

2 of 6 DOCUMENTS

The Independent Review

Spring 2010

## Central Banks as Sources of Financial Instability

**BYLINE:** Selgin, George.

George Selgin is a senior fellow at the **Cato Institute**, professor of economics at the University of Georgia, and the author of the Independent Institute book *Good Money: Birmingham Button Makers, the Royal Mint, and the Beginnings of Modern Coinage, 1775-1821*.

**SECTION:** Pg. 485 Vol. 14 No. 4 ISSN: 1086-1653

**LENGTH:** 5325 words

### ABSTRACT

The present financial crisis has set in bold relief the Jekyll and Hyde nature of contemporary central banks. It has made apparent both people's utter dependence on such banks as instruments for assuring the continuous flow of credit in the aftermath of a financial bust and the same institutions' capacity to fuel the financial booms that make severe busts possible in the first place. The author proposes to challenge this conventional treatment of central banking by arguing that central banks are fundamentally destabilizing -- that financial systems are more unstable with them than they would be without them. To make this argument, he must delve into the history of central banking and explain both why governments favored the establishment of destabilizing institutions in the first place and why there is the modern tendency to regard central banks as sources of financial stability.

### FULL TEXT

The present financial crisis has set in bold relief the Jekyll and Hyde nature of contemporary central banks. It has made apparent both our utter dependence on such banks as instruments for assuring the continuous flow of credit in the aftermath of a financial bust and the same institutions' capacity to fuel the financial booms that make severe busts possible in the first place.

Yet theoretical treatments of central banking place almost exclusive emphasis on its stabilizing capacity - that is, on central banks' role in managing the growth of national monetary aggregates and in supplying last-resort loans to troubled financial (and sometimes nonfinancial) firms in times of financial distress. This one-sided treatment of central banking reflects both the normative nature of much theoretical work on the subject - that is, its tendency to focus on ideal rather than actual central-bank conduct - and the (usually tacit) assumption that however much central banks might depart in practice from ideal, financially stabilizing policies, they at least succeed in limiting the amplitude of booms and busts, compared to what would occur in the absence of centralized monetary control.

I propose to challenge this conventional treatment of central banking by arguing that central banks are fundamentally destabilizing - that financial systems are more unstable with them than they would be without them. To make this argument, I

must delve into the history of central banking and explain both why governments favored the establishment of destabilizing institutions in the first place and why there is the modern tendency to regard central banks as sources of financial stability. I hope to show that the modern view of central banks as sources of monetary stability is in essence a historical myth.

### The Origins of Central Banking

An objective understanding of the macroeconomic and financial consequences of central banking requires, first of all, a value-free definition of the term central bank - that is, a definition that does not presuppose any particular sort of conduct, whether beneficial or malign. Common textbook definitions of central banks as institutions devoted to combating inflation, dampening business cycles, and serving as lenders of last resort must thus be rejected both because they involve a tacit counterfactual whose validity is open to doubt and because they are flagrantly inconsistent with the actual conduct of many real-world central banks.

So what, really, is a central bank? It is fundamentally a bank that possesses a national monopoly or something approaching a national monopoly of the right to issue circulating paper currency. Although outright monopolies are most common today, in a few instances - for example, in the United Kingdom, Ireland, and China - other (commercial) banks also enjoy highly circumscribed currency-issuing privileges.

The privilege of issuing paper currency was not always so limited, however. On the contrary, it was once enjoyed by practically all banks, which depended on it as a means of extending credit when the custom of transferring deposits by means of checks was not yet developed. Although the earliest central banks began as "public" banks that typically enjoyed a monopoly of the banking business of their sponsoring governments only, while sharing with other banks at least to a limited extent the right to issue currency, they gradually acquired currency monopolies as well. Indeed, the transition to central banking in its modern guise tended to follow public banks' consolidation of currency-issuing privileges, for reasons to be made clear in due course.

Nevertheless, the first steps toward modern currency monopolies long predated modern notions of central banking with their emphasis on central banks' stabilizing role. Instead, the public banks that later became full-fledged central banks were established solely for the purpose of catering to their sponsoring governments' fiscal needs - by managing their deposits, administering their debt, and, especially, accommodating their short-run credit needs. Despite their close relationships with the national governments that helped to establish them, these protocentral banks were profit-maximizing firms, and as such they were managed solely in their owners' interest rather than in the interest of the broader financial community. The notion that public banks' privileges obliged them to promote general economic stability came only in the aftermath of numerous financial crises - crises that, I intend to show, the public banks themselves helped to bring about.

