Monetary Communication and Credibility in a Multi-Sector Economy.

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Abstract

Central banks increasingly communicate sectoral narratives about inflation despite operating aggregate instruments. We study optimal and credible monetary communication in a two-sector New Keynesian economy in which the central bank privately observes aggregate and sector-specific fundamentals and chooses both the policy instrument and a public message. Under commitment, the optimal disclosure rule is stark: the authority always reveals the aggregate component, while disclosure of the sectoral components follows a threshold statistics that reflects production elasticities and the intensity of price rigidities. Without commitment, the full-disclosure regime is time-inconsistent in a multi-sector economies: ex post, the authority optimally shades dispersion shocks, creating a communication analogue of the Barro–Gordon credibility problem. In a dynamic extension of the model, reputation partially disciplines communication, but with long run welfare costs. In an application to the euro-area, we map micro price-adjustment frequencies into sectoral rigidities to assess whether sectoral communication incentives rose during the inflation surge.

Keywords: *monetary policy and communication*, *time consistency and credibility*, *reputation*, *Bayesian learning*

JEL classification: D82, E52, E58, E61

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1 Introduction

Recent episodes of economic distress have been characterized not only by large aggregate shocks but by sharp sectoral asymmetries. The pandemic shifted demand and supply unevenly across contact-intensive activities, supply-chain disruptions concentrated pressures on industrial goods, and energy and commodity shocks disproportionately affected energy-intensive production sectors. In such environments, inflation is inherently "compositional": relative-price movements and sectoral inflation differentials become central to aggregate dynamics.

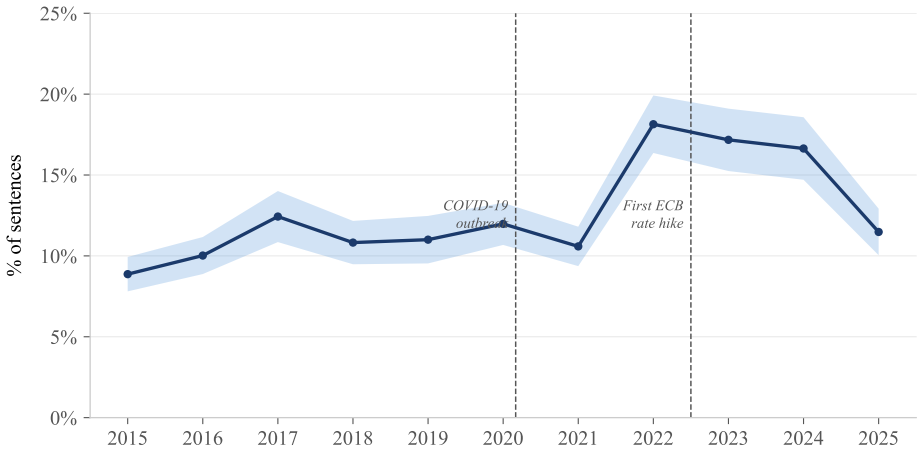
Sectoral heterogeneity matters for stabilization because monetary policy is a single instrument, while the relevant distortions become multi-dimensional once sectors differ in nominal rigidity and are hit by sector-specific shocks. In the one-sector New Keynesian benchmark, the "divine coincidence" result implies that stabilizing inflation can, under conditions, stabilize the output gap. In a genuinely multi-sector economy, this coincidence breaks down: sectoral shocks generate inefficient relative-price gaps and within-sector price dispersion that cannot generally be eliminated with one aggregate instrument, as La'O and Tahbaz-Salehi (2022) and Rubbo (2023) demonstrate.

Against this background, central-bank communication – through policy statements, press conferences, speeches and analytical publications – has become increasingly sectoral. Policy statements and speeches now commonly emphasize distinctions such as services versus goods inflation, or energy versus non-energy components. The euro area provides a salient illustration: while the European Central Bank (ECB) mandate is explicitly geared toward "price stability in the euro area as a whole", the inflation surge brought sectoral narratives to the foreground. As Lane (2025) notes, "the transmission of monetary policy ... remains heterogeneous across different types of banks, firms and households, across different sectors and across countries." And in discussing underlying inflation, Schnabel (2025) singles out sectoral composition—"the most important [challenge] is services inflation," adding that "services inflation has been much stickier than expected." Figure 1 provides a quantitative counterpart to these qualitative observations. Using a dictionary-based, sentence-level measure on ECB monetary-policy communications, it documents a marked increase around the inflation surge in the prevalence of sectoral and heterogeneity-related language. These elements raise a natural question: what role can sectoral communication play in stabilization when sectoral stabilization is not itself a policy objective?

We answer this question by studying optimal and credible monetary communication in a multi-sector New Keynesian economy, as in La'O and Tahbaz-Salehi (2022), augmented with asymmetric information. The monetary authority privately observes two components of fundamentals: an aggregate component that shifts natural output, and a dispersion component that shifts the natural relative price between sectors. It then chooses both an aggregate policy instrument and a public message observed by price setting firms. Communication matters because it shapes firms' posterior beliefs and therefore the pattern of price adjustment, which in turn determines within-sector dispersion and cross-sector misallocation.

The central insight is that sectoral communication is subject to a Barro and Gordon (1983)–type credibility problem, but the object of time inconsistency is information disclosure, not the instrument. Under commitment, the authority can pre-announce and follow a disclosure rule. Without commitment, once the

Figure 1: Sectoral and Heterogeneity Language in ECB Communication



Notes. The figure plots, by year, the average share of sentences in ECB monetary policy documents that contain at least one term from a pre-specified dictionary capturing sector-specific language (sectoral composition and heterogeneity across sectors and countries). The analytical sample covers 2015–2025 and consists of monetary-policy-relevant ECB communications. Sentences are identified using standard sentence segmentation. The shaded band reports a 95% confidence interval around the annual mean computed across documents. Appendix E.1 provides full methodological details.

state is realized and firms are about to set prices, the authority has an incentive to shade the dispersion component in order to dampen within-sector price dispersion—even when full disclosure would be optimal ex ante. This generates a wedge between the commitment-optimal disclosure regime and the discretionary message: an analogue of "inflation bias," but in the domain of communication.

Formally, the paper delivers three results on monetary communication under commitment, discretion, and reputational dynamics.

First, under commitment, the optimal disclosure rule has a sharp threshold structure. The communication problem can be represented as an information-design problem (Bayesian persuasion): the central bank commits ex ante to an information policy mapping its private signals into public messages, taking into account how the induced posterior beliefs shape price setting and welfare. The key object is a composite statistic, Γ, which aggregates the structural trade-off between (i) allocative gains from aligning the cross-sector relative price with fundamentals and (ii) welfare costs from within-sector price dispersion generated by staggered price adjustment. This trade-off depends only on primitives—within- and across-sector substitution elasticities and sectoral degrees of nominal rigidity. The resulting optimal communication rule is stark: the authority always discloses the aggregate component, which can be efficiently stabilized with the policy instrument, while it discloses the dispersion component if and only if $\Gamma > 0$. When $\Gamma < 0$, the induced within-sector dispersion cost dominates, so the authority optimally withholds the dispersion component while still communicating aggregate conditions. A central implication is that the communication regime is pinned down by observable features such as the frequency of price adjustment: when prices become more flexible, within-sector dispersion is less costly and sectoral disclosure becomes more attractive.

We connect this mechanism to the ECB's recent shift toward sectoral narratives by disciplining nominal rigidities with micro evidence. Using euro-area price-change frequencies in services and industry from Gautier

et al. (2025), we map observed adjustment rates into sectoral Calvo parameters and, taking sectoral elasticities to lie in economically plausible ranges, quantify how the post-pandemic increase in price-adjustment frequency raises the likelihood that $\Gamma > 0$—and therefore that full sectoral disclosure is optimal under commitment.

Second, the commitment-optimal full-disclosure regime is generically not credible under a lack of commitment in multi-sector economies. Once the state is realized and firms are about to reset prices, a discretionary authority has an incentive to shade the dispersion component downward to mitigate within-sector price dispersion, even though doing so distorts the cross-sector relative price. This time-inconsistency is inherently multi-sector: in the one-sector limit, where within- and across-sector elasticities coincide, the incentives to deviate offset and full disclosure remains sequentially credible. When within- and across-sector elasticities differ, these forces no longer cancel and the full-disclosure rule fails to be sequentially incentive compatible.

Third, endogenous reputation disciplines communication but does not restore the commitment policy rule and economic outcomes. In an infinite-horizon extension with hidden policymaker types, firms infer whether the authority is committed to the optimal communication rule or strategic from observed messages and outcomes. The strategic authority then chooses messages to trade off short-run stabilization gains against reputational losses, generating endogenously state-contingent disclosure. Reputational forces can sustain informative communication, but long-run welfare remains strictly below the commitment benchmark: reputation mitigates, but does not eliminate, the communication wedge created by sectoral disclosure.

Literature. We contribute to work on multi-sector New Keynesian stabilization, monetary policy communication and transparency, and dynamic credibility and reputation. The unifying mechanism is that, when the central bank holds superior information, communication is an information-design problem; and once messages affect price setting under nominal rigidities, disclosure is subject to a Barro–Gordon–type time-inconsistency problem. In a genuinely multi-sector economy, both the commitment-optimal disclosure rule and the credibility wedge are pinned down by sectoral rigidities and by the gap between within- and across-sector elasticities.

Multi-sector stabilization. A large literature studies optimal stabilization when nominal rigidities are heterogeneous across sectors. Aoki (2001) initiates the analysis in multi-sector New Keynesian models and motivates policy rules that effectively stabilize a weighted inflation index placing greater weight on stickier prices; Mankiw and Reis (2003), Woodford (2003), Benigno (2004), Eusepi, Hobijn, and Tambalotti (2011), La'O and Tahbaz-Salehi (2022) and Rubbo (2023) generalize this insight to richer multi-sector environments. Relative to this literature, our focus is not on optimal inflation weights under full information, but on how sectoral disclosure complements instrument policy when firms set prices under imperfect information.

Communication, transparency, and information design. A maintained assumption is that the monetary authority holds superior information about fundamentals, consistent with evidence on the "information effect" of monetary policy[1] Starting from Morris and Shin (2002), a rich literature debates the welfare consequences

[1] This literature documents that private expectations move materially around policy announcements (e.g., Romer and Romer (2000), Nakamura and Steinsson (2018), Jarociński and Karadi (2020)), and communication conveys both news about macroeconomic conditions and news about future policy actions Andrade and Ferroni (2021). More broadly, rational inattention Sims (2003) provides a structural rationale for such informational asymmetries: firms optimally limit the breadth and fre-

of public information when the central bank has an informational advantage. With nominal rigidities, disclosure can improve coordination and stabilization, but it can also be welfare-reducing by inducing overly sensitive private-sector responses to public signals. A close reference is Tamura (2016), who studies optimal instrument policy jointly with selective disclosure in a sticky-price economy with informational frictions.[2] We build on this information-design approach and focus on a multi-sector environment: the disclosure object is a dispersion component that governs sectoral misallocation, yielding a threshold regime for optimal disclosure governed by a composite statistic that depends on sectoral rigidities and elasticities. In a related quantitative multi-sector framework, Ou, Zhang, and Zhang (2022) emphasizes that increased transparency about unobserved states can be welfare-reducing when nominal rigidities are present.

Credibility and reputation. Classic analyses of time-inconsistent policy, such as Barro and Gordon (1983), emphasize that discretion differs from commitment because policymakers have incentives to deviate ex post once private-sector decisions are taken. We bring this logic to a setting in which the object of time inconsistency is communication rather than the policy instrument: under discretion, the central bank has an incentive to underreport the dispersion component to dampen within-sector price dispersion, even though doing so distorts the cross-sector relative price. This yields a communication analogue of the inflation bias, pinned down by the multi-sector structure and by sectoral nominal rigidities. To study how credibility may be partially restored without commitment, we develop an infinite-horizon reputational extension with hidden types, building on Kreps and Wilson (1982) and applications to monetary policy such as Backus and Driffill (1985). Our setting features imperfect verifiability of deviations, yielding state-contingent disclosure in reputational equilibria and a clean comparison of short-run stabilization gains against long-run welfare costs.[3]

Plan of the paper. Section 2 presents the environment and characterizes the optimal belief-consistent instrument policy given posterior beliefs. Section 3 characterizes commitment-optimal disclosure rule. Section 4 studies credibility under discretion and the reputational equilibrium in an infinite-horizon extension. The appendix contains proofs and auxiliary derivations.

2 Economic Environment

This section presents the economic environment and information structure, defines the private-sector equilibrium, and characterizes optimal monetary policy under asymmetric information.

2.1 The Model

The model builds on a standard New Keynesian framework with monopolistic competition and staggered price adjustment. The economy features a representative household, competitive retailers that aggregate

quency of information they process, while central banks devote substantial resources to monitoring and synthesizing economic developments.

[2] Tamura (2018) adds policy signaling and endogenous information acquisition, highlighting how disclosure can be structured to attenuate signaling distortions.

[3] A complementary dynamic perspective is developed by Gáti (2022), who studies optimal dynamic central bank communication in a Bayesian persuasion framework; our dynamic extension instead emphasizes reputation as the discipline device.

differentiated varieties into sectoral and final goods, monopolistically competitive firms producing those varieties, and a monetary authority. The key departure from the canonical one-sector benchmark is that production is organized in multiple sectors subject to sector-specific productivity shocks that are imperfectly observed by price setters, while the central bank is better informed and can communicate about fundamentals.

Households. A representative household consumes the final good, Y, and supplies economy-wide labor, L. The preferences are given by $U(Y, L) = \log Y - L$ (*cf.* Golosov and Lucas 2007). The household maximizes its utility subject to the budget constraint $PY = WL + \Pi + T$, where P is the price level of the final consumption good, W is the nominal wage, Π is firms' profit income, and T is a lump-sum transfer (or tax) from the fiscal authority. The optimal labor choice of the household is perfectly elastic at the point where nominal consumption demand, Q, equals the nominal wage:

$$Q \equiv PY = W. \tag{2.1}$$

The aggregate nominal consumption Q is under direct control of the monetary authority.[4] This allows us to focus on the optimal setting of policy without having to specify a particular monetary policy instrument and its transmission mechanism to nominal demand.

Aggregation of Individual Goods. The final consumption good Y is an aggregate bundle of individual goods produced in two sectors $j \in \{1, 2\}$ (*cf.* Woodford 2003). Each sector has a continuum of monopolistically competitive firms producing differentiated varieties of goods indexed with $i \in [0, n_j]$ with $n_1 + n_2 = 1$. The individual differentiated goods are aggregated by competitive retailers into the final good using nested bundles with constant elasticities of substitution. First, the individual goods in each sector, Y_{ij}, are aggregated into a sectoral good, Y_j, as follows:

$$Y_j = \left[(n_j)^{-\frac{1}{\theta}} \left(\int_0^{n_j} Y_{ij}^{\frac{\theta-1}{\theta}} di \right) \right]^{\frac{\theta}{\theta-1}}, \tag{2.2}$$

where $\theta > 1$ is the elasticity of substitution of goods within each sector. In turn, sectoral goods, Y_j, are aggregated into the final good, Y, as follows:

$$Y = \left[\left(n_1 Y_1^{\eta-1} \right)^{\frac{1}{\eta}} + \left(n_2 Y_2^{\eta-1} \right)^{\frac{1}{\eta}} \right]^{\frac{\eta}{\eta-1}}, \tag{2.3}$$

where $\eta > 0$ is the elasticity of substitution across sectors. We assume that goods are less (or equally) substitutable across compared to within sectors, i.e., $\eta \leq \theta$. Note that when $\eta = \theta$, the economy is isomorphic to a single sector model, where firms are heterogeneous in productivity and in the extent of nominal rigidity in price setting.

[4] Equivalently, the monetary authority could set another nominal variable—see, e.g., the nominal-wage formulation in Baqaee, Farhi, and Sangani (2024). This policy representation is compatible with both money supply and interest rate control; see examples in Golosov and Lucas (2007), Afrouzi and Yang (2021), La'O and Tahbaz-Salehi (2022).

Demand System and Price Indices. The solution of the profit-maximization problems of the retailers determines the allocation of total consumption demand across individual goods:

$$P_j Y_j = n_j \left[\frac{P_j}{P}\right]^{1-\eta} PY, \qquad P_{ij} Y_{ij} = \frac{1}{n_j}\left[\frac{P_{ij}}{P_j}\right]^{1-\theta} P_j Y_j, \tag{2.4}$$

where P_{ij} are prices of the individual differentiated goods, P_j and P are price indices characterizing the cost of purchasing the sectoral and the final goods respectively:

$$P = \left[n_1 P_1^{1-\eta} + n_2 P_2^{1-\eta}\right]^{\frac{1}{1-\eta}}, \qquad P_j = \left[\frac{1}{n_j}\int_0^{n_j} P_{ij}^{1-\theta} di\right]^{\frac{1}{1-\theta}}. \tag{2.5}$$

These demand curves (2.4) highlight a central property of the forthcoming analysis. They imply that relative demand for good i in sector j is pinned down by two relative prices: the price of the good relative to the sectoral price index, P_{ij}/P_j, and the sectoral price index relative to the aggregate one, P_j/P. Hence, relative prices both *within* and *across* sectors determine the overall composition of demand for individual goods.

Production of Individual Goods. Each individual good is produced by a single firm using production technology that is linear in labor:

$$Y_{ij} = A_j L_{ij}, \tag{2.6}$$

where A_j is an exogenous sector-specific level of productivity drawn independently from a distribution with the unconditional mean normalized to one, L_{ij} is labor hired by the firm in a perfectly competitive market. Each firm employs enough labor to satisfy the demand for its good.

Aggregate Production Functions. Aggregating labor demand across firms and imposing labor market clearing yields the following equilibrium relationships linking goods output and labor input at the aggregate and sectoral levels:

$$Y = \left[n_1\left[\frac{P_1}{P}\right]^{-\eta}\left[\frac{A_1}{\Delta_1}\right]^{-1} + n_2\left[\frac{P_2}{P}\right]^{-\eta}\left[\frac{A_2}{\Delta_2}\right]^{-1}\right]^{-1} L, \qquad Y_j = \frac{A_j}{\Delta_j} L_j, \tag{2.7}$$

where $L = L_1 + L_2$ is total labor supply, $L_j \equiv \int_0^{n_j} L_{ij} di$ is labor employed in sector j, and $\Delta_j \equiv \frac{1}{n_j}\int_0^{n_j}\left(\frac{P_{ij}}{P_j}\right)^{-\theta} di \geq 1$ measures within-sector price dispersion. Dispersion distorts labor demand across otherwise identical firms, creating a wedge between technological productivity A_j and effective sectoral productivity A_j/Δ_j. Aggregate productivity is therefore a weighted harmonic mean of sectoral productivities, with weights determined by relative sectoral prices through demand allocation across sectors.

Pricing of Individual Goods. Each firm producing an individual good sets its price P_{ij} to maximize expected profits while competing for demand (2.4) through sectoral and aggregate price indices. As detailed in the timing of the model, prices are set in a staggered manner: firms set prices at different points in

time and do so under imperfect information. Conditional on its information set at the time of pricing, an individual firm optimally chooses P_{ij} according to

$$P_{ij} = \frac{\mathcal{M}}{1-\tau}\,\mathbb{E}_{ij}\left\{\frac{\left[\frac{1}{P_j}\right]^{-\theta}\left[\frac{P_j}{P}\right]^{-\eta}}{\mathbb{E}_{ij}\left[\left[\frac{1}{P_j}\right]^{-\theta}\left[\frac{P_j}{P}\right]^{-\eta}\right]}\frac{W}{A_j}\right\}, \tag{2.8}$$

where $\mathbb{E}_{ij}$ denotes firm-specific beliefs about productivity shocks, τ is a linear sales tax (or subsidy) rebated lump-sum to households, and $\mathcal{M} \equiv \theta/(\theta-1)$ is the monopolistic markup. Under incomplete information, (2.8) prescribes setting the price (net of tax) as a markup over a risk-adjusted expectation of marginal cost. Firms that have the opportunity to adjust prices update beliefs rationally based on public communication by the monetary authority.[5]

Information and Communication. The monetary authority receives a private signal about sectoral shocks, generating an ex-ante informational asymmetry vis-à-vis firms. Public communication therefore affects firms' posterior beliefs and, through staggered price setting, equilibrium outcomes. We first characterize equilibrium under an arbitrary disclosure rule and then study specific communication regimes.

