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The case for cash

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The case for cash

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ABSTRACT

Cash is an extremely useful social contrivance. Kenneth Rogoff, who calls for phasing-out high denomination cash over time, recently discussed two possible drawbacks of high-denomination cash: the extensive use of high-denomination cash in crime and in illicit and corrupt activities and the role cash plays in preventing deeply negative nominal interest rates imposed on bank accounts. I will argue that using cash is preferable to the alternative, which entails worse types of crimes committed in the absence of cash. Consequently, the current high-denomination cash in the U.S. should be retained.

1. Introduction

The benefits of restricting the cash supply, especially high-denomination currency, supposedly include a reduction in crime and a looser bound on nominal policy rates falling well below zero. Even conceding some of these, cash solves many problems. Notwithstanding cash's obvious benefits, many economists have recently focused on criminals' use of cash and the zero nominal return generated by holding cash as social costs that may outweigh cash's benefits. (Rogoff, 1998, 2014, 2016a, 2016b), recommended restricting the supply of high-denomination cash. Is there enough evidence to endorse their proposals to restrict the provision of high-denomination cash, or even to eliminate it altogether?

I argue here that restricting high-denomination cash would lead to pernicious changes in the type of crimes committed. Specifically, restrictions on high-denomination cash will mean that society will be plagued by deeper institutional corruption by organized crime to launder the proceeds from criminal activity. Furthermore, given the nominal frictions of negative interest rates, as is the case with positive inflation rates, limits likely exist to the net benefits of deeply negative nominal policy interest rates. With these costs and benefits, the policy of restricting the supply of high-denomination cash is not persuasive.

Regarding the remainder of the paper, Section 2 briefly reviews the arguments put forward to restrict the supply of high-denomination cash, including those of Rogoff, 2016a. Section 3 provides analogies for a restriction on cash by considering the effects of bans on goods (other than cash) associated with activities subject to opprobrium. Section 4 reviews cash's essential benefits and draws from both anthropology and economics literatures. Section 5 examines the economics of crime and how crime might evolve in an environment with less cash. Section 6 will briefly review other aspects of arguments for restricting cash, including the well-being of poor and unbanked populations and negative interest rates. Section 7 summarizes and concludes.

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2. The argument to eliminate high-denomination cash

Recently, several authors following the lead of Rogoff (1998), 2014, 2016a, 2016b) have advanced the policy of eliminating high-denomination notes, including Kocherlakota (2016), Peter et al. (2016), Sarin & Summers (2016). The most extensive treatment of the topic is Rogoff's book, *The Curse of Cash*. A brief review of his main argument follows.

Rogoff notes that cash reduces transaction costs by eliminating the “double coincidence of wants” problem, especially for poor people and for others who desire anonymity or do not interact with banks. In addition, cash provides revenue for governments via earnings from seigniorage. Finally, cash has other societal benefits because it provides anonymity in transactions and because of its role in assuring civil liberties to people without oversight by governmental authorities.

Counterbalancing those benefits, high-denomination cash has two main costs. First, as noted by Peter et al. (2016), “Such [large-denomination] notes are the preferred payment mechanism of those pursuing illicit activities, given the anonymity and lack of transaction record they offer, and the relative ease with which they can be transported and moved.” Via the combination of anonymity and convenience provided by high-denomination notes, cash facilitates crime, tax and regulatory evasion, and other forms of corruption. (Rogoff, 1998) states that “Paper money fuels corruption, terrorism, tax evasion and illegal immigration—so the U.S. should get rid of the \$100 bill and other large notes.”

Rogoff (1998), Kocherlakota (2016), Goodfriend (2016) find a second cost of high-denomination notes in preventing deeply negative nominal policy interest rates. Offering a reasonably easy way to earn a zero nominal return, a flight into cash would prevent market interest rates from turning deeply negative even if a central bank attempted to charge deeply negative nominal interest rates on commercial banks' reserves balances held at central banks. If this flight into cash were restricted by removing the convenience provided by high-denomination notes, a central bank could implement more deeply negative nominal policy rates.

Rogoff suggested a policy to restrict the provision of high-denomination cash over a long period. Most of cash's costs can be reduced significantly by eliminating high-denomination notes; in the U.S., Rogoff would phase out the \$100 and \$50 notes. Only much later would he aim to stop issuing new \$20 notes. At the same time, Rogoff advocates for increasing financial inclusion for poor people and for unbanked sectors of society.

Rogoff's book essentially encompasses the views of Peter et al. (2016), Sarin & Summers (2016), both of whom focus on cash in criminal activities, and those of Goodfriend (2016), Kocherlakota (2016)), both of whom focus on cash's role in sustaining nominal policy rates' zero lower bound. Rogoff sees two positive outcomes from his suggested policy of gradual reducing the prevalence of high-denomination notes. Like Peter et al. (2016), Sarin & Summers (2016), Rogoff (2016a) first suggests that crime would be more costly without ready access to high-denomination notes' anonymity and convenience, thus reducing crime. Second, like Goodfriend and Kocherlakota claim, fewer high-denomination notes (with which to avoid negative nominal interest rates) would make deeply negative nominal policy interest rates feasible, allowing central banks to effectively combat recessions, especially those that follow financial crises.

