Monetary Stabilization of a Multi-Sector Economy: Adding Words to Action?

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July 11, 2025

Abstract

In a multi-sector economy with price rigidities, conventional monetary policy alone is insufficient to achieve first-best stabilization. We investigate whether a central bank can leverage private information over economic conditions to enhance policy stabilization and improve economic outcomes. The normative analysis emphasizes that the central bank should avoid manipulating private beliefs and, if it is optimal to disclose information, it should do so in a truthful manner. However, this communication policy is generally not credible, as a benevolent policymaker has sequential incentives to alter the beliefs of price-setting firms to mitigate price dispersion and its adverse effects on welfare. In the absence of commitment, reputation plays a crucial role in shaping these incentives. Specifically, a policymaker who strategically discloses information can achieve substantial stabilization gains during her term, albeit at the expense of long-term economic efficiency.

Keywords: *strategic communication*, *monetary policy*, *credibility*, *reputation*, *Bayesian learning*

JEL classification: D82, E52, E58, E61

[*]We thank Marco Bassetto, Roland Benabou, Michael Ehrmann, Mishel Ghassibe, Sophie Kreutzkamp, Oleksiy Kryvtsov, Kris Nimark, Nick Sander, Luminita Stevens for helpful conversations, and our discussants Bartorsz Mackowiak and Saroj Bhattarai. Seminar participants at multiple institutions and conferences provided valuable comments. The views expressed in this paper are solely those of the authors, and no responsibility for them should be attributed to the Bank of Canada, the Banque de France or the Eurosystem.

1 Introduction

Motivation. All recent episodes of economic distress have produced highly uneven economic disturbances, affecting sectors – and even regions within a single currency areas – with varying intensity. The COVID-19 lockdowns, for example, differentially affected contact-sensitive and non-contact-sensitive sectors. Likewise, energy-intensive industries were disproportionately exposed to oil and other commodity-price shocks, while global supply-chain disruptions and, more recently, heightened tariff uncertainty imposed larger operational distruptions on internationally integrated firms.

As comprehensively documented and analyzed in Guerrieri, Marcussen, Reichlin, and Tenreyro (2023), these uneven shocks, combined with varying degrees of price rigidity, have generated large swings in relative prices—giving rise to policy trade-offs that standard monetary adjustments struggle to resolve: *"to the extent that supply forces play an important role as triggers of inflation, monetary policy faces a difficult trade-off, a situation where the so called 'divine coincidence' – in which price stability and output (gap) stability coincide – does not hold."*

In the canonical New Keynesian model, the so-called "divine coincidence" refers to the remarkable property that a simple monetary policy rule aimed at stabilizing the price level simultaneously efficiently stabilizes real economic activity. Consequently, in this one-sector benchmark, a single instrument suffices to achieve economic efficiency.

In contrast, once the economy is characterized by multiple interlinked sectors with heterogeneous technologies and varying degrees of nominal rigidities, a single policy instrument can no longer systematically implement the first-best allocation. Indeed, as La'O and Tahbaz-Salehi (2022) and Rubbo (2023) demonstrate, sector-specific productivity disturbances generate distortions in relative prices both within and across sectors, prompting misallocation of consumption demand toward firms and sectors whose relative price is too low. In response to these shocks, an efficient allocation would require relative price movements that mirror each sector's underlying productivity shock. However, with only one policy instrument at its disposal, the central bank can influence the economy along essentially one dimension—a direction determined by the common slope of sectoral Phillips curves. This unidimensional intervention cannot simultaneously realign all pairwise relative prices in accordance with their idiosyncratic productivity shocks, so that price dispersion persists and productive efficiency remains unattainable.

In this context, we ask: can central-bank communication support and enhance monetary stabilization when adjustments in policy rates alone cannot efficiently stabilize an economy subject to sector-specific shocks? Can a central bank exploits superior information to improve economic stabilization of the economy?

Our emphasis on monetary communication is motivated by the observation that it has become a central instrument in modern central-bank toolkits: policy-board statements, press conferences and central banker speeches are carefully scrutinized by financial markets and price-setting firms alike. Moreover, central banks typically benefit from broad and harmonized information, owing to their access to detailed datasets, in-house analytical capabilities, and direct links with industry experts and government agencies — whereas individual firms often concentrate on a narrow set of sector- or firm-level indicators.

This informational asymmetry between a central bank and economic agents is for instance established by studies documenting the "information effect" of monetary policy. Seminal studies demonstrate that private inflation expectations shift materially around FOMC announcements (Romer and Romer (2000)), that professional forecasters revise output-growth projections following unexpected rate changes (Nakamura and Steinsson (2018)), and that high-frequency co-movements of interest rates and equity prices can be interpreted as information shocks transmitted through policy statements (Jarociński and Karadi (2020)). Andrade and Ferroni (2021) further decompose the informational component of monetary decisions and communication into news about future macroeconomic conditions (labeled *Delphic* shocks) and news about future monetary policy actions (labeled *Odyssean* shocks). The former case provides support to our assumption that the monetary authority possesses superior information about macroeconomic fundamentals.[1] Moreover, the rational-inattention literature pioneered by Sims (2003) suggests that firms optimally limit the breadth and frequency of macroeconomic data they process, owing to managerial and processing constraints; in contrast, central banks devote substantial resources to monitoring economic developments systematically.[2]

Accordingly, this paper assesses whether a central bank can and should exploit its superior information strategically to enhance economic stabilization. To this end, we provide both a normative and positive analysis of information provision in a multi-sector economy and its coordination with conventional monetary policy. We characterize the conditions under which the central bank should disclose its private information and analyze how reputation dynamics influences truthful communication over time.

Set-up. The analysis is developed in a standard New Keynesian model with nominal price rigidities, enriched with multiple production sectors and informational asymmetries.[3] As mentioned, in the presence of sector-specific shocks, conventional monetary policy alone cannot attain the first-best allocation: nominal rigidities force a trade-off between stabilizing aggregate outcomes and aligning relative prices. In welfare terms, monetary policy must balance three distortions: (i) misallocation arising from within-sector price dispersion; (ii) misallocation due to across-sector pricing errors; and (iii) output-gap volatility. Information frictions and nominal rigidities generate inefficient firms' production and pricing decisions that a single instrument adjustments alone cannot eliminate. This inherent trade-off motivates the investigation of communication as a supplementary stabilization tool.

To introduce the communication channel, we assume the central bank observes sectoral productivity shocks (possibly with noise), whereas firms lack direct access to this information and form expectations from public disclosures. The monetary authority then chooses both its policy rate and the content of its announcements contingent on its signal, after which firms update their beliefs and pricing decisions based on the released information and the observed instrument policy stance.

We begin by characterizing the optimal provision of information and evaluate its credibility. The disclosure problem is cast as a Bayesian persuasion game in which a benevolent central bank, endowed with a commitment technology, pre-announces a rule mapping its information about sectoral and aggregate productivity shocks into public messages, internalizing firms' posterior beliefs and pricing responses.

[1] See also Miranda-Agrippino and Ricco (2021) for the information effect of monetary policy and Fujiwara and Waki (2022) for an extensive analysis of Delphic forward guidance.

[2] This mechanism and heterogeneous firms' responses to monetary policy is empirically documented in Song and Stern (2024).

[3] Specifically, the environment builds on standard references such as Aoki (2001) and Woodford (2003), recently augmented to an input-output structure in La'O and Tahbaz-Salehi (2022).

The optimal communication rule reflects the economy's structural parameters—namely, the elasticities of substitution within and across sectors and the degree of nominal rigidity—which govern the welfare trade-offs associated with price dispersion within and across sectors. When price-dispersion costs within sectors are low relative to the benefits of closing the sector price gap, full disclosure of both aggregate and dispersion shocks is prescribed. Conversely, if revealing sectoral dispersion shocks would generate excessive within-sector price dispersion, the monetary authority withholds information on dispersion shocks while still truthfully reporting aggregate developments, since the policy instrument can optimally stabilize aggregate shocks. The magnitude of nominal rigidities also govern the relative cost of price dispersions within and across sectors, hence influence the communication rule. For instance, if prices are relatively flexible, then releasing the distribution of shocks across sectors is beneficial because it leads to low price dispersion within sectors.

How credible is the optimal communication policy? In the special case of a one-sector economy—where within and across sectors production elasticities coincide—truthful reporting of sectoral shocks is credible. Indeed, the possible benefits of misreporting dispersion shocks on the reduction of within sectors price dispersions are offset by the cost induced by enhanced price distortions across sectors. However, with multiple sectors, the monetary authority faces a temptation to renege on its commitment by understating dispersion shocks to mitigate costly within-sector price heterogeneity.

Thus, while the normative benchmark may prescribe full and truthful disclosure of information, credibility concerns might prevent the implementation of such a policy: the central bank may deviate opportunistically from its optimal communication rule to achieve short-run stabilization gains, through the influence of firms' beliefs and price setting decisions.