Although the Bank of England was not the first major public bank (the Swedish Riksbank preceded it by a quarter-century), it was to become the prototype "modern" central bank, having been the earliest to acknowledge, at first tacitly and grudgingly but at length officially, its duty to rescue other financial firms by serving as a lender of last resort during periods of financial distress. The Bank of England's fiscal origins and its founders' corresponding unconcern for any broad macroeconomic consequences its creation might entail are evident in the 1694 "Tonnage" Act (5 and 6 Will. & Mar. c 20) granting it its original charter, an act "for securing certain Recompences and Advantages ... to such persons as shall voluntarily advance the sum of Fifteen hundred thousand Pounds towards carrying on the War against France." Other early central banks had similar beginnings. Napoleon

established the Bank of France, for example, for the express purpose of buying up French government securities, for which there was no other market at the time; and Germany's Reichsbank, predecessor of the present Bundesbank, grew out of the former Royal Bank of Berlin, founded by Frederick the Great for the purpose of managing the funds of the Prussian state. Yet the fiscal origins of early-modern central banks are often overlooked, especially by their proponents, including central bankers themselves.<sup>1</sup>

The fact that the first central banks evolved from public banks established for purely fiscal reasons suggests that any stabilizing potential they harbored was unanticipated by their founders. That fact might simply mean that by a sheer stroke of good luck, institutions originally designed to serve governments' narrow fiscal ends just happened to be ideally suited, given appropriate constitutional modifications, for scientific crisis management. I argue, however, that the public banks themselves were sources of instability and that their vaunted stabilizing potential was at bottom little more than a potential for self-discipline - a rather limited one at that.

#### The "Principle of Adverse Clearings"

To explore the possibility that central banks' unique privileges may themselves have contributed to financial instability, we must consider precisely how these privileges alter the scope for credit expansion. Doing so requires that we consider the limits to such expansion in a competitive or "free" banking system, meaning one in which numerous banks enjoy equal rights to issue their own distinct brands of circulating notes.<sup>2</sup> In keeping with circumstances surrounding the early development of central banking, I assume that banks, whether enjoying exclusive privileges or not, are obliged to redeem their notes on demand in specie - that is, in gold or silver coin.

In a free banking system, banks treat rival banks' notes much as they treat checks drawn on rival banks today: they routinely return them to their sources for redemption. Indeed, the modern practice of "clearing" checks daily, with net dues settled by transfer of base money, usually on a central bank's books, grew out of the pre-centralbanking practice of regular note exchange, with banks returning rivals' notes directly to them or to central clearinghouses and settling accounts in specie.

This routine note-exchange and settlement process imposes strict limits on credit expansion by individual note-issuing banks and, hence, by the banking system as a whole, creating a tight connection between those limits and the available supply of specie reserves. Domestic monetary equilibrium in such a system can be understood as a state in which individual banks' lending policies are consistent with zero long-run or expected net-reserve drains, and bank reserve ratios just suffice to guarantee an optimally low probability of default owing to random variations of netreserve drains around their zero mean. Starting from such an equilibrium and assuming an unchanging demand for money balances, any bank that further expands its balance sheet independently of its rivals will face a corresponding absolute and relative increase in the return flow of its notes (or checks) through the clearing system and a corresponding net loss of reserves, which will leave it with an inadequate reserve cover, if it does not default outright. Banks in a free banking system may thus be likened to prisoners in a chain gang: escape is impossible for any single prisoner acting alone and especially for the group as a whole because of the difficulty its members will encounter in trying to coordinate their steps. The greater the size of the gang, the more difficult escape becomes.

I have referred elsewhere (Selgin 1988) to this competitive check against overissuance of bank money as the "principle of adverse clearings." Because of it, the total volume of money and credit in a free banking system cannot easily expand

beyond limits consistent with a stable overall volume of payments. Once banks have expanded to the point at which their reserve cushions have fallen to some minimal, prudent level, they can expand further only if the demand to hold their notes or deposits increases - that is, if the value of the flow of their outstanding liabilities through the clearing system, whether notes or checks drawn against deposits, declines.