Rogoff's book provides excellent and deep knowledge on cash's use through history, on economists' understanding (via surveys and other methods) of holding high-denomination cash, and on the importance of cash to poor people and to the unbanked. His policy recommendation for gradually stopping the issuance of high-denomination notes is feasible. Over a five- to seven-year period, he envisions phasing out the \$50 and \$100 bills, showing respect for the significant social changes and time needed to accommodate such a large change to our monetary system.

3. Analogies

It is difficult to imagine a world with a policy-induced restriction on cash availability. To consider that environment, I draw analogies to other restrictions on the public provision of certain goods. The use of cash, in and of itself, is not harmful.² Restricting its supply is meant to accomplish other social goals, such as reducing crime or imposing negative interest rates on money. Consider the following analogies: the public provision of free condoms and the public provision of free clean needles. Like cash, neither condoms nor needles cause direct harm when used as intended.

These analogies demonstrate two propositions, and I will convince the reader that the propositions hold across various situations. First, restricting a particular good will affect the type and nature of other complementary or substitutable activities associated with the good. Second, it is fallacious to suggest that a survey concluding that a certain group of people do not use the good directly means restricting the supply of the good will not harm that group of non-users.

Specifically, consider an activity that society would like to reduce, such as crime, premarital sex, or heroin use. The overall activity is labeled G . The activity can take two forms: “good” or “bad”— G_g and G_b . In the next section I will focus on specific examples. In one case, G is premarital sex, and its good and bad forms (G_g and G_b) are safe and unsafe sex. In the next example, G is illegal injectable drug use, and its good and bad forms (G_g and G_b) are clean or dirty needle use. In Section 4, I apply this framework to the use of cash.

The overall activity level is the sum of the two subcomponents, and each subcomponent depends on the availability of a different good, such as condoms or clean needles: $G(c, \dots) = G_g(c, \dots) + G_b(c, \dots)$. Then, we find that the overall activity level's rate of change

² I overlook the issue of bacterial and viral contamination of currency; one could amend the statement to read that using cash while wearing gloves is not directly harmful. Furthermore, environmental costs exist related to the inks and the fabrication of the paper or polymer used to produce currency.

(the derivative) with respect to the independent variable, c) is positive, indicating a complementary relationship. Thus, more condoms leads to more premarital sex, and more needles leads to more illegal injectable drug use. Similarly, the relationship of the activity's good type with respect to c could be positive as well, indicating a complementary relationship. However, the dependence of the activity's bad type regarding c could be negative, indicating a substitutable relationship. Thus, we could have $\frac{\partial G}{\partial c} = \left(\frac{\partial G_g}{\partial c} + \frac{\partial G_b}{\partial c}\right) > 0$, $\frac{\partial G_g}{\partial c} > 0$ and we may have $\frac{\partial G_b}{\partial c} < 0$. To assure the overall complementarity, we must have that the complementary relationship between the good form of the activity must be larger than the substitutable relationship of the good type—i.e., that $\left|\frac{\partial G_g}{\partial c}\right| > \left|\frac{\partial G_b}{\partial c}\right|$.

For our purposes, there is no need for an overall complementary relationship between the availability of the good and the bad activities; our argument rests on an increase in the activity's negative form and on the availability of the good—does unsafe sex become more prevalent when condoms are less available? Does dirty needle use rise when clean needles are less available? Is $\frac{\partial G_b}{\partial c} < 0$? As we will see, the answer to all is a resounding yes.

I argue that society is not better off restricting the supply of the good c if the mix of good and bad activities is worsened, even if the overall undesirable activity declines. (Rogoff, 2016a) asserts that the overall level of crime would fall after restricting the supply of high-denomination currency; even conceding that point, it does not follow that society is better off if the type of criminal activity worsens as described here.

3.1. Public distribution of condoms

The free public distribution of condoms, especially to adolescents, has long been controversial, and relatively few public schools in the U.S. provide free condoms to adolescent students.³ On one hand, many religious traditions disdain sex outside of marriage, as well as contraception.⁴ People who adhere to those traditions do not condone the public distribution of condoms. On the other hand, many public health professionals advocate for the public distribution of free condoms to reduce unwanted pregnancies and to reduce the incidence of sexually transmitted diseases.⁵

The free distribution of condoms could affect sexual activity in various ways. Advocates of free condoms suggest that condoms' availability would reduce unplanned pregnancies in sexually active individuals. Opponents argue that a greater availability of condoms would condone more sexual activity.

Amongst articles employing a meta-analysis of studies on condom distribution programs, (Charania et al., 2011, Noar, 2008) suggest that condom distribution programs that address the accessibility and acceptability of condom use significantly reduced unprotected sex and the transmission of sexually transmitted diseases. A partially contradictory finding appeared in recent research by Buckles & Hungerman, 2018. Buckles & Hungerman, 2018 studied a widespread program to distribute free condoms in hundreds of U.S. schools in the 1990s. They found that the programs likely increased fertility and the incidence of gonorrhea in schools that distributed free condoms without mandatory counseling. In schools that distributed condoms with mandatory student counseling, the combined program likely reduced fertility with no discernable effect on gonorrhea's prevalence.

