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ABSTRACT

Pillars of Globalization: A history of monetary policy targets, 1797-1997*

This paper studies the evolution of monetary policy targets over the course of the past 200 years. We argue that policy targets are set as part of an assignment procedure that is intended to address both time consistency and monitoring problems. As a result, central banks, after having been assigned to target the exchange rate in the 19th century, are now entrusted with targeting the rate of inflation. Critical advances in the measurement of inflation have proved decisive in bringing about this radical transformation.

JEL Classification: B1, E1, E3 and E5
Keywords: central banks, exchange rates, inflation and monetary policy targets

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> "To determine the pressure of steam, we do not take a popular vote: we consult a gauge. Concerning a patient's temperature, we do not ask for opinions: we read a thermometer. In economics, however, … though the need for measurement is as great as in physics or in medicine, we have been guided in the past largely by opinions. In the future, we must substitute measurement. Toward this end, we must agree upon instruments of measurement".
>
> William T. Foster, Foreword, in Fisher (1923).

> "The advent of modern independent and anti-inflation-oriented central banks is one of the great success stories of modern economic science. But this story has been exaggerated. We should consider the possibility that the unprecedented pace of modern globalization, recently emphasized by Ben Bernanke, the Federal Reserve chairman, might also have played a role. If so, what will happen if the winds of globalization ever reverse course?"
>
> Ken Rogoff "The myth of central banks and inflation", Financial Time, 29/08/2006

The success met by central banks in bringing down inflation during the past quarter of a century is nearly universal, and in developed countries it is absolute. This constitutes perhaps one of the greatest transformations the global economy has experienced recently. What are the forces that brought about this change? According to some, theoretical advances in modern macroeconomics explain it: first, the identification of structural credibility problems in the conduct of monetary policy, known as the "time inconsistency problem"; second, the design of new tools to address this problem, namely independent statutes for the central bank and inflation targets. According to others, the opening up of domestic markets to the forces of international competition – "globalization" -- is the invisible hand that subdued the inflation hydra (Rogoff 2006).

Within this grand debate, an admittedly more focused controversy has developed on the operational design of anti-inflationary rules. First, there is the issue of whether the inflation rate is a sufficiently comprehensive indicator for monitoring monetary developments. Perhaps central banks should also rely on other sources of information and criteria, such as variations of the money supply. Second, there is the related issue of whether central banks should be concerned with asset prices or instead ignore them altogether. Third, there is the issue of determining the adequate measure of inflation: "headline inflation" versus "core inflation";

the inclusion or exclusion of fuel prices; and the adequate measure of monetary contributions to price variation given the structural changes brought about by globalization.

This paper intends to argue that such discussions have a long history, which may be useful in clarifying contemporary debates. Specifically, we discuss the evolution of monetary policy in the long run, focusing on the history of monetary targets. This perspective highlights major resemblances and differences between two "major eras of globalization", viz. the late 19th century and today. These two periods, generally described as displaying a high degree of commodity and capital markets integration, have been characterized by the adoption of transparent policy rules assigned to independent central banks.

On the other hand, the actual rule has changed dramatically. During the globalization of the 19th century central banks were assigned exchange-rate targets. They were supposed to peg the value of the currency to a certain amount of specie (Eichengreen and Flandreau 1997). The ability to maintain the parity of the currency has often been described by both contemporary and later commentators as a test of good behavior. Today by contrast, central banks are assigned inflation targets (Bernanke and Mishkin 1997). Observers often suggest that the capacity to keep the inflation rate within its assigned range (for instance, 0% to 2% in Europe) is as an indicator of the central bank's success.

In other words, the world has experienced a radical transformation in the definition of monetary targets between the two eras: External targets have given way to domestic ones. We intend to explain this transformation by taking a careful look at the emergence of institutions aimed at monitoring the quality and performance of monetary policy making. Toward this end, the remainder of the paper is organized as follows. Section I reviews conventional views on the history of monetary policy, and Section II provides a discussion of the epoch making bullion controversy of the early 18th century. Section III shows how concerns about discretionary actions led to the emergence of convertibility rules. Section IV follows suit,

showing how subsequent problems that emerged from the insufficiencies of the convertibility target led to the gradual takeover of monetary policy by more or less automatic rules. Finally, section V suggest that these rules backfired in the interwar years, leading to their eventual replacement by inflation targets, although the basic framework of assigning a target to an independent agency, has been kept essentially intact, or rather merely reinvented in the recent past.

I. Monetary management in the 19th century: a no brainer?

The conventional view is that monetary management is a recent thing, dating back to the interwar period at the earliest. Economists generally believe that in the 19th century the existence of strict monetary rules ensured that little leeway was left to monetary policy. Central banks, the conventional wisdom goes, did not develop their operating procedures by focusing on the formulation of monetary policy but instead gained their legitimacy by acting as lenders of last resort in the midst of financial crises. It is much later (following the massive deflation of the Great Depression) that central banks began conducting modern monetary management.

Thus the progenitors of modern monetary policy were keynesians and monetarists, who disagreed on the role of monetary policy yet agreed on the existence and relevance of monetary policy making. Keynesians recognized what monetary policy could do; monetarists emphasized what it could not. The reign of keynesianism was undisputed until it began to give way under the blows of monetarist critique and a rampant stagflation. During the 1970s, modern theory identified a contradiction between a central bank's capacity to boost the economy temporarily and its inability to achieve this on a permanent basis. This contradiction (known as the time inconsistency problem) arises because monetary policy can do something about output over the short run but nothing over the long run: the temptation to promote employment is irresistible but dangerous, for intelligent agents will simply adjust the price-

and wage-setting process and so the economy ends up with higher inflation. This eventually wipes out the central bank's ability to achieve anything useful and leaves the economy worse off (Kydland and Prescott 1977; Barro and Gordon 1983). One solution is to have an independent central bank that is run by a conservative central banker (Rogoff 1985; Cukierman 1995). This reasoning paved the way for the two institutional revolutions that occurred in the 1980s and 1990s, whereby independent central bankers were entrusted with an explicit mandate of price stability known as "inflation targeting".

The period before the advent of the keynesian revolution is usually portrayed as one where monetary policy making did not have the scope it has today. Authors recognize that there were anticipations of modern debates but argue that they were confined to the abstract domain of ideas (Rist 1938; Schumpeter 1954; Laidler 1991). The fact is that, in general, countries sought to peg their currency to the price of some precious metal: Initially gold, silver, or a mix of the two called bimetallism (Flandreau 2003). Toward the end of the 19th century, gold became the only reference. This transformation placed a large fraction of the world on a common footing (Eichengreen and Flandreau 1997).

In practice, pegging to gold or silver was achieved through the agency of an institution known as *convertibility*: holders of banknotes could exchange them at the bullion window of the central bank against gold or silver coins and vice versa. But some countries whose finances were poorly run resorted to the seigniorage tax. Their inexhaustible thirst for funds, they drained the resources of the central banks, which eventually found themselves unable to maintain convertibility. Excessive paper issues to finance government expenditure inevitably led to runs on the bullion reserves of the central bank (Lévy 1911). As a result, sustained convertibility has come to be associated, in modern accounts, with sound monetary policy practice (see Bordo and Rockoff 1996).

The practical implications of convertibility are far reaching. Once in place, convertibility becomes a de facto monetary target, akin to a fixed exchange rate defended by foreign exchange intervention. The only difference is that, instead of buying and selling foreign exchange reserves against its own currency in the international foreign exchange market, the central bank buys and sells gold or silver coins against its own notes in the domestic bullion market. But the discipline it induces is essentially the same: in practice, the central bank must adjust the money supply to the imperative of convertibility. Using the price of bullion as a nominal anchor in turn renders the money supply and the general price level endogenous (Bordo et al. 2004). This explains the conventional view that pre-modern monetary policy making was essentially passive, being entirely subjected to the imperatives of convertibility.

This finding is related to an old-fashioned interpretation of the pre-1914 international gold standard that is surprisingly still popular despite it having been proven wrong long ago. This view argues that monetary policy was dictated by unwritten "rules of the game". Supposedly, these rules specified that central banks facilitated the adjustment process by passing on or even amplifying (as opposed to sterilizing) the effect of losses or gains of gold reserves. Gold losses led to more than proportional monetary contraction by central bank ensuring a swift adjustment of the international economy to the new condition while gold gains led to more than proportional monetary expansion. This view explains that the gold standard collapsed between the wars after operating smoothly during the pre-1914 period by the fact that central banks obeyed the rules in the pre-WWI period but not thereafter. Yet Bloomfield (1959) demonstrated conclusively that such was not the case at all: in the pre-1914 period central banks sterilized much of the variation in their gold reserves.

Studies by Tullio and Wolters (2003a,b,c, 2004) identify the determinants of central bank discount rate changes relying on a homogenous German source that documents domestic and international variables at the date when central bank rate changes occurred. The countries

considered are England, Germany, France, and Austria-Hungary for 1876-1913. They find that variation of central bank reserves and the interest rates of the most important foreign central banks (in particular, the Bank of England) were important drivers of actual decisions in monetary policy, explaining much of their variance.

Table 1. Central Banks Reaction Functions:
Determinants of interest rate changes in four institutions (1876-1913)

Explanatory variables	Reichsbank	Banque de France	Öster.-Ung. Bank	Bank of England
Variations of notes cover	-0.035 (13.0)	-0.060 (6.6)	-0.049 (5.5)	-0.039 (16.3)
Var. of Reichsbank rate	--	--	0.129 (1.9)	0.172 (3.4)
Var. of BoF rate	--	--	--	0.270 (1.9)
Var. of Ö-UB rate		-0.469 (2.8)	--	
Var. of BoE rate	0.085 (1.8)	0.152 (2.8)	--	--
Exch.-rate depreciation with respect to parity	0.704 (4.6)	1.153 (6.2)	--	--
Constant	0.039 (1.0)	-0.150 (3.0)	0.028 (0.5)	0.086 (2.7)
Adj-R2	0.696	0.886	0.667	0.626
DW	2.35	1.80	2.44	1.82
Nobs.	136	35	50	221

Source: Tullio and Wolters (2003a,b,c, 2004). The nonsignificant effects of other central banks interest rate changes are omitted by the authors and cannot be reported here.