Accordingly, the paper develops next a positive analysis of how communication and reputation dynamics interact when the monetary authority lacks commitment to follow the optimal communication policy of truthful and complete provision of information. To account for reputational forces, two types of monetary authorities are introduced. The monetary authority is either a "truth-telling" type, which always reports its information honestly, and a "strategic" type, that chooses sequentially the propensity to report its information truthfully. Importantly, the type of a monetary authority is not observable. Firms form a reputation-based belief about the central bank's type and update it over time based on announcements and observed shock realizations Under this set-up, the strategic type optimally determines its propensity to misreport its private signal to trade-off short run stabilizing gains – achieved through influencing firms' beliefs – against the long run reputational cost. The analysis emphasizes that in equilibrium, the reputation of a strategic monetary authority deteriorates over time, due to its propensity to misreport information, but it achieves substantial stabilization gains. These gains come at the expense of the stabilization outcome of a truth-telling monetary authority, and in the long run, lead to degraded economic stabilization relative to the symmetric and optimal information benchmark.

Literature. This paper examines the optimal conduct of monetary policy and communication in a multi-sector economy and derives the conditions and economic implications under which reputational forces can substitute for a lack of commitment.[4] As such, it relates to three strands of the literature.

Our paper builds on multi-sector models where technology and price stickiness are heterogeneous across sectors. In one of the earliest examples of this line of work, Aoki (2001) shows that in a two-sector economy with one sticky and one fully flexible industry, a policy that stabilizes the price of the sticky industry implements the first-best allocation. Mankiw and Reis (2003), Woodford (2003), Benigno (2004), and Eusepi, Hobijn, and Tambalotti (2011) generalize this insight to multisector economies with varying degrees of price stickiness and establish that the monetary authority should stabilize a price index that places greater weights on industries with stickier prices. Relative to these references, we provide conditions under which a central bank could benefit from information asymmetry to effectively stabilize the economy, by considering communication policy as a complement to one-size-fits-all instrument policy.

Morris and Shin (2002) sparked a debate about the benefits of central bank transparency and the social value of public information, i.e., whether the central bank should be more or less transparent about unobserved economic conditions.[5] Ou, Zhang, and Zhang (2022) revisits the transparency question in a multisector economy, based on a quantitative model calibrated to the U.S. economy and emphasize increased transparency regarding the unobserved state of the economy may reduce social welfare owing to the presence of nominal rigidity. We revisit the central bank transparency debate in the context of sectoral asymmetric economic shocks. Our analysis provides a comprehensive normative and positive perspective, and in particular emphasizes the *credibility* problem of the provision of information, in a multisector economy.

Our positive analysis characterizes a Markov equilibrium of a monetary authority with hidden type that switches between truth-teller and strategic and whose reputation evolves over time. This environment builds upon the original reputation work of Kreps and Wilson (1982), later applied to the commitment tension of monetary policy by Backus and Driffill (1985), asset market manipulation in Benabou (2002) and sovereign debt default in Amador and Phelan (2023). Our analysis features a technical contribution, which is that the type of a central bank is never perfectly observable. Hence, because of imperfect verifiability, there is no need for the strategic monetary authority to mimic a truth-telling central bank to conceal its type.

Plan of Analysis. The next section presents the economic environment and establishes the policy framework for analyzing monetary communication. Section 3 characterizes the optimal communication policy and the incentives to deviate from it. Section 4 examines the interplay between credibility of communication and monetary authorities' reputation. An appendix provides the mathematical proofs of the lemmas and propositions presented in the text.

[4]Effectively, this extends the classic analyses of time inconsistency in monetary policy—for example, as studied by Barro and Gordon (1983) and Barro (1986)—to the context of monetary communication.

[5]Recent works have studied monetary provision of information under commitment, e.g., Tamura (2016) and Tamura (2018) investigate the optimal policy for the acquisition and disclosure of information when the monetary instrument signals the central bank's private information. Gáti (2022) considers optimal dynamic communication policy and Herbert (2022) studies optimal disclosure under heterogeneous priors. Stein and Sunderam (2018) explains gradualism in monetary policy as a strategic information game between the bond market and a central bank averse to bond market volatility.

2 Economic Environment

This section begins by setting up a model structure of the economy comprising households, firms and a monetary authority. It then defines a private-sector equilibrium and characterizes the optimal conduct of monetary policy under information asymmetry.

2.1 The Model

The model builds on a standard New Keynesian business cycle framework with monopolistic competition and rigid price adjustment in the production sector. The economy is populated by four types of agents: a representative household, perfectly-competitive producers of final goods, monopolistically-competitive producers of differentiated goods, and a central bank. Notably, the model departs from standard New Keynesian frameworks by incorporating multiple production sectors with sector-specific productivity shocks and asymmetric information regarding these shocks. We start with a one-period model and later extend the analysis to a dynamic version in order to study the reputational dynamics of central bank communication.

Households. A representative household consumes 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 choice of the household is characterized by an infinitely elastic supply of labor at the point where nominal consumption demand, Q, equals the nominal wage:

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

We assume that aggregate nominal consumption is under direct control of the monetary authority.[6] 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 $i \in [0, 1/2]$. 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:

$$Y_j = \left[\left(\frac{1}{2}\right)^{-\frac{1}{\theta}} \left(\int_0^{\frac{1}{2}} Y_{ij}^{\frac{\theta-1}{\theta}} di \right) \right]^{\frac{\theta}{\theta-1}}, \tag{2.2}$$

[6] One could equivalently let the monetary authority set any other nominal variable in the economy—see, e.g., the specification with the nominal wage in Baqaee, Farhi, and Sangani (2024). This generic specification of monetary policy is consistent with money supply control as well as interest rate control; see examples in Golosov and Lucas (2007), Afrouzi and Yang (2021), La'O and Tahbaz-Salehi (2022).

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:

$$Y = \left[\left(\frac{1}{2} Y_1^{\eta-1} \right)^{\frac{1}{\eta}} + \left(\frac{1}{2} Y_2^{\eta-1} \right)^{\frac{1}{\eta}} \right]^{\frac{\eta}{\eta-1}}, \tag{2.3}$$

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 with $\eta = \theta$ the economy becomes isomorphic to one with a single sector.[7]

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:

$$P_j Y_j = \frac{1}{2} \left[\frac{P_j}{P} \right]^{1-\eta} PY, \qquad\qquad P_{ij} Y_{ij} = 2 \left[\frac{P_{ij}}{P_j} \right]^{1-\theta} P_j Y_j, \tag{2.4}$$

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:

$$P = \left[\frac{1}{2} P_1^{1-\eta} + \frac{1}{2} P_2^{1-\eta} \right]^{\frac{1}{1-\eta}}, \qquad\qquad P_j = \left[2 \int_0^{\frac{1}{2}} P_{ij}^{1-\theta} di \right]^{\frac{1}{1-\theta}}. \tag{2.5}$$

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:

$$Y = \left[\frac{1}{2} \left[\frac{P_1}{P} \right]^{-\eta} \left[\frac{A_1}{\Delta_1} \right]^{-1} + \frac{1}{2} \left[\frac{P_2}{P} \right]^{-\eta} \left[\frac{A_2}{\Delta_2} \right]^{-1} \right]^{-1} L, \qquad\qquad Y_j = \frac{A_j}{\Delta_j} L_j, \tag{2.7}$$

[7] This case preserves heterogeneity of firms with respect to productivity and the extent of nominal rigidity in price-setting.

where $L = L_1 + L_2$ is the total labor supplied by the household, $L_j \equiv \int_0^{\frac{1}{2}} L_{ij} di$ is the total labor employed in a given sector, and $\Delta_j \equiv 2\int_0^{\frac{1}{2}} (P_{ij}/P_j)^{-\theta} di \geq 1$ is a sectoral indicator of price dispersion. Variation in prices across firms with identical production technology *within* a given sector leads to a distorted labor demand, thereby driving a wedge between the common firm-specific productivity A_j and the implied sectoral productivity A_j/Δ_j. In turn, aggregate productivity is a weighted harmonic mean of sectoral productivity levels. The sectoral weights reflect the composition of demand *across* sectors, which depends on the relative sectoral prices.

Pricing of Individual Goods. Each firm producing an individual good sets the price P_{ij}, in order to maximize expected profits while competing for demand (2.4) against other firms via sectoral and aggregate price indices. These pricing decisions are subject to nominal rigidity. Initially, all firms preset prices before the realization of productivity shocks. Then, a fraction $1 - \alpha_j \in (0, 1)$ of the firms in each sector adjust their prices after the shocks are drawn.[8] We assume that the firms that reset their prices do not have complete information about the realized shocks. Given the information set of an individual firm at the time of setting the price, it is optimal to price the good according to the following generic optimality condition:

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

where the expectation operator $\mathbb{E}_{ij}$ reflects beliefs of the firm about the productivity shocks, τ is a linear sales tax (or subsidy) collected by the fiscal authority and transferred to the household, $\mathcal{M} \equiv \theta/(\theta - 1)$ is a desired markup of price over nominal marginal cost due to monopolistic competition. Under incomplete information, the price-setting rule (2.8) prescribes setting the price (net of tax) as a markup over the risk-adjusted belief about the marginal cost. When presetting prices, all the firms use a common belief based on the unconditional distribution of shocks. Firms that reset their prices update their belief rationally based on public communication of the monetary authority.[9]

Information and Communication. The monetary authority receives a private signal about the shocks, which leads to an ex-ante information asymmetry vis-a-vis firms. This opens up the possibility of using communication as a distinct policy instrument to influence firms beliefs. In particular, a public message sent by the monetary authority influences firms' posterior beliefs, thereby affecting their price-setting decision. We proceed by first characterizing equilibria under a generic communication policy and then turn to examining the equilibrium implications of specific communication protocols.

