The Role of Dispersed Information in Maintaining Low Interest Rates*

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Abstract

When public debt is issued in domestic currency, any sudden confidence crisis in the repayment ability of the government need not trigger a default, since it can be accommodated by temporary monetary financing, converting default risk into inflation risk. When the default risk premium is determined by well-informed financial intermediaries while inflation arises from the choices of less-informed workers and producers, this conversion masks adverse news, at least temporarily, and results in lower interest rates following adverse shocks. In this paper, we assess the quantitative importance of this channel, and the extent by which it is eroded when persistent fiscal shortfalls shift the prior held by all agents in the economy about the eventual resolution of the imbalance.

1 Introduction

Bassetto and Galli (2019) (BG henceforth) studied how the choice of the currency denomination of government debt affects its interest rate sensitivity to the incoming news. Domestic-currency

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debt is primarily subject to inflation risk, while foreign-currency debt is primarily exposed to default risk. This asymmetry changes the identity of the pivotal agent in times of distress: while bonds are subscribed by relatively well-informed investors, the general price level is determined by the actions of a much broader set of firms and households whose information about government finances and their link to inflation is coarser. As a consequence, when government debt is issued in domestic currency, even sophisticated bond holders are likely to react less to incoming news about government solvency because they can count on inflation only partially incorporating those news.

The goal of this paper is to go beyond a mere description of the sensitivity of debt prices to incoming news and study how different fundamentals affect the costs and benefits of issuing domestic vs. foreign-currency debt. In particular, we wish to evaluate quantitatively the extent by which issuing debt in domestic currency is cheaper for a government that starts from a prior reputation of fiscal responsibility, and how that changes as the prior worsens.

Our paper builds upon a large literature that has studied asset prices in environments with dispersed information. This literature is extensively covered in Brunnermeier (2001) and Veldkamp (2011). We build in particular on the model of Hellwig et al. (2006) and Albagli et al. (2024), who developed a framework to study the distortions that arise in environments where the payoff is a nonlinear function of the underlying (normally distributed) fundamental, and markets imperfectly aggregate heterogeneous information. Compared to their work, we build a multi-period environment in which agents with differential information interact over time, that we can then apply to inflation vs. default risk in the context of government debt.

Our research is also related to the literature on sovereign default. Work that dates back to the seminal contribution of Calvo (1988) analyzes time-consistent monetary and fiscal policy with sovereign default, considering the role of inflation and exchange rate devaluation as an implicit way to default on local-currency debt, and studying their interplay with explicit default. Recent theoretical and quantitative papers such as Aguiar et al. (2014), Hurtado et al. (2022), Roettger (2019), Sunder-Plassmann (2020), Espino et al. (2025), and Galli (2025) have addressed this issue by embedding a monetary side into real sovereign default models in the tradition of Eaton and Gersovitz (1981), Arellano (2008), Aguiar and Gopinath (2006) and a large body of subsequent work. A related body of works such as Araujo et al. (2013), Aguiar et al. (2013, 2015), and Corsetti and Dedola (2016) analyzes the role of inflation as partial default when debt is nominal and self-fulfilling runs on government debt are possible. Engel and Park (2018), Ottonello and Perez (2019), and Du et al. (2016) study the currency composition of debt when the government lacks commitment to repay and to inflate, to rationalize the recent surge in local-currency borrowing. Compared to their work, we consider a setting where the presence of information frictions creates a difference in the sensitivity of debt prices to shocks depending on whether default is explicit or implicit via inflation, and focus on countries that have self-selected into issuing most of their debt in local currency.

2 The Setup

Our model follows BG. The economy lasts three periods. It is populated by a long-lived government, two overlapping generations of strategic players (a continuum of measure one in each period) who choose whether to buy government debt or take an outside investment, and two overlapping generations of noise traders that provide random residual demand. There is a single consumption good in each period, which can be stored at a rate of return that we normalize to zero for the theoretical part.[1]

The government auctions one unit of debt in period 1 and repays it in period 3. We follow Eaton and Gersovitz (1981) and fix the face value of the debt at the redemption, which is normalized to one, letting q_1 be the endogenous price at which the debt will be issued.[2] The repayment in period 3 depends on the realization of a fiscal capacity shock θ. Specifically, if $\theta \geq \bar{\theta}$, then the government has enough revenue to repay the debt in full. In contrast, when $\theta < \bar{\theta}$, a default occurs, in which case we assume a fixed haircut and the government only repays $\delta \in (0, 1)$. All agents share a common prior about θ, which is normal with mean μ_0 and variance $1/\alpha_0$.

Each generation of private agents is composed of a unit measure of informed traders and a random mass of noise traders. In their first period of life, informed agents have an endowment that they divide between storage and purchases of the asset. We normalize to zero the rate of return on storage for the theoretical section; in our quantitative exercise, we use an appropriate measure of excess returns as the empirical counterpart of the theoretical model. In the second period of their life, private agents liquidate any asset position and consume the proceeds of their investment. The first generation buys bonds from the government in the first period and resells

[1] In our quantitative exercises, we convert the interest rate on government debt in an appropriate measure of excess returns, depending on the currency of issue.

