

A FISCAL THEORY OF GOVERNMENT'S ROLE IN MONEY

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As an alternative to market failure explanations, we draw on theory and historical evidence to argue that fiscal considerations explain the roles governments typically play in producing and regulating money. Public monopoly production of coins and banknotes, substitution of fiat for commodity standards, and restrictions on substitutes for government money all generate revenue and especially provide means for meeting fiscal emergencies. We argue that these arrangements do not reflect conscious design so much as the evolutionary survival of the fiscally advantageous. (JEL E5, E6, H1, N1)

I. INTRODUCTION

"Economic policy has, up to the turn of the century, been motivated primarily by fiscal considerations... [F]iscal measures have created and destroyed industries ... even where this was not their intent, and have in this manner contributed directly to the construction (and distortion) of the edifice of the modern economy."

[Schumpeter 1954, 7]

Why do governments play the roles they do in the monetary system? In particular, why have national governments almost universally taken over the business of issuing coins and paper currency, and replaced precious metals with fiat money as the base supporting bank-issued money? Why have they not (in developed countries, at least) also nationalized the production of checking accounts, choosing instead to tax and regulate private banks?

Standard answers to these questions refer to market failures (natural monopolies, externalities, or information asymmetries) that might render unregulated private production of money inefficient or unstable or infeasible. Market-failure explanations assume that gov-

ernments shape monetary institutions to serve money holders, by providing a more efficient and stable payments system than would exist under *laissez faire*. Thus private competition is not allowed in currency issue because markets inherently would fail (or historically did fail) there, and the legal restrictions we see on deposit banking are ones needed to prevent market failures in that industry.

Recent research supplies three reasons for doubting the adequacy of the market-failure approach for explaining monetary arrangements. First, economic historians have found that the actual forms taken by money and banking regulations, and the timing of their adoption, often have little apparent connection to alleged market failures. Observed regulations (e.g. reserve requirements that freeze rather than enhance liquidity) are ill-designed to remedy the suboptimalities that are supposed to have motivated them. Second, monetary historians have found that systems close to *laissez faire* have (by and large) been at least as successful as more restricted systems. Finally, monetary theorists have pointed out weaknesses in theoretical arguments for market failure in money.¹

If the market-failure explanation is doubtful, how else can one explain government's role in money? Charles Kindleberger [1994, xi] poses the challenge squarely: the economist who doubts the market-failure approach "has to explain why there seems to be a strong revealed preference in history for a sole is-

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1. Selgin and White [1994] survey relevant historical and theoretical literature.

suer." We propose a *fiscal hypothesis*: Governments have come to supply currency, and to restrict the private supply of currency and deposits, not to remedy market failures, but to provide themselves with seigniorage and loans on favorable terms. Government currency monopolies and bank regulations can thus be understood as part of the tax system. The "strong revealed preference in history for a sole issuer" is, fundamentally, the preference of fiscal authorities, not of consumers.²

Economic historians have of course often recognized fiscal motives behind specific monetary arrangements, especially those of ancient and medieval autocracies. Analysts of developing countries today have recognized that policies of "financial repression" aim at fostering "financial institutions and financial instruments from which government can expropriate significant seigniorage" (Fry [1988], 14; Giovanni and de Melo [1993]). We go further in arguing that fiscal forces have *typically* shaped the industrial organization of money production, throughout history and across countries, and account for its major institutional features even in advanced democracies today. Such observed legal restrictions as statutory reserve requirements, interest rate ceilings, foreign exchange controls, and monopoly issue of currency impede efficiency but raise revenue.

A Rational Dictator Model

To develop our hypothesis, we adopt a method found in the writings of the Italian fiscal theorists, especially Amilcare Puviani. According to Buchanan [1960, 64], Puviani tried to account for overall government tax arrangements by asking "two simple questions." First, what sort of tax system would a "rational dictator" put in place if his aim were "to exploit the taxpaying public to the greatest possible degree," gaining the greatest revenue consistent with a given threshold of public resistance? Second, to what extent do actual tax arrangements conform with those predicted by such a rational dictator (or "Leviathan")

model? Puviani found a high degree of correspondence between actual tax arrangements in post-unification Italy and ones predicted by his model.³ We argue that a fiscal approach also accounts for monetary arrangements.

To avoid misunderstanding, we are not proposing that governments have consciously designed all monetary arrangements, from scratch, to achieve purely fiscal ends. Such a view would be at odds with the gradual and piecemeal historical development of governments' monetary roles. Instead, as we discuss in more detail below, revenue-seeking governments have opportunistically modified private-market arrangements as these developed.⁴ Revenue-enhancing modifications tend to survive, while others are more likely to be discarded. The resulting arrangements thus look *as if* they were designed from scratch to generate government revenue. The "rational dictator" model of monetary arrangements should be understood in this "as-if" fashion.

