Graph 6 says purchases occur "in the month" without specifying high, average, or end-of-month prices. As shown in Section 4.2, replacing monthly highs with monthly averages in approximate DCA experiments changes download-weighted loss shares only slightly. The monthly-max choice is a disclosed modelling preference for the adoption regression and a minor sensitivity for the loss simulations. The three-quarters headline has a different main driver: download timing and marking near the trough.

3.4 Sample window and cycle timing

The August 2015–June 2022 window is dictated by Sensor Tower coverage and by the paper's revision timing. It includes the 2017 and 2020–21 bull markets and the subsequent crash through mid-2022. The window begins after Bitcoin's earlier history from 2009 and ends before the recovery after mid-2022. Any loss simulation that marks portfolios near a cyclical trough will look sterner than one that marks them at other dates. That is a feature of the design, and it should be stated when the results are generalised.

3.5 The buy-and-hold counterfactual is omitted

Over the same dates the authors study, a one-time Bitcoin purchase held to 30 June 2022 earned a very large positive return (Section 4.1). Placing that path beside download-timed DCA clarifies what the simulations are measuring: the cost of entering with the crowd late in a boom. The return to holding Bitcoin through the authors' sample is a separate benchmark. Readers who see only the loss sentence on the publication page summary do not see that benchmark. The same sample that generates simulated losses for late DCA cohorts also contains the 69–71× buy-and-hold path in Table 1 (about 84–85 percent CAGR). Both paths belong in the report.

3.6 DAU growth, power laws, and inflation

Steep growth in exchange-app DAUs is consistent with the paper's descriptive figures. Interpreting those series as pure "Bitcoin adoption" requires care. DAUs can rise because more people use crypto apps, because existing users open apps more often when prices move, and because multi-homing across apps increases, factors whose growth rates can compound [Perrenod, 2026]. Cross-country links between DAU-age slopes and CPI inflation speak to the monetary-demand hypothesis. Section 4.4 shows those links are fragile in the G20.

4 Re-examination

Unless noted, all calculations use the BIS G20 supplement (monthly DAUs and downloads per 100,000 residents, August 2015–June 2022, 83 months), Bitcoin age measured from the genesis block date of 3 January 2009, World Bank indicator `FP.CPI.TOTL.ZG` for annual CPI inflation [World Bank, n.d.], and daily Bitcoin prices from Yahoo Finance (`BTC-USD`), CoinMetrics Community (`PriceUSD`), and Blockchain.info (market-price chart), retrieved 31 October 2026 [Yahoo Finance, n.d., CoinMetrics, n.d., Blockchain.info, n.d.]. Materials for replication are listed once in the data availability statement below. Where a quantity cannot be reconstructed from those materials, I report the gap and leave the quantity unrecovered. Prices are in USD. CAGR is the constant annual growth rate over calendar time measured in years of length 365.25 days. The aim is an audit a reader can re-run.

4.1 Buy-and-hold Bitcoin over the paper's sample window

Table 1 reports prices on 1 August 2015 and 30 June 2022, the multiple, and the CAGR over 6.91 years for three public series.

Table 1: Bitcoin buy-and-hold returns, 1 August 2015–30 June 2022

Source	Price 2015-08-01	Price 2022-06-30	Multiple	CAGR
Yahoo Finance close	281.60	19,784.73	70.26	85.0%
CoinMetrics `PriceUSD`	281.67	19,332.91	68.64	84.4%
Blockchain.info market price	284.31	20,085.93	70.65	85.1%

Notes: Prices in USD. CAGR uses year length (2022-06-30 − 2015-08-01)/365.25. Sources: Yahoo Finance chart application programming interface (API); CoinMetrics Community API; Blockchain.info charts. Author's calculations.

Figure 1 plots the Yahoo daily close over the window. Across sources, buy-and-hold returns cluster near 69–71× and 84–85 percent CAGR.[1] That path is the natural benchmark for a buy-and-hold Bitcoin claim over the dates WP 1049 studies. The paper's download-timed simulations measure a different path.

