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The Political Economy of Debt Moratoria, Bailouts and Bankruptcy

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Abstract

This paper develops a simple dynamic general equilibrium model of an agricultural economy, in which poor farmers borrow wheat from rich farmers to invest on their land. Because wheat output is stochastic (we allow for both idiosyncratic and aggregate shocks), there may be default ex-post. We compare equilibria in this economy with and without political intervention. Intervention is decided through majority voting and can take the form of a bailout or a moratorium. The results of our formal analysis are confronted with historical evidence from the Panic of 1819 in the United States. With no aggregate uncertainty, the main results of the formal analysis are that allowing for debt moratoria and bailouts not only always improves ex-post efficiency but may improve ex-ante efficiency. Anticipated bailouts always occur in equilibrium and moratoria never occur, but the threat of moratoria enhances efficiency. With aggregate uncertainty, the differences between moratoria and bailouts may collapse, with both occurring only in bad times and with both improving ex-ante efficiency.

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Introduction

Throughout much of the history of the United States, states passed laws providing for debt moratoria and for other forms of debtor relief (Rothbard,
1962, Domowitz and Tamer, 1997). During the Great Depression, states passed laws for debt moratoria of farm mortgages. To further improve farm income, the Roosevelt administration moved to devalue the dollar against gold. Devaluation would have triggered the gold clauses then present in almost $100 billion of outstanding private debt and most likely would have triggered a wave of corporate bankruptcies. Congress, however, abrogated all gold payment clauses, relieving debtors of $69 billion of additional payments generated by the devaluation (Kroszner,1998). In recent times, bankrupt industrial firms and financial institutions have been the beneficiaries of bailouts or

government takeovers. In this paper, we model ex post political intervention in debt contracts in a democracy.

Firms or individuals fail either as a result of firm-specific factors, such as incompetent management or failed product designs, or as a result of macroeconomic factors that are correlated across firms. The motivation for ex post political intervention is to correct for incomplete contracts and to remedy possible externalities that arise when there are many simultaneous failures in a downturn in the economy. Allowing for ex post intervention, however, influences interest rates and the volume of lending ex ante. Ex ante, are there benefits to having political institutions that permit ex post intervention in debt contracts?

We address this question in a two-period model. We consider in turn the case of an economy without and with aggregate shocks. In each case, we first characterize equilibrium in our economy in the absence of political institutions that permit ex post intervention. Then we analyze the properties of the equilibrium when debt moratoria or bailouts can be declared y a majority or super-majority vote of the citizens. We find not only that political intervention can improve the allocation of resources in the second period but also that the anticipation of intervention can, surprisingly, increase lending and improve the allocation of resources in the first period. We end by confronting the model with the historical evidence from the Panic of 1819.

The Model

To model debt and default, we require three periods: t=0,1,2.

- At t=0 Borrowing, lending, and investment occur.
- At t=1 A first set of production flows is realized. Borrowers repay or default. In the case of default, lenders make a continuation or liquidation decision. At the end of period 1, some borrowers may become laborers and enter into labor contracts for production at t=2.
- At t=2 A second set of production flows is realized. All accumulated production is consumed.

Technology, Preferences and Markets

To keep things as simple as possible, we consider a one-commodity economy, in which, to fix ideas, the commodity is wheat. To produce wheat, farmers need labor and wheat (land is not a scarce resource). On any given farm there can be at most two wheat crops, one at date t=1 and the other at date t=2.

Technological assumptions

The production function on any given farm is given by

$$x^t = qf(k^{t-1}, (1+l^{t-1}))$$

where:

1. x^t is period t wheat output,

2. is a farmer-specific productivity shock (it can be interpreted as either the farmer's ability or his land's fertility),

3. k^{t-1} is the amount of wheat planted (or invested) in the farm in period $t-1$ (alternatively, k^{t-1} could represent the amount of tilled land), and

4. $1+l^{t-1}$ is the quantity of labor employed in period $t-1$; it includes the farmer's labor plus the labor from l^{t-1} workers.

Note that the only relevant productivity parameter is the farmer's productivity type. Laborers' productivity types are irrelevant. This feature captures in a stark way the idea that what matters foremost is organizational and entrepreneurial talent.

Again for simplicity, we use the following piecewise-linear production function:

$$qf(k^{t-1},(1+l^{t-1})) = \begin{Bmatrix} q\{\min[\ k^{t-1}\ ,1+l^{t-1}\ ] + a\,(\max[\ 0,1+l^{t-1}-k^{t-1}\ ])\} \\ \text{for } k^{t-1} \le \bar{k}, \text{where } \bar{k} > 1 \\ q\{\min[\ \bar{k},1+l^{t-1}] + a\,(\max[\ 0,1+l^{t-1}-\bar{k}\ ])\} \\ \text{for } k^{t-1} > \bar{k} \end{Bmatrix}$$

This is the simplest function with diminishing marginal productivity of labor (on any given farm). We use this production function to model a competitive agricultural economy. To obtain strictly positive profits in equilibrium, we need at least one scarce factor (here it is wheat) and diminishing marginal productivity with respect to one of the more abundant factors.

The function above exhibits diminishing marginal productivity of labor whenever $a < 1$, for then a marginal increase in labor produces an increase in output of only aq when $1+l^{t-1} \ge k^{t-1}$, as opposed to q when $1+l^{t-1} < k^{t-1}$.

This production function also exhibits decreasing (or, more precisely, no) returns to scale beyond the level of wheat investment $\bar{k} > 1$, so that there is no benefit to investing more than $\bar{k}$ on a farm. As will become

clear below, decreasing returns to scale are essential to inducing wealthy farmers to lend wheat to poor farmers. The production function is illustrated in figure 2.1, assuming $a = 0.5$ and $\bar{k} = 3.5$.

The farmer-specific productivity shocks, q, are independently, identically distributed and take the values $0 \le q_b < q_a q_g$ with probabilities $m_b, m_a, m_g, \equiv 1 - m_a - m_b$. These three types of farmers are introduced to provide a potential role for political intervention. The good types q_g may always remain solvent, the bad types q_b would always go bankrupt if they have borrowed wheat, and the average types q_a may go bankrupt only if there is an unfavorable macroeconomic shock.

We assume that farmers do not know their type at date $t = 0$; they are all equally ignorant about their talents and expect an average productivity of $0 = m_b q_b + m_a q_a + m_g q_g$. That is, not only can't lenders screen borrowers according to type, but also borrowers can't use information about their own types in deciding whether to borrow. At date $t = 1$, farmers do learn their individual types, but this information remains private to the farmer. We also assume that the total population of farmers is large enough that the proportions of farmer types in the population are approximately the same as the probabilities $m_a m_b m_g$.

Besides farm-specific productivity shocks, we also introduce a common "macroeconomic" shock, say, weather conditions. This shock shifts the values of the farm-specific productivity shocks. We denote this shock as $v \in \{H, L\}$ with state H occurring with probability l and L with probability $1 - l$. The productivity shocks are then fully described as q_i^v with $q_i^H > q_i^L$.

The production function and productivity shocks completely describe the technological structure of our economy.

Assumptions on Preferences and Endowments

We assumed identical risk-neutral preferences, mostly for technical convenience. It is worth pointing out, however, that risk-neutrality combined with limited liability induces behavior, contracting arrangements, and qualitative features similar to risk-aversion. Also for simplicity we assume that all consumption takes place at the end of the second period.
Each farmer, consequently, maximizes expected life-time wealth.

We assume there are M farmers, each able to supply costlessly one unit of labor in each period. Farmers differ only in their endowments of wheat.
Some are rich and are the potential lenders or employers; others are poor and are the borrowers or laborers. There are N wealthy farmers

with per-capita endowment of wheat $\overline{W} > 1$ and $M - N$ poor farmers with 0 endowment. Farmers know their endowments at $t = 0$. We assume the poor are substantially more numerous than the rich. Specifically, $M > N(1 + \overline{W})$. In addition, we assume

$$0 \leq \frac{a q_g (M - N)}{N(\overline{W} - 1)} < q_b < 1 < q_a < 1 + a q_g < q_g .$$

Under our technology, this assumption guarantees that:

1. bad types, if not defaulted, will remain as farmers rather than work for a wage $a q_g$.

2. bad types will never make any additional investment at $t = 1$, and

3. Only good types will hire additional labor.

Assumptions on Contracts and Markets

Rich farmers face the following decision at date $t = 0$: Should they use their wheat to hire poor farmers as laborers, or should they invest it, either in lending to poor farmers or in adding capital to their farm via increased k? Reciprocally, poor farmers have the occupational choice decision: Should they borrow and remain independent farmers, or should they become laborers?

