

The Ethics of Payments: Paper, Plastic, or Bitcoin?

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Abstract Individuals and businesses make numerous payments every day. They sometimes have choices about what forms of payment to make or accept, and at other times are effectively forced to use a particular form. Often there is an asymmetric power relationship between payer and payee that raises the issue of whether one side unfairly exploits the other. Is it unethical exploitation for an employer to pay employees with a fee-laden payroll card over other more convenient forms of payment? Does the fee structure of payment networks such as Visa and MasterCard unfairly exploit merchants? The bitcoin payment system is an ethical as well as technological evolution as it was designed to be an electronic payment system that does not rely upon trust. Can an entire payment system like bitcoin be “evil,” as charged by Krugman (2013)? Payment tools as such are ethically neutral, but can be used in an ethical or unethical manner.

Keywords Financial ethics · Payments · Interchange fees · Debit cards · Credit cards · Payment cards · Scrip · Exploitation · Bitcoin

Introduction

Consumers and businesses can sometimes choose how to make payments. Cash or check? Debit or credit? Dollars or bitcoins? For example, United Airlines accepts eleven

different forms of payment.¹ At other times, there is little choice involved: either accept wages in company scrip or become unemployed. Different forms of payment can impose different costs (and sometimes benefits) on the counterparty. Furthermore, there are social costs involved in the total cost of operating the payment system, including financial as well as environmental costs. What are the ethical implications of these different payment forms? At what point does the choice of a payment form change from a routine business decision to an unethical exploitation of the counterparty? The business ethics literature has not yet directly addressed the ethical issues involved in payment systems.

Furthermore, payment systems usually require an element of trust in the system, such as that a bank will honor a payment instruction. The bitcoin system was explicitly designed not to rely on trusted intermediaries like banks, yet it has been criticized by Krugman (2013) as “evil.” Can an entire payment system like bitcoin be “evil”?

The next section defines payments and gives a brief history of the many colorful means that people have used to make payments over the years. Payments can be made in many ways that are continuing to evolve. Next we explore the ethical implications of a payment system like bitcoin that is explicitly designed not to rely upon a specific trusted intermediary, although it does require some trust in other parts of the payments system. A payment system by itself is

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¹ For the curious, these are: American Express, Bill Me Later (but only for U.S. billing addresses), Carte Blanche, Diners Club, Discover, MasterCard, PayPal, TeleCheck (U.S. billing addresses only), United UATP, Visa, Cash, (at an airport ticket office, United ticket office or a Western Union location) <http://www.united.com/web/en-us/content/reservations/online/fop.aspx>, Accessed October 4, 2013.

not evil, but any payment mechanism can be used in unethical ways.

There are other ethical issues involved in payments. We then examine the ethical questions involved when one party has a choice that the other party must accept. Past abuses in which employers have paid workers in scrip spendable only in the company store have led to laws specifying forms of payment for workers. Is it exploitation to pay workers with fee-laden debit cards? We find that it depends on the circumstances.

A Brief History of Payments

A payment is the transfer of access to, and control over, spending power to settle a claim or complete a transaction. In other words, the payee can use the payment proceeds to buy things or make further payments with them. Payments have taken many forms over the centuries, and new forms of payment continue to arise to supplement or even replace older forms of payment.

In the earliest days, physical goods were directly bartered for other physical goods.² For example, one might pay for a plow with surplus grain. This worked, but was inefficient, because both parties to the transaction had to have exactly what the other side really wanted. The use of a medium of exchange for making payment made this process far more efficient. Cattle formed an early medium of exchange. For example, one could sell the surplus grain for a cow to a miller and then use the cow to buy a plow from another farmer. Indeed, the word pecuniary comes from the Latin word *pecus*, or cattle. Even today, cattle are used as part of the traditional bride price in Uganda.³

Of course, cows are bulky and need to eat, limiting their efficiency as a medium of exchange. Over the years, payments have been made using a variety of media and systems. These include:

- *Commodities* For example, in the Virginia colonies, tobacco was used as a form of payment. Colonial laws specified monetary amounts in terms of pounds of tobacco (Schweitzer 1980). In more modern times, prisoners have used cigarettes as a form of payment.
- *Stones* On the Yap islands, stones of various sizes were used as a form of money (Gilliland and Cora Lee 1975).

