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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. Two possible drawbacks of high-denomination cash have recently been discussed by Kenneth Rogoff in his book *The Curse of Cash*, and echoed by other economists. They are the extensive use of high-denomination cash by criminals and others engaged in illicit and corrupt activities, and the role that cash plays in avoiding deeply negative nominal interest rates imposed on bank accounts. Rogoff and others call for a phaseout of high-denomination cash over a long time. The use of cash in crime, I'll argue, is preferable to the alternative, and there are limits to the benefits of deeply negative nominal interest rates. There are no adequate alternatives to cash for poor and unbanked people. Consequently, the current high-denomination cash in the United States should be retained.

JEL Classification: E40, E50

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1. INTRODUCTION

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

I'll argue here that restricting high-denomination cash would lead to pernicious changes in the type of crimes being committed. Specifically, the restrictions on high-denomination cash will select for crimes arranged by organized crime, with deeper institutional corruption of businesses necessary for laundering the proceeds from criminal activity. Furthermore, given that there are nominal frictions for negative rates of interests, as is the case with positive rates of inflation, limits likely exist to the net benefits of deeply negative nominal policy rates of interest. With this configuration of costs and benefits, I don't believe that the policy of restricting the supply of high-denomination cash is persuasive.

2. REVIEW OF THE ARGUMENT TO ELIMINATE HIGH-DENOMINATION CASH

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

Regarding the benefits of cash, Rogoff notes that cash reduces transaction costs by eliminating the "double coincidence of wants" problem, especially for poor people and others who desire anonymity or who do not interact with banks. In addition, cash is a source of revenue for governments via earnings from seigniorage. Finally, cash has other benefits to society, related to its ability to provide anonymity in transactions and its role in assuring civil liberties to the population without any overview by governmental authorities.

Counterbalancing those benefits, high-denomination cash has two main costs. First, as succinctly noted by Sands 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." So, 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 (2016b) states, "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 (2016), as well as Kocherlakota (2016) and Goodfriend (1990), count a second cost of high-denomination notes as preventing deeply negative nominal policy interest rates. By 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 rates of interest on commercial banks' reserves balances held at central banks. If one were to restrict this flight into cash by taking away the convenience provided by high-denomination notes, the central bank could implement more deeply negative nominal policy rates, combating the insufficiency of demand during the period in which the natural rate of interest is negative.

The policy recommendation suggested by Rogoff is to restrict the provision of high-denomination cash over a long period. Most of the costs of cash can be reduced significantly by eliminating the high-denomination notes; in the United States (US), he would phase out both the \$100 and \$50 notes, and only much later would he aim to end the new issuance of \$20 notes. He is advocating a "less cash" world, and not a "cashless" world. At the same time, Rogoff advocates working to provide more financial inclusion for poor people and unbanked sectors of society by the issuance of publicly provided and subsidized accounts and debit cards that would have wide acceptance, and, in other new ways, to overcome the possible inconveniences that might accompany the increasing scarcity of high-denomination notes.

Rogoff's book essentially encompasses the views of Sands (2016) and Summers (2016), both of whom focus on the use of cash in criminal activities, and those of Goodfriend (2016) and Kocherlakota (2016), both of whom focus on the role of cash in sustaining the zero lower bound on nominal policy rates. Rogoff sees two positive outcomes from his suggested policy of gradual reductions in the prevalence of high-denomination notes. First, like Sands and Summers, Rogoff suggests that the execution of crime would be costlier without ready access to the anonymity and convenience of high-denomination notes, which would have the effect of reducing crime. Second, like Goodfriend and Kocherlakota, with fewer high-denomination notes with which to avoid negative nominal interest rates, more deeply negative nominal policy interest rates would be feasible, granting central banks increased ability to combat recessions more effectively, especially those that follow financial crises.

Rogoff's book provides excellent and deep knowledge on the use of cash through history, the holdings of high-denomination cash as best understood by economists from surveys and other methods, and an understanding of the importance of cash to poor people and the unbanked. His policy recommendation of a gradual stop to the issuance of high-denomination notes is feasible, and for 5–7 years, he envisions the phaseout of the \$50 and \$100 bills, respects the significant social changes and the time needed to accommodate such large changes to our monetary system.

3. ANALOGIES

It is difficult to imagine a world with less cash. To begin considering that environment, I draw analogies to other types of restrictions on the public provision of certain goods. First, the use of cash, in and of itself, is not harmful.¹ The wish to restrict its supply is to accomplish other social goals, such as to reduce crime, or to impose negative interest

¹ Here I overlook the issue of bacterial and viral contamination of currency; one could amend the statement to read that the use of cash while wearing gloves is not directly harmful. Furthermore, there are environmental costs related to the use of inks and the fabrication of the paper or polymer used to produce currency.

rates on money. So consider the following analogies: first, the public provision of free condoms, and second, the public provision of free clean needles. Like cash, neither condoms nor needles do direct harm when used as intended.

