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The Measurement Gap

Why America cannot answer the question Congress just asked about cash rounding, and what would make it answerable

Kyle Hatfield, CEO and Co-Founder · Daniel Hobin, CFO and Co-Founder · Alex Ortega, CAIO and Co-Founder

Centsless · www.centsless.org

Analytical, non-advocacy. This paper takes no position on whether the penny or nickel should be eliminated or on any pending legislation.

Abstract

Section 5 of the Common Cents Act (H.R.3074), passed by the United States House of Representatives on July 14, 2026, directs the Treasury and the Federal Reserve to assess the impact of penny supply disruptions and rounding practices on low-income communities, older consumers, and debanked, unbanked, and underbanked individuals [1]. This paper examines whether that question can be answered with existing data. Our audit of the empirical literature, from Lombra (2001) through the Federal Reserve Bank of Richmond (2025), finds that the published estimates of rounding's consumer cost rest on posted-price simulations, self-reported survey diaries, or macro price indexes. To our knowledge, no published study anywhere has measured observed, per-transaction rounding outcomes at the point of sale, and no public authority in the United States collects such data. The population Congress named is precisely the population that transacts most in cash, so the distributional question is real. But cash rounding occurs on exactly the transactions that leave no independent settlement record, and the only state with a mandatory rounding law imposes no recordkeeping on outcomes. The result is a measurement gap: the assessment Congress ordered can currently be answered only with models and surveys, not evidence. We describe the gap, catalog the harm mechanisms that go unmeasured within it, and outline, by analogy to record-based regimes such as Home Mortgage Disclosure Act reporting, what per-transaction evidence infrastructure would make the question empirically answerable.

1. The question Congress asked

The House-passed text of H.R.3074 requires, within 90 days of enactment, a public Federal Reserve report outlining a strategic plan for penny orders and deposits at commercial coin terminals. Within that report, the Secretary of the Treasury must deliver an assessment, conducted within 60 days of enactment, of the impact of penny supply and demand disruptions, and rounding practices for check cashing, on low-income communities, older consumers, and debanked, unbanked, and underbanked individuals, including feedback from state and local entities and recommendations to Congress to address any adverse impacts identified. Follow-up evaluation reports are due 6, 18, and 30 months after the strategic plan [1].

Two features of this mandate matter analytically. First, its scope names specific populations, which makes it a distributional question: not whether rounding costs consumers in aggregate, but whether it costs particular consumers. Second, the practice

under assessment is one that federal law does not mandate and does not track. The same bill makes rounding permissive, states that nothing in it requires any person to round, and excludes checks, electronic fund transfers, and card payments from rounding entirely [1]. The Treasury is therefore being asked to measure the effects of a voluntary, untracked practice on populations defined by their reliance on the one payment method that produces no independent settlement record.

2. Who uses cash

The distributional concern is grounded in measurable usage differences. The Federal Reserve's 2025 Findings from the Diary of Consumer Payment Choice, based on October 2024 data, reports that cash accounted for 14 percent of consumer payments overall, but 24 percent for households earning under 25,000 dollars against 9 percent for households earning over 150,000 dollars. Older adults rely on cash more than younger cohorts, and adults over 65 carry nearly three times the on-person cash of adults 18 to 24 [2].

The FDIC's 2023 National Survey of Unbanked and Underbanked Households, published November 2024, found 4.2 percent of households unbanked, about 5.6 million households, with sharply higher rates among Black (10.6 percent), Hispanic (9.5 percent), and American Indian or Alaska Native (12.2 percent) households, and among lower-income, less-educated, and disabled households. Two thirds of unbanked households, 66.2 percent, relied entirely on cash [3]. Underbanked status is defined partly by use of nonbank services such as check cashing, which connects the FDIC data directly to the check-cashing rounding language in Section 5.

The synthesis is straightforward: the groups Congress named are the groups that transact most in cash. Whatever rounding does, it does most to them. The direction of the concern is defensible. The magnitude is what nobody can currently measure.

