



OXFORD JOURNALS
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Source: *Cambridge Journal of Economics*, November 2004, Vol. 28, No. 6 (November 2004), pp. 903-919

Published by: Oxford University Press

Stable URL: <https://www.jstor.org/stable/23602149>

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Free banking and the stability of early joint-stock banking

C. R. Hickson and J. D. Turner*

Proponents of free banking argue that systems adopting their policies will be stable. In this paper, we present evidence suggesting that, in general, early joint-stock banking systems did not adopt free banking, and those that did proved to be unstable. In particular, we demonstrate that those systems imposing regulations were generally stable. We rationalise the success of regulation as a pragmatic solution to the time-inconsistency problem arising from the peculiar nature of the banking firm. Notably, we find that the 'golden age' of free banking stability can be attributed to restrictions on the organisational form of the early banking firm.

Key words: Free banking, Bank regulation, Banking stability, Limited liability
JEL classifications: G18, G21, G28, N20

1. Introduction

The free banking school arose out of the monetary controversy which preceded the Bank Charter Act of 1844 (White, 1995); but as the school lost the policy debate, its influence subsequently waned. However, partially in response to the recent deregulatory trend in banking, there is renewed interest in free banking policy proposals.¹ Although free bankers have been described as 'a small fringe sect of academic economists' (Goodhart, 1994, p. 413), their controversial views provoke an ongoing policy debate. Selgin and White (1994, p. 1718), two of the main free banking proponents, argue that the study of free banking is important if for no other reason than it provides a benchmark which can be used to evaluate current monetary and banking systems. These authors define a free banking system as one in which there is no government intervention with respect to the quantity of media, no legal barriers to entry or branching, no restrictions on assets, liabilities or capital of banks, no interest rate controls, no central bank and no deposit guarantees (Selgin and White, 1994, p. 1718).

As all sides to the free banking debate recognise, the crux of the free banking debate centres on whether such systems tend to be stable (Dow, 1996; Goodhart, 1994, p. 411;

Manuscript received 10 December 2001; final version received 15 October 2002.

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*School of Management and Economics, Queen's University of Belfast. This paper and related work has benefited from comments by anonymous referees, discussions with Sheila Dow and Larry White, comments from participants at the MMF Conference (Oxford, 1999) and suggestions from participants at a Queen's University seminar series. All remaining errors are the authors' own.

¹ Recent contributions to the free banking debate include Dowd (1996), Glasner (1989), Selgin (1988) and White (1989A, 1995, 1999).

White, 1995). Even though free banking proponents concede that economic theory has not yet yielded decisive arguments for or against the stability of free banking, they believe that their policies will in fact produce stability (Selgin and White, 1994, p. 1744). Thus, they typically appeal to historical examples of free banking (Schuler, 1992A; Selgin and White, 1994). Yet as Dow and Smithin (1999, p. 85) point out, there are no clear-cut historical cases of free banking uncontaminated by some degree of government intervention. As a consequence, free banking authors are forced to countenance systems constrained by some banking restrictions, e.g., Schuler (1992A).

We contribute to the stability debate by demonstrating that stable early joint-stock banking systems were typically characterised by constraints on over-issue and investments in overly risky assets. We also find that those systems lacking these particular controls invariably experienced a significant banking crisis, which we define as the failure of a large bank or a substantial proportion of banks followed by runs on other banks. A government bailout of large banks or a substantial proportion of banks in order to prevent failure is also considered as a banking crisis under our definition. In addition, we discuss why, in some countries, early banking systems, despite being relatively free banking in nature, were also stable. We attribute this stability to the particular contractual form of the banking firm which prevailed in those economies.

Our sample of countries includes the most financially advanced economies of the period—all the major European economies, Argentina, the three North American economies as well as the banking systems of Australia and Japan, both of which were based on Anglo-Saxon banking systems.¹ The sample period contained in Tables 1 and 2 in each case begins with the introduction of limited liability joint-stock banking and extends to just before the introduction of a comprehensive regulatory model. We identify the emergence of a comprehensive regulatory model with the advent of a lender of last resort function, generally provided by a central bank. Since some banking systems were well developed before the emergence of limited liability joint-stock banking, we include the most important of these early systems in Table 4. In each case, we begin with the emergence of private fractional reserve banks, and we conclude when the adoption of limited liability was freely permitted or when a comprehensive regulatory model was introduced.²

This paper is organised as follows: in the next section we use standard economic theory to argue that the banking firm, operating in a free banking environment, suffers from a time-inconsistency problem. In the following section, we examine the stability of early limited liability joint-stock banking systems and their associated regulatory environment. The penultimate section examines the 'golden age' of free banking. We argue that its success may be due to the restricted contractual form available to the banking firm. The final section contains some brief conclusions.

2. The time-inconsistency problem and the stability of free banking

The focus of this section is to examine the ability of free banking models to solve the time-inconsistency problem under different ownership rules. To begin with, we consider

¹ Notably, our list includes all the major economies in Schuler's (1992A) free banking study. Unfortunately, owing to space constraints, we do not include the numerous and heterogeneous antebellum banking systems of the US. However, Selgin and White (1994, p. 1731) describe these systems as being extensively regulated, and therefore not good examples of free banking. For a recent study on the history of antebellum banking, see Bodenhorn (2000).