Although both markets could be open in equilibrium, we demonstrate existence of an equilibrium where only the credit market is open at $t = 0$[1].
Such situations arise when all poor farmers prefer to borrow and work on their own farm rather than working as laborers, and all rich farmers prefer to lend than to hire workers at the prevailing equilibrium market terms. At date $t = 1$ the same two markets might be open. But, as we shall explain, under the contractual assumptions made in our model only the agricultural labor market is open at this interim stage. There is no market for land, because we consider an economy where land is abundant, but wheat and labor are relatively scarce. Such an economy is a fairly realistic representation of much of North and South America, circa 1800. A model with a market for land would be more realistic, but the basic economics of the more elaborate model would be essentially the same as in our simpler setup. We make the following assumptions about the enforceability of these contracts:

- Credit contracts: A farmer can lend wheat in exchange for repayment at date $t = 1$. We assume that the macroeconomic shock is not describable in a contract or verifiable by the courts, so that the repayment cannot be conditioned on the realization of the shock. In

[1] We do no discuss uniqueness in this paper.

addition, wheat output on any given farm is not observable, let alone verifiable. These two assumptions immediately imply that a debt contract must simply be the borrower's promise to make a unit repayment of D at $t=1$ and the debtor's right to foreclose the farm in case of default (see Hart and Moore (1994, 1998) and Bolton and Scharfstein (1990, 1996)). We assume that at $t=1$ it is not legally possible for a farmer to acquire some other piece of land and continue to produce there, unless he has repaid his debts. Thus by foreclosing on the debtor's land, a creditor can prevent the debtor from continuing production. This threat will induce the farmer to repay his debts when he can. The borrower does have an incentive to repay, for otherwise he would lose his second-period output. The unit repayment D at date $t=1$ is, therefore, like the purchase by the debtor of the right to continue producing wheat on the land. Because there is no production beyond date $t=2$, there is no incentive for the borrower to repay a loan at that date. In anticipation, the creditor will insist that repayments take place only at date $t=1$. If the debtor does not produce enough wheat to repay D at date $t=1$, he is forced to default and the creditor forecloses. At that point the debtor simply runs away with what wheat he has and becomes an agricultural laborer. As will become clear, in equilibrium there is no gain to the creditor from renegotiating the debt contract and allowing the debtor to stay and produce on his land.

- Employment contracts: Just as with debt contracts, there is an enforceability issue with labor contracts. We make wage contracts enforceable by requiring a simultaneous exchange of work for wages. Laborers are paid when, figuratively, the seeds are sown or the soil tilled. That is, they are paid *before* output is realized. This completes the description of the economy with no political institutions. As we shall see, such an economy may give rise to excessively high bankruptcies at date $t=1$, when the economy is hit by a large negative macro-shock. This outcome is due to the contractual incompleteness of debt contracts, which precludes state-contingent repayments. To overcome this inefficiency the farmers in this economy may be willing to set up political institutions that can intervene ex-post to suspend, delay, or cancel debt repayments. Because political decisions are made ex-post, after the macro-shock is realized and the individual farmer types are learned, political institutions can serve as a mechanism to remedy the contractual incompleteness of debt contracts. A potential drawback of such institutions, however, is that they may undermine the proper enforcement of debt contracts ex-post. We now turn to a description of these institutions.

Political Institutions

The political institution we consider is majority voting on either debt moratoria or bailouts financed with proportional consumption taxes. The vote takes place at $t=1$, after production is realized but before debt repayment or default takes place. We consider the effects of restricting the franchise to those with invested and of allowing the size of the majority needed to enact a moratorium or a bailout to be larger than a simple majority. Both moratoria and bailouts have adverse

selection problems. For example, as a farmer's wheat production is private information, good farmers may choose not to repay during a moratorium. Consequently, alternative institutions that reduce adverse selection might be preferable. Specifically, individual debtors might be able to apply to an independent authority, say a bankruptcy court, for leniency. The bankruptcy court would be able to learn, at a cost, the type of the debtor and the macro-shock. Repayment would be adjusted to the realization of the macro-shock. Bankruptcy courts were notoriously costly mechanisms in the 19th century (Balleisen, 1996) and remain somewhat so today. In any event, we defer analysis of bankruptcy and other institutions for future research.

In addition to investigating equilibrium under moratoria, bailouts, and the base case of no political intervention, we compare the relative efficiency of the institutions. This comparison would suggest what institution might be chosen ex ante, behind a "veil of ignorance" where endowments, productivity types, and the macro-shock are all unknown. We also consider institutional choice at an interim level where endowments are known but the productivity and macro-shock are not.

No aggregate uncertainty

In this section we assume that $v = L$ with probability one $(l = 0)$, so that there are no aggregate shocks. When there is no aggregate uncertainty, there is no role for ex-post majority voting on debt moratoria (or bailouts) as a way of completing debt contracts. At best, voting on debt moratoria may help in correcting an ex-post pecuniary externality in the labor market at $t = 1$. At worst, majority voting on debt moratoria will undermine the efficient enforcement of debt contracts and introduce time inconsistency problems. As we shall explain, anticipation of majority voting on debt moratoria may improve ex-post efficiency by limiting indebtedness and therefore the number of bankruptcies. Similarly, anticipated bailouts can improve efficiency (both ex-ante and ex-post) by reducing the extent of credit rationing at date $t = 0$.

To see the effect of these two forms of political intervention in our model, we first consider the benchmark economy with no political institutions.

Economy without political intervention

The equilibrium we solve for is driven by our technological assumptions of diminishing returns. It has the following characteristics:

1. At $t = 0$, rich farmers invest $k = 1$ on their own farms and lend $\overline{W} - 1$ to poor farmers.

2. The labor market at date $t - 0$ shuts down, because it is more profitable both for the rich to lend than to hire laborers at the going market rate, and for the poor to borrow wheat and till their own land than to become laborers.

3. The equilibrium repayment rate in the loan contract is such that bad and average types cannot repay. Thus, at date $t=1$, both bad and average poor farmers become laborers. Rich farmers get a unit repayment of $m_g D$. To simplify the analysis we shall suppose that rich farmers have a well- diversified loan portfolio so that $m_g D$ can be taken to be a sure repayment. This assumption is not entirely realistic, but it is innocuous and convenient.

4. At $t-1$, bad and average rich farmers remain as farmers but neither increase their investment nor hire laborers. Good poor farmers plow back all their net earnings to increase investment to $k_{pg} < \bar{k}$. They hire $k_{pg} - 1$ laborers. Good rich farmers increase investment to $\bar{k}$ and hire all remaining laborers.

5. Laborers at $t=1$ work on q_g type rich and poor farms and earn equilibrium wage

$$r_1 = a q_g$$

That is, laborers earn their marginal product on good farms.

6. At $t=0$, a poor farmer borrows:

$$k_p = \frac{N(\bar{W}\text{-}1)}{M-N}$$

Note that, since $M > N \quad (1+W), k_p < 1.$

7. The equilibrium repayment rate is given by the maximum incentive compatible repayment at $t=1$.

Below we determine the conditions under which such an equilibrium holds. We begin by considering good poor farmers' incentives to repay their debt. We proceed to determine conditions under which average and bad farmers default, and we address the issue of renegotiation. We then consider rich farmers' decision to lend to poor farmers or employ them as agricultural laborers. We close this section by deriving the aggregate wheat output in equilibrium.

- **Good farmers' incentives to repay**: In the equilibrium we solve for, poor farmers borrow k_p for a repayment Dk_p at date $t=1$, which they repay only if they turn out to be good farmers. These good-type borrowers derive output $q_g k_p + a q_g (1-k_p)$ from their initial investment at date $t=0$. They can possibly expand production further by increasing their capital investment and hiring labor at date $t=1$. They can also choose to default on their loan, keep their

first period output, and work as laborers in the next period. The repayment terms D must be incentive-compatible with their not defaulting. To see the intuition of the following analysis, consider the special case of $a = 0$. In this case, the good poor farmer cannot earn anything as a laborer in the second period. Thus the lender can demand all of the first-period output, so $D = q_g$. Now for $a < 0$, the borrower's ability to earn wage income in the second period forces the lender to lower D and leave the borrower some surplus, which is reinvested in the farm. For sufficiently large a, the surplus is large enough for labor to be hired.

Specifically, under our technological assumptions, second-period output for sufficiently low D is:

$$q_g + q_g\left[\frac{(q_g - D)k_p - (1 - a q_g)(1 - k_p)}{1 + a q_g}\right]$$

The first term in the expression above represents the output obtained by increasing capital to 1, at which point the capital fully matches the farmer's own labor. The numerator of the bracketed portion of the second term is the amount of wheat available for investment after the debt has been repaid and capital increased to 1. Beyond one unit of capital, the farmer will match capital and labor[2]. The cost of a unit of capital and a unit of labor is the denominator. To keep things as simple as possible we shall restrict attention to parameter values such that

$$a \geq \frac{1 - k_p}{2 - k_p}$$

Under this assumption, Bolton and Rosenthal (1999) show that the equilibrium repayment, D^*, for which the good farmer's incentive constraint binds is such that

$$D^* = \leq q_g - \frac{(1 - k_p)(1 - a q_g)}{k_p} - \Delta$$

for Δ given by:

[2] The bracketed expression indicates that good poor farmers are sufficiently constrained financially that they cannot expand capital beyond $\bar{k}$. Satisfying this constraint may require additional restrictions on the parameters of the model

$$q_g\left(1+\left[\frac{\Delta k_p}{1+a q_g}\right]\right)=q_g k_p + a q_g (2-k_p).$$

This is the repayment in our equilibrium, as at date $t=0$ there is excess demand for loans at that rate. Poor farmers would like to expand investment beyond $k_p<1$, but there are not enough funds available to cover their investment demand. Repayment rates cannot increase to clear the market, as any higher repayment would not be incentive compatible.

