Central bankers as entrepreneurs

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John Singleton

(Victoria University of Wellington)

Abstract

Central bankers have sometimes been portrayed as empire building bureaucrats, yet a new branch of literature arising from political science regards them as capable of entrepreneurial activity. This paper discusses the entrepreneurial behaviour of three leading central bankers during the twentieth century, Montagu Norman, Paul Volcker, and Don Brash, and also examines the entrepreneurial role of central banks in the development of the payment and settlement system. Baumol's theory of productive, unproductive and destructive entrepreneurship is discussed because it might provide a means of linking the bureaucratic critique of central banks to the more recent approach that sees them as institutional and ideational entrepreneurs. However, Baumol's theory does not take us much further because the impact of central bank entrepreneurship on net welfare is hard to measure. Was, for example, Norman a hero for helping to set up new central banks in Europe in the 1920s, or a villain for foisting the gold standard mentality on them?

Introduction

'We are all Keynesians now', remarked Milton Friedman, no doubt ruefully, in 1965 (Fox 2008). If Friedman were alive today, he might have said 'We are all entrepreneurs now', in so far as it is now commonplace to argue that people can behave entrepreneurially in any walk or life and in any type of organisation. Thus even central bankers can be entrepreneurs.

Business and economic historians, including myself, have been slow to acknowledge the entrepreneurial traits of central banks and central bankers. A political scientist, Martin Marcussen (2005), has beaten us to it. He contends that central bankers become ideational entrepreneurs when they devise a new policy framework, and institutional entrepreneurs when they establish a new organisation or drive an existing one in a new direction. But an older and quite separate strand in the literature – one to which Milton Friedman (1982) himself contributed – portrays central bankers in a very different light, as typical rent-seeking bureaucrats.

Innovative entrepreneurs or self-aggrandising bureaucrats, which is it to be? The answer depends on the circumstances and on the perspective of the observer. A way of connecting these apparently contradictory approaches is provided by William Baumol (1990). He divides entrepreneurs into three categories: productive, unproductive, and destructive. An entrepreneur has the option to be an innovator, a rent-seeker or even a crook. His or her selection will depend on the rewards anticipated from the alternatives, which in turn reflects the structure of incentives in society. Though useful, however, Baumol's framework buckles when confronted by the ambiguity and complexity of real life. Unless the welfare implications are obvious and easily measured, considerable subjectivity is involved when deciding whether a particular act is productive or unproductive. So far as central banking is concerned, the intellectual justification for this endeavour remains unproven (Capie and Wood 1991), and a minority of the economics profession, as well as some politicians and commentators, continue to advocate free banking. Even Walter Bagehot (1873), the classical authority on central banking, was lukewarm about the benefits derived from the Bank of England, though he concluded that since it already existed its abolition would be impractical.

Between governments and banks

Whether or not central banks are part of the public sector is a question that need not detain us for long. Most modern central banks are owned by the state, but there are important exceptions including the Federal Reserve System (the Fed) and the South African Reserve Bank (SARB). Until a wave of nationalisations in the 1930s and 1940s, many central banks were privately owned. Regardless of the details of central bank ownership, it has been understood since the late nineteenth century that the purpose of central banking is not to make a profit but rather, in Hawtrey's (1932: vi) words, 'the promotion of economic welfare', however defined. Central banks argue that they serve the public interest by conducting monetary policy, protecting the integrity of the currency, and overseeing the stability of the banking sector (Singleton, forthcoming). One of the perennial debates in central banking concerns the extent to which central banks should be autonomous of government. Practice in this area has fluctuated, although the current orthodoxy favours central bank independence (CBI). Hawke (1973) suggests that central banks occupy the space between governments and banks. No central banker likes to be described as a government official, yet because of their public policy role and their lack of interest in profits (though not necessarily in rents), it is reasonable to conclude that central banks are closer to the public than to the private sector.

Productive and unproductive entrepreneurship

Until Baumol introduced the concepts of unproductive and destructive entrepreneurship, the standard approach stressed the welfare-enhancing nature of entrepreneurship. Destructive entrepreneurship includes criminality and other behaviour that reduces net welfare. Unproductive entrepreneurship is identified with rent-seeking, or behaviour that welfare between individuals or groups in society. These two categories are sometimes combined under the heading of non-productive entrepreneurship. Baumol's (1990: 897-8) distinctive approach to entrepreneurship is encapsulated in the following extract:

> If entrepreneurs are defined, simply, to be persons who are ingenious and creative in finding ways that add to their own wealth, power, and prestige, then it is to be expected that not all of them will be overly concerned with whether an activity that achieves these goals adds much or little to the social product or, for that matter, even whether it is an actual impediment to production.

Baumol was also interested in how the supply of entrepreneurial talent, which he felt was spread equally throughout society, is allocated between productive, unproductive and destructive activities. He argued that this process is driven by prevailing rules and incentives. If the structure of incentives favours unproductive endeavours, then the ingenious will become unproductive entrepreneurs. These ideas were elaborated upon in later work, in which entrepreneurship was also identified with leadership (Baumol 1993: 4). By implication leadership can be productive, unproductive, or destructive – this will come as no surprise to anyone who works in a university. Baumol (1993: 9) stressed that entrepreneurial activity is not confined to the firm and can take place in any type of economic organisation. Baumol's ideas about the allocation of entrepreneurial talent continue to inspire empirical research (Bowen and De Clercq 2008) and to attract scholarly debate (Douhan and Henrekson 2008). At a symposium in Gothenburg earlier this year, Geoff Jones (2010) suggested that one of the remaining big questions in business history is how institutions, culture and education influence whether entrepreneurship is productive or unproductive.

Entrepreneurship in the public sector

That the public sector can make a decisive contribution to economic modernisation is an old idea (Gerschenkron 1966). As long ago as the early 1950s, moreover, Gerschenkron (1952: 153) was ready to acknowledge the important 'role of the state as entrepreneur and manager' in imperial Russia. One of the main functions of the government in Gerschenkron's model is to encourage the flow of entrepreneurial talent into those private sector activities that promote economic growth and development.

At a more mundane level, the concept of public sector entrepreneurship was adopted in many developed countries during the golden age of 'new public management' (Hood 1995) in the 1980s and 1990s. Public sector agencies were now expected to behave in some degree as though they were commercial enterprises and even to be 'innovative'. They were required to offer new services, and encouraged to discover more efficient ways of utilising resources. Managers who responded positively to these challenges might be described as entrepreneurs. Curiously, most work on public sector entrepreneurship ignores Baumol's distinction between productive and unproductive entrepreneurship. Papers in this field generally start from the assumption that the public sector entrepreneur is a person or an agency which has broken away from the old (rent-seeking) bureaucratic mould. According to one recent article that attempts to survey and synthesise the literature, without making any reference to Baumol, the public sector entrepreneur:

> Aims to create value for citizens by bringing together unique combinations of public and/ or private resources to exploit social opportunities; learns to use external forces to initiate and achieve internal change[.]Public managers are entrepreneurial in the way they take risks with an opportunistic bias toward action and consciously overcome bureaucratic and political obstacles their innovations face[.] Uses every opportunity to distinguish their public enterprise and leadership style from what is the norm in the public sector; understand the business as well as supporting the opportunity for business growth and development (Kearney, Hisrich and Roche 2008: 309).