In particular, the large and significant effects of variations of notes' cover on interest-rate changes reported in the first line of Table 1 suggests that one important motivation behind the central banks' policy action was the concern over convertibility. Although Banks were prepared to go to some length to avoid adjustments that might be painful for the economy, they surrendered to a decline of their cover ratio. This result is also supported by the significance of exchange rate variations. For example, a loss of reserves when the exchange rate was strong was not always met by interest rate increases since this signaled not an external drain, but rather an internal one, with specie more likely to eventually flow back

toward the bank's coffers. Thus, the only rule that central banks recognized was a convertibility, or fixed, exchange-rate, rule.

The notion that monetary policy was a non (or a minor) issue, during the pre-modern period is further reinforced by the work of Goodhart (1988) who examines how private, profit making banks of issue transformed themselves into public institutions. He suggests that this was achieved during the 20th century. For the 19th century, he emphasizes the critical role of financial crises, information, and the need for a lender of last resort. According to Goodhart, central banks emerged when increasingly violent financial crises created the need for the emergency provision of liquidity. Institutions that had access to privileged information owing to their peculiar position within the financial system found themselves providing lending of last resort. This could be facilitated by the availability of government support through the granting of legal tender status for the notes of the bank of issue. Finally, a precondition for the transformation of central banks into their modern counterpart was that they move away from commercial banking and focus on their role as providers of liquidity, thereby neutralizing potential conflicts of interest between their mandate to serve the public and their essence to benefit shareholders. In the end, through an evolutionary process that saw the "public good" motive of financial stability taking precedence over the concern over private profits, modern central banks were born. More importantly, concerns over how should monetary policy be conducted played a minor role in this evolution:

> "Until 1914 [monetary] management largely consisted of seeking to reconcile, as best as possible, the need to maintain the chosen metallic standard on the one hand with concern for the stability and well-being of the financial system, and beyond that of the economy more widely. Then, as various pressures of the twentieth century disrupted first the Gold Standard, and thereafter the Bretton Woods system of pegged exchange rates, the macro-economic objectives of monetary management were altered and adjusted. *Yet at all times, concern for the health of the financial system has remained paramount*" (our italics, Goodhart 1988, p. 5-6)

In this perspective, concerns over financial stability give continuity to the history of central banks.[1] But that does not explain why convertibility (as opposed to any other nominal anchor) emerged as a "first best" monetary policy rule with inconvertible paper currency a "second best". Nor does it tell why this has changed nowadays. Some authors have hypothesized that there was something special about gold adherence in that it may have conferred credibility benefits to those who used it as a monetary target (Bordo and Rockoff 1995). But empirical evidence suggests that the gold-standard convertibility rule did not improve significantly borrowing terms once other factors are controlled for (Flandreau and Zumer 2004). Finally, case studies show that some countries, such as Chile, performed extremely well in terms of growth and yet never adopted a gold anchor (Briones 2004). There is therefore nothing obvious in the reasons why, before the mid-20th century, central banks generally adopted the price of bullion as a target for the value of their notes and effective monetary policy rule.

II. Monitoring, targets and the gold standard, 1797-1821

A. *The "Restriction period" as a counterfactual*

To understand why convertibility rules came to predominate, it is useful to think of plausible counterfactuals. The question we ask is the following: had specie convertibility not been adopted, what would have taken place? This leads us to examine how monetary targets are defined and implemented, and how the problem of definition and implementation makes a decisive contribution to the choice of what target is used.

So powerful is the reference to specie convertibility in the context of the 19th century that it seems difficult to imagine a world without it. This paper to deal with this by focusing on one

[1] . It is beyond question that financial stability has been a chief concern among policy makers and designers of central banks statutes. Note however that Goodhart's account relies heavily on case studies laid out for the US Congress' National Monetary Commission of 1908. The commission had been set up following the financial crisis of 1907. Its mandate was to examine whether a central bank would be able to reduce the occurrence or severity of financial crises, and it led to the creation of the Federal Reserve System in 1913 (Timberlake 1993). It had no instruction to examine in details how monetary policy should be conducted in normal times. It is natural therefore that material from the National Monetary Commission displays an exclusive focus on financial stability and downplays the concerns about how to conduct monetary policy.

episode in monetary history when an alternative to the specie convertibility rule was seriously considered in a leading country. This was the era of inconvertibility of the pound between 1797 (when the Bank of England was granted by parliament the right to suspend specie payments) and 1821 (when convertibility was resumed), known as the "Restriction period".

Modern students of the gold standard portray the episode as a parenthesis (Bordo and Schwartz 1984). But a quarter of a century is not an interregnum. During those years, people borrowed, reimbursed, purchased, sold, wrote contracts, financial markets expanded, and Britain was engaged in a major economic transformation, known as the Industrial Revolution, that saw its economic leadership durably established. Moreover, there were senior authorities and member of parliament who recommended that this regime should go on indefinitely. As argued by Fetter (1965), the episode and the controversy were critical for the making of "19th century monetary orthodoxy", i.e. the adoption of convertibility targets.[2]

One important aspect of the episode is that it had not been motivated by a credibility problem. The directors of the bank secured it as a preemptive measure in a period of military conflict with France. As emphasized by economist David Ricardo (although a fierce critic of the policies of the Bank of England), the monetary vicissitudes of the period did not derive from a "want of confidence in the Bank of England, or any doubts of their ability to fulfill their engagements" (Ricardo, 1810, Introduction). For the first time in modern history, a developed nation – the *most* developed one –experienced the effects of inconvertibility without this being associated with a major credibility crisis, such as when John Law infamously inflated away France's public debt (Faure 1977).

[2] . "In 1797 there was in England no generally accepted theory of a monetary and banking system. There were only laws and institutions, inadequate and in some cases inconsistent. The two decades before 1797, despite the economic growth of the country and the expansion of banking, had been almost devoid of any fundamental analysis of the monetary standard, of banking theory, or of the position of the Bank of England. The suspension of specie payments by the Bank of England on February 27, 1797, and similar action by the Bank of Ireland a few days later, precipitated a controversy that continued for over three quarters if a century. Out of this controversy developed most of the principles of monetary and banking orthodoxy, not only of England, but of virtually the entire Western world in the forty years before 1914". (Fetter 1965: 1).

And thus it was that people debated the merits of the new regime. Some, such as the directors of the Bank of England supported the continuation of inconvertibility, and others such as Ricardo called for a swift resumption of specie payments. In 1809, as the pound sterling experienced a serious bout of depreciation, a parliamentary committee was set up. The committee comprised influential figures of the City such as Alexander Baring or Henry Thornton, author of a pamphlet on the effects of inconvertible paper currency (Thornton 1802). After extensive interviews with merchants, bankers, economists, and policy makers, the committee produced the celebrated *Bullion Report* (Parliamentary Papers, 1810). The *Report* recommended a gradual return to specie convertibility.

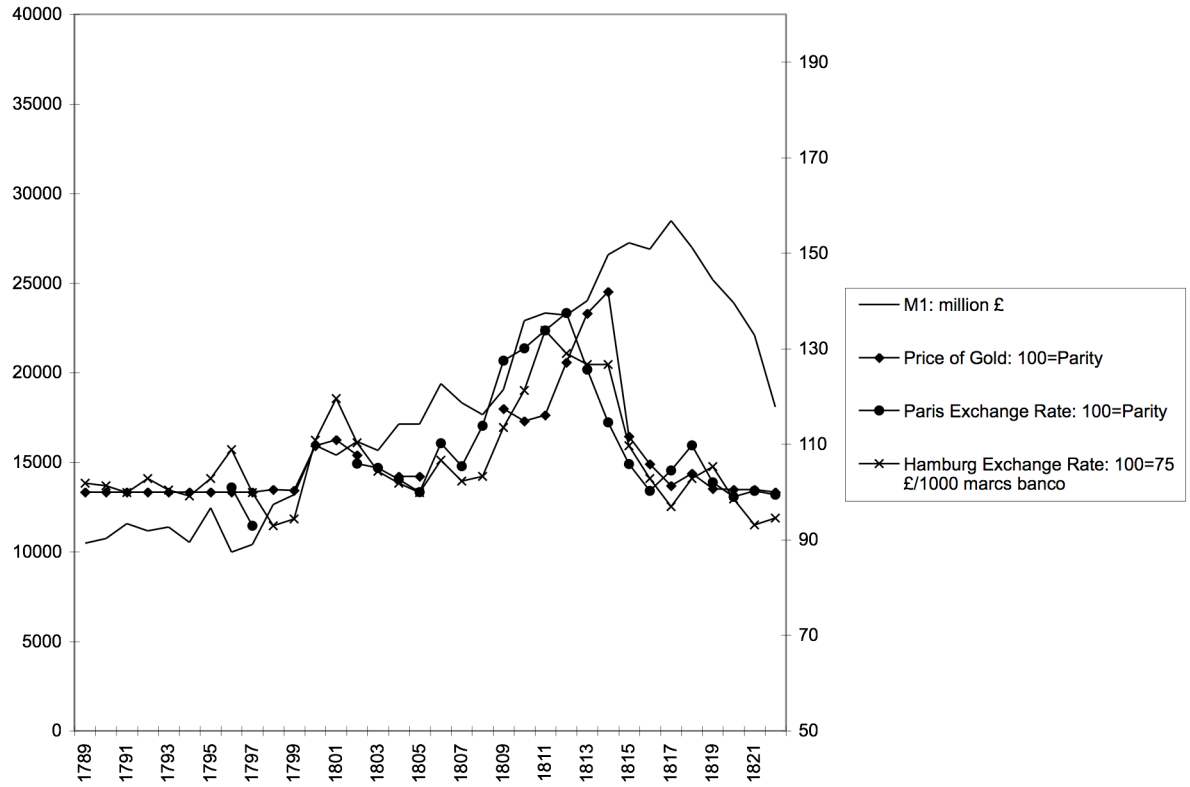
Yet, even after the *Report* was published, there was much delay in actual implementation. Parliament postponed publication of the report and the eventual vote rejected return to convertibility with a clear majority. Despite infuriated diatribes, a parliamentary decision was postponed until 1818. Convertibility itself had to wait until 1821. Thus the period of Restriction forced economists and authorities to confront the possibility of embracing a truly different monetary framework. It is therefore an excellent inspiration point from which to study policy making at the crossroads.

B. *Tolerably accurate criteria*

The controversy surrounding the restriction is widely credited as epoch making (Schumpeter 1954). Historians of economic thought usually interpret it as an intellectual fight between the real bills doctrine according to which the money supply does not drive prices because money is created passively as a counterpart to "real" credit (a view held by the bank's directors) and the quantity theory according to which monetary creation is inflationary (a view held by Ricardo and Thornton, and endorsed by the *Bullion Report* – hereafter "BR") (see Fetter 1965). In what follows we focus instead on the institutional aspects of that debate.