If society restricts free condom distribution programs that employ counseling or other communication efforts to improve acceptability, the existing evidence is mixed on the resulting prevalence of sex, but abundant evidence shows an increase in unsafe sex and in the prevalence of sexually transmitted diseases.⁶

In this analogy, suppose that restricting free condom distribution programs that employ counseling would reduce sex outside of marriage. The type of sex occurring would differ after the restriction—there would be more *unsafe* sex. Second, because the incidence of HIV and other sexually-transmitted diseases in the population is reduced, even people who never use a condom benefit from their availability because of the reduced probability of infection.

3.2. Distribution of sterile needles and syringes

Many programs publicly provide sterile needles and syringes to people who use them to inject heroin and other illegal drugs. (Strathdee & Beyrer, 2015) point out there are approximately 228 needle-exchange programs in the U.S. In contrast to the condom analogy, most uses of sterile needles and syringes are illegal.

Social and legal sanctions against illegal drug use limit needle-exchange programs. For example, a federal funding ban limits their extent, and in 25 states it is illegal to purchase syringes without a prescription, and needle-exchange programs are not authorized by state law.⁷ Such restrictions aim, in part, to deter illegal drug use. Evidence on the effects of needle exchange programs suggests, in contrast to the deterrence hypothesis, that they do not increase injectable-drug use but do decrease the HIV infection rate. Lurie et

³ See Kirby & Brown, 1996).

⁴ Organizations that oppose public condom distribution programs include the Family Research Council, Focus on the Family, and the National Abstinence Educational Association). Organizations supporting public condom distribution include the Centers for Disease Control and Prevention, the American Academy of Pediatrics, and the American College of Obstetricians and Gynecologists.

⁵ Accessed January 30, 2020: <http://www.advocatesforyouth.org/publications/publications-a-z/540-medical-organizations-support-condom-use>

⁶ Where condoms are labeled c and premarital sex as G —with $G_g(c)$ being safe sex and $G_b(c)$ being unsafe sex—we clearly see that $\frac{\partial G_b}{\partial c} < 0$, i.e., unsafe sex increases when condom distribution was restricted.

⁷ Both of these points appear in Strathdee & Beyrer (2015).

al. (1993) note that “available data do not indicate such [needle-exchange] programs increase the amount of drug use.” Hurley et al. (1997) provide evidence that needle exchange programs reduce HIV infections in cities.⁸

Strathdee & Beyrer (2015) document two HIV outbreaks, one in rural Indiana in the 2010s and one in Vancouver, Canada in 1995. Both were arrested with the advent of a needle-exchange program. Indiana saw an upsurge in injection-drug use amongst users addicted to prescription opioids after those prescription drugs became scarce. Using needles for nonmedical purposes is a felony in Indiana punishable by three years in jail. As explained by Strathdee & Beyrer (2015), “When needles are in short supply, injection-drug users have little choice but to share.” Without clean needles, the conditions for an outbreak were set: “Southeast Indiana had previously recorded only about five cases of HIV infection annually, yet by June 10, 2015, a total of 169 people had been newly diagnosed with HIV in about half a year. More than 80% of them were co-infected with hepatitis C virus (HCV).” Subsequent to that outbreak, a medical emergency was declared for Scott County, the affected part of the state. This allowed officials in that county to operate a legal needle exchange program.

In this analogy, suppose that, in contrast to the available evidence, restricting sterile needle and syringe distribution programs would reduce the incidence of illegal injectable-drug use. The type of injectable-drug use occurring under the restrictive policy would differ after the restriction—there would be more sharing of dirty needles.

For the provision of condoms and of sterile needles, it is important to reflect on who benefits from more liberal distribution policies. First, the direct beneficiaries are individuals who avoid an unplanned pregnancy or transmission of a sexually transmitted disease and those who avoid a hepatitis or HIV infection from a dirty needle. In addition, however, many more indirect beneficiaries exist: people with loved ones who have unsafe sex with a person who had earlier used a condom, taxpayers who bear fewer health-care expenditures for people suffering from chronic illnesses, and many others. Even people who never use a condom or clean needle may benefit from others who use those publicly provided items.

These analogies do not directly reveal whether we should restrict the provision of cash, as the economic mechanisms described in these cases do not relate to cash. However, they demonstrate how restricting the public provision of items useful to other activities can change the *nature* or *type* of heterogeneous activities—not just the *extent* of a homogenous activity. In addition, they clarify it is *fallacious* to assert that if people do not use a good, such as condoms or clean needles, they are unharmed by a restriction on the supply of those goods. Now, I will examine cash.

4. What does cash displace?

If high-denomination currency were scarce, what alternatives would criminals and other illicit actors use to conduct nefarious activities? Criminals would need to find a substitute for cash. Any substitute that does not provide anonymity is unlikely to work. Thus, using other familiar forms of money, such as transferring bank balances by check, or credit cards, wouldn't work because tax and criminal authorities could track criminals' actions.

Criminals would likely not resort to bartering for several reasons: barter is difficult to arrange, especially in the relatively thin markets criminals inhabit; it would be difficult to provide security and other infrastructure necessary to identify and exchange bartered goods; and, importantly, barter is generally rare. Anthropologists have extensive evidence that barter did not precede the development of money and has not been widely observed in the historical record, according to Graeber, May 2011.