² Although Graeber (2011) disputes the relative role of barter in the history of money and credit, it is clear that barter did play a major role in trade even if the relative size can be debated.

³ See Odongo (2013). One of the authors personally knows a Ugandan who paid 20 cattle for his wife, although the cattle were more for traditional ceremonial reasons rather than a mercantile exchange.

- *Precious metal coins* Gold, copper, and silver have been used for millennia in the minting of coins. If the government that minted the coins was overthrown, the metal in the coins retained value. Today, one can still find spoons made of “coin silver” in which silver coins had been reshaped into silverware.
- *Base metal coins* Governments now generally use base metals in the minting of coins.
- *Banknotes from private banks* During the “free banking” era in the United States, banks issued their own banknotes that circulated as currency (Rolnick and Weber 1983).
- *Banknotes issued by governments as paper currency.*
- *Scrip—private money* From time to time various entities issue their own money. For example, a company running short on cash might pay its workers with scrip that can only be spent at the company store (Timberlake 1987). Even today, The Walt Disney Company issues “Disney Dollars” that can be spent at its resorts and theme parks.⁴
- *Paper checks.*
- *Travelers’ checks.*
- *Debit and credit cards.*
- *Casino chips* Nevada law requires casinos to post signs indicating that casino chips may not be used for “monetary purposes” outside the casino, evidencing a desire on the part of holders of such chips to do exactly that.⁵
- *Stored payment cards* These range from gift cards that can be used only at a particular store to reloadable cards that can be used at merchants accepting most credit cards. These also include cards used for riding public transit systems in many cities. Government benefits such as food stamps and Social Security are now often paid with such cards, especially for the “unbanked” who do not have bank accounts.
- *Payment in kind (PIK) bonds* One particular type of bond is known as a “Payment in Kind” bond on which the issuer can pay the interest by issuing more debt to the bondholder (Dammon et al. 1993).
- *Wire transfers* Payments can be made through a variety of wire transfer services, ranging from the Fedwire that the Federal Reserve uses to wire money between banks, to the private CHIPS system that banks can all use to wire money between banks, to the retail Western Union and Money Gram systems.
- *ACH payments* The Automated Clearing House (ACH) system is used for electronic payments, such as the

⁴ For more information, see <https://disneyworld.disney.go.com/faq/parks/using-disney-dollars/>.

⁵ See http://gaming.nv.gov/stats_regs/reg12.pdf.

automatic deposit of payroll checks or the direct drafting of utility bills from checking accounts.

- *Cell phones* New payment technologies allow people to make payments using their cell phones (Bernard and Miller 2011).⁶ In many cities, one can now use regular cell phones to pay for parking meters.⁷
- *Electronic toll payments* Many cars now have electronic transponders for making toll payments.
- *PayPal* facilitates payment via the internet.
- *Cryptocurrencies such as bitcoin* We will discuss these in more detail below.

Trends in Payments

Payment technology has evolved substantially over time and is continuing to evolve. In the last century, we have seen payments evolve from a cash-based system in which most payments were made in coins made of gold and silver (or paper currency that was sometimes convertible to gold and silver) to a system in which payments were made by paper check. We are now evolving into a system in which electronic payments are rapidly replacing paper-based payments. Paper check use is declining rapidly.⁸ Other forms of payment are declining as conditions change. Wayne (2011) reports that prisoners no longer use cigarettes as a form of payment after the U.S. Bureau of Prisons banned cigarettes.

The use of physical cash is also in relative decline as consumers and businesses switch to more convenient payment media. The United States stopped distributing bills larger than \$100 in 1969, although it stopped printing them during World War II (U.S. Treasury 2011). Some merchants will not accept anything larger than a \$20 bill. Today, physical cash cannot be used at all to make payments in some places, such as for in-flight purchases on airplanes.⁹ Although U.S. currency bears the designation “This note is legal tender for all debts, public and private,” a merchant does not have to accept it for a transaction that has not yet occurred, only for the settlement of a previous debt.

