From Fiscal Deadlock to Financial Repression: Anatomy of a Fall*

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Abstract

Financial repression can be used to avoid a government default when fiscal policy is constrained. We present a model showing that optimal financial repression progresses through successive stages with increasing levels of distortion. Data from advanced economies suggest that the initial stage of financial repression typically begins when government debt exceeds 100% to 120% of GDP. Moreover, Japan's experience suggests that countries such as the U.S. have significant leeway before resorting to the most distortive forms of financial repression.

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1 Introduction

Financial repression has historically been used to stabilize or reduce high levels of government debt. The fiscal deadlock currently observed in several advanced economies has raised concerns about the potential resurgence of financial repression (Reinhart and Sbrancia, 2015). This paper studies the possible forms that financial repression might take, starting with a model and then analyzing data on government debt in advanced economies.

In this paper, financial repression is defined as any policy through which the government uses the banking sector to avoid default.[1] Even with this narrow definition, the term financial repression has been used in the literature to describe a wide spectrum of policies. These range from the heavy-handed forms of banking regulation implemented in advanced economies after World War II (see Acalin and Ball, 2023, for the case of the U.S.) to the open market purchases of government debt undertaken by central banks over the past 15 years (see Chien, Cole and Lustig, 2023, for the case of Japan). One aim of this analysis is to integrate these differing views of financial repression within a common framework to better understand their differences and interplay.

The basic features of our theoretical framework are as follows. We consider a government whose debt is on an unsustainable trajectory, a situation can be resolved through fiscal adjustment, financial repression, or default. While fiscal adjustment is the preferred solution, it is delayed by political or institutional deadlock. Financial repression is a multi-dimensional policy that sets the quantity of government debt purchased by the banking sector (consolidated to include the central bank), how these purchases are financed, and the extent to which the cost of debt is determined by market forces or not.

We solve for the optimal financial repression policy as a Ramsey problem. The main contribution of the model is to show that financial repression unfolds in a specific sequence as the level of government debt increases. Initially, government debt is placed in the non-bank sector. However, there is an upper limit to the amount of debt non-bank investors are willing to hold due to default risk. Once this limit is reached, the government places its debt in the banking sector, still without imposing heavy distortions on interest rates. This policy, which we refer to as *balance-sheet*

[1] The concept of financial repression originated from Shaw (1973) and McKinnon (1973). In their work, financial repression referred to the policies of developing economy governments that mobilized domestic savings for state-led investment projects. Giovannini and de Melo (1993) measured the revenue that emerging market governments received from financial repression in the 1970s and 1980s. This paper focuses on the role of financial repression in preventing government default in advanced economies.

financial repression, is costly because it distorts the balance sheet of the banking sector.

As debt continues to grow and the cost of distorting the banking sector's balance sheet further increases, it may become preferable for the government to stabilize its debt by extracting quasi-fiscal revenue from the banking sector. This can be achieved, for instance, by lowering the interest rate on bank reserves or requiring banks to accept below-market interest rates. This policy, referred to here to as *quasi-fiscal financial repression*, resembles the extensive banking regulations and interest rate controls commonly observed before the 1970s.

Calibrating the model could, in principle, quantify the debt thresholds that trigger the different stages of financial repression. However, this is challenging because key elements of the model, such as the costs of distorting the banking sector's balance sheet or the default cost, are difficult to measure. Instead, we try and infer from observed policies which version of the model align most closely with the data. This leads to the following observations.

First, we find that consistent with our model, the allocation of government debt between bank and non-bank creditors changes as the level of debt increases. In advanced economies, the banking sector accumulates nearly all increases in government debt once this debt exceeds a threshold of 100% to 120% of GDP. This pattern is remarkably consistent across countries although some, like Japan, reached this threshold earlier than others. Interpreted through the lens of our model, this fact suggests that all G7 economies, with the exception of Germany, may already be in the early stage of balance-sheet financial repression.

Second, governments behave as if the distortionary costs of balance-sheet repression were moderate, at least compared with the alternatives. Banks' government debt purchases have been financed by deposit expansion rather than crowding out lending to the real sector. Moreover, no country, including Japan, with government debt exceeding 200% of GDP, has resorted yet to quasi-fiscal financial repression. This suggests that countries such as the U.S. have considerable leeway to remain in balance-sheet financial repression. This form of financial repression is not without costs, but it can serve as an effective bridge to fiscal adjustment, avoiding the more severe consequences of default.

Literature. The building blocks of the model are familiar from the literature on the interaction between fiscal and monetary policy, as well as on government default. We consider an economy operating under an active fiscal policy regime that could potentially transition to a passive regime in the sense of Leeper (1991). The government defaults to avoid the distortionary costs of domestic taxation, as in Pouzo and Presno (2022).

The paper contributes to the literature on financial repression. A large body of research examines how unsustainable debt dynamics have been resolved historically (Mauro et al., 2015), with several papers specifically studying the role of financial repression. As mentioned above, the term ”financial repression” has been applied to a range of policies in this literature.

The theoretical literature on financial repression is less developed. Like Chari, Dovis and Kehoe (2020), we assume that the government does not default on banks due to the high costs associated with a banking crisis (see also Bocola, 2016; Bolton and Jeanne, 2011; Acharya and Rajan, 2013). Our model also includes quasi-fiscal financial repression, which is costly due to the increased opportunity cost of holding bank deposits.

The welfare cost of quasi-fiscal financial repression, in our model, is analogous to the welfare cost of inflation in models of the optimal inflation rate where the government chooses among various distortionary taxes (Schmitt-Grohé and Uribe, 2010; Lucas, 2000). This literature generally concludes that the optimal rate of inflation is zero or close to zero, consistent with our finding that quasi-fiscal financial repression should only be a last resort. A key difference between our model and this literature is our assumption that fiscal inertia may prevent the government from choosing less distortionary forms of taxation over financial repression.

Our model is real, and inflation plays a relatively minor role. We assume that bank deposits yield a real interest rate determined by the banking sector's budget constraint. Financial repression is thus not necessarily associated with inflation unless the zero lower bound on the nominal interest rate is binding. Additionally, we assume government debt is real, excluding the channels central to the fiscal theory of the price level (Cochrane, 2023).

This paper is related to the literature on central bank backstops of government debt, particularly in the context of the euro debt crisis. Several papers document the role of domestic banks in purchasing government debt during this period (Becker and Ivashina, 2018; Ongena, Popov and Van Horen, 2019). On the theoretical side, an important theme in the euro debt crisis literature is the role of central banks in preventing self-fulfilling government debt crises (Aguiar et al., 2015; Corsetti and Dedola, 2016; Lorenzoni and Werning, 2019; Bacchetta, Perazzi and van Wincoop, 2018). Unlike this literature, our analysis does not rely on the existence of multiple equilibria.

Finally, this paper is closely related to a companion paper (Jeanne, 2024), which focuses instead on the trade-offs between financial repression and default. In contrast, this paper investigates the anatomy of optimal financial repression when different instruments are used to avoid default. The equilibria considered in this paper are

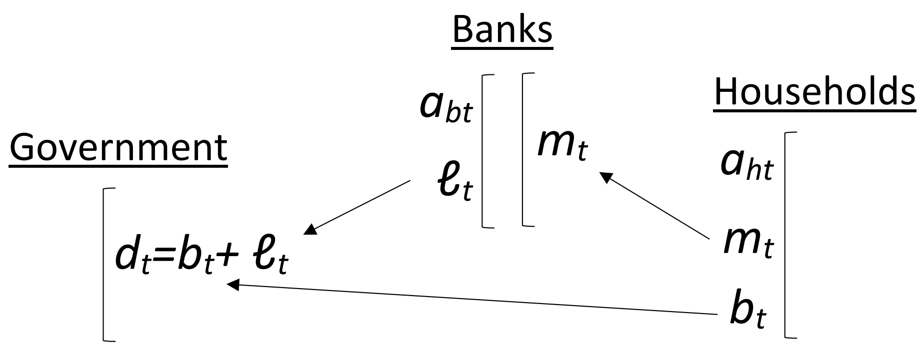

Figure 1: Sectoral balance sheets

default-free.