² The end date selected for the British Isles is 1844/45, which saw the introduction of the Peel Act. This legislation eventually led to the Bank of England's monopoly of the note issue and adoption of its lender of last resort role.

Table 1. *Notable examples of laissez-faire limited liability banking systems in the 19th century*

Country	Double liability	Hostage bond	Investment restrictions	Restrictions on notes & deposits	Minimum Reserve capital requirements	Branching restrictions
Australia c.1840–1893	yes		M and R until 1862	N<C		
Belgium c.1830–50						
Italy c.1861–93				N<3C or 3 × specie reserve		
Mexico 1864–84						

Annotation for restrictions on notes and deposits: N=note issue, C=paid-up capital.
Annotation for investment restrictions: M=prohibition on taking mortgages on real-estate, R=prohibition on investment in real-estate.
Sources: Bett (1957), Butlin (1953), Butlin (1986), Chlepner (1943), Des Essars (1896), La Faro (1929), McCaleb (1920).

the limited liability joint-stock form of ownership. Note first that note-holders and depositors in a fully competitive market may be unable to discipline banking firms adequately because the estimated value of the loan portfolio, at any given time, is unlikely to be known to depositors (Bhattacharya *et al.*, 1998, p. 761).

Under conditions of asymmetric information, a bank has an incentive in each period to over-issue its liabilities, although this is more likely to occur as a consequence of hidden investments in overly risky assets than from an unexpected, though more observable, increase in liability issue. If it is assumed that depositors and note-holders are less than fully rational, the benefits from investing in a riskier portfolio accrues to bank owners, whereas the cost of such investment is partly borne by depositors and note-holders (Jensen and Meckling, 1976, p. 334; Hellman *et al.*, 2000, p. 149; Stiglitz, 1985, p. 135). On the other hand, if it is assumed that depositors and note-holders are fully rational, they will adjust their expectations to reflect the true risk-adjusted value of the bank’s loan portfolio, and consequently demand a corresponding higher compensating risk premium. In this case, all of the agency costs are borne by the bank owners rather than the note-holders and depositors (Jensen and Meckling, 1976).

Following Stiglitz and Weiss (1981), a bank’s over-propensity to invest in overly risky assets is aggravated when owners enjoy limited liability status. Limited liability exacerbates the special problems facing the banking firm in two ways. Firstly, *ceteris paribus*, a more efficient contract design is always to assign liability to the side of the contract incurring the least cost in obtaining information (Kreps, 1990, ch. 16). In addition, *ceteris paribus*, liability should always be assigned to the side of the contract that is the least risk-averse (Kreps, 1990, ch. 16). Since bank liabilities are highly liquid because they are relatively short term, and are in other respects more easily convertible into cash than other assets of similar maturity, it is reasonable to assume that depositors and note-holders are highly risk averse.

From a dynamic perspective, the recognition that a bank may be unable to offer a credible guarantee as to the value of its liabilities is known in the literature as the time-inconsistency problem (e.g., Diamond and Dyvbig, 1983). The recognition of a time-inconsistency

Table 2. Significant examples of limited liability banking systems and their regulatory environment

Country	Double liability	Hostage bond	Investment restrictions	Restrictions on notes & deposits	Minimum capital	Reserve requirements	Branching restrictions
Argentina 1887-90		yes	R, S, I	N<40m pesos or 90% of C no note issue	yes	10%	
Austria-Hungary 1853-1913							
Canada ^a c.1817-70	yes		M	N+D<3C	yes		
Canada 1870-1914	yes		M	N<C	yes		
Mexico 1884-c.1913		yes	R, M	N<C	yes	33%	yes from c.1897
Portugal c.1850-91				N<0.75C	yes	33%	
Russia 1864-1917				no note issue D<C ^b	yes		
Spain c.1844-74			S	N<3C or 3 x specie reserve	yes		
Sweden c.1863-97			R	no note issue	yes		
Switzerland ^c c.1834-81			R, S, I	yes		yes	
Switzerland 1881-1906		yes	R, S, I	N<2C	yes	40%	
USA ^d (National banks) 1863-1914	yes	yes	R, S		yes	yes	yes
USA (State banks) 1863-1914				no note issue	yes	yes	yes

Annotation for restrictions on notes and deposits: N=note issue, D=deposit issue, C=paid-up capital.

Annotation for investment restrictions: M=prohibition on taking mortgages on real-estate, R=prohibition on investment in real-estate, S=prohibition on investment in securities, prohibition on insurance activity.

Notes:^a Until c.1840, the Canadian Provinces granted charters to banks in an ad hoc fashion. However, most banks faced restrictions on their liability issues and they were not permitted to lend on property.

^b There is some uncertainty as to the actual size of the ratio of deposits to capital (Crisp, 1976, p. 125).

^c Banks in Switzerland faced various note issue restrictions and reserve requirements depending on which canton they were based. Note issue was typically limited to some proportion of paid-up capital (Weber, 1992, p. 196; Landman, 1910, p. 10).

^d US National and State banks faced various capital and reserve requirements in this period (Klenbaner, 1990, pp. 69-70).

