Federal Reserve Bank of Atlanta
Research Data Report

Defining Households That Are Underserved in Digital Payment Services

2024 No. 24-3
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Abstract

US households that lack digital means of making and receiving payments cannot participate fully in an increasingly digitized economy. Assessing the scope of this problem and addressing it requires a definition of households that are underserved in digital payments. Traditional definitions of households underserved in the banking system—those that are unbanked and those that are underbanked—do not account for the ownership of nonbank transaction accounts that can be used to make and receive digital payments. In this paper, we define households underserved in digital payments by considering four key elements—access, use, safety, and affordability—and discuss how researchers may assess these elements to quantify the share of households underserved in digital payments.

Keywords: Digital payments inclusion, underserved, fintech, nonbanks

JEL Classifications: D12, D18, G21, G23

This version: September 9, 2024

Authors, acknowledgements, and disclaimers are on the next page.

Authors, acknowledgements, and disclaimer

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This report, which may be revised, is available on the Atlanta Fed website, atlantafed.org.

The authors thank Paola Boel, Brian Clarke, Ken Isaacson, Jessica Washington, participants in the Federal Reserve System Payments Researchers' Underserved Discussion Group, and seminar participants at the Federal Reserve Bank of Kansas City for helpful comments and Kevin Foster for assisting us in analyzing data from the Survey and Diary of Consumer Payment Choice. This paper is an outcome from the "Payments for All" work group focusing on payments inclusion, which is part of the Federal Reserve System's Economic Inclusion Commitment initiative.

https://doi.org/10.29338/rdr2024-03

1. Introduction

Having a safe and affordable way to make and receive digital payments enables people to participate fully in the economy as it becomes more digitized and businesses increasingly shift away from paper-based payment methods (Toh 2021; Federal Reserve Bank [FRB] of Atlanta 2023). Some US households, however, may not have a way to make and receive payments via digital means for some or all types of transactions, including purchases, bill payments, person-to-person (P2P) transfers, and the receipt of payroll, government benefits, or other incoming payments.

Traditional definitions of "unbanked" households—those that do not have a bank account—and "underbanked" households—those that have a bank account but use alternative financial services such as check cashing, nonbank money orders, and payday or title loans—are not suitable for defining who is underserved in digital payments when measuring the share of households that lack a way to conduct digital payments.[1] Although unbanked and underbanked households are underserved *in the banking system*, some may not be considered underserved *in digital payments* if they have access to alternative, nonbank transaction accounts and use them frequently to conduct digital payments. These alternative transaction accounts have recently become more prominent. They include general-purpose reloadable (GPR) prepaid cards, government-administered prepaid cards, fintech digital deposit accounts, and nonbank accounts with online payment service providers such as PayPal, Venmo, and Cash App (Greene and Shy 2023; Toh 2023). Merely counting ownership of such accounts, however, could overstate access to and use of safe and affordable digital payments because some accounts offer digital payment services that can be used for only limited types of transactions, are not widely accepted by transaction counterparties, or are unsafe or expensive.

Unlike "underserved in the banking system," "underserved in digital payments" has no common definition in the United States, making it difficult to measure the scope of the problem. Establishing a definition of households that are underserved in digital payments would make it possible to collect data consistently. Such underserved households may vary significantly, ranging from those that do not own any transaction account to those that own accounts and make digital payments only for a small share of transactions. It is important to recognize the difference between households that *choose* to make no or few digital payments due to their preferences and households that do not make digital payments because they *cannot* access or afford these types of payments. Arguably, only the latter may be considered underserved in digital payments, but distinguishing the two groups is extremely difficult—if not impossible—since researchers can observe only their behavior, not their preferences. Nevertheless, dividing households that are underserved in digital payments into different categories (for example, those that lack access to safe and affordable transaction accounts and those that have access to such accounts but rarely use them for digital payments) and measuring the share of underserved households that each category represents could be useful for policymakers and other stakeholders in designing policies and products that expand access to and use of digital payments for all households.

[1] The Federal Deposit Insurance Corporation (FDIC) defines a household as "underbanked" if the household is banked and in the previous 12 months used at least one of the following nonbank transaction or credit products or services: money orders, check cashing, international remittances, rent-to-own services, payday loans, pawn shop, tax refund anticipation, or auto title loans (https://www.fdic.gov/analysis/household-survey/index.html). Nonbank transaction account services are not included in the FDIC's definition.

This paper aims to define households that are underserved in digital payments. We also define digital payments inclusion, drawing from existing definitions of financial or payments inclusion. Such definitions often describe a desired state in which financial or payment services that are safe, affordable (or low cost), convenient, and equitable are accessed and used by everyone in the economy. With our end goal of measurement in mind, we focus on four elements that can easily be quantified: access, use, safety, and affordability.

This paper is organized as follows. Section 2 reviews existing definitions of financial or payments inclusion. Section 3 presents our definitions of digital payments inclusion and households underserved in digital payments. Section 4 describes the framework for assessing the four key elements in our definitions: access, use, safety, and affordability. Section 5 discusses potential next steps toward measuring the share of underserved households and the factors contributing to their underserved status. Section 6 concludes.

2. Existing Definitions of Financial or Payments Inclusion

Globally and in the United States, many researchers and organizations have sought to define the concept of financial inclusion. Balliester Reis (2021) reviews definitions of financial inclusion from 67 studies in journal articles and institutional working papers. Several organizations, such as the Alliance for Financial Inclusion (AFI), the Consultative Group to Assist the Poor (CGAP), the Center for Financial Inclusion (CFI), and the United Nations, have offered definitions, and a few, including the G20 and the World Bank Group, have created financial inclusion indicators or indexes (Beck 2016).

However, definitions of payments inclusion are scarce. Indeed, we find only one study—CPMI-World Bank Group (2016)—that focuses on payments inclusion as an aspect of financial inclusion. Nevertheless, some definitions of financial inclusion explicitly mention payment services as part of the financial services considered (Chakravarty and Pal 2013; Güngen 2018; Hoyo, Pena, and Tuesta 2013). Many definitions of financial inclusion also implicitly encompass a broad set of financial services such as savings, credit, insurance, and payments.

While specific definitions vary, they share common features. Many researchers and organizations define financial or payments inclusion as an economic state, or the process of achieving that state, in which financial services satisfy certain thresholds or conditions related to access, use, quality, and affordability. Many definitions and inclusion indicators include some, if not all, of these four elements.

Access

All definitions include some version of access, a critical component of financial inclusion because it is the prerequisite for using and benefitting from financial services. Several studies use the ownership of accounts at financial institutions—typically banks, credit unions, post offices, or microfinance institutions—as a proxy for access to financial services (AFI 2010; Demirgüç-Kunt et al. 2022; Park and Mercado 2018). Access may require physical proximity (for example, to an ATM or bank branch) as well as the ability to make payments when needed. Other access indicators include proximity to points of service (POS), such as the numbers of ATMs, bank branches, and POS terminals per 100,000 adults, or the share of small and medium-sized enterprises that have a POS terminal (Camára and Tuesta 2017; Khera et al. 2021; Park and Mercado 2018; Global Partnership for Financial Inclusion [GPFI] 2016).

Households' access to the internet is another factor that affects access to financial services, as those services have increasingly become digital (Khera et al. 2021).

Use

Most definitions of financial or payments inclusion consider the use of financial services. While access refers to having the ability to use financial services, the benefits of those services are accrued only when individuals use them. A common measure of use is extensive margin, such as the share of adults who save at or borrow from a financial institution (Camára and Tuesta 2017; Khera et al. 2021; Park and Mercado 2018). Frequent and regular use of financial services may indicate that households have access to financial services that are valuable to them (CPMI-World Bank Group 2016). Some studies attempt to capture the intensity of households' use of financial services by considering the frequency, regularity, and duration of that use (AFI 2010). Proxies for the intensity of use include the number of deposits into and withdrawals from an account and the number of transactions per 1,000 adults (Allen et al. 2015; GPFI 2016). In research focusing on international comparisons, use can be measured as the share of the population in each country that uses products such as debit cards or cashless transactions. In research focusing on comparisons across individuals within a country, use can be measured by the intensity, frequency, or regularity of use of selected products or services.

Quality

Financial services vary in quality. According to most definitions, financial inclusion requires that the financial services to which households have access meet certain quality standards. One such standard is safety, which is defined in two ways. Objectively, the services themselves must be safe (that is, low or no probability of failure or fraud), or they must be provided safely to the consumers (that is, without unfair or deceptive practices). Subjectively, consumers must perceive the services as safe, that is, trustworthy.[2] For example, many definitions and measures consider the presence of adequate consumer protection as an indicator of high quality. Amidžić, Massara, and Mialou (2014), GPFI (2016), and Park and Mercado (2018) include disclosure requirements (for example, use of plain language and standardized disclosure formats) and dispute resolution mechanisms—both related to consumer protection—as quality indicators in their measures of financial inclusion. Only "responsible" financial services meet the financial inclusion definitions of the CGAP (n.d.) and the World Bank Group (2022). Similarly, other definitions consider only "formal" financial services, "regulated" accounts or products, or services offered by "regulated" providers, as these services tend to be safer than informal or unregulated financial services. Regulated or formal providers are limited to banks or depository institutions in some definitions, but they are broader in other definitions. For example, the CPMI-World Bank Group (2016) includes e-money and prepaid accounts held with banks or other authorized or regulated payment service providers, such as money transfer operators and e-money issuers. A few studies mention convenience, such as ease of use or the time spent completing a financial transaction, as quality attributes (CFI 2018; CPMI-World Bank Group 2016). Other quality attributes mentioned in some studies

[2] Section 5 of the Federal Trade Commission Act defines an unfair practice or act as one that "causes or is likely to cause substantial injury to consumers, cannot be reasonably avoided by consumers, and is not outweighed by countervailing benefits to consumers or competition"; a deception occurs when "a representation, omission, or practice misleads or is likely to mislead the consumer; a consumer's interpretation of the representation, omission, or practice is considered reasonable under the circumstances; and the misleading representation, omission, or practice is material."

include appropriateness and usefulness of the financial services in meeting the needs of the intended customers (AFI 2010; Beck 2016; European Commission 2008; World Bank Group 2022).

Affordability

In addition to including quality attributes, many definitions of financial or payments inclusion require that the financial products or services to which households have access are low cost or affordable. For instance, "affordable" services are required to meet the financial inclusion definitions in World Bank Group (2022), CGAP (n.d.), CFI (2018), and Atkinson and Messy (2013); Beck (2016) uses the term "reasonably priced"; and Demirgüç-Kunt and Klapper (2012) state that such services should pose no "price or nonprice barriers to their use." Of course, affordability is a subjective concept and varies across individuals, let alone countries. Affordability could be used in reference to income, and some definitions include lack of affordable products as a barrier to financial inclusion. Some definitions do not mention specific cost requirements but narrow their focus on financial services provided by formal or regulated financial institutions (Allen et al. 2016; Beck 2016; Cámara and Tuesta 2017; Sahay et al. 2015; Sarma 2008).[3] These financial institutions tend to offer financial services that cost less than those of informal or nonregulated financial institutions.[4]

Typically, the overall goal state of financial or payments inclusion is, first, universal access to high-quality and affordable services within a society and, second, broader and more frequent use of those services.

3. Our Definitions

We set forth definitions of digital payments inclusion and households that are underserved in digital payments with our end goal of measurement in mind.

3.1. Digital payments inclusion

The financial inclusion definitions discussed earlier consider a range of financial services, including payments, credit, savings, and insurance. Although these different types of financial services may be interconnected, they are distinct. Thus, we can think of financial inclusion as comprising several components, each relating to one type of financial service. In this paper, we focus on the (sub)component of financial inclusion relating to digital payments (a subset of payments), which we term digital payments inclusion. Digital payments are payments made through a digital device or channel, such as electronic fund transfer (for example, automated clearing house [ACH] and instant payments); debit, prepaid, or credit card; closed-loop online payment services offered by online payment service providers (for example, PayPal and Cash App); and cryptocurrency transfer.