[2] The proceeds of the sale are consumed by the government in period 1.

them in the secondary market in the second period; the second generation of traders buys in the secondary market and keeps the asset until maturity in the final period. It follows that in both periods of trade, the supply is inelastic, and all the action occurs on the buyers' side. Informed traders are risk neutral and choose their portfolio to maximize expected consumption. Each informed trader i in period t receives a noisy private signal $x_{i,t} = \theta + \xi_{i,t}$, where $\xi_{i,t}$ is distributed according to a normal distribution $N(0, 1/\beta_t)$, and we assume that a law of large numbers across agents applies as in Judd (1985). Based on this signal, informed traders submit price-contingent demand schedules. In submitting their demand, they take into account that the price q_t of the asset in period t is affected by the demand of all other traders and is thus an endogenous public source of information. To preserve tractability, we assume that asset holdings are limited to $\{0, 1\}$.

Noise traders generate a residual uncontingent demand $\Phi(\epsilon_t/\sqrt{\psi_t})$ for the asset, where Φ is the cumulative standard normal distribution function, $\psi_t > 0$, and ϵ_t is itself distributed according to a standard normal distribution. The mass of noise traders is independent of the fundamental and of informed traders' signals. As is standard in this class of models, the presence of noise traders ensures that equilibrium prices do not fully aggregate information, thereby revealing the fundamental.

We will contrast two economies, one in which government debt is denominated in local currency and one in which it is denominated in a foreign currency, in which the price level is normalized to one in each period.[3] The role of issuing debt in domestic currency is that it avoids explicit default, which is replaced by inflation instead. In the long run, we assume that inflation and default have a symmetric effect, that is, the haircut suffered by holders of government liabilities and the probability of the haircut are the same. Through this channel, bad news about fiscal solvency has the same negative effect on the price of government debt: in one case, bad news imply high interest rates because of inflation risk, and in the other because of default risk.

The asymmetry between inflation and default risk that we emphasize in this paper concerns differential information by secondary-market participants. The motivation for this asymmetry stems from a different interpretation of who is the relevant participant in the "secondary market" of period two. In the case of foreign-currency debt, the secondary-market price is dictated by the new generation of bond traders who will take over; short of an immediate fiscal adjustment, which we rule out, there is nothing that the government can do to dampen fluctuations in the

[3]By studying appropriate excess returns, our quantitative section takes into account foreign inflation.

price of its debt. When debt is issued in local currency, the ability to print money to intervene in the market can temporarily substitute for varying demand by bond traders. The extent to which these interventions are stabilizing depends on the beliefs about eventual fiscal solvency of a larger section of the population that uses domestic currency to trade but does not participate in bond markets; it is likely that they are less well informed about government finances. Since the original publication of BG, two real-world events occurred that fit well the potential monetization of debt that may happen in our "period 2:" in March 2020, the Federal Reserve intervened with large-scale purchases of government debt in response to technical difficulties in the U.S. Treasury market at the onset of the COVID epidemic; similarly, in the Fall of 2022 the Bank of England intervened to stabilize the market for UK gilts after the confidence crisis initiated by the mini-budget proposed by the government of Liz Truss. Appendix A in BG contains a microfounded model which features "workers" who use exclusively cash and "bond traders" who hold the government bonds, and shows formally how this can lead workers to be the pivotal agents in pricing inflation risk in the second period for the local-currency debt economy, while bond traders are pivotal in pricing default risk for the foreign-currency debt economy. Mechanically, a central bank can finance the purchase of local-currency debt with the issuance of money. This shifts the burden of future deficits away from the holders of the debt - sophisticated agents, say - to those who hold money.

From the perspective of the Bayesian trading game that we have described here, the key difference is that we assume that second-period agents are better informed in the case of the foreign-currency debt economy than in the case of the local-currency debt economy. Specifically:

- We assume that the precision of the private signal received by the pivotal agent in the second period (β_2) is lower when debt is issued in domestic currency.

- In period 2, agents learn some information from past prices. In the case of foreign-currency debt, when we interpret the pivotal agents in period 2 to be sophisticated bond traders, we assume that they observe perfectly the price q_1 that prevailed in the first period. In contrast, the pivotal "workers" in the case of domestic-currency debt only observe a noisy public ρ of the first-period price, with a distribution that we will specify later on.[4]

[4]To simplify the algebra, we assume that ρ is a public signal. This is not essential for our results.

2.1 Equilibrium

We provide here an overview of the key equilibrium conditions. The complete derivation of an equilibrium is presented in BG, which extends the one-shot analysis of AHT to our setup with two rounds of trading.

To characterize the equilibrium, we work backwards, starting from period 2. The derivation of the second-period equilibrium follows AHT. The expected payoff of buying the risky asset for agent i in period 2 is $\mathbb{E}(\pi(\theta) \,|\, x_{i,2}, q_2, \rho) - q_2$. BG prove that posterior beliefs over θ are strictly increasing in $x_{i,2}$ in the sense of first-order stochastic dominance whenever q_2 and ρ do not fully reveal the value of $\pi(\theta)$,[5]. It follows that in equilibrium there is a threshold $\hat{x}_2(q_2, \rho)$ such that all agents whose signal is above the threshold buy government debt, and all agents below invest in storage.

