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Macroeconomic Features of the French Revolution

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This paper describes aspects of the French Revolution from the perspective of theories about money and government budget constraints. We describe how unpleasant fiscal arithmetic gripped the Old Regime, how the Estates General responded to reorganize France's fiscal affairs, and how fiscal exigencies impelled the Revolution into a procession of monetary experiments ending in hyperinflation.

I. Introduction

Chronology of Events

This paper interprets the French Revolution from the vantage point of macroeconomic theories about government budget constraints. From 1688 to 1788, Britain won and France lost three of four wars. France recurrently defaulted on its debt and Britain did not. After

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1688, Britain had reformed its institutions to allow it to raise enough taxes during peacetime to finance debts incurred in times of war, and France sustained institutions designed to constrain the king's revenues. Modernizing forces in France wanted to eliminate government defaults and to smooth taxes and strengthen France's government by enhancing its access to capital markets. When King Louis XVI acceded to the throne in 1774, he pledged to honor the Crown's debt commitments, and successive governments initiated fiscal reforms to facilitate raising and smoothing taxes. Yet reform was uneven, and the pressure not to default outran the government's ability to raise taxes. This led to a run-up of debt and interest payments in the years preceding 1789. Rather than default again, the king called the Estates General to accelerate the reform process.[1]

The National Assembly aggravated the debt problem by immediately reducing taxes and by repurchasing many offices previously sold by the Old Regime. The government nationalized church properties and transformed the debt problem into a "privatization problem." It used the confiscated National Estates to administer a tax-backed money scheme by issuing notes acceptable at auctions of specific church properties.[2] The government spent the notes for goods, services, and debt payments; auctioned some land on credit; and then burned the notes that were returned at the auctions. However, many notes remained in circulation, especially ones of small denomination. Specie left France for England and the rest of Europe. After two years of note issues, the supply of new currency rose to 70 percent of the pre-1789 stock of specie, and the price level rose about 30 percent. The tax-backed money scheme functioned adequately until a war broke out in 1792, which initially went badly for France. The government wanted more resources, so it divorced note issues from the land sales. The tax-backed money plan devolved into a fiat money scheme, causing real balances to drop and prices to rise quickly in early 1793 and threatening the base of the tax (the inflation tax) that was the government's lifeline. The Girondins bequeathed this situation to the Jacobins, who responded by imposing wage and price controls and a set of legal restrictions designed to boost the demand for *assignats* (a "guillotine-backed currency" scheme). As a result, real balances rose and the price level fell in the face of extraordinary issues of assignats, and the government raised immense revenues. In 1794, the war turned in France's favor, and the sense of emergency

[1] Conklin (1993) asked: to those who trusted in prior arrangements, what is the difference between a "reform" and a "default"? Not much as far as we know.

[2] "Tax-backed" because the land underlying this "land-backed" scheme was acquired by confiscation.

diminished, making unenforceable the legal restrictions that had propped up the currency. The Jacobins fell in the summer of 1794, and the legal restrictions supporting the demand for assignats disappeared along with the Terror. Then France experienced a hyperinflation: real balances fell and prices exploded. The Directory administered the first classic hyperinflation in modern Europe until 1797, when it defaulted on two-thirds of the government's debt. Specie returned from England to France. In 1797, France returned to a specie standard and remained on it throughout the Napoleonic Wars. In 1797, Britain suspended convertibility with specie and did not reinstate it until 6 years after Napoleon had permanently left France.[3]

Macroeconomic Theories Coloring Our Observations

Two macroeconomic ideas and three models of money inform our chronicle of events.

Unpleasant arithmetic.—Government budget constraints and the arithmetic of compound interest impose restrictions on government deficits and debt. We use this arithmetic despite two difficulties. First, we have to assume that some commitment mechanism is available to support any sovereign borrowing.[4] Second, when it is assumed that the government can borrow because it can commit to repay its debt, the government budget constraint alone imposes virtually no restrictions on tax and expenditure processes (see Hansen, Roberds, and Sargent 1991). We obtain restrictions like those in Sargent and Wallace's (1981) "unpleasant arithmetic" only by arbitrarily putting an upper bound on the amount of government borrowing. Assertions that a fiscal crisis sparked the French Revolution hinge on positing a bound and on asserting that the French government was nearly hitting it.

Sustainable plans.—Chari and Kehoe (1990) define a "sustainable" government plan to be one that enlists the self-interest of each group to implement its part when the time or the contingency comes for it to act. "Reform" of the Old Regime was difficult precisely because its institutions were largely sustainable, as a sequence of French finance ministers from 1775 to 1789 discovered.

Tax-backed or asset-backed models of the demand for currency.—These

[3] This summary is based on our reading of the historical record. Other readings include Stourm (1885), Marion (1914–21, vols. 1–4), Harris (1930), Aftalion (1987), White (1989), Bordo and White (1991), and Brezis and Crouzet (1994).

[4] See Bulow and Rogoff's (1989) and Chari and Kehoe's (1993*a*) analyses of the severe limits on sovereign borrowing caused by the market's limited ability to punish sovereign defaults. See also Prescott (1977) and Manuelli (1988).

models describe accompanying fiscal arrangements through which new issues of paper money cause little or no inflation.

Legal restrictions models of the demand for currency.—These models study how a government can tax its citizens by forcing them to hold paper money it is issuing to finance a deficit; they describe circumstances in which large new issues of paper currency cause less inflation than would be expected if people were voluntarily holding the currency.

Classical hyperinflation models along lines described by Cagan (1956).—These models describe circumstances in which rapidly issuing a paper currency causes prices to rise even faster than the quantity of currency.

We use these theories first to shape our descriptions and second to interpret how the revolutionaries explained their actions. We document how the revolutionaries used elements of these theories in the debates that shaped the Revolution. Our double use of theories reflects the rational expectations hypothesis that parts of a time-series model are used by the people within the model to guide their forecasts and decisions. We interpret inflation during the Revolution in terms of a procession of regimes in which the "if" parts of the three types of monetary models are approximately fulfilled.

II. Before the Revolution

Even Absolute Monarchies Have Budget Constraints

The immediate cause of the French Revolution was the fiscal crisis of 1788. For 70 years, France had confronted a sequence of similar crises, all stemming from its incomplete efforts to adopt fiscal policies that Britain had used since 1688.

Figure 1 displays the ratio of debt service to fiscal revenues for France and Britain during the eighteenth century. The two series display the same pattern, increasing from very low values in 1689 to about 60 percent in 1789. The upward movements correspond to the major episodes of the "Second Hundred Years' War" between Britain and France: the Nine Years' War of 1688–97, the Spanish Succession War of 1701–14, the Austrian Succession War of 1741–48, the Seven Years' War of 1756–63, and the American War for Independence of 1776–83. During these conflicts, alliances changed often, but France and England were never on the same side. The similarities in the movements of this ratio in the two countries conceal differences in policies: while Britain would modify the denominator (fiscal revenues), France acted on the numerator (debt service).

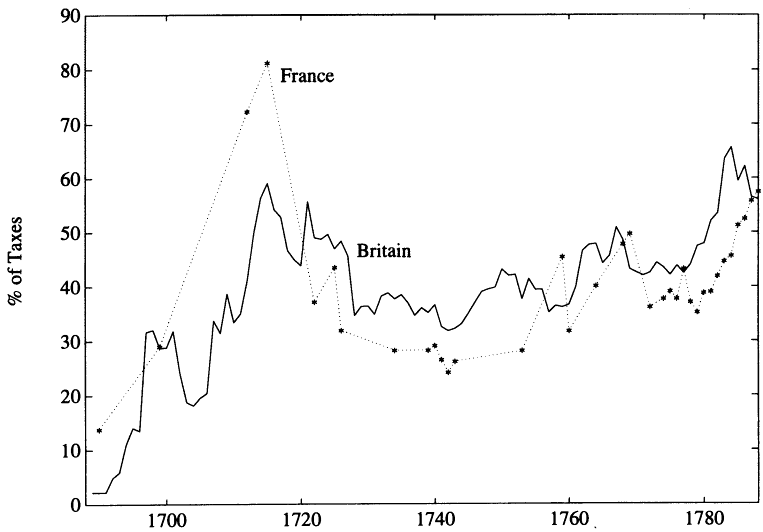

FIG. 1.—Ratio of debt service to taxes, Britain and France, 1688–1788. Sources: for Britain: Mitchell (1988); for France: Weir (1989) and the references listed in n. 8.

The British Experience

The British pattern for this ratio was to increase during wars, when debt was incurred to pay for large military expenditures. During a war, taxes were raised to assure adequate funds to service the loans. After a war, the floating debt[5] was consolidated into perpetual annuities, and taxes were further increased to generate a sufficient net-of-interest surplus to service the debt.

Figure 2 shows the components of Britain's budget constraint during the same period. Total fiscal revenues are set against total spending decomposed into military, civil, and debt service spending. The net-of-interest civil government spending is roughly constant. Military spending surges during wars. In contrast to the volatility of total government expenditures, revenues are smooth. The British government incurred large deficits in wartime and generated small but sufficient surpluses in peacetime. We observe a cycle of debt service rising during each war and then slowly declining with the onset of peace. Britain did not default on its debt during the 100 years following the Glorious Revolution of 1688, which reflected the existence of

[5] By floating debt we mean the following: in Britain, the unfunded debt (notes issued by the Exchequer or various departments, without an act of Parliament); in France, the anticipations, notes issued by the departments or financial officers on behalf of the government, typically maturing within 2 years.

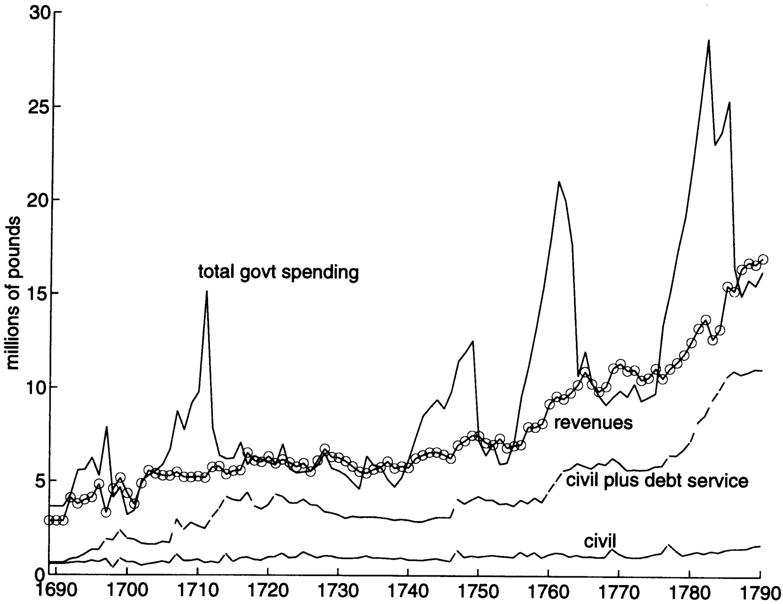

FIG. 2.—Revenues and spending in Britain, 1689–1790. Total spending is decomposed into three components: civil, debt service, and military expenditures. The three lines recorded for expenditures pertain to civil expenditures, civil plus debt service, and then total expenditures, so that the vertical distances between these lines represent, respectively, civil expenses, debt service, and military expenditures. Total revenues are depicted with small circles. Source: Mitchell (1988).

mechanisms intended to make the state creditworthy (see North and Weingast [1989] for a modern account). The British king retained executive power, but the Parliament gained the powers to examine and censor the budget and to vote taxes. By 1715, the system had been refined into a method of funding by which each loan was accompanied by a parliamentary vote for a specific tax to service the loan.