The paper is structured as follows. Section 2 presents the assumptions of the model. Section 3 characterizes the optimal financial repression policies. Section 4 analyzes the data in light of the model and section 5 concludes.

2 Model

We consider a continuous-time economy with three sectors: households, banks and the government. Figure 1 shows the relationships between these sectors' balance sheets. Both households and banks hold government debt alongside real assets, while households also hold banks' liabilities (deposits).

Government. The government finances an exogenous and constant flow of expenditures by raising taxes and issuing debt. The budget constraint of the government is,

$$g + rd_t = \tau_t + \theta_t + \dot{d}_t, \tag{1}$$

where r is the real interest rate, g is government expenditure, τ_t denotes the fiscal revenue collected from households, θ_t is the quasi-fiscal revenue from financial repression collected from banks, and d_t is total government debt, which comprises debt held by households (b_t) and banks (ℓ_t). We consider equilibria without default risk.

Households. The economy is populated by a unitary mass of identical, infinitely-lived households. The utility of the representative household is given by

$$U_0 = E_0 \left\{ \int_0^{+\infty} \left[c_t + u\left(\widetilde{m}_t\right) \right] e^{-rt} dt \right\}, \tag{2}$$

where c_t is consumption and $u\left(\widetilde{m}_t\right)$ is the utility derived from real money balances (bank deposits). The quasi-linear utility implies a risk-free real interest rate r. We assume that $u(\cdot)$ is a power function,

$$u\left(\bullet\right) = \mu \frac{\bullet^{1-\nu}}{1-\nu}, \tag{3}$$

with $\nu > 1$.

Households maintain a portfolio of bank deposits of different types $i = 1, \ldots, n$. The transaction utility provided by these deposits is

$$\widetilde{m} = \sum_{i=1}^{n} \omega_i m_i,$$

where m_i represents the quantity of type-i deposits and $\omega_1 = 1 > \omega_2 > ... > \omega_n = 0$. Deposit differentiation is introduced to reflect that banks can expand their balance sheets by issuing liabilities that increasingly resemble debt rather than deposits. Type-n deposits, which yield no transaction utility, are equivalent to debt.

The total financial wealth of the representative household is $w_t = m_t + b_t + a_{ht}$, where $m_t = \sum_i m_{it}$ is the total holdings of deposits, b_t is government debt, and a_{ht} denotes real assets. Households maximize their utility subject to the budget constraint

$$c_t + \tau_t + \dot{w}_t + \sum_i (r - r_{mit}) m_{it} = y_t + r w_t, \tag{4}$$

where y_t is household income, τ_t is the tax paid to the government, r_{mit} is the real return on type-i deposits and $(r - r_{mit}) m_{it}$ represents the opportunity cost of holding type-i deposits.

Banking sector. The consolidated banking sector, including the central bank, issues deposits m, holds real assets a_{bt}, and lends ℓ_t to the government. We assume that the banking sector maintains a zero level of equity, implying

$$m_t = \ell_t + a_{bt}. \tag{5}$$

The banks' real assets yield $r a_b + \rho(a_b)$, where $\rho(a_b)$ represents additional returns exclusive to banks, reflecting their comparative advantage in certain asset classes, such as loans to small and medium enterprises.[2] One cost of financial repression is to crowd out such lending.

The budget constraint of the banking sector is,

$$\kappa(m_t) + \theta_t = \sum_i (r - r_{mit})m_{it} + \rho(a_{bt}), \tag{6}$$

where $\kappa(m)$ is an increasing and convex function. This cost can be interpreted as the operational costs of banking or the costs of higher leverage in terms of risk. The right-hand side reflects the profits from asset-liability spreads and bank-specific returns. For simplicity, we assume that banks do not make profits or pay dividends to households.

Financial repression. Financial repression policies control three variables: the banking sector's holdings of government debt ℓ_t, the total level of deposits m_t, and the quasi-fiscal revenue θ_t.[3]

In practice, governments set these variables through different mechanisms. For example, central banks may purchase government debt as part of quantitative easing policies. Private banks may also be encouraged to purchase government debt by moral suasion, as seen during the euro debt crisis (Becker and Ivashina, 2018; Ongena, Popov and Van Horen, 2019). Increases in bank deposits can be induced by expanding reserves or relaxing capital adequacy or leverage regulation. Quasi-fiscal revenue θ can take the form of central bank profits paid to the government, which may be adjusted by changing the interest rate paid on reserves. Alternatively, governments may pay banks an interest rate r_ℓ lower than r, as Acalin and Ball discussed by in the context of the US after WWII, in which case $\theta_t = (r - r_{\ell t})\ell_t$.[4]

The specific method by which the government sets ℓ_t, m_t and θ_t is a matter of model interpretation and does not matter for the equilibrium allocations.

Using (3), (6) and the first-order conditions for the households' deposit portfolio

[2] Function $\rho(\cdot)$ is increasing, concave and satisfies $\rho(0) = 0$. If there is a finite level of bank-specific assets α such that $\rho'(\alpha) = 0$, all the assets in excess of α yield the same return whether they are held by banks or by households. These assets can be interpreted as tradable assets that can purchased by banks and non-bank investors in the same markets, such as corporate bonds or securitized loans. Banks are indifferent between holding these assets or government debt.

[3] Because of the perfect substitutability between deposit types, the allocation of deposits across types $(m_i)_{i=1,\cdot,n}$ is indeterminate and irrelevant for welfare (see Appendix A). Thus, we do not track this allocation in our definition of financial repression policy.

[4] Conceivably, the government could levy θ as a tax on banks. However, this interpretation is not quite consistent with another assumption that we make later, that taxes are more difficult to adjust than financial repression policies.

problem, the utility of deposits can be expressed as a function of ℓ, m and θ,

$$u(\widetilde{m}) = -\frac{f(m,\ell)+\theta}{\nu - 1}, \tag{7}$$

where

$$f(m,\ell) \equiv \kappa(m) - \rho(m-\ell),$$

(see appendix A).

Equation (7) shows how financial repression reduces the utility households derive from transaction services. This reduction occurs because financial repression limits the resources available to the banking sector, thereby lowering the return on deposits and their associated utility.

The term $f(m,\ell)$ represents the banking sector's net operating cost, defined as the operating cost minus the bank-specific return on real assets. This cost is minimized when the banking sector does not lend to the government ($\ell = 0$) and when the marginal benefit of expanding the banking sector is equal to the marginal cost,

$$\kappa'(m) = \rho'(m). \tag{8}$$

This equation defines the efficient size of the banking sector.

We assume that the banking sector's net operating cost is strictly positive

$$\underline{f} = \min_{m,\ell} f(m,\ell) > 0, \tag{9}$$

and that the government does not subdidize the banking sector ($\theta_t \geq 0$).[5] This implies that there is always a strictly positive opportunity cost of holding deposits.