Payments will continue to evolve as creative and innovative people try to find ever better ways of making

⁶ Cell phones for payments with text message-based products like M-Pesa, or specific app-based systems like Starbucks.

⁷ For example, see www.parkmobile.us.

⁸ In 1995, Americans wrote 186 checks per capita, dropping 45 % to 102 by 2007 (Schuh and Stavins 2010). Even when payments are made by check, the checks are now scanned into a digital image that is presented to the issuing bank for payment (Bauer and Gerdes 2009).

⁹ For example, United Airlines states on its web site “Credit and debit cards are now the only form of payment accepted on United flights for all in-flight purchases.” <http://www.united.com/page/article/0,6722,51501,00.html>.

payments. As with any new technology, these different forms of payment raise ethical questions, especially when there are asymmetric power relationships between payer and payee. For example, debit cards were unknown a few decades ago, but now their use in paying employees has become controversial, as will be discussed below. A coherent analysis of the ethical implications involved will help in addressing the ethical questions that will occur in the future as payment systems continue to evolve.

Is Bitcoin Evil? Or a Better Mechanism for Trusted Payments?

The bitcoin payment system, first described by the pseudonymous Nakamoto (2008), highlights some important issues in business ethics.¹⁰ Although bitcoin is commonly referred to as a “cryptocurrency,” Nakamoto himself referred to it as “a system for electronic transactions without relying on trust.” Traditional payment systems often rely upon trust. For example, users of paper checks trust that their banks will honor their checks, while users of debit cards maintain similar trust in their banks. The genesis of Nakamoto’s invention was a concern that other electronic payments require a trusted intermediary, such as a bank or electronic mint, in order to verify a transaction. Otherwise, electronic payments could be counterfeited or “double spent.” In other words, without a trusted intermediary to verify that a transaction was legitimate, an electronic message representing ownership of something could easily be duplicated and spent again. Indeed, the word “trust” appears 14 times in his seminal nine page paper and the word “honest” 16 times. The word “currency” only appears once in the context of a physical currency.

Instead of relying on a single trusted intermediary, such as a bank or credit card network to transmit and verify a transaction, the bitcoin system relies upon a large number of competing “miners” to verify transactions.¹¹ A miner is just a computer that is attached to the internet and that performs the computations needed to verify each transaction. Anyone can become a miner by connecting a computer to the internet and running some mining software. In the bitcoin system, a transaction is publicly announced to the network. The miners effectively vote on the legitimacy of each transaction as part of the mining process by time stamping each transaction and verifying that no one has

¹⁰ The name Satoshi Nakamoto appears to be a pseudonym and the identity of the real author or authors is unknown as of this writing. For ease of exposition, I will use the pronoun *he* to refer to Satoshi Nakamoto when he could well be a she or a they.

¹¹ On May 12, 2014, Blockchain.info reported that it was connected to 476 nodes, which approximates the number of miners at that time. <http://blockchain.info/connected-nodes>.

double spent that money before. All transactions are recorded in a public ledger known as the “blockchain.”

The medium of exchange in the bitcoin system is known as a bitcoin. A bitcoin is basically a combination of a digital address and a number that is known as a private key, a cryptographic tool that is the only way to unlock the bitcoins belonging to that address. The private key can be stored in any storage media, including a piece of physical paper, although many keep their information in software applications known as bitwallets. Despite many media images showing coins, there are no official physical bitcoins. Indeed, there is no officialdom to issue any physical bitcoins. Bitcoins are not issued or backed by any government or central bank, but are instead issued to the miners as rewards for being the first to solve the mathematical challenges needed to add a new block of transactions to the blockchain.¹² The other miners then verify the new block and begin the race to create the next block. There is no central authority that issues bitcoins. In essence, the winner of the race to create the new block includes the payment of new bitcoins to itself in the new block. In order to use those newly issued bitcoins, the rest of the miners on the network need to accept the validity of the new block of transactions. This verification is done by verifying that the new block meets the mathematical specifications for a new block.