3. What the studies actually measured

The rounding literature spans twenty-five years and two conclusions, and the disagreement traces to data source rather than arithmetic.

Lombra (2001). Raymond Lombra obtained before-tax prices on 3,585 convenience store items, found 82.5 percent ended in 9, and simulated 5,000 small-basket transactions, estimating a rounding tax of at least 600 million dollars per year and arguing the burden would fall disproportionately on the poor [4]. Critics noted the simulation assumed small

baskets and excluded sales tax, both of which bias toward round-ups. The transactions were assumed, not observed.

Whaples (2007). Robert Whaples obtained records of nearly 200,000 actual register transactions from a convenience chain operating in seven states. Because the penny was still in circulation, none of those transactions was actually rounded. What Whaples could observe was each real total; he then simulated what nearest-nickel rounding would have done to it, finding the effect essentially neutral and slightly consumer-favorable after sales tax in six of seven states [5]. This is the closest any study has come to transaction evidence: real totals, hypothetical rounding.

Wang and Wong, Richmond Fed (2025). Using the 2023 Diary of Consumer Payment Choice, a self-reported three-day survey diary of 4,671 individuals, the authors estimated that nickel rounding would cost United States consumers approximately 6 million dollars per year, with a combined penny-and-nickel phase-out costing approximately 55.58 million dollars per year. They state explicitly that prior studies rely on simulated transactions and that their own estimates assume fixed transaction patterns [6].

Atlanta Fed (2025). A Federal Reserve Bank of Atlanta analysis of the 2024 diary found that 72 percent of reported cash payments already end in zero pennies and concluded that the cash inflationary impact of symmetric rounding is not statistically different from zero [7]. This too rests on survey self-reports.

International evidence. Canada withdrew the penny in 2012 and 2013 after predictive analyses; the most cited post-hoc study collected roughly 18,000 posted grocery prices and simulated rounding, estimating a transfer of about 3.27 million Canadian dollars per year to grocers [8]. New Zealand's and Australia's coin withdrawals were evaluated afterward with small CPI price samples and opinion surveys. A 2025 study of Israeli data used CPI price endings and household expenditure baskets through simulation [9]. In none of these countries was realized per-transaction rounding measured after the coins were withdrawn.

The pattern across the studies we reviewed is uniform. Three proxies appear, posted or scanner prices with simulated baskets, self-reported survey diaries, and macro price indexes, and observed rounding appears nowhere. To our knowledge, no published study in any jurisdiction has measured the actual rounded amounts paid at the point of sale.

4. The gap: no one is collecting the answer

The natural response is that the data must exist somewhere, and in fragments it does: modern point-of-sale systems log the cash transactions they process, including any

rounding their software applies. But those logs are proprietary, unstandardized across vendors, inaccessible to researchers and regulators, and editable by the systems that produce them. A mutable private log is not a measurement, and no mechanism aggregates or verifies such records. What does not exist, anywhere we could identify, is what a study requires: systematic, verifiable, research-accessible records of rounding outcomes.

The Diary of Consumer Payment Choice records what consumers report paying, not what registers decided; it has no merchant-side records, and respondents may round their own reported amounts [2]. Retail scanner datasets capture posted prices, not tendered-cash rounding. Card networks never see the relevant transactions, because every enacted rounding framework, federal draft included, applies rounding to cash only, while card, check, and electronic payments clear to the exact cent [1][10]. The transaction type at issue is structurally the one with no independent settlement record: no bank or network entry exists against which the cash outcome can be reconciled.

The enacted state laws we track add no collection. Arizona's mandatory rounding statute, the only one in the country, fixes the symmetric method, requires a posted notice, and directs that tax be computed and reported on pre-rounding amounts, with the rounding difference disregarded. Neither the statute nor Department of Revenue guidance requires any seller to record, report, or aggregate rounding outcomes [10]. SNAP retailer monitoring analyzes electronic EBT transactions, which are never rounded [11]. Across the federal and state collection regimes we examined, none is collecting observed rounding outcomes, and we found no proposal to begin.