2.2 Private-Sector Equilibria

Given monetary, communication, and fiscal policies, a private-sector equilibrium consists of prices $\{W, P, P_j, P_{ij}\}$ and quantities $\{Y, Y_j, Y_{ij}, L, L_j, L_{ij}\}$ that reflect the optimal choices of the household and firms, as well as the clearing of the goods and labor markets. The private-sector equilibrium must satisfy equations (2.1) and (2.4)–(2.8).

Log-linearization. We characterize private-sector equilibria as log-linear deviations from the deterministic equilibrium with $A_1 = A_2 = 1$, and denote log deviations of a generic variable X by $\hat{x}$. As is standard in the New Keynesian literature, e.g., Woodford (2003) and Galí (2015), we fix τ at a constant level that eliminates the inefficiency arising from monopolistic competition in the deterministic equilibrium. This specification ensures that monetary policy is consistent with the first-best allocation chosen by a social planner, and eliminates the inflation bias of a monetary authority.

Flexible-price efficient equilibrium. Because the sales subsidy τ eliminates the steady-state distortion from monopolistic competition, the allocation under flexible prices and full information is efficient. We therefore use the flexible-price, symmetric-information equilibrium as our benchmark and measure inefficiencies in the sticky-price, asymmetric-information economy by gaps relative to this allocation.[6]

[5] Under complete information, (2.8) reduces to the standard constant-markup rule $P_{ij} = \frac{\mathcal{M}}{1-\tau}\frac{W}{A_j}$. With incomplete information, subjective uncertainty introduces a risk adjustment in expected marginal cost. While prices depend on beliefs, realized shocks ultimately determine equilibrium quantities.

[6] For comparability, we characterize the benchmark under the same average nominal demand Q as in the sticky-price economy. This normalization affects only the nominal level of prices and does not alter real allocations or welfare gaps.

We refer to variables in this efficient benchmark as *natural* and denote them with a superscript n. All the firms in a given sector set their prices at the following common sectoral level:

$$\hat{p}_j^n = \hat{q} - \hat{a}_j, \tag{2.9}$$

In turn, the natural aggregate price level is a weighted average of the sectoral prices, given by $\hat{p}^n = n_1\hat{p}_1^n + n_2\hat{p}_2^n$. Using this aggregate price level to deflate nominal demand yields the natural real output:

$$\hat{y}^n = n_1\hat{a}_1 + n_2\hat{a}_2. \tag{2.10}$$

Finally, note $\hat{p}_R^n = \hat{p}_2^n - \hat{p}_1^n = \hat{a}_1 - \hat{a}_2$ the natural relative price that reflects productivity differentials across sectors. Natural real output and relative price form the state vector of natural variables $\hat{v}^n = (\hat{y}^n, \hat{p}_R^n)$, interpreted respectively as aggregate and sectoral dispersion shocks.

Specifically, with $\hat{a}_j \sim \mathcal{N}(0, \sigma^2)$ distributed independently across sectors, $\hat{v}^n$ is distributed according to $\mathcal{N}(0, \Sigma\sigma^2)$, where the variance-covariance matrix satisfies

$$\Sigma\sigma^2 = \begin{pmatrix} n_1^2 + n_2^2 & 0 \\ 0 & 2 \end{pmatrix} \sigma^2. \tag{2.11}$$

Let $f(\hat{v}^n)$ be the associated density function.

Timing and Information. We are interested in the design and economic implications of monetary communication on firms' price decisions and economic outcomes. This problem is structured as a game.

There are three players: nature, a monetary authority, and firms. The timing of their interaction is as follows:

- Given prior beliefs μ about the distribution of exogenous shocks $\hat{v}^n \sim \mathcal{N}(0, \Sigma\sigma^2)$, all firms *preset* prices $\hat{p}_j^p = 0$.[7]
- Nature draws $\hat{v}^n = (\hat{y}^n, \hat{p}_R^n)$, observable only to the monetary authority.
- The monetary authority sends a public message m and sets the policy instrument $\hat{q}$.
- A share $1 - \alpha_j$ of firms in sector $j \in \{1, 2\}$ *resets* prices $\hat{p}_j^r$, given posterior beliefs $\tilde{\mu} = \mu | m, \hat{q}$.
- Production occurs and output $\hat{y}$ is realized.

The asynchronous timing of pricing decisions introduces nominal rigidity into the economy. The degree of rigidity in a given sector is characterized by the share $\alpha_j \in (0, 1)$ of unchanged preset prices.[8] Note

[7] The normalization $\hat{p}_j^p = \mathbb{E}_\mu(\hat{q}) = 0$ is without loss of generality because any change in the prior expectation of policy $\hat{q}$ reflected in preset prices generates only a nominal scaling of the price level, which is not reflected in real variables or welfare, where only differences in relative prices matter.

[8] The model is presented with traditional Calvo (1983) type of sticky prices. It could equivalently be described in terms of sticky information, imperfect diffusion of information or rationally inattentive firms, as in Adam (2007), Tamura (2018) and La'O and Tahbaz-Salehi (2022).

that while the remaining fractions $(1-\alpha_j)$ of prices are reset, these prices are not fully flexibly adjusted to maximize profits as they would be under perfect information. Instead, reset prices change to the extent that monetary policy and communication are informative about economic conditions.

Indeed, the timing highlights an informational asymmetry between the monetary authority and price-setting firms. For expositional clarity, we assume that the monetary authority observes the underlying state $\hat{v}^n$ perfectly. This assumption is made without loss of generality: the analysis only requires that the monetary authority conditions policy and communication on an information set that is strictly more informative about sectoral fundamentals than the information available to firms.[9] Firms that reset prices after observing monetary policy and communication therefore choose optimally given posterior beliefs $\tilde{\mu}$ formed from the policy instrument $\hat{q}$ and the public message m.

Welfare. To study the conduct of monetary policy in this multi-sector economy, we derive a second-order approximation of the utility function of the representative household for a generic set of prices set by producers of individual goods and obtain the following welfare function:

$$U \approx -\frac{1}{2}\left[(\hat{y}-\hat{y}^n)^2 + \eta n_1 n_2 (\hat{p}_R - \hat{p}_R^n)^2 + \theta \sum_j n_j \mathrm{Var}_i^j(\hat{p}_{ij})\right] + \text{t.i.p.}, \tag{2.12}$$

where t.i.p. denotes terms that are independent of policy.[10] There are three sources of welfare losses, each corresponding to a different level of aggregation. The first term is the *aggregate output gap*, defined as the deviation of output from the natural level $\hat{y}^n$. The second term is the *sectoral relative price gap*, defined as the deviation of the relative price from its natural level $\hat{p}_R^n$. The third term is the *within-sector price dispersion*. Note that welfare depends explicitly on prices because the composition of consumption, which affects welfare, is determined by the relative prices of differentiated and sectoral goods.

2.3 The Conduct of Monetary Policy

Policy Representation of a Competitive Equilibrium. The monetary authority affects equilibrium allocations through two channels: by choosing nominal aggregate demand $\hat{q}$ and by shaping firms' posterior beliefs about the state through a public message m. The next lemma provides a reduced-form representation of equilibrium (and welfare-relevant) prices and quantities as functions of instrument $\hat{q}$ and firms' posterior beliefs.[11]

Lemma 1. *Given monetary instrument, $\hat{q}$ and a public message m, firms form posterior beliefs, $\tilde{\mu} = \mu|m, \hat{q}$.*

[9] Formally, the equilibrium allocations and welfare expressions depend on the monetary authority's information only through the posterior beliefs of firms induced by the observed policy choice and public message. Hence, the analysis is unchanged if the monetary authority observes a noisy signal $s = \hat{v}^n + \varepsilon$, with $\varepsilon \sim \mathcal{N}(0, \Sigma\sigma_\varepsilon^2)$, provided its information is strictly more informative about $\hat{v}^n$ than firms' information. In that case, the monetary authority's sufficient informational statistic is $\bar{v}^n = \mathbb{E}(\hat{v}^n \mid s)$ and all results carry through with $\hat{v}^n$ replaced by $\bar{v}^n$.

[10] Detailed derivations are provided in Appendix A.2.

[11] This approach is closely related to the "primal" approach to policy design, which characterizes allocations directly subject to implementability constraints; see, e.g., Angeletos and La'O (2020) for an application to New Keynesian environments with informational frictions.

Equilibrium reset prices are:

$$\hat{p}_1^r = (\hat{q} - \mathbb{E}_{\tilde{\mu}}\hat{y}^n) - n_2\mathbb{E}_{\tilde{\mu}}\hat{p}_R^n \qquad \hat{p}_2^r = (\hat{q} - \mathbb{E}_{\tilde{\mu}}\hat{y}^n) + n_1\mathbb{E}_{\tilde{\mu}}\hat{p}_R^n, \tag{2.13}$$

Sectoral prices are $\hat{p}_j = (1-\alpha_j)\hat{p}_j^r$*, and aggregate and relative prices are*

$$\hat{p} = (1 - n_1\alpha_1 - n_2\alpha_2)\,(\hat{q} - \mathbb{E}_{\tilde{\mu}}\hat{y}^n) + n_1 n_2\,(\alpha_1 - \alpha_2)\,\mathbb{E}_{\tilde{\mu}}\hat{p}_R^n, \tag{2.14}$$

$$\hat{p}_R = (\alpha_1 - \alpha_2)\,(\hat{q} - \mathbb{E}_{\tilde{\mu}}\hat{y}^n) + (1 - n_1\alpha_2 - n_2\alpha_1)\,\mathbb{E}_{\tilde{\mu}}\hat{p}_R^n. \tag{2.15}$$

Finally, aggregate output is given by $\hat{y} = \hat{q} - \hat{p}$*.*

Proof. See Appendix A.3.1. ∎

Lemma 1 makes transparent why stabilization is intrinsically multidimensional in a multi-sector economy. In a one-sector New Keynesian benchmark, closing the aggregate output gap can be sufficient to replicate the efficient allocation (the "divine coincidence"). Here, by contrast, sector-specific shocks generate a natural relative price $\hat{p}_R^n$ that the economy would like to implement, while price setting is constrained by staggered adjustment and a single aggregate instrument.

Equation (2.15) shows that the equilibrium relative price depends both on the policy stance $\hat{q} - \mathbb{E}_{\tilde{\mu}}\hat{y}^n$ and on beliefs about the natural relative price $\mathbb{E}_{\tilde{\mu}}\hat{p}_R^n$, with loadings determined by sectoral rigidities (α_1, α_2). Even when nominal rigidities are symmetric, $\alpha_1 = \alpha_2 = \alpha$, sectoral reset prices in (2.13) satisfy $\hat{p}_2^r - \hat{p}_1^r = \mathbb{E}_{\tilde{\mu}}\hat{p}_R^n$, so that the relative price of *reset* prices tracks beliefs about fundamentals; however, because a fraction α of prices remains preset in each sector, the equilibrium relative price becomes $\hat{p}_R = (1-\alpha)\,\mathbb{E}_{\tilde{\mu}}\hat{p}_R^n$, which generally falls short of implementing $\hat{p}_R^n$ when $\alpha > 0$ and $\hat{p}_R^n \neq 0$. Thus, sector-specific shocks imply an irreducible relative-price distortion under staggered adjustment: a single aggregate instrument cannot induce the full adjustment of sectoral prices required for efficiency.

When rigidities are asymmetric, $\alpha_1 \neq \alpha_2$, the constraints on stabilization are tighter: (2.15) implies that the same policy action that helps close the aggregate gap also tilts the relative price, creating an additional trade-off between aggregate stabilization and relative-price stabilization. These multidimensional distortions are reflected in the welfare criterion below. Substituting the equilibrium prices characterized in Lemma 1 into (2.12), welfare in a state $\hat{v}^n$ under instrument choice $\hat{q}$ and posterior beliefs $\tilde{\mu}$ can be written as:

$$U(\hat{v}^n, \hat{q}, \mathbb{E}_{\tilde{\mu}}\hat{v}^n) \approx -\frac{1}{2}\left[\left(\hat{q} - \hat{p} - \hat{y}^n\right)^2 + \eta n_1 n_2\left(\hat{p}_R - \hat{p}_R^n\right)^2 + \theta\sum_j n_j\alpha_j(1-\alpha_j)\left(\hat{p}_j^r\right)^2\right] + \text{t.i.p.} \tag{2.16}$$

This expression illustrates the possible conflicts between private pricing incentives (2.13) and household welfare, and emphasizes the importance of coordinating firms' expectations about the underlying economic state.

Belief-Consistent Monetary Policy. Both the instrument $\hat{q}$ and communication policies can, in principle, convey information and influence posterior beliefs. We adopt, without loss of generality, a policy

normalization in which communication is the only channel of disclosure of information: conditional on a public message m, the instrument choice does not reveal additional information, so that firms' posterior satisfies $\tilde{\mu} = \mu \mid m$.[12] Furthermore, given posterior beliefs $\tilde{\mu}$, the monetary authority then chooses $\hat{q}$ optimally and benevolently as a best response to those beliefs, i.e., $\hat{q}(\tilde{\mu}) \in \arg\max_{\hat{q}} \ \mathbb{E}_{\tilde{\mu}}\big[\, U\big(\hat{v}^n, \hat{q}, \mathbb{E}_{\tilde{\mu}}\hat{v}^n\big)\big]$.

Lemma 2. *Given posterior beliefs $\tilde{\mu}$, optimal belief-consistent monetary policy is set according to*

$$\hat{q}(\tilde{\mu}) = \mathbb{E}_{\tilde{\mu}}\hat{y}^n + \gamma_q \cdot \mathbb{E}_{\tilde{\mu}}\hat{p}_R^n, \tag{2.17}$$

where $\gamma_q \in (-1, 1)$ is a composite parameter that satisfies:

$$\gamma_q \equiv \frac{n_1 n_2(\alpha_1 - \alpha_2)\Big[\big(n_1\alpha_1 + n_2\alpha_2\big) + \eta\big(n_1\alpha_2 + n_2\alpha_1\big) + \theta\big(1 - \alpha_1 - \alpha_2\big)\Big]}{\big(n_1\alpha_1 + n_2\alpha_2\big)^2 + \eta n_1 n_2(\alpha_1 - \alpha_2)^2 + \theta\Big[n_1\alpha_1(1 - \alpha_1) + n_2\alpha_2(1 - \alpha_2)\Big]}. \tag{2.18}$$

Proof. See Appendix A.3.2. ∎

Lemma 2 implies that the instrument depends on beliefs only through the posterior means $\mathbb{E}_{\tilde{\mu}}\hat{y}^n$ and $\mathbb{E}_{\tilde{\mu}}\hat{p}_R^n$. Under symmetric price rigidity $\alpha_1 = \alpha_2$, the optimal policy prescribes targeting nominal demand at the perceived natural level of output, i.e., $\gamma_q = 0$ and $\hat{q}(\tilde{\mu}) = \mathbb{E}_{\tilde{\mu}}\hat{y}^n$. More generally, additional adjustment of nominal demand is required in response to perceived changes in the natural relative price to the extent $\gamma_q \neq 0$. Importantly, the fiscal intervention τ removes the steady-state distortion from monopolistic competition and the standard inflation bias is absent: the instrument choice in (2.17) is therefore time-consistent once beliefs are given. Thus, any credibility concerns regarding monetary decisions arise from informational frictions and the incentives to shape beliefs through communication.

Overall, this normalization isolates communication as the object of interest: for any given communication policy–and the posterior beliefs it induces, the instrument is set optimally as the benevolent best response. The analysis therefore proceeds by characterizing optimal communication under commitment and then studying its credibility when the monetary authority cannot commit.

3 The Optimal Disclosure of Information

In this section, we characterize the central bank's optimal communication about aggregate and sectoral economic conditions. We formulate the problem as a Bayesian persuasion problem; see, e.g., Kamenica (2019) for a review. A benevolent monetary authority (the sender) commits ex ante to a state-contingent disclosure rule φ that maps the realized state into a public message. Given the induced information structure, firms (the receivers) update beliefs by Bayes' rule and set prices optimally.

[12] For any equilibrium induced by a pair of (possibly informative) communication and instrument policies, one can construct an outcome-equivalent pair in which the same posterior beliefs are induced by communication alone and the instrument is chosen as a function of those beliefs. This normalization is standard in environments with multiple public signals.

A Bayesian Persuasion Problem. The monetary authority chooses a disclosure rule, i.e., a conditional distribution $\varphi(\cdot \mid \hat{v}^n) \in \Delta(M)$ over public messages m, given the realized state $\hat{v}^n = (\hat{y}^n, \hat{p}_R^n)$, to solve:[13]

$$\max_{\varphi} \ \mathbb{E}\left[U\big(\hat{v}^n, \hat{q}, \mathbb{E}_{\tilde{\mu}}\hat{v}^n\big)\right], \tag{3.1}$$

subject to

$$\hat{q} = \hat{q}(\mathbb{E}_{\tilde{\mu}}\hat{v}^n)\,, \tag{3.2}$$

$$\mathbb{E}_{\tilde{\mu}}\hat{v}^n = \mathbb{E}(\hat{v}^n|m)\,. \tag{3.3}$$

The first constraint indicates that the monetary instrument is set optimally according to posterior beliefs, as specified by (2.17). The second constraint is the Bayes' rule requirement, which stipulates that firms rationally update their posterior beliefs upon receiving a message m under the disclosure rule φ. The expectation in (3.1) is taken over the joint distribution of $(\hat{v}^n, m)$ induced by the prior over states and the disclosure rule φ. Given Lemmas 1 and 2, equilibrium allocations and welfare depend on beliefs only through the posterior means $\mathbb{E}_{\tilde{\mu}}\hat{v}^n$. Therefore, the sender's choice of $\varphi(\cdot)$ is equivalently a choice over the distribution of posterior means subject to Bayesian plausibility. Importantly, the monetary authority commits to the disclosure rule φ prior to observing shocks $\hat{v}^n$.[14]

Bayes' rule restricts feasible disclosure rules through Bayesian plausibility: the distribution of posterior beliefs induced by the disclosure rule φ averages to the prior mean, $\mathbb{E}_{\varphi}[\mathbb{E}(\hat{v}^n \mid m)] = \mathbb{E}(\hat{v}^n) = 0$, by the law of iterated expecations. Moreover, information is bounded between no disclosure and full disclosure. Under no disclosure, $\mathbb{E}(\hat{v}^n \mid m)$ is constant in m; under full disclosure, $\mathrm{Var}(\hat{v}^n \mid m) = 0$ for all m. More generally, by the law of total variance, $\mathrm{Var}(\mathbb{E}(\hat{v}^n \mid m)) \leq \mathrm{Var}(\hat{v}^n)$, with equality under full disclosure and 0 under no disclosure.

Proposition 1. *There exists a composite parameter $\Gamma \in \mathbb{R}$—a function of the elasticities (η, θ), sector sizes (n_1, n_2), and price rigidities (α_1, α_2)—such that the optimal disclosure rule $\varphi(\cdot \mid \hat{v}^n) \in \Delta(M)$ satisfies:*

- *If $\Gamma \geq 0$, full disclosure is optimal: the message reveals the entire state, $m = \hat{v}^n$ a.s., so that firms' posterior means satisfy $\mathbb{E}(\hat{v}^n \mid m) = m = \hat{v}^n$.*

- *If $\Gamma < 0$, partial disclosure is optimal: the message reveals only the natural level of output, $m = \hat{y}^n$ a.s., so that $\mathbb{E}(\hat{y}^n \mid m) = m = \hat{y}^n$, and is uninformative about $\hat{p}_R^n$, so that firms' posterior mean of the natural relative price satisfies $\mathbb{E}(\hat{p}_R^n \mid m) = 0$.*

- *Under symmetric sector sizes and price rigidities, i.e., $n_1 = n_2$ and $\alpha_1 = \alpha_2 \equiv \alpha$, full disclosure $(\Gamma \geq 0)$ is equivalent to*

$$\frac{\theta}{\eta} \leq \frac{1+\alpha}{\alpha}.$$

Proof. See Appendix B. ∎

[13] Equivalently, the sender chooses a joint distribution over $(\hat{v}^n, m)$ or over posterior beliefs $\tilde{\mu}$ subject to Bayesian plausibility.

