Chapter 5
Justice as an Option

In an age of financialization we have new ways to describe historical justice, dynamically, as an option that has a present value even when it cannot be exercised. The statement that historical justice is an option has two colloquial meanings: that historical justice can be done and that it does not have to be done. A further meaning made available by modern options theory is that the option form is now a possible metaphor for historical justice: that historical injustice purportedly confers on those presently disadvantaged a claim analogous to what financial economists would call a conditional (or "state-contingent") right to "put" that injustice back to its present beneficiaries. Extending this metaphorical comparison, we can also say that this kind of claim—a put—becomes more valuable when things are going worse for the beneficiaries of historical injustice.

The basis for my analogy between an actionable historical injustice and a financial put option was first suggested in my Introduction: an investor who buys a put option to sell a stock for one hundred dollars when its price is equal to or higher than that amount acquires the right to sell that stock for one hundred dollars in future states of the market when its price falls below that amount. By purchasing this put, this investor stands to lose less in falling markets than investors with full exposure to the stock's declining price. The seller of the put will have collected extra cash, the premium paid, but will have assumed a liability to compensate the buyer for any further losses if the stock price falls below one hundred dollar by (in effect) promising to buy the stock for one hundred dollars regardless of how far it falls and regardless of their own exposure to losses on the stock. Such a non-voluntary transaction could be considered to be forced, and thus illegitimate, were it not for the historical existence of the put itself. In my analogy, the beneficiaries of historical injustice would be considered to have illegitimately extracted an extra benefit—the premium for a put—that cannot be undone, but that created to compensate those who paid this premium for all future losses below a baseline pegged to the original injustice regardless of whether the beneficiaries of that injustice are also suffering losses. In my analogy with options theory, such a put would automatically rise in value at those

moments in which the fortunes of beneficiaries of that injustice are in decline. In this way, at long last, but only under some scenarios, the victims of historical injustice would be sure to derive material advantage from it. But this put, like a financial option, could have value in situations where the payoff is not automatically triggered. In many situations of heightened market volatility, and in all situations of mark decline, the put option will be worth more—which means that the beneficiaries of historical injustice would have to pay a high price to buy it back. This is the price that I believe politics can extract.

My claim that historical justice is the present value an option will be more than a metaphor if, and only if, I can show that a premium has in fact been paid, that it can be continuously priced like any other option, and that collecting this price when it is high (driving it up when it is not) is tangible way for justice-seeking subjects to derive benefit from bad history without waiting for a revolution. By showing ways to price historical justice *as* an option, the present chapter takes up the task of showing why my claim that justice *is* an option is more than a metaphor.

Before I go into greater technical and empirical detail, let me explain the broader relevance of what follows. The question of historical justice—the topic of this book—is whether, when and how ongoing victims of past injustice can eventually come to benefit from it: could they under some scenarios automatically *put it* to its present beneficiaries as a forced transaction, and under a broader range of scenarios extract present value from the possibility of doing someday? What I here call putting the injustice must remain for now a metaphorical expression of the notion that those who have been able to leverage and run up unjust advantages incur a downside liability that would magnify their losses disproportionately so as to mitigate the losses of those who were relatively disadvantaged by their rise. I nevertheless believe this metaphor captures an important aspect of the overhang of bad history. For example, it implies that, from those who are permitted to run up unjustifiable gains, even more *could* be legitimately taken— and that it should be taken at a time when they are less able to pay and might thus be tempted to argue that their historical victims should accept austerity.

Unlike Rawls, who saw distributive justice as a forward-looking cap on how much the

better-off should benefit from inequality whether it was originally just or not, in my view unjust inequality is intrinsically historical. I mean by this that its originary and cumulative character are co-constitutive: that the foundational wrong occurs with a forward-looking view of its future cumulative effects, and that the magnitude of those effects can make that injustice even worse, looking backward, than it was originally. Such a forced transaction occurs in the financial markets whenever a long put goes "in the money" and can be automatically exercised if the market continues to; it occurs in political systems on the rare occasion of a revolutionary seizure of accumulated wealth. In this respect, my notion of historical injustice as a long put is simply a metaphor for revolution. But it is also possible for the recipients of premiums for sold put, or beneficiaries of historical injustice, to buy them back in order to reduce the danger of suffering additional losses in a falling market when they could be forced to compensate those other losers who are protected by the put.

Once we consider the possibility of buybacks we have moved beyond a mere analogy between a claim against the benefits of historical injustice and a put option as it is understood in finance. We are no longer saying that one is *like* the other and are now talking more technically about the price at which the option can be cashed out. If, as I will argue, historical justice has a present value that continuously fluctuates and can be paid at any time, then it is in this respect not only like an option—it *is* an option. This is so not merely because its changing value is a derivative of changing volatility, both macroeconomic and political. It is also so because there are now financial technologies, based on options theory, that could be used to design vehicles redirecting the flow of funds, collateral and risk that could operationalize and implement historical justice as a project for harvesting the ongoing benefits that arise from injustice in the past.

My argument in this chapter that historical justice is an option turns, however, on a point that has been stressed in previous chapters: the dependence of capital accumulation on the continuing liquidity of financial assets. Liquidity is a sine qua non for the existence of a capital market, but in ordinary capital markets the liquidity of a financial investment is not guaranteed. This is because another sine qua non of a market is a buyer of an asset is exposed to both downward and upward fluctuations its price, and that a seller sheds this exposure. The normal relationship between buyer and seller in a market for commodities is thus predicated on the

absence of liquidity guarantees. Such guarantees, can however, be bought and sold in a capital market by paying a premium. What it means for there now to be a developed capital market is that they can can be priced and purchased separately tradeable option—as purely assets for which there is also a market. Full liquidity in the purchase of an asset can be guaranteed, for example, by an asset repurchase agreement—the right to sell it back for its original purchase price.

But locking in an asset's price through a repurchase agreement or put is not the only way that capital markets can remain liquid. There are also dealers and traders can provide "inside liquidity" to an asset market by being willing to sell when others are buying and to buy when others are selling. Because they are indifferent between buying and selling, provided that they can do so at different prices, they are able to collect the spread between bid and ask prices. Being able to profit from an arbitrage on the relation between two prices makes it unnecessary for these market-makers to provide liquidity by guaranteeing a single price for which they would have to charge a premium.[1] But, as we have seen in earlier chapters, the collapse of liquidity is accompanied, and sometimes defined, by flight or failure of such market-makers This, in the absence of some other guarantee sends asset prices into freefall for lack of a buyer at any price. Such downward spirals can be ended when a very private banker, such as J.P. Morgan in 1907, steps in to set a floor on falling prices, or when the government provides "outside liquidity" to asset markets—for example, when the Fed steps in to purchase debt instruments that would otherwise have no other buyers. The idea is to "restore confidence in the market" by giving other potential buyers something they did not previously have—the right to put (resell) their purchased asset to the Fed at a predetermined price.[2]

By providing outside liquidity central governments can often reverse the collapse of asset prices, no matter how "bubbly" they may have been. But for mainstream economists the stated reason for preventing a "fire-sale" of assets is rarely, if ever, to preserve the wealth of those who currently hold it or to protect them from the risks for which they should have already been rewarded according to the efficient market model (EMM). The stated policy reason for preventing fire sales is, rather, to avoid economic "contagion" and its distorting effect on credit markets—and, even more importantly, the distortions in the market allocation of productive assets if every investment in them were to be priced at its liquidation value in a falling market.[3] But, because the government promotes these apparently laudable goals *by means of* supporting

asset prices, the expected effect of providing a liquidity guarantee will be to prevent the large-scale disaccumulation of existing wealth—a fact that makes it politically controversial.

The major economists who now endorse measures such as those taken by the US government in 2008 assume that government cannot ultimately refuse to them, but they often warn that politically motivated delays will feed market uncertainties and thus drive up the eventual public cost of stabilizing capital markets. Politicians seeking cover to support such policies can then invoke these warnings from eminent economists to blame those who would dissent from a government bailout for further panicking unstable markets and thus making a liquidity crisis worse. This self-serving argument is correct as far as it goes: if there are dissenters to a bailout, their objections will raise the likely cost of a bailout by posing further threats to capital market liquidity. But whether this is good or bad depends upon who pays, and who gets paid, the higher cost of preserving the liquidity of accumulated wealth.

The remainder of this chapter suggests ways—both technical and public—for dissenters to challenge the assumption that the public must pay that cost, and to argue, rather, that the capital markets should pay a premium for the put it receives from government to restore market liquidity. That premium need not take the form of cash—it could be a financial asset, such as a long call, that appreciates in value as markets recover and thus constitutes a growing claim against accumulated wealth. The rising value of a long call as markets recover and rise could be used, and even leveraged, to fund the reduction of social inequalities that capital market growth normally exacerbates. From this perspective, treating historical justice as an option would be much more than metaphorical—it could also provide a strategic blueprint for responding politically to liquidity crises at precisely those moments when the financial system sees its own vulnerability as a reason to expect austerity from everyone else.

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The strategic opportunities that I see are not confined to potential liquidity crises that arise directly from political upheaval. Other "shocks," such as earthquakes, droughts and plagues, can trigger liquidity crises without being seen as outcomes of political struggle. No matter what initially disrupts the inside liquidity of capital markets, the provision of outside liquidity by the state will require political support and/or intensified repression, and thus introduce a political risk that the state will refuse to act, or that will not act in time. The possibility that the state might fail—or only partially succeed— in its efforts to backstop capital markets introduces a further

element of political risk. To the extent that the provision of outside liquidity to capital markets by government must carry elements of political risk, there will be opportunities to leverage this risk to strengthen demands for historical justice.