Sources: Acena (1987), Bett (1957), Cameroon (1967), Capie *et al.* (1994), Chlepnier (1943), Crisp (1976), Des Essars (1896), Flux (1910), Katzenellenbaum (1929), Kindleberger (1993), Klenbaner (1990), Knox (1903), Landman (1910), McCalab (1920), Olsson (1994), Ramos (1950), Rudolph (1976), Schuler (1992A, 1992B), Sokal and Rosenberg (1929), Sumner (1896A, 1896B), Tortella (1972), Tortella (1994), Walker (1896), Weber (1992).

problem in relation to the stability properties of depository institutions has generated a number of models (beginning with that of Klein, 1974) which are designed to prove the viability of a competitive banking system that is free from governmental regulation.¹ Klein's seminal article, although not explicitly using the term 'time-inconsistency', argues that there is a free banking solution to the time-inconsistency problem in that a bank can invest in brand name capital through, for example, advertising or erecting impressive buildings. Since such expenditure is asset specific, it acts to assure that a brand-name-type bank will not cheat through over-issuing its liabilities, providing the present value of its future net income stream is greater than the present value it derives from over-issuing its liabilities. In a competitive equilibrium, the value of the bank's asset-specific investment equals the present value of the bank's net income stream. But as Klein (1974) admits, it may be profitable for a bank to cheat once if its gain through over-issue is greater than its discounted stream of future earnings, inferring that, under his system, a proportion of banks will always cheat.

Klein's model is criticised by Selgin and White (1994, p. 1735) on the basis that it fails to prevent the success of one-time cheating strategies by some banks. They thus offer an alternative solution, which commits a bank contractually to redeeming its private note and deposit issues for a precious commodity at a previously agreed rate of exchange (Selgin and White 1994, p. 1735). When a private bank, operating in a competitive environment, issues its notes beyond that which its note-holders desire for transaction purposes, they are automatically either directly returned to it by its own note-holders, or returned through the inter-bank note-exchange system (White, 1995, ch. 1). Selgin and White (1994) argue, despite requiring no legal minimum reserve ratio, that redemption for a precious commodity ensures that the cost of any over-issue of liabilities is internalised by an errant bank, and thus it has an incentive to issue only the optimum quantity of liabilities.

There is a possible theoretical reason why Selgin and White's automatic reflux scheme cannot guarantee the value of a bank's liability issue. For example, a bank can always limit its real issue so that it is just below the level where automatic reflux would occur. It then could simultaneously increase the riskiness of its loan portfolio, and thereby earn a higher risk premium. This strategy is all the more effective when it is completely unobserved by depositors and note-holders. In the extreme case, the bank's loan portfolio could become so risky that the probability of a bank going bankrupt approaches certainty, with the consequence that its liability issue becomes worthless. Significantly, from our point of view, control over note and deposit liability issue, via the law of reflux, is not sufficient to ensure the stability of free banking, because bankers can opportunistically increase the riskiness of their assets.

White (1995, p. 7) notes that his reflux scheme can only be effective providing a bank remains solvent. For this reason, he adds to his contractual approach the Klein-type argument that safer banks can send confidence-bolstering signals to their note-holders and depositors through asset-specific investments in the form of construction of impressive bank edifices and publicity as to their sound financial health.² Therefore, Selgin and White's redemption into a precious commodity ultimately relies on Klein's assumption that a bank enjoys an infinite income stream.

¹ In this paper, we focus on Klein, as his is the seminal article in this area. The subsequent literature provides variations on Klein, but the concept of brand-name capital is enshrined in these approaches—see for example, Gorton (1994), Demsetz *et al.* (1996), Bhattacharya *et al.* (1998).

² Given that these confidence-boosting signals are very costly, there will be an interior maximum where the marginal confidence gained is less than the marginal cost. Hence, confidence can never be complete in this free banking model. Thanks to an anonymous referee for highlighting this point.

The Klein and Selgin–White models are viable when it is assumed that banks operate within an infinite horizon context. However, both models suffer from a time-inconsistency problem under the more stringent assumption of a definite finite horizon. Such an assumption is not unreasonable when deposits or notes are viewed as contracts with the bank. While it may be uncertain when the last period will occur, we can justify the assumption on the basis that, given a sufficiently high rate of time discount, banks will cheat. Indeed, Goodhart (1988, pp. 60–4) also recognises that reputational capital is only useful if contractual relationships are infinite or if there is a low rate of time discount.

Because in the last period the asset-specific investment of a Klein brand-name-type bank becomes worthless, the bank would simultaneously expand its liabilities and increase the riskiness of its investment portfolio until its liabilities had zero value. As a consequence, rational note-holders and depositors would be unwilling at any interest rate to hold the liabilities of Klein's brand-name-type bank. Thus, the bank would cheat in the penultimate period and, through a process of backwards induction, we can deduce that note-holders and depositors would refuse to hold the liabilities of Klein's brand-name-type bank in any period, including the first period (Kreps, 1990, pp. 513–14).

A Selgin–White redemption-type bank, has the advantage over Klein's brand-name-type bank in that it is obligated to exchange its liabilities for a precious metal at a contractually agreed fixed exchange rate, implying that if the bank is fully solvent, it will redeem all its liabilities even in the last period. Yet, in the absence of a legal requirement that forces the bank to hold a sufficient quantity of the precious commodity, there is no incentive in the last period for a redemption-type bank to maintain sufficient assets. Thus, it would also rationally behave just like the brand-name-type bank with the consequence that rational note-holders and depositors would refuse to hold its liabilities even in the first period.