The controversy revolved on the effects of the restriction. People concurred that suspension of specie payment since 1797 had "enabled the conductors of [the Bank of England] to increase or decrease at pleasure the quantity and amount of their notes" (Ricardo, 1810), and available economic elements suggested that the restriction had increased rather than decreased the money supply. The next question was to determine whether the bank circulated the "right" amount of money, or whether the suspension had led to "over issues".

Figure 1. Economic elements of the bullion controversy



Sources: Exchange rates, price of gold: Lloyd's list; M1 is proxied with note circulation: Clapham 1944.

Figure 1 documents the information available to contemporaries.[3] As can be seen, they noted a continuous increase of the circulation of notes issued by the Bank of England. This had actually begun before the restriction but it accelerated markedly afterwards. A peak was reached when the debate erupted in 1809. Contemporaries also observed that the price of gold was going up and that foreign currencies were appreciating against sterling. After holding up

[3] . We take this series from Clapham (1944). Compare with *Bullion Report* and Ricardo (1810) for public information on these matters. A related series, known to the public, is the average amount of commercial bills under discount reproduced in Cannan (1919).

well the pound was now diving. This raised the possibility that the conductors of the bank had misused their new monetary prerogatives.

The directors of the bank insisted they were not "over-issuing". They challenged the notion that an increase in the supply of banknotes would depreciate them, arguing that they "could not see how the amount of Bank notes issued can operate upon the price of Bullion, or the state of the Exchanges" (BR: 34). On the empirical side, they emphasized that the course of the exchange and the amount of paper circulation "frequently have no connection" (BR: 33), a claim that was not unfounded empirically. On the theoretical side, they argued that they could never "over-issue" because they would "never force a Note in circulation" (BR: 47) and because they would only discount "legitimate mercantile paper" (BR: 47). On the practical side they claimed that, since they would never discount the bills of speculators concerned with shipping gold abroad, their monetary policy could not have any effect upon the exchanges (BR p. 32).

Ricardo (1810) and the authors of the *Bullion Report* disagreed. Building on the insights of the monetary approach to the balance of payments as developed by Hume (1752) that was then part of the conventional wisdom, they provided explicit predictions of what should be expected, ceteris paribus, from an increase in paper money in an inconvertible regime.[4] Their conclusion was that "a general rise of all prices, a rise in the market price of gold, and a fall of the foreign exchanges, will be the effect of an excessive quantity of circulating medium in a country which has adopted a currency … not convertible at will into a Coin which is exportable" (BR: 17). Because there was no consensus at the time on how to construct a price index, and because examining prices one after the other would prove tedious, the value of the pound in terms of other currencies was taken by the authors to be a "tolerably accurate criterion by which we may judge of the debasement of the currency proceeding from […] a

[4] . This suggests that Fetter exaggerated in arguing that there was no monetary doctrine available in 1797. As is obvious from both the *Bullion Report* and Ricardo (1810) both claiming to proceed from first principles, there was indeed an analytical doctrine which to fall upon.

depreciated paper-money" (Ricardo 1810: 12). In their hands, the evidence of a depreciated exchange rate and high price of gold became the basis of "two unerring tests" designed to reject the Bank of England's hypothesis that its paper issues had no effect on the value of the notes (Ricardo 1810: 13). Over-issuing notes implied depreciating the exchange rate or raising the gold premium – and such was precisely what had happened. In the more prudent language of the *Bullion Report*:

> "Although, as Your Committee has already had the occasion to observe, no certain conclusion can be drawn from the numerical amount of paper in circulation, considered abstractly from all other circumstances, either as to such paper being in excess, or still less as to the proportion of such excess, yet they must remark, that the fact of any very great and rapid increase in that amount, when coupled and attended with all the indications of a depreciated circulation, does afford the strongest confirmatory evidence, that, from the want of some adequate check, the issues of such paper have not been restrained within their proper limits." (BR: 64).

C. *The problem of discretionary policy*

Because the pound had depreciated one could not reject that there might have been over-issues. Consequently, one had to reject the view that the amount of notes provided by the Bank of England was always in proportion with the needs of the economy, as the directors maintained. However, there is a long way to go between this finding and the recommendation to return to gold convertibility. Strict monetarism does not mean a fixed exchange rate, but rather an explicit rule for monetary creation. But the *Report* explicitly objected to such rules and in several parts, which Fetter argues had been inspired by Henry Thornton, we even find anticipations of the benefits of active monetary management. For instance there were references to the problem of downward wage rigidity (BR: 67), and consequently, a discussion of the costs of deflationary adjustments that may result from monetary contraction (BR: 67-8). This seems to have led the *Report* to recommend a gradual return to convertibility, with advance warning to the market so that prices could adjust more swiftly

(BR: 68).[5] In such a background, an inconvertible currency might have provided a more adequate framework.

Therefore, the reasons why the *Bullion Report* recommended a return to convertibility should not be confused with the monetarist arguments the *Report* contains. This paper claims that the reasons for recommending convertibility concern institutional issues pertaining to mechanism design. In several parts, the *Report* expresses reservations toward discretionary monetary policy. There was no rigorous, consensual, quantitative evidence that would relate prices and quantities and serve to measure the extent of the "excess issue". The alternative was to trust individuals. However, the authors of the *Report* were skeptical about the human ability to conduct discretionary monetary policy. Rules were better than discretion:

> "The suspension of Cash payments has had the effect of committing into the hands of the Directors of the Bank of England, to be exercised by *their sole discretion*, the important charge of supplying the Country with that quantity of circulating medium which is exactly proportioned to the wants and occasions of the Public. *In the judgment of the Committee, that is a trust, which it is unreasonable to expect that the Directors of the Bank of England should ever be able to discharge. The most detailed knowledge of the actual trade of the Country, combined with the profound science in all the principles of Money and Circulation, would not enable every man or set of men to adjust, and keep always adjusted the right proportion of circulating medium in a country to the wants of trade.*" (BR: 52, emphasis added)

The main advantage of the gold-standard rule, following this line of reasoning, was its legibility for a polity concerned with monitoring the actions of the bank. Convertibility was a completely transparent principle whose maintenance could be tested at any time by looking at the price of gold in newspapers.[6] In that respect, the convertibility advocated by the *Report* can be thought of as a second best arrangement. Other arrangements could certainly exist and

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[5] . Thornton (1802) is credited for having pioneered a statement of the short run expansionary effects of monetary policy, as well as a discussion of its long-run limitations.

[6] . In the words of Ricardo: "It will be a circumstance ever to be lamented, if this great country, having before its eyes the consequences of a forced paper circulation in America and France, should persevere in a system pregnant with so much disaster … The only legitimate security which the public can possess against the indiscretion of the Bank is to oblige them to pay their notes on demand in specie; and this can only be effected by diminishing the amount of bank-notes in circulation till the nominal price of gold be lowered to the mint price [thus adopt convertibility]."

could in time be even superior. But none was as simple and verifiable as the commitment to pay gold for the notes.

Thus, the real concern of the members of the bullion committee had been finding the official doctrine of the bank to be at odds with facts and its directors adamant in their insistence that they should be trusted. This was a much more serious problem than the depreciation of the pound sterling. Ships may travel North or South just as well, but their captains must be able to read a compass.[7] Hence, convertibility can be thought of as having truly solved a monitoring problem. The emergence of foreign exchange targets as a building block of "19th century monetary orthodoxy" resulted from governance problems. Apparently, the concerns of the policy makers of the 19th century were quite similar to those of their modern counterparts.

III. Private profit, collective ends, and policy rules: What Do Central Banks Maximize?

A. *Inconvertibility and shareholders value*

Thus the bullionist controversy was really a debate on the institutional fabric of monetary policy. Consistently it raised the related problems of target selection and mechanism design. In modern macroeconomics, we derive monetary policy making from an optimization problem. Authorities set the inflation rate given preferences over price stability and output. The conflict between these two targets is at the origin of a suboptimal equilibrium, which is

[7] . When the directors of the bank declared that the monetary policy was guided by the solidity of the borrowers, so that they "could not materially err" and always provided the circulation with the right amount of banknotes, the committee confronted them with a thought experiment. The interest rate was 5% and they said they satisfied only legitimate needs. But, the Committee went on: "Is it your opinion that the same security would exist against any excess in the issues of the Bank, if the rate of the discount were reduced from £5 to £4 per cent ?" Answer. [by *Mr. Whitmore*]—"The security of an excess of issue would be, I conceive precisely the same." *Mr. Pearse*. – " I concur in that Answer." "If it were reduced to £3 per cent.?" – *Mr. Whitmore*, "I conceive there would be no difference, if our practice remained the same as now, of not forcing a note into circulation." *Mr. Pearse*. – "I concur in that Answer." (BR: 48)With these answers, the directors had unknowingly given the fort away, since they contained an implicit recognition that the directors' rule pointed to no single equilibrium. And the *Report* deemed the exchange a "very important part of the Evidence of these Gentlemen" (p. 48).

solved by the creation of a central bank with a mandate is to focus on inflation only. This outcome can be contracted out to an independent central banker whose compensation is a function of the success met (Walsh 1995a, 1995b, 2002).

In the late 18th century when there were "only laws and institutions" but no "generally accepted theory of monetary policy" (Fetter 1965) elements of private and public interests also intermingled. In the more advanced monetary systems of the time, such as those of Holland and Britain, a *private* central bank was in charge of fulfilling the *public* task of producing high-powered money (i.e. banknotes). This is critical element, for some contemporaries (such as David Ricardo) worried that the stock of the Bank of England had risen sharply following the restriction. Suspension of specie payment had put a private concern in the position to collect a revenue from paper issues and the price of its stock had reacted favorably: wasn't an abusive monopoly around the corner? Accusations were rampant and they prompted former governor of Whitmore and current vice governor Pearse to claim before the bullion committee that in setting the money supply they were "never induced, by a view to their own profit, to push their issues beyond what they deem consistent with the public interest" (BR, Minutes of evidence: 19).