We define digital payments inclusion as an economic state in which all households have access to and are using safe and affordable digital payments for most of their transactions. This definition aligns with other financial and payments inclusion definitions that treat financial or payments inclusion as a goal state and that consider threshold conditions for four common elements: access, use, safety (as a quality attribute), and affordability.

[3] Formal financial institutions typically refer to commercial banks, credit unions, post offices, and microfinance institutions (see, for example, Allen et al. 2015; Demirgüç-Kunt et al. 2022), and they tend to be regulated.
[4] For example, Hayashi, Hansen, and Maniff (2015) find that checking accounts offered by banks generally cost much less than GPR prepaid cards offered by nonbanks.

A household has access to digital payments for a transaction if it can use digital payments to complete that transaction. Access depends on not only the household's ability to obtain the digital payment instruments and services needed to make the transaction, but also the transaction counterparty's acceptance of those digital payment instruments. Further, access depends on the household's ability to fund the transaction in a timely manner.

The use of digital payments refers to households' actual utilization of digital payments for transactions, which may be captured by the share of transactions that the household makes using digital payments. Having access to digital payments is a prerequisite for using them for transactions, though access does not imply use. Households may choose not to use the digital payment instruments and services they have access to for various reasons, including a lack of understanding of the benefits of using digital payments, negative perceptions of or experiences with using digital payments, or a preference for using cash for transactions.

Our definition of digital payments inclusion does not require households to use digital payments for all their transactions, in part because we recognize that some transaction counterparties do not accept digital payment instruments, and thus it may not be possible for households to access digital payments for all transactions. Our definition also allows us to account partially for cases in which households choose not to access or use digital payment services for some transactions due to payment preferences.[5] For instance, households may choose to use cash for some transactions for various reasons, including perfect anonymity, immediate settlement, offline functionality, and easy budgeting (Shy 2023).

Our definition of digital payments inclusion further requires that the digital payment services households have access to and use are safe and affordable. Among quality attributes, we focus on safety and exclude other attributes such as convenience and usefulness because defining and measuring them are very difficult. A digital payments instrument or service is safe if it meets a particular threshold of safety, and it is affordable if the costs of accessing and using it for transactions is sufficiently low. In Section 4, we detail how researchers could measure these four elements and determine the relevant thresholds.

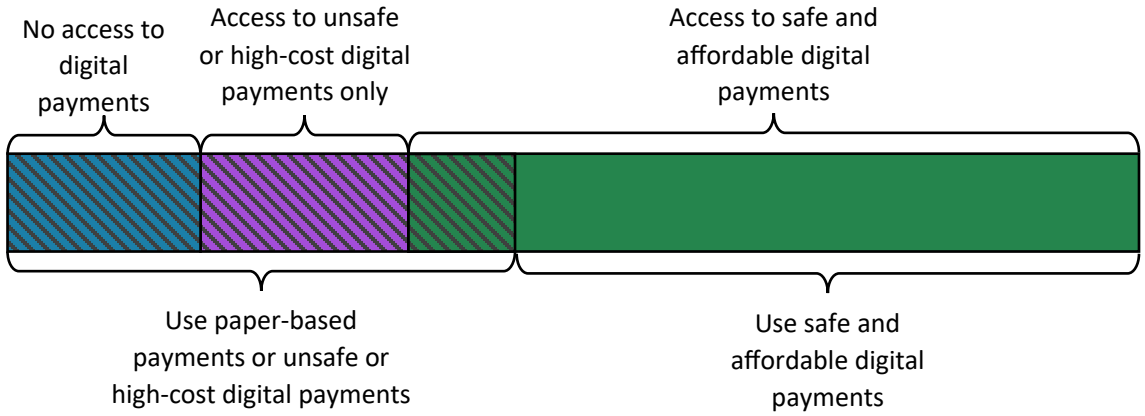
3.2. Households underserved in digital payments

Households' access to and use of safe and affordable digital payments for their transactions reflect how well households are served in digital payments. Figure 1 provides an example of what a household's access to and use of digital payments may look like. The bar in the figure represents the household's full set of transactions. The blue segment of the bar consists of transactions for which the household does not have any access to digital payments; the purple segment consists of transactions for which the household has access only to digital payments that are unsafe or high cost (for the household); and the green segment consists of transactions for which the household has access to safe and affordable digital payments. The shaded segment of the bar comprises transactions the household makes using paper-based payments or unsafe or high-cost digital payments, and the unshaded segment comprises transactions the household makes using safe and affordable digital payments. The household can use safe and affordable digital payments for a transaction conditional on access; that is, it can use these payments only for transactions in the green segment. For all transactions in the blue and purple

[5] Ideally, we would consider only the set of transactions for which households want to use digital payments. However, collecting information about households' payment preferences related to all their transactions is not feasible in practice.

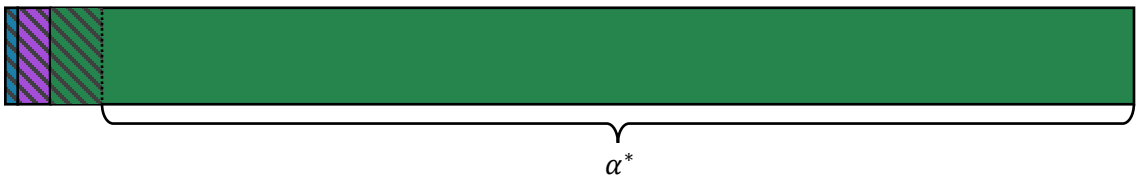
segments, the household must use paper-based payments or unsafe or high-cost digital payments; hence, these two segments are entirely shaded. For transactions in the green segment, the household may choose to use safe and affordable digital payments, unsafe or high-cost digital payments, or paper-based payments. The green-shaded segment represents the share of transactions the household chooses to make using unsafe or high-cost digital payments or paper-based payments, despite having access to safe and affordable digital payments.

Figure 1. The access and use of digital payments by a household



Aligning with our definition of digital payments inclusion, our definition of households that are fully served in digital payments refers to those that have access to and use safe and affordable digital payments for a sufficiently high share of their transactions. This definition allows us to re-express digital payments inclusion as an economic state in which all households are fully served. Figure 2 illustrates a fully served household: The household's share of transactions made with safe and affordable digital payments meets or exceeds the minimum threshold, denoted by α^*.

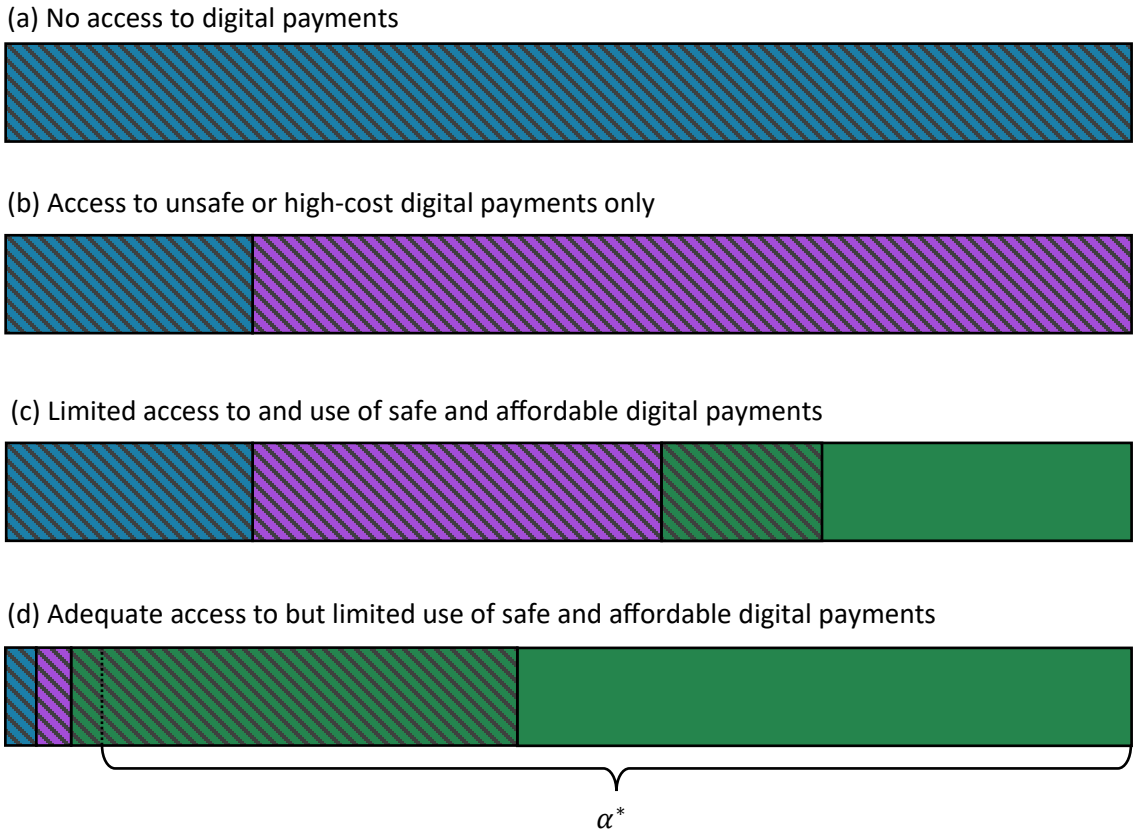
Figure 2. Access to and use of safe and affordable digital payments by a fully served household



We define households that are underserved in digital payments as those that are not fully served, namely households that use unsafe or high-cost digital payments or paper-based payments for a sizeable share (that is, exceeding $1 - \alpha^*$) of their transactions. We recognize that, based on our definition, some underserved households may not be truly underserved; that is, they may use unsafe or high-cost digital payments or paper-based payments for a share of their transactions exceeding $1 - \alpha^*$ due only to their payment preferences. Although our definition of underserved may overstate the number of households that are truly underserved, distinguishing between truly and not truly underserved is extremely difficult, if not impossible, because researchers generally can observe only households' behavior, not their preferences.

There is substantial heterogeneity across underserved households, as they differ widely in their level of access to and use of safe and affordable digital payments. We can divide the underserved households into four broad categories: (a) those that do not have access to any digital payments, (b) those that have access to unsafe or high-cost digital payments only, (c) those that have access to safe and affordable digital payments for some transactions, and (d) those that have access to safe and affordable digital payments for a sufficiently high share of their transactions but use them only to a limited extent. Of these underserved households, those in category (a) can be considered the most underserved because they cannot make any digital payments. Underserved households in category (d) are more like fully served households because their levels of access to safe and affordable digital payments are similar. However, unlike fully served households, underserved households in this category use these digital payments only to a limited extent due to their preferences, lack of awareness of the benefits of digital payments, or other reasons. Figure 3 depicts the four categories of underserved households' access to and use of digital payments. Notably, there may be substantial variations among households in categories (b) and (c). Households in category (b) may differ widely in how their transactions split between transactions without access to digital payments (blue segment) and transactions with access to only unsafe or unaffordable digital payments (purple segment). Similarly, households in category (c) may vary widely in how their transactions split across all the four possible segments, except that they all have a sufficiently small share (smaller than α^*) of transactions that they can make with safe and affordable digital payments (the combined green-shaded and unshaded segments).

Figure 3. Categories of underserved households



Our definitions of households fully served and households underserved in digital payments can help researchers identify the types of data they need to collect for measuring the percentage of households in the United States (or another economy) that are fully served or underserved, and they provide a framework for categorizing underserved households by their access to and use of safe and affordable digital payments. In doing so, our definitions can also help researchers assess not only progress toward digital payments inclusion, in terms of the reduction in the share of households that are underserved, but also changes in the composition of the four categories of underserved households. These assessments can be used to develop strategies for advancing digital payments inclusion, as the priorities of digital payments inclusion likely differ across the four categories of underserved households.