Established in 1694, the Bank of England became an important element of a mechanism committing the government to pay its debts. By the mid 1720s, after the South Sea Bubble, the Bank had acquired virtual monopolies of servicing government debt and issuing notes. The Bank was designed to prevent the government from playing one lender against another.[6] Its charter made it more difficult for the government to default, and the prominence of principal owners of the Bank ensured that any attempt to default would be well publi-

[6] For interpretations of the Bank of England as a commitment mechanism, see Macaulay (1831, vol. 3) and Hicks (1969, pp. 93–95). See Greif, Milgrom, and Weingast (1994) for a related analysis.

cized. In exchange for abstaining from opportunistic behavior, the government acquired credit.[7]

Across the Channel

For France, the three sharp falls in the ratio in figure 1 each correspond to an episode of reimbursement suspension and default in the form of cuts in interest payments. The Spanish Succession War in 1713 marks the first episode. By 1715, the debt service had been reduced through defaults on significant parts of the floating debt. The Regency (1715–23) witnessed the "system" of John Law, a vast operation that first reimbursed the debt with bank notes that devalued quickly. Next, the debt was reconverted into perpetuals and life annuities, with sharply reduced capital value. Finally, because these measures proved insufficient, an interest rate cut was imposed in 1726, by which time the debt service ratio stabilized at 30 percent.

The second episode occurred during the Seven Years' War in 1759, when the government converted the floating debt into perpetuals and halted scheduled reimbursements of fixed-term loans. These reductions continued until the Peace of Paris forced the government to resume its obligations for a short time. Lack of funds soon curtailed compliance. Meanwhile, the floating debt had again bloated to unmanageable proportions, so a third episode started in 1770. The ministry of Terray suspended reimbursements, converted the floating debt to perpetuals, and imposed coupon reductions on bonds of between 7 percent and 50 percent. Taxes were also increased in 1771–73. When Louis XVI succeeded his grandfather in 1774, the floating debt was negligible, debt service stood at less than 40 percent of revenues, and the budget was nearly balanced: 375 million livres in revenues offset 415 millions in expenditures, of which 40 millions were reimbursements of outstanding debt.

These recurrent French defaults reveal different patterns of government revenues and spending between France and England. For this period, budget data for France are not as available as for Britain. To provide a counterpart to figure 2, we constructed estimates of revenues and the components of spending for the period 1759–88 (see fig. 3).[8] Revenues increased sharply between 1770 and 1773, and

[7] In 1797, the British government was to discover another major advantage to the institution, namely the suspension of convertibility of notes, which allowed the financing of the French wars. Significantly, the government did not default on the notes and resumed the gold standard at par in 1819, in effect redeeming the notes at face value and giving a handsome return to those who had accepted the notes during the Bank restriction.

[8] France did not publish the government's accounts before the nineteenth century, and the financial archives burned in 1871. The remaining information is scarce, sparse,

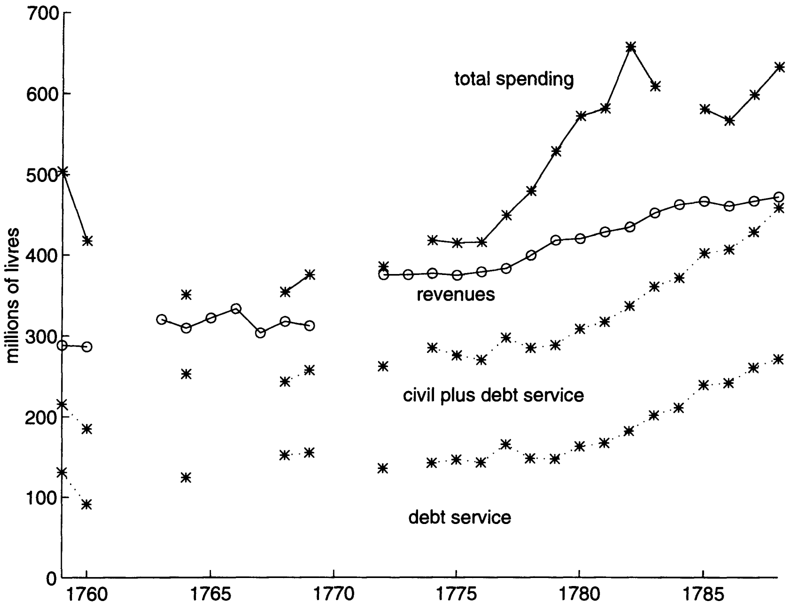

FIG. 3.—Revenues and spending in France, 1759–88. Revenues are depicted with small circles. Expenditures are decomposed as in fig. 2, with successive strings of points denoting civil expenditures, civil plus debt service, and total spending, respectively. So the vertical distances between successive strings of points for expenditures represent civil, debt service, and military expenditures. Source: see n. 8.

grew steadily from 1776 on. The ends of the Seven Years' War and the American War for Independence triggered reductions in spending.

The contrast with figure 2 is instructive. In 1763 and 1783, there was no equivalent to the British debt funding, namely a tax increase sufficient to fund the interest on the debt accumulated during the previous war. In the 1760s, tax revenues remained constant. In the 1780s, they grew too slowly, causing debt service to increase. By 1788, as in 1770 and during the Regency, the inexorable compounding of interest brought France to a fiscal crisis.[9] Figure 3 shows France in the grips of some "unpleasant arithmetic" (see Sargent and Wallace 1981).

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and contradictory. We have constructed the estimates shown here using various published and archival sources, including the following: those published are Necker (1820), Mathon de la Cour (1788), Marion (1914–21), Clamageran (1876), *Compte rendu* (1788), and *Compte général* (1789); unpublished sources are Paris, Bibliothèque Nationale, mss. Joly de Fleury 1437 and 1442, MFF 7749, MFF 4580; and Archives Nationales, F4 1082; see also Riley (1987).

[9] Over the whole period, France was at war only one year out of three. The gross-of-interest budget was in balance only briefly in the 1770s.

French Fiscal Backwardness or Optimality?

In figure 2, Britain looks like a simulation from a Barro (1979) tax smoothing; in figure 3, France does not. It is tempting to compare France's financial arrangements unfavorably to Britain's, but theories of dynamic Ramsey taxation instruct us to be cautious about condemning France's recurrent defaults or praising Britain's abstinence. These theories have governments offering their creditors state-contingent, after-tax returns that respond to news about the government's prospective net-of-interest fiscal surplus. Realization of a positive shock to government expenditures or a negative shock to "exogenous" government revenues results in a lower payoff and good news in a higher payoff.[10] We have not attempted to match these theories to our eighteenth-century observations on French and British finance. We would have to struggle to reconcile the *timing* of the French defaults with these theories, in which low after-tax returns are paid on government debt at the *starts* of "wars." Perhaps it could be argued that the French defaults occurred in response to reckonings that the prospective revenues expected to accrue with French war victory had evaporated with defeat. It would require much more work to coax from these theories an understanding of why France refused to default in 1789, despite its earlier intermittent defaults.[11]

In 1789, modernizing elements in France did not regard past and prospective government defaults as part of an optimal fiscal arrangement. They hoped to reform fiscal institutions to rid France of those defaults, and this is one of the reasons they welcomed the king's call to the Estates General.

Snapshot of the Old Regime Laws

France had the appearance of an absolute monarchy. The king created law by edicts and took executive actions by *Arrêts du Conseil,* although not all laws emanated from the king. There were also legal traditions, with forms of common law and written law varying from province to province that preexisted royal edicts. The king confronted the power of a dozen Parlements, with the Paris court preeminent, which verified that new edicts were consistent with the existing

[10] This is the message of Lucas and Stokey's (1983) examples 7 and 8 and Chari, Christiano, and Kehoe's (1994) fig. 6.

[11] Although Britain did not default, it did issue securities callable at the government's option. Such securities expand the range of contingencies against which a government can insure and tax smooth. Equilibrium tax-smoothing models with a government constrained to issue only callable securities have not been worked out, so we do not know how closely government callable debt would approximate a setting with a complete set of state-contingent securities. See also Grossman and Van Huyck (1988).

body of laws in its jurisdiction. After a law passed muster, it was registered by the Parlements and enforced in court. Parlements also functioned as courts of law and courts of appeal.

The Parlements had the right to remonstrate, that is, to send a written exposition of their misgivings about a law, and to request that the law be reconsidered. If the king persisted, the Parlement could issue "iterative remonstrances." The next step was for the king to summon and preside over a special Parlement session called a *lit de justice.* When the king sat in Parlement, he could compel registration of a law. Further resistance from the Parlement was met by force, exile, or prison.

There was no written constitution, yet legal scholars spoke of one and disputed it. An uneasy sense of balance existed between the king's divine right to rule and the secular necessities of legal continuity. France presented a paradox. The absolute power of the monarchy was acknowledged, and institutions were reinforced that effectively constrained centralized authority.

Offices

Positions in the Parlement were sold by the king and were inherited or resold by the "owner" with tacit royal consent and payment of a transaction tax. Holders of parliamentary offices, as well as other venal offices of justice, were known as the *noblesse de robe.* They formed a cohesive class united by their common arrangements with the Crown.

Beyond the *noblesse de robe,* there was a larger class of officers, more than 50,000 by the time of the Revolution, who also owned their offices. These positions in the judicial, police, administrative, and fiscal systems were properties owned and bequeathed by the officers. An officer's wages represented the interest on the sum, called the finance of the office, which he or his predecessor had paid to acquire the office.[12] The finances of all offices formed a component of the public debt that could not be altered or diminished without major institutional changes.[13]

Taxes

Royal taxes under Louis XIV consisted of the *taille,* a direct tax of medieval origin from which the nobility was exempt, and a vast array

[12] Office owners did not welcome increases in wages because they forced the owners to increase the finance or forfeit the office.

[13] An officer's compensation often went beyond the wages themselves to include all forms of pecuniary and nonpecuniary rewards: feudal-like dues, legal or illegal bribes, prestige, tax exemption, and that most coveted prize, nobility itself (see Bien 1987).

of indirect taxes on consumption and movements of commodities across France's numerous internal borders (*droits, traites, aides,* and *gabelles*). The king collected various feudal dues and revenues from the monopolies that he owned, including coin minting, salt, postal service, tobacco, parts of foreign trade, gunpowder manufacture, and the lottery.

The taille was collected differently in various regions. Within the kingdom's historic core, a system of direct allocation of tax liabilities by royal officers had evolved (the areas under this system were called *pays d'élection*). The monies were collected by the *receveurs,* venal officers who pledged to pay the Treasury the amounts assessed according to a specific timetable. They regularly gave the Treasury *rescriptions,* or claims on themselves due a year hence, which the Treasury resold at discount. The *receveurs* earned interest on the funds collected and also received a commission on the taxes collected (see Bosher [1970] for details). Notes issued by the *receveurs* and *billets* issued by the *Fermes Générales* were called anticipation notes. These notes formed the floating debt system and also allowed private parties to transfer funds to and from Paris in the absence of a developed banking system.

More "recently" absorbed territories such as Brittany, Burgundy, Provence, Artois (fifteenth century), Béarn, Foix, Bigorre (sixteenth century), Franche-Comté, and Flanders (seventeenth century) negotiated their global tax dues with the king through the provincial Estates, which met regularly and were charged with collecting tax monies. Other direct taxes (the *capitation* in 1695) followed the same mode of assessment as the taille. Repeatedly throughout the eighteenth century, attempts were made to impose income taxes without respect to status or privilege. These attempts failed in terms of both the modest amounts collected in 1789 (12 percent of revenues) and the persisting irregularities in assessment.

Indirect taxes and monopolies were leased to syndicates of individuals who contracted with the king. Tax farmers collected taxes within the limits of the law in exchange for a specified amount of money for each year of the lease. The lease stated a minimum payment to the farmers and a rule for sharing the excess over that minimum between the king and the farmers. After 1726, the *Fermes Générales* collected all consumption taxes and internal duties, and managed the salt monopoly.[14]

A last form of tax collection called the *régie* was collected by government employees who received a salary and a commission. Louis XIV

[14] As a variant of tax farming, the *financiers* paid a capital sum corresponding to the present value of a tax.

attempted but failed to use the *régie*. It was reintroduced first in the 1750s as a tax on leather and later to manage the king's feudal rights and the royal demesne. By 1789, 25 percent of fiscal revenues were collected through *régies* and 35 percent through farms. The remaining direct taxes were collected through the *receveurs* and provincial officers.