By providing two analogies, I hope to convince the reader that the propositions hold across a wide variety of situations. These analogies are intended to demonstrate two propositions. First, that if a particular good is restricted in supply, that will affect the type and nature of the other complementary or substitutable activities with which the good is used. Second, it is a fallacy to suggest that if a survey concludes that a certain group of people do not use the good directly, then a restriction placed on the supply of the good will not harm that group of nonusers.

3.1 Public Distribution of Condoms

Free public distribution of condoms, especially to adolescents, has long been controversial, with only a relatively few public schools in the US providing free condoms to adolescent students.² On one side, there are many religious traditions that disdain both sex outside marriage and contraception.³ People who adhere to those traditions do not perceive a public role for the distribution of condoms. On the other side, many public health professionals advocate free public distribution of condoms to reduce unwanted pregnancies and to reduce the incidence of sexually transmitted diseases.⁴

The free distribution of condoms could affect sexual activity in a variety of ways. Advocates of free condoms suggest that the greater availability of condoms would reduce unplanned pregnancies in sexually active individuals, while opponents argue that the greater availability of condoms would condone greater sexual activity.

Review articles employing meta-analysis of studies on condom distribution programs, Charania et al. (2015), and Noar (2008) suggest that condom distribution programs that contain elements addressing the accessibility and acceptability of condom use (as well as availability) resulted in significant reductions in unprotected sex and the transmission of sexually transmitted diseases. A partially contradictory finding is found in recent research by Buckles and Hungerman (2016). Buckles and Hungerman study the results of a widespread movement of free condom distribution program in hundreds of US schools in the 1990s. They find that the programs likely resulted in greater fertility and incidence of gonorrhea in schools that implemented free distribution of condoms without mandated counseling. In schools that distributed condoms with mandated counseling of students, the effects of the combined program indicate a likely decline in fertility and no discernable effect on the prevalence of gonorrhea.

In general, were society to restrict free condom distribution programs that employ counseling or other communication efforts to improve acceptability, the existing evidence is mixed on the effects on the prevalence of sex, but the evidence is reasonably abundant that there would be an increase in unsafe sex and the prevalence of sexually transmitted diseases.

² See Kirby and Brown (1996).

³ Organizations that oppose public condom distribution programs include the Family Research Council, Focus on the Family, and the National Abstinence Education 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. <http://www.communityactionkit.org/index.cfm?pageId=920>

⁴ Advocates for Youth, <http://www.advocatesforyouth.org/publications/publications-a-z/540-medical-organizations-support-condom-use>

In this analogy, I'd like to point to the following: first, suppose that we were to concede that restricting free condom distribution programs that employ counseling would reduce the incidence of sex outside of marriage, the type of sex that would occur would nonetheless be different after the restriction in that there would be more *unsafe* sex. Second, because of the reduced incidence of HIV and other sexually transmitted diseases in the population, even people who never own or use a condom benefit from their availability, because of the reduced probability of infection.

3.2 Provision of Sterile Needles and Syringes

There are many programs in which sterile needles and syringes are provided to people, some of whom use them for heroin and other illegal drugs. Strathdee and Breyer (2015) point out that there are approximately 228 needle exchange programs in the US (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. In addition, in 25 states it is illegal to purchase syringes without a prescription and needle exchange programs are not authorized by state law.⁵ No doubt, such restrictions are intended, in part, to deter illegal drug use. Evidence on the effects of needle exchange programs suggest, in contrast to the deterrence hypothesis, that they do not lead to increased injection drug use, but that they do decrease the HIV infection rate. Lurie et 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 served by them.

Strathdee and Breyer recount two HIV outbreaks, one in rural Indiana in the 2010s and one in Vancouver, Canada in 1995, both of which were arrested with the advent of a needle exchange program. In Indiana, there was an upsurge in injection drug use after users had become addicted to prescription opioids, and after those prescription drugs became scarce. Using needles for nonmedical purposes is a felony in Indiana punishable by 3 years in jail. As explained by Strathdee and Breyer, “when needles are in short supply, injection-drug users have little choice but to share.” With an absence of 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).” After that outbreak, a medical emergency was declared for Scott county, the affected part of the state, allowing officials in that county to operate a legal needle exchange program.

In this analogy, I'd like to point to the following: suppose that we were to concede, in contrast to the available evidence, that restricting sterile needle and syringe distribution programs would reduce the incidence of illegal injection drug use, the type of injection drug use that would occur under the restrictive policy would nonetheless be different after the restriction in that there would be more sharing of dirty needles.

For both the provision of condoms and sterile needles, it is important to reflect on who benefits from the more liberal distribution policies. First, the direct beneficiaries are the individuals involved, those individuals who avoid an unplanned pregnancy or the transmission of a sexually transmitted disease, or a hepatitis or HIV infection from a dirty needle. There are also many indirect beneficiaries: those who have loved ones or

⁵ Both points are provided by Strathdee and Breyer (2015).

family members who later have unsafe sex with a person who had earlier used a condom; taxpayers who bear less of a burden of increased health care expenditures for people suffering from chronic illnesses, and many others. So even if the condom or the clean needle is never used by an individual, an individual whose possible survey response would indicate that he or she has no condom in their wallet, nonetheless, that person may benefit from others who use those publicly provided items.