II. SEIGNIORAGE-ENHANCING INSTITUTIONS

An extensive literature analyzes the revenue-raising device known as seigniorage or inflationary finance. The basic concept is straightforward: a government reaps profit by producing new base money at an expense less than the value of the money produced. The government finances expenditures by spending the new units of base money into circulation.⁵ Such expansion of the monetary base

3. Levi [1988] offers a modern exposition of Puviani's fiscal-predation thesis. An alternative "predatory" hypothesis is *private rent-seeking*: government serves special interests by restricting competition. This hypothesis certainly helps explain a number of legal restrictions on private banks. But it can hardly explain the *exclusion* of private mints and banks of issue from the market in favor of a state-run monopoly.

4. On the (conjectural) evolution of private-market monetary arrangements in the absence of government intervention see Selgin and White [1987].

5. The budget constraint for a government that issues fiat money is $G = T + \Delta D + \Delta H$, where G is government spending (including debt service), T is tax revenue, ΔD is the change in interest-bearing debt held by the non-government public, and ΔH is seigniorage, the change in non-interest-bearing debt (fiat base money) held by the public. For a textbook introduction to seigniorage see McCulloch [1982]. McCulloch notes that the term "seigniorage," from the French *seigneur* or lord, reflects the feudal lord's practice of profiting from monopoly production of debased coins that his subjects were compelled to accept at face value.

2. A divergence between the preferences of fiscal authorities and citizen-consumers implies that political "markets" do not strongly tend to weed out policies that diminish aggregate wealth. On the contrast between "Chicago" and "Virginia" views on this broad question, see Lott [1997].

implicitly taxes base money holders by diluting the value of existing money balances. For the most part the literature treats the base-money expansion rate (or the associated price inflation rate) as the government's choice variable, taking monetary institutions as given. The focus lies on the rate that maximizes seigniorage, or alternatively minimizes the deadweight burden of taxation subject to a revenue constraint. In contrast, we inquire here into what sorts of monetary *institutions* enhance seigniorage.

Why Collect Seigniorage At All?

Several features make seigniorage an attractive option for raising revenue. First, a tax on money balances might be consistent with the Ramsey rule for minimizing the deadweight burden of raising a given amount of overall government revenue. Several theorists have argued, however, that when money is regarded as an intermediate good, any positive inflation tax is inefficient, even given a positive revenue constraint. The optimal inflation tax is then zero (Banaian et al. [1994]; Correia and Teles [1996]). If so, the collection of seigniorage, and the shaping of monetary institutions to that end, cannot be justified on the grounds of fiscal efficiency.⁶

Second, seigniorage is a relatively "hidden" tax. If the public blames inflation on causes other than the government's monetary policy, the political resistance provoked by an inflation tax may be lower, for a given amount of revenue, than that of more obvious taxes. A rational dictator concerned with maximizing his survival in power, extracting seigniorage to the point where the marginal political resistance incurred per dollar of revenue is equal to that of alternative taxes, will then exploit the inflation tax even beyond the point where its marginal deadweight burden equals that of other taxes.

Finally, to the extent that changes in the nominal stock of base money can be made unexpectedly, they impose an ex-post capital levy on holders of the state's unindexed nominal liabilities, including base money. Such a levy may yield substantial revenue rapidly,

making seigniorage an especially valuable fiscal resource during an emergency that threatens the state's survival, such as an insurrection or external military threat (Glasner [1997]). Its unique revenue-raising speed helps to explain why state monopoly of base money survives into modern times, long after state monopolies of other goods like salt have given way to taxation of private producers. We later discuss surprise inflation and the time-consistency issue it poses.

Seigniorage from Commodity Money

What sort of outside-money regime would a rational dictator prefer for fiscal purposes? Precious metals offer the potential for seigniorage extraction through debasement. By adding base metal, 100 silver coins can be remade into 105 (or 150 or 200) apparently similar coins. Coins entirely composed of base metal, by contrast, cannot be further debased. A cowrie shell or a peppercorn, being a naturally-occurring unit, cannot be easily remade or redenominated. Putting aside fiat money for now, fiscal considerations would incline a rational dictator to favor the precious metals over other commodity monies.

Although the earliest known coins appear to have been privately produced, ancient rulers seeking a new source of revenue (and propaganda, by putting the ruler's name or face on the coins) soon granted themselves legal monopolies in minting (Burns [1965]). A monopoly mint extracts seigniorage from the metal it coins, subject to the accounting identity

$$M = PQ + C + S,$$

where M is the nominal value assigned to a batch of coins (e.g. 100 "shillings"), P is the nominal price paid by the mint per ounce of precious metal, Q is the number of ounces of precious metal embodied in the batch of coins, C is the remaining average cost of minting, and S is the nominal seigniorage. Out of every M 's worth of shillings coined, PQ is paid to individuals who brought in precious metal, C covers other mint expenses, and S is retained as profit for the mint-owner. Total seigniorage per year depends on how many batches of coins are produced per year.