[14] The timing is formally as follows: the sender selects φ, known to receivers; nature draws the state $\hat{v}^n$ and a message m according to φ; the receivers update beliefs from the prior μ to the posterior $\tilde{\mu}$ using Bayes' rule and take optimal action.

The natural level of output $\hat{y}^n$, which captures the aggregate component of productivity shocks, is always truthfully disclosed. Ensuring that $\mathbb{E}_{\tilde{\mu}}(\hat{y}^n) = \hat{y}^n$ allows the monetary authority to set the policy instrument $\hat{q}$ so as to optimally stabilize the aggregate output gap. By contrast, whether the monetary authority discloses the natural relative price $\hat{p}_R^n$—that is, the cross-sector dispersion of shocks—depends on the substitution elasticities (η, θ) and price rigidities (α_1, α_2). In other words, the disclosure decision is governed by the structural elements of the economy reflected in the welfare trade-off summarized in Γ, not by the realization of productivity shocks.

To appreciate the logic of partial disclosure, note from (2.13) that if information about the natural relative price is not released, posterior beliefs satisfy $\mathbb{E}_{\tilde{\mu}}\hat{p}_R^n = 0$. In that case, reset prices coincide with preset prices within each sector, $\hat{p}_j^r = \hat{p}_j^p = 0$, implying zero within-sector price dispersion. However, the relative-price gap is not corrected: $\hat{p}_R - \hat{p}_R^n = -\hat{p}_R^n$, so the welfare loss associated with cross-sector misallocation fully reflects underlying productivity differentials across sectors. Based on this insight, one can review the role of elasticities and price rigidities in shaping the optimal disclosure rule.[15]

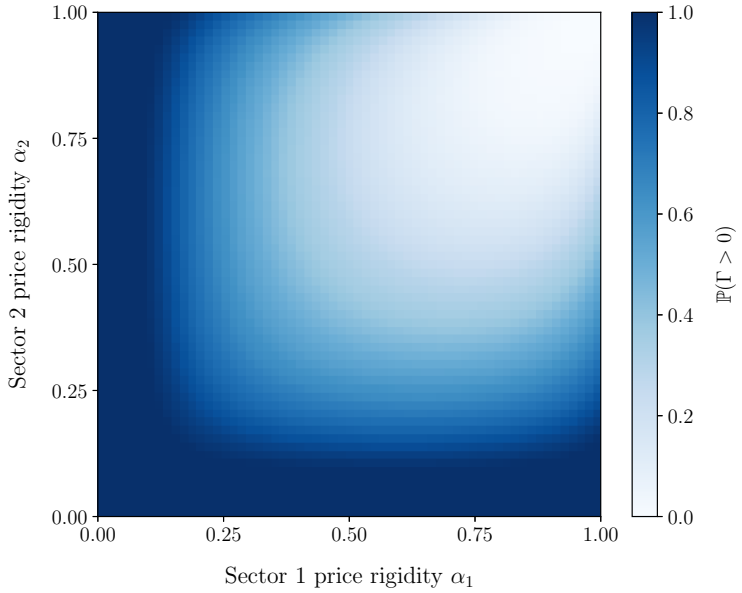
Within and Across Sectors Elasticities. Disclosure of $\hat{p}_R^n$ is optimal when the elasticity of substitution within sectors, θ, is sufficiently low relative to the elasticity across sectors, η. Revealing $\hat{p}_R^n$ improves cross-sector allocation by aligning relative prices with the natural relative price, thereby reducing cross-sector consumption misallocation—an effect whose welfare weight is proportional to η. But under staggered price adjustment, the same information-induced relative-price response simultaneously generates within-sector price dispersion across varieties, distorting within-sector allocations with a welfare cost weighted by θ. The sign of Γ summarizes which force dominates for given values of sectoral rigidities (α_1, α_2). A higher within-sector elasticity θ raises the welfare cost of within-sector price dispersion and therefore tilts the optimum toward withholding $\hat{p}_R^n$. Conversely, a higher across-sector elasticity η increases the allocative gains from aligning relative prices with $\hat{p}_R^n$ and therefore tilts the optimum toward disclosure. In the symmetric economy $(\alpha_1 = \alpha_2 \equiv \alpha,\ n_1 = n_2)$, the effects of elasticities on this trade-off become transparent: $\Gamma > 0$ is equivalent to $\theta/\eta \leq (1+\alpha)/\alpha$, where the right-hand side reflects the intensity of price adjustment under nominal rigidities, as discussed next.

Sectoral Price Rigidities. Price rigidities shape the same trade-off by governing how strongly information translates into dispersion costs and how effectively the economy can implement relative-price adjustment. When nominal rigidities are low (smaller α_j), a larger share of firms can incorporate the relevant signal into prices, reducing the magnitude of within-sector dispersion. At the same time, relative prices can adjust more closely to $\hat{p}_R^n$, strengthening the allocative gains from disclosure. As is clear in the symmetric economy case, greater price flexibility expands the parameter region where $\Gamma > 0$ and full disclosure is optimal.

Figure 2 illustrates this analytical insight and plots, for each pair of sectoral rigidities (α_1, α_2), the Monte Carlo probability that full disclosure is optimal, i.e., $\mathbb{P}(\Gamma > 0)$. The draws randomize elasticities (η, θ) over plausible ranges to reflect uncertainty about their precise values. Full disclosure is most likely when at least

[15] Sector sizes (n_1, n_2) also enter Γ and therefore affect the disclosure region. In what follows, however, we emphasize the role of elasticities (η, θ) and nominal rigidities (α_1, α_2), which primarily govern the welfare trade-off and retain sector sizes n_i for the quantitative application to the euro-area.

Figure 2: Sensitivity of the full-disclosure region to sectoral price rigidities



Notes. The figure reports, for each pair of sectoral rigidities $(\alpha_1, \alpha_2) \in (0,1)^2$, the Monte Carlo estimate of $\mathbb{P}(\Gamma > 0)$, where Γ is the composite coefficient governing whether full disclosure is optimal (Proposition 1). Sector sizes are fixed at $n_1 = n_2 = \frac{1}{2}$. For each grid point (α_1, α_2), we draw (η, θ) independently from uniform distributions $\eta \sim U[1,3]$ and $\theta \sim U[6,8]$ and compute the fraction of draws for which $\Gamma > 0$.

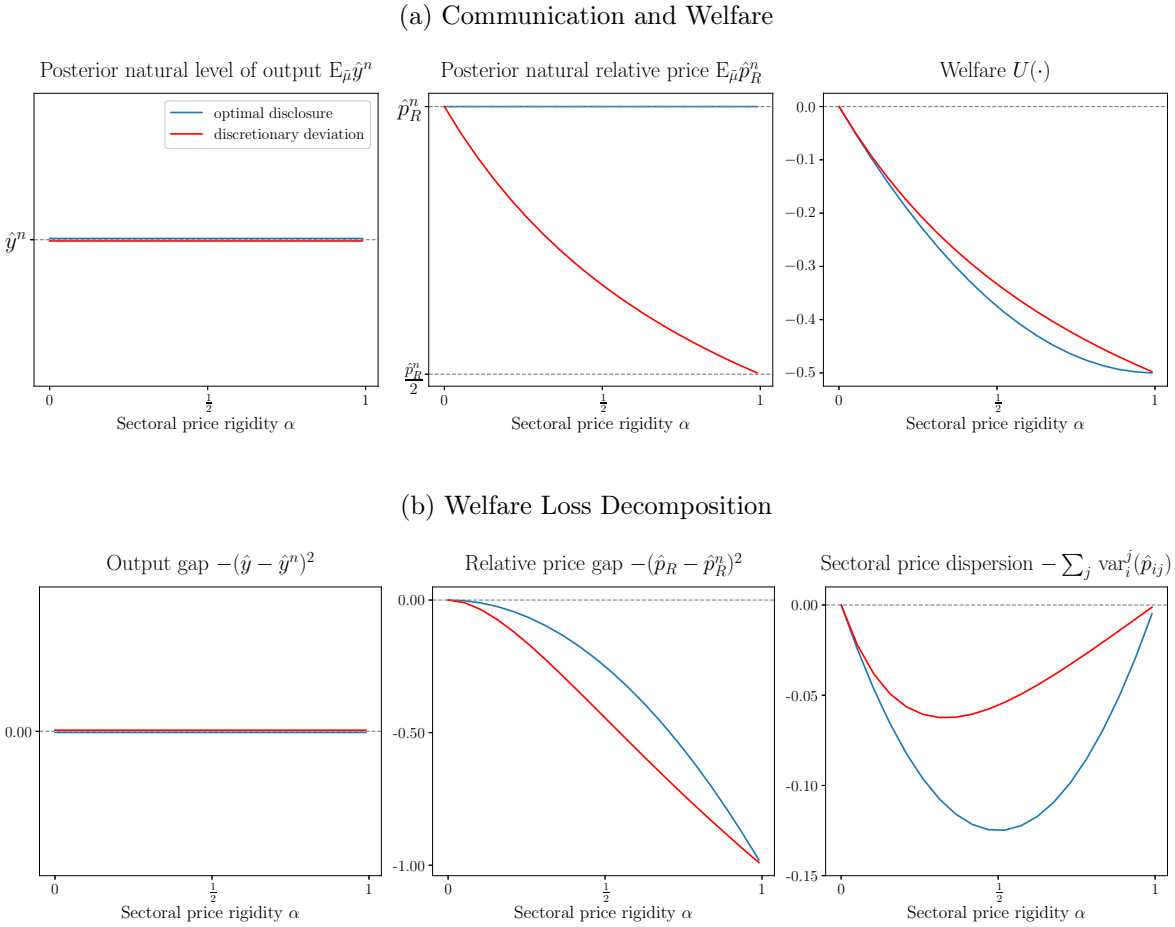
one sector is relatively flexible, whereas partial disclosure arises mainly when rigidities are high and similar across sectors.

Asymmetric price rigidities may strengthen the gains from revealing dispersion shocks. When at least one sector is sufficiently flexible, information about $\hat{p}_R^n$ can be incorporated primarily through price adjustment in that sector, allowing the economy to correct cross-sector relative prices while limiting the dispersion costs associated with staggered adjustment. By contrast, when both sectors are highly rigid, disclosure generates only limited relative-price correction while inducing dispersion costs within sectors, making partial disclosure more likely to be optimal.

Equilibrium and Welfare Implications of the Optimal Disclosure Rule. When $\Gamma > 0$, the optimal disclosure rule prescribes full revelation, $m = \hat{v}^n$ a.s., so that private beliefs satisfy $\mathbb{E}_{\tilde{\mu}} \hat{y}^n = \hat{y}^n$ and $\mathbb{E}_{\tilde{\mu}} \hat{p}_R^n = \hat{p}_R^n$. In the symmetric-rigidity case ($\alpha_1 = \alpha_2$) reported in Figure 3 (blue lines), monetary policy closes the output gap, and remaining welfare losses are driven by the residual relative-price gap and by within-sector dispersion that arises from staggered adjustment. As rigidity increases, the economy becomes less able to implement the efficient relative-price response, so welfare deteriorates even though aggregate stabilization remains effective. As reported in the welfare decomposition, the relative-price component increasingly weighs on welfare as α rises.

With asymmetric rigidities (reported in Figure 4, blue lines), optimal policy reflects the classic Aoki (2001) insight that stabilization should focus on the stickier sector. As a result, the output gap is not generally fully closed, and its sign depends on whether productivity is higher in the more flexible or more

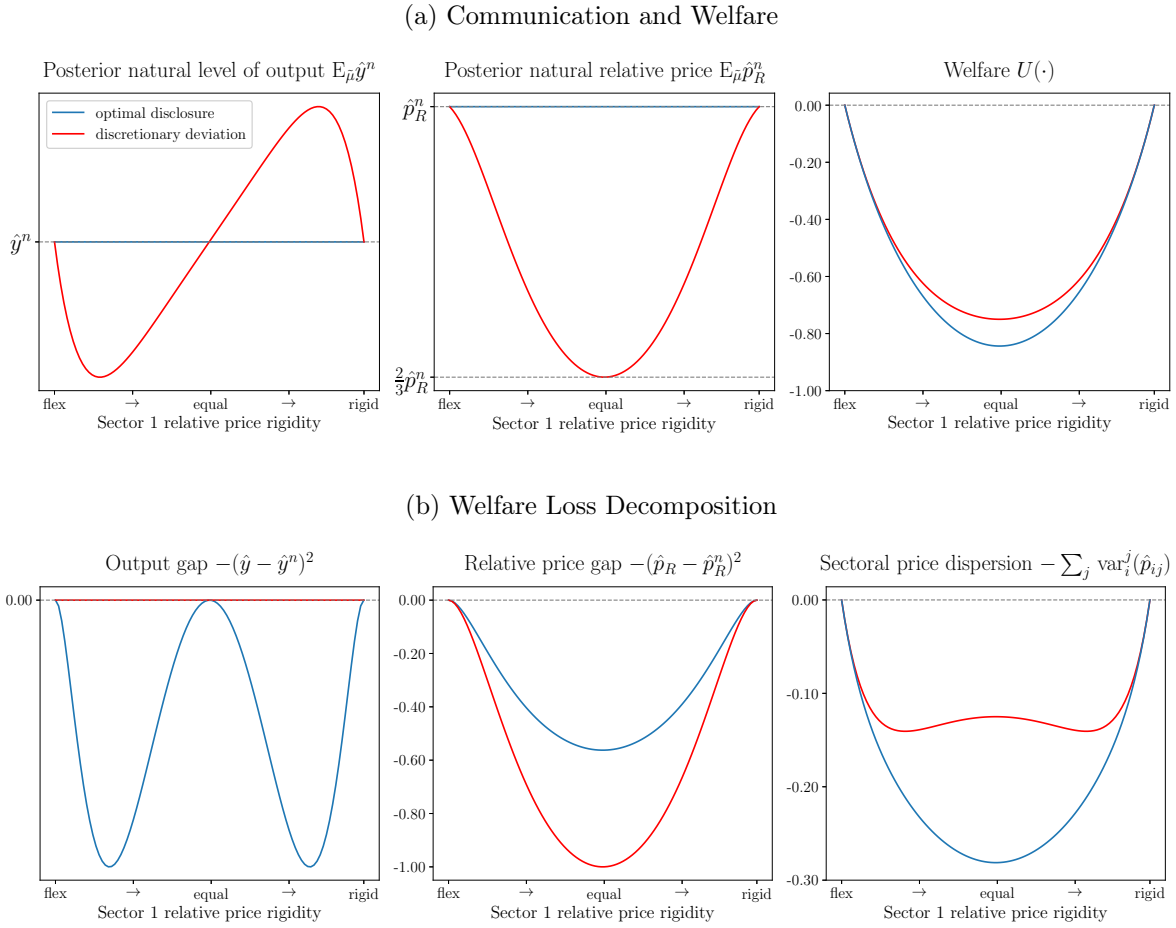
Figure 3: Communication with Symmetric Price Rigidity and $\Gamma > 0$



Notes. Given $\hat{y}^n = 0$ and $\hat{p}_R^n = \hat{a}_1 - \hat{a}_2 > 0$, this figure compares outcomes under (i) the **optimal disclosure rule** derived under commitment to a disclosure rule φ (Proposition 1), and (ii) a **discretionary deviation** (Proposition 2). The figure reports posterior beliefs and welfare as functions of symmetric sectoral price rigidity $\alpha_1 = \alpha_2 = \alpha$. Illustrative parameter values $0 < \eta < \theta$ are selected so that $\Gamma > 0$ for all $\alpha \in (0, 1)$.

rigid sector.

Figure 4: Communication with Asymmetric Price Rigidity and $\Gamma > 0$



Notes. Given $\hat{y}^n > 0$ and $\hat{p}_R^n = \hat{a}_1 - \hat{a}_2 > 0$, this figure compares outcomes under (i) the **optimal disclosure rule** derived under commitment to a disclosure rule φ (Proposition 1), and (ii) a **discretionary deviation** (Proposition 2), as a function of asymmetric sectoral price rigidities (α_1, α_2). The figure reports posterior beliefs and welfare. Illustrative parameter values are chosen with average price rigidity fixed at $\bar{\alpha} = \frac{1}{2}$, sector sizes $n_1 = n_2 = \frac{1}{2}$, and elasticities $0 < \eta < \theta$ so that $\Gamma > 0$ for all $\alpha_1 \in (0, 1)$.

Finally, when $\Gamma < 0$, the optimal communication rule withholds information about dispersion shocks, $m = \hat{y}^n$ a.s. Reset prices then coincide with preset prices, eliminating within-sector dispersion, but at the cost of leaving the natural relative-price gap distorted. In this regime, welfare losses are dominated by cross-sector misallocation induced by uniform relative prices that fail to reflect productivity differentials. Figures 7 and 8 in the Appendix illustrate these elements and further highlight two novel properties of equilibrium. In both symmetric and asymmetric rigidity cases, the monetary instrument closes the output gap ($\hat{y} = \hat{y}^n$), and—because prices remain equalized across varieties and sectors—welfare becomes insensitive to nominal rigidities, with remaining losses driven by the uncorrected natural relative-price wedge.

Table 1: An Application to the Euro Area.

(a) Monthly frequency of price changes, Gautier et al. (2025)

	Services		NEIG	
Product sample	Pre	Post	Pre	Post
Harmonized sample, incl. sales	0.064	0.083	0.125	0.144
Harmonized sample, excl. sales	0.062	0.082	0.060	0.082
Country-specific sample, incl. sales	0.060	0.089	0.119	0.141
Country-specific sample, excl. sales	0.058	0.087	0.063	0.087

(b) Probability that full disclosure is optimal, $\mathbb{P}(\Gamma > 0)$

	Quarterly interpretation			Annual interpretation		
Product sample	Pre	Post	Delta	Pre	Post	Delta
Harmonized sample, incl. sales	0.089	0.121	0.032	0.809	0.938	0.128
Harmonized sample, excl. sales	0.022	0.042	0.021	0.379	0.577	0.198
Country-specific sample, incl. sales	0.079	0.117	0.038	0.768	0.929	0.161
Country-specific sample, excl. sales	0.022	0.048	0.026	0.385	0.622	0.237

Notes. The table reports Monte Carlo estimates of $\mathbb{P}(\Gamma > 0)$ under the optimal disclosure rule of Proposition 1. "Pre" denotes the period 2010–2021 and "Post" denotes 2022–2023; Δ is the difference. Monthly price-change frequencies are taken from Gautier et al. (2025) and mapped into Calvo no-reset probabilities, under either a quarterly, $\alpha_{i,q} = (1-f_{m,i})^3$, or an annual interpretation of the model, $\alpha_{i,a} = (1 - f_{m,i})^{12}$. The harmonized product sample uses a common set of products across euro-area countries, while the country-specific product sample allows the product set to vary by country based on available microdata. "Including sales" and "excluding sales" refer to whether temporary price reductions are counted as price changes. The service-sector share is fixed at $n_1 = 0.65$. Elasticities are drawn from $\eta \sim U[1, 3]$ and $\theta \sim U[6, 8]$.

Application to the Euro-area Inflation Surge. We apply the insights of Proposition 1 to the documented shift in ECB communication toward a greater emphasis on sectoral price dynamics following the inflation surge.

The exercise maps empirically observed price-change frequencies from Gautier et al. (2025) into sector-specific Calvo rigidities, combines them with uncertainty over substitution elasticities, and computes the *ex ante* probability that full disclosure of sectoral dispersion is optimal, $\mathbb{P}(\Gamma > 0)$. The service-sector share is fixed at $n_1 = 0.65$, in line with euro-area national accounts. Comparing the pre-surge period (2010–2021) to the inflation-surge period (2022–2023) quantifies how changes in nominal rigidities—especially the relative rigidity of services—shift the optimal communication regime.