To what extent did interactions between the suspension of convertibility and the private motive create pressures for excessive paper issues? This problem really has two facets, which must be dealt with separately. The first is straightforward: other things being equal, should a private central bank prefer convertibility of inconvertibility? The answer is obvious. Holding of specie reserves entails a deadweight loss. And inconvertibility enables one to reduce the cover ratio. To see this consider the case of a 100% cover ratio. The he asset side of the bank's balance sheet is entirely made of non-interest bearing gold, whose opportunity cost is equal to the revenue from lending. The bank borrows to buy a certain amount of gold and

lends an equivalent amount of paper. On the other hand a 0% cover ratio maximizes profitability. This is because liabilities now comprise only non-interest bearing notes.

The implication is that the expansion of the *real* monetary base is wonderful news for shareholders in an inconvertible standard, leaves them unexcited in a one hundred percent cover system. Of course in the real world, things are and were slightly more complex. First, the Bank of England also took deposits, which were then lent out so that the profits from note issuing were combined with those of regular banking intermediation. Second, the bank did keep gold reserves during the inconvertibility period, and did not have a 100% cover system when convertibility was restored in 1821 but followed instead "Palmer's rule" according to which the ratio had to be of about one third.[8] However, since the expectation nonetheless is that less reserves will be needed under inconvertibility than under convertibility, one should expect the derivative of the price of the bank's stock with respect to an increase in real money balances to be greater in a regime of inconvertibility than in a convertible regime:[9]

$$\frac{\partial P_{BoE}}{\partial (M/P)}\Big|_{inconvertible} > \frac{\partial P_{BoE}}{\partial (M/P)}\Big|_{convertible} \qquad (1)$$

Figure 2 illustrates the relation between real money balances and the price of the Bank of England stock (measured in constant term) before and after the resumption of specie payments. As seen, it lends partial support to the view Equation (1) since the slope of the relation between real money balances and the price of the bank's stock shifts donwards. However, it does appear that the expected profitability of the bank (as reflected by the

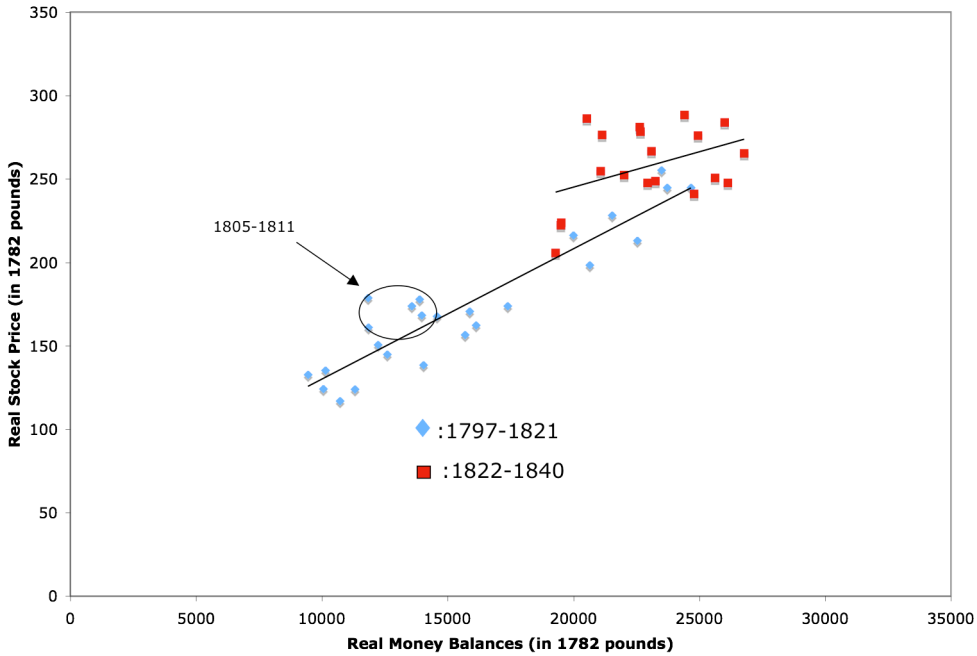
[8] . The computations in Horsefield (1940) show bullion as a proportion of notes plus deposits at 20% in the 1800s and 10% between 1810 and 1815. For details on implicit cover rules during the restriction period see Horsefield (1940). For a discussion of Palmer's rule of 1832 prescribing a 1:3 cover ratio (between notes and bullion) and for the origins of the cover system prescribed in Peel's Act of 1844, see Horsefield (1944).

[9] . Note that the Bank was reluctant to be transparent on its bullion reserve. However, as described in Klein (2005) the reserve was communicated as an index from 1797 onwards and the relation between the index and absolute values was soon leaked. Moreover, the directors of the Bank knew the true figures from the start and were also who were also shareholders so that stock prices must have reflected their private information. They could obviously be inferred from available information: Horsefield (1940) reports evidence that investors inferred the actual cover ratio from knowledge of gross dividends and an assumption about returns.

valuation of its stock) was not dramatically altered by the return to convertibility, suggesting that it may have been discounted, given the extensive debates that preceded it.

In any case, we can safely conclude that when the currency is nonconvertible and the central bank is privately owned, the shareholders of the bank and the economy at large have aligned interests: economic growth increases the demand for real money balances, which drives up the profits of the central bank. The *Bullion Report* recognized the situation. It emphasized that that it was "natural for the Bank Directors to believe, that nothing but benefit could accrue to the public at large [from the inconvertibility of the pound], *while they saw the growth of Bank profits go hand in hand with the accommodations granted to the Merchants*" (Bullion Report, emphasis added). This explains why the Bank of England was a supporter of inconvertibility. Intriguingly, privately owned central banks must not have like the gold standard. This is interesting, especially since political scientists and historians often claim that the gold standard epitomized the age of laissez faire (see e.g. Gallarotti 1995). Had private interests got it the way they wanted, they would have rather floated.

Figure 2. Real Money Balances and the Bank of England Stock



Sources: Bank stock: Vitu (1867); Banknotes: Clapham (1944).

A. *Profit motives and monetary rules*

The second matter that deserves to be examined is whether, as some feared, a private central bank seeking to maximize profits would adopt an inflationary stance. Ricardo was the first to articulate this concern that a central bank that would not follow convertibility rules would essentially behave like a seigniorage revenue maximizing government (Ricardo 1810). Yet a question is open as to whether the objective function of a private central bank and that of a seignorage collecting, money printing government are similar. We argue they're not. An early discussion of this matter can be found in Santoni (1984) who claims that the first order conditions for the private central bank and the government monopoly are not the same.

While the appendix derives steady state solutions, we discuss here the rationale underlying this result. In a continuous time framework, the key difference between the two entities is that the revenue function for the government is given by the real value of instantaneous monetary creation, while for the private central bank (assuming for simplicity a 0% cover ratio) it is the purchasing power (real value) of the interest earned on instantaneous lending against banknotes (i.e. zero cost resources). So the point is not that the zero cover central bank and the government have different budget constraints (both print free money), but that they have different objective functions. In effect, the bank gains from real lending, and real lending is maximized when the demand for money balances is maximized. This is in contrast with the government, who gains from forcing its notes into the circulation.

An interesting result that outlines the intuition concerns what happens when the elasticity of the demand for real money balances is large. In such a case, the seigniorage extraction capacity of the government is severely restricted. At the limit it cannot collect any real resources. However, as shown in the appendix, the private central bank reacts differently. Its best steady state policy converges towards Friedman's inflation rule, according to which the inflation rate is set equal to minus the real interest rate so that agents suffer no cost from

holding non-interest bearing money. This result is normally derived by assuming a benevolent central planner in charge of setting the money growth rate (see Woodford (1990) for a comprehensive discussion). It arises naturally in a profit maximizing framework because a private central bank is concerned with minimizing the opportunity cost of holding money because this ensures that real money balances are maximized: The interests of a profit maximizing central banker issuing fiat currency and those of the public at large are in this case aligned with one another.

This result seems ironic. The bullionist controversy is conventionally remembered as having pitted the forerunners of monetarism (Ricardo and the authors of the *Bullion Report*) against supporters of the real bills doctrine (the directors of the Bank of England, among others) the former warning against the inflationary bias that may have arisen from a bank abiding exclusively by the profit motive. The analysis developed here shows that from a strictly monetarist point of view, it is not at all clear why profit maximization should have led to excessive inflation. In fact if agents are sufficiently averse to inflation then the profit seeking central bank will implement Friedman's rule. Consequently, inconvertibility per se cannot be seen to entail an inflationary bias.

The analysis is result is robust to a number of variants. Consider for instance the situation of classic Keynesian unemployment, where monetary expansion can promote output. Then a profit-maximizing central banker has an incentive to be accommodating as long as the expansion is non-inflationary. This is because, by propelling production, the banker can push the economy towards an equilibrium where output is bigger and thus the demand for real money balances is larger, which increases banker profits. Beyond this point however, money creation becomes inflationary and fails to boost output, thus reducing real profits. The banker will thus be induced to create money exactly up to the point where inflationary pressures set

in.[10] Another way to look at the same thing is to focus on the effects of inflation surprises, once an economy is in equilibrium.[11] They give a transitory boost to output leading to one-off real output gains. But these gains are offset by real losses suffered through the depreciation of the bank's assets, since the bank is a creditor. There are also the long run costs associated with loss of credibility and higher nominal interest rate (expected inflation) in the future, leading to reduced real money holdings. Finally, because the bank is a chartered monopoly, it must take into account the risk of losing its privilege in the future because of inadequate monetary policy.

This last channel may on the other hand provide a rationale for the concerns that contemporaries had regarding the behavior of the bank. As remarked by Ricardo, a portion of the circulation of the bank was used to finance government debt. If the government were able to force-feed the bank so that this fraction would rise, the bank might in effect become a printing machine in the hands of the Treasury. However, on this matter, the parliament, not the government, would have the final word. And this explains why the parliament became the natural home of the bullion debate.

The precise effect of these various factors on the conduct of monetary policy will depend on several variables and parameters and this is no place to develop all alternatives. But the

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[10] . This situation was explicitly discussed by Thornton (1802).