4. Framework for Assessing Access, Use, Safety, and Affordability

We discuss in detail the four key elements of our definitions of digital payments inclusion and households underserved in digital payments. In doing so, we provide a framework researchers can use to assess which transaction accounts or digital payment services meet the access, use, safety, and affordability criteria.

4.1. Access

As discussed in the previous section, we define access to digital payments as the ability to use digital payments. Having access to digital payments is the first step toward being served in digital payments; to

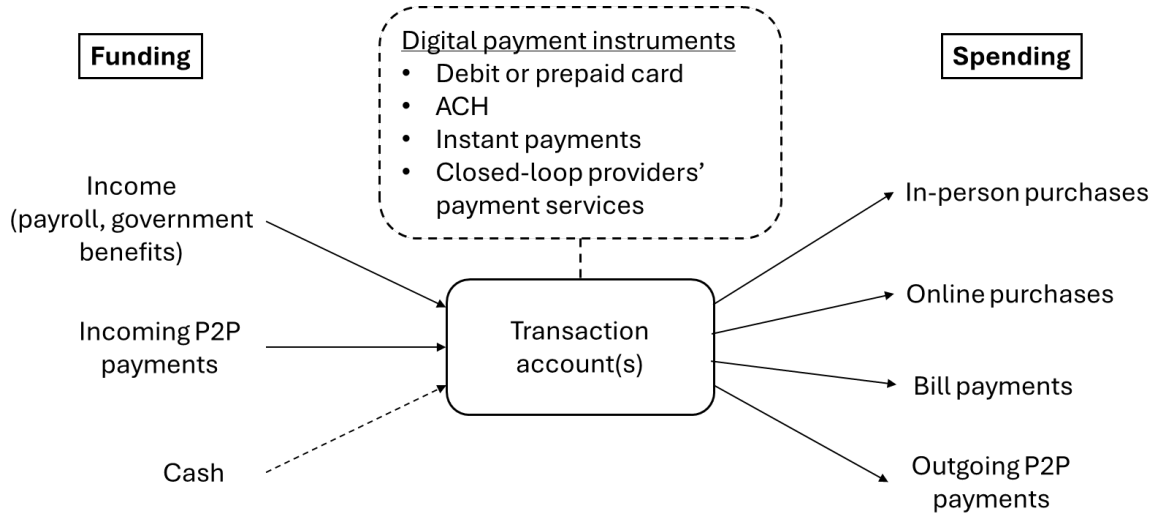
be fully served, households must have access to digital payments for at least the minimum threshold share of digital payments α^*. Moreover, these digital payments must be sufficiently safe and affordable. Households that do not have access to digital payments for at least α^* of their transactions are underserved by our definition.

To determine whether a household has access to digital payments for a sufficiently high share of their transactions, we first define what constitutes access to digital payments for a given transaction. We consider a household to have access to digital payments for a transaction if the following three criteria are met: (1) ownership of transaction (or credit card) accounts that offer digital payment services for the transaction the household is making, (2) acceptance by the transaction counterparty of at least one of the digital payment instruments associated with the transaction accounts, and (3) easy and timely funding of transaction accounts and access to those funds.

Making or receiving digital payments requires the use of digital payment instruments, and transaction accounts play a critical role in providing households with such instruments. We define transaction accounts as deposit or cash balance accounts that can be used to make and receive digital payments with transaction counterparties and to store funds. As additional criteria, a transaction account must not limit the number of transactions that the accountholder can make and must provide the accountholder access to funds in their account with relative ease and immediacy. Common types of transaction accounts include bank (and credit union) checking accounts, fintech digital deposit accounts, nonbank transaction accounts with online payment service providers (PSPs), GPR prepaid cards, and government-administered prepaid cards (electronic benefit transfer [EBT] cards and electronic payment cards [EPCs] such as Direct Express).[6] As Figure 4 shows, digital payment instruments available to households through transaction accounts include debit and prepaid cards and electronic fund transfers, such as ACH, instant payments, and provider-specific closed-loop payment services. A household may also make digital payments using credit cards, even though we do not consider credit card accounts as transaction accounts because they do not allow the household to receive digital payments (apart from purchase refunds) or store funds (in the long term).

[6] EBT cards are used for distributing cash assistance from needs-tested programs such as the Supplemental Nutrition Assistance Program (SNAP) and Temporary Assistance for Needy Families (TANF); they allow benefit recipients to access cash via a network of ATMs and make purchases at selected merchants (Consumer Financial Protection Bureau [CFPB] 2023a). EPCs are used mainly to distribute benefits from programs that are not needs-tested, such as Social Security benefits and unemployment benefits; they are Visa- or Mastercard-branded and can be used to withdraw cash and at any merchants that accept these cards (CFPB 2023a).

Figure 4. Funding to and spending from transaction accounts



Households may be able to use transaction accounts to make or receive digital payments for various types of transactions (see Figure 4 for examples). Transaction accounts may enable households to receive income (such as payroll and government benefits) and incoming P2P payments from other individuals via electronic fund transfers. Transaction accounts (and credit card accounts) may also enable households to make digital payments to merchants for in-person and online purchases, to billers for bill payments, and to other individuals for outgoing P2P payments via electronic fund transfers or payment cards.

Whether a household can use their transaction accounts (or a credit card) for a given transaction depends on two factors: first, whether the transaction accounts offer digital payment instruments that can be used for that transaction type (for example, receiving income or making an outgoing P2P payment) and, second, whether the transaction counterparty (for example, merchant or biller) accepts these digital payment instruments (or credit cards). Most transaction account providers allow their digital payment instruments to be used for a wide range of transactions; however, some providers restrict use of their digital payment instruments to certain transaction types and, in some cases, certain transaction counterparties. For example, government prepaid cards can be used to receive direct deposits of government benefits but no other types of incoming digital payments, and EBT cards that receive direct deposits of Supplemental Nutrition Assistance Program (SNAP) benefits can be used only for food and food-related purchases at authorized retailers.[7] Credit cards can be used only for purchases and bill payments. Even when transaction account providers allow their digital payment instruments to be used for a given transaction, if the transaction counterparty does not accept any of those instruments, the household cannot use digital payments for the transaction.[8] For instance, some billers

[7] Some states use EBT cards to disburse unemployment benefits.

[8] Unlike many financial services (such as savings, credit, and insurance), payment services require acceptance by transaction counterparties, as many types of transactions are characterized as two-sided markets. In other words,

accept debit cards or ACH as a payment method but not credit cards; thus, households that have credit cards but no other digital payment instruments cannot make digital payments to these billers.

Additionally, to make digital payments from their transaction accounts, households must be able to prefund their accounts and access the funds in their accounts (for instance, funds received via direct deposits) in time for their transactions. For households that receive most of their payments in cash, their ability to deposit cash into transaction accounts is critical for funding these accounts.

A household's ownership of transaction accounts is contingent on the absence of factors that may inhibit the household's ability to obtain the transaction accounts. These factors include a lack of understanding of the benefits of owning transaction accounts or using digital payments, negative perceptions of transaction account providers or digital payment services (for instance, a lack of trust or privacy concerns), the inability to meet account-opening requirements (for example, lack of proof of identity), and a lack of awareness of account options available (CPMI-World Bank Group 2016; FDIC 2022; Hayashi, Routh, and Toh 2024). Further, depending on the types of transactions the account supports and the acceptance rate of the digital payment instruments by a household's transaction counterparties, the household may need to own multiple transaction accounts to have access to digital payments for at least α^* of their transactions. Otherwise, households are unlikely to have adequate access to digital payments to be fully served.

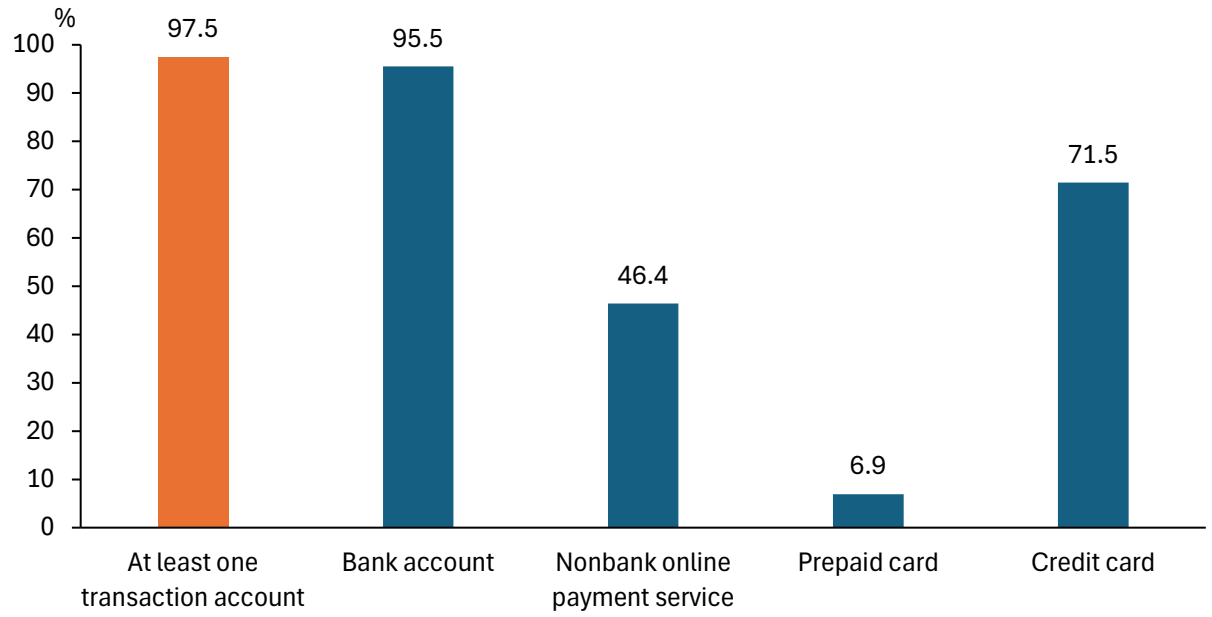
To assess whether a household has access to digital payments for a sufficiently high share of its transactions, researchers need to first verify whether the household owns transaction accounts or credit cards. Several consumer surveys already collect such data. Figure 5 shows the share of households that own different types of transaction accounts and credit cards based on the 2021 FDIC Survey of Unbanked and Underbanked Households (FDIC survey). Nearly 98 percent of US households had at least one transaction account in 2021, and 2 percent of US households owned only alternative transaction accounts (nonbank transaction accounts with online PSP and prepaid cards) or credit cards.[9] Although

payment services offered by financial institutions, payment networks, or nonbank payment service providers need to attract two distinct groups of users—those who make payments and those who receive payments (such as consumers and merchants)—so that the payment services are consumed.

[9] According to the Federal Reserve Board's Survey of Household Economic Decisionmaking (SHED), about 5 percent of unbanked households used cryptocurrency for financial transactions, and thus likely owned a crypto wallet, in 2022 (Lloro et al. 2023). Although access to crypto wallets may increase the share of unbanked households that have a transaction account, as discussed later, a crypto wallet is not currently considered a safe, affordable transaction account and therefore does not contribute to advancing digital payments inclusion.

US households' transaction account ownership rate is quite high, this does not necessarily imply their access to digital payments is sufficient.

Figure 5. Ownership rates of transaction accounts (percentage of households)



Note: Bank account includes checking and savings accounts offered by banks and credit unions.
Sources: FDIC and authors' calculations.

To determine whether households have access to digital payments made through their transaction accounts, researchers need to examine which digital payment instruments are available through those accounts and verify whether these instruments can be used for the types of transactions the household makes and the types of transaction counterparties the household has. Researchers could employ, as a proxy for digital payment instruments available through a specific account, the digital payment instruments that are typically offered by each type of transaction account. Researchers could then examine the types of transactions for which these instruments are typically used. For example, bank accounts typically provide households with debit cards and ACH, which can typically be used for purchases, bill payments, P2P payments (sending and receiving), receiving income, and other incoming payments.