[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).

[9]Under complete information, (2.8) simplifies to a standard strategy for pricing as a constant markup over the marginal cost: $P_{ij} = \frac{\mathcal{M}}{(1-\tau)} \frac{W}{A_j}$. Incomplete information introduces subjective uncertainty that commands adjusting expected marginal cost for risk. Note that while prices decision (2.8) depends on firms' beliefs, the actual realization of shocks affect the final outcome for quantities.

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 $A_1 = A_2 = 1$. We denote log deviations of a generic variable X by $\hat{x} \equiv \ln X - \ln \bar{X}$, where $\bar{X}$ is the value in the deterministic equilibrium. 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 Equilibrium. Even when the economy is subject to shocks, the first-best allocation is implementable in an equilibrium without nominal rigidity and informational friction. Hence, equilibrium gaps relative to this flexible-price symmetric information benchmark serve to gauge equilibrium inefficiencies in economies with rigid prices and information asymmetry.[10]

We refer to the variables in this benchmark efficient equilibrium as "natural" and denote them using 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 $\hat{p}^n = (\hat{p}_1^n + \hat{p}_2^n)/2$. Using this aggregate price level to deflate nominal demand yields the natural real output:

$$\hat{y}^n = \frac{\hat{a}_1 + \hat{a}_2}{2}. \tag{2.10}$$

Finally, note $\hat{p}_R^n = \hat{p}_n^2 - \hat{p}_n^1 = \hat{a}_1 - \hat{a}_2$ 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

$$\Sigma\sigma^2 = \begin{pmatrix} \frac{1}{2} & 0 \\ 0 & 2 \end{pmatrix} \sigma^2. \tag{2.11}$$

[10] We characterize the flexible-price equilibrium assuming that monetary policy sets the same average nominal demand, Q, as in the counterpart equilibrium with sticky prices and information asymmetry. We maintain this comparability throughout the analysis.

We note $f(\hat{v}^n)$ 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 $\hat{p}_j^p = 0$.[11]

- 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 rigidities into the economy. The degree of rigidity in a given sector is characterized by the share α_j of unchanged preset prices. Note that while the remaining fractions $(1 - \alpha_j)$ of prices is 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 emphasizes the characteristics of information asymmetry, where information about sectoral productivity is available only to the monetary authority.[12] Individual firms that have the opportunity to reset their prices upon observing monetary policy and communication behave optimally according to posterior beliefs $\tilde{\mu}$ formed upon observing the monetary authority's decisions $\hat{q}$ and m.[13]

Sectoral and Aggregate Prices under Imperfect Information. The aggregation of optimal prices yields sectoral Phillips curves

$$\hat{p}_1 = \gamma_1 \left[\mathbb{E}_{\tilde{\mu}} \{\hat{y} - \hat{y}^n\} + \frac{1}{2} \mathbb{E}_{\tilde{\mu}} \{\hat{p}_R - \hat{p}_R^n\} \right], \tag{2.12}$$

$$\hat{p}_2 = \gamma_2 \left[\mathbb{E}_{\tilde{\mu}} \{\hat{y} - \hat{y}^n\} - \frac{1}{2} \mathbb{E}_{\tilde{\mu}} \{\hat{p}_R - \hat{p}_R^n\} \right], \tag{2.13}$$

where $\gamma_j \equiv (1 - \alpha_j) / \alpha_j$ is the slope of sector j Phillips curve, and the sectoral price level is related to the aggregate output gap and relative price gap.

[11] 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.

[12] The analysis generalizes to a situation where the monetary authority observes only a noisy signal $s = \hat{v}^n + \varepsilon$, with $\varepsilon \sim \mathcal{N}(0, \Sigma\sigma_\varepsilon^2)$, as explicit in Section 4. Specifically, the relevant informational object under noisy signal is simply the conditional mean of shocks $\bar{v}^n = \mathbb{E}(\hat{v}^n | s) \sim \mathcal{N}\left(0, \Sigma \frac{\sigma^4}{\sigma^2 + \sigma_\varepsilon^2}\right)$. The analysis presented in Section 3 maintain $\sigma_\varepsilon = 0$ for clarity, but generalizes straightforwardly to the case $\sigma_\varepsilon > 0$.

[13] Formally, communication is defined generically as a common understanding among players of the mapping of a message m to posterior beliefs $\mathbb{E}_{\tilde{\mu}} \hat{v}^n$, as is explicit in Section 2.3.

The Phillips curve aggregated at the final good level is then:

$$\hat{p} = \bar{\gamma}\mathbb{E}_{\tilde{\mu}}\left\{\hat{y} - \hat{y}^n\right\} + \frac{[\gamma_1 - \gamma_2]}{4}\mathbb{E}_{\tilde{\mu}}\left\{\hat{p}_R - \hat{p}_R^n\right\}, \tag{2.14}$$

where the slope of the aggregate Phillips curve is $\bar{\gamma} = \frac{\gamma_1+\gamma_2}{2}$.

These Phillips curves highlight the challenges of monetary stabilization in a multi-sector economy. In a standard one-sector New Keynesian model with price rigidities, the knife edge *divine coincidence* result stipulates that there is no trade-off between price and output stabilization. Hence, a monetary authority can implement the first-best economic outcome by closing the aggregate price gap. In contrast, in a multi-sector economy, aggregate stabilization of the price level and output gap is achievable only when price rigidities are symmetric across sectors, i.e, $\gamma_1 = \gamma_2$ as evident from (2.14). However, as shown (2.12) and (2.13), one cannot equalize prices across sectors and simultaneously close the aggregate output gap in the presence of sector-specific shocks, i.e, $\hat{p}_R \neq \hat{p}_R^n$ when $\alpha_i > 0$ and $\hat{a}_1 \neq \hat{a}_2$. In other terms, an economy with multiple sectors introduce a broader trade-off between aggregate and sectoral stabilization, as reflected formally in the welfare criterion.

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:

$$U \approx -\frac{1}{2}\left[(\hat{y} - \hat{y}^n)^2 + \frac{\eta}{4}(\hat{p}_R - \hat{p}_R^n)^2 + \frac{\theta}{2}\sum_j \text{var}_i^j(\hat{p}_{ij})\right] + \text{t.i.p.}, \tag{2.15}$$

where t.i.p. denotes terms that are independent of policy. 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 environment described above provides scope for the monetary authority to influence the equilibrium outcome by controlling nominal aggregate demand $\hat{q}$ as well as shaping beliefs about the state of the economy through messages m. The following lemma emphasizes this feature by characterizing welfare-relevant equilibrium variables as a function of monetary policy and posterior beliefs of firms.[14]

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

[14]This approach is similar to Angeletos and La'O (2020) that develops the primal approach of Ramsey optimal taxation of Diamond and Mirrlees (1971) and Atkinson and Stiglitz (2015) to New Keynesian models with informational frictions.

reset prices are:

$$\hat{p}_1^r = (\hat{q} - \mathbb{E}_{\tilde{\mu}}\hat{y}^n) - \frac{1}{2}\mathbb{E}_{\tilde{\mu}}\hat{p}_R^n \qquad\qquad \hat{p}_2^r = (\hat{q} - \mathbb{E}_{\tilde{\mu}}\hat{y}^n) + \frac{1}{2}\mathbb{E}_{\tilde{\mu}}\hat{p}_R^n, \tag{2.16}$$

In turn, the sectoral prices are $\hat{p}_j = (1-\alpha_j)\hat{p}_j^r$, and the aggregate and relative prices are

$$\hat{p} = \left(1 - \frac{\alpha_1 + \alpha_2}{2}\right)(\hat{q} - \mathbb{E}_{\tilde{\mu}}\hat{y}^n) + \frac{\alpha_1 - \alpha_2}{4}\mathbb{E}_{\tilde{\mu}}\hat{p}_R^n, \tag{2.17}$$

$$\hat{p}_R = (\alpha_1 - \alpha_2)(\hat{q} - \mathbb{E}_{\tilde{\mu}}\hat{y}^n) + \left(1 - \frac{\alpha_1 + \alpha_2}{2}\right)\mathbb{E}_{\tilde{\mu}}\hat{p}_R^n. \tag{2.18}$$

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

Proof. See Appendix A.3.1. ∎

With this characterization at hand, welfare (2.15) associated with an equilibrium given exogenous state $\hat{v}^n$, monetary policy $\hat{q}$ and posterior beliefs $\tilde{\mu}$ can be written as:

$$U(\hat{v}^n, \hat{q}, \mathbb{E}_{\tilde{\mu}}\hat{v}^n) \approx -\frac{1}{2}\left[\left(\hat{q} - \hat{p} - \hat{y}^n\right)^2 + \frac{\eta}{4}\left(\hat{p}_R - \hat{p}_R^n\right)^2 + \frac{\theta}{2}\sum_j \alpha_j(1-\alpha_j)\left(\hat{p}_j^r\right)^2\right] + \text{t.i.p.} \tag{2.19}$$

This expression illustrates the possible conflicts between price setting firms and households welfare, which provide an avenue for monetary attempts to influence firms' beliefs.