As the number of bitcoins that have been issued increases, the relative difficulty of mining bitcoins will also increase. There is a theoretical limit of 21 million bitcoins that will ever be issued. This limit prevents a government or monetary authority from inflating the currency. As that limit is approached, miners will increasingly be compensated for processing bitcoin transactions with transaction fees. A typical transaction fee for a small transaction is .0001 bitcoin, worth about USD 0.043.¹³

Bitcoin transactions are not secret. In order to be verified by the network of miners, they need to be published to the network. It is possible for the general public to trace the transfer of bitcoins from one “bitwallet” to another. However, the owner of a particular bitwallet can be anonymous. This near anonymity is valuable to those concerned with the privacy of their transactions, including users of underground web sites such as Silk Road used for purchasing illegal drugs, as documented by Barratt et al. (2013).

¹² The technology behind bitcoin is actually quite elegant and has many other potential uses. More information about the can be found at www.bitcoin.org and www.coindesk.com.

¹³ More information on fees can be found at https://en.bitcoin.it/wiki/Transaction_fees. As of May 12, 2014, the exchange rate between bitcoins and dollars was approximately \$432 BTC/USD, making a .0001 transaction fee worth about 4.3 cents. Bitcoins are divisible down to .00000001 BTC, a unit known as a Satoshi.

Bitcoin has attracted quite a bit of media attention, and bitcoin-related ventures have started to receive venture capital funding.¹⁴ One of the tantalizing possibilities of the system is that it or a similar open architecture payment network may provide a cheaper method for businesses to receive payments than the Visa and MasterCard systems.¹⁵ It costs almost nothing to receive a bitcoin payment, although a merchant would have its own administrative costs of installing the software to handle bitcoins, transaction fees for converting to other currencies, and currency risk from operating with multiple currencies. The reduction in transaction costs also has potential for substantially reducing the cost of international remittances. This would greatly benefit poor migrants sending home funds to family members in developing countries.

Another advantage for merchants is that, unlike credit card transactions, bitcoin transactions are irreversible. A recipient of a bitcoin payment does not have the risk that the payment processor will reverse the transaction later as fraudulent. Recently, Overstock.com (2014) has started accepting bitcoins and states that its processing costs for receiving payments in bitcoin are lower than for traditional credit cards.

Bitcoin is not without risks, however. Both consumers and merchants must take precautions that their bitwallets do not get hacked, leading to unrecoverable losses. The exchange rate between bitcoin and traditional fiat currencies has fluctuated, undermining its role as a store of value. As a recent innovation, there is also the risk of some unknown technology flaw or other unknown risk.

The bitcoin payment system is not only a technological innovation, but also an interesting innovation in applied business ethics. It represents a technological solution that creates appropriate incentives for honesty without needing a government to enforce laws against dishonesty. It relies only upon miners acting in their own self-interest without any need for altruism or cooperation. For example, suppose that a dishonest miner attempts to change the blockchain to give itself counterfeit bitcoins. As long as the majority of the miners are honest, this cannot happen. The rest of the miners would recognize the corrupted blockchain and reject it, so the dishonest miner would not be able to spend the counterfeit bitcoins. Nakamoto (2008) devotes a large portion of his paper to examining the possibility for an attack on the system and concludes that it is extremely improbable as long as no one controls 51 % of the

¹⁴ Coindesk.com (2014) reports that bitcoin-related ventures have received \$154 million in venture capital as of the first quarter of 2014.

¹⁵ Cardfellow.com reports average credit card transaction fees in the range of 1.95–2 % for transactions where the payment card is physically swiped, and 2.3–2.5 % for transactions where the card is not present, such as online transactions. <http://www.cardfellow.com/blog/average-fees-for-credit-card-processing/>.

computer power. If anyone did manage to control 51 % of the computer mining power in the network, they could fraudulently manipulate the currency. However, they are unlikely to do so because they would damage the trustworthiness of the network and thus destroy the value of the bitcoins that they own as well as their own ability to earn mining revenue.¹⁶ However, one can envision such an attack by an entity with ulterior motives, such as a terrorist group not driven by profit motives. A one-shot attack would also be profitable for an entity with a large debt in bitcoins.