Researchers also need to assess whether the digital payment instruments available to a household are accepted by the household's transaction counterparties. It is not practical for researchers to assess acceptance by each of a household's transaction counterparties. Researchers could use, as a proxy for acceptance by a specific transaction counterparty (for example, the household's utility company), the digital payment instruments available to the household that are typically accepted by that category of transaction counterparty (that is, billers).

Additionally, researchers need to consider whether the household can easily fund their transaction accounts and has timely access to the funds in the accounts. Two potential measures for ease of funding are the ability to receive direct deposits and the ability to deposit cash. Enabling cash deposits into (and cash withdrawals from) transaction accounts is particularly important for promoting transaction account ownership among cash-reliant households because these households may need time to transition from using cash to using digital payments. Households with a bank checking account can deposit cash at their banks' ATMs or branches, and households with a fintech digital deposit account, a GPR prepaid card, or a nonbank transaction account offered by online PSPs can deposit cash at agent locations such as drugstores, grocery stores, and check-cashing outlets. The size of the branch, ATM, or cash-load agent network; fees assessed for cash load; and the time needed for the deposited cash to become available for use to accountholders vary by transaction account provider. Households that have easy access to cash-load locations and quick access to deposits in their accounts are more likely to be able to make timely digital payments. To proxy for the ability of households to make timely digital payments, researchers may use the time taken for the deposited cash or direct deposits to become available for use to accountholders.[10]

Table 1 summarizes, for each type of transaction account, the types of transactions for which digital payment services are typically offered, whether the digital payment services offered are widely accepted by transaction counterparties (merchants, billers, and individuals), and whether account providers enable easy and timely funding of and access to funds in transaction accounts. The ownership of a bank checking account, a fintech digital deposit account, or a GPR prepaid card alone may be sufficient to meet the three criteria for most of the transactions made by most households, while ownership of a government-administered prepaid card or credit card alone may not. We should note that having access to the internet via a smartphone or some other device is a prerequisite for owning some of the transaction accounts (fintech digital deposit accounts and transaction accounts with online PSPs). Moreover, without access to the internet, a household cannot conduct transactions online, including online shopping, bank transfers, or P2P digital payments, which may reduce the benefits of transaction account ownership to the household.

[10] Funds from direct deposits via ACH typically take two days to become available to accountholders, and this delay may affect some households' ability to make payments on time. If providers of transaction accounts offer instant payment services to their customers, the immediate fund-availability feature of instant payments may help cash-strapped households improve their cash flow and avoid high-cost credit products, such as payday loans, and penalties, such as overdraft and late fees (Greene, Hayashi, and Stavins 2020; Bostic et al. 2023).

Table 1: Account functionalities in supported transaction types, acceptance, and access to funds

	Transaction types				Wide acceptance	Access to funds	
	Purchases	**Bill payments**	**P2P (send and receive)**	**Receive income**	**Billers, merchants, individuals**	**Quick access to direct deposits**	**Deposit cash**
Bank checking account	✓	✓	Limited to Zelle participants	✓	✓	✓	✓
Fintech digital deposit account	✓	✓	Varies by provider	✓	✓	✓	✓
Nonbank transaction account with online PSPs	✓	✓	Limited: closed loop	✓	✓ With debit or prepaid cards	✓	✓
GPR prepaid card	✓	✓	Varies by provider	✓	✓	✓	✓
Government prepaid card (EBT)	Authorized retailers only	No	No	Government benefits only	Limited	No	No
Government prepaid card (EPC)	✓	✓	Typically, no	Government benefits only	✓	Typically, no	No
Credit card	✓	✓	Limited	No	Limited, especially by billers	n/a	n/a

4.2. Use

The share of transactions that a household makes using safe and affordable digital payments is an indicator of how well served the household is in digital payments. For a household to use digital payments for a transaction, the household must not only have access to digital payment services for the transaction, but also find them optimal for making the transaction. The lack of use of digital payments, conditional on having access, may arise due to payment preferences or the presence of inhibiting factors. These factors include a higher cost of using digital payment services relative to using paper-based payment methods (for instance, due to fees the household incurs in using digital payments), poor product design (for example, difficulty of use or slower fund availability), negative perceptions of digital payments or transaction account providers (such as higher perceived risks or lack of trust), and a lack of financial knowledge regarding how to use, or the benefits of using, digital payments (Bostic et al. 2023; CPMI-World Bank Group 2016; Greene, Hayashi, and Stavins 2020; World Bank Group 2014). Payment preferences aside, the larger the share of transactions that a household makes using safe and affordable digital payments, the less inhibited the household is in accessing and using digital payments—and therefore the better served the household is in digital payments. As discussed in Section 3.2, we consider households that use safe and affordable digital payments for a sufficiently large share of transactions (exceeding α^*) to be fully served in digital payments; we consider households to be underserved otherwise.

Existing data on how consumers use different payment instruments for transactions can help illuminate the magnitude of α^*. The Survey and Diary of Consumer Payment Choice (SDCPC) gathers data on consumers' ownership of various transaction accounts (and credit cards) and payment instruments they use to make different types of payments.[11] In particular, the share of transactions that consumers who own a bank account and earn higher income (higher-income banked consumers) make using digital payments may provide a ballpark value for α^*. We believe that higher-income banked consumers are more likely to be fully served than any other group of consumers for a few reasons. First, they own bank accounts, which typically offer digital payment services for all common types of transactions that consumers may make, and the associated digital payment instruments are widely accepted by most, if not all, types of transaction counterparties. Second, higher-income banked consumers may be less likely to have transaction counterparties that do not accept digital payments. Third, higher-income banked consumers may be less likely to face factors that inhibit their use of digital payments (for instance, higher cost of using digital payments relative to cash). Fourth, higher-income banked consumers are more likely to use bank products, which tend to be safer and more affordable than nonbank products (we discuss safety and affordability in greater detail in Sections 4.3 and 4.4, respectively). Fifth, higher-income banked consumers are more likely to have digital financial services tailored to their specific needs and use cases.

Table 2 shows how the share of transactions (in number) made using each payment instrument varies across three groups of consumers: higher-income banked consumers (annual household income of at least $50,000), lower-income banked consumers (annual household income less than $50,000), and

[11] Ideally, we would also include incoming payments and the transaction methods consumers used to receive these payments. However, the SDCPC does not include such data.

consumers who own only alternative transaction accounts or credit cards.[12] Higher-income banked consumers made 82.9 percent of their transactions using digital payment instruments (that is, payment cards, ACH, mobile payment application, and account-to-account transfer). Whether all these digital payment instruments are safe and affordable remains a question; however, the share suggests that a good ballpark value for α^* may be 80 percent. As we suspected, lower-income banked consumers and consumers who own only alternative transaction accounts or credit cards—almost all of whom are lower income—made digital payments for smaller shares of their transactions (68.1 percent and 45.0 percent, respectively).[13] The lower share of digital payments suggests that lower-income banked consumers may face some barriers to using digital payments, such as less acceptance of digital payments by their transaction counterparties, and lack of internet or mobile phone access to make digital payments, among others. The substantially smaller share of digital payments made by consumers who own only alternative transaction accounts or credit cards suggests that these accounts and their associated payment instruments may provide poorer access to digital payments.

Table 2: Share of transactions (in number) made using different payment methods across three consumer groups

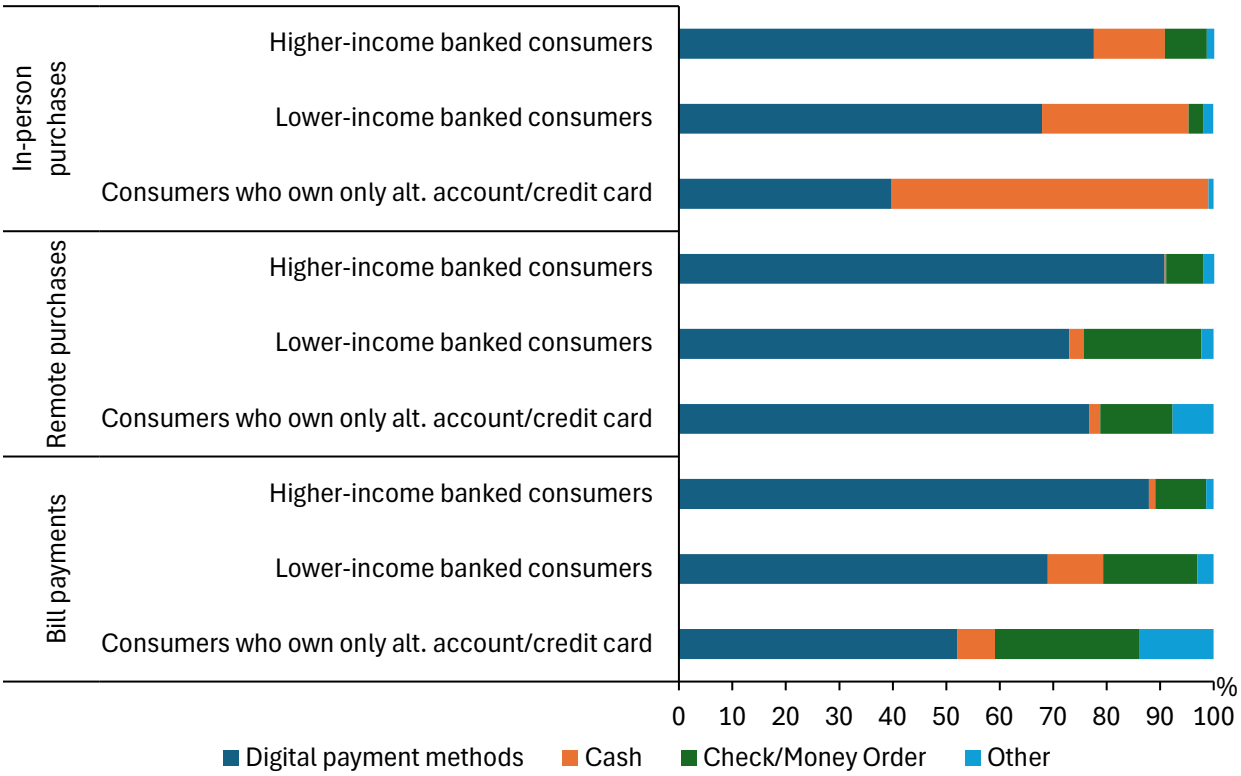
	Banked consumers		Consumers who own only alternative transaction accounts or credit cards
	Higher income	Lower income	All income
Paper-based instruments	**14.6**	**29.5**	**50.6**
Cash	12.1	26.0	42.5
Check/money order	2.5	3.5	8.1
Digital instruments	**82.9**	**68.1**	**45.0**
Debit card	28.0	35.4	25.0
Credit card	37.3	18.3	4.3
Prepaid/gift/EBT card	2.2	3.3	11.1
ACH	13.7	9.3	2.3
Other digital payment methods	1.7	1.7	2.3
Other	**2.5**	**2.3**	**4.4**

Sources: FRB of Atlanta 2023 SDCPC and authors' calculations.
Notes: "Other digital payment methods" comprise mobile payment app payments and account-to-account transfers. "Other" includes multiple payment methods, income deduction, and other payment methods.

[12] We do not divide consumers who own only alternative transaction accounts or credit cards by income because almost all of these consumers have income of less than $50,000.
[13] We obtain qualitatively very similar results when we use the share of transactions *in value* made using different payment methods. See Appendix 1.

Alternatively, researchers may also consider setting different values of α^* for different types of transactions, as transaction counterparties' acceptance of digital payments and households' payment preferences may differ across transaction types. Data from the SDCPC show that the share of digital payments indeed varies across transaction types. Figure 6 depicts consumers' use of digital payment methods for payments across three transaction types: in-person purchases, remote purchases, and bill payments. Across all three consumer groups, the share of digital payments is the largest for remote purchases. Note that the digital payments share for in-person purchases is the smallest of the three, which may reflect brick-and-mortar merchants' lower acceptance rate or potentially their surcharging of digital payment methods, or it may indicate that consumers have a stronger preference for using cash for in-person purchases. Thus, researchers may want to consider setting a smaller minimum threshold share of digital payments for in-person purchases and larger minimum threshold shares for remote purchases and bill payments.