Using the signal distribution of $x_{i,2}$, the market clearing condition in period 2 is

$$\text{Prob}[x_{i,2} \geq \hat{x}_2(q_2, \rho) \,|\, \theta] + \Phi(\epsilon_2/\sqrt{\psi_2}) = 1 \tag{1}$$

Using the distribution of the signal $x_{i,2}$, we can simplify this expression to

$$z_2 := \theta + \frac{\epsilon_2}{\sqrt{\beta_2 \psi_2}} = \hat{x}_2(q_2, \rho). \tag{2}$$

As in AHT, we focus on equilibria where z_2 and q_2 convey the same information, given ρ, and in which ρ does not fully reveal θ. In this case, conditioning beliefs on the endogenous price is equivalent to conditioning them on the exogenous signal z_2.

An agent whose private signal is at the threshold $\hat{x}_2(q_2, \rho)$ must be indifferent in equilibrium between buying the risky asset or storing their endowment. Combining this with equation (2), the equilibrium price $q_2(z_2, \rho)$ must satisfy the indifference condition

$$q_2(z_2, \rho) = \mathbb{E}[\pi(\theta) \,|\, x_{i,2} = z_2, z_2, \rho]. \tag{3}$$

The analysis of equilibrium strategies in $t = 1$ follows that of period two quite closely. BG prove that the second-period price is strictly increasing in z_2, and that this is sufficient to ensure

[5] Equilibria in which prices reveal more than what is collectively known by the informed traders are ruled out by all the papers in this literature; as an example, a discussion of this point appears in Diamond and Verrecchia (1981), page 227.

that the beliefs of first-period strategic traders are strictly increasing in their private signal $x_{i,1}$ in the sense of first-order stochastic dominance, as long as the first-period price is not fully revealing. Hence, the demand from strategic traders in period 1 is also characterized by a threshold $\hat{x}_1(q_1)$, with all traders whose signal exceeds the threshold buying debt and all other traders investing in storage.

Repeating the steps that led to (2), the market clearing condition in the first period can be rewritten as

$$z_1 := \theta + \frac{\epsilon_1}{\sqrt{\beta_1 \psi_1}} = \hat{x}_1(q_1) \tag{4}$$

z_1 is an unbiased public signal of θ, with precision $\tau_{q_1} := \beta_1\psi_1$. As in period two, we focus on equilibria where q_1 and z_1 convey the same information.

We assume that the price signal ρ observed by second-period agents is given by

$$\rho = z_1 + \sigma_\eta \eta_1, \tag{5}$$

with $\sigma_\eta \geq 0$ and $\eta_1 \sim N(0,1)$.[6] ρ is therefore an unbiased public signal of θ, with conditional variance $1/\tau_\rho := \mathrm{Var}(\rho \,|\, \theta) = 1/\tau_{q_1} + \sigma_\eta^2$. τ_ρ represents the precision of the information on θ contained in ρ for $t = 2$ agents.

The equilibrium price in the first period is given by

$$q_1(z_1) = \mathbb{E}[q_2(z_2, \rho) | x_{i,1} = z_1, z_1]. \tag{6}$$

To solve explicitly for the price, we derive the beliefs about θ of a strategic trader in period two:

$$\theta \,|\, x_{i,2}, z_2, \rho \sim N\left(\frac{\alpha_0\mu_0 + \beta_2 x_{i,2} + \tau_{q_2} z_2 + \tau_\rho \rho}{\alpha_0 + \beta_2 + \tau_{q_2} + \tau_\rho}, \frac{1}{\alpha_0 + \beta_2 + \tau_{q_2} + \tau_\rho}\right), \tag{7}$$

where $\tau_{q_2} := \beta_2\psi_2$ represents the precision of information revealed by the market price in the second period. For the marginal trader, for whom $x_{i,2} = z_2$, we thus get

$$\theta \,|\, x_{i,2} = z_2, z_2, \rho \sim N\left(\frac{\alpha_0\mu_0 + (\beta_2 + \tau_{q_2}) z_2 + \tau_\rho \rho}{\alpha_0 + \beta_2 + \tau_{q_2} + \tau_\rho}, \frac{1}{\alpha_0 + \beta_2 + \tau_{q_2} + \tau_\rho}\right). \tag{8}$$

[6]It is worth noting that, since the price is in equilibrium a nonlinear function of z_1, the signal structure that we adopt implies that the noise in the observation of the price is higher in regions of the fundamentals in which the price itself is more volatile. This is a plausible assumption.

Using the beliefs of the marginal agent in equation (3), the equilibrium price is given by

$$q_2(z_2, \rho) = \delta + (1-\delta)\Phi\left(\frac{(1-w_\rho - w_2)\mu_0 + w_2 z_2 + w_\rho \rho - \bar{\theta}}{\sigma_2}\right) \tag{9}$$

where $w_\rho := \frac{\tau_\rho}{\alpha_0+\beta_2+\tau_{q_2}+\tau_\rho}$ and $w_2 := \frac{\beta_2+\tau_{q_2}}{\alpha_0+\beta_2+\tau_{q_2}+\tau_\rho}$ are the Bayesian weights given by the second-period marginal trader to ρ and z_2 respectively, and $\sigma_2 := (\alpha_0+\beta_2+\tau_{q_2}+\tau_\rho)^{-1/2}$ is the standard deviation of her conditional beliefs.