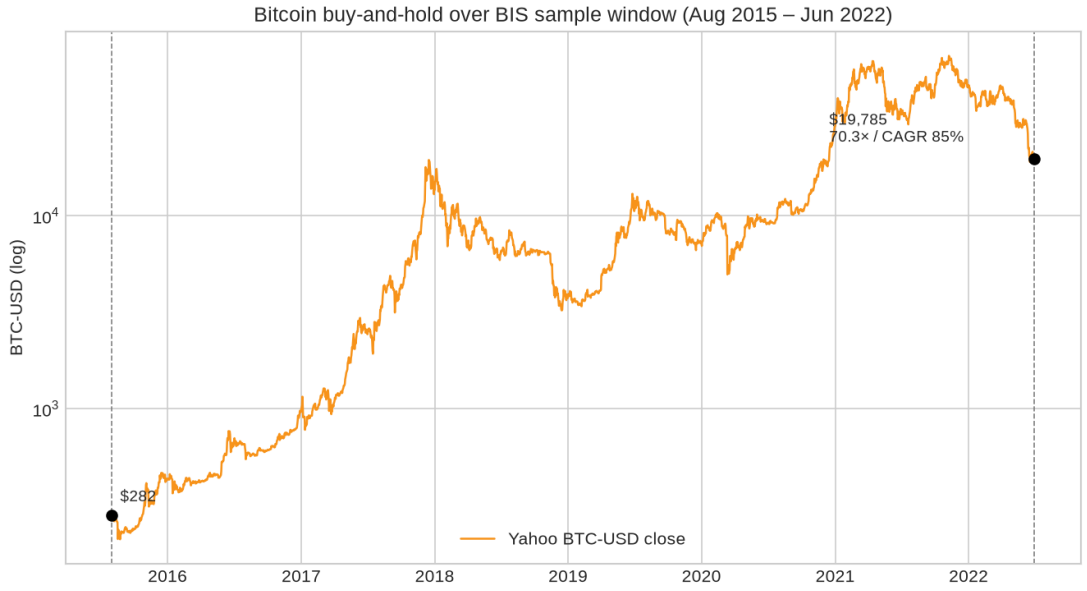


Figure 1: Bitcoin price (Yahoo Finance BTC-USD daily close), August 2015–June 2022. Vertical dashed lines mark the BIS sample endpoints. Source: Yahoo Finance; author's calculations.

4.2 Monthly highs, averages, and approximate DCA loss shares

Figure 2 shows monthly highs, monthly means of daily open-high-low-close (OHLC) averages, and monthly means of daily closes. Table 2 and Figure 3 summarise approximate Graph-6-style experiments: from each entry month m, invest \$100 at that month's price measure in month m and in every subsequent month through June 2022; mark the position to the Yahoo close on 30 June 2022 (\$19,784.73). Entry months are either equally weighted or weighted by the sum of G20 downloads per 100k in that month, a population-unweighted sum of per-100k download rates across the 19 countries.

Download weighting pushes loss shares into the neighbourhood of 81 percent because late-sample downloads dominate; the high-versus-average choice does little. Moving from monthly highs to monthly averages reduces the download-weighted loss share only from 83.2 percent to 81.7 percent. The paper's stated reason for using maxima in equation (1) can stand for the adoption regression. On this approximation, the loss share is stable across the monthly high and average price rules. The binned data behind Graph 5 in the public supplement sum to 72.7 percent of downloads above \$20,000 (27.3 percent below), in line with the reported 73 percent. The binned loss data behind Graph 6 sum to 81.0 percent, in line with the reported 81 percent. The supplement files follow the November 2022 graph numbering, one lower than the revised

[1] Round figures of \$285 to \$19,785 (about 69.5× and 85 percent CAGR) appear in Perrenod [2026]; they lie within the Table 1 band.