Rather than barter, (Rogoff, 2016a, pp 58) suggests that commodity money, foreign currency, and inflated invoices could all work. Certain commodities, such as gold or precious jewels, could serve cash's role in illicit trades, but Rogoff points out shortcomings of this method. These commodity-money alternatives preserve anonymity but sacrifice convenience. Without a commodity that serves as a standard of value for some amount, trading commodities for the fruit of the criminal enterprise is much like bartering because values for what is transferred must be determined on both sides of the transaction.

Rather than barter or commodities, foreign currency (or cryptocurrency) is another form of value transfer available to criminals. These substitutes are similar to currency in many ways, but they have drawbacks for criminals. Foreign currency is more difficult to launder than is home-country currency (at least in the U.S.), and criminals face costs for conversions to their home currency. Cryptocurrency is not fully anonymous (see Kocherlakota, 2018) for current efforts in anonymizing cryptocurrency), so many criminals charged for crimes were discovered via the trail left by cryptocurrency. In addition, cryptocurrency values are highly volatile.

Rogoff points out (Rogoff, 2016a, pp 67) that “there are many vehicles for moving money around, for example, by misreporting amounts on otherwise legal transactions...Indeed, there are plenty of clever ways an illegal transaction can be structured to cover up the true flow of funds, without involving cash.” In these alternatives, anonymity is replaced by secrecy because organizing transactions in these complicated ways usually requires a conspiracy of at least two people; in other words, the payment leg of the illicit transaction becomes a new crime, in and of itself. In these value transfer methods, the receipts for “misreported amounts on otherwise legal transactions”—i.e., inflated invoices—are a type of debt. This criminal (or at least illicit) activity is ostensibly a victimless crime because the transaction's two parties voluntarily agree to conduct the payment.

To summarize, without anonymous high-denomination cash, criminals must use forms of money that exist outside the modern society in which they live to avoid traceable forms of money. I argue that the third form Rogoff (2016a) suggests, inflated invoices

⁸ Again, where clean needle distribution is labeled c and illegal injectable drug use is G —with $G_c(c)$ being use of clean needles and $G_b(c)$ being use of dirty needles—we clearly see that $\frac{\partial G_b}{\partial c} < 0$, i.e., dirty needle use soars when needle distribution is restricted. This case shows little or no evidence that illegal injectable drug use declines at all when needle distribution is restricted; the primary effect seems to be an increase in dirty needle use and in hepatitis and HIV prevalence.

(or similar forms of debt), has many advantages over other forms. First, inflated invoices are denominated in the numeraire currency, therefore adding convenience for the measurement of value for criminals. Second, partially because of their denominations, inflated invoices are more easily transferred than are diamonds and other commodities. Finally, inflated invoices (and other debt claims) mimic more primitive forms of value transfer among trusted groups before the advent of money, namely debt. Notably, the debt must be kept secret from authorities.

With those advantages, criminals (and others conducting illicit activities) who face a scarcity of high-denomination currency would likely *at least partially* use debt to transfer value. A burglar would accept a debt, rather than cash, from a fence, for example. Such means of exchange have crucial disadvantages relative to cash for the criminals involved. First, the obligation is not discharged immediately, which is highly desirable for criminals who wish to convert crime into immediate liquid wealth. The debt instead involves the criminal in a web of mutual dependence with the debtor; the means of exchange is not anonymous, but rather secret. The debt used by criminals would itself be illicit and would cloak the criminal's identity from society by keeping the nature and purpose of the debt secret within the society formed by the debtor-creditor pair.

Using debt raises important questions for criminals. Most importantly, who would enforce such secret debt contracts? Enforcement is needed to establish trust in the debtor and in the debt instrument. Debt issued by criminals would be particularly tricky to enforce because the creditor could not seek enforcement in a court of law. To be accepted as payment for a crime or for the fruit of a crime, debt enforcement would require a third party to force debtors to honor their debt to creditors.

Enforcing illicit debt would require an organized criminal institution with nonlegal means to make debtors pay debts. In other words, *mafias* would be required to enforce illicit debt and engender the trust necessary for criminals to use such debt to transfer value related to criminal activities.

Another important question for illicit debt is what form debt would take? (Rogoff, 2016a) suggests the debt could be issued via inflated invoices owed by legitimate businesses. Money laundering could continue as it does today, except that the initial laundering step would be made with inflated invoices rather than with high-denomination cash.⁹ This suggests the mafia would face another issue when enforcing the illicit debt used to transfer value among criminals. The need for inflated receipts from legitimate businesses to provide illicit debt for criminal purposes would grow quickly as high-denomination cash was phased out. Alternative forms of debt, instead of inflated receipts from legitimate but compromised businesses, could be used. This includes receipts for offshore bank accounts, which keep the account owner's identity secret.