These analogies do not directly shed light on whether we should restrict the provision of cash, as the economic mechanisms described in these cases are not those related to cash. However, they do demonstrate how a restriction on the public provision of some item useful to some other activities can change the *nature or type* of heterogeneous activities, and not just the *extent* of a homogenous activity. In addition, they make clear that it is *fallacious* to assert that if people do not use a good, such as condoms or clean needles, they would be unharmed by a restriction on the supply of those goods. Now let's turn to an examination of cash.

4. WHAT DOES CASH DISPLACE?

If high-denomination cash were scarce, what alternative means would be used by criminals and other illicit actors to conduct their nefarious activities? Criminals would need to find a substitute to cash. Any substitute that does not provide anonymity is unlikely to work. Consistent with Rogoff's analysis, the key to the use of high-denomination cash by criminals is the combination of anonymity and convenience. Anonymity is important to criminals to avoid having their activities traced and punished by the criminal justice system. As such, using other familiar forms of money, such as transferring bank balances by check or using credit cards, wouldn't work, as they would allow tax and criminal authorities to track criminals' actions.

If an anonymous means of payment were not available, criminals could also resort to a *secret* form of payment. Secrecy among a group is a substitute for anonymity provided at the broader level of society. The criminal group could utilize secrecy, where one's identity would be known within the group, but would be cloaked outside of the group. Of course, if high-denomination currency were phased out, there would be many efforts to replace its functions of anonymity and immediate settlement with alternatives (see Kocherlakota 2016b for a review of some nascent efforts in that regard) for both the aboveground and underground economy. A secret means of payment is not feasible at the level of society as a whole, as there is no one from whom the secret is kept; hence, such a secret means of payment would not be offered as an alternative means of payment in general. But for criminal and corrupt purposes, a secret means of payment could substitute for high-denomination cash.

Rogoff points out that currency, and money more generally, has been useful as "a solution to the problem the great nineteenth-century monetary theorist William Stanley Jevons famously termed the 'double coincidence of wants.'" This is simply the challenge of designing a system that, at a minimum, relieves the necessity of doing all trade by barter." (pp. 16). Would criminals resort to barter? It is unlikely for several reasons: (i) barter is difficult to arrange, especially so in the relatively thin markets inhabited only by criminals; (ii) it would be difficult to provide security and other infrastructure necessary to identify and exchange the bartered goods; and, importantly, (iii) barter is rare in general. Anthropologists have developed extensive evidence that barter, in contradistinction to Jevons' claim, did not precede the development of money, and has not been observed in the historical record, as reviewed by Graeber (2011).

If barter is not likely the replacement for high-denomination cash transactions among criminals, what else might be used to transfer value to, or within, the criminal enterprise? Rogoff (2016, pp. 58) points out that "...if there were no cash, criminals and tax evaders would simply find a different way of doing things. But that is easier said than done... Many other methods exist, but compared to cash, they are not as safe for routine use on a large scale and generally not as liquid. There are only so many places you can cash in your uncut diamonds or your gold coins..." Rogoff is suggesting in this passage that in the absence of cash, certain commodities could serve the role played by cash for illicit trades, although he points out shortcomings of this method. In these commodity money alternatives, anonymity is preserved, but convenience of the instrument is sacrificed. If there isn't a standard commodity that serves as a standard of value of some amount, then trading commodities for the fruit of the criminal enterprise is much like barter, as values for what is being transferred must be determined on both sides of the transaction, much like barter.

Rather than barter or commodities, another form of value transfer would be available to criminals deprived of high-denomination cash—some form of debt. Debt is commonly used to transfer value. Indeed, in the historical record examined by anthropologists it was *debt* that preceded money (see Araujo et al. 2016 and the references they provide). Prior to the use of money, people, often living in small familial groups, would engage in gift exchange. Such gifts would incur obligations or debts on the party receiving the gift. Money was an innovation that allowed people to conduct transactions with strangers among whom there was no trust; among trusted neighbors, debt served as the most convenient means of transferring value. Criminals could use a secret form of debt as a means of payment, cloaking their identities from the authorities.

Rogoff (2016: 67) points out 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, as the organization of 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 methods of value transfer, the receipts for "misreported amounts on otherwise legal transactions"—in other words, inflated invoices—are a type of debt. This crime, or at least illicit activity, is ostensibly a victimless crime, in that the two parties to the transaction voluntarily enter into agreement to conduct the payment.

To summarize, without the availability of anonymous high-denomination cash, criminals would have to use forms of money that are outside the use of the modern society in which they live, as those forms of money are traceable. As Rogoff suggests, commodity money, foreign currency, and inflated invoices could all serve. However, I'll argue that the third form Rogoff suggests, i.e., inflated invoices or other similar forms of debt, has many advantages over the other forms. First, inflated invoices are denominated in the numeraire currency, and therefore add convenience in measurement of value for criminals. Second, inflated invoices, partially because of their denominations, are more easily transferred than diamonds and other commodities. Finally, inflated invoices (and other debt claims) mimic the more primitive forms of value transfer among trusted groups before the advent of money, namely debt. It is notable that the debt must be kept secret from the authorities.