Table 2: Approximate DCA loss shares under alternative monthly price rules

Buy-price rule	Equal-weight loss
Monthly high	37.3%
Monthly average (OHLC mean)	33.7%
Monthly mean close	33.7%
Auer et al. Graph 6 (body)	none
Auer et al. introduction ("over 75%") and publication page summary ("three-quarters")	none

Notes: Simulation described in text. Download weights are the sum of G20 per-100k download rates from the BIS supplement (population-unweighted). Prices from Yahoo Finance. Approximation of Graph 6 (global daily downloads and CCData within-month prices unavailable in the public release). Author's calculations.

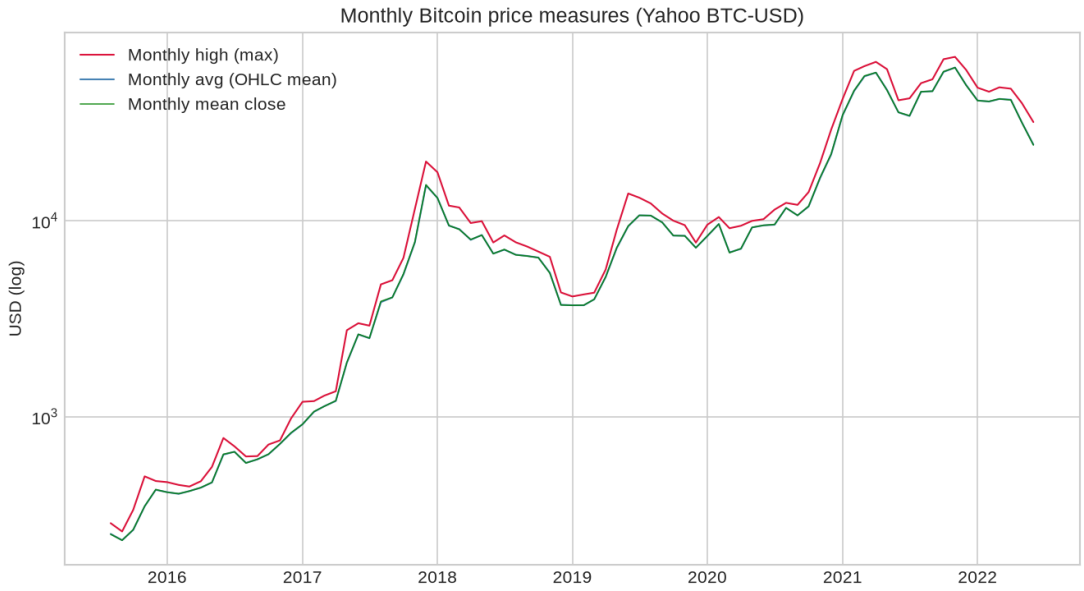


Figure 2: Monthly Bitcoin price measures, Yahoo Finance BTC-USD: monthly high, mean of daily OHLC averages, and mean of daily closes.

paper. The daily download microdata are not public, so the histograms cannot be rebuilt from daily data; the confirmation is at the level of the published bins.

4.3 DAU-age and Bitcoin price-age power laws

For each G20 country i and month t, let D_{it} denote DAUs per 100,000 residents and let A_t denote Bitcoin's age in years since the genesis block on 3 January 2009 (month-end). Table 3 reports ordinary least squares (OLS) estimates of $\ln D_{it} = \alpha_i + \beta_i \ln A_t + \varepsilon_{it}$ over the 83 months. The slope β_i is the elasticity of DAUs with respect to age under a power-law time trend. The fits are descriptive.

Aggregating by the cross-country mean of D_{it} and regressing on $\ln A_t$ yields slope **7.76** ($R^2 = 0.93$). Over the same months, Bitcoin's monthly mean close versus age has slope **7.35** ($R^2 = 0.89$); the monthly high, **7.37**; daily Yahoo and CoinMetrics closes, about **7.31**.[2] Figures 4–6

[2] Perrenod [2026] reports a "world" DAU-age slope of about 7.6 using a 95-country aggregation absent from the public G20 file; the G20 mean series here gives 7.76.