Belief-Consistent Monetary Policy. In general, both monetary and communication policies can influence posterior beliefs. Here, without loss of generality, we focus on monetary policy that is consistent with the communication policy: the instrument policy does not provide any information over and above what is provided through public communication and posterior beliefs become solely a function of the public message, while monetary policy is a function of posterior beliefs.[15] Furthermore, the central bank sets belief-consistent monetary policy in an optimal way.[16] Accordingly, the relevant welfare criterion for setting monetary policy is the expected welfare using posterior beliefs induced by a communication policy: optimal policy is $\hat{q}(\tilde{\mu}) = \text{argmax } \mathbb{E}_{\tilde{\mu}}U(\hat{v}^n, \hat{q}, \mathbb{E}_{\tilde{\mu}}\hat{v}^n)$.

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

$$\hat{q}(\tilde{\mu}) = \mathbb{E}_{\tilde{\mu}}\hat{y}^n + \gamma_q \cdot \mathbb{E}_{\tilde{\mu}}\hat{p}_R^n, \tag{2.20}$$

[15] This approach is for instance developed in Tamura (2016). Formally, posterior beliefs $\tilde{\mu}$ given m and $\hat{q}$ are the same as the posterior beliefs given m only. This informational assignment between instrument and communication is without loss of generality, because for any communication and instrument policy, one can find an alternative communication and instrument policy where the instrument satisfies the requirement of consistency with communication and implements the same allocation.

[16] Alternatively, one could impose suboptimal monetary policy of the form $\hat{q} = \gamma_Y\mathbb{E}_{\tilde{\mu}}\hat{y}^n + \gamma_R\mathbb{E}_{\tilde{\mu}}\hat{p}_R^n$, with policy coefficients γ_Y and γ_R determined based on some external considerations.

where $\gamma_q \in \left(-\frac{1}{2}, \frac{1}{2}\right)$ *is a composite parameter that satisfies:*

$$\gamma_q \equiv \frac{1}{2} \frac{(\alpha_1^2 - \alpha_2^2)\left(\frac{1+\eta}{2} - \theta\right) + \theta(\alpha_1 - \alpha_2)}{(\alpha_1^2 + \alpha_2^2)\left(\frac{1+\eta}{2} - \theta\right) + \alpha_1\alpha_2(1-\eta) + \theta(\alpha_1 + \alpha_2)}. \tag{2.21}$$

Proof. See Appendix A.3.2. ∎

The lemma characterizes policy as a function of the first moment of uncertainty $\mathbb{E}_{\tilde{\mu}}\hat{v}^n$. In the case of 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 $q(\tilde{\mu}) = \mathbb{E}_{\tilde{\mu}}\hat{y}^n$. More generally, additional adjustment of nominal demand is required in response to perceived changes in the natural relative price to the extent $\gamma_q \neq 0$. Note that the fiscal intervention τ eliminates the effects of firms' market power and the monetary inflation bias, hence it is designed so that the instrument policy is time consistent – to the observation of shocks $\hat{v}^n$ and communication m. Thus, any credibility concerns regarding monetary decisions stem from issues related to information asymmetry and communication.

Overall, this approach allows to focus on the provision of information and control of beliefs, while policy decisions are set optimally accordingly. In other terms, given a communication policy, the instrument policy is set optimally, i.e., $\hat{q}$ is the benevolent best response to private firms posterior beliefs induced by communication. Importantly, this approach aligns with the objective to asses whether and how the provision of information and the design of communication policy contribute to economic stabilization. Hence, the analysis proceeds first with the characterization of optimal communication and then assesses its credibility.

3 Normative Analysis: Optimal Communication and Credibility

In this section, we establish a normative benchmark for communication policy and assess its credibility.

3.1 The Optimal Disclosure of Information

The optimal provision of information is the solution to a mechanism design problem known as Bayesian persuasion, see, e.g. Kamenica (2019) for a review. In this framework, a benevolent monetary authority (the sender) commits to a state-contingent disclosure or communication policy conditional on a state. Importantly, the commitment is made before observing the state. This policy is designed so that firms (the receivers) update their beliefs rationally, using Bayes' rule, and make pricing decisions accordingly.

A Bayesian Persuasion Program. The optimal disclosure policy is a mapping $\varphi : \mathbb{R}^2 \to \Delta(M)$ from the state $\hat{v}^n$ to a distribution of messages m that solves the following optimization program:

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

subject to:

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

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

The first constraint ensures that the monetary instrument is set optimally according to posterior beliefs, as specified by (2.20). 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 policy φ. This communication protocol assumes that the monetary authority commits to the disclosure policy φ prior to observing shocks $\hat{v}^n$.[17]

The requirement of Bayes' rule imposes restrictions on the properties of the disclosure policy. First, the monetary authority cannot distort the average beliefs due to the law of iterated expectations $\mathbb{E}\mathbb{E}_{\varphi}\hat{v}^n = \mathbb{E}\hat{v}^n = 0$. Second, the variance-covariance matrix of posterior beliefs $\tilde{\mu}$ is bounded by those associated to no revelation of information (in which case $\tilde{\mu} = \mu$) and full revelation of information (in which case the variance of posterior beliefs is zero because the posterior beliefs perfectly reflect the true state $\hat{v}^n$).

Characterization. The following proposition provides a characterization of the optimal communication policy φ.

Proposition 1. *There is a composite parameter $\Gamma \in \mathbb{R}$ - a function of the elasticities (η, θ) and the price rigidities (α_1, α_2) - such that:*

- *If $\Gamma > 0$, the optimal disclosure policy prescribes complete and truthful release of all information, i.e., $\varphi(\hat{v}^n) = \hat{v}^n$.*
- *If $\Gamma < 0$, the optimal disclosure policy prescribes a partial release of information, with the natural level of output $\hat{y}^n$ disclosed truthfully, and no release of information regarding the natural relative price $\hat{p}^n_R$, i.e., $\varphi(\hat{v}^n) = \hat{y}^n$.*
- *In particular, under symmetric price rigidities, i.e., $\alpha_1 = \alpha_2$, complete and truthful release of information $(\Gamma > 0)$ is equivalent to $\frac{\theta}{\eta} \leq \frac{1+\alpha}{\alpha}$.*

Proof. See Appendix B.1. ∎

Discussion. The natural level of output $\hat{y}^n$, i.e., the aggregate shock, is always truthfully revealed. In particular, by ensuring that $\mathbb{E}_{\tilde{\mu}}(\hat{y}^n) = \hat{y}^n$, the monetary authority sets the policy instrument $\hat{q}$ to optimally close the output gap. Whether the monetary authority discloses the natural relative price $\hat{p}^n_R$, i.e., the dispersion of shocks across sectors, depends on the structure of the economy – namely the sectoral elasticities and the extent of price rigidities, rather than on productivity shocks.

To appreciate the conditions of the proposition, first note from (2.16) that if the natural relative price is not disclosed, then $\mathbb{E}_{\tilde{\mu}}\hat{p}^n_R = 0$ and reset prices remain equal to preset prices, i.e., $\hat{p}^r_i = \hat{p}^p_i = 0$. In this

[17] 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 receiver updates its belief from prior μ to posterior $\tilde{\mu}$ using Bayes rule and takes optimal action.

case there is no price dispersion within sectors; however the relative price gap $\hat{p}_R - \hat{p}_R^n = -\hat{p}_R^n = \hat{a}_2 - \hat{a}_1$ fully reflects the productivity differentials across sectors. Accordingly, truthful disclosure of the natural relative price, $\hat{p}_R^n$, is optimal when the elasticity of substitution within-sectors, θ, is relatively low compared to the elasticity across sectors, η.[18] On the one hand, revealing $\hat{p}_R^n$ leads to substantial price dispersion and consumption misallocation within sectors, whose weight on welfare is proportional to the elasticity parameter θ. However, it contributes to close the natural relative price gap and consumption misallocation of sectoral goods, with welfare contribution proportional to η. Accordingly, disclosing the natural relative price is optimal when the welfare costs of price dispersion within sector is relatively low.

Similarly, when nominal price rigidities are relatively low—allowing a large proportion of firms in both sectors to reset their prices—it is optimal to reveal the dispersion of productivity shocks. Indeed, when many firms can adjust their prices, disclosing information that enables prices to reflect sectoral productivities effectively closes the natural relative price gap, even though this may increase within-sector price dispersion. In contrast, when price rigidities are asymmetric across sectors, the incentive to release information about dispersion shocks diminishes. Specifically, in a Aoki (2001) economy with one fully rigid sector and one fully flexible sector (i.e., $\alpha_1 = 1$ and $\alpha_2 = 0$), the composite parameter Γ is negative, implying that withholding information about the dispersion of shocks is optimal to contain consumption misallocation across sectors. In other words, a central bank stabilizing an economy with substantial heterogeneity in price rigidities can benefit from superior information to improve overall stabilization.