Taxation was not uniform across classes, occupations, or provinces. Specific groups often had the opportunity to pay an *abonnement* or waiver of a new tax or duty. The clergy paid taxes by recurrently conceding a *don gratuit* (free gift).[15] By 1789, the annual average of the clergy's tax bill was 10 millions, or less than 2 percent of the state's fiscal revenues, even though the church owned 10–15 percent of the property in France. Cities, provinces, professional corps, the royal princes, and religious associations also benefited from the waiver system.[16]

The state's liabilities and commitments included favors, gifts, and pensions bestowed by the king. Favors often took a symbolic form. Historians marvel at how Louis XIV had the nobility competing for the honor of holding his shirt while he dressed. Other favors were more costly. Spending on pensions grew at an even faster rate than on defense during the reign of Louis XVI. The revolutionaries were astonished by the thousands of names on the pension lists, as well as by the multiple secret favors consigned in the Red Book and indignantly published by the Assembly. Other favors took the form of exchanges of lands, purchases of fiefdoms, and so on.

Apology for the Old Regime

The revolutionaries considered this structure to be antiquated and inefficient. But it served a purpose. The French nation had been formed over the centuries by granting concessions as well as by conquest, inheritance, and acquisition. Local customs and traditions, privileges, and hierarchies could not easily be overturned or ignored. Incorporating the local power structures into the French realm made it easier to win acceptance of the new rule.

[15] Individuals or communities could negotiate *remises, décharges, modérations*, or *indemnités*, exemptions or special rebates.

[16] A map of the prices at which salt was sold by the *Fermes Générales*, which managed the monopoly, showed a mosaic of exemptions. Some were due to the fact that a region produced salt itself (Brittany and the Atlantic Coast). Others had historical explanations. Prices varied from 1.5 livres for 100 pounds of salt to 62 in Burgundy (but within Burgundy, 20 villages enjoyed prices lower by a half or more). The price increased 30-fold when one crossed from Brittany to Maine. This created opportunities for smuggling.

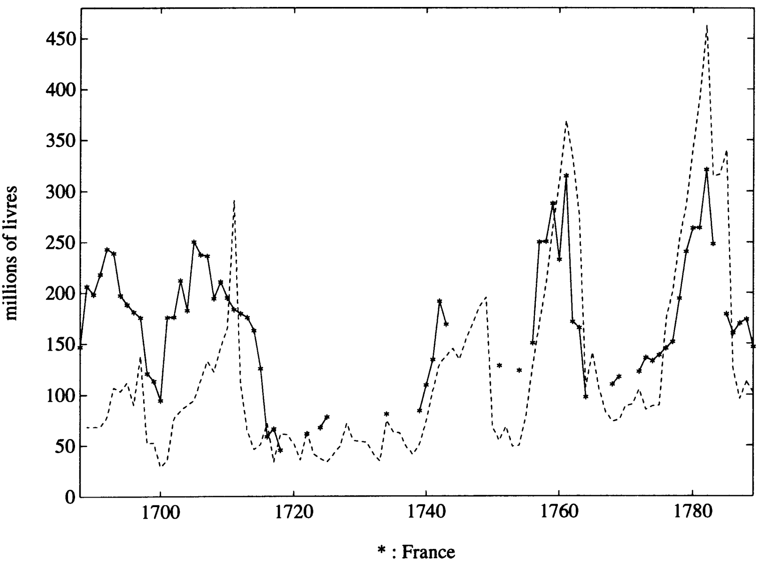

FIG. 4.—Military spending in Britain and France, 1688–1789. Sources: for Britain: Mitchell (1988); for France: Mallet (1789), Forbonnais (1758), and the references listed in n. 8.

Fiscal Pressures to Reform

As wars expanded across continents and oceans, costs rose, and they were no longer funded in the traditional medieval way of raising sufficient taxes during wartime to cover expenditures. Figure 4 compares the history of military expenditures in France and in England. The wars of Louis XIV (between 1688 and 1714) occasioned the first large-scale recourse to borrowing in the form of publicly sold annuities. This began 75 years of increasing reliance on marketable public debt, bringing the debt/gross national product ratio to 63 percent in 1789. By 1789, debt issued on the market represented close to 80 percent of the state's liabilities. Table 1 shows that the three categories of perpetual debt, life annuities, and securities (fixed-term loans and floating debt) each represented 26 percent of the state's liabilities, whereas the finance of all offices represented 735 millions or 17 percent of the total debt or 21 percent if we add bond monies.

Credit was useful to France's foreign policy but difficult for a sovereign monarch to obtain. An obstacle to getting credit was the sovereign's monopoly of force and his power over contract enforcement. This problem was analyzed by Bulow and Rogoff (1989) and Chari and Kehoe (1993*a*). Chari and Kehoe's analysis is driven by the calculation that as long as a government does not lose access to a means

TABLE 1

STATE OF DEBT IN 1789

	Capital Outstanding	Debt Service
1. Rents:		
Perpetuals	1,136.0	56.8
Life annuities	1,154.0	105.0
2. Fixed-term loans	830.3	111.5*
3. Anticipations	322.3	15.8
4. Bond monies	201.8	10.2
5. Financed offices	119.2	5.0
Total (May 1789)	3,763.6	304.3
Ratio to GNP	63.3%	
Ratio to revenues		64.4%
6. Offices	616.7	9.7
7. Feudal rights	130.0	...
8. Debts of clergy	95.0	4.75
9. Debts of abolished institutions	228.4	11.4
Total (November 1789)	4,816.9	325.4
Ratio to GNP	81.1%	
Ratio to revenues		68.9%

SOURCE.—*Compte général* (1789), pp. 44–48, 50–54, 82, and 98–99; *Archives parlementaires*, 10:96, 72:199, 41:145–52, and 30:329.

* 34.7 of this is interest payments.

of saving, the punishment of not being able to borrow in the future is not sufficient to deter a default: if it can lend, a government can tax smooth almost as well as it can by borrowing. From the standpoint of the analysis of Chari and Kehoe (1993*a*), the mystery is that the king could borrow as much as he did. Nevertheless, the debt sustainability problem preoccupied the king's ministers. In 1784, Jacques Necker wrote the following:

> The absolute power of a monarch and full public trust are two notions which need intermediaries to be perfectly conciliated. This authority is in France subject to certain restraints when it comes to an increase in the sovereign's revenues, since the laws which levy new taxes must be registered in the Parlements, and these courts can then enlighten the monarch's justice by their remarks; but a simple *arrêt du Conseil* or a ministerial order authorized by the sovereign are enough to suspend reimbursements or impose a reduction in interest. . . . Therefore one can rekindle or sustain public trust only by giving reassurances on the sovereign's intentions, and by proving that no motive can incite him to fail his obligations. [1784, 3:155]

The last sentence is a succinct definition of "credible policy." However, several pieces of evidence indicate that France had somehow solved the sovereign debt problem.[17] First, in the late 1780s, the king had accumulated large debts and devoted over 50 percent of the state's revenues to servicing them. Second, in the late 1780s, the king adopted extraordinary measures to refrain from defaulting and to acquire more flexibility in servicing his debt, most significantly by convening the Estates General. *Something* impelled him not to default.[18] Third, bond prices in the late 1780s were not especially depressed.[19] Fourth, the Revolution would strain to honor the king's debts and would default only after 8 years of trying and failing with a variety of debt management schemes.

Up to 1789, France's fiscal arrangements had evolved unevenly, and the ability to adjust taxes did not match the king's plans to service his debts. As we have seen, France lived with an array of institutions whose purpose it was not only to provide funds to the king but also to constrain him. These constraints impinged particularly when it became desirable to raise taxes to service debts. The history of repeated defaults prior to Louis XVI is a symptom of France's failure to implement fully the commitment structures and tax system required to support a British-like fiscal policy. Necker (1784, 3:157) observed that "suspension of payments is much less a cause than a result of the lack of trust." Institutional constraints shaped policies, much as they were designed to. When finance ministers pushed against the constraints, the constraints held firm.

Sentiment for Copying Britain

Figure 4 shows that, relative to its population and national output, wars cost Britain more than France. The average annual cost of these wars typically amounted to 1–1.5 years of revenues in Britain, com-

[17] Conklin (1993) studied this problem for the finances of the Spanish monarchy in the sixteenth century and adduced the presence of punishments that the king's creditors could administer to supplement the act of refusing further lending. Chari and Kehoe (1993*b*) study how much debt can be sustained if inabilities to borrow are buttressed by prohibitions against future government *lending*, should it default.

[18] The government seemed to care about its creditors more than it should according to representative agent models of sustainable government debt. But relative to models with agents who differ in their holdings of government debt, representative agent models overstate how difficult it is to sustain government debt. See Rogers (1986) for a study of how heterogeneity impinges on credibility of capital taxation.

[19] See Velde and Weir (1992). The period 1764–70 shows a steady increase in the market discount on government loans, up to yields of 10 percent; in contrast, up to August 1788, only the most recent loans were discounted, only up to yields of 8 percent, whereas perpetuals remained under 6.5 percent. The suspension of reimbursements of August 1788 affected fixed-term loans, but perpetuals remained stable.

pared to 0.5–0.8 in France. The Seven Years' War, which proved so costly and disastrous to the French, cost 40 percent more to the British, although England's population was a third of France's and its income half. As Necker noted, "England still today [in the midst of a war] can find 300 millions to borrow at 3% each year, and exerts amounts of efforts and power out of proportion with its wealth and population" (1781, p. 16).

It is known that French officials understood the case for smoothing taxes. In the 1770s, Montyon, a senior civil servant in the French Finance Ministry, wrote that[20]

> Great Britain finances by taxation neither all nor part of the costs of war, it finances them by loans and increases the annual tax burden only by the amount necessary to face the interest and redemption of the loan. That is the regime that France must adopt, and will adopt sooner or later because its value is only too obvious, and our own mistakes will force us to return to this policy. In wartime it is our habit to increase taxes, at a time when perhaps they should be decreased. Indeed in wartime the country suffers enough from the labor withdrawn from agriculture and manufactures to be sent into the army, the navy, and into the production activities necessitated by war.

French policymakers understood the advantages of Britain's constitution. They also realized that establishing a permanent legislative body[21] would diminish not only the power of the central government but also that of a multitude of provincial bodies, officers, and single-interest groups and corporations. As Montyon put it: "Which European states now enjoy the soundest credit? Those where the authority of a single man is less prominent, and we cannot disguise the fact that Holland and England have a great advantage over France by their constitution. . . . If we faced the sad alternative of sacrificing the [French] constitution to finances or finances to the constitution, we should not hesitate to choose the former."

A Temptation Resisted

A French leader had once contemplated trying to install a British financial "technology." After the disastrous last wars of Louis XIV,

[20] These citations come from the manuscript of a book on the public debt, kept at the Archives de l'Assistance Publique, Paris (Fond Montyon, Fossoyeux 101, carton 22).

[21] The only institution that came close was the Estates General, which had last met in 1614.

the duke of Orléans acted as regent for the young Louis XV from 1715 to 1723. Orléans was tempted to initiate a process of change. Plans circulated in Versailles to establish a permanent version of the Estates General. The regent decided against it because he was advised that to do so would unleash uncontrollable forces. He then compromised with the Parlement and presided over the defaults associated with John Law.[22] Until the start of the Revolution, France remained under a nominal absolute monarchy encumbered by a tax system in need of reform.

Sustainability or Bad Choices?

It has been argued, most recently by Riley (1986), Schama (1989), and White (1989), that the fiscal problems of the Old Regime in France were not the consequence of fatally wounded institutions, but of particular choices made by the king's ministers; that different and wiser policy actions had been feasible; and that failure to take wiser actions indicated the incompetence or competing interests of the policymakers. Such arguments forget that the French monarchy was not really absolute and that social institutions put a host of participation and incentive constraints on people.

French finance ministers understood arithmetic and compound interest.[23] They tried to emulate the fiscal policies of Britain but faced different constraints on their actions. Their failure to achieve outcomes that would have been attainable had they had more authority to make commitments reflects a deficient "commitment technology," or the existence of mechanisms designed to protect *other* commitments.