Fiscal policy vs. financial repression. Several differences between fiscal revenue τ_t and financial repression revenue θ_t are important for the analysis.

First, fiscal policy exhibits inertia. Unlike financial repression, which can be adjusted at short notice, the government cannot modify τ_t whenever it wishes. Specifically, we assume that fiscal policy initially operates in an active regime as defined by Leeper (1991). In this regime, fiscal revenue is equal to a constant level, τ_a, which is insufficient to maintain government debt on a sustainable trajectory.[6] With a constant probability ϕ, fiscal policy transitions to a passive regime, where the present discounted value of future tax revenue is sufficient to repay government debt d_t. This

[5] A negative θ_t could pay for the banking sector's cost of operation and make it possible to implement the Friedman rule. We rule this out.

[6] The analysis can be generalized to the case where τ_a is a function of d.

transition, termed a fiscal adjustment, ensures debt sustainability. The government refrains from using financial repression after a fiscal adjustment.

These assumptions capture the notion that fiscal policy adjustments are often delayed due to political economy constraints. For example, fiscal deadlock has been attributed to "wars of attrition" between political parties (Alesina and Drazen, 1991). In contrast, financial repression can be implemented quickly because it relies on financial regulation and safety-net policies delegated to agencies such as central banks. These agencies, which do not require explicit legislative approval, can act swiftly to address emerging financial instability. This delegation ensures that financial stability can be preserved with minimal delay.

The second key distinction between fiscal policy and financial repression lies in their costs. To account for the economic costs of taxation, we assume that output decreases with higher fiscal revenue,

$$y_t = \overline{y} - \gamma_\tau \tau_t, \tag{10}$$

where γ_τ is a positive coefficient. This variable can be endogenized by linearizing a model where the government taxes output produced with labor (see e.g. Jeanne, 2024).[7]

The welfare cost of taxation and financial repression can then be combined as follows. Assume that the total supply of real assets is constant, $a_{ht} + a_{bt} = a$. Consolidating the budget constraints (1), (4) and (6) and using $w_t = d_t + a$, household consumption can be written as output plus the return on real assets net of government expenditures and banks' net operating cost, $c_t = y_t + ra - g - f(m_t, \ell_t)$, which with (7) and (10) gives the following expression for the households' flow utility,

$$c_t + u\left(\widetilde{m}_t\right) = \bar{c} - \left[f(m_t, \ell_t) + \gamma_\tau \tau_t\right] - \gamma_\theta \left[f(m_t, \ell_t) + \theta_t\right], \tag{11}$$

where $\gamma_\theta \equiv 1/\left(\nu - 1\right)$ and $\bar{c} \equiv \bar{y} + ra - g$.

Equation (11) summarizes how households' utility is affected by financial repression policies. The second term on the right-hand side reflects the impact of fiscal policy and financial repression on output. The third term captures the effect of financial repression on the opportunity cost of deposits.

We assume that raising government revenue has a large welfare cost if it is done through financial repression than through taxation,

$$\gamma_\theta > \gamma_\tau.$$

[7]The marginal distortionary cost of taxation is strictly positive because the model is linearized around an equilibrium with a strictly positive level of taxation.

As shown in Jeanne (2024), this condition is satisfied under plausible model calibrations. This implies that a welfare-maximizing government, when given the choice, will always prefer raising revenue through conventional taxation. Financial repression will be used only when fiscal policy is constrained.

Default. We assume that the government may default on its non-bank debt b_t at any time. A defaulting government reduces its non-bank debt to a level $\underline{b}$ and implements a fiscal adjustment. The trade-off involved in a default is that it reduces the burden of taxation but involves an exogenous output cost γ_d.

In contrast, the government never defaults on debt owed to banks or, equivalently, offsets the impact of such defaults with bailouts. This behavior reflects the significant macroeconomic costs of banking crises, as highlighted by Chari, Dovis and Kehoe (2020).

We focus on equilibria where the government does not default, enabling it to roll over its debt at the risk-free interest rate r. However, the government's option to default imposes constraints on the equilibrium level of debt.

3 Optimal Financial Repression

The equilibrium before a fiscal adjustment can be defined in two equivalent ways. In the Ramsey solution, the focus is on identifying the policy path $(\ell_{at}, m_{at}, \theta_{at})_{t\geq 0}$ that maximizes welfare. Alternatively, policy can be defined as a function of the state, $\ell_a(d)$, $m_a(d)$ and $\theta_a(d)$. In both approaches, households maximize their utility, and markets clear given government policies. The assumption that the government can commit to its policies is inessential, as the equilibrium remains the same under commitment and discretion.

We look for policies that prevent default and maximize welfare. Section 3.1 presents a condition for no default, while section 3.2 characterizes the optimal policies that prevent default.

3.1 No default condition

We proceed backward, starting with the passive fiscal regime that follows a fiscal adjustment. Welfare under this regime is given by the distortion-free welfare level minus the distortionary cost of taxation required to repay the debt,

$$V_p\left(d\right) = \frac{\overline{u}}{r} - \gamma_\tau d, \tag{12}$$

where $\overline{u} \equiv \overline{c} - \gamma_\tau g - (1+\gamma_\theta)\underline{f}$ represents the distortion-free utility flow (see Appendix A). Since fiscal policy transitions to the passive regime post-default, welfare under default is given by

$$V_d(\ell) = V_p\left(\underline{b} + \ell\right) - \gamma_d, \tag{13}$$

where γ_d is the cost of default.

As shown in the appendix, at any time t before the fiscal adjustment, welfare is equal to the welfare level that would be achieved if the fiscal adjustment were implemented immediately, minus the present discounted value of the expected future costs of financial repression,

$$U_t = V_p(d_t) - \int_t^{+\infty} L_s e^{-(r+\phi)(s-t)} ds, \tag{14}$$

where

$$L_s = (1+\gamma_\theta)\left[f(m_s, \ell_s) - \underline{f}\right] + (\gamma_\theta - \gamma_\tau)\theta_s, \tag{15}$$

represents the utility flow loss from financial repression. This loss is the sum of two components: (1) the loss from distorting banks' balance sheets relative to the efficient benchmark, and (2) the additional distortionary cost of financial repression relative to conventional taxation.[8]

The government may default on its non-bank debt b_t at any time. It does not default if and only if $U_t \geq V_d(\ell_t)$ for all t. Substituting from equations (12), (13) and (14), this condition can be rewritten

$$\gamma_\tau\left(b_t - \underline{b}\right) + \int_t^{+\infty} L_s e^{-(r+\phi)(s-t)} ds \leq \gamma_d. \tag{16}$$

That is, the government avoids default if the distortionary cost of repaying the debt plus the expected cost of financial repression is lower than the cost of default.

Equation (16) implies that default can be prevented only if non-bank debt b_t does not exceed an upper bound, which decreases with the expected cost of financial repression. To simplify, we write the no-default condition as,

$$b_t \leq b^*, \tag{17}$$

where b^* is a constant upper bound. We will derive an expression for b^* that ensures that condition (16) is satisfied at all times.

[8]The variables subscripted by t are the paths before the fiscal adjustment, i.e., in the active fiscal regime. We omit the subscript a to alleviate notations.

It follows that government debt in excess of b^* must be purchased by the banking sector,

$$\ell_t \geq (d_t - b^*)^+ , \tag{18}$$

where we use the conventional notation $x^+ = \max(x, 0)$.