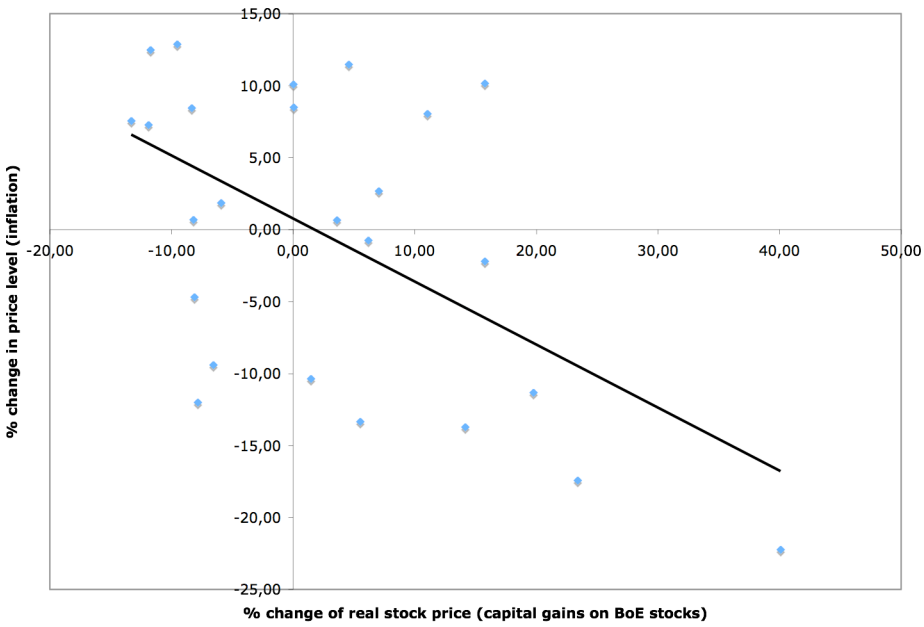
[11] . On inflation surprises and their effects, vide Ricardo (1810): "It is no dispute, that if the Bank were to bring a large additional sum of notes into the market, and offer them on loan, but that they would for a time affect the rate of interest. The same effects would follow from the discovery of a hidden treasure of gold and silver coin. If the amount were large, the Bank, or the owner of the Treasure, might not be able to lend the notes or the money at four, nor perhaps three per cent.; but having done so, neither the notes, nor the money, would be retained unemployed by the borrowers; they would be sent into every market, and would everywhere raise the price of commodities, till they were absorbed in the general circulation. It is only during the interval of the issues of the Bank, and their effect on prices, that we should be sensible of an abundance of money, interest would, during that interval, be under its natural level; but as soon as the additional sum of notes or of became absorbed in the general circulation, the rate of interest would be as high, and new loans would be demanded with as much eagerness as before the additional issues… To suppose than any increased issues of the Bank can have the effects of permanently lowering the rate of interest, and satisfying the demands of all borrowers, so that there will be none to apply for new loans, or that a productive gold or silver mine can have such an effect, is to attribute a power to the circulating medium which it can never possess. Banks would, if this were possible, become powerful engines indeed. […] No nation, but by similar means, could enter into competition with us, we should engross the trade of the world. To what absurdities would not such a theory lead us!"

basic element is that we cannot see why a profit-maximizing central bank should always over-issue. If, as monetarists believe, central banks have no influence over the long run on real values, and if a private central bank issuing an inconvertible currency maximizes its profit by ensuring that it produces a high quality instrument, thus maximizing demand, there is in effect little scope for permanent expansion. Thus, while the directors of the Bank may have erred in motivating their policies by reference to the real bills doctrine, their overarching concern with profits and retaining their charter must have acted as a powerful break on inflation. On this account we may remark that, after 1810, prices stopped rising and actually began a steady decline (Figure 1). Yet nothing had changed within the formal framework in which the Bank of England conducted policy.

To conclude, Figure 3 provides a test of the views developed here by examining whether shareholders of the Bank reacted favorably to inflation. Figure 3 gives empirical evidence that during the restriction period, the association between inflation and changes in bank stock prices was negative. Had the directors "over-expanded", the shareholders would have complained. That they did not complain suggests that over-expansion was not there. A consequence of this perhaps, was the directors' claim that they were "never induced, by a view to their own profit, to push their issues beyond what they deem consistent with the public interest". This could be the rationale behind the real bills doctrine – that the interests of a profit maximizing monopolistic bank of issue are aligned with those of the economy at large, as the bullion report itself had recognized, so that there may not be reasons to worry.[12]

[12] . "And it was very natural for [the Bank Directors] to pursue as before […] the same liberal and prudent system of commercial advances from which the prosperity of their own establishment had resulted, as well as in a great degree the commercial prosperity of the whole country" (BR, p. 49).

Figure 3. Is inflation good for shareholders?



Source: Same as Figure 2, author's computations.

C. *Convertibility as the invisible hand of monetary policy*

Thus was the dilemma: On the one hand, British policy makers were uneasy with the assumption that maximization of shareholder value would always and everywhere generate good monetary policy decisions, for this was expecting a lot from a special interest. At the very least, they felt there was something unseemly in the private appropriation of the profits from circulating inconvertible notes. Ricardo (1819) claimed that the public was not getting a fair deal and made suggestions to share in the profits. In a tract published posthumously Ricardo (1824) explained that he wanted the Bank of England to be split in two parts, a government run currency board, and a privately owned commercial bank without a note issue privilege. A similar, though less extreme view was spelt out in the *Bullion Report* recommending that, if Parliament were not to decide a return to convertibility, then "some

mode ought to be devised of enabling the State to participate much more largely in the profits accruing from the present system [of inconvertibility]".[13]

On the other hand, if this logic were pushed to its conclusion, and a rule were designed to share the profits between the bank and the state, there would be grounds for constant government interference in the conduct of monetary policy. And the authors of the *Report* hastened to state that the nationalization of profits was "by no means the policy they wish to recommend" (p. 65) adding a few pages later that the "compulsory limitation […] of the rate of the Bank profits and dividends by carrying the surplus of profits above that rate to the public account […] would be objectionable as a most hurtful and *improper interference with the rights of commercial property*" (BR: 68: emphasis added).

Thus the Smithian distrust of a merchant's ability to act willingly in the interest of the community at large was echoed by the equally Smithian pessimism regarding a government's ability to set adequate targets. The emergence of convertibility rules came to the rescue and helped solving the institutional conundrum. As long as there is convertibility, a privately owned bank is under a set of constraints that induce it to behave in the interest of the community at large even while pursuing its own interest. To see why, suppose it does over-issue. Then this is bound to lead to an increase in domestic prices. The resulting loss of competitiveness causes a trade deficit, which will manifest itself in a drain of the bullion reserve. This threatens the solidity of the bank, which consequently adjusts the circulation of notes (money supply) in order to defend its own credit. In the end, the bank creates exactly the "right" amount of money, and convertibility emerges as the invisible hand of monetary policy. As argued in the *Bullion Report*:

[13] . "If Your Committee could be of opinion that the wisdom of Parliament would not be directed to apply a proper remedy to a state of things so unnatural and teeming, if not corrected in time, with ultimate consequences so prejudicial to the public welfare; they would not hesitate to declare an opinion, that some mode ought to be devised of enabling the State to participate much more largely in the profits accruing from the present system". (BR: 65)

"So long as the paper of the Bank was convertible into specie at the will of the holder, it was enough, *both for the safety of the Bank and for the public interest in what regarded its circulating medium*, that the Directors attended only to the character and quality of the bills discounted as real ones and payable at fixed and short periods. They could not much exceed the proper bounds in respect of the quantity and amounts of Bills discounted, so as thereby to produce an excess of their paper in circulation, without quickly finding that the surplus returned upon to themselves in demand for specie. *The private interest of the Bank to guard themselves against a demand of that nature, was a sufficient protection for the public against any such excess of Bank paper*, as would occasion a material fall in the relative value of the circulating medium" (BR: 48-9, emphasis added).

This conclusion is important. As already indicated, previous students of the history of central banks have emphasized the role of financial crises and the need for a separation between commercial lending and lending of last resort in effect between private profit and collective ends as a preliminary stage in their evolution, which took place in the 20th century (Goodhart 1988). This paper's exploration of the making of convertibility rules in the early 19th century suggests a different chronology and a different focus. The need to address the conflict of interest between the private profit of the central bank and the general welfare of the economy manifested itself quite early, and was chiefly concerned with monetary policy, not crisis management.

Section IV. Money and crises

But convertibility did not fix everything. First, it implied that under some plausible circumstances such as a reduced production of bullion or a collapse of international monetary cooperation, the "right" amount of money would mean deflation. Combined with downward wage rigidity, this could turn out to be costly (Bordo et al. 2004). The problem would manifest itself in the most disastrous way during the interwar period when the gold standard became the "millstone around the neck of national economies, helping them to sink" (Eichengreen and Temin 2000). But there were difficulties over shorter horizons as well, and the "blind faith in convertibility as a panacea" (Horsefield 1944: p. 112) soon proved to be a delusion.

A. *Monetary rules and asset price bubbles*

By reference to the "right" amount of paper issues, contemporaries referred to both quantitative and prudential norms. The right amount of money was one that would neither encourage a depreciation of the currency nor generate asset price bubbles. The one instrument could meet two targets, people believed, because they coincided. This view is evidenced by the recurrent insistence on the need to discount "real" bills only, by which it was understood bills issued as part of a genuine commercial transaction, as opposed to "speculative" operations. In this logic, the blame for the financial crisis of 1812-1814 was assigned to the excesses of paper money. The notion prevailed in some circles that a money supply subjected to the convertibility rule would render the currency more "elastic", a wording that meant essentially "automatic". Technically, it was thought that the bank's ability to set an adequate money supply would work through the banking system via the operation of the multiplier, ensuring that speculative manias would never be encouraged.

This was optimistic, as became evident in 1848. A few years after the afore-mentioned ideas crystallized in the Bank Act of 1844, a massive crisis took place that triggered a run on the reserves of the bank. Despite its quasi currency-board features (apart from a free circulation of £14 million notes had to be backed one-for-one by reserves), the bank was forced to seek the protection of inconvertibility from the government. Technically, banking failures resulting from commercial liquidations had led to a scramble for gold. Depositors of the bank joined with holders of banknotes to demand that their balances be paid in gold; since deposits were not part of the formula that tied note issues to gold reserves, the bank was caught wrong footed.

The episode forced everyone to recognize that the convertibility target was not a magic bullet ensuring that financial crises would be kept at bay.[14] It came to be understood that

[14] . Clapham (1944) reported that the directors of the bank had themselves contributed to drafting the Act of 1844. This suggests that the bank understood before their opponents that the convertibility rule would not

financial emergencies created a need for central bank discretionary action above and beyond the automatic stipulations of a convertible currency. But then again policy faced the same dilemma that had been at the heart of the bullionist controversy. Again, there could be conflicts of interest in the exercise of discretionary action, and boundaries had to be set that would ensure the political acceptability of emergency liquidity provisions.