Figure 6. Share of transactions (by number) made using different payment methods across transaction types and across consumer groups



Sources: FRB of Atlanta 2023 SDCPC and authors' calculations.

4.3. Safety

Safety is the quality attribute on which we focus in our definitions of digital payments inclusion and underserved in digital payments because it is mentioned (or alluded to) more frequently than any other

quality attribute in existing definitions of financial or payments inclusion. Moreover, safety is easier to define and measure compared with convenience, appropriateness, usefulness, and other quality attributes. Our definition of safety is broad, encompassing avoidance of theft or loss, transparent disclosure of terms and conditions of the accounts and services, fair treatment and business conduct, and data protection and privacy (World Bank Group 2017).

Avoidance of theft or loss means not only that money stored in the transaction accounts cannot be easily lost or stolen, but also that error and fraud resolution mechanisms are present and that resolution is timely. Consumers are protected against the insolvency of transaction account providers, and consumer liability is limited in the event of fraud.

Disclosures of terms and conditions are considered transparent when users can easily find and understand information on policies and on the payment service provider's and the consumer's rights and responsibilities. Consumers' rights are described in legally binding documentation. Policies regarding safety cover consumer liability for unauthorized fraud, the error resolution process, and providers' data sharing with third parties, among others.

The terms and conditions of transaction account or service agreements should be fair to consumers. An example of an unfair term is the right of a transaction account provider to close a consumer's account at any time without providing notice and explanation while indemnifying itself from any liability in doing so (World Bank Group 2017).

Data protection and privacy involves obtaining the informed and lawful consent of consumers before collecting their data; providing consumers control over how data are used, whether data are shared, and with whom they are shared; and implementing policies and procedures to prevent unauthorized access or misuse of consumer data.[14] These policies and procedures may include collecting and retaining only data necessary for service provision, limiting access to data on a need-to-know basis, implementing network security measures, encrypting data, and providing consumers with timely notification and remediation of data breaches or cybersecurity incidents.

Consumer protection regulations and payment network rules play important roles in ensuring the safety of digital payments by establishing a minimum level of safety for transaction accounts, digital payment services, and account or service providers. Federal consumer protection regulations include Regulation E, Regulation Z, the Federal Trade Commission (FTC) Act (Section 5), the Dodd-Frank Act, and the Gramm-Leach-Bliley Act (GLBA). Regulation E protects consumers making electronic fund transfers, which include card transactions, ACH transactions, and any other transactions initiated through an electronic terminal. It establishes disclosure requirements for covered financial institutions, consumer liability for unauthorized transfers, consumer responsibility for reporting unauthorized fraud, the error resolution process, and providers' data sharing with third parties. Regulation Z protects credit card users by establishing disclosure requirements, limitations on fees and charges, rules for resolving billing errors, and limitations on consumer liability for unauthorized transactions. The FTC Act (Section 5) and the Dodd-Frank Act both protect consumers from unfair, deceptive, or abusive practices of transaction-

[14] In the United States, consumers' rights to own and control their personal information have not been fully established. However, as of March 2024, a total of 18 states had passed comprehensive data privacy laws, and five states had enacted them (Bloomberg Law 2024). At the federal level, in addition to the CFPB's rulemaking, Congress has introduced a draft of the American Privacy Rights Act of 2024.

account providers and certain affiliates of these providers; the former is enforced by the FTC and the latter by the CFPB. The GLBA regulates how depository institutions (as well as other providers of financial services) collect, process, and protect their customers' personal information. In addition to being subject to these federal regulations, transaction-account providers may be affected by state regulations.

Transaction-account providers that offer ACH transactions are also subject to NACHA (originally the National Automated Clearing House Association) operating rules, and card issuers are subject to card network rules and the Payment Card Industry Data Security Standards (PCI-DSS). These rules also establish security requirements, disclosure requirements, and the error resolution process. Notably, the rules of major global card networks set cardholder liability for unauthorized transactions to zero, providing cardholders with strong protection against fraud losses.

In addition to regulations and network rules, deposit insurance is critical to the safety of digital payments. Deposit insurance protects the money in a consumer's transaction account, which is used to fund digital payments, from the insolvency of the transaction-account provider. In the United States, the FDIC provides deposit insurance of as much as $250,000 per deposit, per FDIC-insured bank, for each account ownership category; the National Credit Union Administration (NCUA) provides similar share insurance for accounts held at NCUA-insured financial institutions. For prepaid accounts and certain nonbank or fintech transaction accounts that deposit accountholder's funds into an FDIC-insured bank, accountholders may benefit from pass-through FDIC insurance.[15]

Table 3 summarizes the regulations, rules of payment networks/systems, and other protections that affect the different aspects of safety discussed earlier.

Table 3. Regulations, rules, and other protections that may apply to transaction account or service providers

Safety aspect	Relevant regulations, rules, or other protections
Avoidance of theft and loss	• FDIC/NCUA insurance • Regulation E • Regulation Z • Card network rules
Disclosure of terms and conditions	• Regulation E • Regulation Z • FTC Act (Section 5) • Dodd-Frank Act
Fair treatment and business conduct	• FTC Act (Section 5) • Dodd-Frank Act
Data privacy and protection	• GLBA • PCI-DSS • NACHA operating rules

[15] With "pass-through" FDIC insurance, consumers' funds held in custodian accounts at FDIC-insured banks are insured as if the deposits were directly deposited by each consumer themself (FDIC 2023a). Certain conditions must be met for consumers' funds to be eligible for pass-through FDIC insurance.

The safety of the digital payment services a household has access to and uses depends on whether deposit insurance is available for the household's transaction accounts, whether the transaction-account (or digital payment instrument) providers are subject to consumer protection regulations and payment network rules, and the strength of enforcement of these regulations and rules. Bank (and credit union) checking accounts, bank-managed credit card accounts, and their associated digital payment instruments are arguably the safest for consumers, as banks are directly subject to all the regulations (and are examined by federal regulators for their compliance with these regulations) and payment network rules discussed earlier. Further, the funds in bank and credit union checking accounts are automatically FDIC- or NCUA-insured. Bank-managed GPR prepaid card accounts are also subject to the same regulations and rules as bank checking accounts and may be considered equally safe if the funds in the account are eligible for pass-through FDIC or NCUA insurance and the cardholder registers their card.

It is more difficult to evaluate the safety of nonbank or fintech transaction accounts—which include fintech digital deposit accounts, transaction accounts with online PSPs, and nonbank-managed GPR prepaid cards—and the digital payment instruments they offer. It is not always clear which regulations nonbank and fintech providers are subject to. Further, nonbank and fintech providers are often not directly supervised by federal regulators; instead, regulators may require the partner banks of these nonbank and fintech providers to ensure their compliance with existing regulations, which may lead to weaker and less uniform compliance. For instance, Consumer Reports (2023a) finds that consumers' liability for unauthorized fraud and their ability to control their data (such as data deletion) vary across four major online PSPs. In addition, the availability of pass-through deposit insurance varies across different types of accounts that nonbank and fintech providers offer, depending on whether the provider or an FDIC-insured partner bank is holding their customers' funds. Even if the nonbank or fintech transaction account is eligible for pass-through FDIC insurance, customers are still exposed to the risk of losing their funds if the provider fails—in which case accountholders may be able to recover their funds through a bankruptcy proceeding, but that process can be lengthy (FDIC 2023b). Thus, we may consider nonbank or fintech transaction accounts and their associated digital payment instruments to be generally less safe than bank accounts and bank-managed payment cards, at least in the present regulatory landscape.[16]

The safety of government-administered prepaid cards also varies by product and the types of benefits these cards deliver. Regulation E applies to government agencies that distribute benefits from programs that are not needs-tested (for example, Social Security benefits and unemployment benefits) but not from programs that are needs-tested (for example, SNAP and the Temporary Assistance for Needy Families [TANF]). The level of consumer protection that a cardholder receives also depends on the type of government-administered prepaid card they use. Government-administered EPCs, which are either Visa- or Mastercard-branded, are subject to card network rules (including the zero-liability rule) and must comply with the PCI-DSS. Government-administered EBT cards, which are typically used to distribute benefits from needs-tested programs such as SNAP, are not subject to card network rules and security standards; most of these cards also do not use chip technology, which makes them more

[16] Increased regulatory supervision of these fintech and nonbank providers may be on the horizon. In November 2023, the CFPB issued a proposed rule to supervise large fintech and nonbank providers of digital wallets and payment apps for compliance with applicable federal consumer financial protection laws (CFPB 2023e).

vulnerable to fraud. That said, EBT cardholders may still receive some protection from stolen benefits.[17] Overall, government-administered EPCs have a level of safety similar to bank-managed GPR prepaid cards, whereas government-administered EBT cards are less safe.

It is worth considering the safety of cryptocurrencies (such as Bitcoin and Ethereum), as they can be used for digital payments. Currently, their safety is very low. Cryptocurrency holdings are not covered by FDIC pass-through insurance; there is no regulation concerning disclosure requirements and consumer protection from fraud and errors; and, in most states, cryptocurrency-related services require a money transmitter license, but licensure requirements vary widely by state (Jasperse 2022).

To determine whether a household is underserved in digital payments according to our definitions, researchers need to establish whether the transaction accounts and digital payment services that the household has access to and uses are adequately safe. Bank checking accounts, bank-managed prepaid and credit cards, government-administered EPCs, and their associated digital payment instruments are among the safest accounts and products that households can use, and researchers may reasonably consider them to be adequately safe. Cryptocurrencies, on the other hand, come with limited or no consumer protection and may be considered unsafe. Whether a nonbank or fintech transaction account or digital payments instrument is adequately safe may be more difficult to determine. Researchers may need to establish more specific criteria for an account or digital payments instrument to be considered adequately safe. In addition, more research may be necessary to clarify how existing regulations apply to nonbank and fintech transaction account providers.

We also note that researchers' objective assessment of whether a transaction account and the digital payment services it offers are safe may not always align with households' perceptions of whether the account and its services are safe, which influences households' adoption of the transaction account and digital payment services. Households may choose not to adopt a transaction account that researchers deem to be adequately safe because they perceive it as unsafe, and vice versa. For instance, even though researchers would most likely consider bank accounts to be objectively safe, many unbanked households cite safety-related issues, such as a lack of trust in banks and privacy concerns, as reasons for not having a bank account (FDIC 2022).

4.4. Affordability

A transaction account and associated payment instruments may be considered affordable when their costs are sufficiently low so that (almost) all households have enough money to use them. Costs incurred by households are divided into direct costs and indirect costs.

Direct costs include fees imposed by the transaction-account providers and transaction counterparties for the use of digital payment instruments. Fees imposed by transaction-account providers may include fees for opening an account, maintaining the account, using customer services (for example, balance inquiries and resolutions of fraud and errors), funding the account for transactions (for example, cash deposit fees), and digital payment transaction fees. Some fees are waivable, and households do not incur these fees if they meet the conditions for fee waiver. For example, households may not incur any monthly maintenance fees if they maintain a sufficiently high balance in their account or receive a

[17] The Consolidated Appropriations Act of 2023 allows state agencies to use federal funds to replace SNAP benefits stolen via card skimming, card cloning, and other similar methods, but the replacement process varies by state.[17]

sufficiently large direct deposit amount. Thus, the costs incurred by households to use digital payments may differ even among households that own the same type of transaction account from the same provider. Fees imposed by transaction counterparties typically take the form of surcharges for using certain types of digital payment instruments (for example, billers may impose a surcharge for credit card payments). Indirect costs include fees for internet and mobile phone services, which are prerequisites for using many digital payment services, and transportation costs and time spent traveling to and from bank branches or agent locations.