3.2 Stages of financial repression

We now derive the optimal financial repression policies and show that they unfold in several stages. We solve for the policies that maximize welfare at time 0 under commitment. More formally, it follows from equation (14) that we look for paths $(\ell_t, m_t, \theta_t)_{t \geq 0}$ that minimize the intertemporal loss from financial repression

$$\int_0^{+\infty} L_t e^{-(r+\phi)(t)} dt, \tag{19}$$

where L_t is given by (15), subject to the government budget constraint (1) with $\tau_t = \tau_a$; the government debt purchase constraint on banks (18); and the non-negativity constraint on the quasi-fiscal revenue from financial repression, $\theta_t \geq 0$.

We summarize the main properties of the optimal policy below (the details of the derivation can be found in Appendix A). There are three stages in the progression of financial repression,determined by how the level of government debt d_t compares with b^* and another higher threshold d^*.

1. No financial repression. If $d_t \leq b^*$, government debt is entirely held by the non-bank sector ($\ell_t = 0$). The banking sector maintains an efficient balance sheet and does not transfer resources to the government ($\theta_t = 0$).

2. Balance-sheet financial repression. If $b^* < d_t < d^*$, banks purchase the government debt in excess of b^*. These purchases are financed both by issuing deposits and reducing banks' claims on the real sector. There is still no quasi-fiscal revenue from financial repression ($\theta_t = 0$).

3. Quasi-fiscal financial repression. If $d_t = d^*$, the banking sector stabilizes the level of government debt by transferring quasi-fiscal revenue $\theta^* > 0$ to the government.

Government debt increases until it reaches d^* if a fiscal adjustment does not occur. Debt is stabilized by quasi-fiscal revenue at d^*, remaining at that level until a fiscal adjustment is implemented, which can occur at any time with flow probability ϕ.

Figure 2 shows the balance sheet of the banking sector across the successive stages of financial repression. The balance sheet becomes increasingly distorted relative to the efficient benchmark once government debt exceeds b^*. The distortion is optimally allocated between the assets and liabilities of the banking sector by equating the marginal cost of crowding out lending to the real sector and the marginal cost of expanding deposits,

$$\kappa'(m) = \rho'(m - \ell). \tag{20}$$

Differentiating this equation and using $a_b = m - \ell = m - d + b^*$, we derive the derivative of bank lending to the real sector with respect to government debt, or crowding out ratio,

$$\frac{\partial a_b}{\partial d} = -\frac{1}{1 - \rho" / \kappa"}. \tag{21}$$

The crowding out ratio is large in absolute value if the rate of increases in the marginal cost of expanding the banking sector's size is large relative to the rate of increase in the marginal cost of reducing loans.

At some point, it becomes less costly to stabilize the debt with quasi-fiscal revenue from financial repression than to continue expanding the banking sector's size. As shown in Appendix A, this point is reached when

$$\phi(\gamma_\theta - \gamma_\tau) = (1 + \gamma_\theta)\kappa'(m). \tag{22}$$

The left-hand side represents the benefit of delaying quasi-fiscal financial repression. It is increasing with the flow probability of a fiscal adjustment and the cost differential between financial repression and conventional taxation. Quasi-fiscal financial repression should begin when this benefit equals the marginal cost of further expanding the banking sector.

Financial repression, thus, should only be used to generate quasi-fiscal revenue as a *last resort*. It is optimal to wait for a fiscal adjustment rather than using financial repression revenue earlier than necessary. Using financial repression to slow down debt accumulation early is inefficient because it is more distortionary than conventional taxation. This property makes the model different from second-best public finance models in which all forms of taxation should be used at the margin (Lipsey and Lancaster, 1956).

The economy may never reach the point where government debt stabilizes through financial repression. If $\kappa'(m)$ remains below $\phi(\gamma_\theta - \gamma_\tau)$ for all m, the banking sector continues to absorb government debt without limit until there is a fiscal adjustment. This equilibrium does not violate the transversality condition since the fiscal adjustment occurs with probability 1.[9]

The flow welfare cost of financial repression, L_t, reaches its maximum level, L^*, when government debt reaches d^*. This is also the point where the temptation to default is at its peak. Therefore, the maximum level of non-bank debt consistent with no default, b^*, is obtained if condition (16) with $L_s = L^*$ is binding, that is,

$$b^* = \underline{b} + \frac{\gamma_d}{\gamma_\tau} - \frac{L^*}{\gamma_\tau (r+\phi)}. \tag{23}$$

For this value, welfare is at the same level under quasi-fiscal repression as under default.

3.3 Welfare

What is the welfare gain of financial repression compared to default? There is a simple answer to this question in the case where balance-sheet financial repression is costless ($L = 0$). Then equation (14) implies

$$U_t = V_{pt} - e^{-(r+\phi)T} \frac{L^*}{r+\phi}, \tag{24}$$

where V_{pt} is welfare under an immediate fiscal adjustment and T is the time that it takes for government debt to reach d^*.

If $d_t \geq b^*$, the government reduces its non-bank debt by $b^* - \underline{b}$ in a default. Therefore, welfare under default is given by

$$\begin{aligned} V_{dt} &= V_p \left(d_t - (b^* - \underline{b}) \right) - \gamma_d, \\ &= V_{pt} + \gamma_\tau (b^* - \underline{b}) - \gamma_d, \\ &= V_{pt} - \frac{L^*}{r+\phi}, \end{aligned}$$

where the last equality is derived from (23). Using this equation to substitute out L^* in (24) gives

$$U_t = \left[1 - e^{-(r+\phi)T}\right] V_{pt} + e^{-(r+\phi)T} V_{dt}. \tag{25}$$

[9] Government debt purchases remain limited if one introduces the possibility for the government to default on banks, at a higher output cost than defaulting on households.

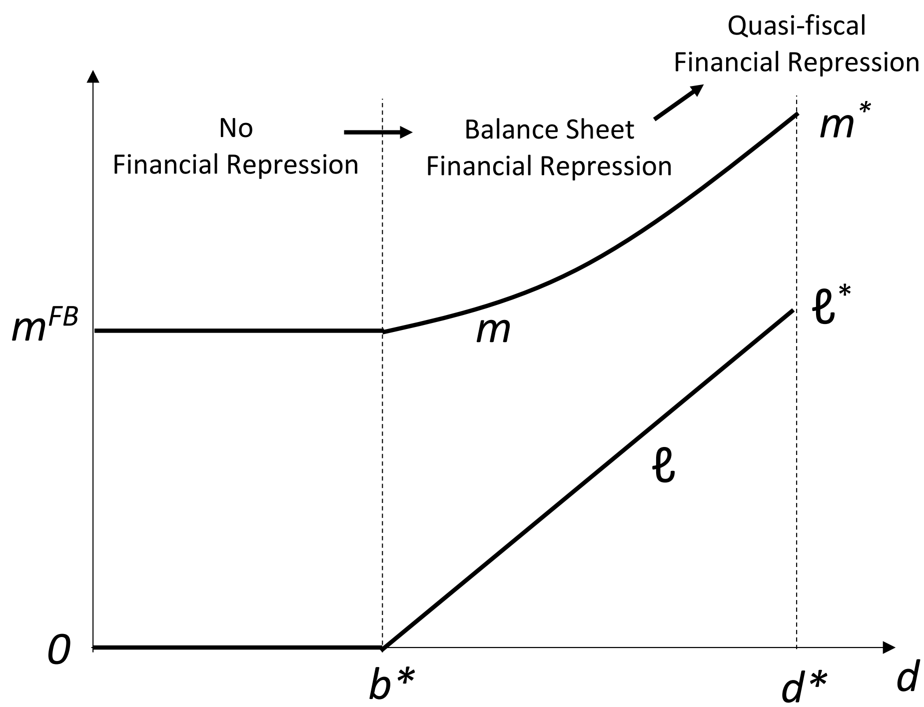

Figure 2: Banking sector balance sheet

This equation shows that welfare depends on how soon quasi-fiscal financial repression begins. If $T = 0$ (i.e., quasi-fiscal financial repression starts immediately), welfare is the same as under default. The benefit of balance-sheet financial repression is to postpone the quasi-fiscal stage. The longer the delay, the closer welfare is to the level under an immediate fiscal adjustment.