Table 1 reports the results under alternative constructions of price-change frequencies. Across all specifications, the inflation surge is associated with a systematic increase in $\mathbb{P}(\Gamma > 0)$. The increase is particularly meaningful under the annual interpretation of price frequencies, and remains positive—though more muted—under the quarterly interpretation, which provides a conservative lower bound on disclosure incentives.[16] The qualitative pattern is robust to whether frequencies are computed on a harmonized euro-area product sample or on country-specific product samples, and to whether sales prices are included.

[16] Under annual interpretation, implied Calvo rigidities are substantially lower, mechanically reducing dispersion costs and shifting the regime toward disclosure.

Interpreted through the lens of the model, the post-pandemic increase in the frequency of price adjustment, together with the pronounced services–industry asymmetry in nominal rigidities, raises the expected welfare gains from communicating sectoral inflation pressures. These results provide a structural rationale for the ECB's emphasis on sectoral heterogeneity in its policy assessments as documented in the introduction, while highlighting that such communication incentives emerge even under conservative assumptions on price adjustment.

4 Communication without Commitment

This section asks whether the optimal disclosure rule characterized under commitment can be implemented when the monetary authority cannot commit ex ante to a communication policy. We first study the one-shot incentive to deviate from the optimal disclosure rule after the state $\hat{v}^n$ is revealed to the monetary authority, thereby identifying when the commitment benchmark is time-inconsistent. We then turn to a repeated-interaction environment in which reputational concerns discipline discretionary communication and can partially substitute for commitment.

4.1 Discretionary Communication and Time Inconsistency

The Bayesian persuasion program (3.1) delivers an optimal disclosure rule under commitment. When the monetary authority cannot commit, the relevant question is whether this rule is sequentially incentive compatible once the state is observed. This subsection characterizes the discretionary deviation incentives and shows how they depend on the structural trade-off summarized by the composite parameter Γ.

Suppose private agents expect the monetary authority to follow the commitment-optimal disclosure rule $\varphi(\cdot)$ characterized in Proposition 1, i.e., firms take messages m at face value and they set posterior beliefs accordingly, $\mathbb{E}_{\tilde{\mu}}\hat{v}^n = m$. After observing the realized state $\hat{v}^n$, does a discretionary authority prefer to deviate from the communication rule?

Formally, after observing $\hat{v}^n$, a discretionary monetary authority chooses a two-dimensional message $m = (m_1, m_2)$ to solve:

$$\max_{m} U(\hat{v}^n, \hat{q}, \mathbb{E}_{\tilde{\mu}}\hat{v}^n), \tag{4.1}$$

subject to

$$\hat{q} = \hat{q}(\mathbb{E}_{\tilde{\mu}}\hat{v}^n), \tag{4.2}$$

$$\mathbb{E}_{\tilde{\mu}}\hat{v}^n = m, \tag{4.3}$$

and, when $\Gamma < 0$, the restriction $m_2 = 0$. The first constraint prescribes that monetary policy is conducted optimally in a belief-consistent manner, as characterized in (2.17). The second constraint stipulates that private firms interpret messages as if generated by the optimal disclosure rule. In other terms, they take the message m of the monetary authority at face value and form posterior beliefs accordingly. When $\Gamma < 0$,

the commitment rule induces a one-dimensional on-path message space: messages depend only on $\hat{y}^n$. In assessing one-shot deviations, we therefore restrict attention to deviations that remain within this on-path message space.[17]

Proposition 2. *In a single sector economy ($\eta = \theta$), the disclosure rule $\varphi(\hat{v}^n)$ is sequentially incentive compatible, i.e., credible. In a multi-sector economy $\eta < \theta$,*

- *if $\Gamma < 0$, the disclosure rule is credible, i.e., sequentially incentive compatible.*
- *if $\Gamma \geq 0$, the disclosure rule is not credible as the central bank has incentives to pursue a discretionary deviation:*

$$m = \begin{pmatrix} m_1 \\ m_2 \end{pmatrix} = \begin{pmatrix} 1 & \kappa_1 \\ 0 & \kappa_2 \end{pmatrix} \begin{pmatrix} \hat{y}^n \\ \hat{p}_R^n \end{pmatrix} = \kappa \hat{v}^n, \tag{4.4}$$

where κ_i are constant composite parameters of elasticities and price rigidities. In particular, if $\alpha_1 = \alpha_2$, then $\kappa_1 = 0$ and $\kappa_2 = \frac{\eta}{\eta(1-\alpha)+\theta\alpha}$ independent of sector sizes (n_1, n_2).

Proof. See Appendix C. ∎

A credibility problem arises only when the commitment benchmark prescribes full disclosure ($\Gamma > 0$) in a genuinely multi-sector environment ($\eta < \theta$). When the optimal rule instead prescribes partial disclosure ($\Gamma < 0$), the authority withholds the dispersion component and sets the instrument optimally given $\mathbb{E}_{\tilde{\mu}} \hat{p}_R^n = 0$; there is then no gain from misreporting the aggregate component $\hat{y}^n$.

We therefore focus on the $\Gamma > 0$ case, where the optimal rule prescribes full disclosure of information. When $\eta = \theta$, the communication wedge is the identity matrix $\kappa = \mathbb{I}$, so the commitment rule is sequentially incentive compatible.[18] Indeed, the marginal welfare effects of relative price-adjustment and within-sector dispersion align so that the ex-post message is consistent with the optimal disclosure rule. By contrast, when $\eta < \theta$ and dispersion shocks are present ($\hat{p}_R^n \neq 0$), a discretionary authority prefers to understate the dispersion component, with $m_2 = \kappa_2 \hat{p}_R^n$ and $0 < \kappa_2 < 1$. This "compression" of the perceived relative-price wedge dampens the price adjustment of resetting firms, reducing within-sector dispersion costs, albeit at the expense of a larger relative-price gap.

When $\alpha_1 = \alpha_2$, the discretionary deviation operates only through the dispersion component: the authority discloses $\hat{y}^n$ but understates $\hat{p}_R^n$. Figure 3 (red lines) illustrates the resulting trade-off between within-sector dispersion and the relative-price gap, and the associated welfare implications.

These strategic incentives to under-report dispersion are also present under asymmetric price rigidities ($\alpha_1 \neq \alpha_2$), as illustrated in Figure 4 (red lines). In this case, the deviation also loads on the aggregate component ($\kappa_1 \neq 0$), because shifting beliefs about $\hat{y}^n$ changes the instrument choice through (2.17). When messages are taken at face value, this additional channel yields welfare gains by allowing the monetary authority to adjust the policy instrument and close the output gap systematically.

[17] Off path, we adopt the convention that any message not in the support of the commitment rule is interpreted as uninformative about $\hat{p}_R^n$, so that the posterior mean remains $\mathbb{E}(\hat{p}_R^n \mid m) = 0$.

[18] Remember that this case concerns the demand aggregation structure: even when $\eta = \theta$, firms may remain heterogeneous with respect to sectoral productivity and nominal rigidity.

Overall, when the commitment benchmark calls for full disclosure ($\Gamma > 0$) in a genuinely multi-sector economy ($\eta < \theta$), the optimal disclosure rule is time-inconsistent. This is a Barro–Gordon problem in disclosure space: the authority would like *ex ante* to commit to full transparency, but *ex post* prefers to understate the dispersion component in order to influence the price-setting response and dampen within-sector price dispersion, even if doing so worsens relative-price alignment. This lack of credibility, however, does not imply that discretionary gains are systematically attainable. The next subsection studies a repeated-interaction environment under a lack of commitment in which reputational concerns discipline communication and can partially substitute for commitment.

4.2 Reputation and Credible Communication

To complete the analysis, we relax the commitment assumption embeded in the optimal disclosure rule and study the equilibrium outcomes under discretionary communication and dynamic reputation. We henceforth restrict attention to multi-sector economies ($\eta < \theta$) that display $\Gamma > 0$, where the optimal communication rule prescribes full disclosure (Proposition 1) but is not sequentially incentive compatible (Proposition 2). We present the key economic elements of analysis and defer the full dynamic-game specification to Appendix D.

4.2.1 A Dynamic Environment with Reputation.

We consider an infinite-horizon extension of the environment with asymmetric information, augmented with an endogenous reputation dynamic, following the classic framework of Kreps and Wilson (1982) applied to monetary policy in Backus and Driffill (1985). There are two types of monetary authorities $\delta \in \{C, S\}$, with stochastic turnover and unobservable types to private agents. A *committed* type $\delta = C$ follows the optimal disclosure rule of Proposition 1. Type $\delta = S$ is *strategic*: each period it chooses communication optimally and may deviate from the rule to pursue the strategic deviation characterized in Proposition 2. In each period, nature draws the state $\hat{v}^n$ and the monetary authority observes a noisy signal $s = \hat{v}^n + \varepsilon$, with i.i.d. noise ε, so that its relevant informational statistic is $\bar{v}^n \equiv \mathbb{E}(\hat{v}^n \mid s)$. Private agents interpret messages in a Bayesian manner, taking into account the reputation of the policymaker ξ for being committed to the optimal disclosure rule, i.e., $\xi = \mathbb{P}(\delta = C)$. Based on posterior beliefs, firms not subject to nominal rigidities set price $\hat{p}_j^r$ accordingly.

Second, reputation ξ evolves endogenously from one period to the next. At the end of each period, private agents update their beliefs about the policymaker's type based on prior reputation, received messages and observable realized economic outcomes $\hat{v}^n$. Communication is therefore disciplined by dynamic incentives: a strategic authority trades off contemporaneous stabilization gains from deviating from the rule-based disclosure against the cost of a decline in ξ, which reduces the credibility and effectiveness of subsequent communication.[19] Formally, given reputation ξ and signal $\bar{v}^n$, a strategic monetary authority chooses a mixing probability $p(\xi, \bar{v}^n)$ between rule-based disclosure ($m = \bar{v}^n$) and the discretionary deviation ($m =$

[19] Note that since the initial information $\bar{v}^n$ of the monetary authority is noisy, private agents cannot perfectly detect upon observing $\hat{v}^n$ whether the public message m was following the rule or the discretionary deviation.

$\kappa\bar{v}^n$) to maximize contemporaneous economic stabilization against the dynamic evolution of reputation:

$$V_S(\xi, \bar{v}^n) = \max_{p\in[0,1]} \mathbb{E}_{m,\hat{v}^n}\Big\{U\left(\hat{v}^n, \hat{q}, \mathbb{E}_{\tilde{\mu}}\hat{v}^n|m\right) + \beta \mathbf{V}_S\big(\xi'\big)\Big\}, \tag{4.5}$$

subject to

$$\hat{q} = \hat{q}(\tilde{\mu}) \qquad \text{instrument policy} \tag{4.6}$$

$$\mathbb{E}_{\tilde{\mu}}\hat{v}^n = \mathbb{E}(\hat{v}^n|\xi, m) \qquad \text{interpretation of } m \tag{4.7}$$

$$\xi' = \xi'(\xi, m, \hat{v}^n) \qquad \text{law of motion of reputation} \tag{4.8}$$

and

$$\mathbf{V}_S(\xi) = (1-(1-\lambda)\rho)\cdot \mathbb{E}_{\bar{v}^n} V_S(\xi, \bar{v}^n) + (1-\lambda)\rho \cdot \mathbb{E}_{\bar{v}^n} V_C(\xi, \bar{v}^n). \tag{4.9}$$

The first constraint requires that the monetary instrument is set in a benevolent and belief-consistent way, as defined in (2.17). The next two constraints capture the Bayesian interpretation of a message m and the dynamic evolution of reputation, a function of prior reputation ξ, public message m and observed economic outcomes $\hat{v}^n$. These expressions are formally characterized in Lemmas 3 and 4 in Appendix D.1.

Expression (4.9) defines the continuation value of a strategic monetary authority with reputation ξ, accounting for stochastic turnover in policymaker types. The parameter λ is the *persistence* of the incumbent, i.e., the probability that the current type remains in office next period, while ρ is the unconditional *prevalence* of the committed type in the population of potential policymakers. Private firms understand this turnover process and, after observing $(m, \hat{v}^n)$, update their belief ξ accordingly. The next-period reputation ξ' therefore reflects both Bayesian updating about the incumbent's type (given on-path behavior and realized outcomes) and the possibility that the incumbent is replaced by a newly drawn policymaker. Note that monetary authorities are benevolent, as they internalize the effects of their decisions on continuation reputation, regardless of whether there is a change in the acting monetary authority. The value functions for a committed monetary authority - denoted $V_C(\xi, \bar{v}^n)$ with its continuation value $\mathbf{V}_C(\xi)$ - are defined analogously, but with the additional constraint that the authority always communicate according to the optimal disclosure rule, i.e., $p = 1$ for all $(\xi, \bar{v}^n)$.

Finally, the effectiveness of a given monetary authority of type $\delta \in \{C, S\}$ in stabilizing the economy is evaluated via the average flow utility, defined as:

$$\mathbf{W}_\delta = \int_\xi W_\delta(\xi) dG(\xi) = \int_\xi \mathbb{E}_{\bar{v}^n}\mathbb{E}_{m,\hat{v}^n} U\left(\hat{v}^n, \hat{q}, \mathbb{E}_{\tilde{\mu}}\hat{v}^n|m\right) dG(\xi) \tag{4.10}$$

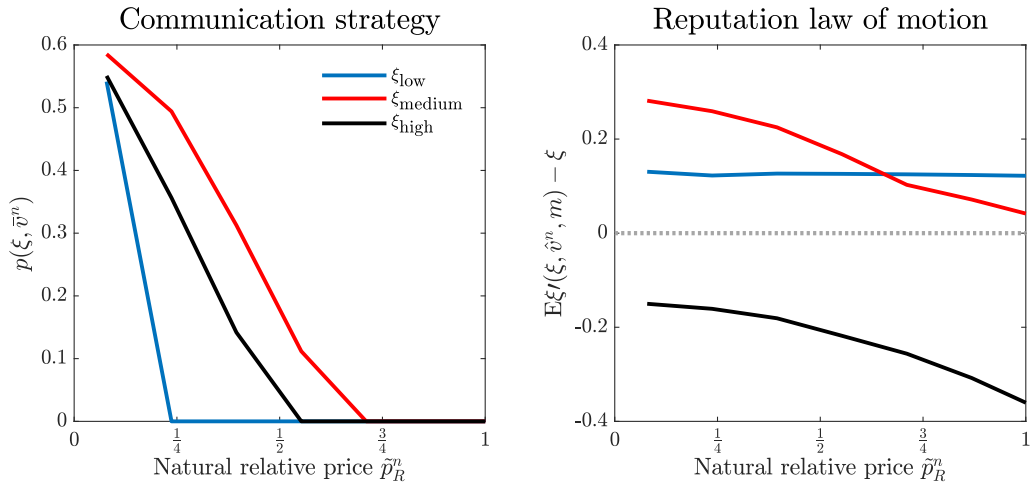
where $G(\xi)$ is the endogenous stationary distribution of reputation ξ induced by equilibrium updating, and $\hat{q}$ satisfies (2.17).

4.2.2 Discussion of Results.

When $\Gamma > 0$ and absent reputational forces, full and undistorted disclosure of information is generically not incentive compatible (see Proposition 2). Whenever strategic disclosure improves contemporaneous stabilization outcomes, a discretionary policymaker strictly prefers to deviate from the optimal disclosure of information, i.e., from the commitment benchmark. Introducing reputation fundamentally alters these incentives. Reputation therefore provides partial discipline, but does not fully replicate commitment and leads to deteriorated economic outcomes. We emphasize three results.

State-contingent Incentives for Rule-based Disclosure. Incentives to follow the disclosure rule are state-contingent and non-monotonic in reputation. As illustrated in Figure 5 for the symmetric rigidity case ($\alpha_1 = \alpha_2$), the propensity to deviate from the communication rule increases with the magnitude of dispersion shocks, reflecting the contemporaneous gains from dampening relative-price adjustment and within-sector dispersion. The dependence on reputation is non-monotonic: deviations are more frequent both when ξ is low (credibility is already weak, so the marginal reputational cost is small) and when ξ is high (reputational capital can be "spent" to improve stabilization in unusually dispersed states). Rule-based disclosure is most prevalent at intermediate reputations and for moderate dispersion shocks, where building credibility improves the effectiveness of future communication.

Figure 5: Reputation and strategic communication



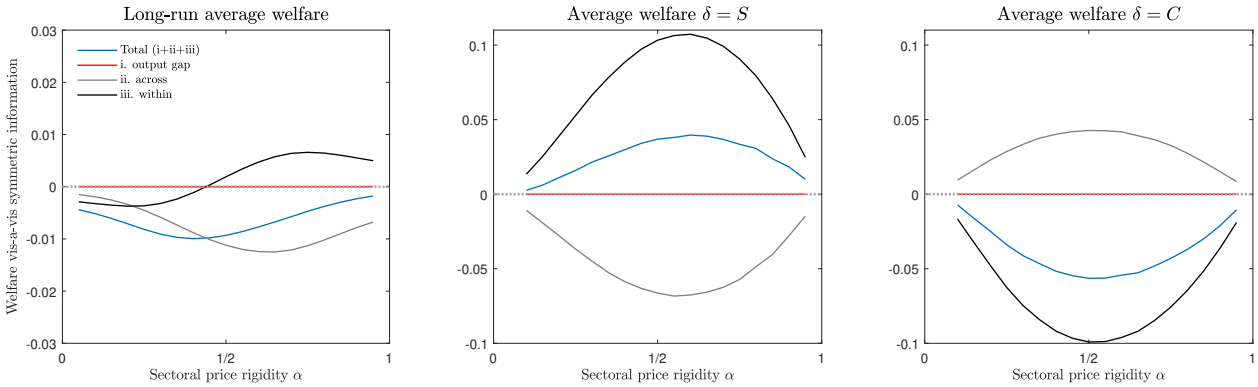
Notes. The left panel reports the communication policy $p(\xi, \bar{v}^n)$ of a strategic monetary authority $\delta = S$, for different level of reputation ξ. The right panel presents the associated law of motion of reputation. The x-axis is indexed as multiple of standard deviation of dispersion $\sigma_{\tilde{p}_R^n}$. Illustrative numerical parameters are presented in Table 2, Appendix D.1.2.

Short-run Versus Long-run Welfare Trade-offs. Reputational incentives generate a non-trivial trade-off between short-run stabilization and long-run welfare. As illustrated in Figure 6, a strategic monetary authority can achieve welfare gains relative to the symmetric-information (full disclosure) benchmark by

influencing firms' beliefs and reducing within-sector price dispersion – through selective discretionary reporting of information (middle panel). By contrast, a committed authority that always discloses information as prescribed by the rule faces a private sector that rationally contemplate possible strategic distortions. This leads to higher within-sector price dispersion and lower welfare (right panel). These effects are most pronounced at intermediate levels of price rigidity, where price adjustments translate into sizable dispersion costs. Accounting for the stochastic turnover between strategic and committed types (left panel), long-run welfare remains below the symmetric information (commitment) benchmark.[20] This result is established analytically in Proposition 3 in Appendix D.1.1 for the case of systematic turnover of policymaker, i.e., $\lambda = 0$.

Overall, the stabilization performance of a strategic authority dominates that under symmetric information, with short-run gains coming at the cost of weaker credibility of future communication and lower long-run effective stabilization.

Figure 6: Reputation and welfare



Notes. The figure provides a decomposition of **total welfare** into the three components **output gap**, **relative price gap** and **price dispersion within sectors** (left panel). The left panel provides unconditional stationary welfare across reputation and types. Middle and right panels provide a similar decomposition conditional on the monetary authority's type $\delta \in \{C, S\}$. Illustrative numerical parameters are presented in Table 2, Appendix D.1.2.