- **Average and bad farmers' incentives to default and debt renegotiation**: Bolton and Rosenthal (1999) show that average farmers will default unless the repayment rate is below $\overset{)}{D}$, where

$$\overset{)}{D} \le \frac{q_a - (1-k_p) - a q_g}{k_p}$$

and that bad farmers will default unless the repayment rate is below

$$m_g D \ge (m_g + m_a)\overset{)}{D}.$$

$\tilde{D}$, where.

$$\tilde{D} \le \frac{q_b[k_p + a(1-k_p)] - a q_3}{kp}$$

This inequality differs from the previous one since, by assumption, $q_b<1$ and "bad" types do not increase their capital.

$$m_g D \ge (m_g + m_a)\overset{)}{D}.$$

We therefore assume that the q_i and a are such that

$$D^* \ge \max\left[\left(1+\frac{m_a}{m_g}\right)\overset{)}{D}, \left(\frac{1}{m_g}\right)\tilde{D}\right] \qquad (3.1)$$

Note that this necessary condition for our equilibrium is satisfied when q_g is large relative to q_a and q_b.

- **Borrowers ex-ante expected payoff**: Because bad and average types default at date $t=1$, run away with their first-period wheat production, and earn a wage aq_g by working as agricultural laborers in the second period, a poor farmer's expected payoff at date $t=0$, denoted R_p, is

$$R_p = m_g q_g \left(1+\left[\frac{\Delta k_p}{1+aq_g}\right]\right)+$$
$$m_a(q_a K_p + aq(1-k_p)+aq_g)+$$
$$m_b(q_b k_p + aq_b(1-k_p)+aq_g)$$

- **Rich farmers' investment and employment decision**}: Consider next the rich farmers' investment decision. Note first that rich farmers would never want to lend more than $\overline{W}-1$, because the marginal return on capital $k<1$ invested on their own farm is at least $\bar{q} > m_g D$. But they would want to lend $\overline{W}-1$ if they cannot hire any additional labor, because the first-period marginal return on capital $1<k$ would be zero (by our assumptions).

  They would not want to expand investment on their farm and hire additional
  labor if by lending k_p they can expect a higher net return than by investing an additional k_p on their own farm. That is, if

$$(m_g D-1)k_p \geq \bar{q}\frac{k_p}{1+w}$$

  or

$$w \geq \frac{\bar{q}}{(m_g D-1)}-1$$

  where w denotes the minimum wage at which a rich farmer can hire a poor farmer. Note that the rich farmer's second period production decision is the same whether he decided to hire laborers in the first period or not. Therefore his first-period decision whether to

employ or lend is entirely determined by the relative first-period return of the two contracts.

Given that poor farmers can borrow and work on their own farm, they will consider working as agricultural laborers instead only if the wage exceeds the payoff from borrowing, or

$$w + a q_g \geq R_p$$

Assuming the lowest possible equilibrium wage prevails,

$$w = R_p - a q_g$$

Substituting for R_p and w and substituting D^* for D, a rich farmer prefers a credit contract to an employment contract if and only if

$$\left(\frac{\bar{q} k_p}{m_g((q_g - \Delta)k_p - (1-k_p)(1-a q_g)) - k_p} \right)$$

$$\leq 1 + \bar{q} k_p + m_g q_g [(1-k_p) + \frac{\Delta k_p}{1 + a q_g}]$$

$$+ (m_a a q_a + m_b a q_b)(1-k_p) + (1-m_g) a q_g \qquad (3.2)$$

Note that conditions (3.1) and (3.2) are mutually compatible for a subset of the parameter space and both hold when $(q_g - q_a)$ is large enough and a is commensurately small), so that our equilibrium exists for this subset of parameters.

- **Equilibrium wheat production**: The economy's total wheat output in this equilibrium is then given by (see Bolton and Rosenthal, 1999

(3.3)

for details)

$$(M-N)\bar{q} k_p + a\bar{q}(1-k_p)) + N\bar{q}$$

at date $t = 1$, and

$$(M-N) m_g q_g \left(1 + \left[\frac{(q_g - D^*)k_p - (1-a q_g)(1-k_p)}{1 + a q_g} \right] \right) + N m_g q_g \bar{k} +$$

$$a q_g \left((M-N)[(1-m_g) - m_g \left(\frac{(q_g - D^*)k_p - (1-a q_g)(1-k_p)}{1 + a q_g} \right)] \right) +$$

$$- N m_g (\bar{k} - 1)$$

$$N(m_a q_a + m_b q_b) \tag{3.4}$$

at date $t = 2$.

To summarize, in our equilibrium the good poor farmers plow all their first period surplus back in their farm and good rich farmers take up the remaining labor supply. There may be misallocation of labor ex-post, as a fraction of laborers only produce aq_g when they could produce more elsewhere. This misallocation is partly due to liquidity constraints of good poor farmers, which result in those rich farmers with the highest ability to pay crowding out the poor farmers with the highest marginal returns from labor. Moreover, if the number of defaulted farmers is too great for them to all be used efficiently on good farms, it would be more efficient to have some defaulted farmers remain as independent farmers.
On the other hand, this equilibrium results in ex-ante efficient allocation of resources, as all available capital is used at the highest expected marginal (and average) productivity $\bar{q}$.
(Although poor farmers have less capital than rich ones, capital could not be reallocated in a manner that would increase total expected output. This is a consequence of our production function. With other production functions, the possibility of default would lead to an inefficiently small transfer of capital from rich farmers to poor.)

Economy with political intervention

The equilibrium without political intervention produces potentially massive defaults by average and bad poor farmers. When the number of defaults is large, political pressure builds to introduce some form of relief for the unfortunate. This relief can be in the form of additional subsidies or tax breaks; government guarantees on new loans or, possibly, even new government loans; debt moratoria; and finally bailouts. We analyze the latter two forms of government relief to debtors. The main difference between a moratorium and a bailout is that under a moratorium no government transfers are required, whereas under a bailout the government raises taxes to repay debts. A moratorium is simply a form of debt cancellation and amounts to a direct ex- post transfer from creditors to debtors. A bailout aims at repaying existing debts of poor farmers by raising taxes on all citizens, that is, both creditors and debtors; it amounts to an indirect ex-post transfer from solvent debtors to creditors in our model[3].

Relief can be introduced if a majority of voters support it. The relief granted is non-selective. That is, the relief cannot be conditioned on the productivity type of the farmer. All farmers can vote on whether to introduce some form of debt relief at date $t = 1$,

[3] In equilibrium, all agents have positive pre-tax returns. As we use a proportional tax on consumption, all agents have strictly positive final consumption in equilibrium.

following the realization of crops and each farmer's acquiring private information about his own type. We focus on simple majority rule; we comment briefly on the effect of supra-majority rule.

Debt Moratoria

For economic efficiency, debt moratoria should be targeted only to certain types of farmers and should be limited to the amount of debt these farmers cannot repay. In practice, it is unfortunately difficult both to discriminate between types and to limit the scope of debt forgiveness. Once a moratorium is proposed, political support for the initiative is maximized by including all debtors in the scheme and by forgiving 100% of their debts. More precisely, any farmer who would vote for partial cancellation of the debt would prefer total cancellation to partial cancellation. Accordingly, we shall begin by considering a vote on 100% debt relief for all poor farmers. We start with the case where a debt moratorium is unanticipated at date $t=0$. In a second step we solve for the equilibrium at date $t=0$ when debt moratoria are anticipated.

Winners and Losers from a Moratorium

To see who will support such an initiative, we must first consider the effects of the moratorium on the labor market equilibrium at date $t=1$. Suppose that the population of bad poor farmers is relatively high, so that

$$m_b(M-N) > (\bar{k}-1)Nm_g + (M-N)m_g\left(\frac{(q_g - D^*)k_p - (1-aq_g)(1-k_p)}{1+q_b k_p + aq_b(1-k_p)}\right).$$

Then Bolton and Rosenthal (1999) show that the labor market equilibrium following a moratorium will be such that Z bad poor farmers become laborers for good (rich and poor) types at equilibrium wage $q_b k_p + aq_b(1-k_p)$ and the remainder stay of their farm. At that wage all average poor farmers remain on their land and expand investment to $k=1$. Average and bad rich types do not expand investment. No average or bad type hires labor. Good rich types expand investment to $\bar{k}$ but good poor types are liquidity constrained in expanding.