When assessing affordability, researchers first need to determine which types of costs to include. Relative to direct costs, indirect costs are difficult to measure and vary significantly by each household's situation. For example, households that need to deposit cash to use a transaction account for digital payments must visit a cash-load location, and their proximity to these locations varies by household; hence, the time and transportation costs they incur getting to these locations may also vary. Among indirect costs, data on fees for internet or mobile phone services may be relatively easy to collect.

Researchers then need to consider which types of transaction accounts and digital payment instruments are considered affordable. Existing research provides some insights. According to results from the SDCPC, consumers consistently rank credit cards as the most expensive payment instrument and cash as the least costly, as shown in Table 4. In the survey, consumers assess costs based not only on interest and fees, but also on rewards and discounts. Since consumers see cash as a cheaper alternative to other payment instruments, the cost of using any digital payment services could be compared with the cost of using cash (especially for cash-reliant consumers). However, this is problematic because cash is not easily used for online purchases or remote bill payments. Moreover, Toh (2021) shows that consumers incur indirect costs when paying bills with cash that cannot be easily measured. Instead, the direct costs of using a Bank On account may be a better proxy for the cost of using affordable or low-cost transaction accounts for digital payment services, as those accounts are designed to provide safe, affordable bank accounts to low- and moderate-income (LMI) households.[18]

Table 4: Consumer perceptions of cost: Payment instruments ranked subjectively from most costly to least costly

Most costly	Money order
↓	Credit card
	Prepaid card
	Check
	ACH (bank account number payment [BANP])
	Debit card
	ACH (online banking bill payment [OBBP])
Least costly	Cash

Source: FRB of Atlanta 2023 SDCPC.

Several studies compare costs across different types of transaction accounts. Table 5 summarizes common fees by type of transaction account. The Government Accountability Office (GAO) (2023)

[18] Bank On accounts are bank accounts that are offered by depository institutions and meet standards developed by the Cities for Financial Empowerment (CFE) Fund to provide low-cost bank accounts for consumers who are underserved in the banking system.

compares costs of maintaining five selected fintech digital deposit accounts and selected GPR prepaid cards offered by the top three issuers with the costs of Bank On accounts. Based on 2022 fee information, the selected prepaid cards are the most expensive, and the Bank On accounts may be more expensive or comparable in cost to the reviewed fintech accounts. GPR prepaid cards generally charge monthly maintenance fees and ATM withdrawal fees that are higher than the fees of the other two types of accounts; moreover, they assess cash reload fees and card purchase fees. Although the GAO (2023) does not include other fees in its comparison, GPR prepaid cards assess additional fees, such as per POS transaction fees and balance inquiry fees (via ATM or interactive voice response (IVR)), as reported in Wilshusen et al. (2012) and Hayashi and Cuddy (2014a).[19]

Table 5: Categories of fees associated with various account types

	Monthly maintenance	**Cash deposit/ reload**	**ATM**	**Customer services/ balance inquiry**	**Overdraft/ NSF**
Bank checking account—Bank On	Yes	No	No, if in network	No	No
Bank checking account—traditional	Yes (typically, waivable)	No	Typically, no if in network and yes if out of network	Typically, no	Typically, yes
Fintech account	No	Typically, no	No, if in surcharge-free network	No	No
Nonbank account	No	Yes, but some providers offer free locations	No, if in surcharge-free network	No	No
GPR prepaid card	Depends on program	Yes, but some providers offer free locations	Yes	Yes	Typically, no
Government prepaid card (EBT)		n/a	n/a for SNAP benefits	No	No
Government prepaid card (EPC)	No	n/a	Yes, after certain numbers of free withdrawals	Typically, no	No
Credit card	Annual fees for some	n/a	Yes	Typically, no	n/a

[19] Wilshusen et al. (2012) and Hayashi and Cuddy (2014a) also report significant variations in fees paid by GPR prepaid card users. For example, Hayashi and Cuddy (2014a) find that cardholders at the 10th percentile and those at the 90th percentile incurred $1.35 and $26.44 in fees, respectively, per month in 2012.

Although overdraft fees generate sizable revenues for depository institutions, the GAO (2023) does not consider such fees because they are not relevant to the three types of transaction accounts it compares. Bank On accounts do not charge an overdraft fee by design: To be certified as a Bank On account, the account cannot assess an overdraft or nonsufficient-funds (NSF) fee. Major fintech digital deposit accounts do not come with traditional overdraft protection but may offer eligible accountholders optional fee-free overdraft protection.[20] Most GPR prepaid cards come without overdraft protection and thus do not assess an overdraft fee; a notable exception is NetSpend cards, which offer overdraft protection with an overdraft fee (Hayashi and Cuddy 2014b). By contrast, many traditional checking accounts charge overdraft and NSF fees, increasing account costs for some consumers (Hayashi, Hansen, and Maniff 2015) and causing them to complain about high or unpredictable fees and to have negative perceptions or distrust of depository institutions (Collins et al. 2022; FRB of Kansas City 2010). According to the 2021 FDIC survey, 30 percent of unbanked households cited "bank account fees are too high" and 27 percent cited "bank account fees are too unpredictable" as reasons for being unbanked (FDIC 2022). Lack of pricing transparency makes it hard or impossible to compare prices or even to predict a final price. Moreover, as discussed earlier, the overall cost of using a given transaction account varies by consumer; thus, predicting the expected cost of using a given account may be difficult for some consumers.

Existing research also confirms the variation in how consumers assess their costs. Consumers look at the tradeoff between the quality of the service delivered and the expected cost (Almquist, Senior, and Bloch 2016). When consumers are unable to pin down the expected cost, this comparison becomes difficult, and long-held perceptions come into play. Consumers' perceived price—what consumers "encode" (as expensive or cheap, for example)—and objective price—what consumers pay—are conceptually and empirically different (Daniel 2020; Zeithaml 1988). For instance, Daniel (2020) finds that low-income consumers evaluate food prices in two ways: with absolute judgments and with relative judgments. Low-income consumers making absolute judgments assess whether a food covers their family's needs given their limited resources. Through relative judgments, consumers assess cost not in terms of concrete needs and resources but in relation to the price of another food, which creates a reference point for the item in question. Both absolute and relative judgments may be applicable in the context of digital payments—that is, whether digital payment services meet underserved households' needs given their limited resources and whether digital payment services are more economical or pricey relative to cash or other non-digital payment methods.

5. Measuring Underserved Households: Opportunities and Obstacles

Although existing surveys and studies provide useful insights into households that are underserved in digital payments, more work is needed to improve how these households are quantified and how their barriers to being fully served in digital payments are identified and quantified. In this section, we first examine the information that is available from existing surveys and studies. We then discuss informational gaps, including our inability to connect some of the information available from different

[20] The eligibility criteria for overdraft protection varies by fintech account provider. Most providers require account holders to receive a certain minimum amount in qualifying direct deposits in the preceding month to be eligible for overdraft protection.

surveys. Finally, we discuss potential next steps toward measuring the share of households that are underserved in digital payments.

Household or consumer information related to our definitions of digital payments inclusion and households underserved in digital payments is collected by government agencies, consumer advocacy groups, and polling firms. Table 6 summarizes the survey data that are available and whether demographic information is included.

Table 6. Available data on digital payments inclusion from household or consumer surveys

Metric	Source	Includes demographics
Access to digital payments		
Bank account ownership	FDIC, SDCPC, SHED, Survey of Consumer Finances (SCF), Financial Health Network	✓
Prepaid card ownership	FDIC, SDCPC, SHED, SCF	✓
Credit card ownership	FDIC, SDCPC, SHED, SCF	✓
Accounts by online payment service providers (PayPal, Cash App, Venmo)	FDIC, SDCPC,	✓
Cryptocurrency (wallet) ownership	SDCPC, SHED	✓
Internet access, smartphone ownership	American Community Survey (ACS)	✓
Online or mobile banking adoption	FDIC, SDCPC	✓
Online or mobile bank apps' purpose of use, usefulness, and security	Consumer Reports	Limited
Use of digital payments		
Shares of payments that are digital (overall and by transaction type)	SDCPC (frequency, intensity)	✓
Shares of payments in cash (overall and by transaction type)	SDCPC (frequency, intensity)	✓
Use of payment apps (PayPal, Venmo, Cash App, Zelle)	Pew Research	Limited
Use of alternative financial services (AFS)	FDIC, SHED (extensive margin), SDCPC (frequency, intensity)	✓
Safety		
Reasons for being unbanked—privacy concerns and distrust	FDIC	✓
Consumers' ratings of security for digital payment rails	SDCPC	✓
Consumers' rating of trust in financial institutions and fintech providers	Pew Research (payment app providers), Plaid and The Harris Poll (fintech), upcoming Office of the Comptroller of the Currency (OCC) survey	Limited
Reports of loss, fraud, ID theft	SDCPC, FBI Internet Crime Complaint Center (IC3), FTC	✓ (SDCPC)
Affordability/cost		

Reasons for being unbanked—high or unpredictable fees	FDIC	✓
Consumers' ratings of costs for digital payment rails	SDCPC	✓
Shares paying fees	SDCPC	✓
Share of consumers incurring fees to use a variety of transaction services	Financial Health Network	Limited
Share of households incurring overdraft or NSF fees, number of overdraft or NSF fees	CFPB	✓

Data about access are collected by government agencies and consumer advocacy groups. Two surveys gather particularly rich data on account ownership: the FDIC survey collects data on households' ownership of bank accounts, prepaid cards, credit cards, and accounts by online payment providers; and the SDCPC gathers data on consumers' ownership of bank accounts, prepaid cards, credit cards, mobile payment accounts (including accounts provided by online payment providers), and cryptocurrency (wallets). Two other surveys also capture data on ownership of some accounts: the SHED data include information on consumers' ownership of bank accounts, credit cards, and cryptocurrency (wallets), and the Federal Reserve Board's Survey of Consumer Finances (SCF) collects data on consumers' ownership of bank accounts, prepaid cards, and credit cards.[21] Reliable and fast internet service and mobile phone ownership are the foundation of access to digital payments, and such data are available from the American Community Survey (ACS), which has asked participants about computer (including smartphone) and internet use since 2013.[22] The FDIC survey asked about internet access and ownership of mobile phone (smartphone/feature phone separately) through the 2019 round but not in the 2021 and 2023 rounds. Besides collecting data on ownership, the FDIC survey and the SDCPC gather information about whether households (or consumers) have adopted online or mobile banking. Consumer Reports (2023b) asks consumers about their purposes in using online or mobile banking apps and how they perceive the usefulness and security of those apps.

Data on the use intensity of digital payments come primarily from the SDCPC. Until 2020, the Survey of Consumer Payment Choice (SCPC) collected a consumer's number of transactions by payment method and by transaction type in a typical month, and the Diary of Consumer Payment Choice (DCPC) collected the number of actual transactions that occurred during a three-day period for each consumer. Since 2021, data on the number of transactions have come from the DCPC only. The SDCPC results enable us to calculate the share of a given payment method (for instance, a debit card) for a given transaction type (for instance, online purchases) for a particular group of consumers (for instance, those with an annual household income of less than $25,000) instead of an individual consumer. Data on AFS use in the extensive margin are available from the FDIC survey and the SHED. A Pew Research Center survey collects information on consumer use of payment apps, including PayPal, Venmo, Zelle, and Cash App, in the extensive margin (Anderson 2022).