The Last Fiscal Crisis of the Old Regime

The reign of Louis XVI had started auspiciously in 1774 because the defaults and tax increases imposed by Terray in 1770–72 had left the new finance minister Turgot with close to a balanced budget. The 20-year-old monarch pledged never to default on the public debt. However, Turgot's aversion to military adventures and efforts to implement far-reaching reforms placed him at odds with vested interests, which eventually led to his downfall. Rather than follow Turgot's

[22] Louis XIV, whose first years of reign were troubled by the Paris Parlement's unrest, had imposed his will on the Parlements and deprived them of the right to remonstrate. When he died and left the regent's powers severely curtailed in his will, the regent bartered with the Parlement: the court would declare the will null and void, and he would return the right of remonstrance.

[23] See Velde and Weir (1992) on the financial competence of French governments.

advice, France persisted in its old pattern of engaging in wars without adequate provisions for financing them. Turgot's successors, Necker and Calonne, financed the war primarily through borrowing and inconspicuous tax increases.

The Treaty of Paris in 1783 left the government with a large peacetime gross-of-interest deficit. Calonne tried to delay the inevitable with more borrowing, but in 1786 he announced to the king that the current fiscal course was not sustainable and proposed a major tax reform. Calonne attempted to bypass the Parlements and failed. He was dismissed and had to flee to England to avoid the Parlements' indictment in 1787. He was replaced by Loménie de Brienne, who unsuccessfully proposed another package of loans and tax increases. As the summer of 1788 began, the government faced stark alternatives: either repeat the operations of 1770–72 by abolishing the Parlements, increasing taxes, and defaulting on the debt or foster wide national consensus to undertake reform on a larger scale. Unpleasant arithmetic and a reluctance to default prompted Louis XVI to awaken a dormant institution, the Estates General, which 60 years earlier the regent had let sleep.

III. The Search for a New Order

Annus Mirabilis (1789)

The French Revolution sought a combination of institutions that would allow France to make the fiscal conversion achieved by Britain in 1688. Necker explained the alternative chosen by the king when he spoke to the Estates General on May 5, 1789 (*Archives parlementaires,* 8:14–15):

> And please note, gentlemen, so that you may feel even more love for your gracious monarch, you do not owe the precious benefit of being assembled here in Estates General by H.M. to an overwhelming financial distress. Indeed, for the greater part, the measures we have presented as ways of eliminating the deficit were always available to the king . . . and supposing, if you will, implausible impediments, what resources would authority not have, had the king only been concerned with his finances, had he followed the ways several predecessors have shown him, and absolved himself from all or part of the various obligations whose extinction would have considerably alleviated the Treasury. Therefore, gentlemen, it is to H.M.'s virtues that you owe his enduring determination in planning and wishing for the Estates General. He would have solved his financial difficulties without

> their help, had he not taken a great interest in upholding property rights, preserving rewards earned in his service, respecting the claims of misfortune, and hallowing all the commitments made by the rulers of a nation true to its honor and its word. . . . H.M. has seen that the people, concerned with the financial difficulties and the state of credit, were aspiring to a return of order and trust that would not be short-lived, nor tied to the contingencies of our current ordeal. . . . He has reflected that, in order to reach such a worthwhile goal, it was necessary to summon new keepers of public peace, and put so to speak the order of finances under the whole nation's supervision.

These statements were true. The government could have followed Terray's example of 1770 and balanced the budget with an equivalent combination of default and tax increases. It did not, and instead sought consensus to change fiscal arrangements. The market for government bonds at the time, even before the call of the Estates General, indicated that expectations were nothing like those in 1769–70, when anticipation of Terray's measures sharply drove prices down. It is tempting to interpret the bond market data and the tone of Necker's remarks as reflecting an emerging understanding between government and governed, and debtor and creditors, that France could not prevail in international struggles, nor could enterprise and commerce prosper, with a government prone to defaults.

Some Adverse and Persistent Revenue Shocks

Soon after Necker's speech, the Court understood the depth of the aspirations aroused by the Estates General, estimated the costs of reform to be unacceptable, and tried to retreat. The Court failed to arrest the momentum gathered behind the forces of reform. Popular pressure and violence prevailed, and in July 1789 the Estates were transformed into a National Assembly empowered to "regenerate" France. The collapse of central authority had fiscal consequences. In eager anticipation of the new order yet to come, castles of feudal lords, tollhouses, and residences of tax collectors were burned across the country. On June 22, 1789, the Assembly decreed that all current taxes would become illegal.[24]

Partly to contain the breakdown of the old order, the Assembly took drastic steps. On August 4, 1789, the revolutionaries terminated the feudal order by abolishing all privileges, including financial ones,

[24] Many people ignored the provision in the decree stating that those taxes would remain in force until the promulgation of a constitution.

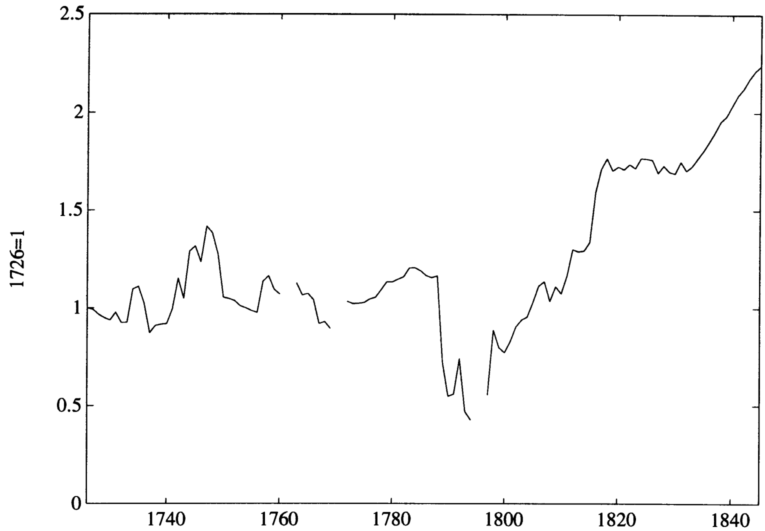

FIG. 5.—Index of real per capita revenues (excluding revenues from currency creation) in France, 1726–1845. Source: the sources listed in n. 8; Nicolas (1882) for the nineteenth century; and Dupâquier (1988) and *Annuaire statistique* (1966) for population estimates; the population for 1795–1815 is adjusted for current boundaries.

and suppressing all offices. However, the Assembly did not intend to default on the state's obligations to the officers. It regarded offices as properties and intended to repurchase them. Table 1 shows how reimbursements of offices appeared on the balance sheet of the government. The Assembly transformed the implicit interest component of the officers' salaries into an explicit interest payment due on the capital owed to the former officer.

On August 4, the Assembly eliminated many of the institutions that the Old Regime used for tax collection and short-term credit. Figure 5 shows the consequent, unprecedented drop in fiscal revenues. The Assembly embraced a paradox. Although publicly committed to honoring the debt, political circumstances forced it to eradicate revenues without diminishing its obligations.

Designing a New Tax System

> Simple rules, easy collection, transparent accounts. [Deputy La Rochefoucauld, chairman of the Taxation Committee, August 18, 1790]

The Assembly discussed tax reform in terms of physiocratic theories and was willing to take the time required to implement a neutral tax system designed to distort relative prices minimally.[25] The Assembly relied heavily on the *contribution foncière* and abolished consumption taxes because it wanted to tax pure rents. The administrative instructions on how to implement the *foncière* specified that the piece of land *itself* was really being taxed and that the owner was but a proxy for the purposes of that payment.

Administering the *foncière* would require compiling and continually updating a complete register of all plots in the kingdom. The failure of the Revolution's tax system traces to the fact that rather than establish a new central administration, the Constituants relied on the newly created local administrations, which had scant incentives to be helpful. The shortage of tax revenues later determined the destiny of the assignat. Figure 5 shows that revenues took a long time to return to prerevolutionary levels. Per capita taxation in the French Empire did not reach prerevolutionary levels until 1810. Thus tax reform did not take effect rapidly enough to solve the debt problem.

Birth of a Currency

In response to a motion by the least ecclesiastical of bishops, Talleyrand, the National Assembly placed the church's assets "at the Nation's disposal," giving the state a "privatization problem." Necker and the Constituants planned to solve the privatization problem *and* the debt problem by creating a new currency. They devised a scheme to raise revenues by auctioning the confiscated lands, thereby withdrawing paper notes issued on the security of the lands sold by the government. This "tax-backed money" scheme propelled the state into the domain of monetary experimentation. Records of their debates show how members of the Assembly marshaled theory and evidence to assess the likely effects of their innovation. They quoted David Hume and Adam Smith and cited John Law's system of 1720 and the American experiences with paper money 15 years earlier as examples of how paper money schemes can go awry.

Necker's original plan embodied two components: a National Bank and a new financial instrument, the assignat. Necker's National Bank was patterned after the Bank of England. He proposed to transform the *Caisse d'Escompte* into a National Bank by granting it a monopoly on issuing notes and marketing government debt. The Caisse was a discount bank founded in 1776 whose main function was to discount commercial bills and issue convertible notes. Although independent of the government in principle, it had occasionally been used as a

[25] Reforming tax laws and tax administration was the preeminent financial task mandated by the *cahiers de doléances*.

source of loans. Its notes had been declared inconvertible in August 1788, and by the time of Necker's proposal, its reserves were exhausted. Necker's plan placed the National Estates (as the church lands became known after the addition of the royal demesne) at the center of the financial picture: a "Bank of France" would issue a 5 percent security mortgaged on the prospective receipts from the modest sale of some 400 millions' worth of National Estates in the years 1791–93.[26]

> Must we hand the State over to a syndicate of publicans? [Deputy Rewbell, December 19, 1789]

The deputies split Necker's plan by accepting the assignat but not the Bank. They refused to establish a Bank mainly *because* they understood it to be a commitment mechanism. A masterful lecture by Dupont de Nemours on the real-bills doctrine explained how a Bank would operate. Bankers such as Necker, Lecouteulx, and Laborde backed the proposal,[27] but the deputy La Rochefoucauld attacked the idea of a bank on the grounds that "the funds it would lend to the State, and the services it would seem to render, would force the government to show regards it would not have to display toward a *multitude of individual enterprises*" (*Archives parlementaires,* 10:673; emphasis added). The chairman of the Finance Committee, Anson, said: "Let us never overlook the fact that the various forced paper-monies issued in a kingdom by the sole authority of a monarch or his cabinet, after having taken the nature of an injustice from their origin, will encounter resistance in their use, and their easy multiplication offers countless abuses; but all these flaws disappear when a paper-money is an emanation of the general will. Who among us would dare question its value? That would be mistrusting ourselves" (*Archives parlementaires,* 12:606).

> To end in a day the work of a half-century. [Deputy Montesquiou, chairman of the Finance Committee, August 27, 1790]

By mid 1790, members of the National Assembly had agreed to sell the National Estates and to use the proceeds to service the debt[28] in

[26] Only 170 millions were to be used initially to cover the deficits of 1789 and 1790.

[27] The British funding system was also based on the word of the Parliament; but the Parliament entered into a balance of power with the executive, whereas the Constituent Assembly did all it could to diminish the executive power (the king and his cabinet), which it did not trust.

[28] The current weight of the debt on government revenues was over 60 percent when due reimbursements were included.

a "tax-backed money" scheme.[29] The government would issue securities with which it would reimburse debt. The securities were acceptable as payment for National Estates purchased at auctions; once received in payment, they were to be burned. (The Appendix describes the mechanics of the auctions.) The Estates available for sale were thought to be worth about 2,400 millions, and the exactable debt (essentially fixed-term loans, unpaid arrears, and liquidated offices) stood at about 2,000 millions. The value of the land was sufficient to let the Assembly retire all the exactable debt and thereby eliminate the interest payments on it.