6. Alcazar [1994] briefly surveys empirical work on whether actual seigniorage rates conform to the implications of the optimal-tax model. In most countries they do not.

Greater nominal seigniorage per batch is earned by *debasement* when Q is reduced for a given M . When reducing silver content, medieval governments typically added base metal, reducing the *fineness* rather than size of coins. Minting costs were lower because coin dies did not need to be resized, and the new coins would circulate more readily because they closely resembled the old. The reduction in metallic content might even go undetected for a time, enhancing short-run real revenues. Alternately, each new shilling could simply be declared to have a higher nominal value, increasing M for a given Q .⁷ Greater seigniorage per batch can also be earned without debasement by reducing P , i.e. putting as much silver into each shilling but paying fewer shillings per batch back to the provider of silver.

As an excess profit or rent in coin production, seigniorage cannot persist without legal restrictions on entry. The fiscal motive thus accounts for state-enforced coinage monopolies. In a competitive minting industry with constant returns to scale, competition would enforce the condition of price equal to marginal and average cost, $M = PQ + C$. Every mint, including the monarch's, would earn zero seigniorage if competing mints could be established side by side, bullion owners were free to choose where to take their bullion to be coined, and no steps were taken to restrict the circulation of nongovernmental coins so that all coins were valued by precious metal content. The few historical cases where competing private mints were allowed (e.g. gold-rush California) do not exhibit the sort of market failures—fraud, or lack of standardization—that are sometimes hypothesized to provide an efficiency-enhancing role for the state in coinage.⁸

The efficiency theory of government coinage predicts that coinage systems will vary in geographic scope only in response to changing economies of scale in coin production. The fiscal hypothesis, by contrast, predicts

that coinage systems will have exclusive territories that expand and contract with sovereign realms. The history of medieval coinage supports the fiscal hypothesis. European monarchs of the middle ages insisted that the right to mint coins belonged exclusively to the sovereign (thus Bisson [1979] speaks of “the proprietary coinage”), even when diseconomies of plant scale led them to delegate actual coin production to local moneyers. During the early Middle Ages kings and princes had trouble enforcing their laws against independent coinages. This “fragmentation of monetary rights” was not due to changing economies of scale in coin production but “corresponded to the multiplication of territorial powers” (Bisson [1979, 3]). When kings regained power over the nobility, one of their first objectives “was to reclaim control over the coinage” (Glasner [1997, 27]).

Many rulers also enforced legal restrictions that were designed to secure the profit from issuing debased coins accepted at face value. Boyer-Xambeu et al. [1994, 49–59] note: “Until the sixteenth century princes in most countries prohibited the weighing of coins and made people accept them all, even when used up, simply in view of their imprints and inscriptions.” Even when weighing was later allowed (to encourage the return of worn coins to the mint), the practice of valuing coins in exchange by bullion weight rather than by tale was “expressly forbidden.” Payments in metal other than the prince's coin, and contracts specifying payments by bullion weight, were outlawed. The practice of culling good coin and passing on bad was a crime that “systematically carried the death sentence.” It is hard to imagine an efficiency-enhancing rationale for such restrictions.

Two reasons consistent with the fiscal hypothesis suggest why past monarchs preferred owning monopoly mints to taxing private mints. First, as the modern theory of vertical integration suggests, monitoring and enforcement problems would likely be lower with vertically integrated (state-owned) mints. Second, increases in the seigniorage rate might be accomplished at lower cost than equivalent increases in the rate of mint taxation, in part because the incidence of an increased mint tax would be more transparent, more concentrated, and therefore likely to meet with more political resistance than a debasement. Both

7. Note that medieval coins typically displayed no numbers, only graphical identifying devices.

8. The many brands of private coins minted from California gold in the 1850s were all denominated in the established gold dollar unit. Assays “invariably found” that the coins' gold content was very close to the precise legal standard, and most coins apparently erred on the side of exceeding the standard (Kagin [1981, 239–42]).

considerations become especially relevant during a fiscal emergency, when revenue needs to be raised immediately. Spufford's figures [1988] indicate that, in times of war, mint-owning medieval rulers raised as much as 60%–92% of their total revenues through debasement.

The value of the ability to meet a fiscal emergency also explains why an insecure rational dictator would prefer owning a monopoly mint to the alternative of selling or leasing monopoly franchises to private bidders. Franchising substitutes fixed advance payments for what would otherwise be a variable flow, but rules out recourse to surprise inflation and corresponding emergency capital levies. Accordingly we observe that central governments have typically retained operational control over mints.