Data on households' (or consumers') perceptions or experiences related to safety (including privacy and trust) and affordability (or costs) are available from several surveys. The FDIC survey asks unbanked

[21] See Federal Reserve Board Survey of Consumer Finances.
[22] See US Census Bureau American Community Survey.

households about their reasons for being unbanked, which include privacy concerns, distrust of banks, and high or unpredictable fees. The SDCPC asks how consumers rate security and cost (among other characteristics) of digital payment rails and cash, whether they have incurred fees, and whether they have experienced incidents of loss, fraud, or ID theft. Through its Making Ends Meet Survey, the CFPB (2023f) asks consumers about their experiences with overdraft or NSF fees. The Financial Health Network estimates the total fees that consumers pay to use a variety of transaction services (such as account maintenance fees, ATM fees, overdraft fees, and prepaid card fees) and the distribution of those fees across consumer groups based on their financial health or on race and ethnicity (Greene et al. 2023). The Pew Research Center's survey asks about payment app users' confidence in the safety of their personal information on those apps and their experiences of data security incidents such as scams and hacks (Anderson 2022). Plaid and the Harris Poll (2021) show how consumers' trust of or comfort with traditional banks or fintech firms varies across different groups (for instance, generational or racial). In addition, the Office of the Comptroller of the Currency (OCC) collected public comments in 2023 in preparation for an annual survey "to understand consumer trust in banking and bank supervision" (OCC 2023). We expect that this new survey will provide a rich data source for understanding different sociodemographic groups' trust in, access to, and use of digital payments.

Government agencies and consumer advocacy groups also collect information about features of transaction accounts and payment products. Fed Communities (n.d.) collects data on bank branch locations to identify banking deserts, that is, census tracts without a physical bank branch within a certain geographic radius from its population center or within the tract itself, which affects physical accessibility to the points of payments services. The CFPB conducts various studies that assess certain features of transaction accounts, such as deposit insurance coverage on funds stored in nonbank transaction accounts and NSF fee practices of large depository institutions (CFPB 2023b, 2023c). The Federal Reserve Board (2023) publishes an annual report on the use of government-administered general-use prepaid cards that includes the total cardholder fees on those cards. The GAO conducts studies on consumer fees for financial services and products such as ATMs, fintech digital deposit accounts, Bank On accounts, and GPR prepaid cards (GAO 2013, 2023). Consumer Reports (2023a, 2024) recently developed its "Fair Digital Finance Evaluation Framework" for evaluating digital financial services; it has examined P2P payment apps, traditional bank accounts (offered by the largest banks), and fintech digital deposit accounts in areas of fees, data sharing and user control, accessibility features, and consumer protections, among others.

Although existing surveys and studies are useful, a closer examination of households underserved in digital payments is needed: Who has no transaction accounts, who uses alternative transaction accounts, to what extent, and why? A deep dive into their use by households without bank checking accounts could help establish a measure of digital payments inclusion for the United States, leading to product designs and tailored strategies for advancing inclusion.

Tracking, in detail, households' ownership of transaction accounts is critical for assessing the progress of digital payments inclusion. As discussed earlier, several surveys ask about ownership of various types of transaction accounts; however, to the best of our knowledge, no survey asks about the complete set of transaction accounts each household owns. Each household, especially an unbanked or LMI household, may own multiple transaction accounts that, together, support digital payments for all types of transactions. Along with gathering information about account ownership, it is important to collect data

on whether a household has internet access and owns a smartphone and how frequently and intensively each household uses digital payments for each type of transaction. Internet access and smartphone ownership are prerequisites for households making and benefitting from digital payments. Even if account ownership increases, the progress of digital payments inclusion may be less than desired if some households rarely use those accounts.

Conducting ongoing studies that assess a transaction account's safety, affordability, and functionality (especially accounts offering digital payment services) is also critical. These characteristics of transaction accounts evolve over time, and new types of transaction accounts (potentially, for instance, municipal bank accounts, postal bank accounts, or a central bank digital currency) may emerge.[23]

Additionally, collecting data on digital payment acceptance by households' transaction counterparties helps assess the progress of digital payments inclusion. Although data on merchant acceptance of digital payment methods are available in other countries, including Canada, the United States lacks such data.[24] While merchants' (or billers') acceptance of digital payments can be assessed through merchant surveys, general tendencies may not be applicable to merchants with which cash-reliant households often interact. Collecting information on merchants' acceptance of digital payments in cash-reliant communities specifically may be important.

Several obstacles stand in the way of quantifying households that are underserved and their barriers to being fully served. First and foremost, reaching households that have no transaction accounts or have only alternative transaction accounts is challenging. Only about 6 million US households, just 4.5 percent of all US households, did not have bank accounts in 2021 (FDIC 2022). Given this small share, unless the size of a survey sample is very large (more than 10,000 respondents), a nationally representative survey cannot obtain enough observations from households without a bank account to conduct a detailed analysis. A possible remedy is oversampling these households. However, because these households tend to have low trust in financial institutions and perhaps in government, they may be reluctant to participate in research, especially if it is conducted by government agencies.

Second, collecting usage data from underserved households is challenging, and a diary study may not be an ideal tool. In the 2018 DCPC, the transaction number for low-income consumers (those with a household annual income of less than $25,000) was significantly smaller than their transaction number reported in the 2018 SCPC, and their transaction value was significantly smaller compared with the same income group's average value of expenditures in the 2018 Current Expenditure Survey (Felt et al. 2023). A viable alternative tool may be a survey that asks questions about the number of transactions with a given payment method for a given type of transaction in a typical month (for bill payments) or week (for purchases).

[23] Comparing characteristics of existing or emerging transaction accounts with those of payment services that have successfully advanced digital payments inclusion in other countries, such as Pix in Brazil, may be a useful exercise for designing products and tailoring strategies.

[24] The Bank of Canada has been conducting surveys of small and medium-sized merchants; see, for example, Welte and Wu (2023).

Third, surveys may not be able to obtain data about the barriers underserved households face in making digital payments and their perceptions of transaction accounts, their providers, and payment methods. Qualitative studies can provide supplemental details and nuances.[25]

We identify possible next steps toward measuring the share of households that are underserved and the extent to which each factor inhibits them from being fully served:

- Review existing surveys and diary studies (especially FDIC, SDCPC, SHED) more systematically, including sample size, frequency of survey administration, questions related to households/consumers underserved in digital payments, and functionality in linking to other survey data.
- Identify options for data collection tools to fill gaps in data, including developing new surveys, leveraging existing surveys, and conducting supplemental qualitative studies.
- Investigate the potential for big data to fill gaps or to be used as external validation of data obtained from individual households via a survey, a diary study, or a qualitative study. Administrative data could include anonymized data on payment methods for making and receiving government payments, anonymized bank account transaction data to explore the behaviors of somewhat digitally underserved households/consumers, aggregated and anonymized online purchase and payment behavior, and geolocation data on banking deserts.
- Collaborate with government agencies, consumer advocacy groups, and financial institutions that focus on financial or payments inclusion to advance research and measurement of households underserved in digital payments.

6. Conclusion

Nearly 98 percent of US households currently have at least one transaction account provided by a bank, a credit union, or a fintech or nonbank firm. Transaction accounts, however, vary in terms of safety, affordability, and functionality. These differences and other factors such as household preferences affect households' intensity of digital payment use. Consequently, some households rarely use digital payments, while other households use them for most of their transactions.

In this paper, we set forth two definitions with our end goal of measurement in mind. We define digital payments inclusion as an economic state in which all households have access to and use safe and affordable digital payments for most of their transactions. We define households that are underserved in digital payments as households that use unsafe or high-cost digital payments or paper-based payment methods for a significant share of their transactions. Underserved households are further divided into four groups ranging from those that have no transaction account (the most underserved) to those that have safe, affordable transaction accounts but only occasionally or rarely use digital payment services.

Although existing surveys and studies provide useful information about households underserved in digital payments, more work is needed to improve the quantification and understanding of these households. It is critical to gather data on households' ownership of different types of transaction accounts, internet access, ownership of mobile phones, and intensity of digital payments use, along with barriers to accessing and using digital payments. Ongoing studies assessing the safety, affordability, and

[25] Qualitative studies on US families and consumers underserved in financial services include Morduch and Schnider (2017) and Servon (2017).

functionality of various types of transaction accounts are also important, as these features and new types of transaction accounts evolve over time. Collecting data on the acceptance of digital payments by merchants and billers—major payment counterparties—is also critical.

To advance data collection, measurement, and research around underserved households, we identify four possible next steps: (1) review existing surveys and studies, (2) identify data collection tools to fill gaps in data, (3) investigate the potential of administrative data to supplement or validate data collected from individual households, and (4) collaborate with government agencies, consumer advocacy groups, and financial institutions in data collection, measurement, and research efforts.

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Appendix 1: Share of Transactions in Value Using Different Payment Methods

Table A1 shows that the share of digital payments in value across three groups of consumers: the share is the highest for high-income banked consumers and the lowest for consumers who own only alternative transaction accounts or credit cards (85.8 percent and 57.1 percent, respectively). Compared with the share of digital payments in number (shown in Table 2), the share of digital payments in value is slightly higher (by 1 to 3 percentage points) for higher-income and lower-income banked consumers and about 12 percentage points higher for consumers who own only alternative transaction accounts or credit cards.

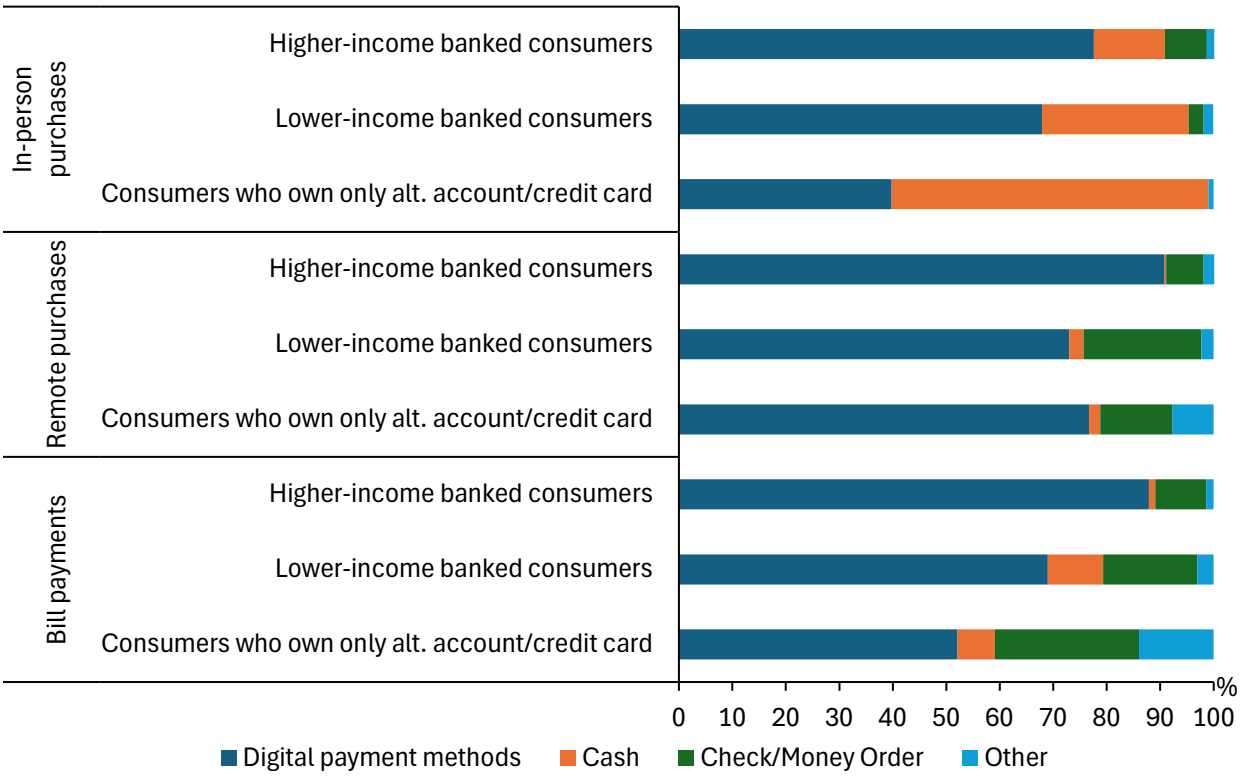
Table A1: Share of transactions (in value) made using different payment methods across three consumer groups

	Banked consumers		Consumers who own only alternative transaction accounts or credit cards
	Higher income	Lower income	All income
Paper-based instruments	**12.8**	**28.1**	**32.7**
Cash	4.1	14.2	13.8
Check/money order	8.7	13.9	18.9
Digital instruments	**85.8**	**69.2**	**57.1**
Debit card	13.3	24.4	35.0
Credit card	21.3	20.8	3.1
Prepaid/gift/EBT card	0.4	1.5	7.8
ACH	46.6	21.0	6.9
Other digital payment methods	4.2	1.5	4.3
Other	**1.5**	**2.6**	**10.2**

Sources: FRB of Atlanta 2023 SDCPC and authors' calculations.
Notes: "Other digital payment methods" comprise mobile payment app payments and account-to-account transfers. "Other" includes multiple payment methods, income deduction, and other payment methods.