We now repeat the procedure to derive an explicit expression for the first-period price, which is our main object of interest. First-period traders are not affected by θ directly, but rather they use these beliefs to forecast q_2, which in turn is a function of z_2 and ρ. First-period traders' posterior beliefs about θ, and the marginal trader's posterior beliefs on z_2 and ρ are given by

$$\theta \,|\, x_{i,1}, z_1 \sim N\left(\frac{\alpha_0\mu_0 + \beta_1 x_{i,1} + \tau_{q_1} z_1}{\alpha_0+\beta_1+\tau_{q_1}}, \frac{1}{\alpha_0+\beta_1+\tau_{q_1}}\right) \tag{10}$$

$$z_2 \,|\, (x_{i,1} = z_1, z_1) \sim N\left((1-w_1)\mu_0 + w_1 z_1, \sigma^2_{2|1} := \frac{1}{\alpha_0+\beta_1+\tau_{q_1}} + \frac{1}{\tau_{q_2}}\right) \tag{11}$$

$$\rho \,|\, (x_{i,1} = z_1, z_1) \sim N\left(z_1, \sigma^2_\eta\right) \tag{12}$$

where $\sigma^2_{2|1}$ is the variance of *new* second-period information z_2 conditional on first-period information (x_1, z_1 and prior), and $w_1 := \frac{\beta_1+\tau_{q_1}}{\alpha_0+\beta_1+\tau_{q_1}}$ is the Bayesian weight given to z_1 by the marginal trader in the first period. Using these beliefs and equation 6, the first-period price is[7]

$$q_1(z_1) = \delta + (1-\delta)\Phi\left(\frac{\mu_0(1-w_\rho - w_2 w_1) + z_1(w_\rho + w_2 w_1) - \bar{\theta}}{\sqrt{w_2^2\sigma^2_{2|1} + w_\rho^2\sigma^2_\eta + \sigma^2_2}}\right), \tag{13}$$

The first-period price is a function of z_1, a combination of the true realization of the shock θ that drives repayment and the realization of the shock ϵ_1, which determines the fraction of bonds absorbed by noise traders.

In equilibrium, the first-period price is thus the expected payoff of debt according to a distorted measure that takes into account both that the marginal agent has a different information set from an outside econometrician who only observes the price, and that the marginal agent is in turn forecasting not the fundamentals but what the future marginal agent expects those fundamentals to be.

[7]Algebra details are provided in the online appendix of BG.

AHT and BG go in detail through the sources of distortion in the one-shot case (AHT) and the dynamic case (BG). What is most relevant for our analysis is that the anticipation that future traders may have coarser information makes the price less sensitive to the same incoming news in the current period.[8] For our application, it implies that the interest rate required by bond traders is less sensitive to incoming news when the main risk they face is inflation risk rather than outright default risk: inflation is driven by the actions of a less well-informed group of agents, while default risk is priced even in the future by a new generation of well-informed traders. Put differently, when a central bank responds to stress in the bond market by monetizing the debt, it can be successful at drowning bad news by shifting the risk onto a set of agents who have a less precise perception of the link between fiscal news and eventual solvency.

We are interested here in exploring what the different risks imply for both the expected revenue from debt issuance, as well as its variance. Defining $W := w_\rho + w_2 w_1$, we can write the ex ante expected price (i.e. before z_1 is realized) as[9]

$$\begin{aligned}\mathbb{E}[q_1(z_1)] &= \delta + (1-\delta)\int \Phi\left(\frac{\mu_0(1-W)-\bar{\theta}}{\tilde{\sigma}_1} + \frac{W}{\tilde{\sigma}_1}z_1\right)\frac{1}{\sigma_{z_1}}\phi\left(\frac{z_1-\mu_0}{\sigma_{z_1}}\right)\mathrm{d}z_1 \\ &= \delta + (1-\delta)\int \Phi\left(\frac{\mu_0-\bar{\theta}}{\tilde{\sigma}_1} + \frac{W\sigma_{z_1}}{\tilde{\sigma}_1}y\right)\phi(y)\mathrm{d}y \\ &= \delta + (1-\delta)\Phi\left(\frac{\mu_0-\bar{\theta}}{\sqrt{\tilde{\sigma}_1^2 + W^2\sigma_{z_1}^2}}\right).\end{aligned} \tag{14}$$

The variance of the price is given by

$$\mathbb{V}(q_1(z_1)) = \int q_1(z_1)^2\,\mathrm{d}\Phi\left(\frac{z_1-\mu_0}{\sigma_{z_1}}\right) - \mathbb{E}[q_1(z_1)]^2 \tag{15}$$

and has no closed-form solution.

To study these moments, we explore the properties of the model numerically. We identify which parameters of the model are most relevant in driving this mean and variance. Although we rely on a stylized model, we can also provide some guidance on the magnitude of the effects that our model delivers; as an example, this allows us to assess how much higher the required returns of debt would have moved in the aftermath of the COVID shock if inflationary financing

[8]Propositions 2 and 3 in BG formalize this statement.