With those advantages, it is likely that criminals and others who seek to conduct illicit activities, when faced with a scarcity of high-denomination currency, would increasingly substitute into the use of debt to transfer value. For example, a burglar would accept a debt, rather than cash, from a fence. Such means of exchange have crucial

disadvantages relative to cash for the criminals involved. First, the obligation is not discharged immediately, a highly desirable feature for the criminal who wishes to convert his 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. It would cloak the criminal's identity from the broader society by maintaining the nature and purpose of the debt as a secret within the society formed by the debtor–creditor pair.

The use of debt raises important questions for the criminal. The most important question is, 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, as 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, enforcement of the debt would require a third party to force the debtor to honor debt.

The enforcement of illicit debt would require an organized criminal institution that could use nonlegal means to make debtors pay. 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 their criminal activities.

Another important question for illicit debt is, What form will the debt take? As Rogoff suggests, the debt could be issued in the form of inflated invoices owed by legitimate businesses. Money laundering could continue as it does today, with the difference being that the initial step of the laundering would be made with inflated invoices rather than with high-denomination cash.⁶ This suggests another issue facing the mafia that would enforce the illicit debt used to transfer value to and among criminals. The need to have inflated receipts from legitimate businesses to provide the illicit debt issued for criminal purposes would grow quickly as high-denomination cash were phased out. Alternative forms of debt could also be used, instead of inflated receipts of legitimate but compromised businesses, such as receipts for offshore bank accounts, which maintain the secrecy of the identity of the account owner.

5. CRIME WITH DEBT INSTRUMENTS AS MEANS OF TRANSFERRING VALUE

Organized criminal firms have exhibited several regularities in their activities. As summarized by Dick (1995: 27), their activities include the following specialties, in particular:

⁶ The US Department of the Treasury's 2015 *National Money Laundering Risk Assessment* 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.
- Other than the first method, the other methods could be utilized using inflated invoices and other similar instruments, rather than cash, to initiate the laundering.

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 suggest that organized crime would be well positioned to provide enforcement services to collect illicit debts incurred in the commission of criminal and illicit activities. As explained by Dick (1995, p. 36): “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.” We could expect that organized crime would also be the likely enforcement agent for other types of illicit debts, those that cannot be enforced in court.

In addition to enforcement of illicit debts that would be used in place of high-denomination currency in illicit and criminal activities, organized crime is well placed to supply the debt instruments, such as invoices from legitimate businesses, that could be used as substitutes for cash in criminal transactions more generally. To obtain those invoices, organized criminal firms could engage in extortion, one of their specialties. Coercing legitimate firms to purchase inputs at inflated prices from the criminal organization is a common activity in organized crime (see, for example, Schelling 1971 and NAC 1976). The invoices for those purchases could then be transferred by the organized criminal enterprise to others to act as substitutes for cash.

A consequence of this method of payment for criminal activities is that the organized criminal enterprise would initially face an excess demand for such cash substitutes. This is because of the large size and value of criminal activities in the economy. To meet this excess demand, the organized criminal enterprise would expand its extortion, coercing formerly unaffiliated business into doing business with it. As Schelling (1971) explains, those most likely to be extorted are those victims who are “poor at protecting themselves.” In addition to criminal firms that cannot ask for police protection, other firms that are weak at protection are those owned by new immigrants, or those who are denied police protection because the criminal organization has bribed the police to insure their inaction in the face of complaints from the business owner. Using bribery for police inaction, a core activity of organized crime, the organized criminal enterprise can “manufacture” many more legitimate businesses into becoming ideal victims of 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 explained by Dick (1995, p. 36), “... 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 relation 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.”

By eliminating high-denomination currency as a means of payment for criminal activities, other forms of payment would be required. Among those forms of payment, it is likely that secretive and illicit debt claims, perhaps in the form of inflated invoices to be paid by legitimate businesses, would become much more common. Because that payment leg of the criminal activity moves from being “decriminalized” to being a criminal activity, it is likely that organized crime would specialize in the provision of such debt instruments and in their enforcement. Organized crime would expand extortion of otherwise legitimate businesses to create useful debt claims, probably bolstered by expanded bribery for police inaction. Given their specialization in extortion, bribery, and enforcement, organized criminal firms are well positioned to supply debt instruments as payment for illicit activities.

With organized crime well positioned to supply debt instruments as payment for illicit activities, although overall crime could be suppressed by the elimination of high-denomination currency, the type of crime that would be selected by the availability of the new means of payment is crime facilitated by organized crime. There would be an expansion of organized crime and the subornation of legitimate businesses to its activities.