And, as soon as such opportunities are recognized, there are likely to be countervailing threats of a capital strike that would further tank the markets. Why shouldn't justice-seeking subjects simply call this bluff and dare capitalism to self-destruct? Such a response may well succeed in many circumstances. But is too easy to assume that a capital strike is impossible in any circumstance because it would be against the interest of capitalists. They may have more resilience to a politically induced economic crisis than justice-seeking movements and the victims of injustice they support. The capitalists are, thus, not the only ones whose bluff might be called.

More fundamentally, however, any plausible threat to destroy something by powerful forces that manifest a willingness to destroy themselves requires deeper analysis. Is capitalism's potential ability to bring about its own destruction a sign of weakness or the basis of its strength? When I said in chapter 2 that the threat of capital strike is the financial equivalent of suicide bombing, I meant to leave open the question of whether they would go through with it. Perhaps they understand, at least implicitly, that their enemies are the ones who in the final analysis will make whatever sacrifice it takes to preserve the capitalist system, and that this is why and how it survives. This conclusion is likely prove false in the final analysis—capitalism cannot survive forever—but it is hard to deny that capitalism has thus far held off demands for historical justice by revealing that even its most vocal critics of capitalism are not ultimately serious about wanting to replace it.

This would probably not have been true of Marx himself. While we cannot be sure what he would say toady, in his own time he would have taken it to be positive effect of labor militancy—and a sign of its success—that it accelerates the self-destruction of capitalism by provoking capital strike that would devastate the financial sector first. For the Marxists who immediately followed, provoking a Capital Strike would have been one way in which a General Strike—or the heightened possibility of it—could weaken capitalism and lead to revolution. This is partly because they would have shared Marx's view that purely financial wealth is inherently "fictitious," and that its destruction would thus harm no one other than those capitalists who falsely believed it to be real. My update of Marx in chapters 1 and 2 rejects his description of all

financial assets as "fictitious." Immaterial forms of wealth, I argue, can play a central role in the materiality of power relations, and the link between their valuation and their liquidity is an important way in which this happens. But my rejection of Marx's account of "fictitious capital" (as it applies to most financial assets) accepts his underlying insight that it valuation is contingent on its liquidity, while adding that we now understand better than Marx could have done that how reproduction of financial liquidity is itself politically contingent. My specific contribution, especially in the present chapter, is thus to draw out the strategic implications of understanding the political reproduction of financial liquidity as a chokepoint in the system of capital accumulation that makes it vulnerable to sabotage by both justice-seeking movements and by capitalists seeking to defeat them. One strategic implication is that, if even less-than-credible threats of capital strike can still win out over demands for historical justice, the reason is that capitalists have their fingers on chokepoint of illiquidity and that justice-seeking subjects do not. This is why I see the politics surrounding liquidity reproduction as a new site of macropolitical struggle, and why I regard the identification, extraction and appropriation of a financial premium for preserving capital market liquidity as a reasonably effective and relatively stable way to redistribute some of the wealth out of which that premium itself can be paid.[4]

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The political strategies that I suggest would oppose a view that is widespread, even on the left, that historical justice is something we cannot afford, and that austerity is our only alternative. Austerity, from my perspective, is a political program that is based on the assumption that the option of historical justice has a present value of *zero*. If this assumption is true, then financial liquidity is purely infrastructural good that government could choose to provide at little or no cost to the financial sector using a rationale similar to that of providing free roads to the driving public: that, yes, it's a type of subsidy for a segment of society, but the imposition of user fees, if any, should be driven by considerations of efficiency rather than of justice.

To me, however, it is fundamental that government provides to financial markets the good of liquidity by guaranteeing the value of the assets that embody the present accumulation and distribution of wealth. This is not merely useful infrastructure for which a user fee might or might not be charged. The very fact that the government's asset guarantee includes the appreciated proceeds of historical injustice bears on whether the beneficiaries of that guarantee should be made to pay a premium for receiving it. It also bears on who should benefit from the

government's insistence on collecting that premium. The benefit should go to those who would otherwise be further disadvantaged by the perpetuation and compounding of historical injustice, for example, by shrinking socioeconomic gaps that originated in past injustice and that will otherwise widen as asset markets recover.[5]

My strategic answer to the politics of austerity is thus that, at the peak of a liquidity crisis of 2008, the option of justice was clearly worth far more than zero, and that its value was rising while its enemies were campaigning austerity as the only alternative to financial collapse. When they suggested that historical justice was worth nothing because of capital market illiquidity, they were thus deflecting the potential rise of a political dynamic in which threatening liquidity makes justice worth more. My strategic response is to identify and advance that political dynamic. I am here proposing that democracy, when it is not just a technology for manufacturing consent, is an arena for the continuous repricing of the option of justice in a class-based society that is thereby deferring an event of sudden disaccumulation that could come about in many ways including a revolutionary abolition of capital markets that aims to wipe out accumulated wealth.

To implement such a strategy, however, I would need to derive the present value of justice as an option to financial value that is already known, or is discoverable, in today's financial markets.[6] I have thus been using the idea that revolutionary justice would abolish capital markets as an analytical tool for defining a paradigmatic break from the state's role in supporting capitalism that causes the sudden illiquidity of financial markets, thus destroying all wealth accumulated in financial form. I here treat revolutionary *dis*accumulation, not as justice achieved, but as the conceptually necessary limit-point in my argument that preventing disaccumulation through illiquidity—and thus rolling over the option of revolutionary justice—is equivalent in its financial value to another option, the option of guaranteeing liquidity, the value that is knowable and can be approximately priced.[7]

My immediate reason for doing this is that value of providing a government guarantee for the liquidity of financial markets—the macroeconomic liquidity premium—is knowable and has already been approximately calculated by a group of eminent financial economists, including Robert C. Merton, who shared the Nobel Prize for coinventing BSM and applying it to microeconomic questions. The most rigorous of these discussions point out that Merton himself began applying Contingent Claims Analysis (CCA, which is another name for options-pricing

theory) to government guarantees of bank deposits as early as 1973, and that, since then, it has always been feasible to use CCA to price other government guarantees against macroeconomic risk. Merton and his collaborators thus agree that government's liquidity guarantee was necessary in 2008 but acknowledge that the contingent claims analysis (CCA) that is used for pricing liquidity guarantees throughout financial markets would have justified charging a very high premium for guaranteeing the liquidity of those markets the value of which should have appeared as an asset on the government's balance sheet to offset the very real liability it assumed in making that guarantee. If the government had charged the correct premium for its guarantee and booked it as an asset the liquidity put would in theory have had the same macroeconomic effect on financial market—that is the point of CCA. It could, however, have yielded far greater benefits for ordinary citizens, whom these economists tend to categorize as either "consumers" or "taxpayers".[8]

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As an outsider who reads the CCA literature, my main contribution is to interpret in strongly political terms—in the language of justice itself—the idea of a macrofinancial intervention to support liquidity and stabilize asset prices. This means taking seriously the claim of these financial macroeconomists the risk of aggregate illiquidity can be priced and consequently hedged—that there is what they would call a macroeconomic liquidity premium— and that the value of that premium will be rise sharply, exponentially, with capital market volatility. But it also means taking more seriously than they did the possibility of harnessing political controversy over government-provided liquidity guarantees to require that the liquidity premium be collected by government and that it then be used by government to mitigate the perpetuation of historical justice that results from accumulated wealth.[9]

The CCA approach is rooted in an earlier concept of a "complete market" that was introduced by the economists Kenneth Arrow and Gérard Debreu, as part of their seminal reformulation of general equilibrium theory in the mid-1950s.[10] A complete market is one in which "every possible state of the world, past, present and future," has "a financial payoff associated with it to which a price could be assigned in the present."[11] In such a market it would be possible to buy accurately priced insurance contracts against any future eventuality— including illiquidity and revolution—however unlikely it might seem.

Insurance contracts like these—sometimes called "Arrow-Debreu securities," after their

originators—are described as being "state-contingent" in finance literature. This is because their value fluctuates with new information that changes the projected probability of contingent future events. In effect, these securities are ways of pricing that probability from the standpoint of a hypothetical trader who would be equally willing to buy or sell the security, depending on its price. As the Nobel laureate James Tobin put it, Arrow and Debreu

> encompassed the uncertain future within the friendly confines of . . . general equilibrium. They simply multiplied the number of commodities to be traded by specifying the date and the contingency—"state of nature"—in which each good would be delivered. They also assumed each agent to have a vector of endowments of commodities so defined and a utility function over such commodities. At the beginning of economic time, a single market in these commodities, i.e., in contingent futures, determines everything: the famous Walrasian auctioneer has a big job finding the equilibrium, but he has to perform only once. . . . Once all the contracts are made, economic life is simply the routine of fulfilling the contracts as the specified dates and contingencies occur.[12]

A journalistic account of the financial revolution that followed from Arrow and Debreu's idea paraphrases their vision as follows:

> The notions of complete and perfect markets are critical here. In a universal and open market, millions of immediately executed transactions in derivatives serve, according to this theory, to verify and enforce prices in an underlying economy and ensure that risks are held by those most able and willing to bear them. . . . Completing markets promise that all possible future contingent states of the world can be encompassed in a contract and actively managed. Contra Knight's (1921) unbridgeable distinction between risk and uncertainty, the alchemic propensities of financial innovation ostensibly turn deleterious uncertainties into fungible globules of risk.[13]

In such a hypothetically complete market, forward contracts might be traded alongside options contracts, so that we could continuously price the value added by optionality as such. And under conditions of market completion, assets could always be collateralized as a source of funding because they would be completely hedgeable, and could thus be made synthetically risk-free. This means that there would never be a risk of credit rationing, and no need for a liquidity premium on assets that are more readily convertible into cash, and thus easier to collateralize.[14] The CCA approach invites us to apply this way of thinking to all intertemporal claims. Here, the question in valuing any put or call is always a matter of pricing in the present what its future value *will have been*.[15] And we can ask this very question about the bipartisan liquidity put provided to the financial sector by the US government in 2008 and 2009.