Thus, for the system as a whole, if we assume that all payments are conducted with bank money rather than with specie itself, the demand for (precautionary) reserves can be understood as increasing, though perhaps less than proportionately, with the volume of payments,  $MV$ , where  $M$  is the stock of bank liabilities, including outstanding notes and demand deposits, and  $V$  is the velocity of circulation of that stock, or its rate of turnover. It follows that for any given domestic stock (supply) of specie reserves and real rate of interest (the latter influencing the demand for precautionary reserves), there will be a unique level of spending,  $(MV)^*$ , at which reserve demand and supply ( $RD$  and  $R_s$ ) are equal. Should a change in the public's demand for real money balances, as manifested in a change in  $V$ , result in a level of spending no longer consistent with such an equilibrium, the banks will respond by expanding or contracting credit until equilibrium is restored. Specifically, an increase in  $V$ , for example, will result in an excess demand for reserves, prompting banks to reduce their lending and thereby to reduce their outstanding liabilities, whereas a decline in  $V$  will have the opposite effect. These implications of the principle of adverse clearings are summarized in figure 1.3

The tendency of a free-banking system to stabilize total spending has the obvious macroeconomic advantages of helping to maintain "natural" values of employment, interest rates, and real output. It also serves to prevent changes in the general price level except in connection with shifts in an economy's long-run supply schedule.

#### International Monetary Equilibrium

This "tight" nature of domestic monetary equilibrium under free banking also has implications for the preservation of international monetary equilibrium. In the context of an international specie standard - let us say gold - the condition for such an equilibrium, that of "purchasing power parity," implies that a given sum of gold bullion should purchase approximately the same bundle of tradable goods in all gold-standard countries: "approximately" because prices can differ persistently by amounts that reflect the costs of importing goods from abroad, including transport costs and duties. Should the bundle's price in any one country vary from its price elsewhere beyond upper and lower boundaries known as "gold points," consistent with the aforementioned costs, the difference will cause more goods to be imported into and fewer to be exported from the country where prices are higher, with gold flows serving to finance the increased trade deficit. This Humean "price-specie-flow" mechanism will eventually restore purchasing power parity by promoting, on the one hand, monetary contraction in the country where goods are more expensive and, on the other, monetary expansion where goods have been less expensive.

A virtue of free banking is that it limits the occasions in which the Humean mechanism must operate by checking a domestic overexpansion of money and credit before it has a chance to drive domestic prices higher than their values consistent with the international purchasing power equilibrium. That this virtue is considerable will become apparent when we examine the workings of a central-banking system, where the preservation of international monetary equilibrium is far more likely to depend on long-run corrections based on international specie movements. International gold flows would of course still occur even in a world with only national free banking systems: national shares of the world supply of gold reserves would alter for reasons analogous to those that can alter individual banks' market shares within a particular country. But such flows would not be evidence of a prior

substantial disturbance of international equilibrium brought about by the arbitrary overexpansion of credit in any one nation.

#### Central Banks: Pied Pipers of Credit

What happens if instead of allowing all or at least many banks to issue circulating notes, that privilege is granted to a single bank? For domestic exchanges, paper notes are generally more convenient than gold and silver coins, and so the notes will typically be preferred to the coins. Banks that are denied the right to issue their own notes will consequently stock and reissue notes from the privileged bank. They themselves will, in other words, tend to treat those notes as a superior substitute for specie reserves. Two important consequences follow from this fact: first, the lessprivileged (henceforth "commercial") banks will tend to send their specie to the privileged (henceforth "central") bank, which will consequently become the sole custodian of the nation's specie reserves. Second, the central bank will be exempt from the principle of adverse clearings. The central bank therefore can operate on a very slim cushion of specie reserves, with a correspondingly greater "leveraging" of central-bank capital. It will also be able to expand credit and thereby increase the effective supply of commercial banks' reserves without having to fear any immediate internal drain of precious metal from its own coffers.

These last observations account for the perceived fiscal advantages of central banking and thus for government's ability to secure generous fiscal support from central banks in return for the monopoly rights granted to them. These fiscal advantages, however, come at the cost of greater potential macroeconomic and financial instability because the privileges on which they are based also make it far more likely that domestic credit expansion will proceed beyond sustainable limits, with equilibrium being restored in the long run by means of an external drain of specie. In other words, central banking set the stage for the "classical" nineteenth-century business cycle.

To see this connection, imagine a "typical" central bank of the early nineteenth century, pressed by its sponsoring government to supply the government with additional credits. Because the central bank is exempt from adverse clearings, it has no certain way of ascertaining in the short run when it has expanded too far. If it only rarely faced unexpected (if modest) changes in the balance of payments, it might even be tempted to lend its entire specie reserve. Nor can it easily determine whether domestic prices are approaching levels that must trigger an external drain of specie because available price statistics, both domestic and international, are limited and crude and because a general discrepancy may not be apparent in price indexes constructed for any particular goods "bundle."