In 1860, this became the center of a European wide debate when Juglar, a French economist, published a pioneering study of this problem (Juglar 1889). Juglar was interested in describing the features of what he called "periodical commercial crises", which he found to be recurrent, international, and always financial in nature. One of his major findings was the identification of early warning indicators in the behavior of macroeconomic banking series and in particular in the central bank balance sheet. Three phases, he argued, could be identified. During expansion, the first period, credit was easy and the central bank was happy to accommodate. However, as a result, bullion reserves were depleted to the point where the central bank became cautious in extending credit. But this was calling off the punch bowl when people were already drunk. Such bank actions only increased alarm, causing more agents to seek support from the bank and more to be turned down. The second phase – the crisis properly speaking -- was in full swell by then. Then began liquidation, the third and last phase. Businesses went bankrupt. The demand for liquidity was raised because borrowers now needed more cash in hand to convince lenders of their creditworthiness. Then, as the economy languished and the velocity of money declined, the central bank began rebuilding its bullion reserve. A low point was reached and the cycle could start again.

Did the central bank have a responsibility in the process? Shouldn't it have acted earlier? Wasn't the strict implementation of the convertibility rule pro-cyclical and thus detrimental?

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discourage crises and that it was better to comply to an automatic rule, which would bear the brunt of criticism in case of problem, than to adopt a discretionary policy and become the target of attacks. This strategy also protected the privilege and indeed, Fetter (1965) reported that the price of the bank stock rose when the Act was drafted.

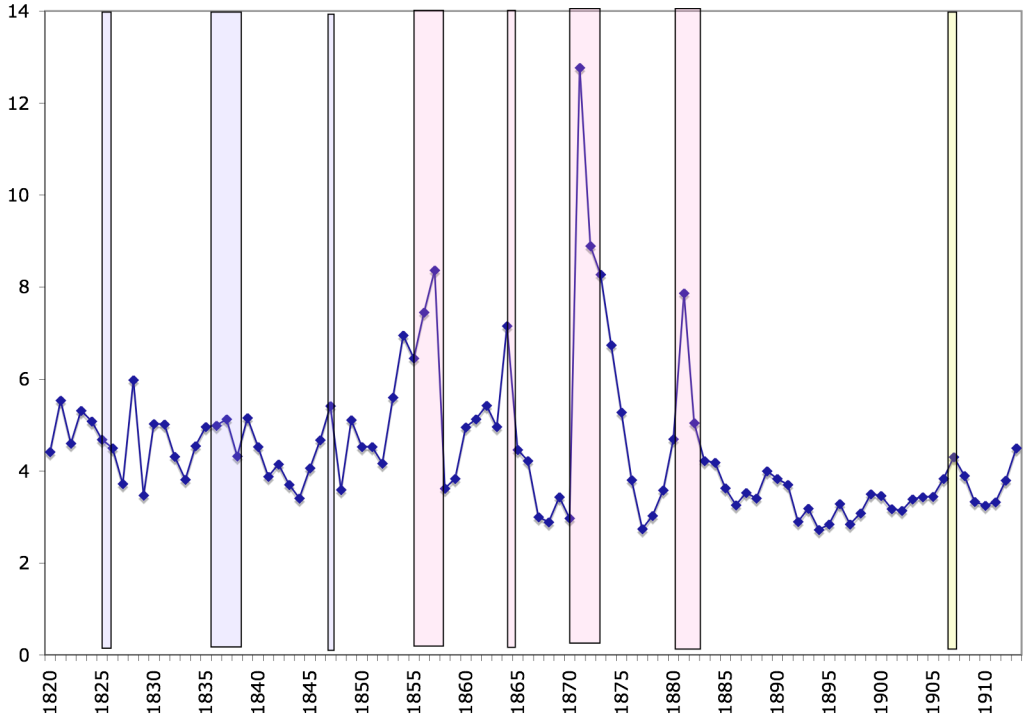
Juglar's analysis raised questions that are surprisingly modern. In implying that, along the business cycle, there were other targets that the Bank might want to consider, he anticipated the modern debate on monetary policy and asset price bubbles (see e.g. Detken and Adalid 2006, Borio 2006 for recent discussions).

B. *Like doctors in a plague: A case study*

In France, the controversy took the shape of a fierce policy debate on the consequences of discretionary interest-rate management by the Bank of France. The reason was that the bank had recently transformed itself into a genuine central bank. Following the Revolution of 1848, it had received the monopoly of issue over the entire country. Moreover, the suppression in 1857 of an usury law that set a ceiling on interest at 6% enabled the bank to manage the interest rate, especially in periods of crises. This permitted it to do away with older policies of credit rationing and to become a genuine lender of last resort for the economy at large. The extension of the powers of the Bank was politically contentious. The Bank was being criticized as being owned by a banking establishment that used it against new entrants. When Savoie was annexed to France in 1860, the Pereire brothers took advantage of the existence of a bank of issue to try and set up a competing bank. A major commission, reminiscent of the bullion committee, was created to discuss the conduct of monetary policy.[15] A recurrent theme was that the central bank was setting a policy that maximized its profits at the expense of the economy's welfare. The concern, consistent with the theoretical elements sketched previously was that the Bank of France was too restrictive. This feeling was motivated by the observation that it distributed record dividends in years of crises. As seen in Figure 4 there was a perfect overlap between years of crisis and years of high dividends, when the Bank of France was both a genuine central bank and also a private company too (1848-1897).

[15] . See Flandreau 2003.

Figure 4. The Bank of France dividend and financial crises



Source: Author's computations. Dividend calculated from data in Bouvier et al. (1965); chronology of crises from Juglar (1889). We added the crisis of 1907.

An outcome such as that shown in Figure 4 is perfectly normal. A crisis implies, following Bagehot's rule of lending of last resort, that the central banks discount record volumes (because there is a need for liquidity) at record rates (Bagehot's expression was "penal" interest rates): both prices and quantities are maximized, and so revenues peak while costs are essentially identical from one year to the next. From a political point of view, however, the matter is more complex, just as the setting of monetary targets by a private company had been at the time of the bullion controversy. The bank, some observers remarked, was very much like a doctor who becomes rich in the midst of a plague. The situation opened the door to conspiracy theories. The bank, accused of fueling speculation in order to generate a profitable

crisis, was caught in a quandary: It was blamed for what it was doing but would have been blamed just as well if it weren't. If it had instead sought to fine-tune the economy, tightening credit before "excessive expansion" occurred, it would have met just as much criticism.[16] Given the set of constraints under which the bank found itself, there was little it could do, but passively follow the cycle. Any deviation from this course -- any attempt at active monetary management -- would be criticized as self-serving.

With the same causes producing the same effects, the eventual solution to this dilemma was reminiscent of the *Bullion Report* recommendation that "some mode ought to be devised of enabling the State to participate much more largely in the profits" of the bank. In 1897, when the bank's charter was renewed after nationalization had been considered, several provisions ensured that a larger share of the bank's profits in emergencies would go to the state (Blancheton 2001). Any revenue arising from a discount rate above 5% could not be paid to the shareholders. It had to be distributed equally between the government and a special reserve.[17] The bank could no longer be blamed for raising interest rates to increase its profits; indeed, as seen in Figure 4, the crisis of 1907 had only a modest impact on dividends.

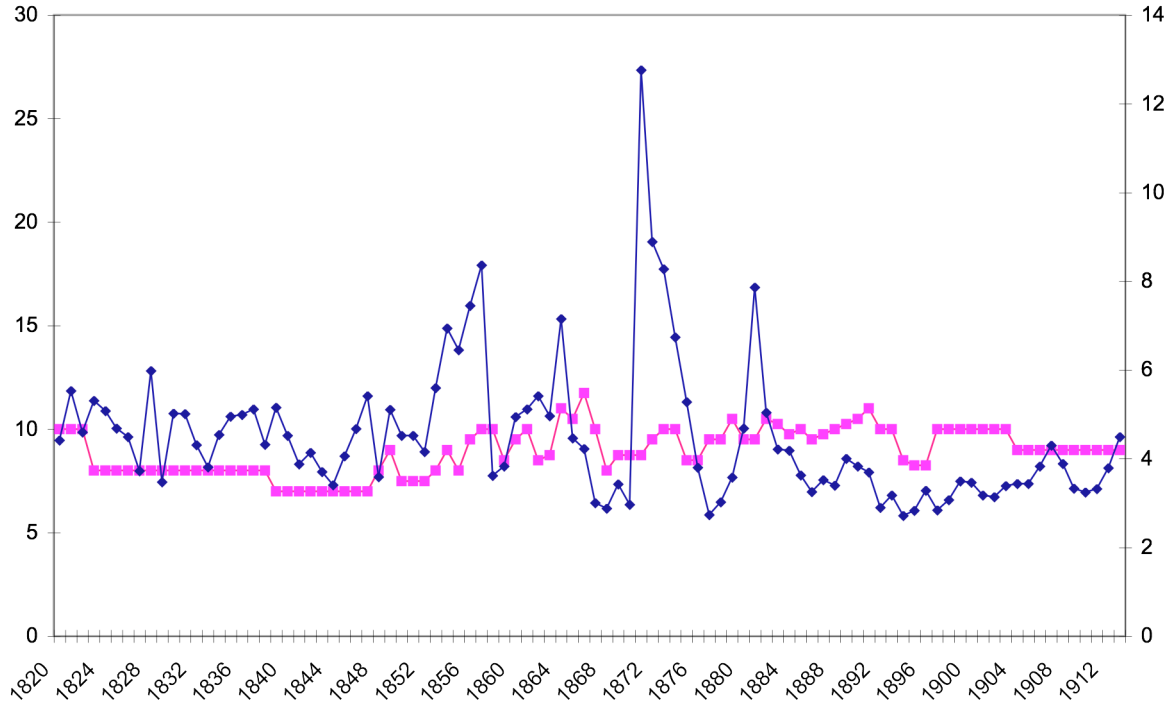
Further evidence of the effect of regulation on dividends can be garnered by comparing the evolution of the dividend paid by the Bank of France to that paid by the Bank of England, where profits arising from suspending the Act of Peel were integrally paid to the government and where strict limits on the issue of notes ensured that credit expansion would immediately be checked (Lévy 1911: 288). Figure 5 shows that, during the period 1848-1897 the volatility of the Bank of France's dividend is substantially higher and the effect of crises quite

[16] . The Péreire brothers motivated their campaign against the bank by pre-keynesian calls for easy credit that would help mobilize unused capacities.