Robert C. Merton and his distinguished collaborators provided a plausibly conservative answer to this question based on CCA. They estimate that as of 2010 (immediately following the crisis), the notional value of the guarantee (the amount guaranteed) came to $17 trillion. The

total includes approximately $5 trillion in debt for Fannie Mae and Freddie Mac, and off-balance-sheet guarantees of roughly $12 trillion to various financial institutions. Importantly, they point out that "the $17 trillion represents the amounts being guaranteed, not the actual value of the guarantee. The value of these guarantees, however, can be enormous, particularly in times of stress."[16]

What, then, was the value of these insurance premiums on liquidity at the peak of the 2008 financial crisis, following the collapse of Lehman Brothers? To answer this question, Merton and his coauthors gave a brief primer the basic principles of CCA as applied to secured credit markets: that the essential risk posed by default, leaving aside legal and other costs, is that the value of the assets pledged as collateral by the defaulting debtor will be less than the face value of the loan. This means that the purchase of any risky bond or loan can be broken down from the standpoint of CCA into two components: a risk-free bond that returns its principal plus the risk-free rate of interest, and a sold insurance policy (or put) on that bond in which the purchaser assumes the risk that, in the event of default, the collateral's market value will be less than the bond's full repayment value. The insurance component could then be priced through CCA. But, instead of paying a third party to insure the value of the collateral (making the loan effectively risk-free), the borrower pays a premium to the lender in the form of interest above the risk-free rate. That risk premium, according to CCA, should be equivalent to the premium for the insurance that the borrower did not have to buy.[17] Merton's seminal insight, first published in 1973, was that a portfolio consisting of a secured loan plus a put locking in the value of the collateral against which funds were borrowed is the privately manufactured equivalent to a US Treasury Bond of the same maturity.[18]

From this insight follow two, initially counterintuitive conclusions. The first is that in secured private credit markets, default risk is ultimately reducible to an insurable risk that pledged collateral might become illiquid. This is why Merton et al. can insist that the value of a risky loan is the value of a risk-free loan minus the value of the guarantee, which is then an option that can be priced that can be added back, whether in the form of an insurance premium or an interest premium. The liquidity of private credit markets thus implies that borrowers and lenders will each, in effect, have "guaranteed the solvency of the other."[19] Loss of confidence in these mutual guarantees explains the "flight" to safer, more liquid assets and ultimately to cash itself during a financial crisis.[20]

The second major conclusion is that the private credit markets are thus, essentially, in the business of establishing synthetic equivalents of risk-free government debt. When those markets are liquid this means that a premium can be paid to make collateral safe in lieu of providing collateral that is considered safe because of a government guarantee. But this definition of private credit market liquidity takes government guaranteed collateral as its baseline, beyond which there is only political risk, and thus indirectly defines private credit market liquidity as equivalent to the ability to issue safe collateral or to make risky collateral safe, which only government has in the final analysis. But, if private risk premiums cannot be priced without referencing them to safe collateral that the government can create, it should be possible to price government guarantees of risk collateral held by private parties by referencing them to private risk premiums. The problem here is how to price the liquidity risk that the government without having to know the market value of the underlying collateral, or anything else that might be part of the due diligence of a private lender.

Pricing the liquidity of an asset or portfolio to the exclusion of all its other features is a strong point of CCA in all its financial applications that can be especially useful in analyzing and pricing macrofinancial risk. Sticking to their method, Merton et al. assume that in states of high market liquidity and stable or rising asset prices, liquidity premiums will be low; but when underlying asset values decline, the sensitivity of the put value to each increment of decline—in technical terms, its *delta*—rises more rapidly. They thus conclude that the price increase of the put would "get very steep very fast" as a "shock propagates," causing the price of underlying assets to fall and volatilities to rise.

> In essence, . . . governments are writing a guarantee on the bank assets. But what are the bank assets? Bank assets are effectively short put options, so these governments are guaranteeing a put, which means they are writing a put on a short put. . . . If puts are convex, then puts on puts are "doubly convex."[21]

Their elaboration of this point is that repeated shocks to asset values—for example, "a series of asset value declines"—would in turn produce even greater sensitivity (higher deltas) and a sharper curvature in the price of the liquidity put. And even if asset *prices* do not change, a change in the volatility of asset *returns*, which typically occurs during market declines, has a very large additional effect on the further "propagation of risk." Finally, there are "feedback loops" caused by the mutual dependence of banks and governments, and of banks and nonbank financial intermediaries, on each other. For example, banks may become weaker because of

government instability and the like:

> The consequence of the banks' becoming weaker means that—because the government has guaranteed the banks—the value of the government guarantee rises, which, in turn, means the government becomes weaker, which feeds back to the banks' becoming weaker. This sort of feedback loop can lead to some pretty intense cycles.[22]

Merton et al. go on to argue that this domestic feedback loop is further intensified by the global connectedness of central banks, insurance companies, and shadow banking institutions.

Such interconnectedness means that the true price of the outside guarantee of liquidity to be provided by government, and thus the financial value of rolling over the inverse option of not providing it, is not straightforwardly measurable in a macrofinancial context. The usual approach is based on deriving an expected default ratio for private that can be compared to the risk-free baseline of government debt. In fully private financial markets, this would be calculated in reverse by dividing the face value of the debt by what it would cost to insure it through purchasing a credit default swap. But in cases where "there is already a government guarantee that exists . . . the CDS price does not reflect all the credit risk but only that part borne by the private sector." Because of this fact, Merton and his collaborators suggest a different approach: "Our methodology is to use a market-tested contingent claims analysis (CCA) technology . . . to derive an estimate of *what the CDS price would have been had there been no government guarantee.*"[23]

Their article, which focuses on methodology, breaks off with a discussion of how such an analysis of interconnectedness might be done by applying something called "Granger causality tests" and using the CDS prices of nonguaranteed equity pledges as proxy for "fair" CDS prices on pledges of guaranteed bonds. This method is applied to specific components of the federal guarantee of capital market liquidity. But in the end, this consortium of prominent economists does add up these components to come up with total price of the liquidity put that that the US government provided in 2008 and 2009 to preserve stable asset prices (by preventing a "fire sale") in both domestic and global capital markets. The explicit purpose of their work was to advocate for such policy, and not to shock the public and stir up opposition by revealing its cost.

But a careful reader can figure out, by adding up the separate components of their analysis that the fair market value of the outside liquidity put in 2008 was very large, and that issuing it had a positive effect on the prices of the financial instruments in which accumulated

wealth was stored and by means of which that wealth could be safely transferred. It follows that the premium that could have been collected for this put at the height of the financial crisis, a premium larger than that year's US federal budget and only somewhat smaller than that year's US GDP, would have been enough to fund publicly provided health care or higher education or a guaranteed basic income or an infrastructure program—or a combination of such initiatives-- without requiring government austerity.

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Why have I presented this technical analysis in such detail when it is not my own area of expertise? The first and most obvious reason is that it shows that top-level mainstream economists believe the liquidity premium can be priced and have shown how to do so. I dwell on this because their method is also a way to price the inverse option of not backstopping capital and partially severing the link between state power and accumulated capital, which would be severed completely and automatically by the stylized conception of revolution that I use as a baseline of analysis in contrast to the stylized conception of a state-backed capital market that underpins CCA.

The second reason for my extended treatment of Merton and his colleagues' work is that it reframes our understanding of the implicit subsidy that capital markets receive from government when it is not required to provide them with outside liquidity. Textbook economics justifies interest-rate premiums in terms of a tradeoff of risk and reward, providing variable incentives for investors with different degrees of risk tolerance. But if, as Merton says, default risks are federally guaranteed for wide swaths of the private credit market, then the interest rate spreads between government debt and the private debt that receives this implicit guarantee may not fully reflect the existence of formal and presumed state guarantees. In effect, private-sector lenders would here be paid an unnecessary insurance premium for debt that the government has already insured. A further problem arises, according to the Chicago School economist Luigi Zingales, because the largest lenders, the Wall Street banks, are incentivized by the near-certainty of government bailouts to undercharge their largest borrowers, the Wall Street hedge funds, for the real risks they take:

> Rational lenders [have] understood that, when push came to shove, the government would probably intervene with help if a big or extensively interconnected financial firm were to fail. …"Too big to fail" had become a self-fulfilling prophecy. If the belief becomes sufficiently

entrenched in the marketplace, the cost, when policy makers surprise the market by *not* bailing out a big bank, grows even greater. Shortsighted policy makes will always prefer the cost of a bailout to the cost of upsetting the market. …Anticipating government bailouts in case of emergency, lenders are willing to lend to large financial institutions very cheaply and without restrictions. Offered cheap credit, the manages of these financial institutions find it attractive to borrow a lot and to take wildly risky gambles because they can maximize their profits in doing so. Unfortunately, the risky bets also maximize the probability that the government *will* have to intervene, as well as the cost that the government will pay when it does. The value of this implicit government subsidy to banks considered "too big to fail" is estimated to be half of a percentage point of interest.[24]

Zingales believes that "the subsidy implicit in the 'too big to fail' policy [was] roughly $30 billion a year" for the eighteen largest bank holding companies before the 2008 financial crisis, and that it is largely responsible for having caused that crisis.[25] Although he, too, ultimately agrees that "some sort of government intervention" was necessary in 2008[26], his stated objective, unlike that of Merton, et al., is to stir up what he calls a "populist" resentment of what happened then as form of "crony finance."