Sensitivity to Structural Parameters. We conduct a sensitivity exercise to assess the effects of model parameters on communication incentives and equilibrium outcomes. Table 3 in Appendix D.1.2 illustrates how these depend on price rigidities, substitution elasticities, and the characteristics of monetary authorities. Lower symmetric price rigidities reduce the welfare cost of within-sector dispersion, weakening reputational discipline and increasing the propensity of a strategic authority to report information strategically, but also compressing the associated welfare gains. By contrast, higher price rigidities strengthen reputational incentives and raise the value of disciplined communication. Asymmetric rigidities substantially amplify the short-run gains from strategic disclosure by allowing the authority to influence relative prices more

[20] Under $\Gamma \geq 0$, Proposition 1 states that full disclosure is optimal. Hence, relative to that benchmark, any equilibrium outcome featuring alternative disclosure patterns (as arises under discretion and reputational dynamics) cannot raise ex ante welfare.

effectively, though again these gains reflect redistribution across authority types and not improvements in long-run welfare.

Differences in substitution elasticities affect the same trade-off emphasized for the characterization of the optimal communication rule, Section 3. Lower across-sector substitutability η increases the relative importance of stabilizing within-sector dispersion, raising incentives for strategic communication, lowering equilibrium reputation, and generating larger conditional welfare gains. Reputational forces are stronger when strategic information provision is easier to detect or when future credibility is more valuable. Higher policymaker competence –measured as the precision of the informational signal σ_ε, a greater prevalence ρ of commitment types, and greater persistence λ of authority types all limit misreporting incentives and attenuate the welfare gains from strategic behavior.

Overall, the sensitivity analysis confirms that reputation operates as an imperfect substitute for commitment: parameter configurations that make dispersion costs more salient strengthen reputational discipline, whereas environments with low dispersion costs weaken it. In all cases, the possibility of discretionary distortions implies persistent credibility losses and lower long-run stabilization performance.

5 Conclusion

This paper develops a theory of monetary communication in a multi-sector New Keynesian economy in which the central bank is privately informed about aggregate fundamentals and sectoral dispersion, and firms set prices under Calvo staggering and imperfect information. Under commitment, the optimal disclosure rule is sharp: the central bank fully discloses the aggregate component, while disclosure of dispersion is determined by a single composite parameter that summarizes the welfare trade-off between relative-price alignment and within-sector price-dispersion costs.

We show that this commitment benchmark is generally time-inconsistent. In genuinely multi-sector economies in which full disclosure is ex ante optimal, a discretionary authority has an incentive ex post to undereport the dispersion component of its information. By dampening firms' relative-price adjustment, misreporting reduces within-sector price dispersion, even though it worsens allocative alignment. Communication therefore features a credibility problem analogous to Barro and Gordon (1983): the ex ante optimal disclosure rule differs from the ex post optimal message.

In a dynamic extension with imperfect observability of misreporting, reputational incentives partially discipline communication. Credibility becomes endogenous and deviations are state-contingent: reputation is accumulated in normal times and "spent" in high-dispersion states. Reputation improves outcomes relative to one-shot discretion but does not replicate commitment, implying long-run welfare losses relative to the full-disclosure benchmark.

Beyond the commitment–discretion trade-off in information policy, the framework provides a structural lens on the post-pandemic shift toward sectoral inflation narratives: environments with stronger sectoral asymmetries and higher frequency of price adjusmtents raise the value of dispersion disclosure under commitment while sharpening the credibility constraint under discretion. A natural direction for future work is to study institutional designs that strengthen commitment in communication, including delegation schemes

and verifiable disclosure technologies.

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A Economic Environment

A.1 Distributions and Signals

Productivity and Natural Variables. Let $\hat{a}_i \sim \mathcal{N}(0, \sigma^2)$, then $\hat{y}^n = n_1\hat{a}_1 + n_2\hat{a}_2 \sim \mathcal{N}\left(0, (n_1^2 + n_2^2)\sigma^2\right)$ and $\hat{p}_R^n = \hat{a}_1 - \hat{a}_2 \sim \mathcal{N}(0, 2\sigma^2)$, with $\text{cov}(\hat{y}^n, \hat{p}_R^n) = 0$, i.e.,

$$\hat{v}^n = \begin{pmatrix} \hat{y}^n \\ \hat{p}_R^n \end{pmatrix} \sim \mathcal{N}\left(\begin{pmatrix} 0 \\ 0 \end{pmatrix}, \begin{pmatrix} n_1^2 + n_2^2 & 0 \\ 0 & 2 \end{pmatrix} \sigma^2 \right) = \mathcal{N}\left(0, \Sigma\sigma^2\right). \tag{A.1}$$

Noisy Signals Let $s_i = \hat{a}_i + \varepsilon_i$ with $\varepsilon_i \sim \mathcal{N}(0, \sigma_\varepsilon^2)$, then $s_y = \hat{y}^n + n_1\varepsilon_1 + n_2\varepsilon_2 \sim \mathcal{N}\left(0, (n_1^2 + n_2^2)(\sigma^2 + \sigma_\varepsilon^2)\right)$ and $s_p = \hat{p}_R^n + \varepsilon_1 - \varepsilon_2 \sim \mathcal{N}\left(0, 2(\sigma^2 + \sigma_\varepsilon^2)\right)$, i.e.,

$$s = \hat{v}^n + \varepsilon \sim \mathcal{N}\left(0, \Sigma(\sigma^2 + \sigma_\varepsilon^2)\right). \tag{A.2}$$

Note that $\text{cov}(s_y, s_p) = 0$. Bayesian updating yields

$$\hat{y}^n | s_y \sim \mathcal{N}\left(s_y \frac{\sigma^2}{\sigma^2 + \sigma_\varepsilon^2}, (n_1^2 + n_2^2)\frac{\sigma^2 \cdot \sigma_\varepsilon^2}{\sigma^2 + \sigma_\varepsilon^2} \right), \tag{A.3}$$

and

$$\hat{p}_R^n | s_p \sim \mathcal{N}\left(s_p \frac{\sigma^2}{\sigma^2 + \sigma_\varepsilon^2}, \frac{2\sigma^2 \cdot \sigma_\varepsilon^2}{\sigma^2 + \sigma_\varepsilon^2} \right), \tag{A.4}$$

i.e.,

$$\hat{v}^n | s \sim \mathcal{N}\left(s \frac{\sigma^2}{\sigma^2 + \sigma_\varepsilon^2}, \Sigma \frac{\sigma^2 \sigma_\varepsilon^2}{\sigma^2 + \sigma_\varepsilon^2} \right), \tag{A.5}$$

so that

$$\mathbb{E}\left(\hat{v}^n | s\right) = s \frac{\sigma^2}{\sigma^2 + \sigma_\varepsilon^2}, \tag{A.6}$$

i.e., relevant signal about the conditional mean $\bar{v}^n = \mathbb{E}\left(\hat{v}^n | s\right)$ are distributed

$$\bar{v}^n \sim \mathcal{N}\left(0, \Sigma \frac{\sigma^4}{\sigma^2 + \sigma_\varepsilon^2} \right), \tag{A.7}$$

and

$$\hat{v}^n | \bar{v}^n \sim \mathcal{N}\left(\bar{v}^n, \Sigma \frac{\sigma^2 \sigma_\varepsilon^2}{\sigma^2 + \sigma_\varepsilon^2} \right). \tag{A.8}$$

A.2 Quadratic Approximation of Households' Welfare

This section presents the key steps in deriving the quadratic welfare criterion (2.12) and (2.16).

Rewrite the utility function using good $C = Y$ and labor market clearing conditions, and the production function as follows:

$$U \equiv \log C - L_1 - L_2 = \log Y - \int_{N_1} \frac{Y(i)}{A_1} di - \int_{N_2} \frac{Y(i)}{A_2} di. \tag{A.9}$$

Second-order approximation of the individual components in log-deviations

$$\log Y \approx \log \bar{Y} + \hat{y}, \tag{A.10}$$

$$\frac{Y(i)}{A_j} \approx \bar{Y}\left[1 + \hat{y}(i) + \frac{1}{2}\hat{y}(i)^2 - \hat{a}_j \hat{y}(i) - \frac{1}{2}\hat{a}_j^2\right]. \tag{A.11}$$

Aggregating up disutility from labor, and denoting within-sector cross-sectional variance by $\mathrm{Var}_i^j(\cdot)$, get:

$$\int_{n_j} \frac{Y(i)}{A_j} di \approx n_j \bar{Y}\left[\hat{y}_j + \frac{1}{2}\hat{y}_j^2 - \hat{a}_j \hat{y}_j + \frac{1}{2}\frac{1}{\theta}\mathrm{Var}_i^j \hat{y}(i)\right] + \text{t.i.p.} \tag{A.12}$$

$$\sum_j \int_{n_j} \frac{Y(i)}{A_j} di \approx \bar{Y}\left[\hat{y} + \frac{1}{2}\hat{y}^2 - \sum_j n_j \hat{a}_j \hat{y}_j + \frac{1}{2}\frac{n_1 n_2}{\eta}(\hat{y}_2 - \hat{y}_1)^2 + \frac{1}{2}\frac{1}{\theta}\sum_j n_j \mathrm{Var}_i^j \hat{y}(i)\right] + \text{t.i.p.} \tag{A.13}$$

Put things together

$$U \approx (1 - \bar{Y})\hat{y} - \frac{1}{2}\left[\hat{y}^2 - 2\sum_j n_j \hat{a}_j \hat{y}_j + \frac{n_1 n_2}{\eta}(\hat{y}_2 - \hat{y}_1)^2 + \frac{1}{\theta}\sum_j n_j \mathrm{Var}_i^j \hat{y}(i)\right] + \text{t.i.p.} \tag{A.14}$$

Using the within-sector demand schedule $\hat{y}_{ij} - \hat{y}_j = -\theta(\hat{p}_{ij} - \hat{p}_j)$, so within-sector output dispersion is proportional to within-sector price dispersion: $\mathrm{Var}(\hat{y}_{ij}) = \theta^2 \mathrm{Var}(\hat{p}_{ij})$. Similarly, under CES aggregation, the sectoral demand wedge satisfies $\hat{y}_2 - \hat{y}_1 \approx \eta(\hat{p}_1 - \hat{p}_2) = \eta(\hat{p}_R - \hat{p}_R^n)$. Assuming an efficient steady state ($\mathcal{M}(1-\tau) = 1$) and using natural variables, welfare writes:

$$U \approx -\frac{1}{2}\left[(\hat{y} - \hat{y}^n)^2 + n_1 n_2 \eta (\hat{p}_R - \hat{p}_R^n)^2 + \theta \sum_j n_j \mathrm{Var}_i^j \hat{p}(i)\right] + \text{t.i.p.} \tag{A.15}$$

The first term reflects the objective of output stabilization, the second stabilization of prices across sectors and the minimization of price dispersion within sectors.

With dichotomous price-setting, the variance of sectoral prices in sector j becomes

$$\mathrm{Var}_i^j(\hat{p}_{ij}) = \alpha_j(1 - \alpha_j)\left(\hat{p}_j^r - \hat{p}_j^p\right)^2. \tag{A.16}$$

Then the welfare criterion becomes (2.16):

$$U \approx -\frac{1}{2}\left[(\hat{y} - \hat{y}^n)^2 + \eta n_1 n_2 (\hat{p}_R - \hat{p}_R^n)^2 + \theta \sum_j n_j \alpha_j (1 - \alpha_j)\left(\hat{p}_j^r - \hat{p}_j^p\right)^2\right] + \text{t.i.p.} \tag{A.17}$$

with the normalization $\hat{p}_j^p = 0$.

A.3 Policy Representation of a Competitive Equilibrium

A.3.1 Proof of Lemma 1

Under the efficient subsidy and log utility, real marginal cost equals $\hat{q} - \hat{a}_j$ in log deviations, hence the reset price equals its posterior mean: $\hat{p}_j^r = \mathbb{E}_{\tilde{\mu}}(\hat{q} - \hat{a}_j) = \mathbb{E}_{\tilde{\mu}}\left(\hat{q} - \hat{y}^n + n_{-j}(\hat{a}_{-j} - \hat{a}_j)\right)$. Insert $\hat{p}_R^n = \hat{a}_1 - \hat{a}_2$ and get:

$$\hat{p}_1^r = (\hat{q} - \mathbb{E}_{\tilde{\mu}}\hat{y}^n) - n_2\mathbb{E}_{\tilde{\mu}}\hat{p}_R^n, \qquad \hat{p}_2^r = (\hat{q} - \mathbb{E}_{\tilde{\mu}}\hat{y}^n) + n_1\mathbb{E}_{\tilde{\mu}}\hat{p}_R^n, \tag{A.18}$$

$$\hat{p} = (1 - n_1\alpha_1 - n_2\alpha_2)(\hat{q} - \mathbb{E}_{\tilde{\mu}}\hat{y}^n) + n_1 n_2(\alpha_1 - \alpha_2)\mathbb{E}_{\tilde{\mu}}\hat{p}_R^n, \tag{A.19}$$

$$\hat{p}_R = (\alpha_1 - \alpha_2)(\hat{q} - \mathbb{E}_{\tilde{\mu}}\hat{y}^n) + (1 - n_1\alpha_2 - n_2\alpha_1)\mathbb{E}_{\tilde{\mu}}\hat{p}_R^n. \tag{A.20}$$

The welfare function then writes:

$$U(\hat{v}^n, \hat{q}, \mathbb{E}_{\tilde{\mu}}\hat{v}^n) \approx -\frac{1}{2}\left[\left(\hat{q} - \hat{p} - \hat{y}^n\right)^2 + \eta n_1 n_2\left(\hat{p}_R - \hat{p}_R^n\right)^2 + \theta\sum_j n_j\alpha_j(1-\alpha_j)\left(\hat{p}_j^r\right)^2\right] + \text{t.i.p.} \tag{A.21}$$

A.3.2 Proof of Lemma 2

The benevolent welfare criterion given posterior beliefs $\tilde{\mu}$ is $\mathbb{E}_{\tilde{\mu}}U(\hat{v}^n, \hat{q}, \mathbb{E}_{\tilde{\mu}}\hat{v}^n)$, i.e.,

$$\begin{aligned}\mathbb{E}_{\tilde{\mu}}U \approx -\frac{1}{2}\Bigg[&\left(\hat{q} - \hat{p} - \mathbb{E}_{\tilde{\mu}}\hat{y}^n\right)^2 + \text{Var}_{\tilde{\mu}}\hat{y}^n + \eta n_1 n_2\left(\hat{p}_R - \mathbb{E}_{\tilde{\mu}}\hat{p}_R^n\right)^2 \\ &+ \eta n_1 n_2\text{Var}_{\tilde{\mu}}\hat{p}_R^n + \theta\sum_j n_j\alpha_j(1-\alpha_j)\left(\hat{p}_j^r\right)^2\Bigg] + \text{t.i.p.}\end{aligned} \tag{A.22}$$

where the $\text{Var}(\cdot)$ terms are independent of $\hat{q}$. The first order conditions w.r.t. $\hat{q}$:

$$(n_1\alpha_1 + n_2\alpha_2)\left(\hat{q} - \mathbb{E}_{\tilde{\mu}}\hat{y}^n - \hat{p}\right) + (\alpha_1 - \alpha_2)\eta n_1 n_2\left(\hat{p}_R - \mathbb{E}_{\tilde{\mu}}\hat{p}_R^n\right) + \theta\sum_j n_j\alpha_j(1-\alpha_j)\left(\hat{p}_j^r\right) = 0. \tag{A.23}$$

The coefficient associated to $\hat{q} - \mathbb{E}_{\tilde{\mu}}\hat{y}^n$ is:

$$\left(n_1\alpha_1 + n_2\alpha_2\right)^2 + \eta\, n_1 n_2\,(\alpha_1 - \alpha_2)^2 + \theta\Big[n_1\alpha_1(1-\alpha_1) + n_2\alpha_2(1-\alpha_2)\Big]. \tag{A.24}$$

The coefficient associated to $\mathbb{E}_{\tilde{\mu}}\hat{p}_R^n$ is:

$$n_1 n_2(\alpha_1 - \alpha_2)\Big[\left(n_1\alpha_1 + n_2\alpha_2\right) + \eta\left(n_1\alpha_2 + n_2\alpha_1\right) + \theta\left(1 - \alpha_1 - \alpha_2\right)\Big]. \tag{A.25}$$

Reorganizing these terms, the optimal monetary rule writes:

$$\hat{q} = \mathbb{E}_{\tilde{\mu}}\hat{y}^n + \gamma_q \cdot \mathbb{E}_{\tilde{\mu}}\hat{p}_R^n, \tag{A.26}$$

with

$$\gamma_q = \frac{n_1 n_2(\alpha_1-\alpha_2)\Big[\big(n_1\alpha_1+n_2\alpha_2\big)+\eta\big(n_1\alpha_2+n_2\alpha_1\big)+\theta\big(1-\alpha_1-\alpha_2\big)\Big]}{\big(n_1\alpha_1+n_2\alpha_2\big)^2+\eta\, n_1 n_2\,(\alpha_1-\alpha_2)^2+\theta\Big[n_1\alpha_1(1-\alpha_1)+n_2\alpha_2(1-\alpha_2)\Big]}. \tag{A.27}$$

Equilibrium Outcome under Belief-Consistent Monetary Policy. It is useful to characterize equilibrium prices and output when monetary policy is set optimally. Reset prices satisfy:

$$\hat{p}_1^r = (\gamma_q - n_2)\,\mathbb{E}_{\tilde{\mu}}\hat{p}_R^n, \qquad\qquad \hat{p}_2^r = (\gamma_q + n_1)\,\mathbb{E}_{\tilde{\mu}}\hat{p}_R^n, \tag{A.28}$$

aggregate and relative prices

$$\hat{p} = \left[\gamma_q - n_1\alpha_1\,(\gamma_q - n_2) - n_2\alpha_2\,(\gamma_q + n_1)\right]\mathbb{E}_{\tilde{\mu}}\hat{p}_R^n = \gamma_p \mathbb{E}_{\tilde{\mu}}\hat{p}_R^n, \tag{A.29}$$

$$\hat{p}_R = \left[1 + \alpha_1\,(\gamma_q - n_2) - \alpha_2\,(\gamma_q + n_1)\right]\mathbb{E}_{\tilde{\mu}}\hat{p}_R^n = \gamma_{p_R}\mathbb{E}_{\tilde{\mu}}\hat{p}_R^n, \tag{A.30}$$

where γ_p and γ_{p_R} collect coefficients, and output

$$\hat{y} = \mathbb{E}_{\tilde{\mu}}\hat{y}^n + \left[n_1\alpha_1\,(\gamma_q - n_2) + n_2\alpha_2\,(\gamma_q + n_1)\right]\mathbb{E}_{\tilde{\mu}}\hat{p}_R^n. \tag{A.31}$$

B The Optimal Disclosure of Information

To characterize the optimal disclosure rule (Proposition 1), first derive the ex-ante welfare criterion $\mathbb{E}U(\cdot)$ as a function of posterior beliefs $\mathbb{E}_{\tilde{\mu}}\hat{y}^n$ and $\mathbb{E}_{\tilde{\mu}}\hat{p}_R^n$. Start from the welfare expression (A.21), and substitute the monetary rule (A.26) and prices (A.28)-(A.30). Specifically, using (A.26) and (A.29), get

$$\hat{q} - \hat{p} - \hat{y}^n = \big(\mathbb{E}_{\tilde{\mu}}\hat{y}^n - \hat{y}^n\big) + \gamma_y\,\mathbb{E}_{\tilde{\mu}}\hat{p}_R^n, \tag{B.1}$$

where $\gamma_y \equiv n_1\alpha_1(\gamma_q - n_2) + n_2\alpha_2(\gamma_q + n_1)$. Define

$$\Omega \equiv n_1\alpha_1(1-\alpha_1)(\gamma_q - n_2)^2 + n_2\alpha_2(1-\alpha_2)(\gamma_q + n_1)^2. \tag{B.2}$$

Then substituting these expressions into (A.21) yields

$$U \approx -\frac{1}{2}\left[\Big(\mathbb{E}_{\tilde{\mu}}\hat{y}^n + \gamma_y\mathbb{E}_{\tilde{\mu}}\hat{p}_R^n - \hat{y}^n\Big)^2 + \eta n_1 n_2\Big(\gamma_{p_R}\mathbb{E}_{\tilde{\mu}}\hat{p}_R^n - \hat{p}_R^n\Big)^2 + \theta\,\Omega\Big(\mathbb{E}_{\tilde{\mu}}\hat{p}_R^n\Big)^2\right] + \text{t.i.p.} \tag{B.3}$$