Nakamoto's conception of trust is apparently of the amoral variety explored in Cohen and Dienhart (2013), a taking on of risk or vulnerability in the expectation that an entity will act in an appropriate way even when they are not monitored.¹⁷ Proponents of the use of the bitcoin system view it as a workaround for their lack of trust in the existing payment infrastructure, dependent as it is on a fallible central bank or other payment intermediary. Instead, the users of bitcoin place their trust in a diverse crowd of profit-motivated miners. Note here that the trust in the network of miners imposes no obligation on anyone to do anything, as would be the case using the moral conception of trust. Anyone can join the network and start mining, and any miner is free to leave the network at any time.

However, some find the bitcoin payment system to be ethically problematic.¹⁸ In a *New York Times* blog post, Nobel Laureate Paul Krugman (2013) declared "Bitcoin is evil," citing arguments that bitcoin is part of a political agenda to damage central banks and the abilities of governments to collect taxes. Although he does not precisely define his usage of the word evil, it appears that he is using it in the common dictionary meaning of "profoundly immoral or malevolent." However, his logic appears to be less ethical or moral but actually based more on his views on central banking and tax policy. He implicitly assumes that central banks in their present form are good, and that the proponents of bitcoin want to use it to replace the fiat money issued by central banks. This would reduce or eliminate the role of central banks in the world economy, which some proponents think would be a good, not evil, outcome.¹⁹

¹⁶ Mims (2014) provides an example of the concern over such an attack.

¹⁷ See Cataldo et al. (2010) for a detailed discussion of the concept of trust and Koehn (2003) for an examination of trust in an online environment.

¹⁸ There are many skeptics about bitcoin from many dimensions.

¹⁹ Hayek (1990), however, makes some compelling arguments that a monetary system in which the government does not have a monopoly on the production of money would be beneficial. Just for clarity, the authors are not expressing an opinion here on monetary policy.

We leave the important debate of the desirability of bitcoin from a monetary policy perspective, along with prognostications of its future success or failure to other venues, and focus in instead on the ethical issues. One issue is bitcoin's potential for facilitating harm to others. One fear expressed by law enforcement agencies is that it may provide a payment mechanism that can facilitate and increase harmful activities such as child pornography, narcotics trafficking or terrorism.²⁰ Krugman might have argued, but did not, that bitcoin's reliance on pure self-interest to induce honesty was evil in itself in that it encourages a society of *hominines economici* who look out only for their own narrow self-interest without any concern for the common good. However, it would be quite a stretch to argue that bitcoin miners would be any more self-interested than current participants in our financial markets, so such an argument would be weak at best.

Clearly, the use of any payment mechanism, whether it be cash, check, wire transfers, or bitcoin, for malevolent purposes is evil. One could similarly argue that paper currency is evil, given its current status as a payment mechanism for illicit activities. This raises again the old ethical question of how to balance a product's potential for abuse with its benefits. As long as a product has significant potential benefits, then the ethical judgment should be made on the use of the product, not the product itself. For example, painkillers like oxycodone have a serious potential for abuse, but also important medical uses. Thus, bitcoin itself is not evil, although bitcoin, like any other payment system, can be used for evil purposes.

Other Ethical Questions Arising from Payment Systems: Worker Exploitation

Bitcoin is neither the first nor the last payment mechanism to present ethical issues. Many issues arise from the different costs and benefits of various payment forms to the payer and the payee. For example, situations in which an employer can force employees to accept certain unattractive forms of payment can be a form of exploitation. Here we follow Sargent and Matthews (1999) to view exploitation as the use of labor without giving "just or equivalent return." Egregious examples occurred in the nineteenth and early twentieth century in which some companies, often monopsonistic employers in isolated mining or logging towns with few other employment opportunities, would pay their workers in scrip that could only be spent in the company store (Fishback 1985). The company store would charge allegedly inflated prices for necessities, and the

²⁰ See, for example, the Congressional testimony at <http://www.hsgac.senate.gov/hearings/beyond-silk-road-potential-risks-threats-and-promises-of-virtual-currencies>.