[17] . The extension of the privilege of the Bank of France in 1857 had specified (art. 8) that it would be enabled to increase its discount rate above 6%, but that profits above this level would be deducted from the amounts distributed annually to the shareholders and incorporated in a special account. The privilege of 1897 lowered the ceiling to 5%; this time, three fourths of the surplus was to be paid to the government (art. 12). Anonymous (1931:141).

considerable, although the effect of the crises of 1848, 1866, 1873, and 1890 (but not 1907) on the Bank of England's dividend are still visible on the chart. [18]

Figure 5. Dividends paid by Bank of France (right axis) and Bank of England (left axis)



Sources: Clapham (1944); Bouvier et al. (1965)

France's evolution wasn't isolated (Canovai 1911). Everywhere it was found necessary to separate policy making from the profit motive and toward the end of the 19th century, the charters of leading central banks were modified in a direction that effectively separated monetary policy decisions from profit motives.[19] This took a variety of regulatory forms with three main arrangements (not mutually exclusive) dominating.

[18] . Of note is that, prior to the Act of Peel, the Bank of England seems not to have taken advantage of crises to distribute higher dividends. This may have reflected the fierce controversy that was surrounding its role then, a controversy that perhaps led the bank to anticipate the effects of subsequent legislation (see Clapham 1944 on the climate surrounding the adoption of Peel's Act, and Horsefield 1944 on the bank's role in supporting it).

[19] . It is interesting that "elasticity" was the term used by Canovai (1911) to designate the property of the money supply that such institutional mechanisms were supposed to deliver. We measure the distance traveled since the early 19th century when elasticity was a property that stood at the antipode of discretion, a kind of miraculous effect of monetary policy rules that, if faithfully adhered to, would ensure that things would work smoothly.

One was the introduction of a curb on the dividend that was paid to shareholders. For instance the 1899 renewal of the charter of the Reichsbank substantially reduced the part of profits that could be appropriated by shareholders, setting a de facto cap on dividends. This transformed the Reichsbank's stock into a kind of bond: a minimal return was easily achieved, thanks to the privilege of note issues, while it was quite implausible to go much beyond this level. Consequently, shareholders' votes no longer influenced profitability, although their role as an external supervisory body still had value for transparency and accountability. The Reichsbank, as result, was a quasi-state bank (Canovai 1911, Levy, 1911). A second type of regulation was the introduction of a ceiling on non-backed issues with a stipulation that issues beyond this threshold would be entirely transferred to the state (United Kingdom), or heavily taxed (Germany, Austria). This ensured that emergency liquidity provision would be mainly guided by considerations of financial stability. Finally, there were also explicit formulas, such as the one just described for the case of France, whereby profits were confiscated if they originated from high interest rates (France, Belgium). Table 2 summarizes the evidence, for a selection of European banks.

The precise effects of such a complex set of regulations on central bank incentives regarding policy making have never been studied and are still not understood. They should be the topic of future research. The French example suggests that they may not always have created more room for cyclical management. The increased predation of central bank's profits by the government led the Bank to seek profits where they were less heavily taxed. The result was a massive increase of direct lending in regional centers where the Bank of France competed for primary customers against the local branches of leading commercial banks (Gonjo 2003). In so doing it moved away from rediscounting and liquidity provision, as a "bank of banks" is expected to behave, and "regressing" into straight credit to local customers. This evolution created pressures for minimizing the frequency and size of interest-

rate changes because dealing with a local clientele implied developing stable relations. This pushed the Bank of France away from modern monetary management for "modern" monetary management became more costly. In effect, the bank adhered to a 3% interest-rate target. The connection between the removal of the profit motive and the emergence of modern monetary policy is loose and long.

Table 1. Central Banks' Profits and Incentives After 1848:
A Selection of Leading Institutions

	Reichsbank	Banque de France	Öster.-Ung. Bank	Bank of England	Banque de Belgique
Statutes	1875	1801	1816/1878	1696	1850
Rule	- Convertibility - Proportion - Contingent	- Convertibility - Ceiling on circulation	- Convertibility - Proportion - Contingent	- Convertibility - Million £14 unbacked circulation - Issues beyond this backed 1 for 1	- Convertibility - Ceiling on circulation
Excess or emergency issues	- Yes	-Yes	- Yes	- Yes	- Yes
Taxes on profits from emergency issues	- 5% of excess issues	- No	- 5% of excess issues	- Entirely taxed	-Partly taxed (after 1872)
Tax on profits	1875: dividend between 4.5% and 8%; beyond 8%, 3/4th go to Government 1890: dividend between 3.5% and 6%,; beyond 6%, 3/4th go to Government 1900: idem	1848: Tax on circulation (0.5%) 1878: Lower tax on unbacked circulation 1897: Tax equal to 1/8th of revenue from unbacked circulation	1878: dividend between 5% and 7%; beyond 7% profits shared with government.	- Fixed annual fee	1850: 1/6th of profits when dividend>6% 1872: 1/4th of profits when dividend>6% 1900: 1/4th profits when dividend>4%
Tax on high discount rate	- No	- 1857: Tax on discount profits when interest beyond 6% - 1897: Tax on discount profits when interest beyond 5%	- No	- No	1872 : No discount profits when interest > 5% 1900: No discount profits when interest > 3.5%

Source: Constructed from information in Lévy (1911).

B. *Why central bank independence?*

On the surface, this evolution runs counter another concomitant one. Between 1870 and 1914, leading economists (Conant 1895; Lévy 1911) achieved critical advances in central banking theory. Relying on extensive historical evidence on the effects of central bank independence on monetary performance and exchange rate-stability, they concluded in favor of a strict separation between monetary policy and government action (Flandreau et al.

1998).[20] On the practical side, the period saw numerous institutional changes aimed at reinforcing the operational independence of central banks. Lévy recommended the creation of a European central bank that would set monetary policy for a number of participating countries, and thus facilitate cooperation. He imagined it would de located in Switzerland so as to escape governmental and diplomatic pressure. Independence had come to be a central element of institutional orthodoxy (Flandreau et al. 1998), and would later become a building block of the reconstruction programs implemented under the auspices of the Geneva-based League of Nations (Flandreau 2003).

The two seemingly conflicting evolutions -- of new regulations aimed at removing financial incentives from monetary policy management and of the consolidation of operational independence within those regulations -- actually operated on different levels. Everything happened as if there were a gradual replacement of the profit motive by a set of publicly set targets. The reduced concern of shareholders over monetary policy as such (since the links between monetary policy decisions and dividends had been severed) created a policy vacuum, which called for more explicit prescriptions of monetary policy. On the other hand, this heightened the danger of government intervention in the actual conduct of monetary policy. With fewer interest in the behavior of the bank, shareholders may have failed to care about misbehavior. Consequently, it was necessary to consolidate both the theory and practice of central bank independence. The combination of these forces ensured that central banks were left with essentially one concern – retaining their charters and the accruing benefits – and a simple target that was the sine qua non for the charter to be retained: specie convertibility. This transformed the central banks into servants of the convertibility rule.

[20] . Flandreau et al. (1998) provide evidence of a remarkably modern command of the time consistency problem as early as 1873 when French premier Adolphe Thiers resisted parliamentary pressures to nationalize the Bank of France in the aftermath of the Franco-Prussia war of 1870-1, arguing that the Bank could only help the government "if it were not a state bank".

Section V. Targets, monetary policy and globalization

This paper has explored the foundations of monetary policy targets in the 19th century. The resulting *tour d'horizon* would not be complete however, if we did not explain how this better knowledge of an earlier regime sheds light on the current system. There are three interesting issues to discuss. The first issue is the question of understanding the relation between the monetary policy rules that emerged from the late 19th century and the collapse of globalization that occurred in the 1930s. The second issue is the question of understanding the differences and resemblances between 19th century monetary policy rules and the modern rules that re-emerged in the past quarter of a century. The third issue is to speculate on the challenges that modern rules are likely to meet. Given space constraints, our discussion remains tentative, and yet a few salient points emerge.

Our study of the making of convertibility rules and of the gradual separation, on the eve of the 20th century, between monetary policy decisions and the profit motive may explain why historians of the 19th century are always struck to discover the very ideological tone of monetary authorities' defense of the gold standard in the 1920s, compared to the language used in earlier times. In fact, through a number of decisive institutional transformations, gold convertibility was now valued for its own sake and quite independently of welfare or growth considerations. Building on this insight, we can further speculate on whether the different levels of commitment to the defense of convertibility displayed by different central banks was a function of the value their shareholders placed on retaining the charter. In this regard, Figure 5 shows that for each stock whose nominal price was 100, the dividend of the Bank of England was on average 2.5-3 times larger than that paid by the Bank of France.[21] Therefore, the privilege paid almost twice as well for every franc or pound invested in England than in France. Such occurrences must have influenced the determination displayed by alternative

[21] . Interestingly, the Price Earning Ratio (PER) of the Bank of England was always above that of its French counterpart, during the period 1820-1914. This may have reflected the greater risk that investors placed on an eventual change in the charter of the Bank of France in a direction that would be harmful for shareholders.

institutions that defended of the status quo. Whether or not similar incentives explain the Bank of England commitment during the 1920s to return to the older parity is still a long shot, but the subject is worthy of future research.

In any case, there are reasons to believe that through the agency of the convertibility principle a certain conception of what monetary policy "ought to be" crystallized and became a holy principle as opposed to the pragmatic criterion it had been in the past. Consequently, the discussion in previous sections sheds light on the dynamics of the interwar period when central banks desperately clung to convertibility even when this meant imposing major costs on the economy. They did so until the costs of convertibility were too large and the goal became self-defeating. As a result, the resilience of monetary policy institutions became a major factor in deglobalization (Eichengreen 1992, James 2001). The relations between institutions, monetary stability and globalization is thus more complex than is implied by current debate: History shows that forces that lead to the creation of monetary institutions capable of delivering a high-quality output are the same that bring international integration. From that respect the question of determining whether low inflation results from globalization or inflation targeting by independent central banks is a rhetorical one. However, the extent to which specific institutions, created at a given time and in a given environment to address specific monitoring problems, remain optimal when the environment does change is a different matter.

The second issue worthy of a discussion is that of the relation between current practices and historical trends. The history that has been told can be understood as that of the serendipitous discovery of principles that foreshadow current practices. Just as today, monetary stability was seen as resulting from the pursuit of formal targets that had been assigned to the central bank. Just as today, the success in reaching these targets was associated

with central bank independence. Just as today, central bankers were faithfully committed to reaching these targets because they derived benefits from fulfilling their mandate.