This is the measurement gap. When the Treasury prepares the Section 5 assessment, it will have surveys, models, and stakeholder feedback, the same inputs as every study above, and the 6, 18, and 30 month follow-up reports will inherit the same limitation unless the underlying data changes.

5. What goes unmeasured inside the gap

Symmetric rounding, consistently applied to uniformly distributed totals, is close to neutral, and the best survey evidence supports that expectation in aggregate [6][7]. The distributional risks live in the departures from that ideal, and each is currently unmeasurable:

Asymmetric application. Neutrality assumes the method is followed. Price endings are not uniform, a large share of posted prices end in 9, and retailers set 9-endings strategically [12].

Whether realized cash totals round up more often than down, for which customers, at which merchants, is exactly the unobserved quantity.

Rounding applied in error to electronic payments. Any rounding of a card or EBT transaction is an overcharge under every enacted framework. We found no central mechanism that tracks whether it happens.

SNAP equal treatment. Federal rules require SNAP customers receive the same prices and terms as cash customers [11]. Cash rounding beside exact-cent EBT charges creates a compliance question that agencies have so far addressed through guidance rather than rulemaking, and no public data shows how it resolves at actual registers.

Tax-base errors. Every enacted state framework we track requires tax on the pre-rounded total [10]. Rounding before tax miscomputes the liability. The frequency of this error in practice is unknown.

Prospective litigation exposure. Industry and legal analysts have warned of class-action exposure where advertised prices and rounded charges diverge [13]. We are aware of no adjudicated rounding case as of this writing, and we present this as prospective risk, not established harm. The point is narrower: if disputes arise, there is no tamper-evident record to resolve them, and a journal the merchant's own system can edit proves little to either side.

6. Precedent: what records change

Regulators have faced this structure before, a distributional question about a diffuse, high-volume practice, and the durable answer has been per-transaction records. The Home Mortgage Disclosure Act converted fair-lending assessment from complaint anecdotes into loan-level data covering roughly 90 percent of the mortgage market, and it is the screening backbone of modern redlining enforcement [14]. HMDA data does not by itself prove discrimination, but it transformed an unanswerable question into a screenable one. Securities trade reporting and information reporting in tax administration followed the same arc: self-attestation and surveys gave way to records, and enforcement capacity followed.

The analogy to cash rounding is direct and limited. Direct, because a per-transaction record of the rounding applied, its direction, its amount, and the payment type would convert the Section 5 question from estimated to observed. Limited, because nothing in the analogy requires new burdens on consumers or changes to who bears rounding; the record is a byproduct of the transaction, not an intervention in it.

7. What would make the question answerable

Stated analytically, the Section 5 assessment becomes empirically answerable when three conditions hold. First, rounding events are recorded at the transaction level, with rule applied, direction, amount, and payment type. Second, the records are tamper-evident, so that after-the-fact disputes about what occurred are resolvable from the record rather than from testimony. Third, aggregation is privacy-protective, reporting counts and distributions rather than identities. Under those conditions, the questions Congress posed, whether rounding is symmetric in practice, whether cash-reliant populations experience different outcomes, whether protected payment types are ever rounded in error, become computations rather than estimates.

This infrastructure exists. Centsless operates a jurisdiction-aware rounding engine in production that applies the correct statutory method per transaction and produces a cryptographically hash-chained, tamper-evident record of every rounding event [15]. We describe it here not as a policy proposal but as an existence proof: the claim that the measurement gap is closable is not speculative, because the class of system that closes it is already running. Whether and how any public assessment should draw on such records is a question for policymakers, and outside the scope of this paper.