Although commercial banks themselves remain constrained like so many members of a chain gang, the central bank's own exemption from adverse clearings allows it to lead them all, Pied Piper fashion, in a general overexpansion by adding to the aggregate, effective supply of commercial banks' reserves. Figure 1 shows that as the central bank expands, the reserve-supply schedule shifts to the right, and the equilibrium volume of aggregate spending (MV) increases accordingly. If given aggregate (goods) supply schedules are assumed, prices will be bid up, eventually triggering an external drain of specie from the central bank. The central bank consequently finds itself in danger of imminent default and proceeds to save itself by aggressively contracting credit. The contraction reduces commercial banks' reserves, forcing them to contract as well and thus triggering a general credit crunch.

From Villains to Heroes: The Origins of the Classical Lender of Last Resort

If central banks are in fact sources of financial instability, how have they

come to be regarded as just the opposite? The explanation resides partly in modern economists' limited understanding of the workings of competitive currency arrangements, which causes them to assume that such arrangements must necessarily be less stable (because less subject to central "control") than monopolistic ones, and partly in their failure to appreciate the origins of the idea that monetary systems require a "lender of last resort."

The Bank of England was the first central bank to assume the role of last-resort lender. During the crises of 1857 and 1866, it did so informally and reluctantly; at length, however, under public pressure it came to acknowledge a duty to rescue other banks threatened by cash shortages, though otherwise solvent.

The chief architect of this newfound understanding was Walter Bagehot, best known today as the second and most illustrious editor of *The Economist*. In *Lombard Street* (1873), Bagehot outlined what is now known as the "classical" lender-of-last-resort doctrine, according to which central banks, during times of financial distress, ought to continue to lend freely, though at "penalty" rates aimed at attracting capital from abroad and at discouraging borrowing by insolvent (as opposed to merely illiquid) banks.

Although many economists are aware of Bagehot's role in developing the modern lender-of-last-resort doctrine, few appreciate his position as one of the foremost critics of central banking. Indeed, some even imagine that Bagehot, in recommending that the Bank of England be held responsible for last-resort lending, actually meant to endorse its monopoly privileges and (at least implicitly) to recommend that all nations create similar institutions. In fact, as even a casual perusal of *Lombard Street* will attest, nothing can be farther from the truth. On the contrary, Bagehot believed that central banks were financially destabilizing and hence undesirable institutions and that it would have been far better had England never created one. He offered his lender-of-last-resort formula not as an ideal, but as a first aid to what was, in his view, a fundamentally unhealthy arrangement, the healthy alternative to which was free banking, with numerous banks issuing their own notes and maintaining their own reserves, as in the pre-1845 Scottish banking system.<sup>4</sup> England needed a lender of last resort not to rescue it from crises inherent in competitive banking, but to limit the severity of crises that were inevitable consequences of the monopolization of currency. Here is Bagehot's own apology from the closing pages of *Lombard Street*:

I know it will be said that in this work I have pointed out a deep malady, and only suggested a superficial remedy. I have tediously insisted that the natural system of banking is that of many banks keeping their own cash [i.e., specie] reserve, with the penalty of failure before them if they neglect it. I have shown that our system is that of a single bank keeping the whole reserve under no effectual penalty of failure. And yet I propose to retain that system, and only attempt to mend and palliate it.

I can only reply that I propose to retain this system because I am quite sure that it is of no manner of use proposing to alter it. . . . You might as well, or better, try to alter the English monarchy and substitute a republic. (1873, 329)

Today, indeed, it appears that a proposal to do away with the English monarchy would meet with far less opposition than one to do away with the Bank of England's monopoly of paper currency!

Despite Bagehot's explicit disavowal of the Bank of England, posterity has managed to treat him not as an opponent of central banking, but rather as one of its high priests - a fate that must surely have him spinning furiously in his grave. Thus, generations of monetary economists have been taught, quite wrongly in my opinion, that central banks are absolutely indispensable tools for financial

stabilization. Yet central bankers themselves, having thus come to be lionized, do little justice to the man who was their (admittedly inadvertent) champion, honoring his "last-resort" lending rules mainly in the breach.

#### The U.S. Case

According to my stylized history of central banking, the concentration of currency-issuing privileges in favored public banks was an important cause of financial crises, which then supplied a rationale for reinforcing and enhancing public banks' monopoly privileges while forcing them to acknowledge a public duty to serve as last-resort lenders.