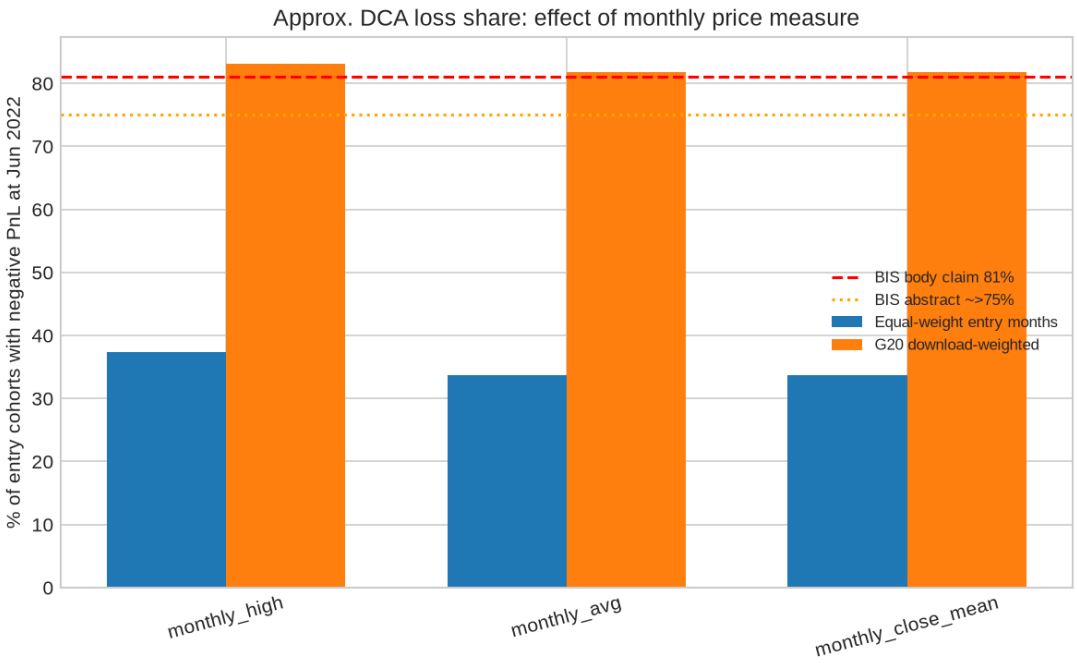


Figure 3: Approximate DCA loss shares under monthly high and average/close rules. Horizontal lines mark the paper's 81 percent (body) and ∼75 percent (introduction and publication page summary) benchmarks.

plot the aggregate DAU fit, the price-age fit, and the country slopes.

China's low fit and flat slope, and Japan's middling R^2, align with well-known regulatory interventions. Korea's high slope at low average inflation is a residual. Steep DAU exponents can diverge from Bitcoin *ownership* exponents: activity intensity and multi-app use can inflate DAU growth relative to unique holders (cf. Auer et al., fn. 7).

4.4 Cross-country slopes and CPI inflation

Table 4 reports the cross-section OLS of country slopes $\hat{\beta}_i$ from Table 3 on each country's average annual CPI inflation rate over 2015–2022 (World Bank indicator `FP.CPI.TOTL.ZG`, percent per year).

In the full set the slope on CPI is 0.100 ($p = 0.031$). That association is carried by Argentina and Turkey. Without them the slope is 0.129 with $p = 0.629$ and $R^2 = 0.016$. High inflation may still matter for crypto-app use in particular countries. The G20 cross-section shows no stable general slope-inflation relation.