Figure 1, blue lines, illustrates the optimal disclosure policy and economic implications in the case where full disclosure is optimal ($\Gamma > 0$, i.e. $\varphi(\hat{v}^n) = \hat{v}^n$) and price rigidities are symmetric across sectors ($\alpha_1 = \alpha_2$). In the absence of price rigidities ($\alpha = 0$), all welfare gaps are closed; however, as the degree of rigidity increases, welfare decreases. The lower panels provide a decomposition of welfare losses: the output gap is fully closed – via the adjustment of the monetary policy instrument $\hat{q}$, while welfare losses arise from the relative price gap –which increase with the degree of price rigidities– and, to some extent, from sectoral price dispersion. In the case where prices are fully rigid $\alpha = 1$, all firms sell at preset prices $\hat{p}_j^r = 0$, so that no welfare losses occur due to sectoral price dispersion; instead, losses are entirely driven by the relative price gap.

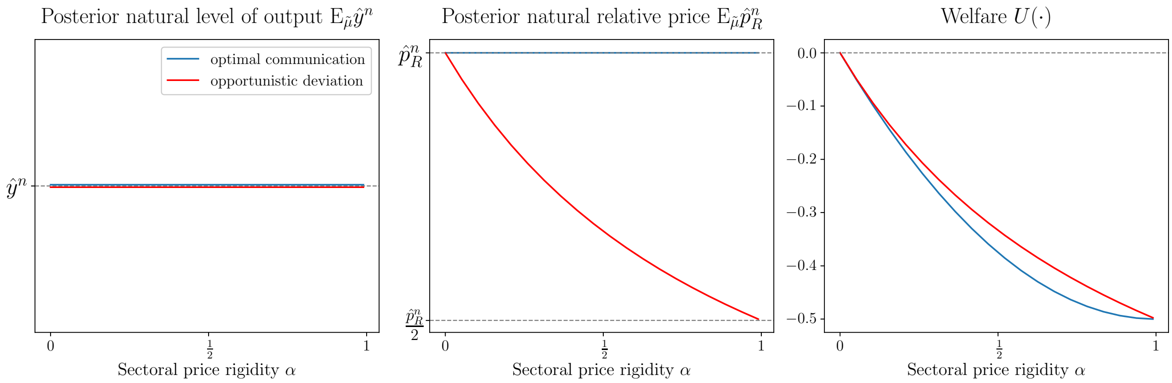
Similar comments apply to the case of asymmetric price rigidities ($\alpha_1 \neq \alpha_2$), as illustrated in Figure 2. In this case, the policy instrument does not completely close the output gap. Indeed, as originally noted in Aoki (2001), optimal monetary policy should focus on stabilizing sectors with higher price rigidity. This is justified because stabilizing sectors with greater price stickiness mitigates the adverse effects of relative-price dispersion on the economy, while more flexible sectors adjust more readily to shocks. Consequently, a positive (negative) output gap emerges if productivity is higher in the less (more) rigid sector.

Finally, if $\Gamma < 0$ and partial disclosure of is optimal, $\varphi(\hat{v}^n) = \hat{p}_R^n$, then there is no price dispersion within sectors. Indeed, posterior beliefs about the natural relative price satisfy $\mathbb{E}_{\tilde{\mu}}\hat{p}_R^n = 0$, so that reset prices equal preset prices $\hat{p}_j^r = \hat{p}_j^p = 0$ and the relative price is $\hat{p}_R = 0$. However, these uniform prices generate welfare losses through the natural relative price gap $\hat{p}_R - \hat{p}_R^n = \hat{a}_1 - \hat{a}_2$, which fully reflects then productivity

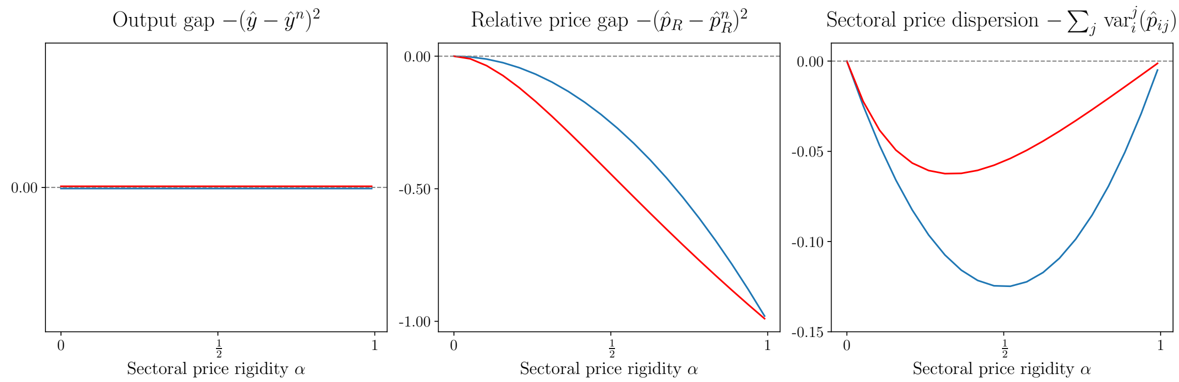
[18] Figure 5 in the Appendix provides contour plots to determine the sensitivity of the sign of Γ to elasticities and price rigidities. The discussion in the text is supported by the analytical expression obtained in the case of symmetric price rigidity $\alpha_1 = \alpha_2$ and confirmed with the numerical exploration provided in the Appendix.

Figure 1: Communication with Symmetric Price Rigidity and $\Gamma > 0$

(a) Communication and Welfare



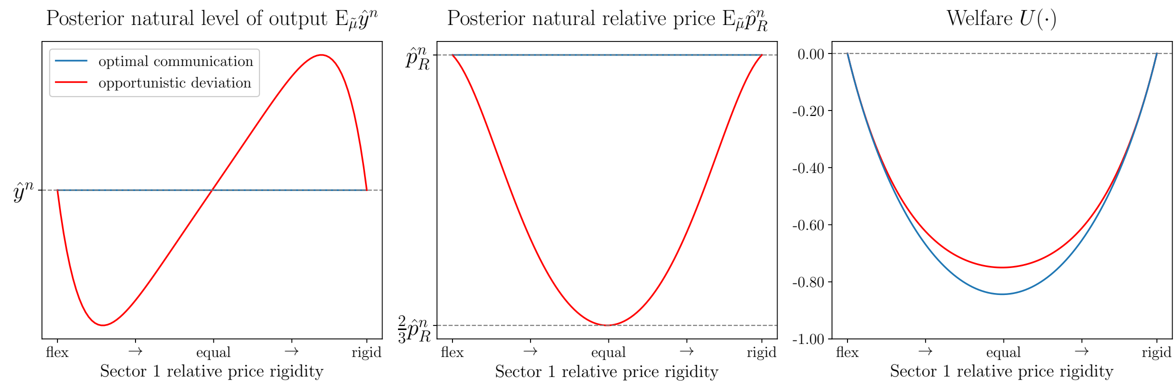
(b) Welfare Loss Decomposition



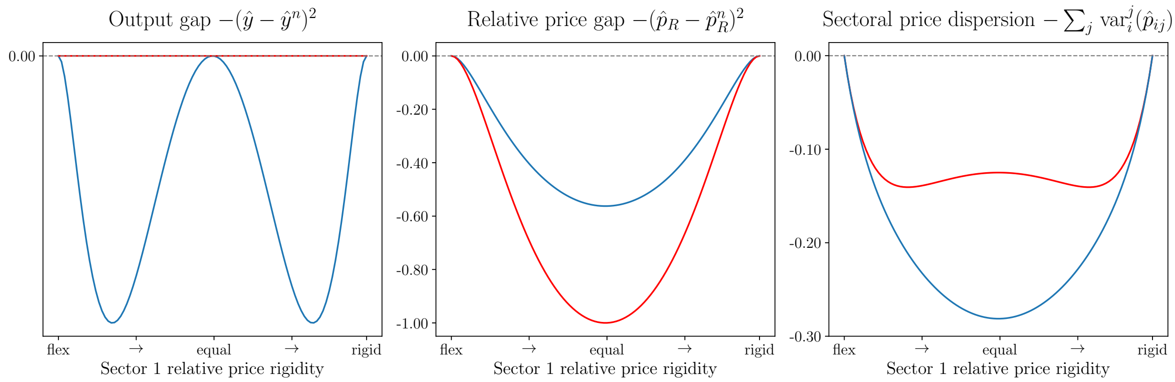
Notes. Given $\hat{y}^n = 0$ and $\hat{p}_R^n = \hat{a}_1 - \hat{a}_2 > 0$, this figure illustrates communication and aggregate economic outcomes under **optimal** and **opportunistic** disclosure of information, as a function of symmetric sectoral price rigidity $\alpha_1 = \alpha_2 = \alpha$. Illustrative parameter values $\eta = 4$ and $\theta = 8$ are set so that $\Gamma > 0$ for all $\alpha \in (0, 1)$.