One result of this scenario is a much greater prevalence of threats and use of violence to enforce debt, and the subornation of many otherwise legitimate businesses to the business of organized crime. It is that subornation of people and businesses by organized crime that is the external cost of the new method of payment that replaces high-denomination cash. Like sexually transmitted diseases or diseases transmitted via dirty needles, the subornation of legitimate business by organized crime to obtain debt instruments as payment for illicit activities is a cost that would harm individuals not associated with the original criminal activity. Further, as in the case of condoms and clean needles, even people that report on surveys that they do not hold much cash, a point heavily emphasized by both Rogoff (2016) and Summers (2016) as evidence in favor of restricting the supply of cash, they 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 result of the scenario relates to the balance of power among those engaged in illicit activities. Consider, for example, the undocumented immigrant seeking paid work. Currently, many such immigrants can find day labor, and, as Rogoff describes, are paid in cash, allowing the employer to avoid various employment taxes and regulations, and the laborer can potentially avoid income and social insurance taxes. Consider the situation in which high-denomination currency is not available, and suppose that the wages are paid in a form of debt. What power does the laborer possess to enforce that debt? Only by allying with an organized criminal labor boss would 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”; indentured servitude and slavery itself are among them.⁷

⁷ For those who might benefit, this footnote describes the economic logic of the heterogeneous activity argument in this paper in a simplified form. Consider an activity that society would like less of, such as crime, premarital sex, or heroin use. The overall activity is labeled G . The activity can take two forms, a “good” and a “bad” form, G_g and G_b , such as safe and unsafe sex, clean and dirty needle use, and nonviolent or non-coerced crime and violent crime or crime that requires coercion of otherwise non-criminals into the criminal activity. The overall level of activity is the sum of the two subcomponents, and each subcomponent depends on the availability of different goods, such as condoms, clean needles, or high-denomination cash: $G(c, \dots) = G_g(c, \dots) + G_b(c, \dots)$. The elasticity of the overall level of activity with respect to the independent variable c could be positive, indicating a complementary relationship, while the elasticity of the bad type of activity with respect to c could be negative, indicating a substitutable

6. PROVIDING ALTERNATIVES TO THE UNBANKED, AND NOMINAL FRICTIONS OF NEGATIVE RATES

6.1 The Unbanked

Recently, the Government of India demonetized two of the most popular rupee notes, the Rs500 and Rs1,000, with an objective of reducing corruption, money laundering, and counterfeiting, and of eliminating “black money”—a term for untaxed stores of wealth gained through corrupt means. The notes were demonetized with immediate effect, and people who held the notes could return them until December for bank deposits or other notes at banks and post offices. People who returned large quantities of old notes received additional scrutiny from tax and criminal authorities; this key feature was intended to render large stores of currency obtained through corrupt means worthless. The government was simultaneously introducing new notes, in the denominations of Rs500 and Rs2,000, with better security features to reduce counterfeiting.

Although it is widely agreed that this note substitution was poorly executed, it shows the intense dependence that the poor have on currency use. Furthermore, if it is believed that the government will occasionally demonetize currency and require individuals to bring in any stores of currency they possess for replacement (and taxation), then currency loses some of its benefits of anonymity, which is likely to be similar, to a small extent, to a withdrawal of the currency.

Problems have occurred with the introduction of the new Rs500 and Rs2,000 notes as their physical sizes are incompatible with existing ATM machines in India. The government suggested that it would be weeks before the ATM machines could be configured to dispense the new notes. Because India is a cash-dominated society, with hundreds of millions of people without access to bank accounts and associated debit cards, the result of this surprise policy has been extremely costly to Indian people, at least in the short run. Many legitimate people who maintain savings in cash cannot easily explain from what sources their cash was obtained; lines for the limited number of currency return facilities are exceedingly long; businesses cannot make change, businesses, when they cannot extend credit to regular customers, must turn away customers who are bereft of cash.

Notwithstanding the short-run costs of the policy, as explained by Kazmin (2016b) 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.” A partially dissenting view was also expressed by Kazmin (2016a) in the *Financial Times*, “Renuka Gaorie — whose rubbish collector in New Delhi’s upmarket Defence 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.’”

While Rogoff’s recommendation to eliminate high-denomination currency over time, with a rapid end to provision of new \$50 and \$100 bills combined with a 5–7 year period, during which people could redeem those notes for newly issued notes

relationship: $\frac{\partial G}{\partial c} = \left(\frac{\partial G_g}{\partial c} + \frac{\partial G_b}{\partial c} \right) > 0$, and $\frac{\partial G_b}{\partial c} < 0$. This makes clear that society is not better-off with a restriction on the supply of the good c , even when the overall activity declines and if the mix of good and bad activities worsens. Rogoff (2016) asserts that the overall level of crime would fall with a restriction on the supply of high-denomination cash; but it does not follow that society is better-off if the type of criminal activity worsens in the ways described here.