Figure A1 depicts the share of digital payments in value across three types of transactions across three groups of consumers. The share of digital payments is the largest for remote purchases and the smallest for in-person purchases across all three groups of consumers. The share of digital payments in value is higher than that in number (shown in Figure 6) across all three types of transactions and across all three groups of consumers.

Figure A1: Share of transactions (by value) made using different payment methods across transaction types and across consumer groups



Sources: FRB of Atlanta 2023 SDCPC and authors' calculations.

Appendix 2: Factors Inhibiting Households' Access to Digital Payments

One factor inhibiting access to digital payments is households' inability to fulfill the requirements for obtaining a transaction account. According to the 2021 FDIC survey, about 40 percent of unbanked households cited lack of money to meet the minimum balance requirements, 14 percent cited problems with past banking and credit history, and 12 percent cited lack of proper identification (FDIC 2022). In contrast to depository institutions, nonbank or fintech transaction account providers do not require a minimum balance, a minimum initial deposit, or the absence of poor banking or credit history. They also do not require full identification for opening an account, though identity verification is necessary to provide consumer protection on those accounts.[26] Some households may avoid opening certain types of transaction accounts, particularly bank accounts, to avoid negative consequences. For example, households that have declared bankruptcy may not want to have records of their payments, and those that have debt collection issued against them may fear that their bank accounts will be frozen.

Another factor inhibiting access to digital payments is households' lack of awareness of transaction account options or the benefits of account ownership (CPMI-World Bank Group 2016). For example, requirements for obtaining a Bank On account are much less rigorous than those of other bank accounts: The minimum opening deposit is $25 or less, an alternative ID (such as a municipal ID or student ID) is acceptable, and only new customers who have been involved with actual incidents of fraud are denied an account. Despite the relaxed requirements and increasing availability of Bank On accounts in all 50 states, many unbanked households continue to cite lack of enough money to meet the minimum requirements, lack of proper IDs, or past banking or credit history problems as reasons for not having a bank account, suggesting that some unbanked households are not aware of the features or availability of these accounts (FDIC 2022).

Households' perceptions of transaction-account providers, transaction accounts themselves, and the associated digital payment instruments may also affect access to digital payment services. Negative perceptions of transaction accounts or account providers, such as perceived lack of privacy, expectations that fees will be high or unpredictable, and perceived lack of trustworthiness of transaction-account providers, have been cited by unbanked households as reasons for not having a bank account (FDIC 2022). Data from the 2023 SDCPC also suggest that more positive perceptions of the payment instruments associated with a transaction account are correlated with consumers' adoption of the transaction account. Table A2 shows how the average ratings for cost, convenience, security, and ease of setup and use of different digital payment instruments compare between adopters and non-adopters of the associated transaction accounts. A plus sign (+) indicates that the transaction account adopters' average rating for a given characteristic of an associated digital payment is significantly higher (at the 5 percent level) than non-adopters' average rating. Bank account adopters rate all four characteristics of the associated payment instruments—debit card and two types of ACH transfers: bank account number payments (BANP) and online banking bill payment (OBBP)—similarly or significantly more highly than

[26] The barrier that the lack of proper identification documents poses to obtaining safe and affordable transaction accounts may be eased as alternative IDs, such as municipal IDs, student IDs, and Individual Taxpayer Identification Numbers, become increasingly available or accepted by transaction account providers (Cities for Financial Empowerment Fund 2024; Sena 2018).

non-adopters of bank accounts. Prepaid card adopters rate the convenience of prepaid cards more highly than non-adopters of prepaid cards, and credit card adopters rate all four characteristics of credit cards more highly than non-adopters of credit cards.

Table A2. Adopter and non-adopter ratings of digital payment method(s) associated with transaction accounts

	Cost	Convenience	Security	Ease of setup and use
Bank account				
Debit card	+	+		+
ACH BANP	+			+
ACH OBBP	+	+	+	+
Prepaid card		+		
Credit card	+	+	+	+

Sources: FRB of Atlanta 2023 SDCPC and authors' calculations.

Previous studies examine how households or consumers perceive the safety or privacy of payment instruments or bank accounts and how their perceptions affect adoption and use of those accounts or payment methods. These subjective views on safety and privacy relate closely to the concept of trust. Brady and Kent (2022) equate trust with "confidence in institutions," described for businesses as delivering safe products at reasonable prices. Sapienza and Zingales (2020) define trust as "an expectation that a person (or institution) will perform actions that are beneficial or at least not detrimental to others." Chawla et al. (2023), using a subset of survey respondents who identified financial institutions as untrustworthy, find that mistrust of banks is associated with fear of loss, fiduciary concerns, lack of transparency, and privacy concerns.

Survey research has identified trust as relevant to a household's choice to have a bank account. According to the 2021 FDIC survey, 34 percent of unbanked households cited "avoiding (banks) gives more privacy" as a reason for being unbanked, and 33 percent cited "don't trust bank." Those were second and third most cited reasons, respectively, after "don't have enough money to meet minimum balance requirements" (FDIC 2022). Using multiple rounds of the FDIC survey, Hayashi, Routh, and Toh (2023) find that distrust of banks and privacy concerns are strongly associated with unbanked households that have never been banked and are not interested in having a bank account, even after the authors control for other variables. They also find that these unbanked households are less likely than other unbanked households to open a bank account.

Bank failures have influenced consumer confidence in financial institutions. According to a Gallup poll conducted in April 2023 (the month after Silicon Valley Bank and Signature Bank collapsed), nearly half of US adults were worried about the safety of their money deposited in financial institutions (Brenan 2023). Low- and moderate-income (LMI) adults and those without a college degree were more worried than others. These poll results are similar to those in 2008 shortly after Lehman Brothers collapsed, and

they suggest that many US consumers are unaware that their money in an FDIC-insured account is protected if a bank fails.[27]

Distrust in financial institutions also fluctuates with the overall condition of the economy and, as stated earlier, varies by consumers' demographic characteristic. Van der Cruijsen and Roerink (2023) find that distrust in financial institutions, measured by various entities in opinion surveys conducted over decades, fluctuates with economic cycles. Moin, Devlin, and McKechnie (2017) find that demographic characteristics affect people's perceptions of trustworthiness in general. These two factors—that trust decreases when the economy declines and that willingness to trust is affected by demographics—may make it difficult to measure the effect of changes designed to improve trust among underserved populations and, thus, increase digital payments access by encouraging bank account adoption.

However, a consumer survey that collects data on demographics, banking status, ownership of alternative transaction accounts, and trust in different types of entities can be used to measure the difference in trust levels between the general population and various subgroups. Then, any change over time in these differences could be attributed in part to factors outside economic conditions that affect trust and would be relevant to efforts to improve inclusion for various subgroups. Existing research has uncovered some of differences in trust levels. For example, Generation Z tends to trust fintechs and traditional financial institutions almost equally (Plaid and the Harris Poll 2021), whereas unbanked and LMI consumers tend to trust traditional alternative financial service (AFS) providers (such as money transmitters) over banks (Rengert and Rhine 2016).

[27] To increase the public's awareness of deposit insurance, FDIC launched a national campaign (FDIC 2023d).

Appendix 3: Potential Survey Questions and Additional Information Gathering

Access

Questions that could be used in a household (or consumer) survey and qualitative studies to assess households' access to digital payment services include:

- Which types of transaction accounts do you have? (select from the list of types of transactions)
- Which providers' products do you have? (for fintech digital deposit accounts, GPR prepaid cards, and online payment service providers' accounts)
- Do you own cryptocurrencies/stablecoins? If so, do you use them for transactions?
- (For households without any safe, affordable transaction account) What are your reasons for not having a transaction account? (select any as well as the most important reason from the list of reasons) Are you aware of Bank On accounts?
- With your (particular) account, can you make in-person purchases/online purchases/in-person bill pay/online bill pay/person-to-person transfers or receive payments from your employers or friends/family members?
- Has a payment counterparty (for example, a merchant, biller, landlord) ever not accepted a digital payment method associated with your (particular) account? Did you use cash, check, or money order (a paper-based method) or a digital payment method associated with another account?
- Do you have access to the internet? Do you have a mobile phone (smartphone/feature phone)? Does your mobile phone data plan limit your use of the phone?

In addition to using a household (or consumer) survey, researchers could employ a merchant/biller survey to collect information on which payment methods (including closed-loop payment service providers' products) merchants/billers accept.

Regulators and consumer advocacy groups could gather information about the types of transactions for which a given transaction account or provider product offers digital payment services. They could also gather information about new account types.

Use

Questions that could be used in a household (or consumer) survey and qualitative studies to assess households' use of digital payment services include:

- What are the three payment methods you use the most (for overall transactions and by type of transaction)?
- How do you receive incoming payments/benefits from employers/governments/other businesses (for example, insurance disbursements)/friends/family members?
- How many transactions do you make in a typical month with a given payment method (overall and by type of transaction)?

Safety

Questions that could be used in a household (or consumer) survey and qualitative studies to assess households' trust and perceptions or understanding of safety and privacy include:

- Do you trust a given type of transaction account provider (bank and credit union, fintech digital deposit account provider, nonbank GPR prepaid card provider, online payment service provider)?
- Do you think a given type of transaction account provider protects its customers from loss of funds due to the provider's failure, fraud, or errors?
- Do you think a given type of transaction account provider treats its customers' privacy carefully?
- Do you know whether the money stored in your (particular) account is insured?
- Can you easily find and understand your account provider's policies and rules regarding consumer liability for unauthorized fraud, consumer responsibility for reporting unauthorized fraud, the error resolution process, and data sharing with third parties?

Regulators and consumer advocacy groups could gather information about the safety of given types of transaction accounts or of main products, focusing on:

- whether and how the funds stored in an account are protected/insured;
- consumer protection from unauthorized fraud, errors, and authorized push payment fraud (if applicable); and
- which regulator(s), if any, supervises/oversees account providers' data security, disclosure, privacy protection.

Affordability

Questions that could be used in a household (or consumer) survey and qualitative studies to assess households' perceptions and understanding of costs and fees include:

- Does the provider of your (particular) transaction account or an account that you may consider obtaining fully disclose fees in a way that you can easily understand?
- Can you predict the monthly cost of using your (particular) transaction account or an account that you may consider obtaining?
- Do you think the cost of using your (particular) transaction account or an account that you may consider obtaining is very high/high/reasonable relative to the benefits you get from using it or relative to the methods (such as cash) you currently use?
- Does the payee (such as a merchant or biller) charge to accept the payment method in question? Do you foresee that some payees will do so?

Regulators and consumer advocacy groups could gather information about fees and conditions for waivable fees of given types of transaction accounts or by main product. Data collected could include:

- Monthly fees and whether, and under what conditions, the fees are waivable to assess if it is difficult for LMI households to meet the conditions
- Card issuance/reissuance fees (if reissuance is due to fraud, whether the fee is waived)
- Per transaction fees
- ATM fees (fees assessed by providers and fees assessed by ATM owners) and number of free ATM transactions
- Cash-load fees (fees assessed by providers and fees assessed by cash-load agents)
- Balance inquiry or call center fees
- Overdraft and NSF fees; *de minimis* threshold the account provider uses to determine whether to charge an overdraft or NSF fee

- Other penalty fees
- The total expected monthly or annual cost for LMI households: Is the cost high relative to the household's income or to the cost of using a Bank On account?