[9]Equation 14 uses the fact that, for any constant a and b, we have $\int \Phi(a+by)\phi(y)\mathrm{d}y = \Phi\left(\frac{a}{\sqrt{1+b^2}}\right)$.

had been off the table and the only way to dilute repayment would occur through outright default.

3 Calibration

This is a preliminary calibration. We are refining our strategy and numbers are subject to change.

3.1 Model Moments

Before we describe our calibration strategy, it is useful to define some moments implied by the model, which we will compare to their corresponding moments in the data.

To calibrate the precision of private information β_1, β_2, we will use the dispersion of individual forecasts. In the model, this is given by

$$D_1 := \sqrt{\frac{\mathbb{V}(\mathbb{E}[\theta \,|\, x_{i,1}, z_1] \,|\, \theta, z_1)}{\mathbb{V}(\theta)}} = \frac{\sqrt{\alpha_0 \beta_1}}{\alpha_0 + \beta_1 + \tau_{q_1}} \tag{16}$$

and

$$D_2 := \sqrt{\frac{\mathbb{V}(\mathbb{E}[\theta \,|\, x_{i,2}, z_2, \rho] \,|\, \theta, z_2, \rho)}{\mathbb{V}(\theta)}} = \frac{\sqrt{\alpha_0 \beta_2}}{\alpha_0 + \beta_2 + \tau_{q_2} + \tau_\rho} \tag{17}$$

for the first and second period, respectively.

As a benchmark to evaluate our choice of σ_η, we use the variance of the average error made when "predicting" past data. In the model, this is given by

$$\overline{\text{FEV}}_\rho := \frac{\mathbb{V}(z_1 \,|\, \rho)}{\mathbb{V}(z_1)} = \frac{\tau_{z_1}}{\tau_\eta + \tau_{z_1}} \tag{18}$$

where $\tau_{z_1} = \left(\frac{1}{\alpha_0} + \frac{1}{\tau_{q_1}}\right)^{-1}$ denotes the unconditional precision of z_1. For simplicity, we assume second-period agents do not use new second-period information $x_{i,2}, z_2$ to perform this exercise.

The model features a constant real interest rate at zero. Our theory concerns excess returns due to inflation risk, so the model counterpart in the data is inflation compensation. For this reason, we calibrate our model to data from the United Kingdom, whose market in inflation-protected securities is deep.

3.2 Data Moments

We first calibrate our model based on data from an advanced economy that issues debt in domestic currency. We choose the United Kingdom because it has a deep market in inflation-protected securities.

We measure the future expected repayment rate embedded in the price q_1 as the inflation compensation, that is, the spread between the yield on inflation-protected securities, which we take to be risk free in this case, and nominal debt of the same maturity. Mechanically, we compute this as the 10 year inflation breakeven rate on UK Inflation Protected Gilts.[10]

In addition to our measure of spreads, we require information about dispersion in expected inflation from both better informed agents (bondholders) and less informed agents (households). To proxy the expectations of better informed agents, we use survey data from the UK Treasury publication "Forecasts for the UK Economy: a comparison of independent forecasts." This publication is released monthly and PDF versions of the document are available back to January of 2012, each of which include a collection of forecasts from professional forecasting organizations covering a variety of macro variables. To ensure consistent information sets at the time of forecast, we use only forecasts that were received in January of the current year to generate one year measure of expected inflation growth.

To recover the expectations of less well informed agents, we make use of the "Bank of England/ Ipsos Inflation Attitudes" survey. This is a quarterly survey that is representative (after sample weighting) of the United Kingdom population and elicits information about inflation expectations at a one and two year horizon, as well as percieved inflation over the past year. One complication is that the survey is multiple choice and elicits information about whether individuals expect, for example, that inflation will be between 1 and 2 percentage points. We take the midpoint of all buckets, and for cases where individuals report inflation as greater than 5% we set their expected inflation to be 5.5%. To be consistent with our data for informed forecasters, we take only the first quarter forecasts starting in 2012. For both datasets, we then compute dispersion directly in the data as the (square root of the) time average of the cross-sectional variance of individual forecasts. When computing cross-sectional statistics regarding uninformed forecasts, we compute all moments using the provided survey weights.

[10]The Bloomberg ID of this series is *UKGGBE10*.

3.3 Parameters

The model consists of two groups of parameters: the first concerns the fiscal fundamentals $(\bar{\theta}, \mu_0, \alpha_0, \delta)$, and the second is related to information $(\beta_1, \psi_1, \sigma_\eta, \beta_2, \psi_2)$.

In our environment, the random variable θ is purely an index of fiscal capacity, so we can normalize $\mu_0 = 0$ and $\alpha_0 = 1$ without loss of generality. Formally, the equilibrium is invariant to changes in $\bar{\theta}$ and μ_0 that leave $\bar{\theta} - \mu_0$ unchanged. Similarly, the equilibrium is also invariant if we multiply $\bar{\theta}, 1/\sqrt{\alpha_0}, 1/\sqrt{\beta_1}, \sigma_\eta$, and $1/\sqrt{\beta_2}$ by a common constant.[11] This leaves us with the seven parameters $\bar{\theta}, \beta_1, \beta_2, \psi_1, \psi_2, \sigma_\eta, \delta$ to set.