(and during some fairly long period, the notes would remain monetized). This is in stark contrast with the abrupt demonetization announcement in India, and the short, two-month period within which people could exchange the demonetized notes with other notes. Nonetheless, the Indian experience is a cautionary one, as it represents only a short interruption of the provision of exiting cash, allowing time for the retirement and replacement of the two most popular notes. Sarin and Summers (2016) argue convincingly that the Indian policy is unwarranted.

Another aspect of cash, particularly high-denomination notes, is its freedom from attachment for debt repayment. As of 2014, approximately 35% of US adults, or 77 million people, had debts in the process of collection, according to the Urban Institute. Such debts are nonmortgage debts more than 180 days past due. The incidence of these debts was concentrated in the southern US. Cash is unique in this respect, and it is not clear that account-based alternatives would be popular with debtors. If high-denomination cash were phased out, there would be significant distributional consequences from the relative scarcity of stores of value that are not subject to liens in the process of debt collection.

Rogoff (2016) is concerned that the poor and unbanked people are not enjoying the benefits of financial inclusion, as banks find it privately too costly to market to the poor and to serve them. Isn't it 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? And, even more strongly, shouldn't those steps be taken prior to any reduction in the availability of high-denomination currency?

Currently, the poor and unbanked people use cash as their main means of interaction with the financial system. Cash is provided free of charge, and has the benefits of anonymity, easy verifiability, and widespread acceptance. Debit cards and the accounts that would fund them, even those provided at subsidized rates, enjoy none of those features. It is unlikely that they represent realistic alternatives for the poor and unbanked when compared with cash, at least presently.

It is useful to point out the differences between high-denomination currency and bearer bonds, whose issuance and circulation was significantly curtailed by the Tax Equity and Fiscal Responsibility Act of 1982. Like currency, bearer bonds are useful in 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) finds liquid bonds inessential in that they can be eliminated with no loss of welfare; such is not the case for either 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 are explained in detail in McAndrews (2015). Eliminating high-denomination notes is intended to lessen avoidance of negative nominal rates that would be charged to bank account balances. While that would make negative nominal policy rates more feasible, it would not directly overcome the many other complications that negative nominal rates create, including many other means of avoidance such as prepaying taxes (Garbade and McAndrews 2012). Various legal, operational, and institutional difficulties—such as the design of debt instruments and finding sound methods to make interest payments from lenders to borrowers, as discussed in Garbade and McAndrews

(2012, 2015)—must be fully addressed and alternatives implemented. Some of the complications in those categories can certainly be overcome in the long run, as suggested by Kimball (2015). However, very similar nominal frictions affect the allocation of resources when positive inflation occurs, for example through nonindexed tax brackets. Certainly, in the long run we can perfectly index tax brackets to adjust and correct for any level of inflation or deflation, but such perfectly indexed tax brackets (and wage and pension adjustments, etc.) don't exist yet. We should not expect that all the nominal frictions associated with negative nominal policy rates would be overcome more quickly than those that contribute to resource misallocation under persistent inflation on the expectation that 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.⁸ The various legal, operational, and institutional frictions that can be foreseen with their possible use clearly limit their applicability beyond some deeply negative number. For example, Rogoff envisions deeply negative rates for the economy while retaining a zero interest rate on retail deposit accounts for consumers. That necessarily limits how deeply negative the overall interest rate may be, otherwise negative rates would be imposed on retail accounts, as financial intermediaries would otherwise lose too much money on retail accounts.⁹ The limitations on deeply negative nominal rates mean that negative nominal policy rates, on their own, are unlikely to be sufficient to provide stimulus that is strong enough to overcome all, or even most, recessionary forces when society encounters the zero lower bound. Consider the case in which the natural rate of interest is -5% , but negative nominal policy rates impose more costs than benefits after they reach -3% . In that case, presumably, society would wish to employ additional tools to support aggregate demand, such as quantitative easing, forward guidance, and discretionary fiscal policy, or a higher target for inflation in the longer run.

Another difficulty of restricting the supply of high-denomination currency, one that Rogoff (2016) points out, is the reduction in income for the central bank. Historically, many central banks did operate without issuing a circulating means of exchange. Roberds and Velde (2014) review those arrangements and others, and find that absent the income from the seigniorage it was practically difficult for the central bank to operate. In the modern context, it appears those difficulties would persist for central banks looking for 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 policy, one must consider the costs and benefits of phasing out high-denomination currency, which Rogoff (2016) sets as a precondition for society to implement deeply negative nominal interest rates.¹⁰ If there are costs to phasing out high-denomination notes, as I have argued, then it is not clear without substantial additional evidence that the benefit of using somewhat more negative interest rate policy versus more traditional policies of discretionary fiscal policy, quantitative easing, and forward guidance, is on balance warranted.

⁸ Rogoff points to many cases in the ancient world of debasement of coins, which he likens to negative nominal policy rates. Unlike a modern negative nominal policy rate, debasements were usually not a continuous process, nor did they win universal favor in their effects.

⁹ Alternatively, as Rogoff (p. 99) suggests, the federal government would be responsible for offering zero interest rate accounts for citizens.