4 Data

We perform an exploratory data analysis to assess the extent to which the model aligns with observed patterns. Significant additional work would be required to fully calibrate the model, which we leave for future research. This analysis is a preliminary exploration, intended only to provide a sense of what insights the data may offer when viewed through the lens of the model. Importantly, the objective is not to rigorously test the model against competing explanations.[10]

4.1 Government debt purchases

The model predicts that when government debt exceeds a certain threshold, a larger fraction of it is accumulated by the banking sector. Is there evidence of this in the data? To investigate this, we use the government debt database of Arslanalp and Tsuda (2014), which provides data on general government debt-to-GDP ratios and the share held by domestic banks (central and commercial). These correspond to the model variables d and ℓ, respectively, covering over twenty advanced economies from 1989 to 2023.

Figure 3 plots ℓ (vertical axis) against d (horizontal axis) for 23 countries between 1989 and 2023.[11] Figure 4 illustrates the same for G7 economies, tracing each country's trajectory over time.

Key patterns emerge. Notably, the banking sector holds a larger share of government debt once total debt exceeds approximately 100% of GDP. This pattern is consistent across the full sample and within G7 countries.

To quantify this observation more precisely, we run a threshold regression of bank-held government debt ℓ on total government debt d (both as shares of GDP),

[10] For example, the hypothesis that central banks purchased government debt as part of monetary quantitative easing policies aimed at lowering long-term interest rates, rather than to avert default.

[11] Each point corresponds to a country-year observation. We exclude Greece because it is the only advanced economy to have defaulted during the time period under consideration. The panel is unbalanced and data start to be available between 1989 and 2012 depending on the countries. Details are provided in Appendix B.

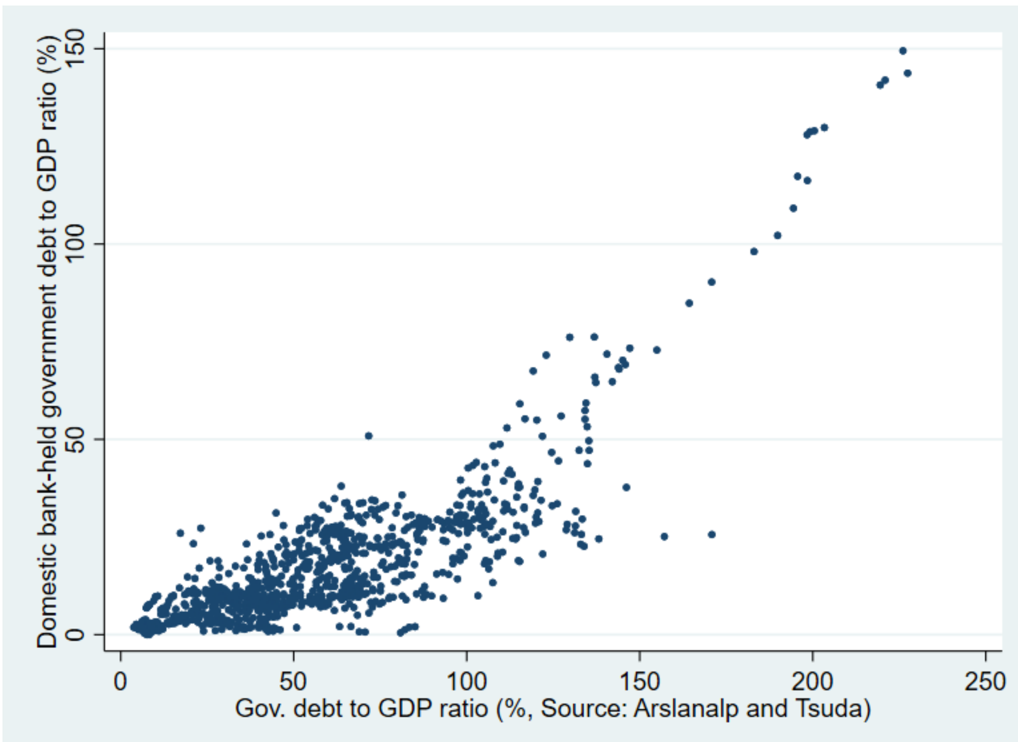

Figure 3: Bank-held government debt (vertical axis) vs. total government debt (horzontal axis) in % of GDP in advanced economies. Source: Arslanalp and Tsuda (2014).

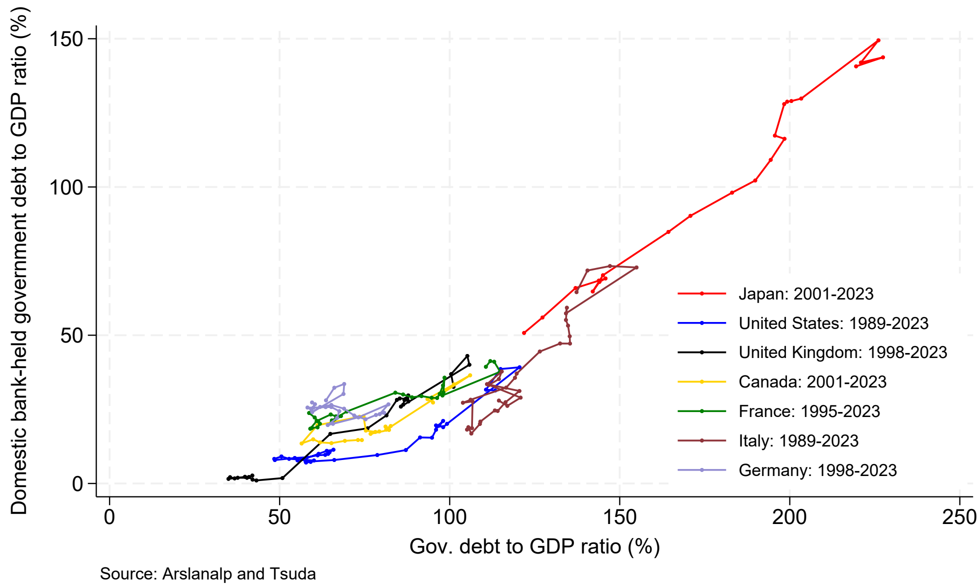

Figure 4: Bank-held government debt (vertical axis) vs. total government debt (horzontal axis) in % of GDP in G7 economies. Source: Arslanalp and Tsuda (2014).

estimating the coefficients based on whether d is above or below a threshold that minimizes the residual sum of squares. Table 1 summarizes the results.

In the pooled sample (column 1), the estimated debt threshold is about 110% of GDP. Below this, banks accumulate about one fourth of debt increases; above, they absorb nearly all new debt. As shown in column 2, similar results hold for G7 countries, with a slightly higher threshold (about 120% of GDP).

Japan's experience is particularly notable. Between 2001 and 2023, its government debt rose from 122% to 220% of GDP, with domestic banks absorbing most of the increase. Other G7 countries exhibited similar patterns but they are less pronounced. However, our results are not only due to Japan. Column 3 of Table 1 shows that the results are robust to excluding Japan from the G7 sample. The data exhibit a pattern that is remarkably consistent across countries.