To summarize in the language of complements and substitutes, we suggest that restricting the availability of high-denomination cash would lead to substitutes for high-denominations cash in payments related to illicit and illegal activities. Labeling cash c , and illicit and illegal activities that use cash as $G(c)$, we have $G(c) = G_f(c) + G_p(c) + G_I(c)$. In this, $G_f(c)$ is activities that would substitute foreign exchange or cryptocurrency; $G_p(c)$ is activities that would substitute precious metals, gems, other commodities or bartering; and $G_I(c)$ is the activities that would substitute inflated invoices. This paper hypothesizes that $\frac{\partial G_I(c)}{\partial c} < 0$ and that these forms of payment require mafias and violence (or the threat of violence) more than does the use of cash. Therefore, eliminating high-denomination currency creates a worse type of crime than the type it displaces.

5. Crime that uses debt instruments as means of transferring value

Organized criminal firms exhibit several regularities. According to (Dick, 1995, page 27), their activities include the following specialties in particular:

“1. Organized criminal firms specialize in extortion, bribery to ensure police inaction, financing for distribution and sale of contraband, and enforcement services.

2. Organized criminal firms tend to transact more frequently in ‘victimless’ criminal trades than with ‘victimizing’ trades.

3. Organized criminal firms tend to transact more frequently in illegal than legal markets...”

These documented tendencies indicate that organized crime is well positioned to provide enforcement services to collect illicit debts incurred via criminal and illicit activities. As (Dick, 1995, page 36) explained, “The state partially defrays the production cost of self-protecting for the legitimate business firm but not for the illicit business owner. It follows that illicit trades will tend to find self-protecting against threats of violence relatively more costly than paying extortion to the organized criminal firm. By similar reasoning it will be relatively less costly for the loan shark than for the legitimate moneylender to hire the organized criminal firm to forcefully collect outstanding debts.” Therefore, organized criminal firms would also be the likely enforcement agents for other types of illicit debts, which cannot be enforced in court.

In addition to enforcing illicit debts used in place of high-denomination currency in illicit and criminal activities, organized criminal firms are well placed to supply debt instruments, such as invoices from legitimate businesses, that could be used as substitutes for cash in typical criminal transactions. To obtain these invoices, organized criminal firms could engage in extortion, again, one of their specialties. Coercing legitimate firms to purchase inputs from the criminal organization at inflated prices is a common activity

⁹ The U.S. Department of the Treasury's 2015 *National Money Laundering Risk Assessment* (Schelling, 1971) points out five methods used in money laundering: “Use of cash and monetary instruments in amounts under regulatory recordkeeping and reporting thresholds; Opening bank and brokerage accounts using nominees to disguise the identity of the individuals who control the accounts; Creating legal entities without accurate information about the identity of the beneficial owner; Misuse of products and services resulting from deficient compliance with anti-money laundering obligations; and Merchants and financial institutions wittingly facilitating illicit activity.” Except for the first method, the methods could be utilized via inflated invoices and similar instruments (rather than cash) to initiate the laundering.

in organized crime (see, for example, Schelling (1971)). Invoices for such purchases are then transferred by the organized criminal enterprise to others in place of cash.

When using this payment method for criminal activities, which reduces the use of high-denomination cash for the purpose, organized criminal enterprises initially face an excess demand for such cash substitutes. This occurs because of the large size and high value of criminal activities in the economy. To meet this demand, criminal enterprises are likely to expand their extortion activities, coercing formerly unaffiliated business into affiliating with them. As Schelling, 1971 explained, those most likely to be extorted are victims who are “poor at protecting themselves.” In addition to criminal firms themselves, which cannot ask for police protection, other firms with weak protections include those owned by new immigrants and those denied police protection because the criminal organization has bribed the police to insure their inaction in the face of complaints from the business owner. Through such bribery for police inaction, which is a core organized criminal activity, the organized criminal enterprise can transform many more legitimate businesses into ideal victims for its extortion.

The realism of the scenario outlined here is supported by many instances of decriminalizing activities, after which the influence of organized crime waned. For example, as (Dick, 1995, page 36) explained, “...organized crime typically withdraws from illicit activities when they are legalized. For example, organized criminal protection of liquor wholesalers fell precipitously after the repeal of Prohibition, transactions with bookmakers declined following legalization of off-track betting, and protection of New York City’s brothels subsided following relaxation of penalties for solicitation and procurement offenses in 1967. In contrast, introduction of state usury laws in the period 1910–1920 significantly increased organized criminal activity in illicit credit markets.”

Additional evidence emerges in environments in which cash availability is restricted. During an eight-month observation of a Norwegian prison, (Mjäländ, 2014) found that prisoners obtained drugs through reciprocal gift exchanges in which prisoners provided drugs to others in the expectation that the provision would be reciprocated. As summarized by Skarbek (2020), “[p]risoners sometimes punish the failure to share by violence or the threat of violence...”¹⁰ This case is very pertinent to the argument.

When high-denomination currency is unavailable as a payment method for criminal activities, other forms of payment become necessary. Among these, secretive and illicit debt claims, perhaps in the form of inflated invoices to be paid by legitimate businesses, are likely to become much more common. Because this payment leg of criminal activity shifts from “dcriminalized” to criminal activity, an organized criminal enterprise would likely specialize in the provision and enforcement of such debt instruments. It would also expand its extortion of otherwise legitimate businesses to create useful debt claims, probably bolstered by expanded bribery intended to ensure police inaction. Given their specialization in extortion, bribery, and enforcement, organized criminal enterprises are well positioned to supply debt instruments used to pay for illicit activities.