Sadler (2000: 25) cites several articles by Baumol, though not the key one, but offers the rosy vision that 'entrepreneurship is about people — either individually or collectively, within organisations or through organisations — using innovation to exploit opportunities and create value.' The emphasis is clearly on the creation of value. Having established, on the basis of a study of the Australian water industry, that entrepreneurship in the public and private sectors is broadly similar, Sadler points out that public sector entrepreneurs do operate in a different environment, one which has both pros and cons. One of the main cons for entrepreneurs in the public sector is the potential for bureaucracy to stymie innovators, but this is balanced by the multiplicity of objectives in many public organisations. Such 'goal ambiguity' creates more scope for discretion and experimentation (Sadler 2000: 31). Sadler's conclusion is intriguing in the present context, because the thrust of institutional reform in central banking since the late 1980s has been to eliminate or at least reduce goal ambiguity, on the grounds that a simple goal is required for effective accountability (Singleton 2010).

A rare historical study of 'an entrepreneur and an innovator operating within a bureaucratic system' (Peirce and Kruger 1993: 52), describes how the educational reformer, Friedrich Althoff, strove to improve the quality of Prussian universities in the years around 1900. Althoff was engaged in productive entrepreneurship, though this term is not used in the article. The authors contend that Althoff possessed an 'extraordinary personality' (Peirce and Kruger 1993: 63), but conclude that entrepreneurship is uncommon in bureaucratic settings because it encounters so many obstacles.

Markowski and Hall (2007: 271), in an article on defence procurement that public sector, are unusual for their readiness to acknowledge that public sector entrepreneurs might not be angels. In short, they bring the bureaucrats back in.

> A culture of entrepreneurialism is not a sufficient condition for socially productive outcomes. Nonproductive entrepreneurship in the commercial sector may for example take the form of corporate litigation to prevent rivals from gaining competitive advantage, market foreclosure, tax evasion, or organised crime …. In the public sector … managers may use their talents to lobby politicians for protection or manipulate the media to increase their social standing rather than for innovation in service delivery.

The neglect of the unproductive and destructive sorts of entrepreneurship in literature on entrepreneurship in the public sector is particularly intriguing given that Baumol's classic article touches on aspects of the public sector, and includes a discussion of the mandarin bureaucracy of Sung China (Baumol's 1990: 901-02, 916).

Another quite separate branch of enquiry deals with the economics of public sector and political corruption. Lambsdorff (2007) and Rose-Ackerman (1999), two of the main researchers in this field, are silent about 'public sector entrepreneurship' in their best-known publications. As is often the case, academics working on related questions appear not to be talking to each other. Though Shleifer and Vishny (1998) discuss both Baumol's approach to entrepreneurship and public sector corruption, they do not attempt to combine them into a theory of the negative aspects of public sector entrepreneurship.

Entrepreneurship in the central banking world

Marcussen comes to the analysis of central bank entrepreneurship from the perspective of political science. Ideational entrepreneurs such as Montagu Norman spread the central banking gospel far and wide in the interwar period, fostering the development of new central banks in Europe, the British Empire, and Latin America.

> In sum, two types of ideational entrepreneur helped to diffuse the central bank as an organizational form through transnational communication: the League of Nations and central bank governors. The League helped to diffuse the central bank through conditional lending and through socialization in international conferences throughout the 1920s. Among the central bank governors, Benjamin Strong and associated money doctors as well as Montagu Norman stand out as internationalists with a strong belief in the Gold Standard and in central bank co-operation (Marcussen 2005: 915).

Marcussen also describes this type of activity as political entrepreneurship. Central bankers acted as institutional entrepreneurs when they set up the Bank for International Settlements (BIS) in 1930, and when they found a new role for the BIS after the end of reparations and the collapse of the Gold Standard (Marcussen 2009). Central bankers in Australia and New Zealand in the 1980s and 1990s are depicted as ideational entrepreneurs who helped to establish a new paradigm in central banking and in economic policy more generally (Marcussen 2007: 145). European central bankers in the late 1970s and early 1980s also advocated extensive economic reforms (Marcussen 1998), and of course in the late 1980s and 1990s they were heavily involved, albeit with considerable reservations, in the movement towards European monetary union (Singleton 2010: ch 15). A further article in this vein contends that the Central Bank of Turkey attempted to be an ideational entrepreneur in the 1990s, but had little impact until it teamed up with a 'policy entrepreneur' in the government (Bakir 2009).

Marcussen seems to be more interested in explaining the behaviour of central banks than in assessing the results, which is fair enough. Many of the initiatives discussed were successful when judged in narrow terms – the BIS has survived for 80 years, though European monetary union now looks very dodgy – but we are left to draw our own conclusions as to whether these initiatives were productive, unproductive, or destructive; did they, to use Hawtrey's phrase, promote economic welfare?

Several recent works describe central banks as innovators, either in relation to their approach to policymaking and internal organisation (Singleton *et al* 2006) or because of their promotion of new technologies such as real time gross settlement (Bech and Hobijn 2007; Khiaonarong and Liebenau 2009: 48-53). But their authors omit to mention that innovative behaviour is a strong sign of th presence of entrepreneurship. Singleton (2006) argues that in 1900 the central banker was a highly specialised breed of banker. After 1914 central bankers began to acquire many of the characteristics of the civil servant, and during the second half of the twentieth century they were increasingly likely to be economists too. Yet Singleton does not acknowledge that some central bankers might also have been entrepreneurs.

An older tradition examines the behaviour of central bankers from the perspective of the economics of bureaucracy. There were half a million central bankers (or central bank employees) around the world by the end of the twentieth century (*The Economist* 1998: 162). Central bankers were self-serving empire builders or rent-seekers (Toma and Toma 1986). Because of the capacity to 'print their own money', central bankers faced the loosest possible budget constraint for much of the twentieth century. According to Lindsay Knight, an Assistant Governor, the RBNZ in the early 1980s was a 'comfortable old slipper' with working conditions and scones that were the 'envy of visiting Treasury officers' (quoted in Singleton *et al* 2006: 237). Central bankers used their ingenuity to complicate both their goals and their procedures, with a view not only to expanding their empires but also to evading responsibility for failure. The chairman of the Fed attempted to play off various interest groups, including Congress, the White House, the farmers, and the banking industry, in order to create autonomy for himself and his institution (Kettl 1988). A central bank with multiple objectives always has a handy excuse when something goes wrong: 'We're sorry inflation rose, but we were worried about jobs' or *vice-versa.* No wonder central bankers preferred 'discretion' to 'rules'. The fact that a few central banks, including the RBNZ, slashed operating costs drastically in the 1990s merely served to highlight the continued inefficiency of the majority (McKinley and Banaian 2005). Central bank independence in the 1990s was supposed to be accompanied by increased accountability, but this did not always follow. The European Central Bank, set up in 1999, is the most independence and the least accountable central bank in history (Forder 2002).