While neither Klein's nor Selgin and White's competitive models have the quality of relying on depositor or note-holder monitoring as a basis for free banking stability, our criticism of both models is that they suffer from a time-inconsistency problem, which undermines the effectiveness of both asset-specific investment and any contract that claims to guarantee a bank's liabilities in terms of a precious commodity. There are two potential solutions for this time-inconsistency problem. One solution is that the government could regulate banks, particularly along the dimensions highlighted above, namely liability over-issue and investment in overly risky assets. Alternatively, bank shareholders could be restricted to having an unlimited liability ownership form. Assuming that incentives of shareholders and managers are aligned, unlimited liability ownership acts to assure depositors and note-holders against default since it significantly reduces a bank's over-propensity to invest in overly risky assets, allowing the bank to pay a lower risk premium.¹ Albeit, this comes at the expense of paying equity owners a higher risk premium and, as we argue below, this in turn generates increased monitoring costs associated with share transferability.

As is commonly recognised, unlimited liability ownership status alone is insufficient to assure against default, because the wealth backing the shares of such institutions can become diluted (Woodward, 1985; Winton, 1993). One can rationalise this by recognising that the value of such shares is, *ceteris paribus*, less to those whose investment in the bank comprises a small proportion of their overall wealth. The propensity for transfers to impecunious individuals would escalate with increased probability of bankruptcy. Thus,

¹ Shareholders of unlimited liability firms, because all their personal wealth is at risk, will have an incentive to monitor closely or participate in the firm's management. Indeed, our study on the corporate governance of unlimited liability banks would suggest that this was the case (Hickson and Turner, 2002B).

restrictions on share transferability are required if the unlimited liability ownership form is to be a credible commitment to depositors and note-holders.

The evidence of the next section, which looks at the stability of limited liability banking under various regulatory constraints, demonstrates that each banking system experiencing a significant crisis failed to restrict investments in overly risky assets. Most also omitted to restrict note issue to some multiple of paid-up capital. Conversely, any banking system adopting such controls experienced no serious banking crisis. We also find this to be the case for the banking systems which placed unlimited liability requirements upon banks. While it could be argued that we present little evidence that such legal controls were binding, the strong correlation between them and banking stability is compelling.

3. Early limited liability banking systems

3.1 *Free banking systems*

We characterise the four banking systems in Table 1 as free banking, on the basis that there were few regulations imposed on banks. In the discussion that follows, we examine the reasons for the instability of each of the cases in Table 1. We argue that, in each case, instability can be attributed to the lack of constraints on liability issue and investment in overly risky assets.

The only regulations facing Australian banks were that owners were subject to double liability, and note issue was limited to paid-up capital. Indeed, the unregulated nature of the Australian banking system in the decades before 1893 is well-documented (Butlin, 1986; Dowd, 1992; Merrett, 1989). Nevertheless, as with unlimited liability, the effectiveness of double liability requires that the transferability of shares be restricted (Woodward, 1985) but, in Australia, bank shares were freely transferable (Hickson and Turner, 2002A). Furthermore, the note issue restrictions were redundant because the Australian banking system was predominantly deposit-based. For example, in 1892, the average deposits/total assets ratio was 71.3%, whereas the average notes/total assets ratio was 2.3% (Hickson and Turner, 2002A). It is notable that, prior to 1893, Australian banks had over-invested in real-estate loans, taken mortgages on real-estate and invested in risky securities (Boehm, 1971, p. 219; Ellis, 1893, p. 294).

Consequently, in 1893, out of 28 major banks, four failed and 11 were suspended and had to be reconstructed by the Colonial governments. Goodhart (1994, p. 419) rightly describes the Australia banking collapse as one of the most dramatic in free banking history. It can be argued that the remaining 13 banks were only saved by the intervention of the Colonial Secretary of New South Wales, who declared banks notes legal tender and stated that no other banks would be allowed to fail, thus bailing out the system (Hickson and Turner, 2002A).

Interestingly, according to Dowd (1992, p. 48), 'the comparative purity of the Australian case ought therefore to give us a reasonably fair indication of how well the theory of free banking has worked in practice'. In an attempt to defend the free banking position, Dowd argues that various government interventions, such as the reconstructions schemes and Victorian bank holiday, contributed to the crisis. However, such interventions only occurred after the banking system was in distress, and the reconstruction scheme may have been an optimal governmental response (Hickson and Turner, 2002A).

As indicated in Table 1, Belgian banks had no apparent regulatory constraints. Indeed, Chlepner (1943, p. 5) states that the Belgium banking system was one of the freest in the world because there were no restraints against the over-issue of notes, nor limits against investment in overly risky assets. Chlepner (1943, p. 19) also notes that Belgium banks had invested almost all their funds in industrial securities or in loans to a limited number of industrial companies.

Consequently, in 1848, the two main commercial banks, Banque de Belgique and Société Générale, had to be rescued by the government (Houtman-De Smedt, 1994, p. 50).