After lengthy debates, in August 1790, the Assembly set the denomination and interest rate structure of the debt. These debates foreshadowed many issues that were later to be studied by Friedman (1948) and Bryant and Wallace (1979). Proponents of "bonds" (large-denomination, high-interest liabilities) contended against advocates of issuing "money" (low-denomination, low-interest liabilities).[30] Bond advocates asserted that it would be wise to isolate these "credit" operations from monetary arrangements, and cited it as an advantage that, when bonds were issued to pay off the national debt, the operation exchanging the National Estates for the debt would involve only financially sophisticated people.[31] Advocates of money asserted that lower denominations would bring about lower interest costs. They also recommended low denominations as a means of involving many people in the swap and binding them to the Revolution. They asserted that a low-denomination assignat would provide France with a new monetary instrument and do for its depressed economy what bank notes seemed to do in Britain: ease credit, lower interest rates, and facilitate trade.

[29] Two distinct aspects of monetary theory help in thinking about the assignat plan. First, a system beginning with a commodity standard typically has room for a once-and-for-all emission of (an unbacked) paper currency that can replace the commodity money without generating inflation. Sargent and Wallace (1983) describe models with this property. That commodity money systems are wasteful underlies Friedman's (1959) preference for a fiat money regime over a commodity money. Second, in a small country on a commodity money system that starts with restrictions on intermediation, those restrictions can be relaxed by letting the government issue bank notes on the security of safe private indebtedness, while leaving bank notes convertible into gold at par. See Smith (1776) and Sargent and Wallace (1982) for expressions of this idea.

[30] The National Assembly debated many now-classic questions in monetary economics. Under what conditions would money creation generate inflation, and with what consequences for business conditions? Distinctions were made between the issuance of money to pay off debt, on one hand, and monetization of deficits, on the other. Would assignats be akin to notes emitted under a real-bills regime and cause loss of specie, or would they circulate alongside specie, thus increasing the money stock? Would inflation affect real wages? How would it affect foreign trade, competitiveness of French industry and agriculture, balance of trade, and foreign exchange?

[31] It had been conventional to issue bonds in denominations of 500 or 1,000 livres.

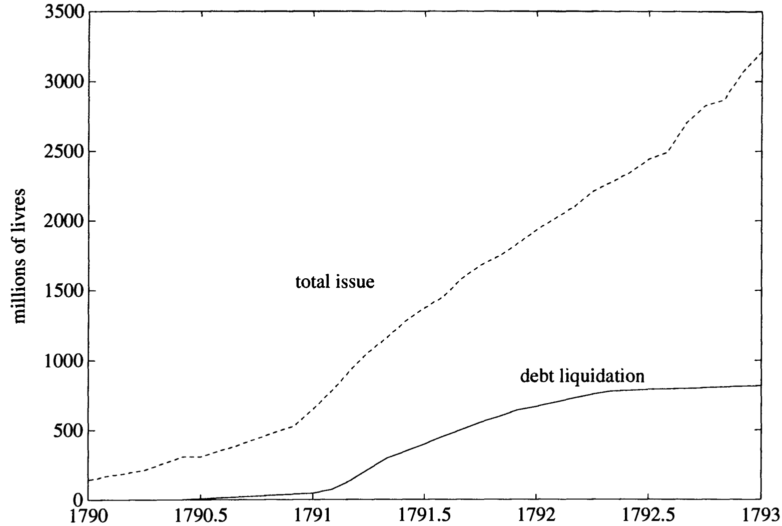

FIG. 6.—Assignats used for debt reimbursement and total issue, 1790–92. Source: Archives Nationales, Paris, AD IX 497bis and 586.

Initially, the arguments for large denominations prevailed. The initial 400 millions issued in April 1790 were in denominations of 200–1,000 livres, as were the Caisse d'Escompte notes. In the plan adopted in September 1790, the lowest denomination was 50 livres, and 35 percent of the notes were ultimately issued in denominations between 50 and 100 livres.[32] Within a few months, the denomination would be lowered to 5 livres and again to 0.5 livre in 1792.[33] The debates did not anticipate the speed with which private intermediaries would emerge to undo the government's choice of large denominations.

IV. Rise and Fall of the Assignat

Figures 6, 7, 8, and 9 are a "biography" of the assignat. Figure 6 shows how the assignat was ultimately to be used in its two capacities: debt redemption and deficit financing.[34] Figure 7 plots a logarithm

[32] As a point of comparison, per capita GNP was around 200 livres; a day's wage for unskilled labor was 1 livre. Adam Smith advised against letting banks issue notes smaller than £5, or 115 livres.

[33] Since gold coins were of 24 and 48 livres and silver coins mostly of 3 and 6 livres, the assignat was to substitute for gold specie at first and then silver; in the end it also replaced copper and billon.

[34] The assignat was adopted on September 29, 1790. The first debts to be reimbursed were the abolished offices and the *financiers'* short-term notes, which reflects the Assembly's insistence on respecting past commitments.

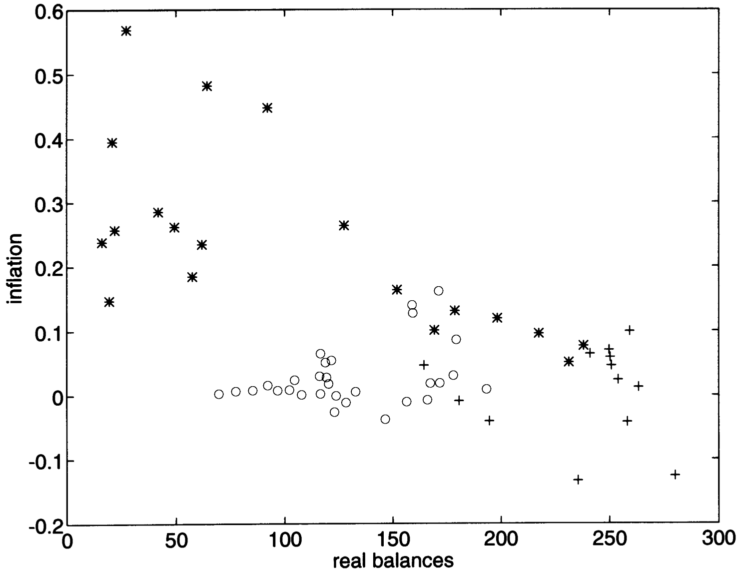

FIG. 7.—Scatter plot of the logarithm of the inflation rate ($\log[p_t/p_{t-1}]$), on the vertical axis, vs. real balances of assignats, on the horizontal axis; the circles depict points from the "real-bills" period from January 1791 to July 1793; the crosses refer to the Terror from August 1793 to July 1794; the stars trace the hyperinflation from August 1794 to March 1796. Sources: Braesch (1934) for 1790–91; reports of the Treasury and the Caisse de l'Extraordinaire for 1791–95 (Paris, Archives Nationales, AD IX 497bis and 586); and Ramel de Nogaret (1801) for 1795–96.

of the inflation rate against real balances. Figure 8 records real balances of assignats from 1790 to 1796. Figure 9 records measures of the price level.[35]

We have partitioned figures 7, 8, and 9 into three periods, corresponding to different monetary regimes or episodes. The three clouds of points in figure 7 depict different real balance–inflation relationships. Only the cloud for the third period has the inverse relationship familiar to us now from twentieth-century hyperinflations. The first period ends in the late summer of 1793 and is charac-

[35] Two measures of the value of the assignat are used: one is its price against gold, as quoted on the market; the other is an index of its value against land, gold, and commodities, called the Caron index. In spite of the Terror, trade in specie continued in Paris, and prices are available for the entire period. Another measure relies on depreciation tables published after the demise of the assignat, to implement a law on debts contracted during the inflation (see below). These tables, one for each *département*, in principle measure depreciation against most consumption goods and land, as well as gold. The index used here, referred to as the Caron index from the name of the editor of the tables (Caron 1909), is an average across the 83 *départements* within the 1791 borders.

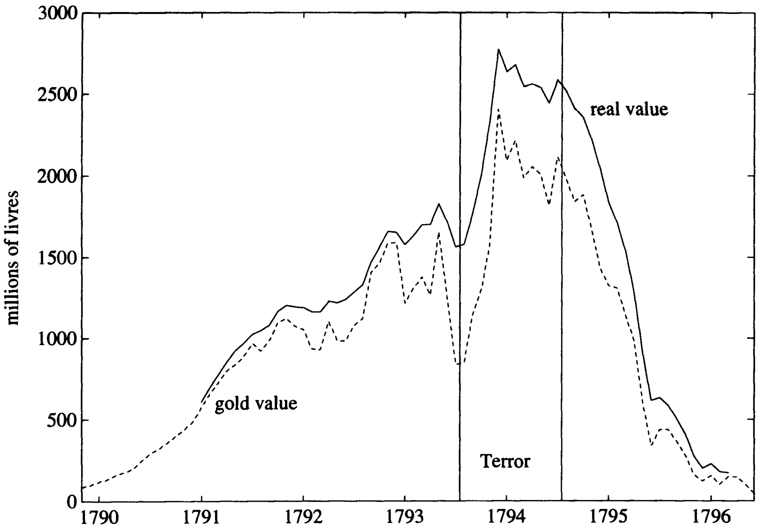

FIG. 8.—Real balances of assignats (in gold and real terms). Sources: Braesch (1934) for 1790–91; reports of the Treasury and the Caisse de l'Extraordinaire for 1791–95 (Paris, Archives Nationales, AD IX 497bis and 586); and Ramel de Nogaret (1801) for 1795–96.

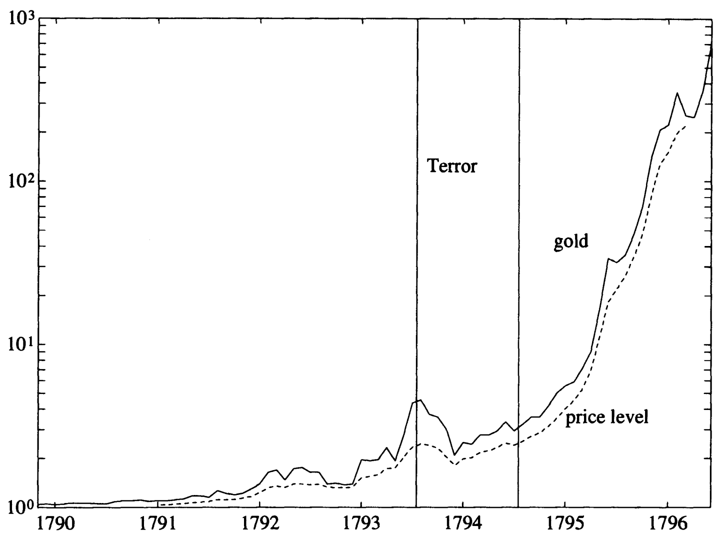

FIG. 9.—Price level and price of gold (log scale). Source: Caron (1909)

terized by growing real balances and moderate inflation. The second period begins and ends with the Terror. It is marked by high real balances, around 2,500 millions, and roughly stable prices. The fall of Robespierre in late July 1794 begins the third of our episodes, in which real balances decline and prices rise rapidly. We interpret these three episodes in terms of three separate theories about money: a "backing" or "real-bills" theory (the text is Adam Smith [1776]), a legal restrictions theory,[36] and a classical hyperinflation theory.[37] We view these theories not as competitors but as alternative collections of "if-then" statements about government note issues, each of which finds its conditions more nearly met in one of these episodes than in the other two.

The price level rose gently through December 1792 (in this month the assignat was discounted 30 percent vis-à-vis gold), to the accompaniment of rapidly growing real balances of assignats. The assignat displaced specie, causing it to leave the country. From January 1793 to the summer, however, the growth of paper money accelerated to almost 9 percent per month, and the price level rose. The Terror stopped this incipient inflation and caused the price level to fall sharply and money growth to slow down to about 3 percent per month. The last period began in August 1794. The inflation rate suddenly accelerated to reach 60 percent per month. The last period was a forerunner of the twentieth-century hyperinflations studied by Cagan (1956), Sargent and Wallace (1973), and others.