By following a simple monetary rule, Friedman (1982: 117) contended, the Fed could assign the conduct of open market operations to a single part-time employee, dispensing with many of its research staff. The Fed, however, had no wish to relinquish its discretionary power and prestige, let alone downsize. "After studying the Fed for [its] 67 years', quipped Friedman in 1981, 'I have no doubt that the United States would be better off if the Federal Reserve had never been established' (quoted in Nelson 2007: 161-2.) One of Friedman's best-known works, the *Monetary History of the United States*, dwelt at length on disastrous policies of the Fed during the depression of the early 1930s (Friedman and Schwartz 1963). He also blamed the Fed for the great inflation starting in the 1960s. Friedman's underlying hypothesis, that central bankers have done more harm than good, is not easily dismissed. We simply don't know what would happen in a counterfactual world with a Friedmanite monetary rule or even free banking.

Lambsdorff and Schinke (2002, 2006) go much further, showing that central bankers are not immune to temptation: they might print money and put it in their own pockets, or sell information about impending policy changes such as a currency devaluation. In some cases they might be coerced into corruption by politicians. In societies with a high level of corruption, such as some of those in South East Asia, it is difficult if not impossible for the central bank to remain completely clean (Hamilton-Hart 2002).

Baumol's framework suggests that in different contexts, and when faced with varying incentives, central bankers could become productive or unproductive entrepreneurs. The remainder of this paper considers some instances of entrepreneurship in central banking, and asks whether they enhanced economic welfare. We find that the distinction between productive and unproductive entrepreneurship breaks down when the welfare implications of alternative policies are ambiguous. If, in some important areas of central banking, we cannot with confidence distinguish between productive and non-productive behaviour, we are not in a strong position to comment on the suitability of the incentives faced by central bankers.

Central banking: a framework

At this juncture it might help to explain what central banks do. The precise answer differs from country to country and over time. Central banks are multifunctional not-for-profit businesses, standing between the public and private sectors. Activities commonly undertaken include:

1. Issuing legal tender notes and distributing coin to meet the requirements of the public.
2. Carrying out banking and agency services for the government, including managing the public debt.
3. Acting as the custodian of the cash reserves of commercial banks, and assisting in the settlement of clearance balances between them, and between the commercial banks and the government.
4. Preserving the integrity of the financial system, including acting as an emergency lender of last resort to troubled banks, and supervising banks in general.
5. Carrying out government policy on the exchange rate and the balance of payments, and acting as custodian of the national reserves of international currency and assisting in their management.
6. Controlling monetary and credit conditions in the public interest – monetary policy. This is the most visible function of the central bank. Monetary policy may be implemented through variations in interest rates, variations in the money supply, or administrative controls.
7. Participating in cooperative international monetary arrangements.
8. Promoting economic development.
9. Advising the government on economic policy.

One way of examining the question of entrepreneurship in central banks is to focus on the distinctive contributions of key individuals, and this approach is taken in the following three sections. Montagu Norman, Governor of the Bank of England between 1920 and 1944, was an ardent proponent of the establishment of new central banks in Europe and the British Empire and the father of the BIS. Paul Volcker, the Chairman of the Federal Reserve Board between 1979 and 1987, reasserted the Fed's independence and implemented a revolution in monetary policy. Don Brash, Governor of the RBNZ from 1988 to 2002, pressed for the introduction of a new type of prudential supervision and sought to contain internal costs. It is not suggested that the only the governors of central banks can be entrepreneurs, merely that examining these famous cases will help to identify some of the issues. The final section concerns the involvement of central banks in the development and modernisation of the payment and settlement system and is more impersonal.

Montagu Norman

The chapter headings of Andrew Boyle's (1967) biography of Norman are intriguing: he was in turn the novice, the escapist, the possessed, the onlooker, the insider, the alchemist, the illusionist, the defendant, and the scapegoat. But Norman, a merchant banker by trade, was also an institutional entrepreneur, who devoted a great deal of energy to promoting and (with varying degrees of success) designing new central banks for countries on several continents. His motives were partly economic and partly political. He wished, at least in the 1920s, to strengthen the revived Gold [Exchange] Standard, by establishing new institutions that would support this policy framework. Politically, he was anxious to spread the values of liberal capitalism into central and eastern Europe

(Péteri 1992: 251), to bind together the far-flung corners of the British Empire, and to make it more difficult for governments to interfere in banking and monetary policy. Though Norman failed in many of these endeavours, some of the central banks that he helped to set have survived.

The International Financial Conference at Brussels, 1920, which had been called by the League of Nations, recommended that every country have an independent bank of issue or central bank (Davis 1920; League of Nations 1945: 12, 20). During the 1920s the League of Nations Financial Committee, which enjoyed particularly close links with the Bank of England (Clavin 2003: 223), advanced a number of financial stabilisation schemes, incorporating the formation of autonomous central banks, for the recently independent countries of central and eastern Europe. Norman and other leading central bankers provided the League and its clients with advice, personnel, short term credit (on occasion), and help with the marketing of reconstruction loans. Inevitably there was some jockeying for position, especially between the Bank of England and the Bank of France.

The first League of Nations reconstruction scheme, for Austria, was to a large extent subcontracted to Norman. The Austro-Hungarian central bank had been liquidated in 1919, leaving Austria, Hungary, and Czechoslovakia without central banks (Schubert 1999). As well as a loan guaranteed by European governments, and measures to balance the budget and stabilise the currency, the League proposed the establishment of a new central bank in Vienna. Sayers (1976, vol. 1: 168) remarked that the institutional design of the Austrian National Bank (ANB), which opened in 1923, reflected 'the British view in its entirety: no government officials, directors elected by shareholders, no lending to governmental bodies, and a note issue with partial gold cover'. A precedent was set when the League insisted that the ANB should have foreign advisers (Santaella 1993), the first of whom was Swiss, who would keep in close touch with the League and the key foreign central banks. The Hungarian central bank, established in 1924, was modelled on its Austrian counterpart (Péteri 1992). Central banks were also set up in Czechoslovakia, Poland, Yugoslavia, the Baltic States, and even Danzig, though the extent to which the League and Norman were involved varied. The policy frameworks imposed on such countries in the 1920s – what might be termed the gold standard mentality – proved completely irrelevant after 1929.