Table 1 shows that Mexican banks also faced no apparent legal restrictions on their activities. On 29 April 1884, one of Mexico's largest banks, the Monte de Piedad suspended payment and the public panicked (McCaleb, 1920, p. 23). According to McCaleb (1920, p. 23), the Monte de Piedad's problems were attributable to a significant quantity of non-performing real-estate loans. With the other banks being run, the government extended support through a decree that allowed 20% of all tax payments to be paid in the bills of the Monte de Piedad, and only with this action was public confidence restored, bringing an end to the crisis (McCaleb, 1920, p. 24).

In Italy, six banks were legally permitted to issue notes up to the limit of either three times paid-up capital or three times the specie reserve. As indicated in Table 1, these six banks, as well as the deposit-issuing banks, faced no other legal restrictions. Conservatively, in this era, La Faro (1929, p. 809) describes the Italian banking system as an ill-regulated one. It is notable that both the note-issuing banks and deposit banks had over-invested in commercial real-estate (Des Essars, 1896, pp. 166–9; La Faro, 1929, p. 809). Consequently, in the early 1890s, a major note-issuing bank (Roman Bank) failed, precipitating a banking crisis that prompted the government to rescue the note-issuing banks by reorganising them. Subsequently, the government encouraged the banks of issue to come to the rescue of the deposit banks.

In summary, consistent with our theoretical predictions, each of the four free banking systems listed in Table 1, based on our definition, experienced a banking crisis. Although severe crises did occur in each of the above cases, the four systems did exist relatively crisis free for several decades. The main explanation for this is that banking crises are usually precipitated by exogenous shocks, and it is these shocks which reveal the underlying weaknesses in the regulatory environment (Honohan, 1997, p. 3). For example, in the case of Belgium, the exogenous shock was monetary in nature, whereas in Australia there had been a property and stock market crash. A further explanation for the relatively crisis-free nature of the Australian banking system, at least until 1862, was that the British Treasury supervised Australian banks. However, by 1862, responsibility for supervision had been handed over to the colonial governments, who quickly moved towards a situation whereby banks were essentially unregulated (Butlin, 1986, pp. 84–9).

It is notable that each of the four systems freely allowed banks to lend to real-estate companies, take mortgages on real-estate and invest in overly risky securities. Furthermore, each case of banking instability precipitated the introduction of more stringent regulatory controls, especially with regard to note issue and the riskiness of assets. The next section of the paper examines the stability of limited liability banking systems which had more stringent regulatory controls than the four systems listed in Table 1.

3.2 Limited liability banking systems with regulatory controls

In contrast to the banking systems described above, those listed in Table 2 had extensive regulatory controls. In particular, all had restrictions against note issue as well as having regulation curtailing investment in overly risky assets. Consequently, apart from Argentina and Spain, these systems were relatively stable, experiencing no notable crises. We shall rationalise the Argentinean and Spanish banking instability at the end of this section.

In the absence of the failure of a big bank or a significant proportion of failures, or government action to prevent failures, we can designate the banking systems of Austria–Hungary, Mexico, Portugal, Russia, Sweden and Switzerland as being free of banking

crises. In addition, the Canadian banking system was free of banking crises in the period 1838–1914.¹ However, some commentators argue that Canada experienced a financial panic in 1837 (Schuler, 1992B, p. 83). On the basis of our criteria, we do not designate this as a banking crisis, because only three out of 21 one Canadian banks actually failed (Neufield, 1972, p. 77).

According to Kindleberger (1996), the US had several notable financial panics in the period under consideration. However, our definition of a banking crisis requires the failure of a large bank or a significant proportion of banks, or government action to prevent failures. As demonstrated in Table 3, the main incidence of bank failures in the US occurred during recession years. In the worst year, 1893, only 3.1% of total banks failed. Given the small unitary nature of US banks, we do not designate the episodes of financial panic in the US as banking crises.

Looking at Table 2, we see that each banking system apparently imposed a wide range of controls on its member banks. We argue that such controls were, on the whole, designed to constrain liability issue and overly risky investments. We discuss each case in detail below and, in particular, we rationalise why the constraints on Argentina and Spain proved ineffective.

Notably, all the banking systems in Table 2, except the Argentinean, Portuguese, Russian and US State banking systems, imposed constraints on investments in overly risky assets such as real-estate, securities and insurance. As noted in the previous section, the law of reflux cannot sufficiently control liability issue due to unobserved increases in the riskiness of the bank's loan portfolio. Therefore, restrictions on banks investing in these historically very risky areas constrains their ability to reduce the value of their liabilities.

From Table 2, both the US and Canada imposed double liability on shareholders, which meant that their liability extended to twice paid-up capital. Notably, all but three of the systems in Table 2 imposed non-trivial minimum capital requirements. These provisions acted to restrain risk-taking behaviour, thus decreasing the propensity to invest in overly risky assets.

As indicated in Table 2, note issue restrictions were prominent in this era. For example, eight of the 11 banking systems had similar restrictions in that their note issue (or note issue and deposit issue in the case of Canada) was limited to proportions of paid-up capital. Remarkably, proportions ranged from three-quarters to three times paid-up capital. Indeed, the Austro-Hungarian, Russian, Swedish and US state banking systems effectively

Table 3. *Banking failures in the US during major recessions, 1863–1914*

Year	No. of national bank failures	No. of national banks	No. of state bank failures	No. of state banks
1873	4	1,983	33	1,330
1884	6	2,625	54	1,488
1890	6	3,484	30	4,717
1893	69	3,807	228	5,685
1896	34	3,689	66	8,423
1907	12	6,422	58	15,564

Source: US Department of Commerce: *Banking Statistics*, 1970.