Under this scenario the moratorium creates a positive pecuniary externality for bad and average poor farmers, who see their second-period wheat income increase from aq_g to, respectively, $q_b k_p + aq_b(1-k_p)$ and q_a. These farmers therefore clearly favor a moratorium. Note that this pecuniary externality is at the expense of good farmers. Therefore all good rich farmers would be opposed to this initiative even if the moratorium were limited only to bad and average poor farmers (and therefore did not involve a direct loss in debt repayments). All rich farmers would, a fortiori, be opposed to

a moratorium that includes also the solvent good poor farmers. The latter would support a moratorium if the gain in debt forgiveness is greater than the increase in the wage bill, or if

$$\frac{(q_g - D^*)k_p - (1 - aq_g)(1 - k_p)}{1 + aq_g} \geq \frac{q_g k_p - (1 - aq_g)(1 - k_p)}{1 + q_b k_p + aq_b(1 - k_p)}.$$

This inequality will holds for sufficiently large q_g. In this case, there would be $(M - N)$ voters in favor of a moratorium. There would be a majority in favor of the moratorium ex-post.

Ex-post efficiency of moratoria

The moratorium always increases ex-post efficiency, as measured by total wheat output. Indeed, by allowing defaulting farmers to stay on their farm, the moratorium improves the allocation of labor at date $t = 1$. Under our assumptions, it is efficient to have all bad farmers in excess of $(\bar{k} - 1)Mm_g$ as well as all average defaulting farmers remain on their farms. An unanticipated moratorium equilibrium achieves this. The only remaining inefficiency is that good poor farmers are liquidity constrained and cannot expand to $\bar{k}$. The general observation here is simply that as a result of the moratorium there can no longer be any distortions on the real economy resulting from nominal debt obligations. In other words, moratoria increase aggregate production through redistribution from rich creditors to poor borrowers. Thus the main (potential) problem with moratoria is not ex-post efficiency but ex-ante efficiency, when moratoria are anticipated.

Ex-ante equilibrium with anticipated moratoria

When moratoria are anticipated, they give rise to credit rationing. Indeed, rich farmers would never lend if they expected a moratorium. Now, by lending to fewer poor farmers, rich farmers might guarantee that the number of debtors will not exceed the number of creditors, so that in a vote comprising only debtors and creditors they would have a majority to defeat any moratorium. But voting is not restricted to debtors and creditors, and the outcome of the vote will depend on how the remaining agricultural laborers vote.

From the perspective of a laborer, a moratorium is always good news since it reduces the supply of labor. Thus laborers always weakly favor moratoria. If they vote in favor when they are indifferent, there will always be a winning majority for a moratorium, so that the credit market shuts down at $t = 0$. In that case the economy achieves a lower aggregate output in both periods of

$$N\bar{q}\left[\bar{k}+a\left(1+\frac{M-N}{N}-\bar{k}\right.\right.$$

at date $t=1$[4], and

$$N\bar{q}\bar{k}+aq_g(M-N\bar{k})$$

at date $t=2$.[5]
On the other hand, if laborers vote against moratoria when they are indifferent, an equilibrium with credit rationing obtains at date $t=1$
where $n<M-N$ poor farmers get credit of $k_p=1$ (the efficient scale for a poor farmer working on his own). The number n is such that a majority
against debt moratoria exists at date $t=1$ (i.e., $2n\leq M$).

This equilibrium obtains only if laborers are indifferent. That is the case only if the equilibrium wage at date $t=1$ is unaffected by an increase in supply of labor from defaulting poor farmers. In other words, this equilibrium obtains only if $w=aq_g$, whether a moratorium is approved or not. Consequently, the equilibrium with credit rationing is extremely fragile and depends entirely on the assumed piecewise-linear structure of the production technology. Any small change in equilibrium wage resulting from a change in supply of labor would result in a majority in favor of moratoria ex-post and would lead to a shutdown of the credit market.
An alternative way of ensuring that a majority against moratoria exists ex-post is to lower the repayment for some farmers to $D^{\#}$ so that the cost of repaying would be less important than the increased labor costs under a moratorium. In other words, $D^{\#}$ solves

$$\frac{(q_g-D\#)k_p-(1-aq_g)(1-k_p)}{1+aq_g}=\frac{q_gk_p-(1-aq_g)(1-k_p)}{1+q_bk_p+aq_b(1-k_p)}.$$

Good farmers borrowing at $D^{\#}$ would also oppose the moratorium. If they were sufficiently numerous, a majority could emerge to oppose a moratorium. Under this scenario, ex-post moratoria impose a

[4] Note, in particular, that $N(\bar{W}-\bar{k})$ of the initial endowment is not invested at date $t=0$.

[5] At date $t=1$, all bad and average rich farmers hire $(\bar{k}-1)$ laborers at wage aq_g to produce additional output of respectively $q_b(\bar{k}-1)$ and. Because they only need to increase the labor force to reach maximum efficient scale, and because by assumption $q_b>aq_g$, this choice is profitable. All other laborers are employed on good rich farms

constraint on lending terms but do not necessarily imply inefficient credit rationing ex-ante.

Implementing a two-tier loan structure is not feasible with decentralized lending and uncertainty about the number of borrowers who will be good types. Free-riding will cause a two-tier structure to unravel. A two-tier structure could be supported if there were a single financial intermediary who would make the appropriate trade-off between increasing the probability of a moratorium and the benefit of obtaining D^* rather than $D^\#$ from borrowers at the margin. The solution to the maximization problem of the intermediary is provided in Bolton and Rosenthal (1999). When M is large, the probability of a moratorium will be close to, but not exactly, 0. Thus, there is a small chance of observing a moratorium on the equilibrium path.

The equilibrium with an intermediary leads to greater ex post efficiency even when the effects of a moratorium are fully anticipated and the moratorium does not occur. The gain comes from good poor farmers who have borrowed more cheaply; they can use retained earnings to expand at $t=1$.

Interestingly, if the threat of a moratorium resulted in $D^\# \leq q_a$, then even average types would repay their loans ex-post.[6]

In this case, there is an additional ex-post efficiency gain with the political institution of a moratorium. The threat of a moratorium allows average poor farmers to keep their farms.

Restricting voting rights

When repayment rates low enough to produce a majority opposed to a moratorium are not profitable for the rich and when credit rationing is infeasible, credit markets collapse when moratoria are anticipated. To avoid a complete shutdown of the credit market at date $t=0$, it would then be necessary to restrict voting rights one way or another. In fact voting rights were generally restricted at the beginning of the nineteenth century. Only land owners and sufficiently wealthy men were allowed to vote. In our model, restricting the franchise to those having capital, either endowed or borrowed, would improve ex-ante efficiency. It would take out altogether the votes of agricultural laborers and thus make lending to a maximum number of $\hat{n}$ poor farmers possible, where $\hat{n}(1-2m_g)=N$.

Another means of making moratoria more difficult is to require more than a
simple majority for enactment under direct democracy. The same objective

[6] The fact that average types will repay for low values of $D^\#$ makes reduced terms more feasible for creditors. If only good types repay, we must have $m_g D^\# > 1$. But if both good and average types repay, it sufficies that $(m_g + m_a)D^\# > 1$.

can be accomplished in a representative democracy with a bicameral legislature with property interests overrepresented in one chamber. Measures to make a moratorium more difficult, however, are not desirable when the threat of a moratorium leads to an equilibrium with a lower interest rate than when no political intervention is permitted.

To summarize, when there is no aggregate uncertainty, a debt moratorium will always improve ex-post efficiency. But allowing for voting on a moratorium will cause lenders to adopt strategies that always result in a majority in opposition to a moratorium. Moratoria do not occur on the equilibrium path. The threat of a moratorium undermines credit markets. Ex-ante efficiency is reduced if credit rationing occurs. The threat of moratoria may lead to lower repayment rates, however, leaving ex-ante efficiency unchanged and ex-post efficiency improved.

Bailouts

We suppose again that farmers vote on whether to bail out defaulting debtors at date $t=1$, following the realization of crops and the revelation of farmer types. As with moratoria, it will be difficult to target the bailout to only average and bad poor farmers. Accordingly, we shall consider a vote on a bailout of D for all poor farmers financed with a proportional tax on consumption at date $t=2$. That is, we suppose that the government is able to run a deficit at date $t=1$ by borrowing against receipts from a tax on accumulated consumption in the second period. The reason we consider a consumption tax is that consumption is easier to monitor than income. Just like the creditors, a government will have difficulties observing or verifying the actual revenues generated by each individual farm, so that an income tax would give rise to widespread evasion. We assume that all consumers are taxed at tax rate t. The maximum tax the government can set is $\bar{t}<1$.

If taxing consumption were as difficult as taxing income the government might have too small a tax base to finance a bailout. That may be one reason why debt moratoria appeared to be the preferred choice of relief in the Panic of 1819. Nevertheless, suppose that an efficient consumption tax (or an inflation tax) is available and consider who would support or oppose such a tax ex-post.

Winners and Losers from a Bailout

Ignoring the tax implications of the bailout, average and bad poor farmers would benefit from a bailout to the extent that they both get higher wages and have the option to remain on their farm.

Similarly, good poor farmers might be against the bailout if it results in too sharp an increase in wages.