Next, let $\mathcal{I}$ denote the information generated by the disclosure rule. Under belief-consistency, posterior beliefs coincide with the true conditional expectations: $\mathbb{E}_{\tilde{\mu}}\hat{y}^n = \mathbb{E}[\hat{y}^n \mid \mathcal{I}]$ and $\mathbb{E}_{\tilde{\mu}}\hat{p}_R^n = \mathbb{E}[\hat{p}_R^n \mid \mathcal{I}]$. Since $\mathbb{E}[\hat{y}^n \mid \mathcal{I}]$ and $\mathbb{E}[\hat{p}_R^n \mid \mathcal{I}]$ are $\mathcal{I}$-measurable, the projection residual $\hat{y}^n - \mathbb{E}[\hat{y}^n \mid \mathcal{I}]$ is orthogonal to any $\mathcal{I}$-measurable

random variable, including $\mathbb{E}[\hat{p}_R^n \mid \mathcal{I}]$. Hence, the associated projection residuals satisfy

$$\mathbb{E}\Big[\big(\hat{y}^n - \mathbb{E}_{\tilde{\mu}}\hat{y}^n\big)\,\mathbb{E}_{\tilde{\mu}}\hat{p}_R^n\Big] = 0, \qquad \mathbb{E}\Big[\big(\hat{p}_R^n - \mathbb{E}_{\tilde{\mu}}\hat{p}_R^n\big)\,\mathbb{E}_{\tilde{\mu}}\hat{p}_R^n\Big] = 0. \tag{B.4}$$

Using (B.4), expanding squares in (B.3), and applying the law of total variance,

$$\begin{aligned}
\mathbb{E}\Big(\mathbb{E}_{\tilde{\mu}}\hat{y}^n + \gamma_y\mathbb{E}_{\tilde{\mu}}\hat{p}_R^n - \hat{y}^n\Big)^2 &= \mathbb{E}(\hat{y}^n - \mathbb{E}_{\tilde{\mu}}\hat{y}^n)^2 + \gamma_y^2\,\mathbb{E}\Big(\mathbb{E}_{\tilde{\mu}}\hat{p}_R^n\Big)^2 \\
&= \mathbb{E}(\hat{y}^n)^2 - \mathbb{E}\Big(\mathbb{E}_{\tilde{\mu}}\hat{y}^n\Big)^2 + \gamma_y^2\,\mathbb{E}\Big(\mathbb{E}_{\tilde{\mu}}\hat{p}_R^n\Big)^2, \qquad \text{(B.5)} \\
\mathbb{E}\Big(\gamma_{p_R}\mathbb{E}_{\tilde{\mu}}\hat{p}_R^n - \hat{p}_R^n\Big)^2 &= \mathbb{E}(\hat{p}_R^n - \mathbb{E}_{\tilde{\mu}}\hat{p}_R^n)^2 + (\gamma_{p_R}-1)^2\,\mathbb{E}\Big(\mathbb{E}_{\tilde{\mu}}\hat{p}_R^n\Big)^2 \\
&= \mathbb{E}(\hat{p}_R^n)^2 - \mathbb{E}\Big(\mathbb{E}_{\tilde{\mu}}\hat{p}_R^n\Big)^2 + (\gamma_{p_R}-1)^2\,\mathbb{E}\Big(\mathbb{E}_{\tilde{\mu}}\hat{p}_R^n\Big)^2. \qquad \text{(B.6)}
\end{aligned}$$

Substituting (B.5)–(B.6) into the ex-ante expectation of (B.3) yields

$$\begin{aligned}
\mathbb{E}U = -\frac{1}{2}\Bigg[&\mathbb{E}(\hat{y}^n)^2 + \eta n_1 n_2\,\mathbb{E}(\hat{p}_R^n)^2 - \mathbb{E}\Big(\mathbb{E}_{\tilde{\mu}}\hat{y}^n\Big)^2 \\
&+ \Big(\gamma_y^2 + \eta n_1 n_2\big[(\gamma_{p_R}-1)^2 - 1\big] + \theta\Omega\Big)\mathbb{E}\Big(\mathbb{E}_{\tilde{\mu}}\hat{p}_R^n\Big)^2\Bigg] + \text{t.i.p.}
\end{aligned} \tag{B.7}$$

where the first two terms are simply the unconditional variance of $\hat{y}^n$ and $\hat{p}_R^n$, two terms that are independent of policy. Equivalently, collecting communication-relevant terms only,

$$\mathbb{E}U = \frac{1}{2}\,\mathbb{E}\Big(\mathbb{E}_{\tilde{\mu}}\hat{y}^n\Big)^2 + \frac{1}{2}\,\Gamma\;\mathbb{E}\Big(\mathbb{E}_{\tilde{\mu}}\hat{p}_R^n\Big)^2 + \text{t.i.p.}, \tag{B.8}$$

where the coefficient Γ satisfies

$$\Gamma \equiv -\Big[\gamma_y^2 + \eta n_1 n_2\big((\gamma_{p_R}-1)^2 - 1\big) + \theta\Omega\Big], \tag{B.9}$$

with γ_q given by (A.27) and

$$\gamma_{p_R} = 1 + \alpha_1(\gamma_q - n_2) - \alpha_2(\gamma_q + n_1), \tag{B.10}$$

$$\gamma_y = n_1\alpha_1(\gamma_q - n_2) + n_2\alpha_2(\gamma_q + n_1), \tag{B.11}$$

$$\Omega = n_1\alpha_1(1-\alpha_1)(\gamma_q - n_2)^2 + n_2\alpha_2(1-\alpha_2)(\gamma_q + n_1)^2. \tag{B.12}$$

The $\theta\Omega$ term captures within-sector dispersion costs; the η-term captures the allocative gain from moving

p_R toward p_R^n. An equivalent representation of the composite parameter Γ is:

$$\begin{aligned}\Gamma = -\Bigg\{ & \Big[\big(n_1\alpha_1 + n_2\alpha_2\big)\gamma_q + n_1 n_2(\alpha_2 - \alpha_1)\Big]^2 \\ & + \eta n_1 n_2\Big(\Big[(\alpha_1 - \alpha_2)\gamma_q - (\alpha_1 n_2 + \alpha_2 n_1)\Big]^2 - 1\Big) \\ & + \theta\Big[n_1\alpha_1(1-\alpha_1)(\gamma_q - n_2)^2 + n_2\alpha_2(1-\alpha_2)(\gamma_q + n_1)^2\Big]\Bigg\}. \end{aligned} \tag{B.13}$$

Optimal Disclosure Rule. Let φ denote an (ex ante) disclosure rule that maps $\hat{v}^n$ into a public message m. The characterization of the optimal disclosure rule follows Proposition 2 in Tamura (2018). Under commitment, the authority chooses φ to maximize

$$\max_{\varphi}\ \mathbb{E}\,U(\mathbb{E}[\hat{v}^n \mid m]) = \frac{1}{2}\,\mathbb{E}\Big[(\mathbb{E}[\hat{y}^n \mid m])^2 + \Gamma\,(\mathbb{E}[\hat{p}_R^n \mid m])^2\Big]. \tag{B.14}$$

Recall that $\hat{v}^n$ is Gaussian with mean zero and variance–covariance matrix $\tilde{\Sigma}$, i.e.

$$\hat{v}^n = \begin{pmatrix} \hat{y}^n \\ \hat{p}_R^n \end{pmatrix} \sim \mathcal{N}\Big(0, \tilde{\Sigma}\Big), \qquad \tilde{\Sigma} \equiv \Sigma\sigma^2, \tag{B.15}$$

where, under our i.i.d. sectoral shocks, $\tilde{\Sigma}$ is diagonal: the aggregate and dispersion components are orthogonal. By the law of total variance, for each component $x \in \{\hat{y}^n, \hat{p}_R^n\}$,

$$\mathrm{Var}(x) = \mathrm{Var}(\mathbb{E}[x \mid m]) + \mathbb{E}[V(x \mid m)] \ \ \Rightarrow\ \ 0 \le \mathrm{Var}(\mathbb{E}[x \mid m]) \le \mathrm{Var}(x). \tag{B.16}$$

In matrix form, writing $S \equiv \mathrm{Var}(\mathbb{E}[\hat{v}^n \mid m])$, this yields the standard persuasion feasibility constraint

$$0 \preceq S \preceq \tilde{\Sigma}. \tag{B.17}$$

Under Gaussianity, any S satisfying (B.17) is implementable by some (possibly noisy) linear signal m.

Because the objective in (B.14) depends only on the diagonal elements of S,

$$\mathrm{Var}(\mathbb{E}[\hat{y}^n \mid m]) = S_{11}, \qquad \mathrm{Var}(\mathbb{E}[\hat{p}_R^n \mid m]) = S_{22},$$

the problem can be written as

$$\max_{S}\ \frac{1}{2}\big(S_{11} + \Gamma S_{22}\big) \quad \text{s.t.} \quad 0 \preceq S \preceq \tilde{\Sigma}. \tag{B.18}$$

By (B.17), the largest feasible value of S_{11} is $\tilde{\Sigma}_{11} = \mathrm{Var}(\hat{y}^n)$, attained by fully revealing $\hat{y}^n$; and the largest feasible value of S_{22} is $\tilde{\Sigma}_{22} = \mathrm{Var}(\hat{p}_R^n)$, attained by fully revealing $\hat{p}_R^n$. Conversely, $S_{ii} = 0$ is feasible (no disclosure about component i). Therefore: (i) since the coefficient on S_{11} is $+1$, the maximizer sets $S_{11} = \tilde{\Sigma}_{11}$ and $\hat{y}^n$ is fully disclosed; and (ii) the choice of S_{22} is driven by the sign of Γ: if $\Gamma > 0$, set $S_{22} = \tilde{\Sigma}_{22}$ (full

disclosure of $\hat{p}_R^n$), whereas if $\Gamma < 0$, set $S_{22} = 0$ (no disclosure of $\hat{p}_R^n$).

Symmetric Economy. In the symmetric case with $n_1 = n_2 = \frac{1}{2}$ and $\alpha_1 = \alpha_2$, one has $\gamma_q = 0$, $\gamma_y = 0$, $\gamma_{p_R} = 1 - \alpha$, and $\Omega = \frac{1}{4}\alpha(1-\alpha)$, so that (B.9) simplifies to

$$\Gamma = -\frac{1-\alpha}{4}\left[\theta\alpha - \eta(1+\alpha)\right]. \tag{B.19}$$

Hence, the full disclosure condition $\Gamma \geq 0$ is equivalent to

$$\frac{\theta}{\eta} \leq \frac{1+\alpha}{\alpha}. \tag{B.20}$$

C Discretionary Deviation

This section presents the elements of the proof of Proposition 2.

Welfare as a Function of Posterior Beliefs. Substitute the monetary rule (A.26) into (A.18), (A.19) and (A.20) and get:

$$\hat{p}_1^r = (\gamma_q - n_2)\mathbb{E}_{\tilde{\mu}}\hat{p}_R^n, \qquad \hat{p}_2^r = (\gamma_q + n_1)\mathbb{E}_{\tilde{\mu}}\hat{p}_R^n. \tag{C.1}$$

$$\hat{p} = \Big[(1 - n_1\alpha_1 - n_2\alpha_2)\gamma_q + n_1 n_2(\alpha_1 - \alpha_2)\Big]\mathbb{E}_{\tilde{\mu}}\hat{p}_R^n, \tag{C.2}$$

$$\hat{p}_R = \Big[(\alpha_1 - \alpha_2)\gamma_q + (1 - n_1\alpha_2 - n_2\alpha_1)\Big]\mathbb{E}_{\tilde{\mu}}\hat{p}_R^n. \tag{C.3}$$

Now consider the utility flow (A.21) and derive each quadratic term, starting with the output gap:

$$\begin{aligned}\hat{q} - \hat{p} - \hat{y}^n &= \left(\mathbb{E}_{\tilde{\mu}}\hat{y}^n - \hat{y}^n\right) + \gamma_q\,\mathbb{E}_{\tilde{\mu}}\hat{p}_R^n - \hat{p} \\ &= \left(\mathbb{E}_{\tilde{\mu}}\hat{y}^n - \hat{y}^n\right) + \Big[(n_1\alpha_1 + n_2\alpha_2)\gamma_q - n_1 n_2(\alpha_1 - \alpha_2)\Big]\mathbb{E}_{\tilde{\mu}}\hat{p}_R^n,\end{aligned} \tag{C.4}$$

Second, the relative-price gap is

$$\hat{p}_R - \hat{p}_R^n = -\hat{p}_R^n + \Big[(\alpha_1 - \alpha_2)\gamma_q + (1 - n_1\alpha_2 - n_2\alpha_1)\Big]\mathbb{E}_{\tilde{\mu}}\hat{p}_R^n, \tag{C.5}$$

using (C.3). Third, the within-sector price dispersion term reads:

$$\theta\sum_{j=1}^{2} n_j\alpha_j(1-\alpha_j)(\hat{p}_j^r)^2 = \theta\Big[n_1\alpha_1(1-\alpha_1)(\gamma_q - n_2)^2 + n_2\alpha_2(1-\alpha_2)(\gamma_q + n_1)^2\Big]\left(\mathbb{E}_{\tilde{\mu}}\hat{p}_R^n\right)^2. \tag{C.6}$$

Collecting (C.4), (C.5), and (C.6) into (A.21), the flow welfare can be written as a function of the realized

state $\hat{v}^n = (\hat{y}^n, \hat{p}_R^n)$ and posterior means $\mathbb{E}_{\tilde{\mu}}\hat{v}^n = \big(\mathbb{E}_{\tilde{\mu}}\hat{y}^n, \mathbb{E}_{\tilde{\mu}}\hat{p}_R^n\big)$:

$$
\begin{aligned}
U\Big(\hat{v}^n; \mathbb{E}_{\tilde{\mu}}\hat{v}^n\Big) \approx -\frac{1}{2}\Bigg\{ & \Bigg[\Big(\mathbb{E}_{\tilde{\mu}}\hat{y}^n - \hat{y}^n\Big) + \Big((n_1\alpha_1 + n_2\alpha_2)\gamma_q - n_1 n_2(\alpha_1 - \alpha_2)\Big)\mathbb{E}_{\tilde{\mu}}\hat{p}_R^n\Bigg]^2 \\
& + \eta n_1 n_2 \Bigg[-\hat{p}_R^n + \Big((\alpha_1 - \alpha_2)\gamma_q + (1 - n_1\alpha_2 - n_2\alpha_1)\Big)\mathbb{E}_{\tilde{\mu}}\hat{p}_R^n\Bigg]^2 \\
& + \theta\Big[n_1\alpha_1(1-\alpha_1)(\gamma_q - n_2)^2 + n_2\alpha_2(1-\alpha_2)(\gamma_q + n_1)^2\Big]\Big(\mathbb{E}_{\tilde{\mu}}\hat{p}_R^n\Big)^2\Bigg\} + \text{t.i.p.}
\end{aligned}
\tag{C.7}
$$

Discretionary Deviation when Full Disclosure is Optimal, $\Gamma > 0$. We now characterize the optimal message $m = (m_1, m_2)$ that maximizes (C.7), equivalently minimizes the bracketed quadratic loss, subject to $\mathbb{E}_{\tilde{\mu}}\hat{v}^n = m$. Let

$$A \equiv (n_1\alpha_1 + n_2\alpha_2)\gamma_q - n_1 n_2(\alpha_1 - \alpha_2), \tag{C.8}$$

$$B \equiv (\alpha_1 - \alpha_2)\gamma_q + (1 - n_1\alpha_2 - n_2\alpha_1), \tag{C.9}$$

$$D \equiv \theta\Big[n_1\alpha_1(1-\alpha_1)(\gamma_q - n_2)^2 + n_2\alpha_2(1-\alpha_2)(\gamma_q + n_1)^2\Big]. \tag{C.10}$$

Then (C.7) can be written as

$$U\Big(\hat{v}^n; \mathbb{E}_{\tilde{\mu}}\hat{v}^n\Big) \approx -\frac{1}{2}\Big\{\big[\big(\mathbb{E}_{\tilde{\mu}}\hat{y}^n - \hat{y}^n\big) + A\,\mathbb{E}_{\tilde{\mu}}\hat{p}_R^n\big]^2 + \eta n_1 n_2\big[-\hat{p}_R^n + B\,\mathbb{E}_{\tilde{\mu}}\hat{p}_R^n\big]^2 + D\big(\mathbb{E}_{\tilde{\mu}}\hat{p}_R^n\big)^2\Big\} + \text{t.i.p.} \tag{C.11}$$

The first-order condition w.r.t. $m_1 = \mathbb{E}_{\tilde{\mu}}\hat{y}^n$ is

$$-\big[\big(\mathbb{E}_{\tilde{\mu}}\hat{y}^n - \hat{y}^n\big) + A\,\mathbb{E}_{\tilde{\mu}}\hat{p}_R^n\big] = 0 \qquad \Rightarrow \qquad \mathbb{E}_{\tilde{\mu}}\hat{y}^n = \hat{y}^n - A\,\mathbb{E}_{\tilde{\mu}}\hat{p}_R^n. \tag{C.12}$$

The quadratic loss is strictly convex in (m_1, m_2) since $\eta n_1 n_2 > 0$ and $D \geq 0$, hence the FOCs characterize the unique optimum. The first-order condition w.r.t. $m_2 = \mathbb{E}_{\tilde{\mu}}\hat{p}_R^n$ is

$$-A\big[\big(\mathbb{E}_{\tilde{\mu}}\hat{y}^n - \hat{y}^n\big) + A\,\mathbb{E}_{\tilde{\mu}}\hat{p}_R^n\big] - \eta n_1 n_2\, B\big[-\hat{p}_R^n + B\,\mathbb{E}_{\tilde{\mu}}\hat{p}_R^n\big] - D\,\mathbb{E}_{\tilde{\mu}}\hat{p}_R^n = 0. \tag{C.13}$$

Using (C.12), the first term in (C.13) vanishes, yielding

$$\eta n_1 n_2\, B\big[-\hat{p}_R^n + B\,\mathbb{E}_{\tilde{\mu}}\hat{p}_R^n\big] + D\,\mathbb{E}_{\tilde{\mu}}\hat{p}_R^n = 0 \qquad \Rightarrow \qquad \mathbb{E}_{\tilde{\mu}}\hat{p}_R^n = \kappa_2\,\hat{p}_R^n, \tag{C.14}$$

where

$$\kappa_2 \equiv \frac{\eta n_1 n_2\, B}{\eta n_1 n_2\, B^2 + D}. \tag{C.15}$$

Substituting (C.14) into (C.12) gives

$$\mathbb{E}_{\tilde{\mu}}\hat{y}^n = \hat{y}^n + \kappa_1\,\hat{p}_R^n, \qquad \kappa_1 \equiv -A\kappa_2. \tag{C.16}$$

Therefore, the optimal discretionary deviation from truth-telling satisfies the following rule

$$m = \begin{pmatrix} m_1 \\ m_2 \end{pmatrix} = \underbrace{\begin{pmatrix} 1 & \kappa_1 \\ 0 & \kappa_2 \end{pmatrix}}_{\equiv \kappa} \begin{pmatrix} \hat{y}^n \\ \hat{p}_R^n \end{pmatrix} = \kappa \hat{v}^n. \tag{C.17}$$

Symmetric price rigidity: closed-form κ_1 and κ_2 Assume $\alpha_1 = \alpha_2 \equiv \alpha$. Then $\alpha_1 - \alpha_2 = 0$ implies $\gamma_q = 0$ in (A.26). The coefficients in (C.8)–(C.10) become

$$A = (n_1\alpha + n_2\alpha)\gamma_q - n_1 n_2(\alpha - \alpha) = 0, \tag{C.18}$$

$$B = (\alpha - \alpha)\gamma_q + (1 - n_1\alpha - n_2\alpha) = 1 - \alpha, \tag{C.19}$$

$$D = \theta\Big[n_1\alpha(1-\alpha)(0-n_2)^2 + n_2\alpha(1-\alpha)(0+n_1)^2\Big] = \theta\,\alpha(1-\alpha)\,n_1 n_2. \tag{C.20}$$

It follows immediately from (C.15) that

$$\kappa_2 = \frac{\eta n_1 n_2(1-\alpha)}{\eta n_1 n_2(1-\alpha)^2 + \theta\,\alpha(1-\alpha)\,n_1 n_2} = \frac{\eta}{\eta(1-\alpha) + \theta\alpha}, \tag{C.21}$$

and from (C.16) that

$$\kappa_1 = -A\kappa_2 = 0. \tag{C.22}$$

Partial Disclosure is Optimal, $\Gamma < 0$ The program is (4.1) - (4.3) with the additional constraint $m_2 = \mathbb{E}_{\tilde{\mu}}\hat{p}_R^n = 0$. Imposing the on-path restriction $m_2 = 0$, the objective is minimized by setting $m_1 = \hat{y}^n$ (from (C.12)). Hence there is no incentive to misreport the aggregate component when dispersion is pooled.