scrip could be traded for U.S. currency, but only at a discount. While there are debates as to how widespread or egregious these practices were, they received sufficient notoriety that the U.S. Congress and many states have passed laws regulating how employees are paid. Employers are no longer allowed to pay their workers with scrip.²¹

Note that this brings up basic concepts of fairness and justice, which have been widely discussed in the ethics literature. What is fair in the context of a seemingly simple payment transaction? Note that in this transaction, as in any business transaction, both parties think they are better off—have a surplus—as a result of the transaction. However, in all but the most abstract and theoretically competitive market structures, there is some surplus that could go to either the buyer or seller and is subject to negotiation or force. Basic concepts of fairness indicate that both sides should share in this surplus to some degree. How much each side should get is a matter of broad social debate, as indicated by the debate over executive compensation (Bebchuck and Fried 2004). However, it is clear that a system in which one party gets the entire surplus and the other party gets almost no surplus is exploitive.

Similarly, any part of a transaction that imposes large costs on one party in order to provide a much smaller benefit to the counterparty is also exploitive. In circumstances in which both parties are free to negotiate, one would expect such situations not to occur. The party that would bear a large cost would gladly enter a deal in which it would pay the other party just enough to forgo its small benefit and thus not inflict the large loss. However, when there are large differences in negotiating power, such as the mining camp where the mining company is the only employer, then such a preferable outcome may not occur. The mining company may have the power to impose terms and conditions on its workers that provide relatively small benefits to the company but much larger costs on its workers who have little choice.

The Case of Payroll Cards

Some employers now pay their employees with prepaid debit cards, also known as paycards. (Kiviat 2003) reports that companies ranging from McDonald's to FedEx now pay some of their employees with paycards instead of checks. The companies generally reload the employees' cards on payday by transferring the funds to a bank. These paycards, which often work on the Visa or MasterCard networks, allow employees to access their pay at ATMs as well as purchase goods directly with their paycards. Wal-Mart is also attempting to eliminate paper paychecks entirely and move completely to direct deposit and

paycards (Heet 2009). Wal-Mart also permits its paycard users to write checks against the balances on the paycards through the Money Network.

However, this transformation has not been without controversy. Some payroll cards can impose fees on the users above what they would incur with cash or check. For example, one payroll card issued by Comdata does allow one free transaction, so the user can cash out for free at a bank (St. Edwards University 2014). However, after the first transaction, the charges include \$1.00 for an in-network ATM withdrawal, \$5.00 for a cash disbursement from a participating bank, \$1.50 for an ATM balance inquiry, \$1.00 for a declined transaction at an ATM, \$.50 for a PIN-based purchase, and so forth. These fees can add up rapidly.

It could thus appear to be exploitive for an employer to force fee-laden payroll cards on vulnerable low-wage workers when other payment mechanisms are similar in cost to the employer. A McDonald's franchisee has been sued for using only debit cards to pay workers instead of checks. The allegation is that because the workers had to pay fees to access the funds from ATMs, they were not being paid their full wages in violation of the labor laws (Silver-Greenberg and Clifford 2013).

An additional complexity arises from the heterogeneity of employee circumstances. An employee with a bank account may be able to cash a payroll check and access the banks' ATMs at zero marginal cost. This employee would be quite happy with a payroll system that relies on checks or direct deposit. However, a large fraction of the U.S. population is "unbanked." Lusardi (2010) reports that 12 % of the United States population does not have either a checking or a savings account, and that the unbanked are disproportionately poor and less-educated minorities. Others may shun bank accounts out of concern that creditors may be able to seize them. The unbanked may have to pay a significant fee to cash a paycheck at a check-cashing outfit. Fox and Woodall (2006) report that the check cashing outlets charged an average of 4.11 % to cash a paper payroll check, over \$20 for a \$500 paycheck. This represents several hours of work for a worker receiving the minimum wage. Thus, an unbanked person might prefer a paycard to a paper check, despite the fees involved.