But poor farmers also have a reason to oppose bailouts: the extra tax burden. Rich farmers, on the other hand, now have a reason to favor bailouts: their loans get repaid! As long as the repayment of their debts exceeds the additional tax burden and wage bill, they will support a bailout. Because the tax burden is spread over the entire population, creditors always end up getting more from a bailout than the added tax burden on their own consumption. The rich thus favor a bailout if it does not entail too steep a rise in wages. As our technological assumptions imply that only good types hire labor, only these types would be likely, among the rich, to oppose a bailout. Note also that these types bear a disproportionate share of the bailout.

In sum, if the wage effects of the bailout are small, rich creditors favor a bailout. Some, if not all, poor farmers on the other hand oppose it. The bad poor farmers - who would have defaulted and become agricultural laborers anyway - mainly see their tax bill increase and are therefore opposed. The average poor farmers oppose the bailout if the value of the option of staying on their land is less than the increase in taxes. Finally, the good poor farmers oppose the bailout because their tax burden is likely to exceed the nominal value of their debts. If wage effects are large, all good framers may oppose a bailout while all average and bad types support it.
Thus the political coalitions that form for bailouts are very different than for moratoria.

Ex-post efficiency of bailouts

Unanticipated bailouts have efficiency properties very similar to those of moratoria. By removing the nominal debt overhang they allow bad poor farmers and average farmers to make efficient economic decisions. Following the bailout, these farmers would decide to become laborers only if they are more productive elsewhere than on their farm. As for the other farmers, their investment decisions are unaffected at date $t=1$ because they get taxed only at date $t=2$ and because the consumption tax is neutral with respect to investment decisions. Admittedly, the ex-post efficiency of bailouts depends to a large extent on the method of taxation used to finance the bailout. If taxes are sufficiently distortionary, then bailouts would be dominated by moratoria.

Ex-ante equilibrium with anticipated bailouts

To fix ideas, suppose that wage effects are small so that all rich lenders
and average poor farmers favor a bailout, but bad and good poor farmers oppose it. Suppose, in addition, that a majority favors a bailout, $N > \frac{M}{2(1-m_a)}$. This implies that lenders are always fully repaid ex-post, so that they would have every incentive to lend ex-ante. In other words, the ex-ante response to bailouts is the

opposite of moratoria. Bailouts give rise to more rather than less investment.

In fact, anticipated bailouts raise issues of existence of equilibrium. To see this, note that all poor farmers seek to borrow $\bar{k}$ no matter how high the required repayment D, because they do not have to repay out of their own money anyway. Now, if $D > \bar{q}$ the rich prefer to lend all their endowment rather than investing in their own farms. But even if rich farmers lend everything, aggregate demand for loans exceeds supply, for by assumption $N(1+\bar{W}) < M$. Consequently, an equilibrium may obtain only at the maximum rate $\bar{D}$ that the government can actually repay. Such an equilibrium is sustainable, however, only if the bailout rule gives priority to bailing out debts of lower denomination. In that case no lender would sign a lending contract with $D > \bar{D}$ when all other contracts specify repayment $\bar{D}$.

To characterize this equilibrium further, suppose that all poor farmers borrow

$$k_p^{\,b} = \frac{N\bar{W}}{M-N} < 1$$

in exchange for a unit repayment of $\bar{D} > \bar{q}$ at date $t=1$. Then the total bailout bill for the government at date $t=1$ is

$$\bar{D}k_p^{\,b}(M-N) = \bar{D}N\bar{W}$$

Denote by x the total accumulated output at date $t=2$. In equilibrium we must then have

$$\bar{D}N\bar{W} = \bar{t}x$$

or

$$\bar{D} = \frac{\bar{t}x}{N\bar{W}}$$

(assuming that the government can costlessly tax all private consumption at date $t=2$ as well as borrow costlessly on international markets).

As long as equilibrium lending terms $\bar{D}$ are greater than $\bar{q}$, rich farmers prefer to lend all their wheat rather than investing on their farms. At these terms, poor farmers obtain a strictly positive total expected before-tax payoff of

$$\bar{q}k_p + m_g[\bar{k}q_g - (\bar{k}-k_p) - (\bar{k}-1)q_b k_p] + m_a[q_a - (1-k_p)] + m_b q_b k_p.$$

which is more than anything they can hope to get by working as agricultural laborers in both periods. (Indeed, they would prefer to borrow more at these terms.)

Bolton and Rosenthal (1999) characterize in more detail the existence of this ex-ante equilibrium with maximum lending. Note that ex ante efficiency follows from $k_p{}^b < 1$. An ex-post bailout may improve both ex-post and ex-ante efficiency because of the inefficiency of the debt contract under no bailout. This contract is inefficient because creditors are unable to appropriate all the output produced ex-post on poor farms with their investment. A bailout allows for a potentially superior collection technology ex-post by complementing the creditors' debt-collection technology with the government's taxation technology.

Comparing bailouts to moratoria, we conclude that bailouts--in a world with costless tax collection--are more desirable than moratoria. We also observe that bailouts here occur "along the equilibrium path", whereas moratoria are almost always an "off the equilibrium path" possibility that constrains the equilibrium outcome. We shall see in the next section, however, that with aggregate uncertainty moratoria can occur on the equilibrium path. Perhaps more interestingly, with aggregate uncertainty the equilibrium with bailouts may be such that in some states total accumulated debts are too high for the government to be able to bail out everybody. In other words, the anticipation of bailouts in some states may give rise to a massive default in other states.

Aggregate and Individual Uncertainty

In this section we extend the model by assuming that $0 < l < 1$. Recall that l denotes the probability that state H occurs and $1-l$ the probability that state L is realized. In state H, productivity of all farmers is higher than in state L. With aggregate uncertainty, ex-post majority voting on debt relief may complete debt contracts, which are constrained to be independent of the state of nature. To keep the analysis tractable we shall make the extreme assumption in this section that $a = 0$ (and that $q_a^j > 1$ for $j = H, L$)[7]. Although this assumption eliminates many interesting effects, it does help in highlighting the main observation of this section that ex-post political intervention can play a beneficial role in completing debt contracts.

Economy without political intervention

[7] In the previous section with $a = 0$ we had $1 < q_a < +aq$. Clearly, with $a = 0$ one of the inequalities has to be dropped. It is most natural to drop the second one.

As in the case without aggregate uncertainty we focus on an equilibrium where:

1. Rich farmers invest 1 on their own farms and lend the remainder $\overline{W}-1$ to poor farmers, who each borrow $k_p = \frac{N(\overline{W}-1)}{M-N}$.
2. The labor market at date $t=0$ shuts down. In addition:
3. Because $a=0$ there is only limited demand for labor at date $t=1$.
4. We distinguish the two states by deriving an equilibrium repayment rate in the loan contract D such that bad and average types cannot repay in state L, but only bad types default in state H.

With the restriction that $a=0$ the conditions for such an equilibrium to obtain are straightforward to derive. We begin by considering poor farmers.

- **Poor farmers' ex-ante expected payoff and ex-post default decisions**: In state L good farmers repay their loan if and only if $q_a^l \geq D$ and average and bad farmers cannot repay if $D > q_a^l$. Similarly in state H good and average farmers repay their loan if and only if $q_a^H \geq D$ and "poor" farmers cannot repay if $D > q_b^H$. If good poor farmers retain some earnings after the debt repayment they invest to expand capacity and possibly to hire labor. Because $a=0$, labor is essentially free and good farmers would want to expand up to $\overline{k}$. Thus, assuming that

$$q_g^H > q_g^L \geq q_a^H = D^* > q_a^L$$

a poor farmer's ex-ante payoff from borrowing k_p is given by:

$$R_p = [l\overline{q}^H + (1-l)\overline{q}^L]k_p + m_g[l(q_g^H - q_a^H)q_g^H + (1-l)(q_g^L - q_a^H)q_g^L$$

To ensure that lenders do not wish to renegotiate the debt contract in either state we now assume that:

1. in state L the q_i^L are such that

$$q_a^H \geq \max\left[\left(1+\frac{m_a}{m_g}\right)q_a^L, \left(\frac{1}{m_g}\right)q_b^L\right]$$

and,

2. in state H the q_i^H are such that,

$$q_a^H \geq \left(\frac{1}{1-m_b}\right) q_b^H .$$

Consider next rich farmers' lending decisions.

- **Rich farmers' lending decision**: As in the case with no aggregate uncertainty, rich farmers would never want to lend more than $\overline{W}-1$. Bolton and Rosenthal (1999) show that a rich farmer prefers credit

$$\frac{1}{[(l(m_g+m_a)+(1-l)m_g)q_a^H-1]}-\frac{1}{[l\bar{q}^H+(1-l)\bar{q}^L]}$$

$$k_p \geq \quad -\frac{m_g[l(q_g^H-q_a^H)q_g^H+(1-l)(q_g^L-q_a^H)q_g^L]}{[l\bar{q}^H+(1-l)\bar{q}^L]}$$

contracts lending $\overline{W}-1$ to a labor contract if and only if

Again, this condition is jointly satisfied with our renegotiation-proofness conditions above for a non-empty subset of the parameter space (e.g., for m_g, q_a^H and q_g^H large enough).