Thus, although the elimination of high-denomination currency might suppress overall crime, the type of crime selected by the availability of the new payment method is facilitated by organized crime. As a result, organized crime would expand, and legitimate businesses would be suborned.

Among the results of this scenario are the increased prevalence of threats of and the use of violence to enforce debt and the subornation of many otherwise legitimate businesses into the business of organized crime. This subornation is the external cost of the new method of payment that replaces high-denomination cash. As in the transmission of diseases via dirty needles or sexual contact, the subornation of legitimate business to obtain debt instruments to pay for illicit activities harms individuals not associated with the original criminal activity. Furthermore, as with condoms and clean needles, even people who report that they do not hold much cash—a point (Rogoff, 2016a, Sarin & Summers, 2016) emphasized as evidence in favor of restricting the cash supply—nonetheless fully enjoy the benefits of reduced threats of violence and subornation of their businesses and those of their neighbors in the presence of high-denomination cash used by others.

An additional outcome of this scenario relates to the balance of power among those engaged in illicit activities. For example, currently, undocumented immigrants seeking paid work can find day labor, and, as Rogoff (2016a) describes, are paid in cash, allowing the employer to avoid various employment taxes and regulations. In addition, such laborers can avoid income and social insurance taxes. If high-denomination currency is unavailable, suppose that the wages are paid in the form of debt. What power does the laborer possess to enforce that debt? Only by allying with an organized criminal labor boss could the laborer be assured of being paid. One can imagine the depredations that might accompany membership in the labor mafia: there are worse situations than being a “wage slave,” including indentured servitude and slavery itself.

The question for policymakers is how to balance the possibility of reducing some illicit uses of currency—for tax evasion, for example—and the increased prevalence of violence and threats of violence in criminal activities when high-denomination currency is restricted. At present, it is impossible to provide clear estimates of the benefits and costs of restricting high-denomination cash. Rather, it is only possible to point out that such a policy has costs that should be considered in any relevant cost–benefit analysis.

6. The unbanked and the nominal frictions of negative interest rates

6.1. The unbanked

In 2016, the Indian government demonetized two of its most popular rupee notes, the Rs500 and Rs1000, to reduce corruption, money laundering, and counterfeiting and to eliminate “black money” (i.e., untaxed stores of wealth gained by corrupt means). The demonetization was effective immediately, and people who held the notes were able to exchange them for bank deposits or other notes

¹⁰ Skarbek, pg. 54.

at banks and post offices through December 2016. People who returned large quantities of old notes received additional scrutiny from tax and criminal authorities. This was the key feature intended to render large stores of currency obtained through corrupt means worthless. To reduce counterfeiting, the government simultaneously introduced new Rs500 and Rs2000 notes with improved security features.

Although it is widely agreed that this note substitution was poorly executed, it revealed impoverished people's intense dependence on cash. Furthermore, if a government occasionally demonetizes currency and requires individuals to bring in any such stores they possess for replacement and taxation, currency loses some of its benefits of anonymity. Thus, this practice is likely to be somewhat similar to a withdrawal of the currency.

Problems occurred during the introduction of the new Rs500 and Rs2000 note, as their physical sizes were incompatible with existing ATMs in India. The government suggested that configuring the ATMs to dispense the new notes would take weeks. Because India is a cash-dominated society in which hundreds of millions of people lack access to bank accounts and the associated debit cards, this surprise policy was extremely costly to the Indian people, at least in the short run. Many legitimate people who maintained cash savings could not easily explain where they obtained their cash; lines for the limited number of currency-return facilities were exceedingly long; businesses could make change; and businesses, when they could not extend credit to regular customers, had to turn those who lacked cash away.

Notwithstanding the policy's short-run costs, as [Kazmin \(2016b\)](#) explained in the *Financial Times*, “[d]espite the difficulties, many economists, and even ordinary Indians, believe Mr Modi's shock therapy will yield long-term benefits.” However, [Kazmin \(2016a\)](#) also expressed a partially dissenting view in the *Financial Times*: “Renuka Gaorie — whose rubbish collector in New Delhi's upmarket defense Colony showed her shredded rupees he found in the trash — expressed both support and exasperation. ‘It's about time we had black money removed, but he [Modi] should have gotten everything in place first,’ she says. ‘It's utter madness.’”

Rogoff recommended eliminating high-denomination currency over time through a rapid end to the provision of new \$50 and \$100 bills combined with a five to seven year period during which people could redeem those notes for newly issued notes (and during which the old notes would remain monetized). This contrasts starkly with India's abrupt demonetization announcement and the two-month period during which people could exchange the demonetized notes. Nonetheless, the Indian experience is a cautionary one, as it represents only a short interruption of the provision of existing cash, allowing time for the retirement and replacement of the two most popular notes. [Sarin & Summers \(2016\)](#) argued convincingly that the Indian policy was unwarranted.