¹ Indeed, only a very small number of banks failed in this period (Bordo *et al.*, 1996, p. 57; Neufield, 1972, pp. 78–9).

Table 4. *Important cases of unlimited liability banking systems*

Country	Investment Restrictions on restrictions	Restrictions on notes & deposits	Minimum Reserve capital	Reserve requirements	Limit on number of partners
Australia c.1817–40					≤6
England 1708–1826					≤6
England 1826–44					
France 1796–1848					
Germany 1821–71					
Holland 1813–63					
Ireland c.1721–1820					≤6
Ireland 1824–45					
Japan c.1868–86				yes from c.1882	
Scotland 1727–1845					
Sweden c.1831–97	R		yes ^a		

Annotation for investment restrictions: R=prohibition on investment in real-estate.

Notes:^a The minimum capital for Swedish banks was 250k silver dalers.

Sources: Barrow (1975), Bodenhorn (1992), Butlin (1953), Cameroon (1967), Capie *et al.* (1994), Checkland (1975), Clapham (1944), Collins (1988), Cottrell and Anderson (1974), De Jong (1929), De Vries (1994), Dillion (1898), Dowd (1992), Flux (1910) Gilbert (1882), Hall (1949), Kerr (1908), Kindleberger (1993), Lemoine (1929), Munn (1981), Nataf (1992), Ollerenshaw (1987), Plessis (1994), Quittner (1929), Sandberg (1978), Schuler (1992A), Soyeda (1896), Tilly (1994), Whale (1930), White (1990), White (1992), White (1995).

prohibited their banks from issuing notes altogether.¹ Furthermore, the deposit issue of Russian banks was restricted to a fixed proportion of paid-up capital.

In addition, six of the banking systems in Table 2 imposed legal reserve requirements on bank liabilities, which acted to restrict note issue since each note issued was required to be backed by considerable amounts of gold or government currency. Furthermore, as reserve requirements had to be held in the form of liquid assets, they also acted to limit bank riskiness.

As indicated in Table 2, four of the banking systems required forfeitable hostage bonds. Banks in Mexico and Switzerland (1881–1906) were required to post forfeitable hostage bonds to the value of 100% of note issue and 60% of note issue respectively.² In the US, National banks received notes of a uniform design bearing their name when they gave the Comptroller of the currency the equivalent amount of particular US government bonds. Such schemes obviously also acted to prevent over-issue, even though they were designed to facilitate government bond issues. Ultimately, a large proportion of each note issued was backed by the government, raising the problem that the stability of such banking systems rested on the credibility of the government.

In an era of rudimentary state regulatory control, branching restrictions may have also served to restrict the ability of a bank to over-expand its liabilities. This problem may be particularly acute in federal systems, whereby banks can evade effective regulation by expanding across jurisdictions. Thus, in this era, branching restrictions would be more beneficial in countries such as the US and Mexico.

¹ On 4 March 1865, a law was passed taxing US State bank notes. This Act, which took effect in 1866, no longer made it profitable for State banks to issue notes, and effectively, it acted as a restriction on State banks issuing notes (Klenbaner, 1990, p. 66).

² From 1897, banks in Mexico only had to post a bond equal to 20% of their note issue (McCaleb, 1920, p. 85).

In this era, governments also monitored banks, requiring them to submit accounts. These accounts served to inform regulators whether or not a particular bank met simple regulations such as note issue restrictions, reserve and capital requirements. For example, in Canada until 1870, banks had to provide half-yearly accounts and statements to the Provincial government; and from 1870, statements of the position of banks had to be made monthly to the Minister of Finance and Receiver-General (Walker, 1896, pp. 443–5, 454–8). Notably, a similar approach was adopted by Mexico, Sweden and the US; and in Switzerland, the Federal Council inspected bank accounts at least once a year (Sumner, 1896A, pp. 290–2).

Obviously, the effectiveness of the above regulations depend on their enforcement though, realistically, this can only be ascertained through in-depth case studies on each system. However, one can attribute the Spanish banking crisis of the mid-1860s, in which a substantial number of banks failed (Tortella, 1994, p. 867), to ineffective enforcement. For example, while the Bank of Issues Law (1856) forbade note-issuing banks from dealing in public securities (Acena, 1987, p. 110), loans to publicly owned railway companies and other government bonds made up most of the banks' investments (Tortella, 1994, p. 867).

The Argentinean system is somewhat anomalous in that it, too, had apparent stringent regulatory controls, but yet it also experienced a severe crisis in 1890 (Ramos, 1950, p. 91), arguably due to ineffective enforcement of legal requirements. First, the requirement that note issue be *fully* backed by national gold bonds was never enforced (Ramos, 1950, pp. 87, 90). Second, the legal requirement that the note issue be less than 40 million pesos, or less than 90% of capital, turned out to be non-binding, because only one bank, the National Bank, had a note issue approximating that order of magnitude (in 1888, its note issue was approximately 41 million pesos), whereas, the next six largest banks had an average note issue of just over 9 million pesos (Ramos, 1950, p. 88). Significantly, the note issue of banks increased 115% between March 1888 and January 1890 (Ramos, 1950, p. 90).