Norman also promoted the development of central banking in the more sophisticated countries of the British Empire, primarily as a means of ensuring that they pursued sound monetary and financial policies (Plumptre 1940; Sayers 1976 I: 200-10; Cain and Hopkins 1993: 90-2, 109-45). Australia already had an embryonic central bank by 1914. The SARB was created in 1921 with strong support from Norman and the Bank of England (De Kock, G. 1954). A former Bank of England official, W.H. Clegg, was appointed as the first Governor of the SARB. Another Bank of England official, Sir Otto Niemeyer, was invited by the New Zealand government, in 1930, to advise them on exchange rate policy. Norman grasped this opportunity to argue for a central bank. Modelled loosely on Niemeyer's proposals, the RBNZ was set up in 1934, once more with a CEO drawn from the ranks of the Bank of England (Singleton *et al* 2006: ch. 1; Hawke 1973: 12-81; Wright 2006).[1] But the most important country in the British Empire was India. Whether or not India should have a central bank was a matter of intense controversy during the 1920s and 1930s. Norman hoped that the quasi-official Imperial Bank of India would evolve into a central bank and then enter into a 'hindoo marriage' with

[1] The Bank of Canada, founded in 1935, owed less to the Bank of England, towards which the Canadians were suspicious (Cain 1996)

the Bank of England (Balachandran 1994: 629). In the event a new institution, the Reserve of India, was set up in 1935. Norman achieved his objective of seeing the foundation of central banking in each of the main countries of the British Empire. However, he found that several of these central banks, and not least the RBNZ, were susceptible to local political influence.

In 1925 Norman, the high priest of central bank cooperation, proposed the establishment of an international club for central bankers. An opportunity to achieve this goal was presented in 1930, when it became necessary to create a new bank to handle the payments associated with German reparations. The Bank for International Settlements was an early example of collective entrepreneurship by Europe's leading central bankers, including Norman, Emile Moreau (Bank of France), and Hjalmar Schacht (Reichsbank). With the suspension of reparations payments in 1931, the BIS had to find a new role, much as the IMF did after the collapse of Bretton Woods. The BIS became the central bankers' meeting place, surviving many vicissitudes during the 1930s and 1940s, and ultimately becoming an important player in the management of the international economy (Toniolo 2005).

Norman failed to embed a revived gold-based world monetary system, managed by independent central banks. He was, however, involved in the establishment of a number of central banks as well as the BIS, although his was never the only voice. The institutional and policy framework that Norman recommended was far from ideal (and was not always accepted), but at least some of the central banks set up in the 1920s and 1930s were survivors. Norman was undoubtedly an entrepreneur, and he intended his activities to be productive and welfare enhancing. But whether or not the fruits of his entrepreneurial endeavours should be judged productive or non-productive is debatable. His legacy is nothing if not ambiguous.

Paul Volcker

Paul Volcker was an ideational entrepreneur. He transformed the Federal Reserve System from an organisation that sought to live with inflation into one that fought it. In the process, the Fed was able to assert a much larger measure of autonomy from Congress and the government, an independence that persisted until the crisis of 2007-09.[2]

It is unlikely, though, that Volcker would recognise himself as an entrepreneur; in later in life he compared himself to a physician. 'The doctor says, "I know you don't like this, but it's good for you." Maybe that sounds trivial. But you don't do it unless you think it's for the overall good of the country (quoted in Treaster 2004: 9).' He certainly prescribed strong medicine, tightening US monetary policy sharply between 1979 and 1982, becoming a hero to some and a villain to others.

After serving as the President of the New York Fed, Volcker succeeded the ineffectual G. William Miller as Chairman of the Federal Reserve Board in August 1979 (Romer and Romer 2004: 156-7). Inflation had been a problem in the US since the mid-1960s. During the 1970s, inflation was accompanied by slow economic growth (stagflation). Miller and his predecessor, Arthur Burns, drew

[2] Is it legitimate to talk about monetary policy in a business history paper? Yes, it is. A paper on entrepreneurship in the aircraft industry might have to say something about aircraft. A paper on the pharmaceuticals industry might include some reference to pharmaceuticals. Monetary policy, moreover, influences the choices open to firms of all sorts.

back from tackling inflation head on, partly out of deference to the electoral concerns of the government, and partly because they subscribed to a broadly Keynesian view of the economy. Although Congress required the Fed to announce monetary targets from 1975 onwards, little importance was attached to these targets in practice. Between 1975 and 1979, monetary policy continued to be implemented through the manipulation of interest rates rather than the control of the money supply.

Fearing the effects of rampant inflation, Volcker introduced radical new operating procedures in October 1979, based on controlling the path of non-borrowed bank reserves. Open market operations (OMOs) would be conducted with the aim of ensuring that the level of non-borrowed reserves was consistent with the official targets for money supply and commercial bank credit. The federal funds rate (the previous policy interest rate) was now allowed to fluctuate within wide bands. In essence, Volcker had switched from an interest rate target to something approaching a monetary base target (Hetzel 2008: 151-71).

Volcker set out his philosophy in the March 1980 Federal Reserve *Bulletin*.

> In the past, at critical junctures for economic stabilization policy, we have usually been more preoccupied with the possibility of near-term weakness in economic activity or other objectives than with the implications of our actions for future inflation. . . . The result has been our now chronic inflationary problem. . . . The broad objective of policy must be to break that ominous pattern. . . . Vacillation and procrastination, out of fears of recession or otherwise, would run grave risks (quoted in Romer and Romer 2004: 145).

In fact Volcker was not quite as single-minded as his manifesto promised. Interest rates rose significantly between August 1979 and April 1980, but then the Fed hesitated for a few months as the real economy weakened markedly and panic gripped the Carter administration. Not until after the presidential election, won by Ronald Reagan, who was expected to be more supportive of tight monetary policy, did Volcker and the Fed return to the attack (Goodfriend and King 2005). Inflation was still running at 12 per cent per annum. The federal funds rate was permitted to rise by 600 basis points in November and December 1980 alone. Monetary stringency was maintained during 1981, with the Fed opting to sacrifice recovery from the 1980 recession in order to smash inflation. It is inconceivable that either Burns or Miller would have acted with Volcker's resolve. The costs of disinflation in terms of lost output and unemployment were very considerable. America experienced one of its worst recessions of the post-war era, and even Reagan found the recession hard to bear.

Following the abatement of inflationary pressure, the Fed reverted to 'business as usual' in October 1982. The money supply was now given less prominence, and there occurred a covert return to the old policy of managing the federal funds rate. Volcker became more responsive to the level of slack in the economy. This was a slap in the face for monetarists, and confirmed that the Fed, like most other central banks, was essentially pragmatic. Milton Friedman was not amused, concluding that Volcker had been toying with monetarism (Nelson 2007: 168). Nevertheless, Volcker had established such a reputation for toughness in the battle against inflation that both he and the Fed became difficult to challenge. Although Ronald Reagan considered appointing a new Fed chairman at the end of Volcker's first term in 1983, he was persuaded that any change would be unpopular with the financial sector, and would make the government look soft on inflation (Treaster 2004: 176). Volcker had restored the independence of the Fed, and his eventual successor, Alan Greenspan, would consolidate that independence.