Local versus International Coin

A government that seeks seigniorage from the monopoly production of coin may act as a *discriminating* monopolist when the elasticity of demand with respect to their depreciation rates varies across coins: the revenue-maximizing rate is lower for coins facing relatively elastic demand. During the early Middle Ages in Europe, low-value or "petty" silver coin from local mints circulated almost exclusively in local exchange. Higher-value coin from the same mints was mainly used in international markets (Cipolla [1956]), where it competed head-on with foreign coin.⁹ Because the demand for high-value coins was much more elastic, a rational dictator would subject high-value coins to lower rates of seigniorage (less frequent debasement).

Medieval European governments accordingly extracted less seigniorage from gold coin than from silver, and debasement of silver coins was much less frequent for large denominations than for small.¹⁰ Mints went to

great lengths to preserve the quality of their "international" monies (*monete grosse*) even while ruthlessly debasing the locally used petty coins. The Spanish government, for example, took pains to preserve the metallic content of its silver coin, which by the late 15th century had become Europe's (and the New World's) most stable and coveted, while actively debasing the petty copper coinage which it produced as a local monopoly (Motomura [1994]). The English government debased some small-denomination coins, but carefully protected the international reputation of larger coins, especially sterling (Mayhew [1992]).

Fiat versus Commodity Money

The seigniorage motive favors fiat over commodity money in three respects. First, government captures a one-shot profit from replacing the existing stock of monetary metal with fiat money.¹¹ Second, issuing fiat money is a cheaper way to capture an ongoing flow of seigniorage revenues each year. Finally, the demand for a fiat money is less elastic, because users encounter greater costs in trying to employ any foreign money in its place. We elaborate these last two points in turn.

Seigniorage flow is most profitably captured with a money that can be produced (in nominal units) at zero resource cost, and whose nominal stock can be expanded at whatever rate desired. In principle, nominal units of money can be created under a silver standard without incurring mining costs, and the nominal money growth rate can be controlled, by continual debasement, i.e. by continually redefining the unit of account to equal progressively fewer grams of pure silver. A mint that wants to earn a large annual profit from debasement, however, must recoin a large part of the outstanding money stock. In practice, it is much more costly to expand the nominal stock of coins 5% through recoinage than it is to expand the nominal stock of a fiat money 5%, which requires only the expansion

9. Transportation costs, and penalties connected to legal tender laws (which were most readily enforced in local transactions), made it normally uneconomical to import better small-denomination foreign coin for domestic use. Legal tender laws compelling the acceptance of domestic coin at face value were less readily evaded for small denomination coins, because weighing coins was less worthwhile for small transactions.

10. The fact that politically influential aristocrats were the principle users of high-value coins (Cipolla [1956, 26]) supplied a separate public-choice reason for rulers to refrain from debasing these coins as extensively as petty coins.

11. The government realizes a capital gain even if it does not sell off its monetary gold stock. (The central bank's balance sheet typically disguises this gain by counting fiat money as "liabilities" of the central bank, as though central bank notes were still redeemable.) Still, the failure of central banks to liquidate their gold stocks even decades after the demise of the Bretton Woods system is puzzling from a purely fiscal perspective.

of ledger entries and the printing of more identical paper notes.

The process of debasement also invites substantial public resistance. Compulsion, no lighter and no more popular than that necessary to exact ordinary taxes, is needed to prevent market participants from exchanging and valuing new (debased) coins by weight rather than face value, and thus to encourage them to treat both old domestic coin and foreign coin as mere raw material to be taken to the mint. The tax imposed by recoinage is fairly obvious once the reduced precious metal content of the new coins becomes known. Seigniorage flow can be extracted more easily and less obviously with a fiat money, whose nominal quantity can be increased merely by spending new units into circulation that are identical to existing units, obviating the need to recall or devalue the old currency. No one objects to accepting the newly issued units at a value equal to old—since they are identical in (zero) commodity content and interchangeable—so no obvious compulsion is needed.

Fiat money also offers the public smaller opportunities for switching to alternative base monies. Under a silver standard, alternative coins can always be evaluated (even if not legally) by weight, making the substitution of foreign for domestic money a relatively simple matter of measuring both in terms of silver content (measured in a fixed reference weight unit, a so-called “ghost money” unit). If domestic money is being frequently debased, traders quoting prices in weight units would naturally favor more stable foreign coins, less frequently requiring weighing and assaying, as their medium of exchange. By contrast, traders who consider switching from a domestic to an alternative *fiat* currency as a medium of exchange find that there is no simple common metric. A network effect associated with using the common unit of account protects the incumbent currency by imposing high transactions costs on those who would switch first (Selgin [1997]). Acceptance of an alternative currency in transactions presupposes familiarity with its exchange value, but until its acceptance is widespread, or at least until the domestic unit has become thoroughly unreliable as a unit of account (as in a high inflation), there is scant individual incentive to track the exchange rate between the incumbent and alternative currencies. Inflation thus

usually has to become quite severe before “dollarization” of domestic transactions occurs.