We calibrate $\delta = 0.63$ on the average recovery rate in sovereign defaults on external, foreign-currency debt from Cruces and Trebesch (2013). Implicit in this is our maintained assumption that inflation and default are used to a similar extent to alleviate fiscal pressures. This implies that, in the event of a fiscal shortfall, inflation would eventually wipe out 37% of the debt.

We calibrate the remaining parameters to target the following moments of the data.

- The average and standard deviation of inflation spreads. In the model, this corresponds to the average and the standard deviation of the yield to maturity of debt as of period 1 $(1/q_1 - 1)$;

- The standard deviation of CPI inflation. Normalizing the initial price level to 1, we interpret inflation as being $1/q_2$: this is the price at which second-period agents are willing to trade money for goods.

- The average error made by the UK population at large when asked about their perception of past inflation in the Bank of England/Ipsos Inflation Attitudes Survey. We take this as a proxy for the (inverse of) the precision with which second-period agents perceive the first-period price.

- The average cross-sectional dispersion in the inflation forecast of professional forecasters and of the UK population at large. We assume that professional forecasters represent bondholders who determine the price q_1, while the population at large represents price setters, who determine q_2. We thus match dispersion among professional forecasters to D_1 in the model, and that in the general population to D_2.

[11] If $\mu_0 \neq 0$, the statement would apply to multiplying $\bar{\theta} - \mu_0$ by the given constant.

A challenge in matching model moments and data is that the level of disagreement on inflation forecasts among the general UK population in the data is too high to be reconciled with equation (17). This might reflect some departure of expectation formation from the fully Bayesian benchmark with a common prior that we adopt. More importantly for us (and out of introspection from one of the authors), it might reflect the view that the standard deviation of inflation that we observe between 2012 and 2025 might not reflect the true unconditional standard deviation. In our calibration, the possibility that the UK might resort to a large fiscal inflation is a tail event; hence, much of the volatility will only be observed if large shocks occur. To some extent, the COVID experience captures part of this, but we think that there is a further part of the tail that is unobserved. As a first step, we assume that the true unconditional standard deviation of inflation in the data is twice as large as that implied by our 2012-2025 sample, and adjust our moments accordingly.[12]

Table 1 summarizes our calibration exercise.

Table 1: Parameters selected to match targets.

Variable	Value	Target	Data	Model
ψ_1	4.34	Breakeven inflation spreads (st. dev.)	0.94	0.94
ψ_2	0.26	YoY CPI Inflation (st. dev.)	5.42	5.42
$\bar{\theta}$	-1.66	Breakeven inflation spreads (mean)	3.15	3.15
β_1	3.55	Informed forecast dispersion (mean)	0.09	0.10
β_2	0.13	Uninformed forecast dispersion (mean)	0.30	0.31
τ_η	0.06	Uninformed error on past inflation (mean)	0.39	0.94

Notes: All moments related to realized inflation or spreads are expressed in percentage points.

As expected, we obtain a low value for $\bar{\theta}$, reflecting that the prior probability that the United Kingdom will make good on its government debt rather than resorting to inflationary finance is high. We also observe the dispersion in the reported numbers by professional forecasters is much lower than in the population at large. In the model, this implies that the precision of the first-period signal is much higher than in the second signal. To match the volatility of inflation spreads and inflation, we also need the bond market to be more efficient at aggregating information than the goods market, reflected in a lower noise coming from the noise traders in period 1 relative to period 2 (higher ψ_1 and lower ψ_2). Our current calibration misses the private agents' perception of past prices (in the population at large). In order to match other moments, our algorithm

[12] We plan to have a more systematic treatment of this peso problem in future versions.

currently pushes too far in the direction of no recall of past prices.

4 Results

We first compare the spreads that we obtain with those that would arise under two alternative scenarios:

- In the first counterfactual ("more precision"), second-period agents have the same information precision as first-period agents (i.e. we set $\beta_2 = \beta_1$), the noise coming from noise traders is the same across periods ($\psi_2 = \psi_1$), and there is perfect recall of the past price ($\tau_\eta = \infty$). We regard this as a calibration that would be appropriate if the United Kingdom issued all of its debt in inflation-linked gilts (or foreign currency) and all the fiscal risk took place through default. In this case, nominal repayment would not be guaranteed, and the initial holders of bonds would need to find new comparatively sophisticated financial intermediaries willing to take the bonds to their eventual repayment.
- In the second counterfactual ("perfect information"), agents are endowed with perfect information, that is, $\beta_1 = \beta_2 = \infty$. In this case, the long run happens right away: debt is priced according to its eventual repayment. This counterfactual allows us to assess what is the value of dispersed information in determining the mean yield on government debt, as well as its volatility.

Table 2: Counterfactual exercise for the UK.