My third reason to dwell on the analysis of Merton, et. al, is the eye-popping size of the liquidity premium that they believe the US federal government could and should have charged to the financial sector and booked as an asset on its balance sheet. Its estimated valuation, when added up, would have been larger that the federal budget in 2008 and only somewhat smaller than the GDP at that time. The order of magnitude of the bailout's finance valuation is not in dispute, nor is the method used to derive it. The range of possible estimates is based rather on a range of views about what categories of non-federal credit market debt, with a notional value in the tens of trillions, were implicitly guaranteed by the US federal government beyond the facilities that were explicitly provided. The $17 trillion in notional value that was, according to Merton et al., federally guaranteed as of 2010 is an admitted underestimate. For example, it does not include student debt (then exceeding $1 trillion, most of which was already federally guaranteed). The authors also mention in passing that federal guarantees of private pension funds, which are not included in their calculation, are especially risky because the persistent low interest rates maintained by the Fed reduces the ability of pension funds to meet their future obligations. We could also include other components of the notional value of the credit market that the government implicitly guaranteed in 2008 or that it was already guaranteeing before the financial crisis. This extension should certainly include the implicit, but never-formalized, federal backstops for Fannie Mae and Freddie Mac to the expectations created by the policies

Zingales deplores that the federal government will ultimately do whatever it takes to back all credit instruments that have been pledged, and thus leveraged, as collateral for other credit instruments in order to stop a downward spiral in the systemically important financial markets.

The political importance of government backstops for credit market liquidity is apparent in the ratio of total credit market debt (TCMD) to gross domestic product (GDP).[27] In 2016, TCMD (which includes federal debt that is already "safe") was $63.5 trillion and GDP was $18.6 trillion, yielding a ratio of 340 percent.[28] And TCMD, when added to real estate and equity, represents most of the financial assets that can be pledged as security in financial transactions. "Too big to fail" means that lenders against this collateral are implicitly short a put for which they will not be expected to pay, whether upfront in cash or by capping their ability to benefit from a financial recovery. But for my purposes, it is enough to stress that the magnitude of financial wealth implicitly and explicitly protected by the US government's promised willingness to tax GDP was, even under the most conservative estimates, much larger than the US GDP itself.

But if we stopped at the value of TCMD in the United States, we would be neglecting the substantial role that the United States played in guaranteeing international markets and therefore vastly underestimating the value of the liquidity put. The Bank of International Settlements reported that the notional value of the global financial derivates market in 2008 was over $683 trillion.[29] Since 2008, and arguably before, the Fed has provided off-balance sheet guarantees for this market, and for the global money market in general. While there is some double counting in the figure the BIS provides (insofar as multiple derivatives can be written on the same assets), the scale of the guarantee that the Fed provided is astounding.[30]

The global reach of this guarantee is worth stressing, along with its tenuous legal basis. While the Federal Reserve has an explicit mandate to provide liquidity support to the US banks that fall under its regulatory and supervisory purview, in recent years it has also increasingly supported the nonbank financial intermediaries (often based outside of the United States) that comprise what we now call the "shadow banking system." By the early twenty-first century, the volume of money flowing through this system had already eclipsed the traditional banking system. Shadow banks provided 45 percent of total credit in 2003, and their total liabilities were roughly $25 trillion, or more than double those of the traditional banking centers.[31] Because of the transnational scope of this financial system, the various backstops, guarantees, credit swaps,

and "facilities" provided by central banks go considerably beyond the scope of underwriting the liquidity of domestic markets. The economist Perry Mehrling constructs a hypothetical balance sheet for the Fed that estimates the monetary value of these backstops (the liabilities arising from puts) at $3.6 trillion for global money markets and $2.6 trillion for global derivatives markets, and he strongly supports Fed interventions in these markets as something to which the public should become accustomed.[32]

In contrast to Mehrling, the economists Morgan Ricks and Anastasia Nesvaitolova deplore the extension of liquidity supports to issuers of financial assets outside the government and the regulated banking system. They note that the flight to safety during financial panics puts excessive demand on government-issued liquidity as synthetic, privately created assets that were once acceptable as money equivalents suddenly become less accepted and are dumped on the market. At these moments of credit contraction, the so-called financial innovations that appear to expand capital market liquidity during an upswing can lead to what Hyman Minsky called a "shortage" in government-created liquidity, which is suddenly in higher demand.[33] As a follower of Minsky, Nesvetailova argues that the definition of "liquidity" itself has been distorted by the proponents of such financial innovation to create the illusion that new financial instruments are as liquid as the government obligations they purportedly replicate.[34]

Ricks provides the more nuanced statement of this position by insisting that "'liquidity' and 'moneyness' are not synonyms." He means by this that securities of any maturity may be highly liquid and show great price stability, but that only the shortest-term IOUs can satisfy the need for money. These instruments are "liquid" in a sense that only state-created money can be. It follows that, if the implicit government guarantee of liquidity of new financial instruments were explicitly withdrawn, they could no longer be considered liquid in the sense that money always is.[35] Fair enough, but why wouldn't the guarantee be reinstated in the next crisis if there were no organized political opposition to doing so? Contrary to Ricks and Nesvaitolova, I do not believe that the problems addressed by the 2008 bailouts are the result of semantic confusion about the correct usage of "liquidity" as a concept.

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My argument above has assumed that the extension of the liquidity concept to support markets in financial derivatives, tri-party repo, and so on was primarily a response to the fact that these assets are now the largest repositories of accumulated wealth. I thus focus, as Nesvaitolova and

Ricks do not, on the interactions between major institutions: the interaction between the money market (or "shadow banking system") and the governments—most notably the US government—that supply it with safe collateral, as well as the interactions between the capital markets and the money markets that provide them with the financial liquidity needed to meet the discipline of payments. Following Mehrling, I also presuppose an institutional context in which shadow banks, trading risk-free securities for cash instruments, now perform the functions of traditional banks in providing the financial sector with the cash to make payments and the credit to defer them.[36]

The money market is predicated on the existence of large pools of inherently safe and liquid collateral, such as US Treasury obligations and their equivalents. These are considered to be "inherently" safe because they do not require posting additional collateral in order to borrow cash them. But insofar as this is true, the reasoning is somewhat circular because they are also defined as intrinsically liquid in the sense of being instantly convertible into cash. Through this circular reasoning, the pledge of an interest-bearing risk-free asset (a government bond) for a non-interest-bearing US government obligation (money) becomes the only form of collateralized transaction that is *not* considered to be the swap of one form of debt for another, but rather, a transaction that provides the cash that can be used to liquidate date by enabling its bearer to make payment on demand. This definition of fully collateralized liquidity reveals the foundational paradox of the money market, which is that cash does not pay interest, yet interest-paying bonds are traded for cash at a discount rather than a premium. But if bonds themselves are inherently liquid, would anyone (outside Keynes's "lunatic asylum") accept payment in cash rather than in bonds?[37]

The answer, once again, seems tautological.[38] Money, as cash, is the most liquid asset that can be defined within the financial logic of capitalism because it is the only thing that fully satisfies the demand for *funds* as such in the discipline of payments.[39] So it always commands a premium in the money market over other negotiable securities, including derivatives on money and other money substitutes. This is especially true in times of crisis. The premium that the dollar in the form of cash commands over the most liquid collateral that can be posted to borrow it—the US Treasury obligation—is thus measured by the excess value of bonds one must post over the amount of money one can borrow against them, also known as "the haircut."[40] The money-market haircut—the discount rate at which risk-free bonds are convertible into dollars—

measures the difference between being fully liquid and being able to *pay*. This price is set in the money market (most importantly, in London's "repurchase and reverse repurchase" or "repo" market) that turns securities into funds by putting a positive dollar price on lending against the safest security than can be pledged as collateral (AAA-rated US Treasury obligations).[41]

As Perry Mehrling and many others have demonstrated, this interchangeability of funds with financial assets on the money market (i.e., the money market funding of financial markets) underlies the ability of institutions to manufacture new financial products, such as derivatives, in which previously created value is preserved and accumulated. Creating a negotiable security can turn an illiquid thing or future state of the world into an asset that can be priced today *because* it can be pledged as collateral to generate funds today. It is *having* a price that makes securities both analogous to money and convertible into it. Indeed, price is how we analogize an object to money by representing it as a potential source of funds, and also how we convert it into money by either selling it or borrowing against it. We have seen this logic at work in my argument that historical justice can be financed through harnessing the self-shorting propensities of capital markets.

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Beyond the potential use of contingent claims analysis to price the government-provided liquidity put in times of crisis, my ten-year collaborative project of "rethinking capitalism" in an era of derivatives has led me to a basic truth that underlies the financialization of capitalism: that the BSM model is not just a way to price derivatives, but also a technology for manufacturing synthetic public debt (the equivalent of US Treasuries) out of private credit and other forms of capital.[42] This is not, as some financial journalists suggest, an undesirable side-effect of the financial innovation BSM enables. Rather, as I've illustrated in discussing Robert C. Merton's early contributions, it was part of BSM's original intent to show what private credit instruments would be worth if all their identifiable risk components (except liquidity risk) were stripped away, leaving synthetically-created risk-free financial asset as precipitates of the process of pricing the volatility of risk. Since 1973 this has meant that, as part of the process of manufacturing (i.e., pricing) collateralized debt obligations (CDOs), the financial industry produces synthetic Treasuries (AAA securities) as byproducts that can be recycled as safe collateral and used in place of government-issued debt to borrow money (for example, in the repo markets). From a macroeconomic perspective, the creation of CDOs using the technology

of BSM is thus a privatization of the process of producing increased US government debt without thereby making funds available for increased government spending.