Because currency substitution and the elasticity of demand for domestic base money are reduced under fiat currency, the fiscal hypothesis predicts higher inflation rates under fiat standards than under metallic standards (which allow inflationary finance via debasement). This prediction is borne out historically in a comparison of commodity-money and fiat-money episodes after 1600 (Rolnick and Weber [1994]).

Fiat-money Monopoly

Why does a revenue-seeking government itself issue fiat currency monopolistically, instead of taxing private issuers? The reasons for thinking that a seigniorage-seeking government would prefer a mint monopoly to taxation of private mints apply again. In the case of fiat money, a more fundamental reason exists as well: open competition in the production of fiat currency is to date a purely hypothetical possibility, and one that might not be sustainable in practice. If “competitive supply” of fiat money meant free entry into the production of fiat dollar notes—the equivalent of legalized counterfeiting—each counterfeiter would produce notes until even the highest denomination note was worth no more than the paper and ink it contained. If there were no upper bound on denominations, profits from producing dollars would persist until the dollar became worthless (Friedman [1960]). Alternatively, with trademark protection, perfectly competing firms might issue distinct irredeemable monies, bearing identifiable brand names but perfect substitutes for one another (Klein [1974]; Taub [1985]). The result would again be an equilibrium without economic profit, either (in the case where an enforceable infinite-horizon pre-commitment is feasible) with positive-valued money paying a competitive rate of return, or (in the case where time-inconsistency or “cheating” cannot be prevented) with the same worthless-money outcome as the legalized counterfeiting case (Selgin and White [1994]).

Monopoly revenues from the production of fiat money could in principle be obtained by a group of fiat-money issuing institutions whose aggregate currency issue is set at the monopolist's revenue-maximizing level. The

principle drawback of this arrangement is that it requires costly monitoring to avoid cheating (issues in excess of allotments) by individual cartel members. Italy in the late 19th century offers a case in which the cartel approach proved unsustainable. Following the Risorgimento, the new national Italian government, having failed in its early attempts to establish a single bank of issue, awarded legal tender status to the (then irredeemable) notes of six established banks in return for their funding of government debt. The system broke down because one cartel member—the Bank of Rome—was discovered to have cheated on the cartel, secretly exceeding its note allotment by issuing notes with duplicate serial numbers (Sannucci [1989]).

Restrictions on Substitutes

The ability of a national fiat-money producer to earn seigniorage is, like that of a national mint, limited by the availability of substitutes for domestic base money. Potential substitutes include foreign currencies. As noted above in the contrast between local and international coin in medieval Europe, opportunities for substitution into foreign currency increase the elasticity of demand for domestic money. They thereby reduce the maximum steady-state real seigniorage, and raise the inflation rate associated with achieving any target level of real seigniorage. A rational dictator will take steps to limit currency substitution, and can do so using such means as exchange controls and legal tender laws (Nichols [1974]). Nations threatened by loss of seigniorage due to currency substitution, because they have for other reasons committed to dismantle barriers to free capital flows, might try to form a cartel—a multinational central bank—and share its seigniorage. The movement for a European central bank can thus be given a fiscal interpretation.

A second set of close substitutes for domestic base money consists of private financial assets, including redeemable private banknotes and deposits, that function as exchange media. Here again, a rational dictator would take steps to suppress the substitutes, either by prohibiting them altogether (as has been commonly done with private banknotes), or by capping their interest yield (as has sometimes been done with bank deposits), or by

otherwise restricting their availability or attractiveness.

Alternatively, bank liabilities can simply be taxed—for example, by reserve requirements. Unlike competitive private issue of commodity or fiat base money, private banking does not deprive the government of the ability to manipulate the rate of inflation. When banknotes and deposits are redeemable claims to fiat money, their rate of expansion ultimately depends on the rate at which the stock of fiat money expands. It follows that, in allowing private firms to issue redeemable substitutes for (fiat) base money, a rational dictator does not deprive himself of the ability to increase short-run seigniorage via a surprise inflation.