Cost pressures may induce an employer to prefer a single payroll system. Checks or direct deposit are convenient and low cost for employees with bank accounts, but costly for the unbanked. Payroll cards, despite their fees, may be less costly and more convenient for the unbanked than traditional checks. Here we get to classic choices between the utilitarian "greatest good for the greatest number" and a Rawlsian selection of the best worst case. Employers choosing to use payment cards should select payment card products that are not laden with excessive fees that reduce the payment benefits of the cards. Fees

²¹ See 29CFR531.34 for details.

vary widely across different payment card products, and employers should resist the temptation to choose a paycard program that shifts setup costs from the employers onto the employees by attaching high fees to the cards.

U.S. regulators have stepped in. Following media and political scrutiny, the U.S. Consumer Financial Protection Bureau (2013) has recently ruled that Regulation E, which governs electronic funds transfers, effectively prohibits employers from paying employees exclusively with paycards. Similarly, Zibel (2013) reports that MasterCard has increased consumer protection for MasterCard-branded paycards.

Credit Card Fees

Asymmetric power relationships, along with allegations of abuse, also exist with debit and credit cards. For example, if a customer purchases merchandise for \$100.00 and pays with a credit card, the merchant may only receive \$97.50, assuming a 2.5 % credit card fee to the merchant. The processing fee is split among the merchant's bank, the credit card network, and the bank that issued the card. Note that five parties are involved in this transaction: The buyer, the buyer's credit card issuer, the credit card network, the merchant's bank (or credit card processor), and the merchant (Schmalensee 2002).

Payment systems such as credit cards display strong network effects in that the more users a payment system has, the more attractive it becomes to other users. The founders of credit card systems faced a "chicken-and-egg" problem in that consumers were reluctant to use a new payment system if no merchants accepted it, and merchants were reluctant to sign up for a new system that consumers did not use. Nocera (1994) describes how the Bank of America solved this problem with massive "drops" in which it issued massive numbers of credit cards in a geographic area all at once. This created a large density of consumers with cards, which led a large number of merchants to sign up. Once a credit card network becomes entrenched, it becomes very hard for rivals to start a new credit card network as consumers are more likely to carry and use a card that is usable at the most merchants, leaving new entrants at a large disadvantage. Industries with strong network effects thus can become highly concentrated with a lack of effective competition to hold down prices.

Some merchants complain that they have little choice but to honor Visa and MasterCard-branded cards and that the fees are excessive (Hayashi 2009). With the widespread use of plastic, they feel they will lose significant business if they do not accept the dominant cards. They also complain that they are forced to pay higher fees on cards that provide rewards to users, and they cannot choose to decline higher-fee rewards cards while accepting other Visa or

MasterCard-branded cards. Similar to credit cards, debit cards also impose processing charges which merchants have had little choice but to accept. As is often the case where asymmetric power arrangements lead to putatively unfair results, the government responds with regulation. Congress stepped in with the so-called "Durbin amendment" as part of the Dodd-Frank financial reform law in 2010 to limit debit card, but not credit card, fees (Hubbard, Hubbard and Bradley 2013).

However, credit and debit cards also provide substantial convenience to consumers and merchants in that large quantities of cash do not need to be transported. Consumers are not limited to the cash in their pocket to make a transaction, and credit cards provide even more flexibility for consumers to separate the timing of their consumption from the timing of when they finally pay for it.

The alternatives to credit cards also impose costs as well as risks on the recipient, as a check may be fraudulent or not honored because of insufficient funds. There are also processing costs to the banking system of handling paper checks, which is one of the impetuses for the ongoing switch to electronic payments. There are costs involved with the use of coins as well. They are heavy relative to other forms of payment, and this makes it much more expensive to count and transport. The heavy weight of coins is one of the reasons leading to the need for heavy duty trucks for the transport of coin and currency (Lambert et al. 2013). Using small denominations of coins to pay large bills is one way of imposing large counting costs on the counterparty. This sometimes happens when people try to protest large bills by paying in pennies.²² Likewise, paper cash may be counterfeit, is vulnerable to theft, and costs time and money to transport and count. For this reason, there are many situations where counterparties refuse to accept paper cash.

Consumer Payment Choice: Cash, Check, Debit, or Charge?