5 Limitations

WP 1049 remains a useful study of procyclical retail activity on crypto exchange apps: prices lead measured DAUs, young men are over-represented, and shocks that move Bitcoin prices also move app usage. Those results stand on the paper's design. The simulated-loss calculations are a separate object. They show that cohorts who buy Bitcoin when (and after) they download exchange apps, and who are marked in 2022 after the late-2021 peak, often show negative paper

Table 3: Country-level DAU-age power-law slopes (G20 supplement)

Country	ISO2	Slope β	R^2	N
Turkey	TR	13.05	0.956	83
Korea	KR	12.52	0.811	83
Argentina	AR	11.10	0.962	83
Japan	JP	9.20	0.733	83
India	IN	9.08	0.890	83
Brazil	BR	8.87	0.970	83
Russia	RU	8.33	0.941	83
Indonesia	ID	8.28	0.950	83
France	FR	8.21	0.943	83
Mexico	MX	8.10	0.950	83
Germany	DE	7.40	0.923	83
Italy	IT	7.34	0.958	83
Australia	AU	7.17	0.885	83
United States	US	7.00	0.899	83
United Kingdom	GB	6.94	0.924	83
South Africa	ZA	6.18	0.922	83
Canada	CA	6.16	0.892	83
Saudi Arabia	SA	4.74	0.828	83
China	CN	4.12	0.403	83

Notes: Age from 2009-01-03. Data: BIS WP 1049 G20 supplement (Sensor Tower). Author's OLS. Eleven of nineteen R^2 exceed 0.9; only China and Japan fall below 0.8.

Table 4: DAU-age slope versus average CPI inflation (G20)

Specification	Intercept	Slope on CPI	R^2	p-value	N
All 19 countries	7.452	0.100	0.245	0.031	19
Excluding Argentina and Turkey	7.230	0.129	0.016	0.629	17

Notes: CPI = country mean of annual `FP.CPI.TOTL.ZG` for 2015–2022. Dependent variable: Table 3 slopes. Author's OLS. Using 2015–2021 CPI averages yields $R^2 = 0.198$ (all) and 0.010 (excluding AR and TR).

gains when entry is concentrated in 2021. That pattern is download-timed DCA into a cyclical peak. Realised wealth of Bitcoin holders over 2015–22 is a separate object. Beside Graphs 5–6, the buy-and-hold path in Table 1 makes the distinction concrete. Santostasi and Perrenod [2026] discuss why long-horizon Bitcoin holding can diverge from short-horizon trading around attention spikes; this note leaves that mechanism untested.

Exchange-app DAUs differ from Bitcoin addresses, exchange-traded fund (ETF) shares, or broker statements. The public supplement is G20 monthly data, so the global daily downloads behind Graph 5 are unavailable for an independent rebuild. The binned data behind Graphs 5 and 6 in the public supplement give 72.7 percent above $20,000 and an 81.0 percent loss share, which confirms the published bins and leaves daily-level reconstruction outside this audit. Graph 6's within-month price rule and the construction of the $900 median stake remain partly unspecified, so Table 2 is an approximation anchored to the paper's verbal description and to G20 download timing. This note omits re-estimation of equation (1), the China/Kazakhstan event studies, the Shapley decomposition, and the Appendix B PVAR, and it omits fees, taxes, and altcoin returns. Bitcoin dominance uses CoinGecko Research's published *yearly average* dominance rates; the month-weighted figure of about 60 percent is an approximation to the sample-period mean. CoinGecko Research yearly averages accessed 31 October 2026.[3] Nothing herein is investment advice.

[3] Daily total-crypto market-capitalisation series from CoinGecko were unavailable at the time of writing (API rate limits); yearly averages from CoinGecko Research are used.