Another aspect of cash, particularly of high-denomination notes, that makes it convenient is that it facilitates freedom from attachment for debt repayment. According to the [Ratcliffe et al. \(2014\)](#), as of 2014, approximately 35 percent of U.S. adults, or 77 million people, had debts in the process of collection. The incidence of such debts, which are defined as nonmortgage debts more than 180 days past due, was concentrated in the southern U.S. Cash is unique in this respect, and it is not clear whether account-based alternatives would be popular with debtors. Were high-denomination cash phased out, there would be significant distributional consequences due to the relative scarcity of stores of value that are not subject to liens related to the debt collection process.

[Rogoff \(2016a\)](#) expressed concern that poor and unbanked people do not enjoy the benefits of financial inclusion, as banks find it too costly to market to and serve them. Is it not, then, a good policy to advance steps such as those suggested by Rogoff, including the provision of accounts and debit cards to the poor, irrespective of the elimination of high-denomination currency? Moreover, should such steps be taken prior to any reduction in the availability of high-denomination currency?

Currently, poor and unbanked people use cash as their main means of interaction with the financial system. Cash is available free of charge, and its benefits include anonymity, easy verifiability, and widespread acceptance. Debit cards and the accounts that fund them, even if provided at subsidized rates, are lacking such features. At present, it is therefore unlikely that they represent realistic cash alternatives for poor and unbanked people.

It is useful to point out the differences between high-denomination currency and bearer bonds, whose issuance and circulation the Tax Equity and Fiscal Responsibility Act of 1982 curtailed significantly. Like currency, bearer bonds are useful for tax evasion. Unlike currency, however, such bonds are not a means of payment and are therefore not widely acceptable in exchange; furthermore, the identity of the person collecting principal and interest can be revealed when the bond matures. In a model that examines currency, liquid bonds (such as bearer bonds), and illiquid bonds, [Kocherlakota, 2003](#) found liquid bonds inessential because they can be eliminated with no welfare loss; such is not the case for currency or illiquid bonds.

6.2. Nominal frictions of negative interest rates

Negative nominal policy interest rates, which are the desiderata of the move to eliminate high-denomination currency, have many potential limitations, several of which [McAndrews \(2015\)](#) explained in detail. Eliminating high-denomination currency is intended to lessen avoidance of negative nominal rates that would be charged on bank account balances. Although this would make negative nominal policy rates more feasible, it would not directly overcome the many other complications of negative nominal rates, including many other means of avoidance such as prepaying taxes ([Garbade & McAndrews, 2012](#)). Various legal, operational, and institutional difficulties discussed by [Garbade & McAndrews \(2012\)](#), [Garbade & McAndrews \(2015\)](#), such as the design of debt instruments and designing and establishing sound methods to make interest payments from lenders to borrowers, must be fully addressed, and alternatives must be implemented. Some such complications can certainly be overcome in the long run, as [Kimball \(2015\)](#) suggested. However, similar nominal frictions affect resource allocation when positive inflation occurs (e.g., through nonindexed tax brackets). In the long-run, tax brackets can be adjusted perfectly to correct for any level of inflation or deflation, but such brackets (and wage and pension adjustments, etc.) do not yet exist. Therefore, it is unlikely that all nominal frictions associated with negative nominal

policy rates can be overcome more quickly than those that contribute to resource misallocation under persistent inflation due to the expectation that a society may occasionally employ negative rates to combat a recession.

Negative nominal policy rates are a novel policy in the modern era and have many limitations.¹¹ The various legal, operational, and institutional frictions that can predictably arise with their possible use clearly limit their applicability beyond some deeply negative number. For example, Rogoff envisioned deeply negative rates for the economy while retaining a zero-interest rate on consumer retail deposit accounts. That necessarily limits how deeply negative the overall interest rate can become. Otherwise, negative rates would be imposed on retail accounts, as financial intermediaries would otherwise lose too much money.¹² The limitations on deeply negative nominal rates indicate that negative nominal policy rates alone are likely cannot provide a stimulus that is strong enough to overcome all—or even most—recessionary forces when society encounters the zero lower bound. Brunnermeier & Koby (2019) findings reinforced this point: there exists a “reversal” interest rate below which monetary policy becomes contractionary rather than stimulative. Consider a case in which the natural rate of interest is negative five percent, but negative nominal policy rates become contractionary after they reach negative three percent. In that case, presumably, society would wish to employ additional tools to support aggregate demand, such as quantitative easing, forward guidance, and discretionary fiscal policies—or, in the longer-run, a higher inflation target. It is unclear where the reversal interest rate is, but it is important to recognize that negative policy rates are not without costs, and these costs likely increase with the depth of the negative policy rate.

As Rogoff (2016a) indicated, another difficulty related to restricting the supply of high-denomination currency is the reduction of the central bank's income. Historically, many central banks operated without issuing a circulating means of exchange. Roberds et al. (2016) reviewed those arrangements and others, and they found that without seigniorage income, it was difficult for the central bank to operate. In the modern context, such difficulties seem to persist for central banks seeking fiscal support, perhaps especially during banking crises, when such support is most needed.

Because of the limitations that the various frictions outlined by McAndrews (2015) impose on deeply negative nominal interest rate policies, one must consider the costs and benefits of phasing out high-denomination currency, which Rogoff (2016a) set as a precondition for implementing deeply negative nominal interest rates.¹³ If there are costs to phasing out high-denomination notes, as I have argued, it remains unclear, without substantial additional evidence, whether the benefit of using a somewhat more negative interest rate policy instead of more traditional policies such as discretionary fiscal policies, quantitative easing, and forward guidance, is warranted overall.