A Real-Bills Regime (1790–92)

Bryant and Wallace (1979, 1984) analyzed fiscal implications of alternative denomination structures of government debt and the incentives that interest rate spreads would give private intermediaries to unravel a government's decision to restrict its issues to large denominations. Large positive nominal interest rates on government debt create an opportunity for intermediaries to earn riskless profits by issuing low-denomination notes to intermediate government debt. During the first months of the assignat experiment, the government confronted and gradually learned to manage the forces that Bryant and Wallace wrote about. It appears from available data on circulation by denomination that the large-denomination notes were re-

[36] Keynes (1940) urged a forced saving program for war finance. Bryant and Wallace (1984) and Villamil (1988) have formalized aspects of Keynes's analysis.

[37] According to Cagan's (1956) definition of hyperinflation, beginning in the month in which inflation exceeds 50 percent per month and ending in the month before inflation drops below 50 percent per month for at least a year, the assignat experienced a hyperinflation from May to December 1795.

deemed quickly. By July 1792, 75 percent of the stock of notes of 500–2,000 livres had been redeemed in payments on Estates or exchanged for lower denominations.[38] By contrast, almost 98 percent of the 50-livre notes were still circulating. The interest coupons on the first batch of assignats, worth between 3 and 15 livres, circulated at a premium until the government issued its 5-livre notes in late 1791. More evidence of strong demand for small-denomination currency comes from the fact that within weeks of the September 1790 vote, private as well as public banks appeared across the country to provide intermediation services. The National Assembly abstained from regulating the industry, and soon there were hundreds of banks. In exchange for assignats, these banks issued their own currency in denominations ranging from 0.025 to 25 livres. Some banks were privately owned and operated for profit; others were set up by local authorities and cities. Public banks tended to operate with 100 percent reserves (see White 1990). Some private coinage also occurred, particularly in Paris and Lyon, where merchants minted copper coins redeemable in assignats.

The Assembly responded by eliminating its competitors in the business of issuing currency. In June 1791, it approved a plan to issue 5-livre notes, thereby placing the assignat squarely in competition with silver, the main specie in France (two-thirds of the pre-Revolution coinage was in silver). The notes were quickly issued in exchange for higher denominations, and by August 1792 they represented over a third of the total outstanding stock of assignats. The private banks then began issuing smaller denominations, and the *billets de confiance* (as this private money was collectively known) multiplied (see White 1990).

Again the Assembly moved to meet the competition from the private banks. In December 1791, notes of 0.5–2.5 livres were approved without much debate. But there were delays and difficulties in manufacturing them. For the high denominations of previous issues, production costs had been a very low percentage of face value. The low face value of the new notes caused the government to simplify and cheapen the production process, at the risk of making counterfeiting easier.[39] In August 1792, the first "small assignats" appeared. The government could now impose a monopoly: within a few weeks, all private banks were forbidden to issue their notes, and private coins were outlawed. The various *Caisses Patriotiques,* as the money-issuing banks were most often called, were conveniently accused of fraud

[38] The proportion of redeemed notes of all denominations rose abruptly in April 1792, when war was declared.

[39] These notes were nevertheless the most expensive assignats made, at a cost close to 1 percent of face value.

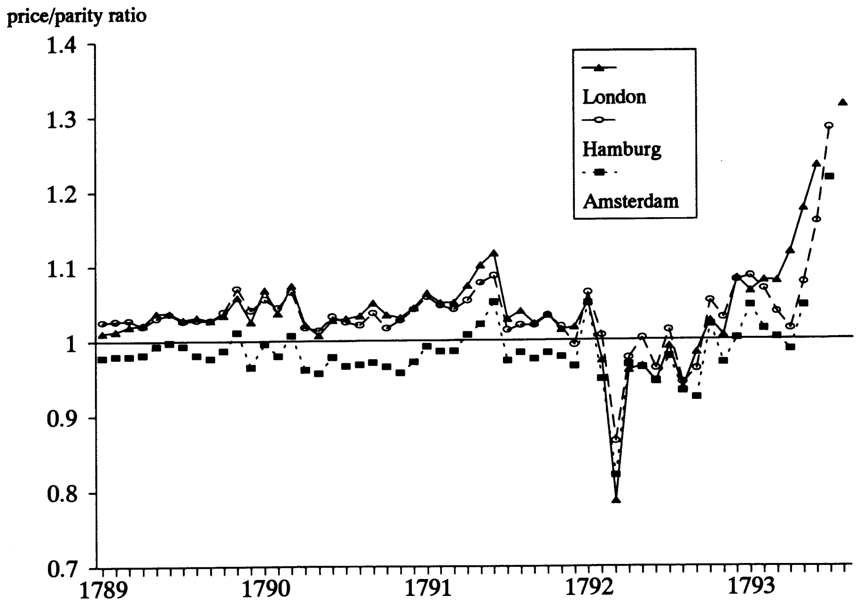

FIG. 10.—Prices in Paris of foreign exchange futures, January 1789–July 1793 (monthly sampling). Prices are normalized so that parity is one (gold parity for London, silver otherwise). The contracts are 30 days for Amsterdam and 60 days for London and Hamburg. A normalized price of 1.1 means that 1.1 oz. of specie in Paris buys 1 oz. of specie abroad. Source: Bouchary (1937).

and liquidated. For the small copper coinage, the government melted down church bells to mint new coins. Soon inflation made its contribution to lowering the average denomination of the currency.

Small-denomination assignats tended to remain in circulation and to drive specie out of the country, just as Smith (1776) had predicted. Figure 10 shows the price of foreign exchange futures in Paris in the early years of the assignat. The prices remained above specie parity most of the time, providing incentives for *exporting* specie from France.

> Buying a few choice church lands is still the best way to invest one's money. [Marie Antoinette, queen of France, to the count of Fersen, June 5, 1792]

Marie Antoinette's own assessment of investment opportunities in France two months before the overthrow of the monarchy (on August 10, 1792) attests to the success of the land sales. The sales, which opened in Paris in October 1790, were the pivotal element of the new currency system. In the early months of 1791, sales were rapid and prices high. By November 1791, over 1,500 millions of Estates had been adjudicated across France. Prices paid for the lands reflected a capitalization rate of 3–3.5 percent applied to the yields on land, which matched rates then being applied to exchanges of rental properties in France. Overbidding in expectation of inflation was thus limited.

In May 1790, when the specific arrangements for the sales were voted, it had been decided to offer purchasers of National Estates generous payment terms. A down payment of only 12–30 percent was required, with the balance payable in assignats and due in 12 yearly installments. The government accepted large claims on private debtors, payable in assignats. This arrangement is interpretable as a version of a financing scheme described by Persson, Persson, and Svensson (1987), by which a government attenuates the time consistency problem of Auernheimer (1974) and Calvo (1978)—its temptation to inflate away outstanding nominal claims on it—by acquiring nominal claims on the public. In November 1791 the government tried to shorten the terms of payment to 4 years for all subsequent sales. This immediately had a negative effect on sales, which forced the government to reverse its decision within weeks. The 12-year schedule of payment (shortened to 10 years in 1794) was maintained until 1796. In June 1793, after its policy had evolved from "real bills" to "inflationary finance" under the pressures of war, the Convention voted to sell these claims. There were few buyers.

War

The declaration of war on the German Empire and Austria on April 20, 1792, proved to be a turning point in the Revolution. Most people supported the conflict, although isolated individuals such as Robespierre voiced their opposition in vain. War forced changes in the monetary-fiscal experiment. Debt payments were suspended indefinitely, and the assignat was converted from its initial purpose to become the main means of financing the war. When the war started, the assignat had already depreciated 25 percent in real terms and 40 percent against gold. As Laffon-Ladébat explained on May 14:

> The 1,500 millions of *assignat* balances are virtually the only monetary instruments (*signes représentatifs*); this is close to 1,000 millions less than the specie in France before the Revolution. Compared to gold, they represent no more than 750 or 800 millions; they are clearly insufficient. Thus it is not the quantity emitted which occasions the *assignat's* depreciation, but its nature, and the distrust shared even by men who should reassure the Nation. . . . The high price of gold is not caused by an excessive mass of *assignats* in circulation,

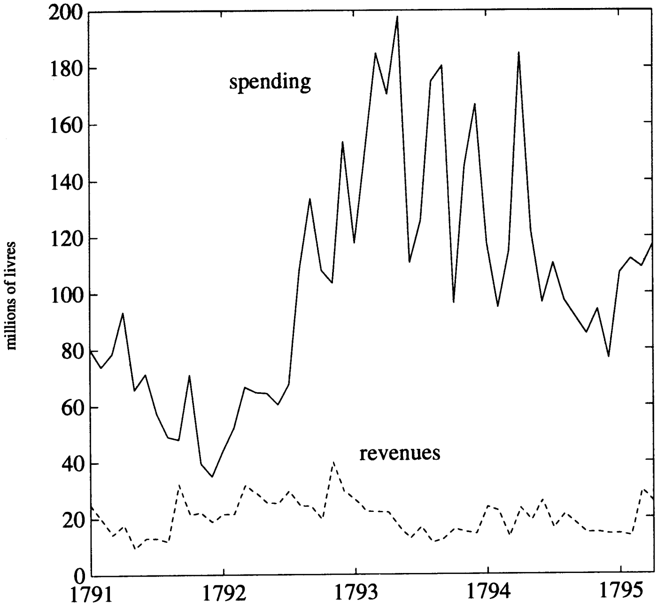

FIG. 11.—Spending and revenues, 1791–95 (real value). Source: Archives Nationales, Paris, AD IX 497bis and 586.

> and a larger issue presents no risks as long as you take all measures necessary to restore public confidence and the balance between the various standards of value. [*Archives parlementaires,* 43:340]

The Convention would soon shore up "public confidence" with drastic measures.

War started in the summer of 1792, the monarchy was abolished in September 1792, and the king was executed in January 1793. After the king's execution, France fought against Britain, Holland, Piedmont, and Spain. In spring 1793, defeats followed one another, officers deserted, armies collapsed, and the assignat's value fell, threatening the base of the inflation tax. Summer 1793 brought more military defeats and civil war. With the country experiencing chaos, internal rebellion, and external war, the fiscal resources of the central government were depleted (see fig. 11). The months preceding the imposition of the Terror in figures 9 and 10 display signs of an incipient hyperinflation: falling real balances and rising inflation. To arrest the flight from currency, the government created an artificial demand by imposing severe legal restrictions. The government closed the stock market, abolished joint stock companies, and imposed harsh penalties for refusing to take the assignat at par. In September, the Terror began.[40]

Terror (1793–94)

Proponents and agents of the Terror have been portrayed as preferring authoritarian methods, and the defeated Girondins have been cast in the role of liberals overwhelmed by the totalitarian Montagne. Leninist writers saw the Terror as a necessary phase of revolution and took state control of the economy as a model of economic policy independent of the specific circumstances of the French Revolution. Our view is that the Convention embraced extreme measures reluctantly because it faced extreme fiscal exigencies.[41]

Two of the Convention's committees composed of fewer than a dozen men administered the Terror. Legislation suspended most civil liberties and gave broad powers to representatives of the Convention throughout France. The committees repressed rebellious acts and subjugated all other interests to the imperative of survival of the government in the face of general invasion and widespread rebellion. Economic and political dictatorship merged.

Legal Restrictions

Threat of death for offenders enforced parity of assignats with specie. It was illegal to hold such assets as commodities, private financial securities, precious metals, specie, jewelry, or foreign exchange, and markets in them were closed. Holding land was permitted. All assets and bonds constituting the public debt were converted into a single nontransferable perpetual rent title. In response to inflation, grain prices, then consumer prices and wages, and later producer prices were controlled with the so-called laws on the Maximum.[42] Currency demand was supported by the laws on the Maximum and restrictions against hoarding.

Under the Terror, any citizen accused of violating these laws could expect swift and arbitrary proceedings. The law on parity of the assi-

[40] Brezis and Crouzet (1994) emphasize the distortions produced by the price controls.

[41] When the National Assembly adopted a penal code in 1791 incorporating the death penalty, Robespierre argued against it. Circumstances, not ideology, propelled him from being an opponent of capital punishment to being the leader of a bloodthirsty Montagne. Likewise circumstances impelled the economic measures instituted during the Terror.