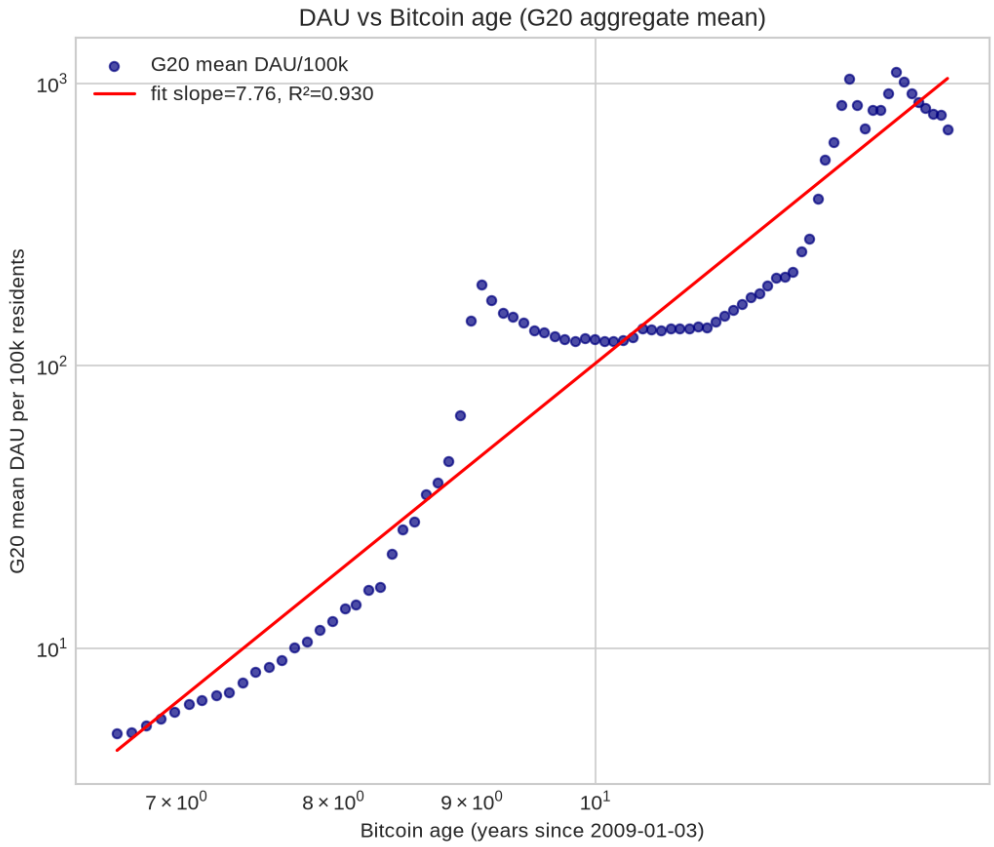


Figure 4: G20 mean DAU per 100k versus Bitcoin age (log-log), with OLS fit.

6 Conclusion

WP 1049 documents price-led entry into crypto exchange apps with care. Its three-quarters loss figure comes from hypothetical purchase rules timed to those apps and valued in a bear market. Over August 2015–June 2022, public price series put buy-and-hold Bitcoin near 69–71× principal (about 84–85 percent CAGR). Approximate DCA exercises place loss rates near 81 percent once entry is weighted by downloads, and a monthly-high versus monthly-average buy rule in the approximate DCA exercises moves that share only from 83.2 to 81.7 percent. Most G20 DAU-age power laws are steep, with China and Japan as regulatory outliers, and slope-CPI associations fade without Argentina and Turkey. The entry results can be used as measured. The three-quarters figure should be cited as a simulation valued in 2022 with an explicit purchase rule. Brokerage or exchange-level realised returns can test how close those simulations come to actual retail P&L.

Data and code availability

The author deposits the derived outputs of this note: the results tables, the figures, and the analysis script that produces them. The BIS working paper and its public supplement are available from `https://www.bis.org/publ/work1049.htm` and are not redistributed here; the supplement should be cited jointly with Sensor Tower and Auer et al. [2022], as the file notice