Dwyer and Saving [1986] show that, if bank deposits and currency are perfect substitutes, and if government is as efficient as private firms in producing money, then government can obtain the same maximum steady-state revenue by imposing a positive reserve ratio or other form of tax “licensing fee” on a private banking industry as it would by suppressing private banking altogether. Historically, governments have typically chosen to suppress private banknotes, while allowing checkable private bank deposits to coexist along with fiat money. A straightforward explanation for this, consistent with the rational dictator model, is that the public treats reputable banknotes as very close substitutes for base money. In historical cases where private note issuance was relatively unrestricted, as in Scotland and Canada, commercial bank notes displaced coin (and, in Canada, government-issued “Dominion” notes) almost entirely where their denominations overlapped. The government therefore enhances its seigniorage tax base by suppressing private notes.¹²

12. Federal Reserve officials have recently been scrutinizing electronic payments media that amount to the re-introduction of private currency. In an unusually candid statement of the authorities' concern for seigniorage, Alan Greenspan [1997, 49–50] worries that the result of new electronic currency substitutes may be “simply a diversion of seigniorage from the government to the private sector.” White and Boudreaux [1998] argue that (non-price) competition to “divert” seigniorage is efficient, while nationalization of currency for the sake of seigniorage implies inefficiently low quality.

Bank deposits, by contrast, are *not* such close substitutes for base money, and competing private banks can typically produce deposits and other banking services more efficiently than government can.¹³ Taxes on private banks are likely to bring in more revenue than a ban on private banking that enhances seigniorage only slightly. In consequence, as Glasner [1989, 33] notes, for fiscal reasons "most governments have preferred allowing banks to operate and exploiting them as a source of credit to suppressing them or to operating banks of their own."

Fiscal considerations can thus account for governments allowing competitive deposit-taking (subject to statutory reserve requirements and other devices aimed at directly or indirectly taxing bank deposits) while suppressing redeemable private banknotes.

III. MONETARY REPUDIATION AND THE TIME-INCONSISTENCY PROBLEM

Governments, as we have noted above, may sometimes seek revenue through a surprise inflation that acts as a "capital levy" on money. The capital levy is imposed by a deliberate short-run burst of money creation. Holders of cash balances experience a loss of real wealth as the price level jumps more than expected. Such a capital levy makes it possible to generate more real revenue in the short run, but at the cost of smaller steady-state seigniorage once the public recognizes the risk of a high-inflation period occurring and therefore holds less real base money at any given non-peak inflation rate than it would hold if the inflation rate were viewed as stable.

The rational dictator will find inflationary capital levies most worthwhile during emergencies (especially wars) that put present revenues at a large premium over future revenues by threatening his reign (Glasner [1989]). A capital levy is attractive to a government that attaches a high discount rate to revenues obtained in the future, or one that expects to be short-lived without the levy. Consistent with this view is the finding of Cukierman et al. [1992] that inflation rates and reliance upon

seigniorage revenue are positively correlated with political instability and polarization. In countries with more unstable and polarized political systems, established governments are more willing to sacrifice their long-run inflation tax base to remain in power, because such a strategy will either preserve the particular government that resorts to it, or will at least serve to "constrain the behavior of future governments ... with which they disagree" (Cukierman et al. [1992, 538]). In general a rational dictator cannot exclude the possibility of confronting a fiscal emergency at some future date, and so will value a monetary arrangement that allows him to resort to an inflationary capital levy even if in ordinary times he collects little seigniorage (Glasner [1997]).

However, a capital levy strategy is time-inconsistent: it yields more revenue (in present value terms) than steady inflation only if levies are greater than expected. A capital levy that appears "optimal" for each rational dictator, considered in isolation from his predecessors and successors, may be suboptimal for all successive rulers together. If the public fears that the government will expropriate much of their monetary wealth, they will hold smaller real balances, reducing (to zero, in the limiting case where total expropriation is expected) the maximum yield to all successive governments from a steady-state inflation tax.

The time-inconsistency problem associated with monetary repudiation supplies a rational dictator with a motive for trying to convince the public that monetary policy will be based upon a long time horizon, beyond the term of any particular ruler. In other words, the rational dictator wants to be able to resort to surprise inflation, but also wants the public to believe that he will probably not resort to it.

If the dictator is well-entrenched, faces few external military threats, and has credibly arranged for a line of successors who will maintain his policies indefinitely, then the public may recognize that he has more to lose than to gain by repudiating the currency. On the other hand, short-lived dictators (and rulers in democratic regimes) are typically unable to make such arrangements, and so must seek a different solution. One historical solution was retention of a fixed-parity metallic standard, modified to allow for the suspension of central bank convertibility during fiscal emergen-

13. A number of American states experimented with state-run commercial banks in the decades before 1860. Most of the banks were so incompetently run as to incur financial losses despite their monopoly privileges.