4.2 Crowding out vs. deposit expansion

In our model, banks can accommodate government debt via deposit expansion or reduced lending to the real sector. Identifying which mechanism dominates in the data is important because each implies different timelines for when banks' capacity

Table 1: Threshold regression of ℓ on d

	(1) Full sample	(2) G7 countries	(3) G7 excl. Japan
Debt threshold	109.6%	120.9%	106.2%
Debt below threshold			
d	0.260***	0.326***	0.360***
	(24.53)	(14.34)	(11.47)
cons	0.888	-4.364*	-6.584**
	(1.41)	(-2.32)	(-2.79)
Debt above threshold			
d	0.991***	0.984***	1.118***
	(35.52)	(29.80)	(12.78)
cons	-82.15***	-75.35***	-95.88***
	(-20.88)	(-13.62)	(-9.01)
N	920	197	174

t statistics in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

to absorb government debt might be exhausted.

To investigate this, we analyze correlations between banks' government debt purchases and changes in other balance sheet components using the following variables

$$\begin{aligned} \Delta \ell_t &= \ell_t - \ell_{t-10}, \\ \Delta m_t &= m_t - m_{t-10}, \\ \Delta a_{bt} &= a_{bt} - a_{bt-10}, \end{aligned}$$

where ℓ_t is the ratio of bank-held government debt to GDP, m_t is the ratio of currency and deposits to GDP, and a_{bt} is the ratio of bank loans to GDP. The variables m_t and a_{bt} are sourced from the OECD national balance sheet database and national sources, while ℓ_t comes from the Arslanalp-Tsuda database (see Appendix B for details).

By analyzing changes in these variables over ten-year intervals, we aim to mitigate the impact of short-term business cycle fluctuations. Furthermore, we consider only observations where total government debt exceeds 110% of GDP, so that the economy is presumably in the early-stage financial repression regime in which the banking sector is likely required to absorb additional government debt.

Our primary question is whether banks' purchases of government debt are associated with a reduction in bank loans, as suggested by the crowding-out effect, or with an increase in bank deposits. Figure 5 gives the answer. The left panel plots Δm_t against $\Delta \ell_t$, revealing a statistically significant positive correlation. The line of best fit has a slope greater than one, indicating that as banks' holdings of government debt increase, deposits grow by more than enough to finance this acquisition.

Conversely, the right panel shows no significant correlation between Δa_{bt} and $\Delta \ell_t$, suggesting that increases in bank-held government debt do not crowd out bank loans. A systematic crowding-out effect would imply a negative correlation between these variables.

While these correlations are not necessarily causal and should not be interpreted as definitive evidence against crowding out, they do suggest that banking sectors have generally financed government debt purchases through deposit issuance rather than by reducing loans to the real sector. Japan's experience, in particular, illustrates the significant capacity of the banking sector to absorb government debt through this mechanism. Between 1999 and 2023, Japanese banks absorbed nearly the entire increase in government debt, equivalent to 113% of GDP, while expanding their deposits by 182% of GDP. Although bank loans initially declined as a share of GDP at the beginning of the period, they ultimately increased by more than 30% of GDP over the entire period.

This result is different from those obtained by Becker and Ivashina (2018) for euro area countries. These authors find that between 2007 and 2013, the absorption

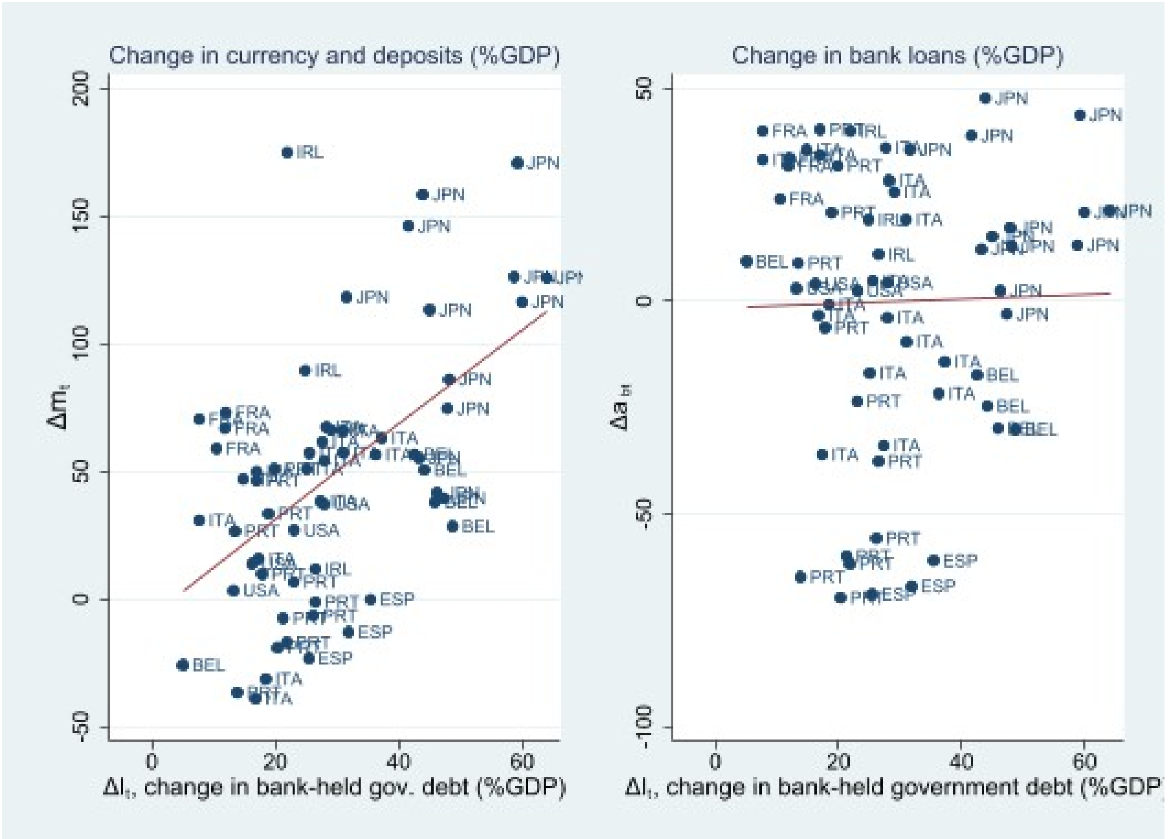

Figure 5: Changes in Currency and deposits (l.h.s.) and in Bank loans (r.h.s.) vs changes in bank-held government debt, all in share of GDP. Sources: Aslanalp and Tsuda (2014), OECD and national sources.

of government debt by domestic banking sectors led to a drop in the supply of loans to large corporate issuers. These results are based on quarterly regressions and are thus not directly comparable to ours. Correlations observed at a quarterly frequency may not hold when considering much longer periods.

4.3 Discussion

Our model of optimal financial repression may not accurately describe the real world. Large-scale purchases of government debt by central banks may be due to reasons other than financial repression. Even if financial repression is at play, it is not necessarily optimal. That being said, and acknowledging the speculative nature of this exercise, it is interesting to consider what the model suggests if we take it at face value for a moment.

First, the evidence in Section 4.1 suggests that several advanced economies have entered the first stage of financial repression, where additional government debt is purchased by the banking sector. Japan did so as early as the 1990s, and other countries, such as the U.S. and France, may have entered this regime in recent years.