7. Summary and conclusion

Whether a social condition is a curse depends on how bad the alternative is. Without high-denomination currency, criminals must rely on alternative means of payment. Debt, in various forms, would likely be used much more than it is today. Such illicit and secret debt would require the involvement of organized crime to arrange and enforce the debt instruments. Even if crime and corruption decline in aggregate, a selection of and expansion of organized crime would likely occur. Organized crime itself would, through its activities in extortion, bribery for police inaction, and enforcement of criminal agreements and debt, worsen the lives of many people and change the nature of criminal societies' activity.

Those people obligated to pay illicit debts such as inflated invoices may be unable to discharge their debts fully. One key benefit of cash is that it immediately discharges one's obligations, at least up to the value of the cash exchanged. With debt enforced by organized crime, on the other hand, the parties are engaged in a relationship policed by threats of violence. Many such parties would be unable to discharge their debts to the organized criminal enterprise, as they would become subject to the threat of violence once ensnared in the relationship.

Because of the rise in organized criminal activity, it is unclear whether society benefits overall from phasing out high-denomination currency even if criminal activity declines. For instance, violence and the threat of violence might increase, worsening the lives of many. Furthermore, because organized criminal enterprises would suborn legitimate businesses to produce inflated invoices that could be used as debt instruments, many otherwise innocent people might fall prey to organized crime and have their well-being reduced significantly as a result of such a shift in criminal activity. Finally, people with little power, such as undocumented immigrants, would likely endure the brunt of the effects of cash scarcity and might be conscripted into labor gangs ruled by organized criminal enterprises, worsening their lives relative to the current, cash-based compensation system.

The promise of new forms of financial inclusion that would address the lack of mainstream financial services for poor and unbanked people remains unfulfilled. Many developments, such as gift cards and other debit products, have features that appear attractive when compared with cash, but, so far, the combination of zero fees, anonymity, widespread acceptability, and the immediate discharge of one's obligations, which cash provides, is unattainable. Alternatives intended to meet the important needs of the cash-based licit economy, especially those of the poor, should be well-identified and in place prior to phasing out high-denomination currency.

Phasing out high-denomination currency would advance the goal of implementing deeply negative nominal policy interest rates, as the avoidance of negative interest rates charged on bank accounts would be less feasible. However, many other avoidance techniques

¹¹ Rogoff (2016a) pointed to many cases of coin debasement in the ancient world, which he likened to negative nominal policy rates. Unlike a modern negative nominal policy rate, however, debasements were usually not a continuous process, nor did they win universal favor in their effects.

¹² Alternatively, as (Rogoff, 2016a, page 99) suggested, the federal government would be responsible for offering zero-interest rate accounts for citizens.

¹³ Agarwal & Ruchir (2015) outlined alternatives to achieving deeply negative nominal rates. Not all of these involve eliminating high-denomination currency, but they introduce a variable exchange rate between currency and bank deposits.

remain available. Although many of these can be eliminated in the long run, doing so may be costly, so they may not be eliminated in a timely manner. Furthermore, there are many operational, legal, public acceptance, and institutional frictions related to collecting interest payments from lenders to pay to borrowers. Those frictions are likely more difficult to overcome, even in the long run. Consequently, there are limits to the benefits of negative nominal policy rates.

There are potential disadvantages to phasing out high-denomination currency, as well as limited advantages to doing so. The spread of organized crime may leave society in a more intractable situation in terms crime and corruption, with increased harm to vulnerable people, because of the high-denomination currency phase-out, even if crime and corruption decline overall. The limits on how deeply negative nominal policy interest rates can be set to prevent frictions from overwhelming the policy's possible benefits indicate that other demand-enhancing policies, such as discretionary fiscal policies, quantitative easing, and forward guidance, likely need to be employed when encountering the zero lower bound in future, even with the phase-out of high denomination cash. In the long run, a higher inflation target also offers the monetary authority additional latitude to avoid the zero lower bound on nominal policy rates.

Rogoff (2016a) recommended phasing out both the \$50 and \$100 cash notes over a five- to seven-year period. Although my analysis does not specify these denominations' benefits and costs, they are not particularly large compared with those of other developed countries. In addition, their value is gradually eroding with positive inflation. Therefore, I conclude that they should be retained.

Cash does not fuel crime any more than condoms fuel lust or clean needles fuel addiction. Cash is a social contrivance that helps people, who are sometimes in vulnerable positions, to alleviate their concerns and discharge their obligations with finality. Without the use of convenient high-denomination currency, many vulnerable people might become ensnared in a trap in which their obligations are never fully discharged, as they face the threat of violence if they fail to pay more. That such people do not hold large amounts of high-denomination currency at present offers no evidence that they do not benefit from its presence in society. As Schelling (1971) pointed out, the people who would prefer a world with less organized crime include "...those who dislike corruption, especially when it is centralized and regularized by large monopoly organizations that can build corruption directly into our institutions, rather than leave it to gnaw away at the edges."

Declaration of Competing Interest

None.

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