Volcker also played an entrepreneurial role in the operation to contain the effects of the international debt crisis in the 1980s. Hearing that Mexico was in dire straits whilst relaxing on a fishing trip in Wyoming, Volcker packed away his tackle and ‘headed back to Washington almost fishless’ (Volcker and Gyohten 1992: 200). Great efforts were required to avert an international banking collapse. In view of our interest in productive and non-productive entrepreneurship, it must be noted that the debt crisis was not an exogenous event. The increase in interest rates engineered by Volcker in 1979-82, and the associated strengthening of the US dollar, put considerable pressure on borrowers in the developing world (Dornbusch, Vinals and Portes 1988: 246). In combination with other financial and economic problems, the surge interest rates proved too much for some countries. The scares experienced in the international banking system in the early 1980s prompted central bankers to devote more attention to the design of crisis prevention measures. Volcker was prominent in the negotiations that led in 1988 to the first Basel Accord, which specified minimum capital adequacy standards for G-10 banks (Kapstein 1989: 333).

In a recent history of US monetary policy, Hetzel (2008: 153, 172) describes Volcker as a ‘natural leader’ and an excellent ‘crisis manager’. Stephen Axilrod (2009: 91), who worked closely with Volcker, said that he ‘was responsible for a major transformation – akin to a paradigm shift’ in the central bank’s response to inflation. Volcker restored the battered reputation of the Fed. Indeed, ‘It was solely because of Volcker that this particular innovation [in monetary policy between 1979-82] was put in place, one of the few instances in my opinion where a dramatic shift in policy approach could be attributed to a particular person’s presence rather than mainly to or just circumstances (Axilrod 2009: 91).’ Without realising it, Hetzel and Axilrod are describing some of the characteristics of an entrepreneur.

Volcker was a revolutionary figure in twentieth century central banking, inspiring some of the conservative central bankers of the following twenty-five years. Whether he was on balance a productive or a non-productive entrepreneur is a question that cannot be answered definitively, though for Hetzel and Axilrod the answer is not in doubt. The relative value placed on the control of inflation compared with the stabilisation of output and employment in conditions such as those of the early 1980s depends on the perspective of the observer. The unanticipated effects of Volcker’s actions on the international banking system and borrower nations should also be borne in mind when assessing his achievements. As in the case of Montagu Norman, it is difficult to fit Volcker into Baumol’s categories.

Don Brash

When Don Brash was appointed Governor of the RBNZ in September 1988, several of the innovations for which New Zealand became well known in the 1990s were already in the offing. New Zealand’s distinctive variety of central bank independence, involving a contract between the Governor and the Minister of Finance, as set out in the 1989 Reserve Bank Act, was the product of several years of debate between Reserve Bank and Treasury officials. Furthermore, the inflation targeting framework owes its origins to remarks by the finance minister, Roger Douglas, who said on TV in April 1988 that he would like inflation to be reduced to no more than 1% per annum within a couple of years (Reddell 1999). Douglas, who had first suggested that the central bank should begin thinking about CBI, was a peerless and controversial policy entrepreneur. Yet Brash would prove entrepreneurial in the *implementation* of the new monetary policy framework as well as in other important areas: the advent of transparency, the reform of prudential supervision, and the promotion of internal efficiency.

Until the 1989 Reserve Bank Act, most central bank legislation was vague on the details of the relationship between the central bank and the government. New Zealand became the first country to spell out the terms of this relationship. In conformity with the broad thrust of public sector reforms in New Zealand (Green and Singleton 2009), the relationship between the central bank and the government was placed on a businesslike footing. A Policy Targets Agreement would be negotiated between the Governor of the RBNZ and the Minister of Finance. Once this agreement – in the event couched as an inflation target – was signed, the Governor enjoyed full operational authority, but risked dismissal (or at least public chastisement) if the target was missed. Brash was an enthusiastic supporter and advocate of these arrangements.

Unlike previous central bankers, who revelled secrecy, Brash was genuinely committed to the principles of accountability and transparency, and regarded public communication of the RBNZ's thinking as one of his main functions (Von Furstenberg and Ulan: 211–13). Under the terms of the 1989 Act, the central bank was required to issue a Monetary Policy Statement (MPS) twice a year. The MPS analysed the current economic situation, outlined the prospects for inflation, and discussed the implications for policy. Economic forecasts were published in the intervening quarters. No other central bank provided the public with as much information and commentary. Brash made frequent public appearances. By keeping the public and financial markets informed, especially about how he would act in different situations, he hoped to mould price- and wage-setting behaviour. Brash was a more accomplished communicator than any of his predecessors. As well as explaining current economic policy, he sought to justify and entrench the new policy framework. He spoke on the international as well as the local stage.

The introduction of a new and highly innovative prudential regime based on 'attestation and disclosure' provides a second instance of Brash's entrepreneurship. New Zealand did not have a formal regime of prudential supervision until 1987. In the late 1980s the largest commercial bank, the Bank of New Zealand (BNZ), fell into serious difficulties as a result of reckless lending and inadequate risk management (Singleton and Verhoef forthcoming 2010). What was the best way of avoiding the recurrence of such incidents? On the one hand, the Basel Accord put New Zealand under pressure to introduce minimum standards of capital adequacy by 1991. The norm in many countries, including the US, moreover, was for bank supervisors to conduct detailed on-site examinations to determine whether banks were compliant with regulations. On the other hand, ideational entrepreneurs within the RBNZ believed that the close supervision of banks was unnecessary and potentially counterproductive, for it could give bank customers the false impression that the authorities were responsible for the health of individual financial institutions. These issues were discussed in great detail and with some rancour within the central bank. Banking supervisors (a new and low status group) advocated a relatively standard regime, whereas economists (an established and high status group) argued for a light-handed regime of supervision.

Rejection of the Basel Accord was not practicable because that would have created uncertainty about the New Zealand banking system in the financial capitals of the world. Brash came down in favour of an approach involving the minimum level of supervision deemed necessary to conform to the Accord. The new prudential regime, which came into force in January 1996, was different from any other in the developed world. Each registered bank was required to draw up and publish a quarterly disclosure statement. The purpose of this statement was to inform the public and the financial markets of the true condition of the bank (including with respect to the Basel ratios), and thus to provide the basis for sound financial decisions. No additional information was supplied to the central bank. Directors of each registered bank were required to attest to the accuracy and truthfulness of the information disclosed to the public, and could face prosecution if that information was false (Singleton *et al* 2006: ch 7).

Critics argued that New Zealand was free-riding on the British and Australian bank regulators (Turner 2000). Over 90% of the assets of the New Zealand banking sector were held by banking groups from those countries. Brash strenuously denied the charge of free-riding, but the important point for our purposes is that he was prepared to introduce a radically different approach to prudential supervision from that seen in Europe or North America. Whether or not New Zealand deserves to be seen as a free-rider, its banking system survived the worst of the 2007-09 global financial turmoil unscathed.

The 1989 Act also provided for regular funding agreements – the equivalent of Policy Targets Agreements – between the Governor and the Minister of Finance. Central banks had almost always operated with loose (or non-existent) budget constraints. Their power of money creation led to a culture gold-plating. But gold-plating was not an option under the tough funding agreement that was in effect imposed by the New Zealand government in the early 1990s. Brash, however, surprised everyone by more than living within the budgetary target set. Some non-core activities and installations were spun-off or closed down, and mechanisation reduced the demand for semi-skilled labour in activities such as note processing. Brash's zeal for economy ensured that New Zealand became one of the most efficient of central banks in the 1990s (Mendzela 1994).