cies.¹⁴ Drawbacks of this arrangement included its inability to yield much seigniorage during non-crisis times, and the high cost of sustaining (via post-crisis deflation) the public's confidence in the promise to preserve the ancient and honorable parity. Another solution, where rival parties are not severely polarized (and so are willing to cooperate to attain mutually desired ends) is the establishment of an "independent" monetary authority that is supposed, like a business corporation, to operate with a time-horizon much longer than its current directors' terms. The decision to form an independent monetary authority is most likely to be made when rival political parties have little to lose by cooperating to restore a depressed inflation-tax base, such as immediately following an inflation-based capital levy that has greatly increased the public's estimate of the likelihood of future high inflation. Historically, then, central banks are most likely to be given independence by democratic governments in the wake of relatively severe inflations. The Reichsbank, for example, gained independence at the end of the German hyperinflation. In the United States, the "Accord" giving the Federal Reserve greater independence from the Treasury came in the wake of the post-World-War-II inflation. Cross-sectionally, our argument predicts that independent central banks—serving the need for a commitment device—should be found more commonly in pluralistic democracies than in autocratic states where a ruling lineage has secure tenure. This prediction is broadly consistent with evidence from the 1980s. In Cukierman's [1992] ranking of 46 central banks, the 14 most independent were found in liberal democracies, with the sole exception of Hungary's. Of the remaining 32 less-independent banks, 16 were in countries that were authoritarian for the entire 1980s, and six more were in countries that were authoritarian at the start of the decade.¹⁵

The fiscal hypothesis suggests that central bank independence is unlikely to be absolute,

and predicts that independence is most likely to be withdrawn during periods of heavy fiscal demand. Consistent with that prediction, the Reichsbank lost its independence during Hitler's rearmament program, and the Federal Reserve System lost its during both world wars (Sylla [1988]).

IV. THE EVOLUTION OF MONETARY ARRANGEMENTS

On the face of it, present-day monetary institutions display several striking similarities to those predicted by the rational dictator model. Practically everywhere base money *does* take the form of fiat paper or deposit credits, issued by a central bank.¹⁶ These central banks enjoy exclusive monopoly privileges granted to them by their governments, returning the bulk of their seigniorage revenues to the sponsor governments. Currency areas correspond to national political boundaries rather than to the criteria suggested by the theory of optimal currency areas. Typically, no statute or rule limits the rate at which the central bank may expand the monetary base. Private firms are typically prohibited from issuing redeemable banknotes. Banks are, on the other hand, typically allowed to supply checkable deposits, subject to reserve requirements and other taxes.

Just how is it that monetary institutions came to take a form so well suited for meeting governments' fiscal ends? An answer based on continuous seigniorage maximization, in which governments are portrayed as designing monetary arrangements from scratch purely to achieve fiscal ends, would be far from adequate. Fiscal motives, we have argued, do directly explain why various rulers monopolized coinage, providing a precedent for later state monopolization of paper money. But fiscal motives by themselves do not account for the gradualness and seeming haphazardness with which revenue-enhancing reforms ar-

14. Glasner [1997, 39] notes that "recognition of the time-consistency problem may help rationalize the seemingly irrational attachment to the gold standard" of pre-1930 governments.

15. Information on regime types is taken from Derbyshire and Derbyshire [1996]. Cukierman's survey excludes most communist countries, which had relatively dependent central banks.

16. Although Hong Kong (two private note issuers before the mainland takeover), Scotland (two), and Northern Ireland (four) retain private note issue even today, the base money is fiat (dollars or sterling) in each of the three systems. We expect that private banknotes will be phased out in Hong Kong now that it has come under mainland Chinese rule. In Scotland and Northern Ireland, seigniorage is extracted by a 100% marginal reserve requirement (in non-interest-bearing Bank of England liabilities) against notes.

rived, culminating in monopoly issue of fiat money.

In modern times especially the governments of industrial democracies do not continuously act to maximize seigniorage. (Inflation rates would be much higher if they did.) Yet monetary institutions capable of extracting maximum seigniorage from the public have emerged and have persisted. Indeed, the single most effective means for extracting seigniorage—monopoly issue of fiat money—became a permanent feature of monetary systems only during the twentieth century.

Our explanation for the gradual and uneven development of seigniorage-enhancing monetary institutions consists of three parts. The first is that government monetary institutions represent to a large extent piecemeal and opportunistic modifications of private-market developments, including the growth of banking and substitution of paper notes and checking accounts for gold and silver coins. The more genuinely “Leviathan-like” governments of pre-industrial times were simply unable to take advantage of such technological developments, and so had to settle for relatively limited seigniorage revenues obtainable through mint monopolies. Eventually, as explained above, increased opportunities for foreign currency substitution made the exploitation of mint monopolies for revenue unprofitable, causing governments to look elsewhere for sources of revenue, and emergency revenue especially. One such source was the banking industry, originally perceived, not as device for earning seigniorage, but as a source of loans on favorable terms. Such loans were typically obtained in exchange for awards of monopoly privileges, especially in note issuance (Smith [1990]). The harnessing of monopoly banks of issue—central banks—as sources of substantial seigniorage came later, with the discovery that such banks (unlike competing banks of issue) could suspend payments with relative impunity, opening the way to the emergence of fiat money.