8. Conclusion

Congress asked a good question. The cash-using population is measurably skewed toward the households Section 5 names, the aggregate evidence suggests symmetric rounding is nearly neutral, and the distributional evidence, the part Congress actually asked about, does not exist, because, to our knowledge, no one has ever observed rounding outcomes at the register and no public authority is collecting them now. Twenty-five years of literature substitutes simulation for observation, and the mandated assessment will too, unless the data changes. The gap is not a criticism of any study or agency. It is a statement about infrastructure: questions get answered when transactions leave records. The penny's retirement created a new class of transaction decisions, millions per day, currently invisible. Making them visible is an engineering fact before it is a policy choice.

References

[1] H.R.3074, Common Cents Act, House-passed text, Section 3, Section 4, Section 5. docs.house.gov (HR3074_SUS) and congress.gov. Passed the House by voice vote July 14, 2026; referred to the Senate Committee on Banking, Housing, and Urban Affairs July 15, 2026.

[2] Federal Reserve Financial Services, 2025 Findings from the Diary of Consumer Payment Choice, May 2025. frbservices.org.

[3] FDIC, 2023 National Survey of Unbanked and Underbanked Households, November 2024. fdic.gov.

[4] Lombra, R., Eliminating the Penny from the U.S. Coinage System: An Economic Analysis, *Eastern Economic Journal* 27(4), 2001, 433-442.

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[7] Federal Reserve Bank of Atlanta, Rounding Rules and Cash Inflation When We No Longer Make Cents, Policy Hub: Macroblog, November 3, 2025. atlantafed.org.

[8] Cheung, C., Eliminating the Penny in Canada: An Economic Analysis of Penny-Rounding on Grocery Items, *Atlantic Economic Journal* 46, 2018, 231-239. See also Chande, D. and Fisher, T., Have a Penny? Need a Penny? Eliminating the One-Cent Coin from Circulation, *Canadian Public Policy* 29(4), 2003.

[9] Sayag, D., Snir, A., and Levy, D., 0.001% and Counting: Revisiting the Price Rounding Tax, 2025, published in *Contemporary Economic Policy*, using Israeli price-ending and basket data.

[10] Arizona Revised Statutes 44-7952; Arizona Department of Revenue, Arizona Penny-rounding Law and Arizona Cash Transaction Rounding Law: Guidance for Businesses, effective March 12, 2026. azdor.gov. The full set of enacted state frameworks is compiled at www.centsless.org/intelligence/legislation-tracker.

[11] 7 CFR 278.2(b), equal treatment of SNAP customers; 7 CFR 274.7 on benefit redemption. ecfr.gov.

[12] Levy, D., et al., Not All Price Endings Are Created Equal, *Journal of Monetary Economics*, 2020; Levy, D., Bergen, M., Dutta, S., and Venable, R., The Magnitude of Menu Costs, *Quarterly Journal of Economics* 112(3), 1997.

[13] Industry and legal analyses of rounding litigation exposure, including Holland and Knight commentary on consumer-protection class-action risk and National Retail Federation and American Bankers Association statements, November to December 2025. Presented as prospective risk; no adjudicated rounding case is known to the authors as of July 20, 2026.

[14] Home Mortgage Disclosure Act, 12 U.S.C. 2801 et seq.; CFPB HMDA data documentation and Department of Justice Combatting Redlining Initiative, 2021.

[15] Centsless platform documentation, docs.centsless.org. United States provisional patent application, 31 claims, filed November 2025.

Limitations

The central claim of this paper is a negative existence claim: that no published study measures observed per-transaction rounding outcomes and no public authority collects such data. It is supported by a full audit of the literature named above and of federal and state collection regimes, but a proprietary or unpublished dataset cannot be categorically ruled out, and we would welcome correction. Survey figures cited from the Diary of Consumer Payment Choice and the FDIC household survey carry their own sampling limitations. Litigation exposure is presented as prospective, not realized. Legislative facts are stated as of July 20, 2026 and will change; the current status of every framework cited here is maintained at www.centsless.org/intelligence/legislation-tracker. The authors are officers of Centsless, which builds the class of evidence infrastructure discussed in Section 7; readers should weigh that interest, which is disclosed here precisely so the analysis can be evaluated on its sources, all of which are public.