Second, the evidence in Section 4.2 indicates that banks have financed their purchases of government debt mostly by expanding their deposits rather than by restricting their lending to the real sector.

Third, there is little evidence that any advanced economy has entered the final, quasi-fiscal stage of financial repression. Even after the banking regulatory reforms that followed the global financial crisis, regulation remains far from the levels observed after World War II. Advanced economies' banking and financial systems remain liberalized and market-based. Interest rates are market-determined, and most central banks pay interest on reserves. Central banks' profits, and the dividends they pay to their treasuries, have remained very small as a share of GDP, including in Japan.

These facts are consistent with a version of the model where the cost of expanding the banking sector's balance sheet is small compared to the cost of of crowding out bank lending to the real sector or the cost of extracting quasi-fiscal revenue from the banking sector. This may justify a rather benign view of financial repression. We do not know how much leeway Japan has in further expanding the size of its banking sector, but based on Japan's experience, countries such as the U.S. still have a long way to go. Japan can be used as a benchmark to derive back-of-the-envelope estimates of the welfare impact of financial repression for these countries.

Let us quantify the welfare decomposition (25) for the U.S. If the U.S. government debt-to-GDP ratio continues to increase at the same rate after 2023 as it did on average over the period 2000-2023—2.8 % of GDP per year—it would reach the current (2023) Japanese debt level by 2060, or after $T = 37$ years. Assume that quasi-fiscal repression begins in 2060 if no fiscal adjustment is implemented in the U.S. before then. Under the conservative assumptions that the discount rate r is 4%, and the probability of a fiscal adjustment occurring in any given year is $\phi = 5\%$—meaning it takes, on average, 20 years for the U.S. to implement a fiscal adjustment—we calculate $e^{-(r+\phi)T} = 3.4\%$. Equation (25) implies that U.S. welfare in 2023 is a weighted average of welfare under fiscal adjustment and welfare under default, with weights of 96.6% and 3.4%, respectively. This shows that welfare in 2023 is much closer to the level under fiscal adjustment than to the level associated with default.

This simple exercise is not intended to imply that financial repression is without cost. In fact, financial repression is as costly as a default in its final, quasi-fiscal stage. However, it may provide substantial welfare benefits in its early stages by allowing time for a fiscal adjustment to be implemented.

5 Conclusions

This paper contributes to our understanding of financial repression in several ways. At the theoretical level, we presented a model in which financial repression can take various forms, ranging from relatively benign interventions to more coercive and distortive policies that extract quasi-fiscal revenue from the banking sector. The model suggests a natural progression in the deployment of financial repression policies, starting with more market-friendly measures like central bank purchases of government debt and escalating to more distortive interventions.

Empirically, we found that countries tend to enter the first stage of financial repression when government debt exceeds a threshold of 100% to 120% of GDP. In this stage, banks primarily finance their purchases of government debt by expanding deposits rather than by restricting lending. The Japanese experience further suggests that this initial stage of financial repression can persist for an extended period.

For those concerned about the risks of financial repression, this paper provides a mix of bad and good news. On the downside, countries such as the U.S. may already have entered the early stage of financial repression. On the upside, the distortions associated with this stage appear to have relatively mild costs, especially when compared to the severe forms of repression observed in the past, or to the consequences of a default.

Future research could focus on several extensions to this analysis. One direction is to calibrate the model to explore its quantitative implications in more detail. A key challenge for calibration is quantifying the costs associated with expanding the size of the banking sector. Another extension could involve accounting for the utility derived from government debt, as suggested in the literature on the convenience yield of U.S. Treasury debt (see e.g. Krishnamurthy and Vissing-Jorgensen, 2012; Reis, 2021). Incorporating this feature would allow banks' purchases of government debt to have a positive fiscal impact by reducing interest rates, softening the dichotomy in the model between balance-sheet interventions that do not generate revenue and those that increase quasi-fiscal revenue.

The channels through which financial repression affects banks' balance sheets also need to be modeled more realistically. While the baseline model assumes that the government directly sets all balance sheet parameters, in reality, these are influenced indirectly through banking regulation. Further research is needed to understand how financial repression shapes the equilibrium of the banking sector as a regulated industry, particularly in light of advances in financial technology.

Another important extension would involve moving from a closed-economy framework to an open-economy context. Such a shift would introduce additional complexities, including stronger government incentives to default if debt is held by foreign investors, the impact of financial repression on exchange rates, and the potential role of capital controls. Moreover, the international spillovers of financial repression would need to be examined.

In the context of the euro area, the analysis becomes even more intricate. The model would need to take into account the constraints implied by a common currency area with free trade and capital mobility. While it may be desirable to confine financial repression to countries with unsustainable debt paths, free trade and capital mobility impose significant constraints on such confinement. Addressing these issues would require further refinements to the model.

In summary, this paper highlights both the potential risks and opportunities associated with financial repression, offering a foundation for future research to refine the theoretical framework and explore its practical implications in greater depth.

APPENDIX A. PROOFS

Derivation of equations (7). Households maximize their utility (2) subject to their budget constraint (4). The first-order condition for the demand for type-i deposits is

$$\omega_i u'\left(\widetilde{m}_t\right) = r - r_{mit}.$$

The total cost of deposit holding can then be written

$$\sum_i (r - r_{mi}) m_i = u'\left(\widetilde{m}\right) \widetilde{m} = -(\nu - 1) u\left(\widetilde{m}\right). \tag{26}$$

The first equality is derived from the first-order condition and $\widetilde{m} = \sum_i \omega_i m_i$. The second equality uses the fact that the utility for deposits is a power function given by (3). Equation (26) and the budget constraint (6) imply equation (7).

A financial repression policy (ℓ, m, θ) uniquely determines $\widetilde{m}$ through equation (7). The interest rates on the different types of deposits are given by,

$$r_{mi} = r - \omega_i u'\left(\widetilde{m}\right).$$

Given m and the implied $\widetilde{m}$, any deposit portfolio $(m_i)_{i=1,\cdot,n}$ that satisfies $m = \sum_i m_i$ and $\widetilde{m} = \sum_i \omega_i m_i$ can implement the equilibrium.

Derivation of equations (12) and (14). In the passive regime (after a fiscal adjustment) fiscal policy follows a rule $\tau_t = \tau_p(d_t)$ such that the transversality condition $\lim_{t \to +\infty} d_t e^{-rt} = 0$ is satisfied if d_t follows the budget constraint (1) with $\theta_t = 0$. This implies that the PDV of tax revenue is equal to the PDV of government spending plus the initial debt,

$$\int_t^{+\infty} \tau_p(d_s) e^{-r(s-t)} ds = \frac{g}{r} + d_t.$$

Using this equation and (11) with $\theta_s = 0$ and $f(m_s, \ell_s) = \underline{f}$, welfare can be rewritten as

$$U_t = \int_t^{+\infty} \left[\overline{c} - \gamma_\tau \tau_p(d_s) - (1 + \gamma_\theta)\underline{f}\right] e^{-r(s-t)} ds = \frac{\overline{c} - \gamma_\tau g - (1 + \gamma_\theta)\underline{f}}{r} - \gamma_\tau d_t,$$

which is equation (12).