However, financial crises have not been limited to those nations in which currency-issuing privileges are concentrated in a single bank. The United States, in particular, endured a series of severe crises - in 1873, 1884, 1893, and 1907 - prior to its decision to embrace central banking in the form of the Federal Reserve System, which was created in 1913. The U.S. case therefore appears to contradict my claim that central banks are properly regarded as destabilizing rather than stabilizing institutions.

The contradiction, however, is more apparent than real. First, by almost any measure, the major financial crises of the Federal Reserve era - those of 1920-21, 1929-33, 1937-38, 1980-82, and 2007-2009 most recently- have been more rather than less severe than those experienced between the Civil War and World War I, even overlooking outbreaks of relatively severe inflation from 1917 to 1920 and from 1973 to 1980. More important, the pre-Fed crises can themselves be shown to have been exacerbated, if not caused, by regulations originally aimed at easing the Union government's fiscal burden. The U.S. case therefore represents a special instance of the general pattern according to which central banking emerged as an unintended by-product of fiscally motivated government interference with the free development of national financial institutions.

The interference in the U.S. case consisted, in part, of Civil War legislation that limited commercial banks' ability to issue their own banknotes.' National banks were allowed to issue their own notes only if every dollar of such notes was backed by \$1.10 in federal government bonds, and state-chartered banks were forced to withdraw altogether from the currency business by a prohibitive tax assessed against their outstanding circulation beginning in August 1866. The result of these combined regulations was an aggregate stock of paper currency geared to the available supply of government securities. From the late 1870s onward, as the government took advantage of regular budget surpluses to reduce its outstanding debt, the supply of eligible backing for national banknotes dwindled, and the total stock of such notes also dwindled until, by 1891, the latter stock was only half as great in value terms as it had been a decade earlier. Regulations also prevented the stock of currency from adjusting along with seasonal increases in currency demand. Yet the U.S. economy was growing, and the seasonal demand for currency tended to rise sharply during the harvest season - that is, between August and November of each year. In the circumstances, it is hardly surprising that the United States endured frequent crises and that they all involved more or less severe shortages of paper currency.

Canada's experience, in contrast, gives the lie to the claim that the United States could put an end to crises only by means of more complete centralization of its currency system. Canadian banks, unlike their U.S. counterparts, were free to issue notes on the same general assets that supported their deposit liabilities. They were as a result perfectly capable of accommodating both secular and seasonal changes in the demand for currency. Figure 2 displays the course of Canada's well-behaved banknote currency, regulated solely by unfettered market forces, alongside the course of regulation-bound national banknotes in the United States for the years from 1880 to 1900. To anyone the least bit conversant with patterns of

currency demand, the superiority of the less-regulated arrangement ought to be obvious. If we consider both Canada's highly successful arrangement, which avoided all of the antebellum crises to which the U.S. economy had been subject, and the Fed's own performance, to characterize the U.S. turn to central banking in 1913 as a "second best" solution is perhaps being overly generous.<sup>6</sup>

#### The Path to Fiat Money

Understood as a means for preventing crises and preserving the international gold standard, Bagehot's lender-of-last-resort solution was a failure. Crises continued and even worsened, in part because the rules for last-resort lending were often disobeyed, but also because such lending alone could limit but not eliminate violent changes in credit conditions and associated disruptions of gold payments that stemmed from prior central-bank misconduct. It eventually became evident that the international gold standard and central banking were incompatible arrangements, one of which had to go (Redish 1993).

The dismantlement of the international gold standard, temporarily at the outbreak of World War I and permanently in the course of the Great Depression, marked the end of "classical" financial crises: no longer was there a Humean price-specieflow mechanism to snap back to equilibrium the national monetary systems that had temporarily escaped beyond the mechanism's confines. Fiat money instead allowed central banks to expand without any clear constraints, on a permanent basis and with impunity, though at the cost of persistent inflation. Yet these new circumstances did not bring an end to financial crises or even reduce their severity. They merely altered the nature of crises. The former Humean denouement, in which central banks were forced to retrench by an external drain of reserves, was replaced by a more subtle turning-point mechanism consisting of the tendency of factor prices, caught behind other prices during booms, to catch up, thus raising interest rates, eliminating inflation-based profits, and exposing and bursting related asset-price bubbles. Such "postclassical" crises are today no less frequent than their classical counterparts were during the nineteenth century, and they are equally attributable to central banks' mismanagement of money.