       With the benefit of hindsight, all of this is apparent in the BSM formula itself, which can be read and algebraically rebalanced as an equation that hypothetically commensurates all asset prices with US Treasuries. What cannot be taken for granted, based on the formula alone, is that there will be a robust and liquid market for trading this synthetic risk-free debt at par with actual US Treasury debt. If there is not such a market, US Treasuries will trade at a premium because they are more liquid unless the US government steps in, as expected, to guarantee the liquidity of privately created public debt. This is why the financialization of capitalism can be criticized by Nesvaitolova and Ricks for making unrealistic, and false, assumptions about the functional equivalency of synthetic Treasuries and *real* government obligations.[43] But his criticism misses—or implicitly dismisses—the political significance of what happened from 2007 through 2009.

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We now know that the BSM formula's assumption turned out to be empirically true, because the government guaranteed the liquidity of synthetic AAA-rated securities once the financial crisis struck. Had the state refused to do so, the accumulated wealth held in the form of financial derivatives could not have been priced and much of it could have therefore vanished. This means that the BSM formula not only presupposes, but is politically contingent on, the expectation of a state guarantee for privately manufactured alternatives to public debt. In the financial sociologist Donald MacKenzie's sense, BSM had to be performed by the US government in 2008 and 2009 to remain descriptively relevant thereafter.[44]

       But MacKenzie's notion that economies are created by performing economic theories, also misses the political significance of BSM's commensuration of public and private debt. BSM neither assumes that these are ultimately one and the same, nor does it make them so. The point of financial macroeconomics, as identified by Merton and his colleagues, is that the swap between them contains an embedded guarantee that can itself be priced using the methodology of BSM, and that this implicit price of preserving capital market liquidity has in fact been paid and collected in ways that are yet to be transparent.[45] How, then, should we grasp the implicit political meaning of the liquidity guarantees to financial markets that Merton and his colleagues now advocate?

My political argument builds on the indisputable fact that financial crisis accentuates the difference between government bonds and all other assets that might be used as collateral: as investors dump those other assets in pursuit of liquidity, there is an increased demand for governments to increase the supply of safe collateral that can be sold or lent to generate funds. Government bonds, especially US Treasuries, perform this function in the money market, which, as I have said, prices the difference between cash itself and the safest collateral for which it can be traded. Because the collateralized money market, much more than the regulated banking system, now funds the financial market, the declining safety of privately-created collateral increases the demand on the US government to issue debt in whatever quantities are required to satisfy the need of money markets for safe assets in which to park their pools of funds.[46]

This has been the case since the 1990s, and the political question today is whether the handful of governments that now manufacture safe collateral will do so in sufficient quantities to enable the money markets to keep financial markets liquid and thus prevent asset prices from falling. Whatever its specific components, a government bailout accomplishes this by definition, and among the political questions raised by this definition is whether, and how, the government should spend back into the economy the revenues it nominally borrows by issuing bonds. Would such spending raise inflation, reduce the confidence of the financial markets, and make the bailout more expensive? Because the future liquidity of the financial system lies in government's hands, we have here an issue of the extent of its demonstrable commitment to preventing the collapse of asset values at all costs, and the ability of bond markets to reduce those costs by detaching the expansion of government bond issuance from an increase in deficit spending. Do governments or bond markets here have the upper hand?

Based on this understanding of the financial literature, my political intervention is to focus directly on the financial valuation of the guarantee that government provides in restoring capital market liquidity under circumstances in which money markets fueled by bonds provide that liquidity. This is different from simply adding up the obscene amounts of money that circulate among financial institutions in the course of transacting the bailout. And it is also different from asking the obvious question of why government does not spend the money that it nominally "borrows" to bail out capital markets in order to run a fiscal deficit and thus stimulate the economy. My question is specific to the financial value of bailing out the financial system as expressible in the price of a financial asset—a macroeconomic put.

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My focus on the financial value of the bailout—what it was worth to beneficiaries—is a different project from trying to calculate its total cost to the government. The latter project was attempted by the economist James Felkerson, who concluded that the sum of Fed expenditures, unusual asset purchases, and liquidity swaps between 2007 and 2010 was over $29 trillion.[47] This figure includes $10 trillion in Central Bank Liquidity Swap (CBLS) loans that were made and repaid. These were short-term credit agreements allowing non-US central banks to sell and repurchase their own currency for dollars, and they peaked in 2008 with a notional value of nearly $3 trillion.[48] Another large component of Fed expenditures, totaling over $8 trillion, was the Primary Dealer Credit Facility (PDCF), which allowed the Federal Reserve to function as a lender of last resort to market makers posting good collateral following the Bear Stearns collapse in 2008 and continuing until 2010.[49] These extraordinarily large totals reflect the sum of short-term loans that were not all outstanding at the same time, were overcollateralized, and were all paid back with interest according to their terms. They contributed, of course, to the restoration of liquidity, but putting them end-on-end to calculate a total does not contribute to an analysis of the value of the bailout, which is best understood as the price of a sold put for which no premium was paid.

Other elements of the bailout, as popularly understood, are relevant to the calculation of costs associated with issuing the put. In 2008, the Term Securities Lending Facility (TSLF) Treasury obligations were swapped for privately manufactured securities at par, even though there was no real market for them. The cost of this program, measured in the nominal value of the Treasuries issues, was over $2 trillion.[50] But because the interest on those bonds was near zero, the real cost to the Fed of swapping them for toxic assets would seem to be much lower— unless, of course, one insists, as I do, that there was embedded in this swap a price guarantee for which no premium was paid.

My approach is thus to consider the value of the put to its recipients as a financial liability of government that should have been balanced by an offsetting asset: in focusing on the federal balance sheet it is agnostic on the question of whether, and in what form, $2 trillion should have been reflected in the federal budget deficit in 2008 and 2009. I am concerned, rather, with the federal balance sheet.

That balance sheet should reflect all the other swaps with embedded guarantees that were

part of the bailout. As part of the first Quantitative Easing in 2009 (QE1), the Agency Mortgage-Backed Security (AMBS) program swapped bonds collateralized by mortgage loans, many of which were failing, at par for US Treasury obligations.[51] There was also the Troubled Asset Relief Program (TARP). This program, a bailout initiative of the Treasury rather than the Fed, was funded by adding more than $700 billion to the deficit, originally for the purpose of purchasing assets held on the balance sheets of banks that were by then considered toxic, though some had previously been rated AAA. Eventually, this increase in government borrowing was used to recapitalize the banks in return for which the Treasury received preferred stock.[52] Both of these rationales for increasing the deficit to fund TARP were accepted by the bond markets as a form of government borrowing that would not be inflationary because the dollars received from bond purchasers would not be circulated back into the economy as higher government spending. Such uses of government debt to prop up financial asset prices that would otherwise collapse are not unprecedented; but they are a departure from orthodox economics, in which government spends money into existence and then borrows to "fund" its budget deficit. Neither are they consistent with the heterodox tradition in economics that used to be called "functional finance" and is now called "modern money theory," in which government spends as much as necessary to stimulate the economy and then borrows to adjust for the inflationary effects, if there are any.[53]

But connecting the funding of the bailout to government debt however, complete bypasses the question of valuing what the financial industry got from the liability that government assumed, and whether that liability should, and could, have been balanced by an offsetting asset. My newer approach, which took hold starting with the Russian debt default of 1998, is that government treasuries now issue debt not primarily for Keynesian reasons of fiscal and monetary policy, but to supply the increased amount of safe collateral that is demanded by the money markets on which the financial system now depends. [54] This "epistemic framework" for understanding the importance of money markets in the financial system suggests, according to financial economist Daniela Gabor, "that the state has become a collateral factory for shadow banking."[55] Within this framework, there need be "no macroeconomic consequences" if "debt issuance could be completely divorced from fiscal policy," and thus from the question of what the "Treasury would do with the money that it borrows."[56] In this scenario, "Treasuries can do for market-based finance what the central bank does for bank-based finance, creating the 'base asset' that supports the growth of shadow liabilities . . . The state, in its debt-issuing capacity,

becomes a 'shadow central bank . . . '"[57] Gabor concludes that,

> as the state withdrew from economic life, privatizing state-owned enterprises and state banks, and putting macroeconomic governance in the hands of independent central banks, its role in financial life grew bigger. Sovereign debt has become the cornerstone of modern financial systems, used as benchmark for pricing assets, to hedge positions in fixed income markets and as collateral for credit creation via shadow banking.[58]

Instead of "fiscal dominance," she says, states seek "financial dominance—defined . . . as "asymmetric support for falling asset prices."[59]

Like Gabor, I too am suggesting that the apparent abdication of fiscal responsibility for growth in economic output has given states—at least a few of them—a much more direct role in guaranteeing and promoting the growth in asset values. I have said that what we now call the financial "bailout" consisted of government being allowed to borrow for free from the financial sector to issue more safe collateral, on the condition that government would not spend whatever additional funds it happens to raise as a necessary side effect of such increased borrowing. Government's role in issuing both bonds and the currencies in which they are repaid has put it in the position of being a dealer in the shadow banking system in which currencies and bonds are swapped—what Perry Mehrling calls "the dealer of last resort."[60] Mehrling points out that since the period extending from 2007 to 2010, the financial sector has had less doubt that asset market liquidity in a larger sense—the question of whether there will continue be a market at all—is ultimately guaranteed by governments that are willing to step in and trade their own debt, backed by currency they themselves can print, for privately issued debt that would otherwise be illiquid. Gabor adds that, because of this epistemic shift, the capitalist state no longer borrows more in order to spend more, as it did in Keynesian capitalism. In austerity capitalism, it spends *less* so that it can borrow more cheaply, because debt issuance (collateral creation) is in the interest of the state, aside from any need to spend more money.