After the recession of the early 1990s, New Zealand enjoyed fifteen years of almost uninterrupted economic growth and financial stability. Criticism of the RBNZ and of Brash became increasingly muted over this period. Indeed, New Zealand came to be seen as an exemplar of central bank practice, especially in the areas of governance, transparency, and monetary policy (Svensson 2001). Brash appears to have been a relatively productive central banking entrepreneur.

Payment and settlement system reform

A distinguishing feature of the 'central' bank is that it stands at the centre of the national payment and settlement system. Payments between banks, and between banks and the government, are settled by transfers between their 'settlement' accounts at the central bank. Each economy contains systems for the processing of different types and sizes of transaction, such as EFTPOS, cheques, and securities trades. These payment systems are then linked to the settlement accounts at the central bank (Summers 1994; Fry *et al* 1999; Mayes 2006). In recent decades central banks have been in the forefront of change in this area, especially through their involvement in modernising the interface between payment systems and the settlement accounts. The primary objective of central banks has been to reduce the risks faced by users of these systems and their clients as well as by the financial system as a whole.

The modern payment and settlement system emerged during the nineteenth century. Because of their official or semi-official status, banks of issues (central banks) came to be seen as the safest depositories for the reserves of other banks. Central banks, moreover, were well-placed to supply cheap liquidity to the banking system so as to facilitate the smooth conduct of settlement, and if necessary to act as the emergency lender of last resort (Goodhart 1988; Bagehot 1873).

The need for security, certainty, and massive amounts of liquidity makes the settlement function a natural monopoly. Payment systems are akin to network industries. The successful functioning of a payment system depends on cooperation amongst member banks. Establishing a new payment system, or upgrading an existing one, requires consensus, but this might be difficult to obtain. The central bank may step in as a coordinator to ensure that decisions are made and implemented without excessive delay (Committee on Payment and Settlement Systems 2005: 9, 10 23-5). Either the central bank could persuade the banks to agree on investing in a new payment system, or it could install and operate the new system itself. A common justification (or rationalisation) for central bank operation of payment systems is the need to safeguard the stability of the banking industry.

Central bank involvement in the ownership and operation of payment systems varies. Khiaonarong (2003: 20) found that 64 per cent of a sample of large value payment systems in Europe and the Asia-Pacific in the early 2000s were owned by central banks, 13 per cent were in private ownership, and 24 per cent were in joint central bank and private ownership. Private ownership predominated in retail payment systems. Some central banks followed a minimalist approach, owning the central platform linking the payment system as a whole to the settlement accounts, but leaving other payment systems in private hands. The Bank of Finland and the Reserve Bank of Australia were in this group, and the Bank of England did not even own the central platform. By contrast the Bank of Thailand pursued a maximalist approach, owning and operating the bulk of the large value payment system in Thailand. The Fed was one an intermediate position, owning Fedwire, one of two large value payments systems in the US, and offering a nationwide cheque collection facility.

Gilbert (2000) discusses one entrepreneurial action of the newly formed Fed, namely to establish an interregional mechanism for the collection of cheques in 1915. (By ‘collection’ we mean the presentation of cheques to the payer’s bank to initiate payment and settlement with the payee’s bank.) For legal reasons, and because of the fragmentation of the US banking system, the interregional collection of cheques was a costly and protracted matter for the payee’s bank. The Fed was able to provide a smoother (and cheaper because subsidised) service, not least because it was the only bank authorised to operate nationwide. Similarly, in 1918, the US central bank set up the Federal Reserve Wire Transfer Service (Fedwire) to facilitate interregional electronic funds and securities transfers (Gilbert, Hunt, and Winch 1997). The 1913 Federal Reserve Act did not require the central bank to offer either of these services. Consequently we can regard the Fed’s involvement in them as entrepreneurial. Whether or not these new services would have emerged in the absence of a Fed initiative, and whether the Fed operated them efficiently, are interesting but different questions.

Financial liberalisation raised concerns about the robustness of existing payment and settlement networks in the 1980s and 1990s. Participants are exposed to operational, legal, credit, and liquidity risk. A bank with insufficient funds in its settlement account, and no further means of supplementing these funds, must cease payment, causing a ripple through the payment and settlement system. In extreme cases the entire system could break down if the authorities do not inject sufficient emergency liquidity.

Payment systems are linked to settlement accounts either by a deferred net settlement (DNS) or by a real time gross settlement (RTGS) platform. Under DNS, payments are aggregated, and a single round of net settlements occurs at the end of the day. Although this arrangement is convenient, the damage caused by the failure of a bank to settle could be very large because large net debits could build up in the course of a day. By contrast, under RTGS a stream of gross payments is processed throughout the day. RTGS requires more liquidity, but problems are revealed instantaneously, and no bank is permitted to run up large debits with the rest of the system. Should a problem emerge under RTGS, the central bank must decide whether to supply additional liquidity to the market or the illiquid bank or do nothing. If the difficulty is expected to be transitory, the unmet request for settlement may be shunted into a loop and presented again later in the day, by which time the bank concerned might have gained liquidity. RTGS protects banks, their customers, and the financial system from some risks, but requires the central bank to be more active in the supply of liquidity, particularly on an intra-day basis.

Whereas DNS is a centuries old approach, RTGS was introduced by Fedwire 1917, offering another example of entrepreneurial initiative by the US central bank. The Danish National Bank was the next central bank to introduce an RTGS platform in 1981. From the mid 1980s onwards, there was a trend amongst central banks, first in developed and then in developing countries, to switch from DNS to RTGS. Most of the central banks concerned decided to own and operate the new RTGS platforms. Using terminology from the literature on innovation, Bech and Hobijn (2007: 161) describe those central banks that adopted RTGS before 1987 as innovators, those that migrated to RTGS between 1986 and 1998 as opinion leaders, those that switched between 1998 and 2004 as the early majority, and subsequent adopters as the late majority. In 1999 the Trans-European Automated Real-time Gross settlement Express Transfer system (TARGET), which links the RTGS system of the European Central Bank (ECB) to the RTGS platforms of participating European nations was established (Bech and Hobijn 2007: 154). The extent to which the migration from DNS to RTGS was justified by the relative merits of the two methods is a matter for debate (Kahn, McAndrews, and Roberds 2003). Nevertheless, the promotion of RTGS is a clear example of central banks acting entrepreneurially.

Khiaonarong (2003) found that the costs of operating payment systems tend to be lower when they are in private hands. However, users do not necessarily pay less for private payment services because many central banks provide large subsidies for their own payment services. Central banks may also offer greater security and higher quality service.

It may be concluded that central banks have often acted as productive entrepreneurs in the field of payment and settlement systems. They have helped to establish new services that otherwise might not have appeared as soon. In a field where security and reliability are paramount considerations, central banks offer services in which users can have full confidence.