In so far as the market imposed any constraints on Argentinean bank risk-taking, such a constraint was undermined when the Argentinean government guaranteed it would make good any deficiency if, in the event of bankruptcy, a bank's hostage bond proved insufficient to meet its debt obligations. Furthermore, although the Argentine National Banking system was modelled on the US National banking system (as can be seen in Table 2), unlike the US National banks, there were no investment restrictions. Consequently, Argentinean banks invested heavily in real-estate (Ramos, 1950, p. 95).

In summary, the number of free banking systems in the early period of limited liability joint-stock banking turns out to be relatively small. Our main finding, however, is that the more extensively regulated banking systems exhibited greater stability than the free banking systems did. These findings support our theoretical argument in Section 2, where it was argued that free banking models suffered from a time-inconsistency problem which could be solved by constraints on bank risk-taking and the over-issue of liabilities. Alternatively, as was also argued in Section 2, free banking could be stable under unlimited liability. In the next section, we provide evidence which supports our contention that free banking worked effectively under unlimited liability requirements.

4. Free banking under an unlimited liability regime

Table 4 contains examples of early banking systems. Several of these episodes are regarded by Selgin and White (1994) as the golden era of free banking. Significantly, this era is also associated with the unlimited liability bank. We present evidence in this section suggesting that the stability of banks in this era is mainly attributable to their liability status.

In Section 2, it was argued that unlimited liability on its own may not be sufficient to eliminate the time-inconsistency problem, and that restrictions on trading of unlimited liability shares may be required. In England and Ireland, for example, from the last quarter of the eighteenth century, shares in banks were inalienable because banks were restricted to having the partnership form. Later, when share transfers were permitted with the enactment in the mid-1820s of the Banking Copartnership Act, sellers of bank shares remained liable for the debts of a bank for up to three years after they had sold their shares (Hickson and Turner, 2002B). This regulation acted to ensure that sellers would be inclined to transfer shares to those with similar levels of appropriate wealth.

In addition to the legislative controls noted above, the deeds of copartnership of British and Irish banks generally controlled the transfer of shares by requiring that such shares be authorised by the banks' directors (Plumptre, 1882, p. 444). As directors were generally the wealthiest shareholders, they had an incentive to ensure against the dilution of wealth backing shares by requiring shareholders to have a minimum level of wealth.

We argue that the above controls operate against the dilution of the wealth guarantee of unlimited liability bank shares, and this explains why the banking systems listed in Table 4 were stable. Nevertheless, there are two notable exceptions which we rationalise below. While the banking crises in England and Ireland in the 1820s were undoubtedly sparked by the depression following the Napoleonic Wars, the root cause of the banking instability was arguably the six-partnership restriction. Though a possible rationale for the six-partnership constraint is that it served to limit the capacity of banks to unexpectedly increase their liability issue. However, as is commonly recognised, size restrictions generally operate to limit a bank's ability to diversify its portfolio sufficiently, and therefore make it increasingly difficult for banks to withstand unexpected trade shocks, for example. Significantly, during this era, English banking was more unstable than that of Scotland which had no such restrictions (White, 1995, pp. 40–4). For example, according to Pressnell (1956, p. 538), 60 banks failed in England in 1825, whereas, only one Scottish bank failed (White, 1995, p. 43). As the standard wisdom of the time attributed the English banking crisis to the six-partnership restriction (Munn, 1981, p. 85), it is unsurprising that the Banking Copartnership Act of 1826 eliminated it and permitted the formation of unlimited liability joint-stock banks. Notably, after this Act was passed, English banking became relatively stable in terms of bank failures.

The legally enforced size restriction imposed under the Bank of Ireland Charter Act (1783) stipulated that no partnership exceeding six in number could issue notes (Hall, 1949, p. 37). Analogously, this Act limited the ability of provincial banks, that is those operating outside Dublin and the North, to diversify their portfolios sufficiently. Thus, these banks predominately lent to the agricultural industry, and as a consequence, under the impact of an agricultural depression in 1819/20, 16 of the 31 private banks failed, of which only one was a Dublin bank (Hall, 1949, p. 127).¹ Consistently, after the removal of the six-partnership legislation and the introduction of unlimited liability joint-stock banks, Irish banking was stable, experiencing no notable banking crises.

Undoubtedly, the best-known historical case of free banking is that of Scotland (White, 1992, 1995). Unlike England or Ireland, Scottish banks were never restricted to the partnership form of organisation. Scottish law permitted banks to be formed on a copartnership basis, which implied that Scottish banks effectively operated as unlimited liability joint-stock banks with transferable shares (Munn, 1981). Although the stability of

¹ The only Dublin bank to fail during the 1820 crisis was Alexander's (Barrow, 1975, p. 18). The banks which failed during the crisis are listed in Hall (1949, pp. 127–33) and Barrow (1975, Appendix 2).

the Scottish banking system during the free banking era is accepted with little dispute, the reasons for the stability have been much debated. Contrary to White (1992, 1995), we suggest that the success of the Scottish system was not due to free banking *per se*, but to restrictions on the organisational form that banks were permitted to adopt. However, there were three limited liability joint-stock banks in Scotland which had been established by Charter. Nevertheless, these banks are regarded as semi-government functionaries created by the State (Checkland, 1975, p. 204, 275; Kerr, 1898, p. 108). Interestingly, the charters of these banks controlled the amount of capital they could issue, forbade them from engaging in any other business apart from banking, and appeared to limit the amount of liabilities that could be issued (Turner, 2000, p. 75).