Figure 2: Communication with Asymmetric Price Rigidity and $\Gamma > 0$

(a) Communication and Welfare



(b) Welfare Loss Decomposition



Notes. Given $\hat{y}^n > 0$ and $\hat{p}^n_R = \hat{a}_1 - \hat{a}_2 > 0$, this figure illustrates communication and aggregate outcomes under **optimal** and **opportunistic** disclosure of information, as a function of asymmetric sectoral price rigidity. Illustrative parameter values are set with an average price rigidity fixed at $\bar{\alpha} = \frac{1}{2}$, and elasticities $\eta = 4$ and $\theta = 8$, so that $\Gamma > 0$ for all $\alpha_1 \in (0, 1)$.

differentials across sectors. Figures 6 and 7 presented in the Appendix further highlight two novel properties of equilibria. In both symmetric and asymmetric rigidity cases, the monetary instrument closes the output gap ($\hat{y} = \hat{y}^n$), rendering welfare insensitive to the degree of nominal rigidities, because all prices are equal within and across sectors.

3.2 The Credibility of the Optimal Disclosure of Information

The commitment assumption embedded in the Bayesian persuasion program (3.1) raises the question of the credibility of the optimal communication policy. This section characterizes the sequential incentives to deviate from the normative disclosure benchmark, as a function of the fundamental parameters (elasticities and price rigidities) captured in the composite parameter Γ.

The Opportunistic Disclosure of Information. Consider a central bank (perceived as) committed to disclosing information as prescribed by the optimal communication rule $\varphi(\hat{v}^n)$, characterized in Proposition 1. To appreciate the credibility of this commitment, we ask: does the monetary authority have an incentive to deviate from this rule and report information strategically once it observes the state of the economy $\hat{v}^n$?

To evaluate these incentives, one needs to distinguish whether the rule prescribes truthful and complete disclosure of information ($\Gamma > 0$ and $\varphi(\hat{v}^n) = \hat{v}^n$) or partial disclosure ($\Gamma < 0$ and $\varphi(\hat{v}^n) = \hat{y}^n$). Formally, the program of such a strategic monetary authority is as follows. Given the observed state of the economy $\hat{v}^n$, the central bank chooses a bi-dimensional message $m = (m_1, m_2)$ to solve:

$$\max_m U(\hat{v}^n, \hat{q}, \mathbb{E}_{\tilde{\mu}}\hat{v}^n), \tag{3.4}$$

subject to

$$\hat{q} = \hat{q}(\mathbb{E}_{\tilde{\mu}}\hat{v}^n), \tag{3.5}$$

$$\mathbb{E}_{\tilde{\mu}}\hat{v}^n = m, \tag{3.6}$$

with the additional constraint that $m_2 = 0$ if $\Gamma < 0$. The first constraint prescribes that monetary policy is conducted optimally in a belief-consistent manner, as characterized in (2.20). The second constraint ensures that private firms take the message m of the monetary authority at face value and form posterior beliefs accordingly, based on the belief that the central bank is committed to disclose information truthfully. The additional constraint $m_2 = 0$ if $\Gamma < 0$ indicates that the central bank is bound not to disclose any information regarding the natural relative price, when partial disclosure is optimal. Indeed, if the monetary authority were to disclose information related to the natural relative price despite having pre-committed not to do so, private firms would immediately detect this strategic behavior.

Proposition 2. *In a single sector economy ($\eta = \theta$), the communication rule $\varphi(\hat{v})^n$ is credible. In a multi-sector economy,*

- *if $\Gamma < 0$, the rule is credible.*

- *if* $\Gamma > 0$, *the rule is not credible as the central bank has incentives to pursue an opportunistic communication strategy:*

$$m = \begin{pmatrix} m_1 \\ m_2 \end{pmatrix} = \begin{pmatrix} 1 & \kappa_1 \\ 0 & \kappa_2 \end{pmatrix} \begin{pmatrix} \hat{y}^n \\ \hat{p}_R^n \end{pmatrix} = \kappa \hat{v}^n, \tag{3.7}$$

where κ_i *are composite parameters of elasticities and price rigidities, with* $\kappa_1 \in (-\frac{1}{2}, \frac{1}{2})$ *and* $\kappa_2 \in (0, 1)$. *In particular, if* $\alpha_1 = \alpha_2$, *then* $\kappa_1 = 0$ *and* $\kappa_2 = \frac{\eta}{\eta(1-\alpha)+\theta\alpha}$.

Proof. See Appendix B.2 ∎

Discussion. Credibility of the optimal provision of information is a concern only in a multi-sector economy ($\eta < \theta$) when full disclosure of information is optimal ($\Gamma > 0$). Indeed, under optimal partial disclosure of information ($\Gamma < 0$), there is no incentive to misreport the natural level of output $\hat{y}^n$ when information about natural relative price is withheld and the monetary instrument is set optimally to stabilize the output gap (otherwise, the monetary instrument would be set under-optimally).

Accordingly, all subsequent analysis focuses on the case where full disclosure of information is optimal, i.e., the $\Gamma > 0$ case. Note how the credibility of the full disclosure rule is tied to the structure of the economy. In particular, if production takes place in a single sector ($\eta = \theta$), then the communication wedge κ is the identity matrix, which implies that there are no incentives for the central bank to deviate from the communication rule. Instead, if the multi-sector economy ($\eta < \theta$) is hit by idiosyncratic sectoral shocks (i.e., $\hat{p}_R^n \neq 0$), the monetary authority has incentives to under-report ($m_2 = \kappa_2 \hat{p}_R^n$ with $0 < \kappa_2 < 1$) the extent of shock dispersion in order to influence the beliefs of firms that reset prices and mitigate within-sector price dispersion.

In the special case of symmetric price rigidities ($\alpha_1 = \alpha_2$), the incentives to misreport information are solely related to the natural relative price, not the natural level of output, because the monetary instrument can effectively close the output gap. Figure 1, red lines, illustrates the economic implications of this opportunistic disclosure strategy. Once the monetary authority observes the realized shocks $\hat{v}^n$, it truthfully reports the natural level of output while under-reporting the natural relative price ($\kappa_2 \in (0, 1)$). Consequently, when private firms take these messages at face value, welfare gains are realized relative to the optimal disclosure rule $\varphi(\hat{v}^n)$. These gains stem from a reduction of price dispersion within sectors, albeit at the expense of an increased relative price gap. Indeed, under-reporting the natural relative price induces price-setting firms to limit the amplitude of their price adjustments, thereby containing within-sector price-dispersion.

These opportunistic incentives to under-report the dispersion of shocks are also present under asymmetric price rigidities ($\alpha_1 \neq \alpha_2$), as illustrated in Figure 2, red lines. In this case, welfare gains are also tied to a reduction in within-sector price dispersion, although it comes with higher natural relative price gap. The characterization also underlines that there is an opportunity to misreport the natural level of output ($\kappa_1 \neq 0$). When messages are taken at face value, such an opportunistic disclosure of information can yield welfare gains by completely closing the output gap.

Take-Away. Overall, this normative section has established the optimal communication rule, and its coordination with the instrument policy. The propensity to disclose sector-specific shocks depends on the sectoral structure of the economy and the extent of price rigidities. When full disclosure is optimal, the communication rule suffers from a lack of credibility, because the monetary authority has incentives to misreport its information in order to achieve additional welfare gains at the expense of price-setting firms. However, a lack of credibility does not imply that the monetary authority can systematically capture these gains. In the next section, we study the equilibrium implications of these incentives under a lack of commitment and examine whether and how the monetary authority can rely on its reputation to achieve some discretionary welfare gains.

4 Positive Analysis: Credibility and Reputation

This section examines how communication and reputation are intertwined when a monetary authority lacks commitment to follow the optimal communication rule characterized in Section 3.1. Accordingly, we consider the multi-sector economy ($\eta < \theta$) in which complete and truthful disclosure of information is optimal (i.e., $\Gamma > 0$).

To appreciate the interplay between strategic communication under a lack of commitment and reputation we extend the formal environment as detailed below.

4.1 Communication with Dynamic Reputation

4.1.1 Monetary Authorities and Reputation

Monetary Authorities' Types. There are two types of monetary authorities, indexed by $\delta \in \{tt, st\}$, for *truthful* and *strategic*. Both types observe a noisy signal about the underlying state of the economy $s = \hat{v}^n + \varepsilon$, and communicate about the conditional average value of the natural level of output and relative price $\bar{v}^n = \mathbb{E}(\hat{v}^n|s) = s\frac{\sigma^2}{\sigma^2+\sigma_\varepsilon^2}$, where σ_ε^2 is the variance of the noise term, which is referred to as the *competence* of the monetary authority as in Moscarini (2007).[19] The key difference between these monetary authorities lies in their communication practices.