Conclusion

Central bankers are capable of being as entrepreneurial as anyone else, and certainly as entrepreneurial as anyone in the public sector proper. The examples discussed above show how central bankers created new institutions (Montagu Norman), forged new policy frameworks (Volcker and Brash), reformed their own institutions (Brash), and promoted the adoption of new technologies (RTGS). Central bankers were interested in far more than bureaucratic expansion, though it must be acknowledged that until the 1990s they rarely allowed questions of internal efficiency to distract them from grander objectives.

But what kind of entrepreneurs are central bankers? Are they productive or non-productive? This type of question is difficult to answer in the absence of conclusive measures of the welfare effects of their initiatives. From some perspectives, central banking is an unnecessary or even a harmful pursuit. Even if we assume that central banks have the potential to increase public welfare, their actions, though guided by good attentions, could easily misfire. Few would question that the members of the Federal Reserve Board believed that they were conducting their affairs responsibly in 1929-33, yet the outcome was a terrible depression and the collapse of one-third of the US banking sector. Were Montagu Norman's efforts to foster the emergence of new and ideologically orthodox (pro-gold standard and later pro-sterling bloc) central banks productive or non-productive? That depends on what one thinks of the gold standard. Was Paul Volcker's anti-inflationary campaign productive or unproductive? That depends on how one weighs the costs and benefits of his policies.

Baumol's categorisation of entrepreneurship as productive, unproductive, or destructive is certainly thought provoking, but it is not readily applicable to situations and industries in which the distinction between productive and non-productive is hard to establish with any certainty. Central banking is such an industry. Central banks produce complex services such as monetary policy and financial stability policy. In the field of monetary policy in particular, the decisions of central banks may be controversial and their outcomes matters of enduring debate.

Bibliography

Axilrod, Stephen H. 2009. *Inside the Fed: Monetary Policy and its Management, Martin through Greenspan to Bernanke*. Cambridge MA: MIT Press

Bagehot, Walter 1873. *Lombard Street*. London: King

Bakir, Caner 2009. 'Policy Entrepreneurship and Institutional Change: Multilevel Governance of Central Banking Reform', *Governance: An International Journal of Policy, Administration, and Institutions* 22, 4: 571–598

Balachandran, G. 1994. 'Towards a "Hindoo Marriage": Anglo-Indian monetary relations in interwar India, 1917-35', *Modern Asian Studies* 28, 3: 615-47

Baumol, William J. 1990. 'Entrepreneurship: productive, unproductive, and destructive', *Journal of Political Economy* 98, 5, pt 1: 893-921

Baumol, William J. 1993. *Entrepreneurship, Management and the Structure of Payoffs*. Cambridge, MA: MIT Press

Bech, Morten L. and Hobijn, Bart 2007. 'Technology diffusion within central banking: the case of real-time gross settlement', *International Journal of Central Banking* 3, 3: 147-81

Bowen, Harry P. and De Clercq, Dirk 2008. 'Institutional context and the allocation of entrepreneurial effort', *Journal of International Business Studies* 39, 4: 747-67

Boyle, Andrew 1967. *Montagu Norman*. London: Cassell

Cain, Peter J. 1996. 'Gentlemanly imperialism at work: the Bank of England, Canada, and the Sterling Area, 1932-1936', *Economic History Review* 49, 2: 336-57

Cain, Peter J. and Hopkins, Anthony G. 1993. *British imperialism: crisis and deconstruction, 1914—1990.* London: Longman

Capie, Forrest and Wood, Geoffrey E. 1991. *Unregulated Banking: Chaos or Order?* New York: St Martin's.

Clavin, P. 2003. '"Money talks": competition and cooperation with the League of Nations, 1929-30', in M. Flandreau (ed.), *Money doctors: the experience of international financial advising 1850-2000*. London: Routledge, pp. 219-48

Committee on Payment and Settlement Systems 2005. *Central bank oversight of payment and settlement systems*. Basel: BIS.

Davis, J. S. 1920. 'World currency and banking: the first Brussels financial conference', *Review of Economic Statistics* 2, 12: 349-60

De Kock, G. 1954. *A history of the South African Reserve Bank, (1920-52)*. Pretoria : J.L. Van Schaik

Dornbusch, Rudiger, Vinals, Jose and Portes, Richard 1988. 'Mexico: Stabilization, Debt and Growth', *Economic Policy* 3, 7: 233-283

Douhan, Robin and Henrekson, Magnus 2008. 'Entrepreneurship and second-best Institutions: going beyond Baumol's typology', IFN Working Paper No. 766

Forder, James 2002. 'Interests and "independence": the European Central Bank and the theory of bureaucracy', *International Review of Applied Economics* 16, 1: 51-69

Fox, Justin 2008. 'The comeback Keynes', Time 23 Oct. http://www.time.com/time/magazine/article/0,9171,1853302,00.html (accessed 27 Mar. 2010)

Friedman, Milton 1982. 'Monetary policy: theory and practice', *Journal of Money, Credit and Banking* 14, 1: 98-118

Friedman, Milton and Schwartz, Anna J. 1963. *A monetary history of the United States, 1870-1960*. Princeton: Princeton University Press

Fry, M. J., Kilato, I. R., Senderowicz, S., Sheppard, D., Solis, F., and Trundle, J. 1999. *Payment systems in global perspective*. London: Routledge

Gerschenkron, Alexander 1953. 'An economic history of Russia', *Journal of Economic History* 12, 2: 146-59.

Gerschenkron, Alexander 1966. *Economic Backwardness in Historical Perspective*. Cambridge, MA: Belknap Press

Gilbert, R. Alton 2000. 'The advent of the Federal Reserve and the efficiency of the payments system: the collection of checks, 1915-1930', *Explorations in Economic History* 37: 121-48

Gilbert, R. Alton, Hunt, Dara, and Winch, Kenneth C. 1997. 'Creating an integrated payment system: the evolution of Fedwire', *FRBNY Economic Policy Review*, July: 1-7

Goodfriend, M. and King, R. 2005. 'The incredible Volcker disinflation', *Journal of Monetary Economics* 52, 5: 981-1015

Goodhart, Charles 1988. *The evolution of central banks*. Cambridge MA: MIT Press

Green, David and Singleton, John 2009. *The watchdog: New Zealand's audit office 1840-2008*. Dunedin: University of Otago Press

Hamilton-Hart, Natasha 2002. *Asian states, Asian bankers: central banking in Southeast Asia*. Ithaca NY: Cornell University Press

Hawke, Gary R. 1973. *Between governments and banks: a history of the Reserve Bank of NewZealand*. Wellington: Government Printer

Hawtrey, Ralph G. 1932. *The art of central banking*. London: Longmans, Green

Hetzel, Robert L. 2008. *The monetary policy of the Federal Reserve: a history*. Cambridge: Cambridge University Press

Hood, C. 1995. ‘The “New Public Management” in the 1980s: variations on a theme’, *Accounting, Organizations & Society* 20, 2/3: 93-109.