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My political approach to all this this goes beyond the apparent irony in both Mehrling's broadly positive and Gabor's broadly negative view of the bailout as a reflection of our time. In this chapter I rather stress that what the government did to restore systemic liquidity, and reduce the spread of differential liquidity, amounted to an assumption of liability for a fall in asset values in the way that selling a put does. The state's ability to do this can thus be conceived,

manufactured, and priced as a financial asset—essentially, an option—that it sells for a price or swaps from an offsetting option.

The second point I stress is more specific to the role of public debt in underpinning and guaranteeing the liquidity of private credit markets. As we have seen, the original BSM formula solves for the price of a call by placing it in a hypothetical portfolio of financial assets that is *defined* to have a return equivalent in all future states to a risk-free government bond. This portfolio represents the possibility of engineering out of the private sector any excess risk attributable to its not being the public sector. We have also seen that BSM produces synthetic risk-free (AAA) securities as a by-product of its technique for manufacturing and pricing riskier securities. This is because the fundamental technique for pricing the excess risk that would exist without a government guarantee is to precipitate out the risk-free components of any security, and thus to isolate the risk and price it separately as the cost of dynamically hedging that risk. According to modern finance theory there *should* be no liquidity premium whatsoever demanded for holding such privately synthesized risk-free portfolio as an alternative to a real financial obligation of the government because they are engineered to trade at par with US government debt. And yet, the theory allows us to calculate such a premium. Does this mean that the theory ignores, or assumes away, the political risk that the state will not perform the actions required to make the theory true? Does it mean that the power of finance capital over the state is such that it has no choice other than to perform those actions rather than exposing the hypocrisy of modern financial institutions about their own theoretical foundations?

The more nuanced conclusion of the new literature on financial macroeconomists discussed above is that there is indeed political risk that the US government will not be willing to swap its own bonds at par for synthetically created equivalents, but that this risk can now be defined and priced as the premium required to *obligate* the US government to honor the theoretically required equivalence of its own bonds and privately manufactured AAA securities by swapping them at par. So, if BSM and its progeny implicitly project into the private sector the sovereign power to create risk-free securities, it follows that the liquidity premium commanded by public debt measures the gap between the private financial sector's power over government and its vulnerability to paying what could be a very high premium for government backstops of private debt markets with public debt. There is, moreover, no doubt that the subsequent valuation of capital markets could sustain such a premium, since in theory it would have already been

calculated as the premium required to set a floor on that valuation.

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The central claim of this chapter has been that the premium for this liquidity provided during the Great Recession of 2008 could have been priced, and still can be, by democratic forces hoping to claim it. That premium would be valued at zero only if the option of justice is taken off the table at precisely those moments when it should be possible to command a higher premium for rolling it over.

There remains, of course, the question of when and how and to whom the premium should be paid. It might have been paid, as I have said, by crediting the public with a new financial asset matching the value of the private financial risk the public has assumed, and these offsetting positions could conceivably be settled through the same netting process that is used elsewhere in global financial markets.[61] But the notion of paying for short puts with long calls provides only the crudest outline of such a justice-based approach. Taking a more nuanced approach, the government might, for example, accept in return for its put what financial specialists call a "laddered" call—collecting different percentages of the upside at different levels of recovery. This long (bought) call could, as I've suggested, be exercisable only up to a specified index level (a "knock-out"), above a specified index level (a "knock-in"), or within a specified band (a call "spread").

If we rethink the structure of the government's long call in this way, we can also rethink the structure of the short put that government provides (sells) to capital markets. The government could, for example, sell a cheaper put by letting asset prices drop further, and then buy a cheaper call to offset it. Or it could protect only some markets and not others. Another way for government to take less upside in a market recovery would be to buy a put, rather than a call, at an exercise price that is lower than its sold put (it would then hold what is termed a "put spread"). In this scenario the government would retain a residual downside claim against those it had bailed out, and thus be able to "put back" the assets that it originally acquired at a loss for what would later become a gain relative to still-collapsing asset prices.[62] Once we identify a range of possible implementations of my approach we can see how their pricing would contingent on factors such as the level, timing and likelihood of paying off as market valuations recover. The main theoretical constraint imposed on my approach by financial macroeconomics is that the price of the call structure that government imposes on the financial sector as a

premium for the bailout should be set at par with the price of the liquidity guaranteed that government provides to support or restore asset valuations in turbulent times.

Once we know that modern options theory allows us to price macroeconomic guarantees, we can see that there is no inherent reason for present holders of wealth to receive the entire upside (or as much of it as they now do) from the liquidity put the government provided to end the Great Recession. Yet from 2007 to 2010 the US government was under almost no political pressure from an organized and militant left to demand a call on asset market recovery, or some other vehicle through which a premium for the sold put could be collected. Had there been opposition to the public bailout of financial markets, a macroeconomic call on their recovery could now have supported massive public investment in programs to reduce socioeconomic inequality. This did not happen, however, because the climate of emergency precluded the political debate over the bailout that it would have necessitated. In this context, neither the Treasury nor the Federal Reserve presented policy makers with a range of alternatives to giving Wall Street nearly everything it wanted, and thus created the impression that the policy makers had no alternatives. But, once there are known to be alternatives, it follows that advocates for greater justice should not dismiss technologies of finance merely because they notice—without any further political analysis—that the whole conceptual edifice depends on government guaranteeing the equivalence of synthetic public debt and real Treasury obligations.

This is Achilles' Heel of today's financialized capitalism and should be understood as a point of vulnerability that can be exploited to put the option of justice back on the table when its value is already rising, and, then to make it more valuable. Once this has been done, the paramount political question becomes how to redirect the cumulative benefits of unjust enrichment without destroying them in the process. Otherwise, all of the value created by bad history will have been wasted when seen from the redemptive standpoint of historical justice.

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In this chapter, my proposal for treating historical justice as an option has been based on the straightforward acknowledgement by our most eminent mainstream economists and legal thinkers that bailout of 2008 was something that *had to happen*.[63] They demonstrate that, at moments when the sudden collapse of the financial market is easily envisioned, a heightened sense that this is possible "propagates" and "amplifies" the risk that it will occur.[64] They do not, however, not directly factor into their calculations the forms of anticapitalist political action,

discussed in later chapters, that increase uncertainty about whether it will occur unless it is accompanied by greater justice. Neither do they discuss in what form the government should demand that a justice/liquidity premium be paid. The do, however, argue that it could be paid and show it its value could be calculated. This is the point of departure for my own argument in chapter 6 and 7.

This chapter has drawn on recent literature in financial macroeconomics to show that:

- Capital market illiquidity would wipe out the present benefits of past injustice. For that reason, it would be an event of revolutionary justice, as I define it, though not a form of distributive justice as defined by Rawls.

- Imposing historical justice as capital market illiquidity is a real option that distinguishes meaningful democracy from a mere technology for manufacturing consent to present inequality. This is true even, and perhaps especially, when the collapse of financial asset prices would burst a perceived financial bubble and cause a flight in credit markets to the most liquid forms of collateral, which are government bonds and cash.

- The monetary value of US government guarantees of asset markets has been calculated by leading financial macroeconomists as the price of a sold put option on aggregate credit market liquidity. In 2008 it may have exceeded $9 trillion when the US GDP $13 trillion.

- This price is equal to the premium that democracy should be able to extract for rolling over the option of justice as disaccumulation and preserving asset values in financial markets at moments of impending capital market collapse.

- It is demonstrably a price that will have *already* been paid by some (for example, the victims of government austerity) to others (for example, the beneficiaries of financial recovery) for supporting the market value of accumulated wealth.

- The price of the aggregate liquidity put is also the amount that could be harvested for purposes of funding greater justice, or at least of reducing inequality, at such moments.

- Reducing the effects of past evil in this way is thus what society *can* afford to do in precisely those circumstances in which the beneficiaries of cumulative injustice would argue that historical justice is no longer affordable and must be set aside in

favor of austerity policies. These would otherwise be circumstances in which they could be forced to pay a premium for keeping what they have.

- In such circumstances, a democratic response would be to ask: Who pays this premium, and who gets paid? Why, for example, should beneficiaries of past injustice be able to extract a price for restoring their own confidence in the market forces that preserve their wealth? Why shouldn't the historical victims of past injustice now derive some benefit from having suffered it.

The next chapter explores some possible vehicles through a significant part of the liquidity premium that might be collected by capitalism's potential gravediggers.

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[1] See, Treynor, "Economics of the Dealer Function."

[2] When the federal government takes the short side of a macroeconomic put, it offers to give away the long side to potential buyers of the asset who are presumed to be unwilling to pay upfront the cost of buying put protection for themselves. The fact that they are not expected to pay, whether in cash or by limiting their future gains, means, as we shall see, that they can expect to keep all of the upside potential of their investment with none of the downside risk.

[3] Bengt Holmström and Jean Tirole, *Inside and Outside Liquidity* (Cambridge, MA: MIT Press, 2011), esp. ch. 54. For detailed discussion of the effect of liquidity crises on asset prices, see Franklin Allen et al., eds., *Liquidity and Crises* (Oxford: Oxford University Press, 2011), esp. chs. 5, 15.