- **Equilibrium wheat production in each state of nature**: In state L the total equilibrium output is now simply

$$(M-N)\bar{q}^L k_p + N\bar{q}^L)$$

at date $t=1$, and

$$(M-N)m_g q_g^L(k_p+q_g^L-q_a^H)+N\bar{q}^L+N(\bar{k}-1)(m_g q_g^L+m_a q_a^L)$$

at date $t=2$. In state H total output is

$$(M-N)\bar{q}^H k_p + N\bar{q}^H$$

at date $t=1$, and

$$(M-N)[m_g 2q_g^H k_p(1+q_g^H-\frac{q_a^H}{k_p})+m_a q_a^H k_p]+N\bar{q}^H+N(\bar{k}-1)(m_g q_g^H+m_a q_a^H)$$

at date $t=2$. Recall that $a=0$ (and laborers are essentially free), so it now pays both good and average type rich farmers to expand their farm capital up to $\bar{k}$ at date $t=1$. Similarly, good poor farmers expand capacity by $\max[(q_g^H k_p - q_a^H); \bar{k} - k_p]$ (assuming that $\bar{k} > (q_g^H + 1)k_p - q_g^H$ we obtain the expression above).

Economy with political intervention

As in the previous section we consider in turn debt moratoria and bailouts.

Debt Moratoria

We shall restrict attention to parameter values such that a majority in favor of moratoria emerges only in state L. More precisely, we shall determine an equilibrium repayment D such that good poor farmers oppose a moratorium in state H to get L Then as long as $(M-N)m_g + N > (M-N)(1-m_g)$ there will be a majority against moratoria in state H and a majority in favor of moratoria in state L (as $(M-N) > N$ by assumption).

In state H, a good poor farmer would oppose a moratorium if the benefit in cheap labor outweighs the cost of repaying the loan. Assuming that the population of bad poor farmers is relatively high, so

$$(M-N)m_b > M(\bar{k} - k_p)(m_g + m_a),$$

that[8]

the equilibrium wage following a moratorium will equal $q_b k_p$. Therefore good poor farmers oppose a moratorium if

$$(q_g^H - D)k_p q_g^H \geq q_g^H \left[(1-k_p) + \frac{q_g^H k_p - (1-k_p)}{1+q_b^H k_p} \right]$$

or,

$$D \leq q_g^H - \frac{1-k_p}{k_p} - \frac{q_g^H}{1+q_b^H k_p} + \frac{(1-k_p)}{(1+q_b^H k_p)k_p}$$

Thus, if we make the assumption that

$$q_g^L - \frac{1-k_p}{k_p} - \frac{q_g^L}{1+q_b^L k_p} + \frac{(1-k_p)}{(1+q_b^L k_p)k_p}$$

$$\leq q_g^H$$

[8] A weaker, necessary and sufficient condition is straightforward but algebraically messy.

$$\leq q_g^H - \frac{1-k_p}{k_p} - \frac{q_g^H}{1+q_b^H k_p} + \frac{(1-k_p)}{(1+q_b^H k_p)k_p} \qquad (5.1)$$

an equilibrium repayment of $D^* = q_a^H$ would give rise to no moratorium in state H and a moratorium in state L.
In that moratorium equilibrium, the poor farmers' ex-ante expected payoff is
then

$$R_p^m = l[\bar{q}^H k_p + m_g(q_g^H - q_a^H)q_g^H] +$$

$$(1-l)[m_b 2q_b^L k_p + m_a(q_a^L + 1)k_p q_a^L + m_g(q_g^L + 1)k_p q_g^L]^9$$

Rich farmers prefer to lend $(\bar{W} - 1)$ instead of hiring laborers if and only if

or,

$$R_p^m \geq \frac{l\bar{q}H + (1-l)\bar{q}^L}{(l m_g q_a^H - 1)} - 1. \qquad (5.2)$$

Thus as long as $(M-N)m_g + N > (M-N)(1-m_g)$, and conditions (5.1) and (5.2) hold, the equilibrium with moratoria is such that:

1. rich farmers continue to lend at repayment terms $D^* = q_a^H$,

2. no moratorium is voted in state H, with good and average types repaying their loans

3. a moratorium is voted in state L.

This equilibrium dominates the equilibrium without political intervention in both ex-ante and ex-post efficiency. Ex-post efficiency is improved in state L by allowing average and bad poor farmers to stay on their farms and thus remain productive. Ex-ante, the likelihood of state L occurring (l) is sufficiently small that it does not affect rich farmers' lending decisions, so that efficiency is not impaired. Interestingly, the possibility of an ex- post moratorium involves a transfer of rents to poor farmers both ex-ante and ex-post. The reason that poor farmers also benefit ex-ante has to do with the threat of default or a moratorium in state H, which can be avoided only by

[9] Note that an implicit assumption here is that $(q_g^L + 1)k_p \leq \bar{k}$.

giving poor farmers better lending terms ex-ante. As suggested in the introduction, political intervention here plays a critical role in "completing" financial contracts that are constrained to be state-independent.[10]

Bailouts

The most interesting case here is where a majority is in favor of a bailout in state L and against in state H. In this case the equilibrium with bailout is similar to that with a debt moratorium as long as l is small. To see this, note first that the ex-ante equilibrium outcome with anticipated bailout in state L is then the same as the equilibrium outcome with no bailout; that is, rich farmers continue to lend $(\overline{W}-1)$ at equilibrium repayment terms $D^* = q_a^H$. The reason that equilibrium terms do not exceed q_a^H is simply that higher terms would trigger default by average poor farmers in state H, and therefore would not be profitable. More precisely, if l is large the anticipated increase in repayments in state L (through bailouts) is outweighed by the anticipated fall in expected repayments in state H.

In sum, anticipated bailouts in state L do not affect the ex-ante equilibrium and they lead to an ex-post welfare improvement in state L, just as with moratoria. In this case, the sharp distinctions between the effects of bailouts and moratoria observed in the previous section disappear with the introduction of aggregate uncertainty.

The Political Economy of Debt Relief in the Panic of 1819

The empirical motivation for our model came from the observation that state legislatures in the United States frequently voted debt moratoria in the late nineteenth and early twentieth centuries. Most notably, many states intervened in private debt contracts as a result of the severe downturn known as the Panic of 1819. Between October 1818 and April 1822, Tennessee, Kentucky, Maryland, Illinois, Pennsylvania, Missouri, Louisiana, and Vermont passed stay laws imposing debt moratoria. Rhode Island made it more difficult to seize the assets of debtors by repealing "summary process". Minimum appraisal laws passed in Indiana, Pennsylvania, and Kentucky made it more difficult to sell debtor assets at auctions.[11]

At the same time, Congress provided for delayed repayments of land debts to the federal government. On the other hand, proponents of federal relief for private debts lost. Although the United States constitution explicitly gives bankruptcy powers to the federal government, no bankruptcy law existed between 1803 and 1842.

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[10] Recall that repayments cannot be made contingent on aggregate shocks because courts cannot verify whether state H or L has occurred. The state of nature is "certified" only by the outcome of majority voting on debt moratoria. If no majority in favor materializes, it becomes common knowledge that state H has occurred (or that state L has occurred if a majority in favor of a moratorium is formed).

[11] Rothbard 1962, 196-197.

In this section, we analyze the politics of the Panic in light of our model.

We begin by arguing that the economy of the United States in the period around 1820, particularly in the South and the West, was closely approximated by our model. We next show that frontier states, where new settlers had borrowed to finance agricultural investment, were much more likely to provide debt relief than were older states and that congressional preferences on relief of land debts parallel those leading to debt moratoria at the state level. We end by examining why there was no federal legislation for relief from private debts.

Most of the data we bring to this effort are political in the form of legislation passed by the states or roll call votes cast by senators and representatives in Congress. As Domowitz and Tamer (1997) point out, there does not appear to be economic data before 1830 that would provide evidence of private defaults. On the other hand, there are ample data on political outcomes. These outcomes can be informative about the preferences of agents in the economy and the reaction of these agents to macro-shocks.

The Economy at the Time of the Panic

The major cause of the Panic, according to North (1961, 182-183), was the collapse of the world price for cotton. Between January 1918 and June 1919, cotton prices fell by more than 50%. Cotton, in turn, dominated both American exports and the economy of the South. The decline of cotton prices also affected the West, as the West's economy was largely driven by sales of wheat and livestock to the South. Bulk commodities were transported to the South on the Mississippi and its tributaries. Neither canals nor railroads crossed the Appalachians before 1825. The Northeast provided non-bulk manufactured goods, banking, shipping, and other services to the other regions. (Douglass North defines the South at this time as Alabama, Georgia, Louisiana, Mississippi, North Carolina, South Carolina, and Virginia; the West as Illinois, Indiana, Kentucky, Missouri, Ohio, and Tennessee; and the Northeast as all other states.)

Both the South and the West correspond roughly to the technological structure of our model. In a nation that was still almost entirely rural, the West and western portions of the South were nearly entirely so, 99% rural in 1820. Although the Atlantic seaboard portion of the South was “only” 95% rural, what little urban population existed was mainly in the New England (10.5% urban) and Middle Atlantic (11.3%) states. In a national labor force of 2,900,000 people, more than two-thirds worked on farms.[12]

Given the low technological level of agriculture at this time, it is not too far-fetched to regard the South and West as single-commodity regions with labor (often in the form of slaves) as the major input factor.