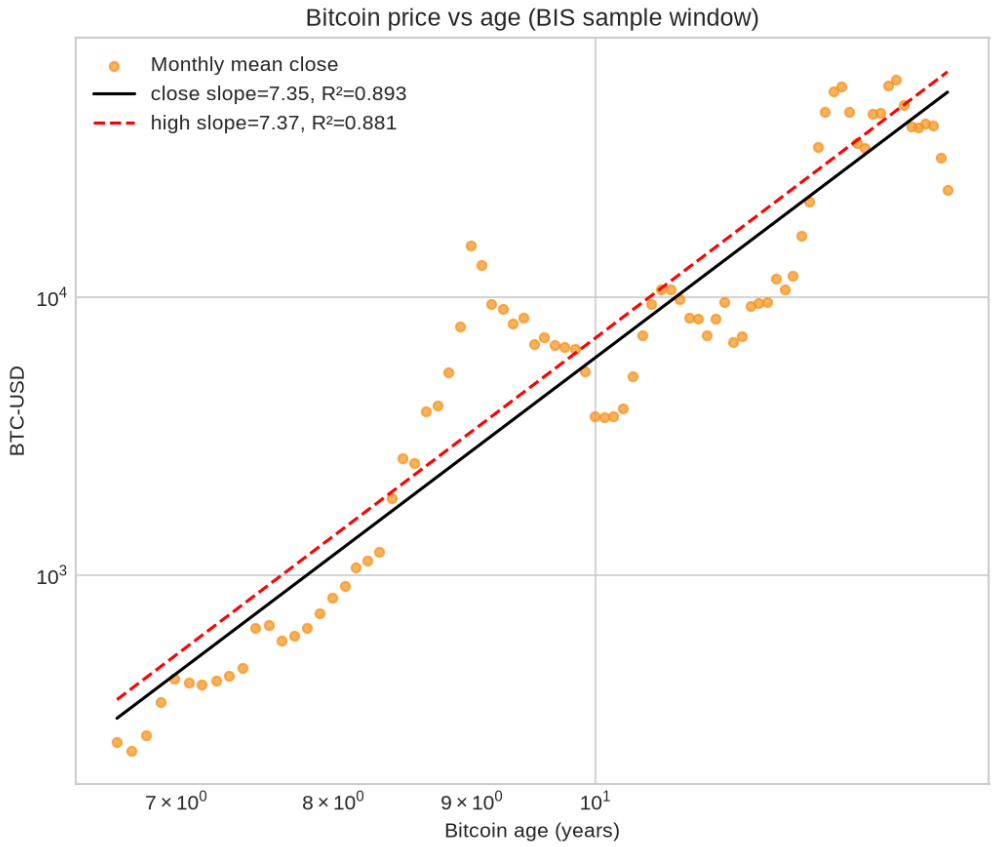


Figure 5: Bitcoin price versus age over the BIS window (monthly mean close and monthly high).

requires. The public price sources are Yahoo Finance (`BTC-USD`), CoinMetrics Community (`PriceUSD`), and Blockchain.info (market-price chart). Consumer price inflation comes from the World Bank (`FP.CPI.TOTL.ZG`). All of these were retrieved on 31 October 2026. No proprietary Sensor Tower daily global extract was used beyond the public G20 release.

Conflict of interest

The author declares no conflict of interest.

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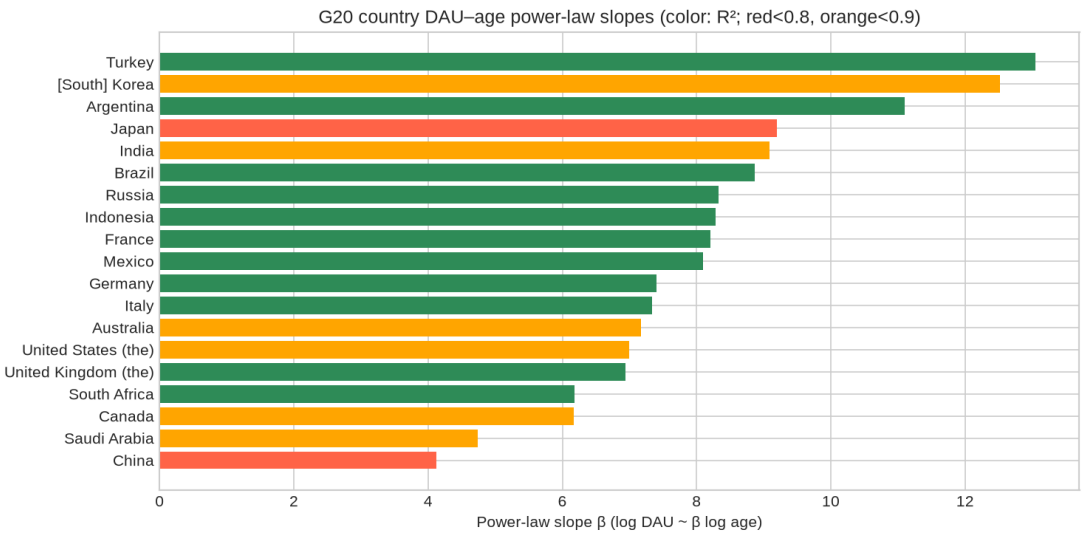