What should consumers do when choosing whether to pay with cash or credit cards? With merchants effectively forced to accept the standard payment cards, regardless of

²² See 31 USC 5103 and the U.S. Treasury discussion of it at <http://www.treasury.gov/resource-center/faqs/Currency/Pages/legal-tender.aspx>. As the statute states "United States coins and currency (including Federal reserve notes and circulating notes of Federal reserve banks and national banks) are legal tender for all debts, public charges, taxes, and dues. Foreign gold or silver coins are not legal tender for debts." There appears to be no exception for small coins, leaving a loophole for those who wish to pay large bills with small coins. Also TB Tropes (2014) provides a list of tropes in the media in which large bills are settled with coins. For a real life example of a man who paid his electric bill in pennies, see McGee (2009) as well as <http://www.paywithpennies.com>.

the fees, the consumer's choice of payment method can have a substantial impact on the profitability of a transaction to the merchant. As the total costs of processing payments are effectively passed on to consumers in the form of higher prices, a single consumer's payment choice has a spillover effect not only on the merchant but on other consumers as well. The issues become murkier when rewards cards are involved. The interchange fees paid by merchants are often different for different payment cards, even those issued by the same brand (e.g., Visa or MasterCard). Debit card fees in the United States are currently regulated by the Federal Reserve under the so-called "Durkin Amendment" to the Dodd-Frank Financial Reform Act. Credit card fees are not regulated and are generally much higher. In general, rewards credit cards that pay generous rebates, airline miles, or other rewards generally incur the highest interchange fees. However, standard credit card merchant agreements restrict the ability of merchants to charge extra for credit cards or to differentiate between rewards and non-rewards cards under the same network brand.

The criteria for decision-making concern the relative benefit to the consumer versus cost to the merchant. As small businesses typically pay the highest interchange fees, a small purchase from a small business imposes a large cost on the merchant but a small benefit to the payer. This can be particularly acute for small transactions if the merchant incurs a fixed per swipe fee in addition to a percentage fee. Actions which impose a large cost on one party but create a much smaller benefit for the other party are socially inefficient and widely regarded as unfair. Thus, the use of cash is ethically preferable in such situations.

However, the opposite may be true for a large transaction with a large business. Large merchants can generally negotiate more favorable interchange fees. Carrying around large amounts of cash is risky not only for the consumer, but also for the business itself. Likewise, the value or convenience of the float, the time between the transaction and the ultimate payment of the credit card bill, along with any rewards or rebates may be substantial to the consumer. Thus, the high benefits to the consumer outweigh the interchange fee to the merchant, making the use of a credit card an appropriate choice.

Credit Cards and Vulnerable Populations

Just as credit card users face ethical issues in the use of credit cards, credit card issuers also face ethical issues in the marketing of credit cards. Many credit card users are "convenience users" who use the card regularly and pay off the card each month, thus incurring no interest or other charges (Mathews and Slocum 1969). The costs of operating the credit card systems are incurred by the merchants

through interchange fees and by other users who pay significant interest rates and late fees (Chakravorti and Emons 2003). The credit card issuers have strong financial incentives to promote usage among customers who are most likely to incur late fees and pay large amounts of interest. These are likely to be among the most vulnerable consumers, those with the least financial sophistication and the least impulse control. This creates serious concerns about irresponsible and predatory lending as discussed in Richards et al. (2008) and Rodford (2009). Thus, the marketing of credit cards brings up similar issues as marketing to vulnerable populations as discussed in Brenkert (1998) and Palmer and Hedberg (2013).

Conclusions

Consumers and businesses have choices of how to make payments and what forms of payments to accept. Different forms of payment impose different levels of costs and benefits on the payer and the payee. The continuing evolution in the technology of payments raises interesting ethical questions for businesses as well as public policy considerations. Users of payment systems should consider the ethical implications of their choices. Situations in which the bargaining power of one of the parties is limited raise questions about the fairness of the result, leading to a debate over the fairness of credit card interchange fees as well as payroll cards. Issuers of credit cards need to consider the ethical issues involved in marketing credit cards to vulnerable populations of unsophisticated users. A new payment system such as bitcoin, like any tool, is neither good nor evil on its own, but it is the ethical or unethical use of the payment system that matters.

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