[4] I have in mind the possibility that redistributive measures, such as those attempted in the welfare state, could be redesigned, broadened and financed by describing their payoff and funding mechanisms in the language of complex derivatives that are parametrically linked to both societal and financial metrics. In the terminology of options theory, both the payouts and the funding of such programs could then be described as contingent claims that would "knock in" and "knock out" within various bands pegged to the relevant societal and financial metrics. I will sketch a few such possibilities later but alluding to them now is a way to underscore my belief that questions of historical injustice cannot be reopened in the twenty-first century without incorporating the logic of finance. For further discussion of historical justice as a claim against a fund, see Meister, *After Evil*, ch. 8.

[5] Is this a version of the Rawlsian forward-looking justice I criticize in chapter 4? If it is, my claim would be that Rawlsian justice is a *derivative* of historical justice, and that minimizing inequality has appeal only when the price of rectification is very high. I would view this as a historical compromise, and not as "the original position."

[6] I am grateful to Glenn Shafer for comments on an earlier version of this paper that helped me see that there was little point in calling justice an option if the present perpetuation of past injustice could not be continuously

priced.

[7] An apparent problem with my use of the liquidity premium as an analytical tool to price revolutionary justice is that we cannot say what the financial effect of a revolution that didn't happen would have been. Optimists who cling to the utopian hope of post-revolutionary abundance trust that the overall magnitude accumulated wealth could be preserved over the course of its redistribution. For pessimists, the real possibility that asset prices could fall to zero as a result of revolution calls forth ideals of revolutionary asceticism, based on denying that wealth that disappears before it can be redistributed was ever worth having.

   The truth is that we can't exclude the possibility that aggregate accumulated wealth would rebound under more equal social conditions if the post-revolutionary regime engages in class compromise with defeated financial elites; but neither can we exclude the possibility that the value of all pure financial asset would be wiped out if the revolution tries to call the bluff of a counter-revolutionary capital strike. Such a waste of accumulated wealth in the name of revolutionary purity (wiping out the capitalists) could not be just, in Rawls's sense, if no one benefits. For me, the problem is less a matter of a spiteful waste of existing resources, than it is of failure to harness the exponential processes through which asset values both accumulate and disaccumulate for the purpose of historical redress. To do this in the text above, I use the concept of revolution, hypothetically, to capture the present value of an option, the *inverse* of which would be the option of not destroying liquidity in the effort to advance justice. The hypothesis behind this hypothetical is that the present value of the revolutionary option is pegged to the present value of its inverse.

[8] See, e.g., Holmström and Tirole, *Inside and Outside Liquidity*, 2011; Angeletos, Collard, and Dellas, "Public Debt as Private Liquidity"; Dale F. Gray, Robert C. Merton, and Zvi Bodie, "A New Framework for Analyzing and Managing Macrofinancial Risks of an Economy," NBER Working Papers, no. 12637 (National Bureau of Economic Research, 2006); Dale F. Gray, Robert C. Merton, and Zvi Bodie, "Contingent Claims Approach to Measuring and Managing Sovereign Credit Risk," *Journal of Investment Management* 5, no. 4 (Q4 2007): 5–28; Dale Gray and Samuel Malone, *Macrofinancial Risk Analysis* (Chichester, UK: Wiley, 2008).

[9] Such potentially redistributive consequences of a bailout are sometimes suggested as allusion but never emphasized by these economists, who have no apparent wish to predict, or to create, a public backlash against the policy makers who accepted their advice to bail out capital markets.

[10] Arrow and Debreu, "Existence of an Equilibrium."

[11] Nicholas Dunbar, *Inventing Money: The Story of Long-Term Capital Management and the Legends behind It* (Chichester, UK: Wiley, 2000), 48.

[12] Tobin, "On Limiting the Domain," 23.

[13] Duncan Wigan, "Financialisation and Derivatives: Constructing an Artifice of Indifference," *Competition & Change* 13, no. 2 (June 2009): 157–72.

[14] Bengt Holmström and Jean Tirole, *Inside and Outside Liquidity* (Cambridge, MA: MIT Press, 2011), 15–18.

[15] Here we have a full assimilation of intertemporal and interspatial markets in which the pricing of fully executable contemporaneous contracts (those making up the "spot market") is exceptional. These self-terminating

transactions are contracts that will *not* be traded as securities because no element of contingency or futurity is embedded in the price. All other contracts will include a price ("premium") for optionality that will depend on the time remaining for the event that makes it exercisable to occur—or *not*—and on the degree of variance (volatility) in the underlying situation that is *currently* expected to occur during that time. It is the fluctuation in these present expectations that makes the trading of these past contracts a vehicle for continuously repricing future risks. For more on this point, see Meister, *After Evil*, chs. 8, 10 and conclusion.

[16] Robert C. Merton et al., "On a New Approach for Analyzing and Managing Macrofinancial Risks," *Financial Analysts Journal* 69, no. 2 (2013): 22–23.

[17] Ibid., 23.

[18] Mario Draghi, Francesco Giavazzi, and Robert C. Merton, "Transparency, Risk Management and International Financial Fragility," NBER Working Papers, no. 9806 (National Bureau of Economic Research, 2003), esp. 14–25. See also Merton et al., "Analyzing and Managing Macrofinancial Risks." The original framework for this analysis was developed in Merton, "Pricing of Corporate Debt," May 1974.

[19] Merton et al., "Analyzing and Managing Macrofinancial Risks," 26. "The key implication here is that the payoff function of the guarantee resembles the payoff function of a put option on the underlying assets of the borrower. For a home mortgage bond, the put option is on the value of the house; for a corporate bond, the put option is on the value of the corporate assets. For a sovereign bond, the put option is on the value of whatever sovereign assets the creditor gets claim to, including taxing power. . . . Remember, risky debt is nothing more than risk-free government debt minus a guarantee/put." Merton et al., 24.

[20] It also explains the increasing liquidity premiums paid for assets that are substitutable for cash during periods of credit rationing. Holmström and Tirole, *Inside and Outside Liquidity*, ch. 4; Douglas W. Diamond and Philip H. Dybvig, "Bank Runs, Deposit Insurance, and Liquidity," *Journal of Political Economy* 91, no. 3 (July 1983): 401–19; Douglas W. Diamond, "Liquidity, Banks, and Markets," *Journal of Political Economy* 105, no. 5 (October 1997): 928–56.

[21] Robert C. Merton et al., "On a New Approach for Analyzing and Managing Macrofinancial Risks," *Financial Analysts Journal* 69, no. 2 (April 2013): 25–26. In the more technical parts of their discussion, this "nonlinearity" is graphed as the "convexity" of options pricing—i.e., the difference between the curvature of an option contract's payoff and the "hockey-stick" payoff of a futures contract, which does not have the added value of optionality.

[22] Ibid.

[23] Ibid., 27. Italics added.

[24] Luigi Zingales, *A Capitalism for the People: Recapturing the Lost Genius of American Prosperity* (New York: Basic Books, 2012), 58–59.

[25] Ibid., 67.

[26] Ibid., 89.

[27] "Adding all sectors together, total credit market debt averaged around 150 percent of GDP between 1946 and 1970. That ratio moved up gradually to 170 percent by the end of the 1970s, but then accelerated sharply during the 1980s, ending that decade at 230 percent. The rate of debt expansion slowed during most of the 1990s but surged again from 1998. By 2007, total credit market debt to GDP had hit 360 percent." Duncan, *New Depression*, 77. See, generally, Duncan, chs. 2–3. Duncan bases his analysis on Board of Governors of the Federal Reserve System, "Flow of Funds Accounts of the United States: Flows and Outstandings," Statistical Release (Washington, Q1 2011): 60, https://www.federalreserve.gov/releases/z1/20110609/z1.pdf.

[28] Board of Governors of the Federal Reserve System (US), "All Sectors; Debt Securities and Loans; Liability, Level," FRED, Federal Reserve Bank of St. Louis, Q4 2018, https://fred.stlouisfed.org/series/TCMDO. For further discussion, see Robert Meister, "Liquidity," in *Derivatives and the Wealth of Societies*, ed. Benjamin Lee and Randy Martin (Chicago: University Of Chicago Press, 2016), 143–73.

[29] Bank for International Settlements, "OTC Derivatives Market Activity in the First Half of 2008," November 2008, 6, https://www.bis.org/publ/otc_hy0811.pdf.

[30] See Manmohan Singh and James Aitken, "The (Sizable) Role of Rehypothecation in the Shadow Banking System," IMF Working Papers, no. 10/172 (International Monetary Fund, 2010).

[31] Tobias Adrian and Adam Ashcraft, "Shadow Banking: A Review of the Literature," FRBNY Staff Reports, no. 580 (Federal Reserve Bank of New York, 2012), 4; Zoltan Pozsar et al., "Shadow Banking," *Federal Reserve Bank of New York Economic Policy Review* 19, no. 2 (December 2013): 1–16; Manmohan Singh and Zoltan Pozsar, "The Nonbank-Bank Nexus and the Shadow Banking System," IMF Working Papers, no. 11/289 (International Monetary Fund, 2011).

[32] Perry Mehrling, "Financial Globalization and the Future of the Fed," in *Keynesian Reflections: Effective Demand, Money, Finance, and Policies in the Crisis*, ed. Toshiaki Hirai, Maria Cristina Marcuzzo, and Perry Mehrling (New Delhi: Oxford University Press, 2013), 280.

[33] Hyman P. Minsky, *Can "It" Happen Again? Essays on Instability and Finance* (Armonk, NY: M. E. Sharpe, 1982), ch. 6 ("Financial Instability Revisited: The Economics of Disaster").