[42] This was a massive undertaking: the law of March 1794, called the Second General Maximum, was published in three volumes running 1,100 pages; prices and wages were set for each of the 550-some districts making up France. The law was never applied in much detail.

gnat called for arraignment and trial within 48 hours of the offense. The law encouraged denunciations from informants and gave extravagant powers to local authorities to enforce the restrictions. In a few dozen instances, the death penalty was imposed for crimes against the assignat or for hoarding.[43]

The debt remained intact. The conversion of outstanding bonds into perpetuals in August 1793 protected the value of these claims against reimbursement in depreciated paper, leaving future governments with a still-overwhelming burden of debt service.[44] Market prices for government bonds, available until June 1793, remained high, suggesting that a major default was not deemed likely, even while the political situation deteriorated.

The May 1794 conversion of life annuities into perpetual annuities is an example of the Terrorists' commitment to property rights.[45] Cambon faulted the last ministers of Louis XVI for selling life annuities at a single rate, independent of age, which offered higher-than-market returns for most annuitants. Genevan bankers had noticed the loophole and exploited it by buying annuities on groups of young girls and then selling the pooled annuities to investors. The scheme, although legal, was considered unacceptable. One remedy would have been outright default or at least reneging on the Genevan annuities. Instead, Cambon thoroughly investigated the available international literature on life annuities (including impressive mathematical treatments) to compute fair rates of conversion for annuities on all ages, as well as annuities on multiple nominees of various ages. Such care contrasts with the usual portrayal of the Terror as a period of government-sponsored theft and murder, and reflects the French government's continuing commitment to honor debts from the time of Louis XVI.[46]

Figure 12 shows seigniorage raised by assignat creation,

$$\frac{M_t - M_{t-1}}{(p_t + p_{t-1})/2},$$

[43] The death penalty for hoarding was suspended in January 1794 after an innocent man was rescued at the last minute by his son's plea to the Convention. Proclaiming it an honor to save an innocent person, Danton himself carried the decree to the tribunal.

[44] This contrasts with the previous episode of inflation in France. In 1719, all government debt was reimbursed in notes of John Law's Bank. The subsequent inflation, and reconversion to annuities, performed a 40–50 percent reduction in debt service.

[45] Implementing optimal fiscal and debt management policies requires recourse to long-term bonds with the possibility of conversion at the debtor's option. France was forced into the use of short-term loans and self-amortizing life annuities, whereas Britain successfully converted to perpetuals.

[46] The Jacobins consistently refused to alter the terms under which the sales had been made; even in the summer of 1795, they remained opposed to the abandonment of the assignat's legal equivalence to gold in payments for National Estates and taxes.

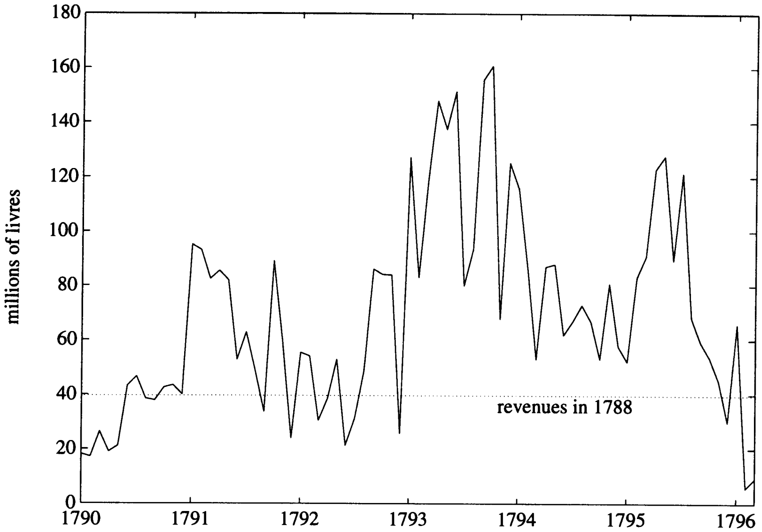

FIG. 12.—Seigniorage raised on the assignat, in real terms

where p_t is the price level and M_t is the nominal stock of assignats. Seigniorage measures the real revenues raised by printing currency at near-zero cost and exchanging it for goods and services. The average monthly revenue in 1788 is shown for comparison. From April 1792 to August 1795 (when the only remaining belligerents were Austria and Britain), spending amounted to some 4,500 millions in real terms, of which over 3,700 millions were raised through money creation. Reinforced by legal restrictions, the assignat financed the war.

Hyperinflation (1795–96)

> We are crushed under the weight of our victories. [Deputy Merlin de Thionville to the Convention, May 12, 1795]

By the summer of 1794, the war turned in France's favor. Victory at Fleurus on June 26 led to a swift 6-month conquest of Belgium and Holland, and enemies were expelled from all French territory. By May 1795, peace treaties had been signed with all powers except Austria and Britain. The war no longer justified the repressive economic and political apparatus of the Terror, and the Jacobin party was overthrown. Robespierre was executed on July 28, 1794. The last significant remnants of the party (including Cambon) were purged in April 1795.

On his way to the guillotine, the fallen dictator was jeered with the cry, *"Foutu Maximum!"*[47] Within 2 months, it was evident that efforts to enforce the Maximum were futile. Legal restrictions were ignored, although the laws were not repealed until January 1795. A police report in early October 1794 notes that "the majority of the people wants complete freedom of trade again; it thinks that supply will then be plentiful, that the price of commodities would rise at first but then fall with competition" (Aulard 1898, 1:152). A few weeks after Cambon's arrest, trade in specie became legal, and the commodities, foreign exchange, and financial markets reopened. In June 1795, the government ceased to value the assignat at par for receipts, payments on National Estates, or expenditures. Instead, the government specified a rule according to which currency was valued as a function of the current money stock (each increase of the stock by 500 millions triggered a 20 percent devaluation). A month later, creditors were relieved of the legal obligation to accept reimbursements in paper. The assignat had become a full-fledged fiat currency, severed from specie.

As the apparatus of legal restrictions disappeared, the demand for the currency fell, and the assignat became known as "Parisian money." Police reports attest that by the fall of 1795, even Parisians were deserting the assignat in favor of hoardable commodities, a portfolio adjustment labeled "speculation" (*agiotage*) by an irate government. People joked that if the walls of Parisian houses were to tumble, the starving population would be smothered in food and drowned in wine. Specie was also in great demand, and there is evidence that gold appreciated relative to assignats, particularly in exchange for manufactured goods. In terms of gold, prices were lower than in 1790, creating trading opportunities for the savvy. A Swiss visiting Paris hastened to change his gold for paper; bought hundreds of shoes, stockings, and hats; shipped them off to Switzerland; and lived in Paris like a king for a month. Foreign exchange prices corroborate these anecdotes by showing that in the fall of 1795, silver was 20 percent cheaper in Paris than in Hamburg, a signal prompting imports of specie into France. Figure 13 shows the price on the Paris market of a futures contract on German marks, a claim to a fixed amount of specie in Hamburg 60 days hence.

The Government's Response

The Thermidorian Convention bequeathed a hyperinflation to the Directory in October 1795. Faced with a dwindling inflation tax base, war, and limited fiscal resources, the new regime experimented. It

[47] Rough translation: there goes the f——g Maximum.

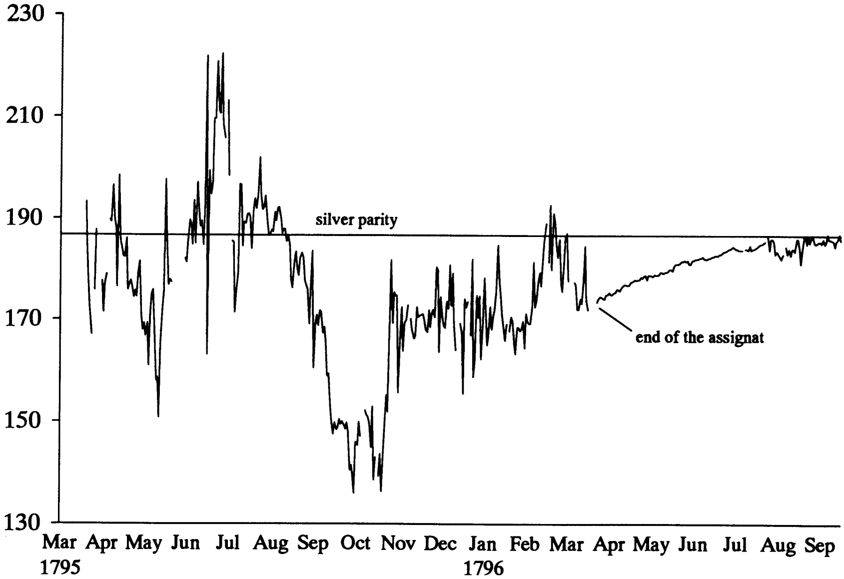

FIG. 13.—Price in Paris of Hamburg currency delivered in Hamburg, March 1795–September 1796 (daily); silver par = 186.7. A rate of 170 means that 1 oz. of silver in Paris buys 1.1 oz. in Hamburg, affording a 10 percent profit (inclusive of transport costs) from shipping the silver from Hamburg to Paris. Source: Bouchary (1937).

briefly reenacted Jacobin measures against hoarding. In December 1795, financial markets were again closed and denounced as a "den of thieves and conspirators, who plot to starve us back to monarchy" (*Moniteur Universel,* 23 Frimaire 4). The government reopened the markets three weeks later when it wanted to know the market price of its money.

The government implemented a mandatory open-market operation, called the Forced Loan (December 10, 1795). Taxpayers were required to turn over a specific quantity of assignats in exchange for interest-bearing coupons admissible in payment of future tax liabilities. The assignats were accepted at a 100:1 ratio, and the government expected to collect 600 millions (in real terms) within 10 weeks. The Directory's inability to collect taxes efficiently doomed the plan: it took 5 months to collect 50 millions. The assignat's price lifted briefly from 0.5 percent to 0.7 percent of face value and then fell even further.

Nothing could save the assignat. Ramel-Nogaret, the new finance minister, said "it was impossible to maintain the *assignat*'s initial credit, if it is true, as experience has taught us, that any currency (*un signe quelconque*) may lose its value not only proportionately to increases in quantity, but even at a progressive rate" (*Moniteur Universel*, 14 Pluviôse 4). The government made a final effort to support the assignat. On December 23, 1795, the legislature reckoned the current circulation to be 24 billions and set a final ceiling of 40 billions. When that limit was reached, all the instruments, fonts, and forms were carried to the Place Vendôme in Paris and disposed of in a solemn ceremony (February 19, 1796). Ramel-Nogaret eulogized the assignat: "The *assignats* have made the Revolution; they have brought about the destruction of orders and privileges; they have overturned the throne and founded the Republic; they armed and equipped those formidable armies which have carried the tricolor flag beyond the Alps and the Pyrenees. . . . We owe them our freedom" (*Moniteur Universel*, 14 Pluviôse 4).

Meanwhile, the Directory's need for funds continued. Two abortive attempts were made to create a successor currency to the assignat. The first took place outside the legislature in February 1796. A private group of bankers, including shareholders of the defunct Caisse d'Escompte and future organizers of the Bank of France (which would be created in 1800), proposed to take over the remaining National Estates and to manage or sell them as it saw fit. In exchange, the bankers would provide the government every month with 25 millions in bank notes, convertible on demand into specie. In spite of the executive's interest, the project was defeated in the legislature, where opposition to "putting the Constitution in the safe deposit of the bankers" (in the words of an opponent) was still very strong.

The legislature decided to retry the real-bills method of issuing money. A specific set of National Estates (including church lands in annexed territories) was earmarked for sale: 2,400 millions of a new currency, the *mandat,* were issued to retire the assignats at 30 : 1 and to finance spending for 1796. The sales were to be made at fixed prices (computed mechanically by multiplying the property's income in 1790 by a capitalization factor) rather than through auctions, and payments were scheduled over a 6-month period. Starting at 35 percent of face value in March, the mandat fell to 6 percent by early summer 1796. The mandat failed even though the government did not issue one note beyond the self-imposed 2,400 million ceiling. By August the government ceased to accept the mandat at par for taxes or payments for the Estates. Land sales were suspended in October 1796, and the mandat and assignat were demonetized on February 4, 1797, thus ending 7 years away from a metallic standard.