D Reputation and Credible Communication

This Appendix is composed of two parts: first a detailed presentation of the dynamic version of the game outlined in Section 4.2, and second the proofs of the associated Lemmas and Proposition.

D.1 A Dynamic Communication Game with Reputation

To study how reputation disciplines communication when the monetary authority cannot commit, we consider the multi-sector economy ($\eta < \theta$) in which full and truthful disclosure is optimal under commitment (i.e., $\Gamma \geq 0$).

Monetary authorities' types and information. The monetary authority has an unobserved type $\delta \in \{C, S\}$: committed (C) orstrategic (S). Each period, nature draws $\hat{v}^n = (\hat{y}^n, \hat{p}_R^n)$ and the authority observes

a noisy signal $s = \hat{v}^n + \varepsilon$. It forms the posterior mean

$$\bar{v}^n \equiv \mathbb{E}(\hat{v}^n \mid s) = \frac{\sigma^2}{\sigma^2 + \sigma\varepsilon^2}\, s,$$

where σ_ε^2 measures (inverse) *competence* as in Moscarini (2007).[21]

Communication and reputation. The committed type always reports truthfully, $m = \bar{v}^n$. The strategic type mixes: with probability p it reports $m = \bar{v}^n$, and with probability $1 - p$ it reports $m = \kappa\bar{v}^n$, where κ is the discretionary wedge from Proposition 2. Firms do not observe δ and hold a belief $\xi \in (0, 1)$ that the acting policymaker is committed, $\xi = \mathbb{P}(\delta = C)$. We refer to ξ as *reputation*.

Timing. Time is discrete and infinite. In each period: (i) firms enter with reputation ξ and preset prices $\hat{p}_j^p = 0$; (ii) nature draws $\hat{v}^n$, the authority observes s, sends m, and sets $\hat{q}$; (iii) a fraction $1 - \alpha_j$ of firms reset prices using posteriors $\tilde{\mu} = \mu \mid (\xi, m, \hat{q})$; (iv) outcomes realize; firms observe $\hat{v}^n$ and update reputation to $\bar{\xi}$; (v) the incumbent remains in office with probability λ (*persistence*) and is replaced with probability $1 - \lambda$; a replacement is committed with probability ρ (*prevalence*). Hence,

$$\xi' = \lambda\bar{\xi} + (1 - \lambda)\rho. \tag{D.1}$$

Bayesian updating. Firms update (a) beliefs about fundamentals upon receiving m and (b) beliefs about the polymaker's type upon observing $(m, \hat{v}^n)$, characterized in Lemmas 3–4.

Lemma 3. *Given reputation ξ, message m, and strategic policy $p(\cdot)$, firms' posterior mean satisfies*

$$\mathbb{E}_{\tilde{\mu}}\hat{v}^n = \frac{m\, f_{\bar{v}^n}(m)\big[\xi + (1-\xi)p(\xi, m)\big] + \kappa^{-1} m\, f_{\kappa\bar{v}^n}(m)(1-\xi)\big[1 - p(\xi, \kappa^{-1}m)\big]}{f_{\bar{v}^n}(m)\big[\xi + (1-\xi)p(\xi, m)\big] + f_{\kappa\bar{v}^n}(m)(1-\xi)\big[1 - p(\xi, \kappa^{-1}m)\big]}. \tag{D.2}$$

where $f_{\bar{v}^n}(\cdot)$ is the probability distribution function of $\bar{v}^n \sim \mathcal{N}\left(0, \Sigma\frac{\sigma^4}{\sigma^2+\sigma_\varepsilon^2}\right)$ and $f_{\kappa\bar{v}^n}(\cdot)$ is the probability distribution function of $\kappa\bar{v}^n \sim \mathcal{N}\left(0, \Sigma_\kappa\frac{\sigma^4}{\sigma^2+\sigma_\varepsilon^2}\right)$, where

$$\Sigma_\kappa = \kappa\Sigma\kappa^T = \begin{pmatrix} \frac{1}{2} + 2\kappa_1^2 & 2\kappa_1\kappa_2 \\ 2\kappa_1\kappa_2 & 2\kappa_2^2. \end{pmatrix} \tag{D.3}$$

Lemma 4. *Given prior reputation ξ, message m, and realized shocks $\hat{v}^n$, firms update the incumbent's reputation to*

$$\bar{\xi} = \frac{f_m(\hat{v}^n)\, f_{\bar{v}^n}(m)\, \xi}{f_m(\hat{v}^n)\, f_{\bar{v}^n}(m)\big[\xi + (1-\xi)p(\xi, m)\big] + f_{\kappa^{-1}m}(\hat{v}^n)\, f_{\kappa\bar{v}^n}(m)(1-\xi)\big[1 - p(\xi, \kappa^{-1}m)\big]}, \tag{D.4}$$

where $f_m(\hat{v}^n)$ denotes the probability distribution function of the productivity $\hat{v}^n$ conditional on a message m, i.e., $\hat{v}^n|m \sim \mathcal{N}\left(m, \Sigma\frac{\sigma^2\sigma_\varepsilon^2}{\sigma^2+\sigma_\varepsilon^2}\right)$.

[21] Allowing for a noisy signal is only needed for the reputational analysis. The static characterization in Section 3 extends to noisy information by replacing $\hat{v}^n$ with $\bar{v}^n$; see footnote 9.

Equilibrium. A Markov Perfect Bayesian Equilibrium consists of value functions, the belief-consistent instrument rule (2.17), a communication policy $p(\xi, \bar{v}^n)$ for type S, and Bayesian belief updating satisfying (D.2)–(D.4).

Benchmark welfare. We benchmark outcomes against imperfect but symmetric information, where firms observe the same signal s as the authority and hence share the posterior mean $\bar{v}^n$. Under $\Gamma \geq 0$, this benchmark attains the commitment optimum. Define

$$W^{SI} = \frac{1}{1-\beta}\, \mathbb{E}_{\bar{v}^n}\, \mathbb{E}_{\hat{v}^n|\bar{v}^n}\, U(\hat{v}^n, \hat{q}, \bar{v}^n), \tag{D.5}$$

where $\hat{q} = \hat{q}(\bar{v}^n)$.

D.1.1 Analytical analysis without dynamic adjustment of reputation

To isolate reputational discipline, we consider the polar case with no persistence of the incumbent, $\lambda = 0$. Then the identity of the monetary authority is redrawn every period, so firms' belief that the authority is committed is time-invariant and equal to the population prevalence of committed types: $\xi = \rho$.

Proposition 3. *Let $\lambda = 0$. Then:*

i. Reputation is constant. $\mathbb{P}(\delta = C) = \xi = \rho$.

ii. A strategic authority always deviates. For all $\bar{v}^n$, $p(\xi, \bar{v}^n) = 0$ (so $m = \kappa \bar{v}^n$).

iii. Type-contingent welfare is ordered as

$$W_C(\rho) \leq W^{SI} \leq W_S(\rho).$$

iv. Ex-ante welfare is below the symmetric-information benchmark:

$$W(\rho) = \rho\, W_C(\rho) + (1-\rho)\, W_S(\rho) \leq W^{SI},$$

with strict inequalities in (iii)–(iv) when $0 < \rho < 1$.

Proof. See Appendix D.2.3. ∎

Interpretation. With $\lambda = 0$, current communication has no effect on future credibility: ξ does not move, so the strategic authority faces a purely static problem each period. As a result, whenever the discretionary wedge $m = \kappa \bar{v}^n$ yields a (weak) contemporaneous improvement by dampening within-sector dispersion, the strategic type chooses it for all $\bar{v}^n$, implying $p(\xi, \bar{v}^n) = 0$.

Two limiting cases clarify the welfare ordering. If $\rho = 0$ (the authority is known to be strategic), firms invert messages: $\mathbb{E}(\hat{v}^n \mid m) = \kappa^{-1} m$, so misreporting has no effect on beliefs and the outcome coincides with imperfect symmetric information: $W(0) = W_S(0) = W^{SI}$. If instead $\rho > 0$, firms attach positive probability

to rule-based disclosure, so they do *not* fully undo the wedge. Strategic misreporting then shifts beliefs away from $\bar{v}^n$ toward $\kappa\bar{v}^n$, reducing within-sector dispersion and raising the strategic type's conditional welfare above W^{SI}.

These gains are not free. When a committed authority reports $m = \bar{v}^n$, firms still rationally entertain the possibility that the message came from a strategic type. This contaminates the interpretation of truthful messages, induces additional price dispersion, and depresses $W_C(\rho)$ below W^{SI}. Aggregating across types therefore yields $W(\rho) \leq W^{SI}$: absent reputation dynamics, strategic distortions reallocate welfare across types and lower long-run stabilization on average.

D.1.2 Numerical Analysis With Dynamic Adjustment of Reputation

Results presented in Section D rely on a numerical solution of the model under a standard calibration (Table 2), maintaining the assumption that $\Gamma \geq 0$, i.e., full disclosure of information characterizes the optimal communication policy (see Proposition 1). The sensitivity analysis is reported in Table 3.

Table 2: Numerical Values

Parameter	Symbol	Value
Discount factor	β	0.96
Elasticity across sectors	η	4
Elasticity within sector	θ	8
Price rigidity 1	α_1	0.5
Price rigidity 2	α_2	0.5
Dispersion of technology shocks	σ_a	1
Competence of monetary authorities	σ_ε	1/5
Prevalence of truth-telling type	ρ	0.5
Persistence of CB type	λ	0.2

Notes. This table provides the baseline calibration used in numerical exercises reported in Section D.1.2.

D.2 Proofs of Lemmas 3 and 4 and Proposition 3

D.2.1 Proof of Lemma 3

Throughout, $\delta \in \{C, S\}$ denotes the monetary authority's type (committed vs. strategic). Since $\bar{v}^n$ and m are continuously distributed, we work with densities. Let $f_X(\cdot)$ denote the density of a continuous random vector X.

Conditional on being *committed* ($\delta = C$), the authority always reports truthfully:

$$m = \bar{v}^n.$$

Table 3: Sensitivity Analysis

	Average propensity to report truthfully			Average reputation			Average welfare ($.10^{-2}$)		
	$\delta = tt$	$\delta = st$	$\mathbb{E}(\delta)$	$\delta = tt$	$\delta = st$	$\mathbb{E}(\delta)$	$\delta = tt$	$\delta = st$	$\mathbb{E}(\delta)$
Baseline	1.00	0.112	0.556	0.72	0.23	0.48	−5.61	3.63	−0.99
Price rigidities									
$\alpha_1 = \alpha_2 = 0.25$	1.00	0.131	0.566	0.60	0.30	0.45	−3.35	1.65	−0.85
$\alpha_1 = \alpha_2 = 0.75$	1.00	0.103	0.552	0.77	0.20	0.49	−4.31	3.40	−0.46
$\alpha_1 = 0.25 < \alpha_2 = 0.75$	1.00	0.091	0.546	0.82	0.18	0.50	−11.49	11.40	−0.06
Elasticities									
$\eta = 3$; $\theta = 8$	1.00	0.103	0.551	0.78	0.20	0.49	−7.24	6.00	−0.62
$\eta = 5$; $\theta = 8$	1.00	0.126	0.563	0.63	0.28	0.45	−3.60	1.93	−0.83
Monetary Authorities									
competence $\sigma_\varepsilon = 1/3$	1.00	0.108	0.554	0.60	0.26	0.43	−6.23	2.90	−1.67
$\sigma_\varepsilon = 1/7$	1.00	0.125	0.563	0.77	0.21	0.49	−4.96	3.75	−0.61
prevalence $\rho = 0.4$	1.00	0.101	0.460	0.67	0.18	0.38	−7.16	3.16	−0.97
$\rho = 0.6$	1.00	0.124	0.649	0.77	0.28	0.57	−4.20	4.09	−0.88
persistence $\lambda = 0.1$	1.00	0.101	0.550	0.80	0.15	0.48	−4.05	2.53	−0.76
$\lambda = 0.3$	1.00	0.110	0.555	0.67	0.29	0.48	−6.40	4.38	−1.01

Notes. The baseline calibration presented in Table 2 assumes standard parameters and symmetric price rigidities across sectors. Average welfare is reported relative to an economy with symmetric information.

Conditional on being *strategic* ($\delta = S$), the authority uses the (possibly state-dependent) mixing rule $p(\xi, \cdot)$:

$$m = \bar{v}^n \quad \text{with prob. } p(\xi, \bar{v}^n), \qquad m = \kappa \bar{v}^n \quad \text{with prob. } 1 - p(\xi, \bar{v}^n).$$

It is convenient to introduce a latent "channel" indicator $r \in \{T, D\}$, where $r = T$ (truthful channel) corresponds to $m = \bar{v}^n$ and $r = D$ (distortion channel) corresponds to $m = \kappa \bar{v}^n$.

Because $\bar{v}^n = \mathbb{E}(\hat{v}^n \mid s)$ and m is a deterministic function of $\bar{v}^n$ given (δ, r), we have:

$$\mathbb{E}(\hat{v}^n \mid m, \delta = C) = \mathbb{E}(\hat{v}^n \mid \bar{v}^n = m) = m,$$

$$\mathbb{E}(\hat{v}^n \mid m, \delta = S, r = T) = \mathbb{E}(\hat{v}^n \mid \bar{v}^n = m) = m,$$

$$\mathbb{E}(\hat{v}^n \mid m, \delta = S, r = D) = \mathbb{E}(\hat{v}^n \mid \bar{v}^n = \kappa^{-1} m) = \kappa^{-1} m.$$

Therefore, by the law of iterated expectations over the latent event "m was generated via the truthful channel" vs. "the distortion channel",

$$\mathbb{E}(\hat{v}^n \mid m) = m \cdot \mathbb{P}(T \mid m) + \kappa^{-1} m \cdot \mathbb{P}(D \mid m), \tag{D.6}$$

where T (resp. D) denotes the event that the message m was generated through the truthful (resp. distortion) channel.

Let $\xi \in (0, 1)$ denote the prior reputation, i.e. $\xi = \mathbb{P}(\delta = C)$. The unconditional density of m under the truthful channel is the density of $\bar{v}^n$ evaluated at m, denoted $f_{\bar{v}^n}(m)$. Under the distortion channel, the density of m is the density of the transformed random variable $\kappa \bar{v}^n$ evaluated at m, denoted $f_{\kappa \bar{v}^n}(m)$.

The (unconditional) density contribution associated with the truthful channel is:

$$\underbrace{f_{\bar{v}^n}(m)\, \xi}_{\text{committed always truthful}} + \underbrace{f_{\bar{v}^n}(m)\, (1 - \xi)\, p(\xi, m)}_{\text{strategic truthful with prob. } p(\xi, \bar{v}^n),\, \bar{v}^n = m}.$$

The density contribution associated with the distortion channel is:

$$\underbrace{f_{\kappa \bar{v}^n}(m)\, (1 - \xi)\, \big(1 - p(\xi, \kappa^{-1} m)\big)}_{\text{strategic distortion with prob. } 1 - p(\xi, \bar{v}^n),\, \bar{v}^n = \kappa^{-1} m}.$$

Hence the total density of m is

$$f_m(m) = f_{\bar{v}^n}(m)\big[\xi + (1 - \xi) p(\xi, m)\big] + f_{\kappa \bar{v}^n}(m)(1 - \xi)\big[1 - p(\xi, \kappa^{-1} m)\big]. \tag{D.7}$$

Applying Bayes' rule (in density form) gives the posterior probability that the message was generated through the truthful channel:

$$\mathbb{P}(T \mid m) = \frac{f_{\bar{v}^n}(m)\big[\xi + (1 - \xi) p(\xi, m)\big]}{f_{\bar{v}^n}(m)\big[\xi + (1 - \xi) p(\xi, m)\big] + f_{\kappa \bar{v}^n}(m)(1 - \xi)\big[1 - p(\xi, \kappa^{-1} m)\big]}, \tag{D.8}$$

and $\mathbb{P}(D \mid m) = 1 - \mathbb{P}(T \mid m)$.

Substituting (D.8) into (D.6) yields (D.2):

$$\mathbb{E}(\hat{v}^n \mid m) = \frac{m \cdot f_{\bar{v}^n}(m)\big[\xi + (1-\xi)p(\xi, m)\big] + \kappa^{-1}m \cdot f_{\kappa\bar{v}^n}(m)(1-\xi)\big[1 - p(\xi, \kappa^{-1}m)\big]}{f_{\bar{v}^n}(m)\big[\xi + (1-\xi)p(\xi, m)\big] + f_{\kappa\bar{v}^n}(m)(1-\xi)\big[1 - p(\xi, \kappa^{-1}m)\big]}. \tag{D.9}$$

Finally, using (A.7), $f_{\bar{v}^n}(\cdot)$ is the pdf of $\bar{v}^n \sim \mathcal{N}\Big(0, \Sigma\frac{\sigma^4}{\sigma^2+\sigma\varepsilon^2}\Big)$, and $f_{\kappa\bar{v}^n}(\cdot)$ is the pdf of $\kappa\bar{v}^n \sim \mathcal{N}\Big(0, \Sigma\kappa\frac{\sigma^4}{\sigma^2+\sigma\varepsilon^2}\Big)$, where

$$\Sigma\kappa = \kappa\Sigma\kappa^\top.$$

D.2.2 Proof of Lemma 4

Let $\xi = \mathbb{P}(\delta = C)$ denote prior reputation. Given $(m, \hat{v}^n)$, firms update

$$\bar{\xi} \equiv \mathbb{P}(\delta = C \mid m, \hat{v}^n) = \frac{f_{m,\hat{v}^n|\delta=C}(m, \hat{v}^n)\,\xi}{f_{m,\hat{v}^n|\delta=C}(m, \hat{v}^n)\,\xi + f_{m,\hat{v}^n|\delta=S}(m, \hat{v}^n)\,(1-\xi)}.$$

We compute the two likelihood terms.