Commodity prices are made endogenous when new land is brought into cultivation. Some of the drop in the cotton price reflects an expansion in production from 157,000 bales in 1812 to 377,000 in 1821. But over a longer run, cotton production was able to expand tremendously while whites prospered in the “Cotton Kingdom”. By 1859,

[12] United States Department of Commerce, 1975, hereafter HS, 134.

5,337,000 bales were produced.[13] Clearly the world market price was also determined by shifts in foreign demand. World price shocks bear similarity to the macroeconomic shock in our model.

An important omission from our model is a market for land. The thirteen former colonies had ceded all their western land claims to the federal government. Almost all of the Louisiana Purchase was government land. Sale prices and property rights for government-controlled virgin land was then and is today (as in Brazil) an important issue of economic policy. Some advocated that the government charge a zero price and only regulate quantities. But until 1860, the government sold land. Rising prices for cotton and other sources of prosperity stimulated land sales at the end of the Napoleonic Wars. Receipts from land sales in the South increased from $332,000 in 1815 to $9,063,000 in 1818. In the West, the jump was from $2,078,000 to $4,556,000.[14]

With the Panic, land sales fell abruptly, never regaining the 1818 level in the South and passing it in the West only in 1835. The receipts were in large part only down payments, some of which had been borrowed in private markets. Private debt was also used to finance investment on the land, including slave purchases.[15] In addition, many citizens in the South and West were debtors to the federal government, with payments due on the outstanding balance of land purchases. Before the passage of the Land Act of 1821, the federal government was owed some $23,000,000.[16] The land debt to the government exceeded annual federal expenditures (around $20,000,000 in 1820[17]), and was an appreciable fraction of the government debt of $90,000,000 in 1821.[18] When the Panic occurred, easy private credit had been extended by the frontier branches of the privately owned Second Bank of the United States.
Credit; tightening by the Philadelphia headquarters led to substantial resentment on the frontier.

Debt Relief at the State Level

The pressure for debtor relief led to legislation mainly in frontier states.
We specify the frontier as Ohio, Indiana, Illinois, Kentucky, Tennessee,
Missouri, Alabama, Mississippi, and Louisiana, as distinct from the states on the Atlantic seaboard that were once British colonies. Six of these nine frontier states were listed by Rothbard (1962) as

[13] HS, 518.
[14] North, 1961, 256.
[15] In our model there is no market for land (there is an abundance of land), so that our story does not quite fit these events. It would be innocuous, however, to introduce a market for land in our model. At date $T = 0$ all this would mean is a higher investment outlay for farmers; as for date $T = 1$, default will give rise to excess supply of land and consequently to a collapse of property prices as seen in the Panic of 1819; the main complication with introducing land in our model is the possibility of strategic behavior by rich buyers in the market for land, such as waiting for panics to buy land on the cheap. It is beyond the scope of this paper to address these somewhat peripheral issues.
[16] Rohrbough, 1968,
[17] HS,1104.
[18] HS, 1103.

providing some form of debtor relief in response to the Panic. In contrast, only 4 of the remaining 15 states passed a "stay law" or some other measure. ($c_1^2 = 3.70, p - value < .10$. This chi-square statistic and those later refer to the $2x2$ contingency table of, for example, $([\text{Frontier, Non - Frontier}]x\ [\text{Law, No Law}])$.

Because the great preponderance of new agricultural investment was taking place in frontier states and because these states were overwhelmingly rural, debtors were likely to dominate the electorate there. In addition, the frontier was more likely than the old states to have universal male suffrage rather than suffrage restricted on the basis of property holding or wealth.[19] It is thus not surprising that most of the ex post intervention occurred on the frontier.

Note, however, that debt relief was largely a northern and border state matter. Of the eight states in North's southern region, only 2, Louisiana
and Tennessee, both on the frontier, granted debt relief, against 8 of the
16 other states. Indeed, debt relief measures were passed in 4 of the 9
New England and Middle Atlantic states, which, in many historical accounts,
are regarded as pro-creditor.

The absence of debt relief in the South may be the expression of a reaction in the South to stay laws that were passed by southern state legislatures immediately preceding the formation of the United States. McCoy notes, with reference to James Madison, "Madison vehemently condemned ... popular legislation ... in the wake of a commercial depression that overtook much of the country in the mid-1780s. Paper money laws, so-called "stay" laws that offered relief to debtors, laws that impugned the sanctity of contracts; all may have expressed the immediate will of a people suffering the consequences of economic hard times, but they just as clearly violated the rights of both individuals and minorities. And in Madison's judgment, he and other critics of this debtor legislation were defending much more than the specific interest of creditors... By wantonly disregarding the rules of property and justice that raised men from savagery to civilized order, these laws threatened to bring republican government in America into profound disrepute."[20]

Madison's economic conservatism may have carried over more broadly to state legislatures in the South, which were dominated by property owners in the older regions of the states, the high endowment types in our model. Within the South, one-white-man, one-vote, applied only in the four frontier states.[21] In Virginia, about half the white males were disenfranchised by a property requirement. Moreover, the legislature

[19] Of course, suffrage requirements would become endogenous in an extended version of our model. We can only speculate that, during the transition from colonial status to democracy, creditors or property owners dominated the political process and opted to protect their interests from redistribution. In contrast, on the frontier, yeoman farmers-debtors were likely to have had more weight when state voting requirements were adopted upon entry to the United States

[20] McCoy, 1989, 41.

[21] Freehling, 1989, 164.

was not reapportioned to reflect greater population growth beyond the Tidewater.[22]
South Carolina had universal white male suffrage but severe property qualifications for office holding; the state Senate was malapportioned to give control to the older coastal region.[23]

Suffrage and apportionment may be an important part of the story of why stay laws and other form of debt relief were more prevalent in frontier states. Not only may a larger fraction of the population have been in default in those states, but also debtors may have had more political voice there.

Relief for Purchasers of Land

The initial federal reaction to massive defaults by those buying land on credit was the land law of April 24, 1820. For future sales, it eliminated sales on credit but reduced the minimum purchase price to $1.25 per acre from $2 per acre. At the same time, forfeiture on outstanding debt was delayed until March 21, 1821. Just before this deadline, on March 2, another act was passed. A debtor could either repay at a 35% discount (getting the price reduction of 1820), give up part of his land in payment for the remainder, or extend the time required to pay. This bailout/moratorium was, like the S&L bailout of the 1980s, a substantial transfer between regions. The beneficiaries were concentrated on the frontier. The costs to the Treasury were borne by the entire nation.

There were many roll call votes on the floor of Congress on the 1820 and 1821 land bills. The 1820 bill was largely non-controversial in the Senate and passed on a 31-7 vote. Although the bill granted a one year moratorium on outstanding debt, its provisions banning future sales on credit were not to the frontier's liking. Amendments were introduced to make the law more lenient. One, by Edwards of Illinois, reduced the purchase price to $1 an acre.[24]
It failed 11-24. Of the 11 favorable votes, 10 came from the frontier. Only 5 frontier senators cast negative votes. $(c_1^2 = 15.12, p - value < .001)$. All 8 of the frontier states (Missouri not yet admitted) had at least one senator voting for cheaper purchase prices. This voting pattern was repeated on other votes. For example, amendments by Edwards to give purchase preferences to squatters and by Noble to eliminate the cash payment requirement both failed 8-28. Of the 8 favorable votes, 7 came from the frontier. Of the 7 votes cast against passage of the bill, 6 came from frontier senators dissatisfied with the bill's lack of leniency.

The House of Representatives also had a lopsided majority in favor of the 1820 bill. Only one amendment led to a recorded roll call. As in the Senate, frontier representatives wanted the cash payment provision eliminated. The non-frontier states voted overwhelmingly, 123-7, to maintain cash payment, and they were joined by the entire Ohio

[22] Freehling, 1989, 169-170.
[23] Freehling, 1989, 222.
[24] Vote #119, 2/18/19. All roll call data taken from VOTEVIEW. See the Web site http://voteview.gsia.cmu.edu.

delegation (6-0). Elsewhere on the frontier, representatives sought, 12-6, to eliminate the new requirement for cash payment. The bill then passed. The bill won overwhelmingly in the older states, 122-10, but lost on the frontier, 11-13. The frontier received a temporary reprieve for its debt and lower prices, but much stricter terms for future purchases.

The 1821 bill was more lenient. In the Senate, Lowrie of Pennsylvania failed, by only one vote, to reduce the discount for prompt payment from 37.5% to 25%. All 15 senators from the frontier voted against the amendment, which was supported by the older states 20-6. $(c_1^2 = 22.52, p - value < .001)$. Although the amendment vote clearly delineates the frontier's desire for leniency, passage, as in 1820, was non-controversial. The House also voted on the 37.5% discount with the Anderson amendment on Feb. 27, 1821.[25] The amendment passed 72-62; the 20-4 margin on the frontier was pivotal. The bill itself passed 97-40, winning 21 of the 24 votes from the frontier.