- A *truth-telling* monetary authority ($\delta = tt$) always reports the conditional average $\bar{v}^n = \mathbb{E}(\hat{v}^n|s)$ truthfully, i.e., $m = \bar{v}^n$.
- A *strategic* monetary authority ($\delta = st$) adopts a stochastic disclosure strategy. Formally,
  - with probability p, it reports its information truthfully, i.e., $m = \bar{v}^n$,
  - with probability $1 - p$, it reports its information strategically, i.e. $m = \kappa\bar{v}^n$, where κ is the opportunistic communication wedge characterized in Proposition 2.

[19] Appendix A.2 provides an overview of derivations of the probability distributions used in this section. Note that the additional features are introduced solely to study the interplay of communication and reputation when one relaxes the commitment assumption. The analysis conducted in Section 3, and in particularly Propositions 1 and 2 generalizes to the case of noisy signal, as argued previously in footnote 12.

Importantly, the type of the monetary authority is unobservable. However, private firms hold a belief $\xi \in (0,1)$ that a monetary authority is of the truth-telling type ($\delta = tt$). Accordingly, we refer to ξ as the *reputation* of the monetary authority.

Furthermore, note that the message reported strategically depends on the (a)symmetry of price rigidities across sectors, as characterized in Section 3.2. In particular, under symmetric price rigidities, a strategic monetary authority would systematically reports the signal about the natural level of output $\bar{y}^n$ truthfully. But it would under-report the signal about the natural relative price with $m_2 = \kappa_2 \bar{p}_R^n$ with probability $1 - p$.

Timing. The timing of the game is augmented to incorporate the types and strategies of monetary authorities as well the dynamic evolution of reputation. Time is discrete and infinite. The sequence of events within each period is as follows:

- Firms hold an initial belief that a monetary authority is of the truth-telling type ($\delta = tt$) with probability ξ.
- Given prior μ about the distribution of exogenous shocks $\hat{v}^n \sim \mathcal{N}(0, \Sigma\sigma^2)$, all firms *preset* prices $\hat{p}_j^p = 0$.
- Nature draws the state $\hat{v}^n = (\hat{y}^n, \hat{p}_R^n)$. The monetary authority observes a noisy signal $s = \hat{v}^n + \varepsilon$, and forms the conditional expectation $\bar{v}^n = \mathbb{E}(\hat{v}^n | s)$. It then 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 $\tilde{\mu} = \mu | \xi, m, \hat{q}$.
- Production occurs and output $\hat{y}$ and prices are realized. Firms then observe the realized shocks $\hat{v}^n$ and given prior reputation ξ and message m, they update their belief about the type of the monetary authority's type to $\bar{\xi}$.
- Overnight, nature maintains the monetary authority with probability λ and replaces it with probability $1 - \lambda$. In that event, a truth-telling monetary authority is drawn with probability ρ. Consequently, the dynamic law of motion of reputation is given by

$$\xi' = \lambda \bar{\xi} + (1 - \lambda)\rho, \tag{4.1}$$

  where λ denotes the *persistence* of the monetary authority's mandate and ρ to the *prevalence* or long run average of truth-telling types.

4.1.2 Bayesian Interpretation of Information

At two distinct moments within each period, firms need to interpret information and form posterior beliefs in a Bayesian way. First, firms need to form beliefs about the underlying shocks $\hat{v}^n$ upon receiving a message m. Second, they update the reputation probability ξ that the monetary authority is a *truth-telling* type upon observing realized shocks.

Interpretation of a Message. Firms that can reset prices upon receiving a message m need to form beliefs about the underlying value of shocks $\hat{v}^n$.

Lemma 3. *Given reputation ξ, a message m and a strategic monetary authority communication policy $p(\cdot)$, private firms form posterior beliefs according to:*

$$\mathbb{E}_{\tilde{\mu}}\hat{v}^n = \frac{m \cdot f_{\bar{v}^n}(m)\left[\xi + (1-\xi)p(\xi, m)\right] + \kappa^{-1}m \cdot f_{\kappa\bar{v}^n}(m)(1-\xi)\left[1 - p(\xi, \kappa^{-1}m)\right]}{f_{\bar{v}^n}(m)\left[\xi + (1-\xi)p(\xi, m)\right] + f_{\kappa\bar{v}^n}(m)(1-\xi)\left[1 - p(\xi, \kappa^{-1}m)\right]}. \tag{4.2}$$

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

$$\Sigma_\kappa = \kappa\Sigma\kappa^T = \begin{pmatrix} \frac{1}{2} + 2\kappa_1^2 & 2\kappa_1\kappa_2 \\ 2\kappa_1\kappa_2 & 2\kappa_2^2 \end{pmatrix} \tag{4.3}$$

Proof. See Appendix C.1. ∎

In words, given a message m, firms form the posterior mean of the underlying shocks $\hat{v}^n$ as a weighted average of two potential underlying values $\{m, \kappa^{-1}m\}$ – corresponding respectively to a *truthful* and a *strategic* disclosure of information. The weights are determined by the likelihoods $f_{\bar{v}^n}(m)$ and $f_{\kappa\bar{v}^n}(m)$ of a message m being truthful or strategic, the current reputation ξ and the endogenous communication policy $p(\xi, m)$ of a strategic monetary authority.[20]

Update of Reputation. Once production is realized, private firms observe sectoral productivity. Accordingly, firms update the monetary authority's reputation based on the observed sectoral productivity and the initial message received.

Lemma 4. *Given prior reputation ξ, a message m and observed shocks $\hat{v}^n$, private firms update the reputation of the acting monetary authority to $\bar{\xi}$ according to*

$$\bar{\xi} = \frac{f_m(\hat{v}^n)f_{\bar{v}^n}(m) \cdot \xi}{f_m(\hat{v}^n)f_{\bar{v}^n}(m)\left[\xi + (1-\xi)p(\xi, m)\right] + f_{\kappa^{-1}m}(\hat{v}^n)f_{\kappa\bar{v}^n}(m)\left(1 - p(\xi, \kappa^{-1}m)\right)(1-\xi)}, \tag{4.4}$$

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

Proof. See Appendix C.2. ∎

In words, the updated reputation $\bar{\xi}$, i.e., firms' revised beliefs that the acting monetary authority is of the truth-telling type, is increasing in the prior reputation ξ, the likelihood to receive a given message m under truthful reporting $f_{\bar{v}^n}(m)$, and the likelihood of the observed shocks $\hat{v}^n$ given an initial noisy signal $\bar{v}^n$ reported truthfully $m = \bar{v}^n$, i.e., $f_m(\hat{v}^n)$.

[20] The probability distribution functions $f_{\bar{v}^n}(\cdot)$ and $f_{\kappa\bar{v}^n}(\cdot)$ represents the likelihood of a message m provided the monetary authority report truthfully or strategically, respectively.

4.1.3 Optimization Program and Equilibrium Definition

The following optimization program formalizes the decision of a strategic monetary authority, capturing the interplay between short-term benefits of opportunistic report of information and long-run reputational incentives. Given a prior reputation ξ and conditional mean $\bar{v}^n$ induced by a signal s, the monetary authority chooses the propensity p to report information truthfully to maximize the effects of economic stabilization on contemporaneous utility and the dynamic evolution of reputation. Formally,

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

subject to

$$\begin{aligned} \hat{q} &= \hat{q}(\tilde{\mu}) && \text{instrument policy} && (4.6)\\ \mathbb{E}_{\tilde{\mu}}\hat{v}^n &= \mathbb{E}(\hat{v}^n|\xi, m) && \text{interpretation of } m && (4.7)\\ \xi' &= \xi'(\xi, m, \hat{v}^n) && \text{law of motion of reputation} && (4.8) \end{aligned}$$

and

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

The first constraint requires that the monetary instrument is set in a benevolent and belief-consistent way, as defined in (2.20). The next two constraints capture the Bayesian interpretation of a message m (4.2) and the dynamic evolution of reputation ξ, that satisfies (4.1) and (4.4).

The final expression (4.9) in the program represents the continuation value of a strategic monetary authority with reputation ξ, accounting for the possibility of stochastic turnover of 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 truth-telling monetary authority - denoted $V_{tt}(\xi, \tilde{v}^n)$ with its continuation value $\mathbf{V}_{tt}(\xi)$ - are defined analogously, but with the additional constraint that the authority always reports truthfully (i.e., $p = 1$ for all $(\xi, \bar{v}^n)$).

Finally, the effectiveness of a given monetary authority of type $\delta \in \{tt, st\}$ 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 distribution of reputation ξ and $\hat{q}$ satisfies (2.20).

Equilibrium Definition. A Markov Perfect Bayesian Equilibrium consists of value functions, a monetary instrument policy, a communication policy for the strategic monetary authority, together with an endogenous distribution over reputation, such that:

- Firms set prices optimally given their beliefs and all markets clear.

- The monetary instrument policy satisfies (2.20), i.e., it is set optimally in a benevolent and belief-consistent manner.

- A truth-telling monetary authority reports its information truthfully. A strategic monetary authority's communication policy is determined as the solution to (4.5).

- Beliefs are updated in a Bayesian rational manner, that is, the interpretation of messages and the update of reputation satisfy (4.2) and (4.4).