A natural interpretation of the reasons why the history of central banks repeats itself may be found in their agency nature. As agents in charge of implementing monetary policy for the benefit of society, central banks are expected to produce a currency with certain attributes deemed useful by using a number of instruments considered as legitimate. To determine whether they are successful or not, it is simpler to ask them to achieve certain goals that can be used to monitor their performance. In this context, targeting (the exchange rate as in the 19th century or the inflation rate as today) is a particularly relevant framework. The legitimacy of the central bank is tightly related to its ability to achieve the objective it has been assigned and, because this objective is simple and transparent, the legitimacy is itself simple and transparent.

As a result, changes in the targets assigned to monetary policy can be traced to changes in the way society defines and measures the "quality" of money. In this regard two major factors explain the shift that has occurred in the definition of monetary targets between the periods under consideration. The first is the emergence of a consensus over price indices as adequate tools for tracking inflation. Our discussion of the bullionist controversy revealed that such instruments were entirely lacking then, leading the authors of the *Bullion Report* to focus on the exchange rate and the price of gold. Ironically, there was less correlation between exchange-rate variations and the money supply than between the money supply and the price level as it has been reconstructed later. But there was just no consensus on how to measure prices and hence there was too much discretion for monetary policy, which had thus to be subjected to strict convertibility rules. Following this line of analysis, it is no surprise that Fisher, one of the founding fathers of modern macroeconomics, devoted an entire chapter of his early treatise and later a full book to the issue of measuring price variations (Fisher 1907,

1930) before becoming a proponent of price stabilization schemes as opposed to exchange stabilization (Fisher 1907, 1930, Jonung 1979, Bordo et al. 2003).

The second and perhaps less important factor is a residual from the Keynesian view that inflation is good while deflation is bad. This once predominant notion (we saw it was part of the intellectual background of the *Bullion Report*), which became a building block of orthodox theory in the midst of the interwar collapse survives today in the form of inflation targets that are low but above zero. Some economists have sought to motivate this number by emphasizing the existence of downward adjustment costs when inflation is close to or below zero. Reference to the work of Akerlof et al. (1996) establishing this theoretical result is now conventional (see e.g. the survey in Bernanke and Mishkin 1997, Bernanke 1998). Yet in the perspective developed here -- that political acceptability is a crucial aspect of a successful delegation scheme -- we may understand why a range that neither displeases monetarists nor alienates moderate Keynesians was eventually chosen. Polities must in cases agree on things they do not understand.

Finally, before concluding, we should like to say a word on current discussions. A bird's eye view of the evolution of central bank institutions suggests that there has been a definite trend toward a greater contribution of "scientific" ingredients in the conduct of monetary policy. This grew naturally from the dilemma of discretionary monetary policy, which early 19th century British monetary authorities were the first to meet. The more monetary policy becomes a science – as opposed to being an "art" – the greater the leeway that society will be able to grant to policy makers, because the monitoring problem will be reduced. For example, the availability of objective, agreed-upon measures of inflation permitted the emergence of inflation targeting when 19th century monetary authorities were instructed to peg their currency to gold. To the extent that this rules out deflation and to the extent that deflation is a bad thing, this development constituted an improvement.

Our discussion provides historical significance to the current debates over alternative ways to measure inflation, since these different measures correspond to alternative assessments of the outcome of monetary policy. This also explains the concerns over the significance of evolution of the money supply, a debate that really began with the bullion controversy when observers suggested that the increase in the supply of banknotes, even when it was not met with exchange-rate depreciation was only a debasement time bomb. Finally, this explains the concerns of modern policy makers regarding whether or not they should respond to asset price bubbles. Although some have argued that monetary policy is turning into a "science" (Clarida et al. 1999), it is likely that these issues will remain controversial for some time.

Conclusions

This paper has provided an overview of the making of modern monetary policy rules. It argued that the reason why exchange-rate targets emerged in the 19th century as criteria for sound policy is not that there was no alternative. The possibility of a managed currency had been effectively considered. Nor is it because the management of this currency by a private institution would have been necessarily inflationary, although this is what Ricardo and others feared. We saw that there was no necessary conflict of interest between the pursuit of private ends by a profit-seeking bank of issue and the fulfilling of collective goals normally associated with the conduct of monetary policy. The reason why convertibility emerged, we argued, was the concern that delegating monetary authority to a private concern might turn out to involve too much discretionary action. In order to rule this out, a strict target was thus assigned to central banks.

Moreover, as the century progressed, concerns about the effect of the profit motive on the way central banks dealt with crises led to increased regulation whereby exceptional profits accruing -- for instance, from the bank's function as lender of last resort -- would

automatically be confiscated by government authorities. As a result, the actions of central banks had to take place in the narrow space left between a convertibility target that ensured they would not expand too much and a profit appropriation rule that ensured they would not contract too much. By then, central banks, though still nominally private companies, had really become monetary bureaucracies.

This evolution paved the way for subsequent transformations in the interwar period. We argued that, because of earlier transformations, central banks could now take actions that were detrimental to the welfare of the economy without having to support the effects of such decisions, since the link between the prosperity of the economy and their own welfare had been severed. Central banks could continue to target the exchange-rate because they were protected from government interference by a complex institutional coating. The existence and design of the convertibility targets go a long way toward explaining the persistence of restrictive policies despite worldwide deflation during the 1930s. Just as they may have promoted globalization before WWI convertibility rules contributed to the collapse of globalization after that conflict. In this light, the terms of the ongoing debate about whether central bank independence and inflation targeting or rather globalization caused the recent disinflation are missing the point.

Historians like to emphasize persistence. Economists have a soft spot for novelty. As an essay in economic history, this paper was about both. It was about persistence because it sought to show that the dilemmas faced by modern monetary policy makers have counterparts in previous centuries. It is about novelty because current issues incorporate new elements in a way that makes them both distinctive and unique. By combining historical and contemporary insights, it is hoped that we have achieved two things. First, our historical perspective on the use of monetary policy targets found modern policy makers in the good company of their forerunners, facing pretty much the same structural objectives, challenges, and constraints.

This may be cold comfort, but it is one kind of comfort. Second, and possibly more importantly, it has helped to identify which resources and constraints are available to modern policy makers that were not available to previous ones. As Schumpeter stated in *Business cycles* (Schumpeter 1933), we learn economic history to know "why we are as far as we are" but also "why we are not further".

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Appendix:

We develop here a simple theoretical analysis of the difference between seigniorage collection by a government and an independent monetary institution. Let:

M : nominal quantity of money

P : price level

M=M/P : real money balances

Y : nominal income

y=Y/P : real income

g_x=d(log x)/dt=(1/x)(dx/dt) : percentage rate of growth of variable x (e.g. g_P : inflation)

m^D=f(y,g_P) : demand for real money balances; and

i=r+g_P : the nominal interest rate, equal to the sum of the exogenous real interest rate and the inflation rate.

Consider first the steady-state revenue Φ^G collected by a government seeking to maximize seigniorage (see e.g. Friedman 1971 for a classic treatment) conventionally given by:

$$\Phi^G = \frac{1}{P}\frac{dM}{dt} = \frac{M}{P} \cdot g_M \qquad (1)$$

Inflation is constant along the steady state and since (by assumption) real income is also constant (positive growth could be handled without loss of generality), we have:

$$g_P = g_M \qquad (2)$$

Moreover, equilibrium between money demand and money supply requires that:

$$m^D = m \qquad (3)$$

It is then possible to compute the derivative of the government revenue function with respect to g_P in order to obtain a first order condition for the revenue maximizing steady state inflation rate. Formally, substituting (2) and (3) into (1) and taking the derivative yields:

$$\begin{aligned}\frac{d\Phi^G}{dg_P} &= \frac{M}{P} + g_P \frac{df(y,g_P)}{dg_P} \\ &= \frac{M}{P} + \frac{M}{P} \cdot \frac{1}{f(y,g_P)} g_P \frac{df(y,g_P)}{dg_P} \\ &= \frac{M}{P}\left(1 + g_P \frac{d\log m^D}{dg_P}\right) = 0\end{aligned} \tag{4}$$

From which we obtain the usual solution:

$$g_P \frac{d\log m^D}{dg_P} = -1 \tag{5}$$

To simplify things further, we consider the following money demand function:

$$m^D = l(y)e^{-bg_P} \tag{6}$$

In this case we have:

$$\frac{d\log m^D}{dg_P} = -b \tag{7}$$

So that:

$$g_P^* = g_M^* = \frac{1}{b} \tag{8}$$

Consider now the situation of a revenue maximizing central bank. The revenue function is not given by the real value of instantaneous monetary creation, as in the government case, but by the purchasing power of the interest earned on lending against banknotes (i.e. zero-cost resources). Formally:

$$\Phi^B = i \cdot \frac{M}{P} = (r + g_P)\frac{M}{P} \tag{9}$$

Taking derivatives with respect to the inflation rate and then setting the expression equal to zero yields:

$$
\begin{aligned}
\frac{d\Phi^B}{dg_P} &= \frac{M}{P} + (r+g_P)\frac{df(y,g_P)}{dg_P} \\
&= \frac{M}{P} + \frac{M}{P}\cdot\frac{1}{f(y,g_P)}(r+g_P)\frac{df(y,g_P)}{dg_P} \qquad (10) \\
&= \frac{M}{P}\left(1+(r+g_P)\frac{d\log m^D}{dg_P}\right) = 0
\end{aligned}
$$

From which it follows that:

$$
(r+g_P)\frac{d\log m^D}{dg_P} = -1 \qquad (11)
$$

Substituting (7) into (11) gives the formula for the steady state optimal inflation rate:

$$
g_P^{**} = g_M^{**} = \frac{1}{b} - r \qquad (12)
$$

Which is strictly smaller than the optimal inflation and money creation rate for the seigniorage maximizing government. Interestingly, for reasonable parameters of interest rate elasticity of real money demand, which are typically set between 0.2 and 0.4 (Knell and Stix 2004), and a real interest rate of (say) 3%, we get a target inflation range of -0.5 to 2%.

Finally, as indicated in the text, it is interesting to look at what happens when the interest rate elasticity is very large ($b \to \infty$). Then we have:

$$
g_P^{**} = -r \qquad (13)
$$

Where we recognize Friedman's inflation rule, which is normally derived by assuming a benevolent central planner in charge of setting the money growth rate (see Woodford 1990).