To summarize the discussion of voting on relief for land debts, there was a national consensus that the Panic required a policy adjustment for land debtors. Within this consensus, there was a sharp debate over the degree of leniency, with close roll call votes in 1821 on amendments defining the terms of the new policy. Disappointed in 1820, the thinly populated frontier obtained better terms in 1821.

No Federal Relief for Private Debt: The Failure to Pass a Bankruptcy Bill

Although the federal government provided relief to those in debt to the government, Washington failed to provide a fresh start or a breathing spell to those in default on private debts, in contrast to stay laws at the state level.
The inaction of the federal government is somewhat surprising, as the Constitution adopted in 1787 clearly provided for federal bankruptcy law powers. Moreover, in contrast to many other aspects of the Constitution, the bankruptcy clause was not in controversy during the ratification process. Before the enactment of a stable, permanent law, bankruptcy laws were short-lived and served the purpose of writing off severe downturns in the economy. Creditors obtained very little in the court proceedings (Balleisen, 1996). Bankruptcy in the nineteenth century therefore resembled a moratorium subject to the inefficiency of court costs. If we see bankruptcy as a moratorium, it is not surprising that an interim conflict over bankruptcy law could develop even if there was initially a widespread agreement that Congress could enact bankruptcy laws.[26]

The Panic of 1819 occurred during the “Era of Good Feelings” when the United States was virtually a one-party state. The Jeffersonian Democrat-Republicans were in control; despite the Panic, President Monroe was reelected in 1820 by the Electoral College unanimously less one vote. It is not surprising, given the political ascendancy of the “left”, that no bankruptcy law was passed, even if the Jeffersonians

[25] VOTEVIEW # 135.

[26] See Berglof and Rosenthal, 1998, for details of the congressional politics of bankruptcy legislation in the 1840s and 1890s.

were particularly strong on the debt-ridden frontier. The bill under consideration in 1822, for example, was, in the view of Blair of South Carolina, very similar to the 1800 law that the Jeffersonians had repealed upon their taking control of both the executive and legislative branches in 1803.[27]

In the 15th Congress, the Senate took no recorded floor votes on bankruptcy.
The House took just one, voting in February 1818 to postpone consideration of a bill indefinitely. The 16th Senate did pass a bankruptcy bill by the narrow margin of a 23-19 vote on February 19, 1821. Floor votes took place over ending imprisonment of bankrupts, whether classes of debtors other than merchants should be included, and whether the bill would apply to contracts written before passage of the legislation. The Senate bill was reported unamended to the floor of the House by the Judiciary Committee,[28] but, in 7 procedural votes between February 28 and March 2, 1821, the bill was tabled. The 17th House had amendment voting on treatment of debtors other than merchants and on whether creditor majorities would be needed to approve voluntary bankruptcies. No action took place in the Senate. Substantive votes did occur in the 18th and 19th Senates both on the issues that arose previously and on the treatment of banks. But neither the 18th nor the 19th House took any action.

The voting patterns on bankruptcy did not match those on the land debt. There was no clear conflict between frontier states and the older part of the country. The old South was as opposed to a federal bankruptcy law as the frontier South. Data from the House votes indicate that the main trading centers--New York, Philadelphia, Boston, and Charleston, South Carolina--voted together, frequently in opposition to rural districts in their own states. Representatives of these trading centers argued that it was especially necessary to provide a fresh start to merchants who, unlike farmers, were more subject to circumstances beyond their control, including domestic and foreign political changes that involved uninsurable risk.[29]

Merchants, it was argued, also were heavily engaged in interstate commerce and thus required a uniform national law.[30] An advantage of a national law would be to give geographically distant creditors as much protection as that afforded to creditors near the debtor.[31] Those opposed to a national law objected strongly to the fresh start provision, in large part because they foresaw substantial opportunities for fraud.[32] The arguments for a bankruptcy law made in 1818 were remade, to no avail, in the 1821 and 1822 debates.[33]
Why did no bill materialize? At this point, we can only suggest several possible explanations.

[27] History of Congress, House of Representatives, hereafter HC, 1822, 663.
[28] HC, 1821, 1193.
[29] HC, 1818, 1016-17.
[30] HC, 1818, 1018.
[31] HC, 1818, 1019.
[32] HC, 1818, 1023.}
[33] HC, 1822, 967, 986.

1) Amendments could be offered to provide differential treatment for different classes of debtors, merchants, manufacturers, and banks. Eligibility for bankruptcy could be determined by a debt threshold. For example, during the 1818 debate in the House, it was proposed to include merchants as well as bankrupts but to require $5000 in debt to be eligible. The aim of the threshold was to deter bankruptcy by very small, artisan manufacturers, but the threshold caused the support of small merchants to be lost. The most divisive item was apparently a provision that required an agreement of 2/3 of the creditors to permit bankruptcy; some representatives preferred to allow debtors to declare bankruptcy on their own. All in all the House bill had 64 sections.[34] As Speaker Henry Clay remarked, "it was very probable the bill would be lost by the variance of opinion on some of its important details."[35]

In such a setting, it can be difficult to construct a stable majority combining a diverse set of groups. To take a modern example, the modern underpinnings of the banking industry in the United States, the Glass- Steagall Act, were not changed legislatively between 1933 and 1999. Kroszner and Strattman (1998) have recently argued that the legislative status quo prevailed because banks, insurance companies, and securities firms had distinct interests in changes from the status quo. Each interest group vetoed detrimental changes. In summary, in economies more diverse than that of our simple model, it may be difficult to form majorities to change the status quo on bankruptcy.

2) One way to maintain the status quo is to use one house of Congress to block a bill with majority support in the other house. In the Senate, each state had 2 senators indirectly elected by state legislatures, but the directly elected House was apportioned on the basis of population. While New York, Virginia, Pennsylvania, and Massachusetts had 25, 25, 23, and 22 representatives, respectively, the five frontier states of Indiana, Illinois, Alabama, Mississippi, and Louisiana each had only a single representative. It could be difficult to craft legislation that would garner a majority in both chambers.

3) The Supreme Court ruled on the constitutionality of stay laws only in the late 1820s and thereafter. In states where most of the debt was owed to foreigners or lenders residing in other states, debtors may have had a preference for keeping state institutions. States' rights arguments were invoked frequently in the congressional debate.[36] Part of the argument was that the bankruptcy clause in the Constitution was intended not to extinguish contracts but to prevent debtors to evade payment by moving assets across state lines.

4) If inter-state or foreign debtors in a state may have had an interest in resisting federal intervention, intra-state creditors may also have wanted to avoid federal intervention if they believed that federal bankruptcy law would be more debtor friendly on intra-state debt. In particular, creditors in the old South may have had greater confidence in their gentry-controlled state legislatures.

5) States' rights was connected with the slavery issue. Concerns with federal intervention on slave issues may have led to a preference for

[34] HC, 1818, 1010-1011.
[35] HC, 1818, 1011.
[36] Stevenson, VA, HC, 1822, 770, Smyth, HC, 1822, 792.

limiting federal intervention on other issues. Representative Woodson (KY), despite not mentioning slavery explicitly, did indicate that the bankruptcy issue was bound up with a much broader debate about states' rights.[37]

In addition to a long-term concern over slavery, the role of the federal government in economic matters was open to debate. The federal government was extremely small in 1820, with only 6,900, mostly military, employees.[38] The government provided defense and conducted foreign affairs, collected taxes through the tariff, managed the western lands, and ran the post office. The uniform tariff policy would be sharply disputed by John C. Calhoun and fellow South Carolinians in the Nullification Crisis later in the decade. Federal bankruptcy courts would have represented an important expansion in federal regulation. (By contrast, when a stable bankruptcy law was finally passed, in 1898, the Civil War had resulted in the abolition of slavery and the acceptance of federal predominance over state governments, one national and no state currencies existed, and federal economic regulation had been accepted through the Interstate Commerce Act of 1887 and the Sherman Anti-trust Act of 1893.) In particular, a federal role in bankruptcy would have decreased rents enjoyed by local assignees, receivers, sheriffs, and auctioneers (Balleisen, 1996, 474).

Conclusion

With incomplete contracts, there is an obvious case for governmental intervention in markets. Contracts cannot be contingent on individual productivity. A consequence is that there are excessive defaults. In our setup, the total output of the economy would be higher if average type defaulting farmers were allowed to remain on their land. Contacts also cannot be conditioned on the state of the economy. In our equilibrium with uncertainty about the state of the economy, average farmers remain on their land in good times but default in bad times. With state contingent contracts, the average type farmers would, for some sets of parameters, be able to remain on their land in both states. Political intervention can remedy the inefficiencies that arise from both sources of contractual incompleteness. Not only is aggregate production increased ex post but, ex ante, the total output of the economy is increased by allowing for debt relief. The stay laws observed in the Panic of 1819 might well have been an anticipated response to aggregate uncertainty rather than an inefficient form of expropriation that would deter future lending.

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[37] HC, 1822, 1120.
[38] HS,1103

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