Though presenting little evidence, it is claimed that two of these state-created banks, the Bank of Scotland and Royal Bank of Scotland, acted to police other Scottish banks, enhancing the stability of Scottish commercial banking (Checkland, 1975; Munn, 1985; Dow and Smithin, 1992). This view has a problem in that it ignores the potential of this scheme to encourage predatory behaviour on the part of the policemen towards their commercial competitors (Goodhart, 1988, p. 8). Furthermore, many authors argue that the note exchange system was responsible for a stable banking system in Scotland during the 'golden era' of free banking in that it acted to prevent banks from aggressively over-issuing (Checkland, 1968, 1975; Munn, 1975, 1985; Tyson, 1985).¹ But, as implied in Section 2, even though the clearinghouse is in a privileged position enabling it to gather information on a member bank, it would be unable to assess the asset quality of a member because of the opaque and fungible nature of a bank's assets. A clearinghouse could ask to see the bank's accounts before giving assistance, but even accounts will not enable the clearinghouse to determine the quality of a bank's assets. This, in turn, implies that a clearinghouse will be unable to restrain banks from investing in overly risky assets.

As with the Scottish case, in all the other countries in Table 4 apart from Japan and Australia, there existed quasi-government banks. These banking institutions were typically given note-issuing privileges and limited liability status in return for agreeing to purchase government debt. The depositors and note-holders of these banks were given implicit assurances of bank solvency by the quasi-government nature of these institutions and the restrictions contained within their charters.

In this paper, we have argued that unlimited liability ownership generated stability in the 'golden age' of free banking. Consequently, we have minimised the role of other regulations, such as geographical and small note restrictions. For example, several countries banned the issue of small notes, e.g., Sweden (Flux, 1910, pp. 34–6), Australia (Butlin, 1953, ch. 1), England from the mid-1770s (15 Geo. 3.c.51), and Scotland from the mid-1760s (White, 1995, pp. 26–7). Adam Smith (1776, p. 422) argued that the small note ban in Scotland prevented 'beggary bankers' from entering the industry and effectively raised the quality of banks. An additional argument in favour of banning small notes is that they would circulate amongst the less-informed classes, implying that the probability of counterfeits would increase and that the effectiveness of the law of reflux might be diminished.² Although small note bans may have had a positive impact on the stability of the banking sector, they by no means secured its stability.

¹ Viner (1975, p. 243) argues, in opposition to White and Selgin's reflux scheme that, if enough banks over-issue in an aggressive fashion, then non-aggressive banks, in self-defence, must respond by adopting the over-trading strategy.

² For additional views on small note issues, see Cowen and Krozner (1989, pp. 224–5); Sechrest (1989, pp. 804–5) and White (1989B, pp. 815–16).

In addition to prohibitions on small note issue, apart from the state-chartered banks, joint-stock banks were typically not permitted to issue notes within Dublin or London.¹ Furthermore, the establishment of Banque de France in the early part of the nineteenth century led to a prohibition on note-issuing banks within Paris. It is difficult to rationalise how such regulations generated stability, but easy to rationalise how they enhanced seignorage.

5. Conclusion

Based on the evidence presented in Tables 1 and 2, we demonstrate that, following the introduction of limited liability ownership, free banking was not widely adopted by major banking systems during the nineteenth century. In particular, we demonstrate that the limited liability systems experiencing a significant banking crisis failed to impose effective constraints against over-issue and overly risky investments. We rationalise this phenomenon as a consequence of peculiar informational asymmetries stemming from the nature of a bank's loan portfolio, which in turn generates a time-inconsistency problem. This time-inconsistency problem remains unsolved by existing free banking models such as those of Klein, and Selgin and White. This recognition has led us to argue that the pragmatic evolution of banking systems towards adopting regulatory controls against over-issue and investment in overly risky assets was an efficient solution to this basic problem in an era of rudimentary government supervision.

Consistently, we associate the golden era of free banking with the fact that banking firms were legally constrained to unlimited liability ownership. We argue that bank ownership constraints, combined with effective regulation to prevent dilution of shareholders' wealth, ensured banking stability, providing that banking firms were not inordinately restricted in their ability to diversify their loan portfolio. Therefore, our evidence suggests that free banking has been successful only when there have been narrow legal restrictions on a bank's choice of organisational form. Ultimately, these banking systems are far removed from any 'free banking' utopia where there is freedom to adopt a wider variety of organisational forms.

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¹ The Banking Copartnership Act (1826) in England meant that note-issuing joint-stock banks could only be formed outside of a 65-mile radius of London. The Peel Act (1844) removed this restriction. The Irish Joint Stock Bank Act (1824) meant that no bank apart from the Bank of Ireland could issue notes within a 50-mile (Irish miles) radius of Dublin. This requirement was repealed in the Irish Banking Act (1845).

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