Committed type. If $\delta = C$, the authority reports truthfully $m = \bar{v}^n$. Hence

$$f_{m,\hat{v}^n|\delta=C}(m, \hat{v}^n) = f_{\hat{v}^n|\bar{v}^n}(\hat{v}^n \mid \bar{v}^n = m)\, f_{\bar{v}^n}(m).$$

By Gaussian updating (see (A.5)), one has

$$\hat{v}^n \mid \bar{v}^n \sim \mathcal{N}\left(\bar{v}^n,\ \Sigma\frac{\sigma^2\sigma_\varepsilon^2}{\sigma^2 + \sigma_\varepsilon^2}\right),$$

so define

$$f_m(\hat{v}^n) \equiv f_{\hat{v}^n|\bar{v}^n}(\hat{v}^n \mid \bar{v}^n = m).$$

Therefore

$$f_{m,\hat{v}^n|\delta=C}(m, \hat{v}^n) = f_m(\hat{v}^n)\, f_{\bar{v}^n}(m). \tag{D.10}$$

Strategic type. If $\delta = S$, conditional on $\bar{v}^n$ the authority uses the mixing rule: with probability $p(\xi, \bar{v}^n)$ it sends $m = \bar{v}^n$ (truthful channel), and with probability $1 - p(\xi, \bar{v}^n)$ it sends $m = \kappa\bar{v}^n$ (distortion channel). Thus, for a given realized message m, the message could have been generated by: (i) the truthful channel with $\bar{v}^n = m$, or (ii) the distortion channel with $\bar{v}^n = \kappa^{-1}m$. Therefore the joint likelihood is the sum of the two channel likelihoods:

$$f_{m,\hat{v}^n|\delta=S}(m, \hat{v}^n) = \underbrace{f_{\hat{v}^n|\bar{v}^n}(\hat{v}^n \mid \bar{v}^n = m)\, f_{\bar{v}^n}(m)\, p(\xi, m)}_{\text{truthful channel}} + \underbrace{f_{\hat{v}^n|\bar{v}^n}(\hat{v}^n \mid \bar{v}^n = \kappa^{-1}m)\, f_{\kappa\bar{v}^n}(m)\,\big(1 - p(\xi, \kappa^{-1}m)\big)}_{\text{distortion channel}}. \tag{D.11}$$

Using the same conditional Gaussian law as above, define

$$f_{\kappa^{-1}m}(\hat{v}^n) \equiv f_{\hat{v}^n|\bar{v}^n}(\hat{v}^n \mid \bar{v}^n = \kappa^{-1}m), \qquad \hat{v}^n \mid \bar{v}^n = \kappa^{-1}m \sim \mathcal{N}\left(\kappa^{-1}m,\ \Sigma\frac{\sigma^2\sigma_\varepsilon^2}{\sigma^2+\sigma_\varepsilon^2}\right).$$

Then (D.11) becomes

$$f_{m,\hat{v}^n|\delta=S}(m,\hat{v}^n) = f_m(\hat{v}^n)\, f_{\bar{v}^n}(m)\, p(\xi,m) + f_{\kappa^{-1}m}(\hat{v}^n)\, f_{\kappa\bar{v}^n}(m)\,\big(1-p(\xi,\kappa^{-1}m)\big). \tag{D.12}$$

Posterior reputation. Substituting (D.10)–(D.12) into Bayes' rule yields

$$\bar{\xi} = \frac{f_m(\hat{v}^n)\, f_{\bar{v}^n}(m)\,\xi}{f_m(\hat{v}^n)\, f_{\bar{v}^n}(m)\,\xi + \Big(f_m(\hat{v}^n)\, f_{\bar{v}^n}(m)\, p(\xi,m) + f_{\kappa^{-1}m}(\hat{v}^n)\, f_{\kappa\bar{v}^n}(m)\,(1-p(\xi,\kappa^{-1}m))\Big)(1-\xi)} \tag{D.13}$$

$$= \frac{f_m(\hat{v}^n) f_{\bar{v}^n}(m)\cdot\xi}{f_m(\hat{v}^n) f_{\bar{v}^n}(m)\,[\xi+(1-\xi)p(\xi,m)] + f_{\kappa^{-1}m}(\hat{v}^n) f_{\kappa\bar{v}^n}(m)\,(1-p(\xi,\kappa^{-1}m))\,(1-\xi)}, \tag{D.14}$$

which is (D.4).

D.2.3 Proof of Proposition 3

We prove the four elements in turn.

i. Constant reputation when $\lambda = 0$. From the law of motion (D.1),

$$\xi' = \lambda\bar{\xi} + (1-\lambda)\rho.$$

Setting $\lambda = 0$ gives $\xi' = \rho$ for all histories. Hence reputation is constant and equal to the prevalence, $\xi = \rho$ in every period.

ii. A strategic type always deviates (truthful probability $p = 0$). Fix a period and condition on the strategic authority's information $\bar{v}^n$. Given the equilibrium belief-formation rule of firms (Lemma 3) and the instrument rule (2.17), the strategic authority chooses the distribution of the public message m to maximize expected contemporaneous welfare

$$\max_m\ \mathbb{E}\Big[\,U(\hat{v}^n,\hat{q},\mathbb{E}_{\tilde{\mu}}\hat{v}^n \mid m)\ \Big|\ \bar{v}^n\Big].$$

By Proposition 2, for any realized state $\hat{v}^n$ the flow payoff is a concave quadratic in the posterior mean $\mathbb{E}_{\tilde{\mu}}\hat{v}^n$, and the unique maximizer is attained at the "opportunistic" target $\mathbb{E}_{\tilde{\mu}}\hat{v}^n = \kappa\hat{v}^n$. Taking conditional expectations given $\bar{v}^n$ preserves concavity and yields that the maximizer of the conditional objective is $\mathbb{E}_{\tilde{\mu}}\hat{v}^n = \kappa\bar{v}^n$.

Now compare the two pure actions available to the strategic type:

$$m = \bar{v}^n \qquad \text{(rule-based report)} \qquad \text{vs.} \qquad m = \kappa\bar{v}^n \qquad \text{(strategic report)}.$$

Under Lemma 3, the induced posterior mean $\mathbb{E}_{\tilde{\mu}}\hat{v}^n$ is a deterministic function of (ξ, m). Since $\kappa\bar{v}^n$ is the conditional maximizer, sending the strategic report weakly dominates sending the truthful report:

$$\mathbb{E}\Big[U(\hat{v}^n, \hat{q}, \mathbb{E}_{\tilde{\mu}}\hat{v}^n \mid m = \kappa\bar{v}^n) \;\Big|\; \bar{v}^n\Big] \;\geq\; \mathbb{E}\Big[U(\hat{v}^n, \hat{q}, \mathbb{E}_{\tilde{\mu}}\hat{v}^n \mid m = \bar{v}^n) \;\Big|\; \bar{v}^n\Big],$$

with strict inequality whenever $\bar{v}^n$ implies a non-zero dispersion component and the mapping in Lemma 3 does not already deliver $\mathbb{E}_{\tilde{\mu}}\hat{v}^n = \kappa\bar{v}^n$ under $m = \bar{v}^n$. Therefore, when $\lambda = 0$ (so $\xi = \rho$ is constant and there is no dynamic value of reputation), a strategic authority optimally chooses the strategic report in every period:

$$p(\xi, \bar{v}^n) = 0 \quad \text{for all } (\xi, \bar{v}^n).$$

iii. Type-by-type welfare ranking: $W_C(\rho) \leq W^{SI} \leq W_S(\rho)$. Recall that W^{SI} is the benchmark with symmetric information: firms and the authority share the same signal (and under $\Gamma \geq 0$ this benchmark attains the ex-ante optimum by Proposition 1).

Strategic type. Under (ii), the strategic authority always sends $m = \kappa\bar{v}^n$. Given Proposition 2, this choice moves the induced posterior mean toward the opportunistic target and therefore yields weakly higher contemporaneous welfare than the symmetric-information benchmark, conditional on $\bar{v}^n$. Integrating over $\bar{v}^n$ gives

$$W_S(\rho) \;\geq\; W^{SI},$$

with strict inequality whenever the opportunistic distortion is non-degenerate (i.e. $\kappa \neq I$ and dispersion states occur).

Committed type. A committed authority always sends $m = \bar{v}^n$. When $0 < \rho < 1$, firms rationally attach positive probability to strategic distortion even after observing m, so the posterior $\mathbb{E}_{\tilde{\mu}}\hat{v}^n$ differs from the symmetric-information posterior $\bar{v}^n$ (Lemma 3). Since under $\Gamma \geq 0$ the symmetric-information posterior is ex-ante optimal (Prop. 1), any such distortion weakly reduces welfare relative to W^{SI}:

$$W_C(\rho) \;\leq\; W^{SI},$$

with strict inequality for $0 < \rho < 1$ under non-degenerate distortion.

iv. Average welfare is below W^{SI} when $0 < \rho < 1$. With $\lambda = 0$, each period's type is an i.i.d. draw with $\mathbb{P}(\delta = C) = \rho$, so unconditional welfare is the mixture

$$W(\rho) = \rho\, W_C(\rho) + (1 - \rho)\, W_S(\rho).$$

Because Γ *geq*0 implies that (imperfect) symmetric information is ex-ante optimal (Proposition 1), no equilibrium outcome generated by discretionary communication can raise unconditional welfare above W^{SI}:

$$W(\rho) \leq W^{SI}.$$

Moreover, for $0 < \rho < 1$ and non-degenerate distortion, part (iii) implies $W_C(\rho) < W^{SI} < W_S(\rho)$. Since the committed type occurs with positive probability and suffers a strict loss, the mixture is strictly below the benchmark:

$$W(\rho) < W^{SI} \qquad \text{for } 0 < \rho < 1.$$

E Appendix on Figures

E.1 Natural Language Analysis

This appendix documents the construction of the quantitative text-based measure used in Figure 1, a replicable proxy for the prevalence of sector-specific and heterogeneity-oriented language in ECB monetary-policy communication.

Corpus and analytical sample. We begin from a corpus of ECB communications collected from public ECB sources. The analytical sample used for Figure 1 consists of 1,650 documents over 2015–2025. We retain document types commonly used for monetary-policy communication, namely: (i) speeches, (ii) interviews, (iii) press conference introductory statements and Q&A transcripts, (iv) Monetary Policy Accounts, and (v) blog posts. To restrict attention to monetary-policy-relevant content within this set, we apply an inclusion filter: a document is kept if it contains at least one of the following terms (case-insensitive): *inflation*, *price stability*, *monetary policy*, *interest rate*, or *economic outlook*.[22]

Preprocessing and sentence segmentation. Each document is converted to plain text and processed using a standard NLP pipeline. We segment documents into sentences using spaCy's sentence boundary detection. Let S_d denote the set of sentences in document d and $|S_d|$ its sentence count. We lemmatize tokens using spaCy to improve recall across morphological variants (e.g., *heterogeneous*/*heterogeneity*, *transmit*/*transmission*). All matching is performed on lemmatized text; multi-word expressions are matched at the sentence level.

Dictionary construction. We construct a pre-specified dictionary of sector-specific and heterogeneity-related terms, organized into five thematic categories: (i) *Sectoral composition* (e.g., energy, goods, services, food; "underlying" components of inflation), (ii) *Sectoral heterogeneity* (uneven price dynamics and price adjustment across sectors), (iii) *Regional heterogeneity* (cross-country or cross-region differences within the euro area), (iv) *Monetary-policy transmission* (pass-through and transmission channels), and (v) *Transmission heterogeneity* (heterogeneous transmission across agents, sectors, or countries). The dictionaries contain single-word terms and multi-word expressions. The union of the five categories defines the set of dictionary matches used to compute the headline measure in Figure 1.

[22] This relevance filter is intended to remove communications with limited monetary-policy content while preserving a broad set of policy-facing documents.

Document-level metric (sentence-level intensive margin). For each sentence $s \in S_d$, define an indicator $\mathbb{1}\{s \in \mathcal{D}\}$ equal to one if the sentence contains at least one match from the dictionary (across any of the five categories), and zero otherwise. The document-level measure is the share of sentences with at least one match:

$$x_d \;=\; \frac{1}{|S_d|} \sum_{s \in S_d} \mathbb{1}\{s \in \mathcal{D}\}. \tag{E.1}$$

This sentence-level metric reduces sensitivity to repeated mentions of the same term within a sentence and yields an interpretable unit: the fraction of sentences in a document that invoke sector-specific or heterogeneity-related framing.

Aggregation over time and confidence intervals. We aggregate document-level measures to the annual frequency. Let $\mathcal{D}_t$ denote the set of documents dated in year t and $N_t = |\mathcal{D}_t|$. The annual series plotted in Figure 1 is the unweighted mean across documents:

$$\bar{x}_t \;=\; \frac{1}{N_t} \sum_{d \in \mathcal{D}_t} x_d. \tag{E.2}$$

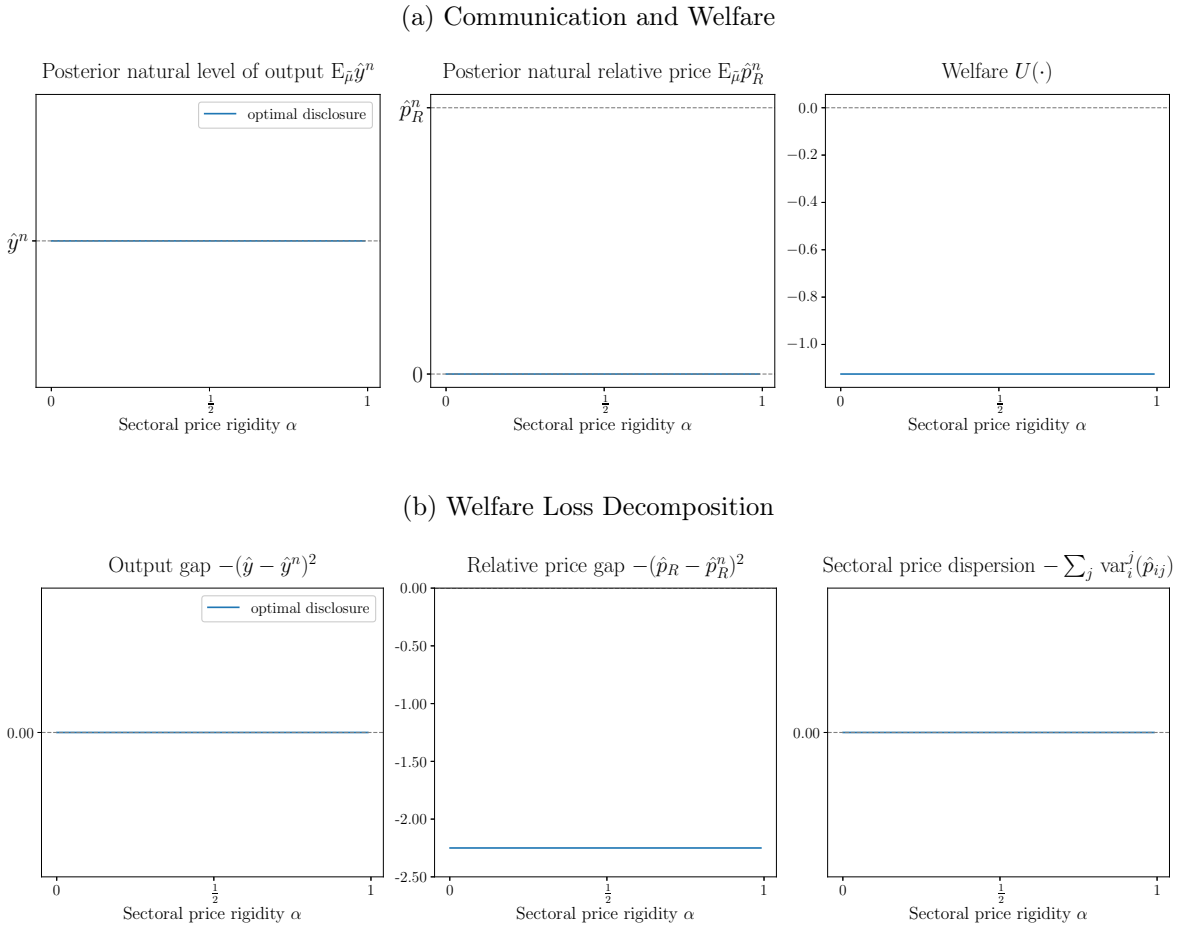
The shaded band reports a 95% confidence interval around $\bar{x}_t$ computed from the cross-document dispersion within year:

$$\bar{x}_t \pm 1.96 \cdot \frac{s_t}{\sqrt{N_t}}, \qquad s_t^2 \;=\; \frac{1}{N_t - 1} \sum_{d \in \mathcal{D}_t} \left(x_d - \bar{x}_t\right)^2. \tag{E.3}$$

This uncertainty measure reflects within-year heterogeneity across documents. Because the unit of observation is a document, it does not account for serial correlation across years; the figure is intended as a descriptive time-series summary.

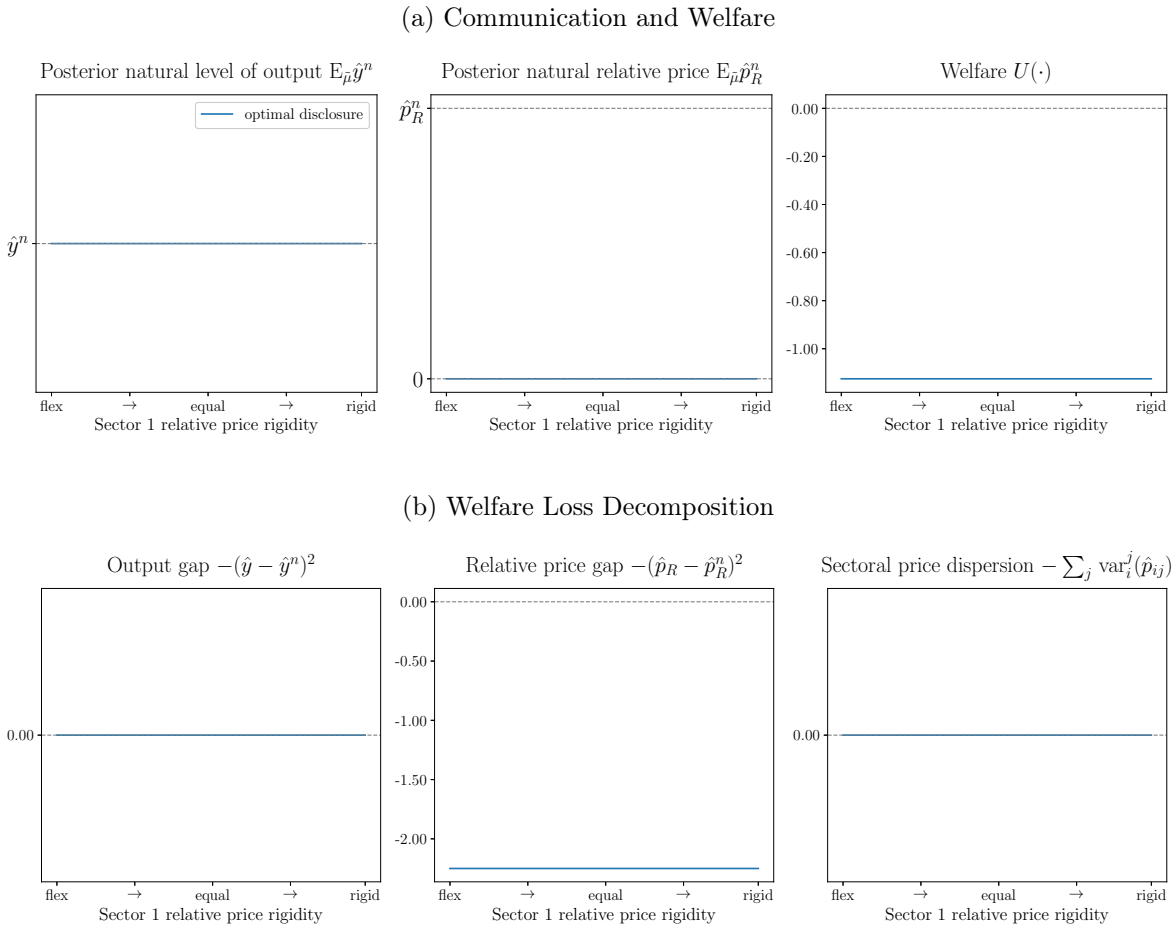
E.2 Additional Figures

Figure 7: Communication with Symmetric Price Rigidity and $\Gamma < 0$



Notes. Given $\hat{y}^n = 0$ and $\hat{p}_R^n = \hat{a}_1 - \hat{a}_2 > 0$, this figure illustrates communication and aggregate economic outcomes under the **optimal disclosure of information**, as a function of symmetric sectoral price rigidity $\alpha_1 = \alpha_2 = \alpha$.

Figure 8: Communication with Asymmetric Price Rigidity and $\Gamma < 0$



Notes. Given $\hat{y}^n = 0$ and $\hat{p}_R^n = \hat{a}_1 - \hat{a}_2 > 0$, this figure illustrates communication and aggregate economic outcomes under the **optimal disclosure of information**, with an average price rigidity fixed at $\bar{\alpha} = \frac{1}{2}$.