The representative household's utility flow is given by (11) with $\tau_t = \tau_a$ before the fiscal adjustment. Taking into account that fiscal policy switches to the passive regime with probability ϕ, the valuation equation for pre-adjustment welfare is given by

$$rU_t = \overline{c} - (1+\gamma_\theta) f(m_t, \ell_t) - \gamma_\tau \tau_a - \gamma_\theta \theta_t + \phi\left(V_{pt} - U_t\right) + \dot{U}_t,$$

where $V_{pt} = V_p(d_t)$ is welfare if there is a fiscal adjustment at time t. Integrating this equation gives

$$\begin{aligned}
U_t &= \int_t^{+\infty} \left[\overline{c} - (1+\gamma_\theta) f(m_s, \ell_s) - \gamma_\tau \tau_a - \gamma_\theta \theta_s + \phi V_{ps}\right] e^{-(r+\phi)(s-t)} ds, \\
&= \int_t^{+\infty} \left[\overline{c} - (1+\gamma_\theta)\underline{f} - \gamma_\tau\left(\tau_a + \theta_s\right) + \phi V_{ps}\right] e^{-(r+\phi)(s-t)} ds - \int_t^{+\infty} L_s e^{-(r+\phi)(s-t)} ds, \\
&= \int_t^{+\infty} \left[(r+\phi) V_{ps} - \dot{V}_{ps}\right] e^{-(r+\phi)(s-t)} ds - \int_t^{+\infty} L_s e^{-(r+\phi)(s-t)} ds, \\
&= V_{pt} - \int_t^{+\infty} L_s e^{-(r+\phi)(s-t)} ds,
\end{aligned}$$

where L_s is given by (15). The third line is obtained using the budget constraint $\tau_a + \theta_s = g + rd_s - \dot{d}_s$, equation (12) and $\dot{V}_{ps} = -\gamma_\tau \dot{d}_s$. The fourth line is obtained integrating by parts. The fourth line is equation (14).

Optimal financial repression. As indicated in the text, the problem is to find the paths $(\ell_t, m_t, \theta_t)_{t \geq 0}$ that maximize

$$-\int_0^{+\infty} L_t e^{-(r+\phi)(t)} dt, \tag{27}$$

where $L_t = (1+\gamma_\theta)\left[f(m_t, \ell_t) - \underline{f}\right] + (\gamma_\theta - \gamma_\tau)\theta_t$, subject to the government budget constraint (1) with $\tau_t = \tau_a$; the banks' debt purchase constraint (18); and the non-negativity constraint $\theta_t \geq 0$. We denote by λ_t, μ_t and ν_t the costate variables respectively associated with these constraints.

There are four first-order conditions, respectively, associated with d_t, m_t, θ_t and ℓ_t:

$$\dot{\lambda}_t = \phi \lambda_t - \mu_t \mathbb{1}_{d_t \geq b^*}, \tag{28}$$

where $\mathbb{1}_{d_t > b^*}$ is the indicator variable that takes value 1 if government debt is larger than b^*;

$$f_m(m_t, \ell_t) = 0 \Rightarrow \kappa'(m_t) = \rho'(m_t - \ell_t), \tag{29}$$

$$\lambda_t + \nu_t = \gamma_\theta - \gamma_\tau, \tag{30}$$

$$\mu_t = (1+\gamma_\theta) f_\ell(m_t, \ell_t) = (1+\gamma_\theta)\rho'(m_t - \ell_t). \tag{31}$$

The first-order condition for ℓ_t, equation (31), implies that μ_t is strictly positive, i.e., that (18) always binds:

$$\ell_t = (d_t - b^*)^+. \tag{32}$$

The banking sector holds government debt in excess of b^*.

The first-order condition for m_t, equation (29) then implies

$$\kappa'(m) = \rho'\left(m - (d_t - b^*)^+\right). \tag{33}$$

Since $\kappa(\cdot)$ is convex and $\rho(\cdot)$ is concave, this equation implicitly defines the level of bank deposits, m_t, as an increasing function of government debt, d_t.

If the government extracts quasi-fiscal revenue from the banking sector, the constraint $\theta \geq 0$ is non-binding, implying $\nu_t = 0$. By equation (30), λ_t is constant. Then equations (28), (29) and (31) imply

$$\phi(\gamma_\theta - \gamma_\tau) = \mathbb{1}_{d \geq b^*}(1+\gamma_\theta)\kappa'\left(m(d)\right), \tag{34}$$

where $m(d)$ is the function implicitly defined by (33). Let us assume that $\kappa'(m^{FB}) < \phi(\gamma_\theta - \gamma_\tau)$ where m^{FB} is the efficient size of the banking sector, and that there exist m^* and ℓ^* such that

$$\frac{\phi(\gamma_\theta - \gamma_\tau)}{1+\gamma_\theta} = \kappa'(m^*) = \rho'(m^* - \ell^*). \tag{35}$$

The level of quasi-fiscal revenue that stabilizes government debt at d^* is

$$\theta^* = g - \tau_a + rd^*. \tag{36}$$

Using this equation to substitute out θ^* in $L^* = (1+\gamma_\theta)\left[f(m^*, \ell^*) - \underline{f}\right] + (\gamma_\theta - \gamma_\tau)\theta^*$, and equation (23) with $d^* = b^* + \ell^*$, one can solve for the maximum level of government debt d^*. This completes the characterization of the equilibrium with optimal financial repression.

In summary, we have shown the following. The government lets its debt increase until it reaches a threshold d^* (assuming that there is no fiscal adjustment). Debt is stabilized at this threshold by extracting quasi-fiscal revenue from the banking sector. Before that, the government places its debt in the non-bank sector as long as it is lower than b^*, and starts to place its debt in the banking sector when it exceeds b^* . The banking sector finances its government debt purchases by issuing deposits and by reducing its lending to the real sector.

APPENDIX B. DATA

The data used in section 4.1 come from Arslanalp and Tsuda (2014). The country sample includes Australia, Austria, Belgium, Canada, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Iceland, Ireland, Israel, Italy, Japan, Korea, Latvia, Lithuania, Luxembourg, Malta, the Netherlands, New Zealand, Norway, Portugal, San Marino, Singapore, the Slovak Republic, Slovenia, Spain, Sweden, Switzerland, the United Kingdom and the United States. We exclude Greece because it defaulted.

Arslanalp and Tsuda's database gives the ratio of general government debt to GDP, as well as the amount of debt held by the domestic central bank and the amount held by domestic banks. We sum up the two amounts to compute the ratio of government debt held by the domestic banking sector to GDP.

For section 4.2 we complement the Arslanalp-Tsuda database with data about the balance sheet of the banking sector: currency and deposits on the liability side and loans on the asset side. Relative to the Arslanalp-Tsuda database we lose Cyprus, Iceland, Korea, Malta, New Zealand, San Marino, Singapore and Switzerland.

The data come from the OECD financial Account and Balance Sheets database except for the countries mentioned below. We collect Currency and Deposits in the liabilities of Monetary and Financial Institutions (MFIs), and Loans in the assets of the same sector. MFIs include the central bank, deposit taking corporations and money market funds (MMFs). The variables are in local currency and converted into shares of GDP.

We use national sources for the US, Japan, and Canada because the OECD does not provide balance sheet data for these countries.

For the US, we use flow of funds data provided by the Board of Governors of the Federal Reserve System. We sum up Currency and Deposits in the liabilities of the central bank and private depository institutions. We use Loans on the asset side of private depository institutions.

For Japan, we use data from the Bank of Japan and the Cabinet Office. The two datasets contain loans, and currency and deposits for the central bank and depository corporations.

For Canada, we use data from Statistics Canada—National Balance Sheet Accounts. The data on currency and deposits and loans are for the monetary authorities, chartered banks, and money market funds.

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