We hypothesize that the seigniorage motive did not produce fiat money before the 20th century¹⁷ because (redeemable) banknotes had not yet become commonly accepted in areas of lesser financial sophistication, so those areas could not be subjected to a capital levy by the government's monopolizing the issue of banknotes and permanently suspend-

ing redemption of government notes. As Ardant [1975, 192] puts it, “a developed economy was the prerequisite. It was necessary that bank bills be common in all circles and that the state could pay its soldiers, its functionaries, even its peasants in paper money. ... France in the seventeenth century did not have the conditions for a successful state manipulation of the money supply.” During the Restriction period of 1797–1821, even while the rest of the United Kingdom operated on a Bank-of-England-note standard, Northern Ireland's continued adherence to a gold coin standard indicated the fact that banknotes did not yet commonly circulate there. California likewise remained on a gold coin standard during the American Civil War, accepting Greenback dollars only at a discount, and thus remained immune from seigniorage taxation through the issue of Greenbacks.

The second part is that governments, and democratic ones especially, are most anxious to obtain seigniorage revenues, and to alter monetary arrangements in ways that generate more seigniorage, during fiscal emergencies, especially wars. Such emergencies act as fiscal catalysts for seigniorage-enhancing innovations that public resistance might otherwise preclude. Thus the fiscal hypothesis explains the observation that the move from commodity to fiat money typically occurred in steps corresponding to fiscal emergencies.¹⁸ The first step away from the gold or silver standard in many countries, as already noted, was the establishment of a government-sponsored bank. The Bank of England, the Bank of France, and the Swedish Riksbank are well-known examples of government-sponsored banks established to play the fiscal role of lending the government funds on favorable terms. Over time, with the aid of further legislation that granted it a note-issuing monop-

17. There were episodes of temporary suspension (e.g. the Napoleonic Wars in Britain, the Civil War in the United States), but notes that were (correctly) expected to become redeemable in the future were not fiat money. Unlike a fiat note, a temporarily suspended note has a lower bound to its current value set by the discounted expected value of its future redemption media. The government is constrained to (re-)accumulate a sufficient inventory of redemption media. If the “ancient and honorable parity” is to be re-established, the government's potential capital gain is limited to the interest it might earn (or loan interest it might avoid) by lending out or spending from its reserves during the suspension.

18. Chown [1994, 201] documents this observation.

oly, the privileged bank's liabilities became high-powered money. In many European countries this step was reached by end of the 19th century. Fiat money could then be established by the suspensions of central bank liabilities prompted by the fiscal emergency of the First World War.¹⁹ In the United States, where central bank liabilities achieved high-powered status somewhat later, the establishment of fiat money awaited the fiscal emergency of the Great Depression. The leading alternative to the fiscal hypothesis, the view that government's purpose in establishing fiat money is to remedy a market failure to converge to a more efficient monetary standard, offers no explanation for the historical timing of the steps toward fiat money.

The third and final part of our explanation is that, once a revenue-generating reform is in place, it is more likely to survive than other arrangements even when it proves to be a source of disorder. Glasner [1997, 36] argues that early states with access to seigniorage "improved their chances of survival in military competition." During peacetime also, fiscally advantageous innovations prove especially durable, in part because they enjoy the support of powerful interest groups: the recipients of state spending, and the fiscal authorities and regulators themselves. The result is a gradual accretion of revenue-enhancing changes, culminating in arrangements that look remarkably "as if" they were designed from scratch to maximize government revenue.

Together these arguments imply that seigniorage-enhancing institutional arrangements will be observed emerging later in countries that face fewer fiscal crisis, and especially those facing fewer external military threats. Thus central banking came early to belligerent nations of Europe, and only later to Switzerland, North America, Australia, and New Zealand.

V. CONCLUSION

Fiscal considerations explain the main contours of government's roles in money, and

their evolution through the centuries. To say this is not to claim that the fiscal hypothesis accounts for every organizational detail of past or present arrangements, or that alternative accounts are universally invalid, but rather that the fiscal hypothesis provides a useful "default rule." It fits the overall historical pattern of facts better than its leading competitor, the market failure hypothesis. Researchers seeking to explain particular government roles in the monetary system should therefore "follow the money": they should not fail to consider the fiscal implications.

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19. Earlier suspensions—the Bank of England during the Napoleonic wars, the U.S. national banks during the Civil War—were also associated with fiscal emergencies, but were eventually followed by full resumption at the pre-war parity.

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