Jones, Geoff 2010. ‘What is new in business history?’, Powerpoint presentation at symposium on ‘What is new in business history?’, University of Gothenburg

Kahn, C. M., McAndrews, J. and Roberds, W. 2003. ‘Settlement risk under gross and net settlement’, *Journal of Money, Credit and Banking* 35, 4: 591-608

Kearney, Claudine, Hisrich, Robert and Roche, Frank 2008. ‘A conceptual model of public sector corporate entrepreneurship’, *International Entrepreneurial Management Journal*, 4: 295–313

Kettl, Donald F. 1986. *Leadership at the Fed*. New Haven: Yale University Press

Khiaonarong, Tanai 2003. ‘Payment systems efficiency, policy approaches, and the role of the central bank’, Bank of Finland Discussion Papers 1/2003

Khiaonarong, Tanai and Liebenau, Jonathan 2009. *Banking on Innovation: Modernisation of Payment Systems*. Heidelberg: Physica Verlag

Lambsdorff, Johann Graf 2007. *The Institutional Economics of Corruption and Reform: Theory, Evidence and Policy*. Cambridge: Cambridge University Press

Lambsdorff, Johann Graf and Schinke, Michael 2002. ‘Non-benevolent central banks’, Centre for Globalization and Europeanization of the Economy Working Paper No. 16

Lambsdorff, Johann Graf and Schinke, Michael 2006. ‘Insider-trading among central bankers: a treatise on temptation and policy choice’, University of Passau Discussion Paper No. V-34-06

League of Nations 1945. *The League of Nations reconstruction schemes in the inter-war period*. Geneva: League of Nations

Marcussen, Martin 1998. ‘Central bankers, the ideational life-cycle and the social construction of EMU’, European University Institute, Robert Schuman Centre, Paper No. 98/33

Marcussen, Martin 2005. 'Central banks on the move', *Journal of European Public Policy* 12: 5, 903-23

Marcussen, Martin 2007. ‘Central banking reform across the world: only by night are all cats grey’, in Tom Christensen, Per Lægreid, eds, *Transcending new public management: the transformation of public sector reforms*. Aldershot: Ashgate, pp.135-53

Marcussen, Martin 2009. ‘Bending and bowing the BIS’, unpublished paper, University of Copenhagen

Markowski, Stefan and Hall, Peter 2007. ‘Public sector entrepreneurialism and the production of defense’, *Public Finance and Management*, 7, 3: 260-93

Mayes, David G. 2006. *The future of financial markets*. Basingstoke: Palgrave Macmillan

McKinley, Vern and Banaian, King 2005. ‘Central bank operational efficiency: meaning and measurement’, in Neil Courtis and Peter Nicholl (eds.), *Central bank modernisation*. London: Central Banking Publications, pp. 167-82

Mendzela, John. 1994. ‘Improving the Management of a Central Bank – A Case Study’, *IMF Working Paper 94/37*, 1994

Nelson, Edward 2007. ‘Milton Friedman and U.S. monetary history: 1961-2006’, *Federal Reserve Bank of St. Louis Review* 89, 3: 153-82

Peirce, W. S. and Kruger, P. 1993. ‘Entrepreneurship in a bureaucracy: the case of Friedrich Althoff’, *Journal of Economic Studies* 20, 4/5: 52-70

Péteri, G. 1992. ‘Central bank diplomacy: Montagu Norman and central Europe’s monetary reconstruction after World War I’, C*ontemporary European History* 1, 3: 233-58

Plumptre, A. F. W. 1940. *Central banking in the British dominions*. Toronto: University of Toronto Press

Reddell, Michael 1999. ‘Origin and Early Development of the Inflation Target’, *RBNZ Bulletin* 62, 3: 63–71

Romer, Christina D. and Romer, David H. 2004. ‘Choosing the Federal Reserve chair: lessons from history’, *Journal of Economic Perspectives* 18, 1: 129-61

Rose-Ackerman, Susan 1999. *Corruption and government: causes, consequences and reform*. Cambridge: Cambridge University Press.

Sadler, Robert J. 2000. ‘Corporate Entrepreneurship in the Public Sector: The Dance of the Chameleon’, *Australian Journal of Public Administration,* 59, 2: 25–43

Santaella, J. A. 1993. ‘Stabilization programs and external enforcement: experience from the 1920s’, *IMF Staff Papers* 40, 3: 584-21.

Sayers, Richard S. 1976. *The Bank of England 1891-1944.* Cambridge: Cambridge University Press, vol. 1.

Schubert, A. 1999. ‘The emergence of national central banks in central Europe after the break-up of the Austro-Hungarian monarchy’, in Holtfrerich, Reis, and Toniolo (eds.), *The emergence of modern central banking from 1918 to the present*. Aldershot: Ashgate, pp. 186-230

Shleifer, Andrei and Vishny, Robert W. 1998. *The grabbing hand: government pathologies and their cures*. Cambridge MA: Harvard University Press

Singleton, John 2006. ‘The central bank and government partnership in Australia and New Zealand since the 1930s’, in Gordon Boyce, Stuart Mcintyre and Simon Ville (eds.), *How organisations connect*. Melbourne: Melbourne University Press, pp. 100-22

Singleton, John (forthcoming 2010). *Central banking in the twentieth century*. Cambridge: Cambridge University Press

Singleton, John, with Grimes, Arthur, Hawke, Gary, and Holmes, Frank 2006. *Innovation and independence: the Reserve Bank of New Zealand, 1973-2002*. Auckland: Auckland University Press

Singleton, John and Verhoef, Grietjie 2010. 'Regulation, deregulation and internationalization in South African and New Zealand banking', *Business History*.

Summers, B. J. (ed.) 1994. *The payment system: design, management, and supervision*, Washington, DC: International Monetary Fund

Svensson, Lars E. O. 2001. *Independent Review of the Operation of Monetary Policy in New Zealand: Report to the Minister of Finance*, Wellington: Treasury

The Economist 1998. 'Central bankers', 28 Nov. 1998, p. 162

Toma, E. F. and Toma, M. (eds.) 1986. *Central bankers, bureaucratic incentives and monetary policy*. Dordrecht: Kluwer

Toniolo, Gianni 2005. *Central bank cooperation at the Bank for International Settlements, 1930*-1973. Cambridge: Cambridge University Press

Treaster, Joseph B. 2004. *Paul Volcker: the making of a financial legend.* Hoboken NJ: John Wiley & Sons

Turner, John D. 2000. 'The Hayekian Approach to Banking Supervision in New Zealand', *Annals of Public and Cooperative Economics* 71, 1: 105–25

Volcker, P. A. and Gyohten, T. 1992. *Changing fortunes: the world's money and the threat to American leadership*. New York: Times Books

Von Furstenberg, George M. and Ulan, Michael K. 1998. *Learning from the World's Best Central Bankers*. Boston: Kluwer.

Wright, Matthew 2006. 'The policy origins of the Reserve Bank of New Zealand', *Reserve Bank of New Zealand Bulletin* 69, 3: 5-22