Statistic	Baseline	Counterfactuals	
		More precision	Perfect information
Bond spreads (mean)	3.15	2.57	2.86
Bond spreads (st. dev.)	0.94	9.81	12.63
Inflation (st. dev.)	5.42	10.80	12.63

Notes: All moments are expressed in percentage points.

Table 2 displays our findings. The different information scenarios have a modest impact on mean bond spreads, but an outsize effect on their volatility.

Concerning the mean spread, we find a non-monotone pattern: the baseline scenario implies that the government pays 29 basis points more than its expected repayment (which is captured by the case of perfect information). In the alternative scenario of real bonds and pure default risk, it would pay 29 basis points *less* than otherwise. As discussed in Albagli et al. (2024), this measure is affected by the nonlinearity of the payoff function, and the relative prevalence of downside and upside risk. BG contains a detailed description of all the countervailing forces that act on the mean price. Quantitatively we find that the net effect of countervailing forces is small and the specific qualitative pattern is not robust across calibrations.

In contrast, we find that the volatility of bond prices is reduced by one order of magnitude when default risk can be converted into inflation risk and passed on to less-well informed agents than when it must be retained by sophisticated bond holders. It is important to stress that this applies even though the bonds are purchased by sophisticated agents in the initial period under either scenario. Perfect information further increases the volatility.

The ability of the central bank to convert default risk into inflation risk by intervening in the bond market in times of distress is thus very valuable in ensuring stable interest rates not only when distress materializes, but also when bond investors contemplate the possibility that it might: by buying government bonds with newly created money, the central bank may drown a negative signal, potentially buying time to avoid the day of reckoning.[13]

Figure 1 shows how the key variables of interest change with respect to the precision of the signal received by second-period agents as we vary β_2. In contrast to Table 2, ψ_2 and τ_η are held fixed in these experiments. With ψ_2 and τ_η at their baseline values, the pattern of mean spreads reverses. The robust feature remains the large and monotonic increase in the volatility of spreads.

Next, we compare the baseline economy and the higher-precision economy for different levels of the fiscal threshold $\bar{\theta}$. We interpret our baseline economy as one in which debt is issued in local currency, and the higher-precision economy as one in which debt is issued in a foreign currency whose real value is unaffected by the fiscal solvency of the country that we are studying. As a first step, Figure 2 shows what happens in the model if the government is always issuing debt, no matter what the spread turns out to be. In this case, issuing debt in local currency (the blue line) is more and more beneficial as we move the critical threshold for fiscal solvency to zero, the

[13]Because the payoff in our model is exogenous, the day of reckoning comes regardless. In future work, it would be interesting to expand the model by endogenizing the government choice of long-run surplus. The direction in which results would be affected is ambiguous: drowning the signal may lead the government to underestimate the gravity of its predicament, but at the same time it may stave off a roll-over crisis that would otherwise doom a solvent government, as in Cole and Kehoe (2000).