Figure 6: G20 country DAU-age slopes. Bar colour indicates R^2 (red < 0.8, orange < 0.9, green ≥ 0.9).

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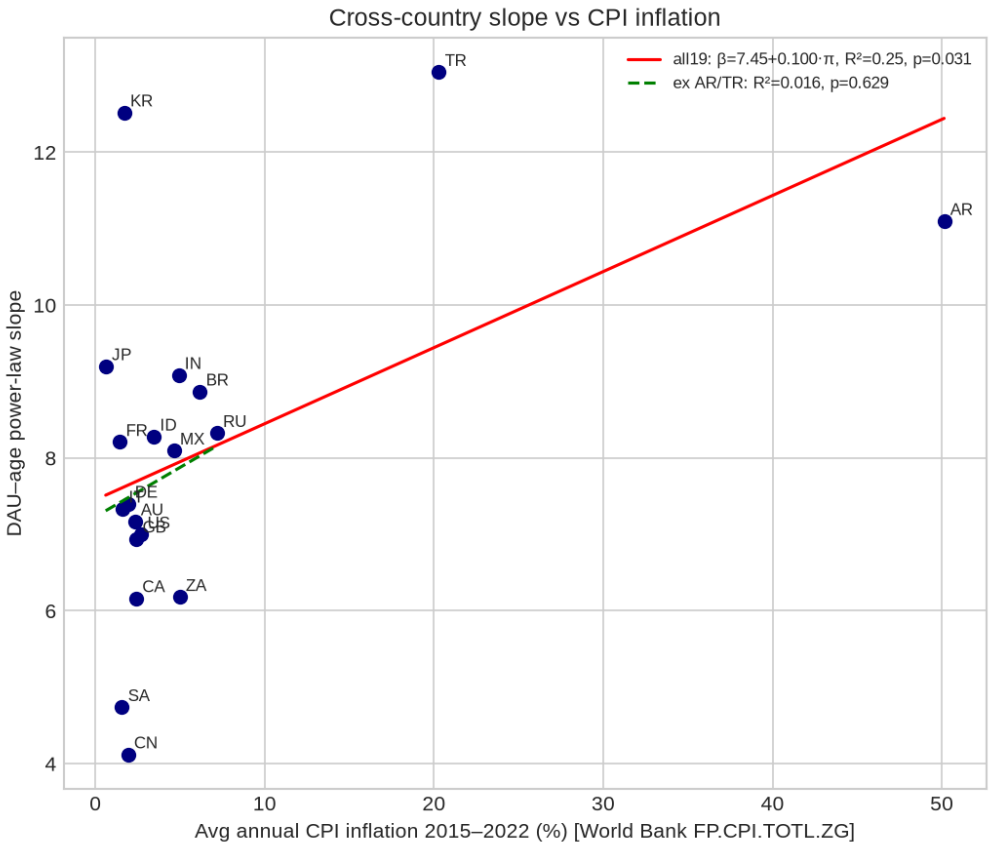


Figure 7: Country DAU-age slopes versus average CPI inflation, 2015–2022. Fitted lines: full sample and sample excluding Argentina and Turkey.

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