¹⁰ Kimball and Agarwal (2015) outline alternatives to achieving deeply negative nominal rates, not all of which involve eliminating high-denomination currency, but which introduce a variable exchange rate between currency and bank deposits.

7. SUMMARY AND CONCLUSION

Whether a social condition is a curse depends on how bad the alternative is. Without high-denomination cash, criminals would be forced to rely on an alternative means of payment. It is likely that debt, in various forms, would be used to a much greater extent than is the case today. Such illicit and secret debt would require the involvement of organized crime both to assist in arranging the debt instruments and in its enforcement. Even if crime and corruption would decline in aggregate, it is likely that there would be a selection and expansion of organized crime. Organized crime itself would—via 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 activity society.

Those people that are on the hook to pay illicit debt, such as making good on inflated invoices, may well be unable to fully discharge their debts. One key benefit of cash is that it immediately discharges one's obligation, 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 the threats of violence. Many such parties would not be able to discharge their debt to the organized criminal organization, as they would subject to the threat of violence once they are ensnared in the relationship with the organization.

Because of the rise of organized criminal activity, it is not clear that society is better-off even if overall criminal activity declines with the phaseout of high-denomination currency. Although crime might decline, violence and the threat of violence might rise, worsening the lives of many. Furthermore, as a result of the demand that organized crime would have to suborn legitimate businesses to produce inflated invoices that could be used as debt instruments, many otherwise innocent people may 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 bear the brunt of the scarcity of cash, and may be conscripted into labor gangs ruled by organized crime, worsening their lives relative to the current, cash-based compensation.

The promise of new forms of financial inclusion that would address the lack of mainstream financial services for poor and unbanked people remains unfulfilled. There are many developments, such as gift cards and other debit products, that have attractive features compared with cash, but so far the combination of zero fees, anonymity, widespread acceptability, and immediate discharge of one's obligation that cash provides is unattainable. Alternatives 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.

The goal of implementing deeply negative nominal policy interest rates would be brought closer by the phaseout of high-denomination cash, as avoidance of the negative rates charged on bank accounts would be less feasible. But there are many other avoidance techniques still available. While many of those can be eliminated in the long run, doing so may be costly, and therefore they may not be done in a timely way. Furthermore, there are many operational, legal, and institutional frictions in collecting interest payments from borrowers. Those frictions are likely more difficult to overcome, even in the long run. As a result, there are limits to the benefits of negative nominal policy rates.

There are potential downsides from phasing out high-denomination cash, and limited benefits from doing so. The spread of organized crime may leave society in a more intractable situation regarding crime and corruption, with harm falling in a more intense way on more vulnerable people, because of the high-denomination cash phaseout, even if crime and corruption overall may drop. The limits to how deeply negative nominal policy interest rates may be set without frictions overwhelming the possible benefits of the policy suggest that it is likely that other demand-enhancing policies, such as discretionary fiscal policy, quantitative easing, and forward guidance, will need to be employed in the event of encountering the zero lower bound in the future, even with the phaseout of high-denomination cash. Over the longer run, a higher inflation target also offers the monetary authority additional latitude to avoid the zero lower bound on nominal policy rates.

Rogoff (2016) recommended phasing out both the \$50 and \$100 cash notes over 5–7 years. While my analysis does not pin down the benefits and costs of particular denominations, these denominations are not high compared with other advanced country denominations. In addition, their value is gradually eroding with positive inflation. Thus, 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 assists people, sometimes in vulnerable positions, to alleviate their concerns and discharge their obligations with finality. Without the use of convenient high-denomination cash, many vulnerable people will likely be ensnared in a trap in which they are unable to fully discharge their obligations and would then face the threat of violence if they fail to pay in full. 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."