[34] She thus attacks our "demonetized" financial system for purporting to "liquefy any type of asset," an assertion that undermines the notion that liquidity is "an attribute of assets per se"—and specifically of state-created money—making the concept as applied to other financial assets a questionable surrogate for confidence in the "prevailing price level." For this reason, she rejects the widespread assumption that financial innovation creates more liquidity in the economy, suggesting instead that it "*decreases the liquidity of the economy*" by creating a higher demand for cash ("traditional liquid assets") in place of cash substitutes. Nesvetailova, "Crisis of Invented Money," 127, 134, 138, 146–47. Her argument that finance is "alchemy," a frequent claim in the literature, is elaborated in Anastasia Nesvetailova, *Financial Alchemy in Crisis: The Great Liquidity Illusion* (London: Pluto Press, 2010). Cf. Mervyn King, *The End of Alchemy: Money, Banking, and the Future of the Global Economy* (New York: Norton, 2016).

The point of Nesvaitalova's "financial alchemy" claim seems to be that the meaning of "liquidity" has

magically changed to describe the existence of stable markets for new financial instruments, but that these markets themselves are under the illusion that the old meaning of being "liquid" (convertible at par for cash) still obtains. But why was this an "illusion" if there is an implicit guarantee to convert these instruments at par that was actually honored? See, e.g., Thomas Ferguson and Robert Johnson, "Too Big to Bail: The 'Paulson Put,' Presidential Politics, and the Global Financial Meltdown: Part I: From Shadow Financial System to Shadow Bailout," *International Journal of Political Economy* 38, no. 1 (2009): 3–34.

[35] Morgan Ricks, *The Money Problem: Rethinking Financial Regulation* (Chicago: University of Chicago Press, 2016), 44.This implies that the premium for providing "money services" should be priced differently from a liquidity premium, and that the proliferation of highly liquid credit instruments may increase the demand for money services (currency reserves) in the banking system. He thus proposes drawing a sharp regulatory line between currency issuance and credit creation, and argues for an outright ban on the issuance of near-money (negotiable short-term credit instruments) by any entity other than a regulated bank. Ricks, *Money Problem*, 2016, pt. 1, esp. chs. 2–3.

[36] See Perry Mehrling, "Financialization and Its Discontents," *Finance and Society* 3, no. 1 (2017): 1–10; Perry Mehrling, "Essential Hybridity: A Money View of FX," *Journal of Comparative Economics* 41, no. 2 (May 2013): 355–63.

[37] This basic question has driven the development of Keynesian economics and its central concept of liquidity preference. See James Tobin, "Money, Capital, and Other Stores of Value," in *Essays in Economics: Macroeconomics* (Cambridge, MA: MIT Press, 1987), 217–28. See also Tobin's seminal essay, "Liquidity Preference as Behavior toward Risk," in *Essays in Economics: Macroeconomics* (Cambridge, MA: MIT Press, 1987), 242–71. Cf. Aglietta, *Money*, 2018.

[38] Those who are so inclined can avoid, or at least soften, this appearance by describing institutions such as the repo market using Marxist-Hegelian language: their existence converts money for itself into money in itself by providing holders of negotiable assets with a vehicle for generating funds. The token form, currency, is the signifying medium through which stored value is transmitted among persons, across space, and between times. The value of the security as a *typification* of money (money *for* itself), is parasitical on the possibility of tokenizing the security's price to satisfy the need for funds to meet the discipline of payments. Monarchs used to collect a fee, known as seigniorage, for minting coins (tokenizing assets) that could be used for purposes of payment. Today, the "haircut" taken by money market traders is the everyday price that having cash (or money in itself) commands over holding the most liquid negotiable security (which would otherwise represent money for itself).

[39] Aglietta, *Money*, 40–41.

[40] Gorton and Metrick, "Haircuts."

[41] One doesn't need to go into all the details here; the repo and reverse repo markets are well explained in Marcia Stigum and Anthony Crescenzi, *Stigum's Money Market*, 4th ed. (New York: McGraw-Hill, 2007). The central point is that one doesn't *need* collateral (security) if one *has* funds, but that even the safest (most liquid)

collateral (AAA US Treasury obligations) is not pledgeable dollar-for-dollar as a source of short-term funds. There is always a haircut requiring one to pledge in the present value of a Treasury more than can be borrowed against it in dollars. See Adrian and Ashcraft, "Shadow Banking"; Pozsar et al., "Shadow Banking"; Emmanuel Farhi and Jean Tirole, "Shadow Banking and the Four Pillars of Traditional Financial Intermediation," NBER Working Papers, no. 23930 (National Bureau of Economic Research, 2017).

[42] See www.rethinkingcapitalism.ucsc.edu. I am grateful to Stephen Bruce for funding the Bruce Initiative at UCSC, and to the Institute for Public Knowledge's project on "Cultures of Finance" at NYU.

[43] As noted above, debt-cycle theorists in the Minskyan tradition, such as Nesvaitolova, argue that financial innovations like these reduce liquidity by creating shortages of truly safe financial assets (stores of value) when they are most needed. See, e.g., Anastasia Nesvetailova, "Hyman Minsky and the Credit Crisis: How Much Do Regulators Know about Today's Finance?" *Credit* 9 (April 2008): 26; Anastasia Nesvetailova, "Beyond the Political Economy of Hyman Minsky: What Financial Innovation Means Today," in *Financial Crisis, Labour Markets and Institutions*, ed. Sebastiano Fadda and Pasquale Tridico (Milton Park, UK: Routledge, 2013), 60–78. Although such a Minskyan perspective on debt cycles is useful as a counterbalance to some of the hype surrounding modern finance theory, my analysis in this article suggests a more strongly political interpretation of the 2008 bailout.

[44] MacKenzie, *An Engine, Not a Camera*.

[45] My view thus differs from MacKenzie's performativity thesis because the putative erasure of differential liquidity—the closure of liquidity spreads—that can come about by performing BSM (in MacKenzie's sense) presupposes the continuing validity of a *distinction* between the added liquidity that is thus produced and the liquidity of completely safe assets that can always be collateralized to get cash. These are, by definition, government-issued bonds that in addition to financing public expenditure secure the funds—the money—on which the discipline of payments in private capital markets is ultimately based.

[46] Pozsar, "Institutional Cash Pools and the Triffin Dilemma of the U.S. Banking System"; Pozsar et al., "Shadow Banking."

[47] James Felkerson, "$29,000,000,000,000: A Detailed Look at the Fed's Bailout by Funding Facility and Recipient" (Annandale-on-Hudson, NY: Levy Economics Institute, December 2011), 29–31, http://www.levyinstitute.org/pubs/wp_698.pdf.

[48] Ibid., 10–13.

[49] Felkerson, "$29,000,000,000,000."

[50] Ibid., 13–15.

[51] Felkerson, "$29,000,000,000,000," 28–30; Tooze, *Crashed*, 285.

[52] For a broad summary of the Fed's liquidity support programs, see Tooze, *Crashed*, 206–10. For an account of TARP's eventual transformation for an asset purchase program to a recapitalization of the banks see pp. 179–84, 196–99.

[53] Abba P. Lerner, "Functional Finance and the Federal Debt," *Social Research* 10, no. 1 (February 1943): 38–51; L. Randall Wray, *Modern Money Theory: A Primer on Macroeconomics for Sovereign Monetary Systems* (Houndmills, Basingstoke, Hampshire, UK, and New York: Palgrave Macmillan, 2012).

[54] Daniela Gabor, "The (Impossible) Repo Trinity: The Political Economy of Repo Markets," *Review of International Political Economy* 23, no. 6 (2016): 967–1000; Perry Mehrling et al., "Bagehot Was a Shadow Banker: Shadow Banking, Central Banking, and the Future of Global Finance," in *Shadow Banking within and across National Borders*, World Scientific Studies in International Economics, vol. 40 (Hackensack, NJ, and London: World Scientific, 2015), 81–97.

[55] Gabor, "The (Impossible) Repo Trinity," 969–70.

[56] Ibid., 974, 981–82.

[57] Ibid., 988 [citations omitted].

[58] Ibid., 993.

[59] Ibid., 971.

[60] Mehrling et al., "Bagehot Was a Shadow Banker"; Perry Mehrling, *The New Lombard Street: How the Fed Became the Dealer of Last Resort* (Princeton, NJ: Princeton University Press, 2011), http://ebookcentral.proquest.com/lib/uchicago/detail.action?docID=597862.

[61] Annelise Riles, *Collateral Knowledge: Legal Reasoning in the Global Financial Markets* (Chicago: University of Chicago Press, 2011).

[62] There are still many details to be worked out after adopting the basic conservation principle that the premiums for long and short macroeconomic positions must be equated. The first type of detail has to do with the index of recovery to which the government's call is tied. Should it be a bond or money market volatility index, a broader equity or asset price index, or an index, perhaps custom designed, on a macroeconomic spread? Then there is the question of which accounts are liable for settlement of the call: Which financial institutions or sectors would be considered to "short" the recovery to the extent that their underlying collateral was guaranteed by the state? They should be among the principal counterparties to the government's long call.

[63] "Financial markets exhibit dynamics that frequently put them in direct tension with commitments enshrined in law of contracts. This is the case especially in times of financial crisis when the full enforcement of legal commitments would result in the self-destruction of the financial system. This law-finance paradox tends to be resolved by suspending the full force of law where the survival of the system is at stake." Katharina Pistor, "A Legal Theory of Finance," *Journal of Comparative Economics* 41, no. 2 (May 2013): 315–30; Eric A. Posner, *Last Resort: The Financial Crisis and the Future of Bailouts* (Chicago: University of Chicago Press, 2018).

[64] Robert C. Merton et al., "On a New Approach for Analyzing and Managing Macrofinancial Risks," *Financial Analysts Journal* 69, no. 2 (April 2013): 22–33.