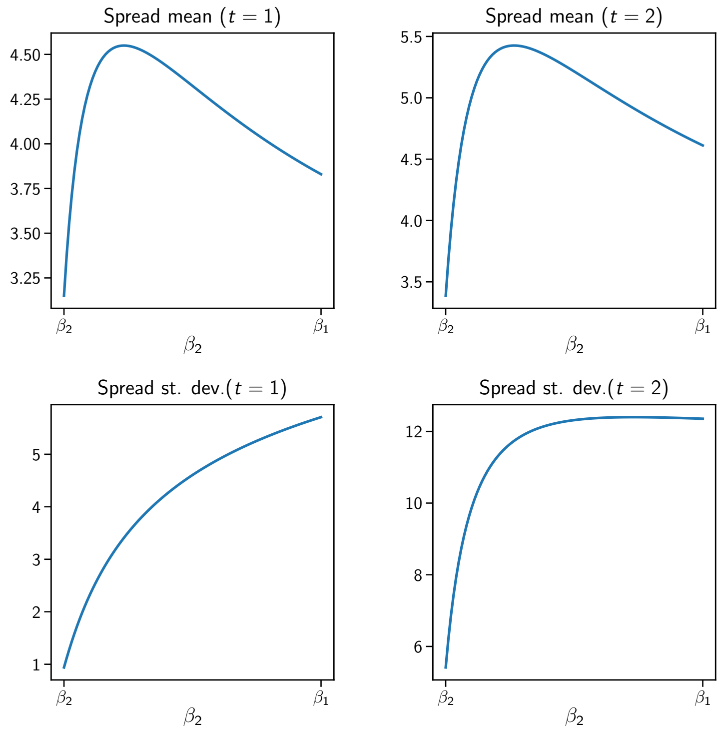

Figure 1: β_2 Comparative Statics

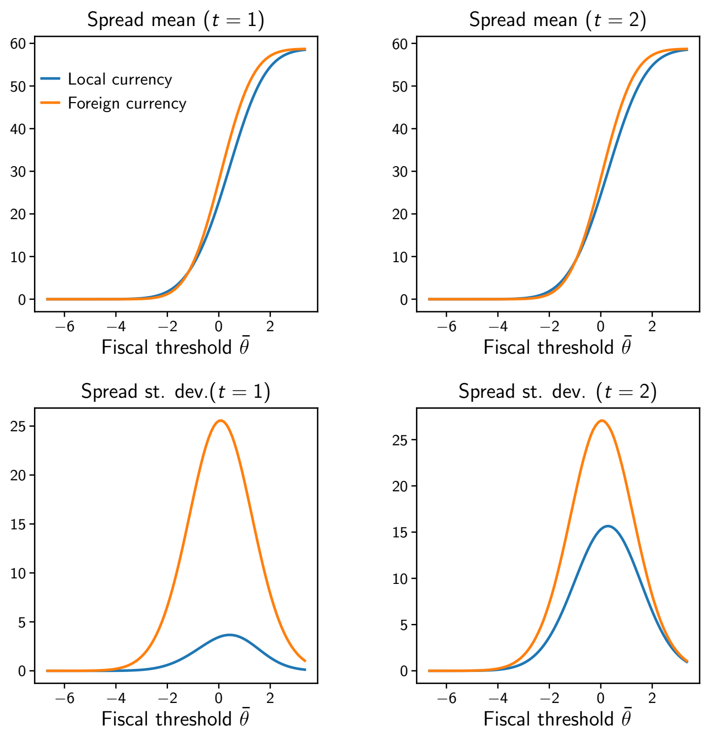

Figure 2: $\bar{\theta}$ Comparative Statics

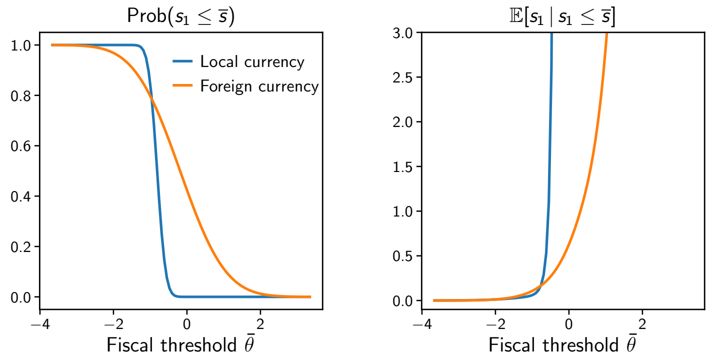

Figure 3: $\bar{\theta}$ Comparative Statics

point of maximal uncertainty ex ante. Issuing local-currency debt always guards the government against extreme events: the less well informed households do not respond strongly to incoming news in period 2, and this in turn reassures first-period bondholders that their investment is not as risky as in the case in which second-period bondholders generate their own assessment of eventual default risk. Based on this picture, we would thus conclude that a worse prior about fiscal solvency would make local-currency debt an even more valuable insurance mechanism, at least until default becomes almost certain.

In practice, we think that the government always has the option not to issue debt in periods in which the spread becomes prohibitive (in our calibration, the spread reaches 60%). We also consider what happens when the government adopts a rule not to issue debt when the spread exceeds 10%. This strategy effectively allows the government to treat debt issuance as an option; we would then expect extra volatility to bring additional value, as it always does to options.

In computing an equilibrium under this government strategy, the only difference occurs under local currency debt, in which households have imperfect recall of the first-period price. If we assume that they understand the cutoff rule, they would gather extra information from the existence of debt in period 2. For tractability, we shut down this channel of learning and assume that this strategy is not known to households. Better informed bondholders observe the spread perfectly, hence the government strategy does not convey any extra information to them, and it does not matter whether they are aware of the government strategy. With this assumption, our equilibrium is the same as before whenever the first-period spread is below 10%, and there is no market otherwise.

Figure 3 shows two key features of the economy under his government strategy. The left panel shows the probability that the government will successfully issue debt (that is, the probability that the required spread is below 10%). The right panel shows the average spread paid by the government, conditional on issuing debt. When $\bar{\theta}$ is very low and the possibility of a default is remote, local-currency debt still dominates. Reaching the 10% threshold is a tail event, much less likely when bond prices are anchored by the stable (and favorable) expectations of less well informed households; average spreads are also lower. As $\bar{\theta}$ increases, initially we observe the same force that was at work in Figure 2: the insurance and stability value of local-currency debt becomes even more valuable. However, when fiscal solvency becomes more questionable, less well informed households become less and less willing to bear future inflation risk, and the 10% threshold is no longer such a tail event. At some point, the greater responsiveness of the price of foreign-currency debt brings new benefits: bondholders are better able to distinguish responsible governments (that is, governments with $\theta > \bar{\theta}$, to which credit will be extended, from governments that will default, and the probability of obtaining credit increases. Moreover, conditional on obtaining credit, as $\bar{\theta}$ grows, local currency debt spreads will cluster closer and closer to the 10% threshold. In contrast, the greater volatility of foreign-currency debt implies that spreads will scatter across a wider range of values below 10%, and the average spread conditional on issuance is correspondingly improved.

This leads us to conclude with a cautionary note. As fiscal sustainability becomes more questionable, the ability of a central bank to intervene and stabilize the market for government bonds without triggering a bout of inflation is initially valuable, but a point comes at which this power is ineffective at keeping interest rates under control. We view this as a reason why countries that are usually associated with weak fiscal fundamentals, such as Argentina, find it preferable to issue debt in foreign currency.

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