One last monetary experiment accompanied the demise of paper money. In June 1797, a law established a depreciation table for reimbursing *nominal* contracts made between January 1791 and July 1796. The amount of specie to be repaid was adjusted to reflect the value

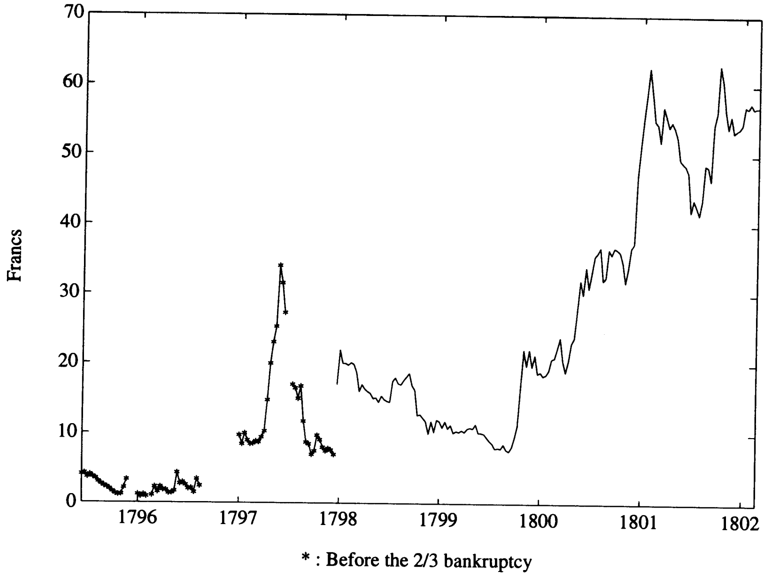

FIG. 14.—Price of a 5-franc perpetual, 1795–1802. Source: *Moniteur Universel,* various issues.

of the assignat at the time of the contract. In each *département,* local administrations computed an index of the value of the assignat against gold and also against commodities and land.[48] By December 1797, these indexes were available to settle claims between individuals.

Default

The debt problem, fomenter of the Revolution, became acute in 1796. The government, with a larger perpetual debt to service after the conversion of August 1793, remained unable to raise revenues from the fiscal system inherited from the Constituante. Once paper money became unavailable, the government started paying the interest on the debt with IOUs acceptable in payment for national lands. The market discounted these 77–85 percent. The price of government debt remained accordingly low (see fig. 14) since the market did not expect major improvements in interest payments.[49] The con-

[48] This scheme was to be proposed again in the 1970s by Shaefer and by Leijonhufvud (1984) (see Sargent 1986, p. 153). A version of this scheme was part of the ill-fated Austral plan in Argentina in 1986.

[49] The price of a perpetual rent of 5 francs was priced around 9 francs in February–April 1797, shot up to 33 after the elections, and fell between 7 and 9 when the bankruptcy was announced.

servative majority elected in the spring of 1797, and the resounding defeat of the former members of the Convention, raised hopes that were quickly dashed by the 18 Fructidor coup. The executive purged the legislature and cut the debt by two-thirds.

The "two-thirds bankruptcy" applied to both perpetual and life annuities. It consisted of a "mobilization" of two-thirds of the capital (life annuities were capitalized at 10 times), which was reimbursed to debt holders in the form of *bons du 2/3,* or vouchers, admissible in payment for National Estates. The remaining third of the capital was "consolidated" into annuities, and exact payments were promised in the future. The two-thirds vouchers were nearly a total loss since the market priced them at 1–2.5 percent of face value. As figure 14 shows, the market anticipated the bankruptcy.[50]

V. The Legacy

Unintended Consequences for England through Specie Flows

According to Hawtrey (1919), much of the specie that left France, in response to the market signals depicted in figure 10, went to England, fueling an expansion of credit and inflation there. When the hyperinflation began in the spring of 1795, market prices signaled for *importing* metal into France (fig. 13). The expansion of credit in England came to a halt, and deflation began. Hawtrey claimed that flows of gold back to the Continent caused the drain on the Bank of England and prompted the Bank Restriction Act of 1797.[51] It is ironic that Britain should have stumbled on a temporarily inconvertible currency as a successful means of finance whereas France deliberately created a new system of currency but failed to sustain it except by the Terror.[52]

> The Revolution is over. [Proclamation of the Consuls Bonaparte, Cambacérès, and Ducos, December 15, 1799]

The Constitution of the year 3 survived until 18 Brumaire 8 (November 1799), when General Bonaparte established a military dictator-

[50] After the bankruptcy, the government still paid interest in *bons d'arrérages* admissible in payment of taxes; the market valued them at a 20–35 percent discount. The ratio of the cash value of the *bons* to the price of bonds remained between 0.33 and 0.40 until November 1799.

[51] Britain passed the Bank Restriction Act on February 27, 1797, three weeks after France returned to specie. See Fetter (1965, chap. 1) for an alternative to Hawtrey's account.

[52] Bordo and White (1991) do not emphasize the accidental nature of the suspension and prefer to interpret it as the application of a well-understood "contingent gold-standard rule."

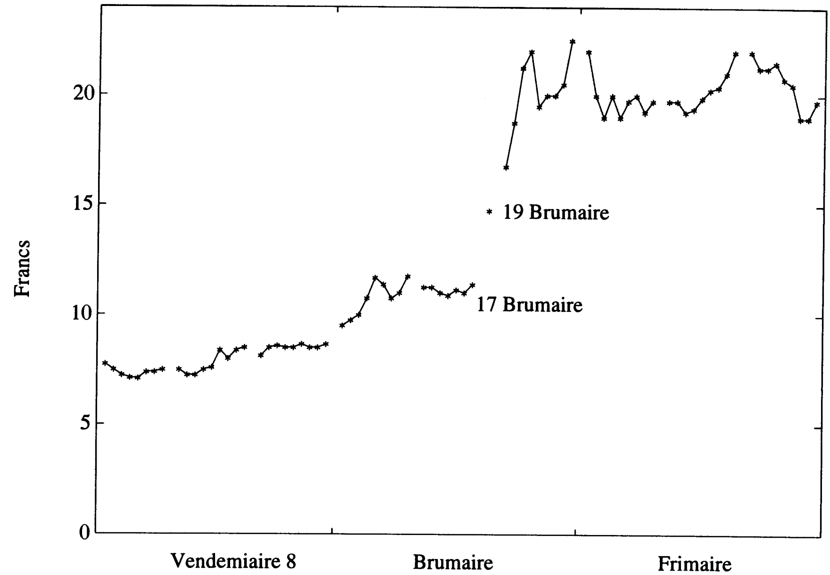

FIG. 15.—Price of a 5-franc perpetual, September–December 1799 (daily). Source: *Moniteur Universel,* various issues.

ship. Much later, when an irritated Emperor Napoleon asked Talleyrand how he had become so rich, the expert flatterer answered: "Why, Sire, I simply bought a lot of government bonds on 17 Brumaire and sold them three days later" (Orieux 1974, p. 256). Figure 15 confirms that Talleyrand earned a handsome return. This anecdote suggests that some people expected a strong government to end financial disorder. France returned to an absolute monarchy under another name.

Paradoxes accompanied the Napoleonic stabilization. Numerous practices of the Old Regime were reestablished for tax collection. Bond monies were required from officials who were granted a commission on amounts collected.[53] A strong central control over allocation, assessment, and collection of taxes was asserted, reversing the Revolution's ineffectual reliance on local authorities. Indirect taxation, abandoned by the Constituante and reluctantly brought in on a small scale by the Directory, was considerably extended with custom tariffs and excise taxes.

Figure 5 shows how tax revenues increased. The residual debts of the Directory were liquidated, and interest payments on the debt in

[53] Thereby reversing the Revolution's reforms, which Bosher (1970, p. 314) sees as the "triumph of the general interest over selfish private ones."

specie resumed for the first time in 12 years. The budget of 1802 was balanced 25 years after Turgot. Napoleon disliked capital markets and did not borrow or use his creation, the Bank of France, for financing. Budgets remained balanced until the Russian campaign of 1812.[54]

Appendix

The Auction Mechanism

The term National Estates covered all the property of the church (chattels and real estate), the royal demesne (i.e., the king's personal possessions), the estates of the émigrés,[55] and those of individuals executed under the laws of the Terror.[56]

From May 1790 to July 1793, the estates sold were primarily the church lands and buildings. Some feudal dues and rights were also put on sale, until they were abolished outright in 1792. These properties, called "First Origin Estates," were sold as follows. Either individuals or townships could ask to purchase an estate. The value of the estate was then estimated by the authorities (usually by multiplying its income by 22). The authorities then published a list of selected estates with these estimates. As soon as at least one offer was made, an auction date was set and published. An "English auction" was held, and once the highest bid had been offered, the auction was adjourned. New posters were published announcing the highest bid and setting the date and place of a second auction, to be held within a month of the first. At the second auction, one-minute candles were lit in sequence and bidding started at the highest bid established during the first auction. If two candles expired without any new bids, the estate was awarded to the highest bidder from the first auction. Within a fortnight, the buyer was to pay a down payment (be-

[54] The low price of government bonds (i.e., the rentes that had survived the two-thirds bankruptcy) suggested that borrowing on the market would have been even more expensive than it ever was for eighteenth-century governments (see Velde and Weir 1992). The lowest level to which interest rates fell was 6 percent in 1809, only briefly. Napoleon's policy of financing wars through taxation was partly shaped by the French government's recent bankruptcy record, but partly also by his own unchecked authority. The dictatorial regime had advantages for some aspects of tax collection, but left intact the same "sovereign borrowing" problem that Necker had so sharply characterized in 1784 (see Bordo and White 1991).

[55] The Assembly had obtained estates of émigrés, French nationals residing outside the territory since 1789 who would not return or could not justify their absence before a deadline. On February 9, 1792, these estates were confiscated and assigned to "compensate for the costs that their activities have occasioned to the Nation" (*Archives parlementaires,* 38:314). Although some properties were heavily mortgaged, the émigrés' estates represented vast resources of approximately the same order of magnitude as the first lands sold in 1791. The émigrés' lands were added to the National Estates in July 1792 and sold in late 1793.

[56] Under the Old Regime, auctions were used to sell government-owned farmlands, logging rights, and assets that the government had acquired through judicial proceedings (inheritance or bankruptcy).

tween 12 and 30 percent) and sign 12 promissory notes for the rest, in 12 equal payments over 12 years, at 5 percent interest. The buyer retained the option to prepay part or all of the remaining balance (later, premiums were offered to those who paid early). Acceptable means of payment were gold and silver, assignats, and some debt certificates used by the liquidation agency to liquidate small offices. The latter were few in quantity (less than 2 percent of the value of the assignats issued in March 1792). When payment was made in assignats, the assignats were canceled immediately and then sent to Paris for burning. When payment was made in coin, the coins were sent to Paris and then exchanged at the Treasury for assignats held by the Treasury, which were then canceled and burned.

From July 1793 to February 1796, the "Second Origin Estates" from the estates of the émigrés were auctioned. They were sold under similar rules to the earlier ones, but with 10-year terms instead of 12. By January 1794, both categories of estates were placed under the same rules.[57]

From March 1796 to November 1796, a similar sales system was implemented as part of the mandat experiment. Estates were estimated at 22 times income (18 for houses) and awarded to the first bidder who made a 25 percent deposit, the balance of which was due within 3 months, payable in mandats at face value. In late July, the balances due were to be paid in mandats at market value. In September, auctions replaced the single-bid system.

Sale of National Lands continued until 1815 (see Bournisien [1908] and Marion [1908] for details).

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[57] In June 1795 the sale procedure changed: any estate was estimated at 75 times the income. The first individual to submit a bid for that price was immediately awarded the estate. The ensuing buying frenzy quickly convinced the government that it was making a big mistake, and the change in procedure was rescinded within 3 weeks.

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