REFERENCES

- Agarwal, R., and M. Kimball. 2015. Breaking Through the Zero Lower Bound. International Monetary Fund Working Paper 15/224. Washington, DC: International Monetary Fund.
- Araujo, L., V. Bignon, R. Breton, and B. Camargo. 2016. On the Origin of Money. Mimeo Sao Paulo School of Economics. 19 June.
- Charania, M. et al. 2011. Efficacy of Structural-Level Condom Distribution Interventions: A Meta-Analysis of U.S. and International Studies, 1998–2007. *AIDS Behav* 15(7): 1283–1297.
- Dick, A. 1995. When Does Organized Crime Pay? A Transaction Cost Analysis. *International Review of Law and Economics* 15: 25–45.
- Garbade, K., and J. McAndrews. 2012. If Interest Rates Go Negative . . . Or, Be Careful What You Wish For. *Liberty Street Economics*. 29 August. <http://libertystreeteconomics.newyorkfed.org/2012/08/if-interest-rates-go-negative-or-be-careful-what-you-wish-for.html> (accessed 1 November 2016).
- . 2015. Interest-Bearing Securities When Interest Rates are Below Zero. *Liberty Street Economics*. 4 May. <http://libertystreeteconomics.newyorkfed.org/2015/05/interest-bearing-securities-when-interest-rates-are-below-zero.html> (accessed 1 November 2016).
- Goodfriend, M. 2016. The Case for Unencumbering Interest Rate Policy at the Zero Bound. Paper presented at the Jackson Hole Economic Policy Symposium, Federal Reserve Bank of Kansas City, Jackson Hole, Wyoming, 26–27 August (revised 15 September 2016).
- Graeber, D. 2011. *Debt: The First 5000 Years*. Melville House Publishing.
- Hurley, S., D. Jolley, and J. Kaldor. 1997. Effectiveness of needle-exchange programmes for prevention of HIV infection. *The Lancet* 349 (9068): 1797–1800.
- Kazmin, A. 2016a. Indians Endure Currency Pain with Touch of Schadenfreude. *The Financial Times*. 11 November. <https://www.ft.com/content/fd27a18c-a812-11e6-8b69-02899e8bd9d1> (accessed 20 November 2016).
- . 2016b. Narendra Modi's Bonfire of the Rupees. *The Financial Times*. 17 November. <https://www.ft.com/content/0467b734-ac23-11e6-ba7d-76378e4fef24> (accessed 20 November 2016).
- Kimball, M. 2015. How Negative Rates are Making the Swiss Want to Pay Their Taxes Early. *Confessions of a Supply Side Liberal*. 7 November. <http://blog.supplysideliberal.com/post/152854884833/how-negative-rates-are-making-the-swiss-want-to> (accessed 20 November 2016).
- Kirby, D., and N. Brown. 1996. Condom Availability Programs in U.S. Schools. *Family Planning Perspectives* 28: 196–202.
- Kocherlakota, N. 2003. Societal Benefits of Illiquid Bonds. *Journal of Economic Theory* 108: 179–193.
- . 2016a. Want a Free Market? Abolish Cash. *Bloomberg View*. 1 September.

- . 2016b. The Zero Lower Bound and Anonymity: A Monetary Mystery Tour. Comments at a conference in honor of Charles M. Kahn, posted on Narayana Kocherlakota's website. June. <https://docs.google.com/viewer?a=v&pid=sites&srcid=ZGVmYXVsdGRvbWFpbnxrb2NoZXJsYWtvdGEwMDI8Z3g6MzIxMDI0Yjc5OWFiMDhiNg> (accessed 1 November 2016).
- Lurie, P. et al. 1993. Public Health Impact of Needle Exchange Programs in the United States and Abroad: Summary, Conclusions, and Recommendations. Berkeley, California: University of California.
- McAndrews, J. 2015. Negative Nominal Central Bank Policy Rates: Where Is the Lower Bound? *Federal Reserve Bank of New York*. 8 May. <https://www.newyorkfed.org/newsevents/speeches/2015/mca150508.html> (accessed 1 November 2016).
- Modi, N. 2016. PM's address to the Nation. 8 November. http://www.pmindia.gov.in/en/news_updates/prime-ministers-address-to-the-nation/?comment=disable (accessed 20 November 2016).
- Noar, S. 2008. Behavioral interventions to reduce HIV-related sexual risk behavior: review and synthesis of meta-analytic evidence. *AIDS Behav* 12(3): 335–353.
- Ratcliffe, C. et al. 2014. Delinquent Debt in America. *Urban Institute*. 30 July.
- Roberds, W., and F. Velde. 2014. Early Public Banks. Working Paper 2014-03. Federal Reserve Bank of Chicago.
- Rogoff, K. 1998. Foreign and Underground Demand for Euro Notes: Blessing or Curse? *Economic Policy* 26: 263–303.
- . 2014. Costs and Benefits to Phasing Out Paper Currency. In *NBER Macroeconomics Annual*, edited by J. Parker and M. Woodford. Chicago: University of Chicago Press.
- . 2016a. *The Curse of Cash*. Princeton University Press.
- . 2016b. The Sinister Side of Cash. *The Wall Street Journal*. 25 August.
- Sands, P. 2016. Making it Harder for the Bad Guys: The Case for Eliminating High Denomination Notes. M-RCBG Associate Working Paper 52. Harvard Kennedy School: Mossavar-Rahmani Center for Business and Government.
- Sarin, N., and L. Summers. 2016. Most sweeping change in currency policy in the world in decades. *Larry Summers' Blog*. 21 November. <http://larrysummers.com/2016/11/21/most-sweeping-change-in-currency-policy-in-the-world-in-decades/> (accessed 30 November 2016)
- Schelling, T. 1971. What is the Business of Organized Crime? *Journal of Public Law* 20: 71–84.
- Strathdee, S., and C. Beyrer. 2015. Threading the Needle — How to Stop the HIV Outbreak in Rural Indiana. *New England Journal of Medicine* 373: 397–399.
- United States Department of the Treasury. 2015. *National Money Laundering Risk Assessment 2015*. <https://www.treasury.gov/resource-center/terrorist-illicit-finance/Documents/National%20Money%20Laundering%20Risk%20Assessment%20E2%80%932006-12-2015.pdf> (accessed 1 November 2016)