Although the advent of that money has not rendered central banks any less capable of generating booms and busts, it has considerably complicated the possibility of fundamental reform because a fiat standard, unlike a gold or silver standard, must be monopolistically administered if it is to retain any value, and because allowing commercial banks the right to issue notes that are themselves redeemable in fiat money, whatever advantages such a policy may have, will not by itself deprive the fiat-money-issuing authority of its crisis-making capacity.

It is important that people recognize the route by which we came to the present impasse so that they might shed their essentially romantic notion of central banking and instead approach it, as Walter Bagehot once did, as a fundamentally dangerous institution - one still more in need of confinement and taming than it was in Bagehot's own day.

#### FOOTNOTE

1. The Bank of France Web site, for instance, says that Napoleon established the bank "to foster renewed economic growth in the wake of the deep recession of the Revolutionary Period"! For a review of the origins of central banking in western Europe and the United States, see Smith 1936.

2. Strictly speaking, a "free" banking system, to use the expression in its European sense, is one in which banks are generally free from restrictive regulations, not simply free to issue their own notes. But the implications of free and competitive note issue in particular concern us here.



**FOOTNOTE**

3. For details, see Selgin 1988, 37-85, 1994, and 2001, the last of which considers the possibility of a coordinated overexpansion.

**FOOTNOTE**

4. The thoughtless extension of Peel's act to Scotland in 1845 began a process of currency centralization there that is as yet still incomplete. On the Scottish system in its free-banking heyday, see White 2009.

**FOOTNOTE**

5. Among other forms of interference, the most notorious consisted of state governments' erection of barriers to branch banking, which, by generally preventing branching both within and across state lines, gave rise to an exceedingly decentralized, undercapitalized, and underdiversified banking industry and forced "country" banks to rely on correspondents for access to the New York money market. This arrangement caused specie reserves to become concentrated in New York, much as they tended to be concentrated in privileged banks of issue elsewhere, with a similar tendency toward the excessive "pyramiding" of credit on available specie reserves during booms and corresponding disruptive contraction during busts.

**FOOTNOTE**

6. For details, see Breckenridge 1895. Although numerous legislative attempts were made, mainly between 1893 and 1907, to reform the U.S. currency system along Canadian ("asset currency") lines, all of them failed owing in large part to reformers' (well-founded) belief that asset currency would have to be combined with branch banking if it was to be sufficiently "elastic." Established unit bankers for this reason aggressively and successfully opposed these proposals. It was only following the failed efforts to deregulate the U.S. currency system that reformers began to champion a "central reserve bank" alternative.

**LOAD-DATE:** April 1, 2010

**LANGUAGE:** ENGLISH

**ACC-NO:** 66609

**BIBLIOGRAPHY:** References

Bagehot, Walter. 1873. *Lombard Street: A Description of the Money Market*. London: Henry S. King.

Breckenridge, Roelift M. 1895. *The Banking System of Canada 1817-1890*. New York: MacMillan.

Redish, Angela. 1993. *Anchors Aweigh: The Transition from Commodity Money to Fiat Money in Western Economies*. *Canadian Journal of Economics* 26, no. 4: 777-95.

Selgin, George. 1988. *The Theory of Free Banking: Money Supply under Competitive Note Issue*. Totowa, N.J.: Rowman and Littlefield.

\_\_\_\_\_. 1994. *Free Banking and Monetary Control*. *Economic Journal* 104, no. 427:

1449-59.

\_\_\_\_\_. 2001. In-Concert Overexpansion and the Precautionary Demand for Bank Reserves. *Journal of Money, Credit, and Banking* 33, no. 2: 294-300.

Smith, Vera. 1936. *The Rationale of Central Banking*. London: P. S. King & Son.

White, Lawrence H. 2009. *Free Banking in Britain: Theory, Experience, and Debate 1800-1845*. 2nd ed. London: Institute of Economic Affairs.

Acknowledgments: This article is based on a lecture given at the conference "Free Currency: The Future of Money," sponsored by the Friedrich von Naumann Institute, Potsdam, Germany, April 24, 2009.

**GRAPHIC:** References

IMAGE GRAPH, Figure 1, Reserve and Spending Equilibrium under Free Banking

IMAGE GRAPH, Figure 2, National and Canadian Banknotes Outstanding, 1880-1900

**DOCUMENT-TYPE:** Feature

**PUBLICATION-TYPE:** Magazine

**JOURNAL-CODE:** NDRV

Copyright 2010 ProQuest Information and Learning  
All Rights Reserved  
Copyright 2010 Independent Institute