4.2 Equilibrium Without Dynamic Adjustment of Reputation

To isolate the effects of dynamic reputational forces on communication incentives, we first consider an economy where there is a systematic change in monetary authority overnight, i.e., the persistence parameter is null $\lambda = 0$. This assumption implies that the probability that a monetary authority is a truth-teller remains constant and equals the overall prevalence of truth-telling types, so that $\xi = \rho$. In other words, reputation is constant from one period to the next.

To examine the stabilization and welfare properties of equilibrium, we introduce W^{SI}, the unconditional average welfare under imperfect but symmetric information, where the monetary authority does not benefit from an informational advantage and firms receive the same signal s. Under the assumption $\Gamma > 0$, this is the optimal level of welfare, since symmetric information is optimal (Proposition 1). Formally, this benchmark level of welfare satisfies:

$$W^{SI} = \frac{1}{1-\beta} \mathbb{E}_{\bar{v}^n} \mathbb{E}_{\hat{v}^n|\bar{v}^n} U(\hat{v}^n, \hat{q}, \bar{v}^n), \tag{4.11}$$

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

The following proposition characterizes the equilibrium and welfare properties of the economy with information asymmetry but without endogenous adjustments in reputation.

Proposition 3. *Let $\lambda = 0$, then*

i. reputation is constant across periods

$$P(\delta = tt) = \xi = \rho, \tag{4.12}$$

ii. a strategic monetary authority ($\delta = st$) always misreport its information

$$\forall \hat{v}^n,\ \forall \xi,\ p(\xi, \bar{v}^n) = 0, \tag{4.13}$$

iii. a strategic monetary authority ($\delta = st$) achieves stabilization gains relative to the economy with sym-

metric information, at the expense of the stabilization of a truth-telling monetary authority ($\delta = tt$),

$$W_{tt}(\rho) \leq W^{SI} \leq W_{st}(\rho) \tag{4.14}$$

iv. and at the expense of the long run stabilization of the economy

$$W(\rho) = \rho \cdot W_{tt}(\rho) + (1-\rho) \cdot W_{st}(\rho) \leq W^{SI} \tag{4.15}$$

with the inequalities in (4.14) *and* (4.15) *being strict if* $0 < \rho < 1$.

Proof. See Appendix C.3. ∎

In the absence of dynamic reputational forces, there are always weak welfare gains to misreport information. In other words, there is no restriction on the propensity of a strategic monetary authority to misreport its information so that $p(\xi, \bar{v}^n) = 0$ and $m = \kappa \bar{v}^n$ for all $\bar{v}^n$. Indeed, any movement of firms' posterior beliefs away from $\bar{v}^n$ toward $\kappa \bar{v}^n$ can mitigate price dispersions and yield welfare gains. Whether this communication policy is effective in stabilizing the economy depends on the equilibrium adjustment of posterior beliefs through the interpretation of messages.

In the case where the monetary authority is strategic with probability 1, i.e., $\rho = 0$, then private firms understand its incentives and decode messages perfectly, so that $\mathbb{E}_{\tilde{\mu}}(\tilde{v}^n|m) = \kappa^{-1}m$. Consequently, despite the attempt to influence beliefs and misreport information, the strategic monetary authority ultimately reveals its information and firms set prices accordingly. In this special case, the economy operates as if information were symmetric, and there are no additional stabilization gains, i.e., $W(0) = W_{st}(0) = W^{SI}$.

Instead, a strategic monetary authority can achieve some stabilization gains if it is perceived as truth-telling with some probability, i.e., if $\rho > 0$. In this case, the interpretation of messages $\mathbb{E}_{\tilde{\mu}}(\tilde{v}^n|m)$ balances the possibility that the message originates from a truthful report, (in which case, the message m reflects the signal of the state of the economy) or from a strategic report (in which case, the signal received by the monetary authority is $\kappa^{-1}m$). Thus, by misreporting its signal, the monetary authority shifts posterior beliefs away from the true state, thereby inducing firms to set prices in a way that mitigate price dispersion. This allows the strategic monetary authority to achieve some stabilization gains above the symmetric information benchmark, but these gains come at the expense of stabilization under truth-telling, and impair the long run welfare performance of the economy. Indeed, when private firms receive a message m from a truth-telling monetary authority, they entertain the possibility that the message might instead come from a misreporting strategic monetary authority, and they adjust their beliefs and prices accordingly, which amplifies price dispersion and weighs on welfare

These core ideas generalize to an economy with active dynamic reputational forces.

4.3 Equilibrium With Dynamic Adjustment of Reputation

To characterize the interplay of strategic communication and reputation, we now turn to the general case where monetary authorities are not systematically replaced overnight, i.e., $\lambda > 0$. Since a closed-form representation of equilibrium is not available in this dynamic environment, we rely on numerical exposition under a standard calibration (Table 1), maintaining the assumption that $\Gamma > 0$, i.e., complete and truthful release of information characterizes the optimal communication policy (see Proposition 1).

Table 1: 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

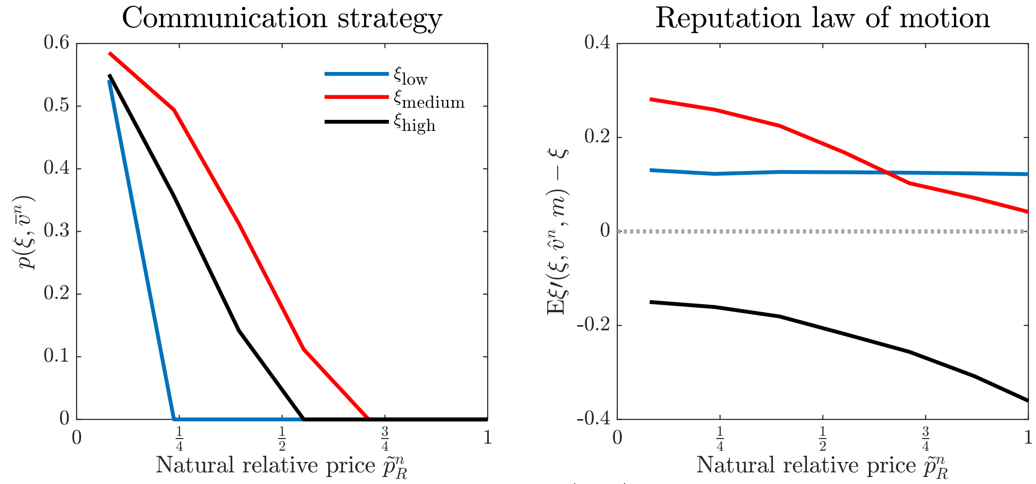
Notes. This table provides the baseline calibration used in numerical exercises reported in Section 4.3.

We present three results. First, active reputational forces significantly curb the temptation of a strategic monetary authority to systematically misreport information. Second, the economic implications derived in Proposition 3 generalize to an economy with active reputational forces: a strategic monetary authority can achieve stabilization gains relative to a symmetric information economy, at the expense of the long run stabilization of the economy. Finally, we discuss the sensitivity of these distributional gains to the core variables of the economy (nominal rigidities and sectoral elasticities) and to the characteristics of monetary authorities (such as competence, persistence and prevalence).

State Contingent Incentives to Report Information Truthfully. Figure 3 panel (a) represents the endogenous communication policy $p(\xi, \bar{v}^n)$ of a strategic monetary authority as a function of the signal $\bar{p}^n_R$, in an economy with symmetric price rigidity ($\alpha_1 = \alpha_2$). Two elements stand out: first, the propensity to misreport increases with the magnitude of the dispersion shock $\bar{p}^n_R$; second, it is not linear in the level of reputation ξ. Indeed, it is optimal to misreport at both low and high level of reputation in order to stabilize the economy in the presence of asymmetric sectoral shocks. Similarly, it is optimal to refrain from misreporting at intermediate levels of reputation and relatively mild dispersion shocks $\hat{p}^n_R$, precisely to build reputation dynamically and better prepare for large dispersion shocks in the future.

Short-run vs. Long-run Welfare Implications. Figure 4 presents the unconditional long run welfare (panel a), and the conditional welfare metrics for strategic and truth-telling monetary authorities (panels b and c), relative to the symmetric information welfare benchmark (4.11). A strategic monetary authority achieves welfare gains relative to the symmetric information case, by its ability to influence price setting firms' beliefs and reduce within-sector price dispersion (panel b). In contrast, a truth-telling monetary authority, that reveals its information truthfully unconditionally, is interacting with firms that account for

Figure 3: Reputation and propensity to misreport



Notes. The left panel reports the communication policy $p(\xi, \hat{v}^n)$ for different level of reputation ξ, the right panel the associated law of motion of reputation. The x-axis is indexed as multiple of standard deviation of dispersion $\sigma_{\tilde{p}_R^n}$.

the possibility that messages may be strategic and distorted relative to the signal observed. This adjustment yields an increase in price dispersion within sectors, and, consequently, a decrease in welfare (panel c). These effects peak at intermediate level of price rigidities α, where price adjustments translate into large price dispersions within sectors. Overall, accounting for the stochastic turnover of truth-telling and strategic monetary authorities, long-run welfare is lower than under symmetric information (panel a).

Overall, over the course of its term, the reputation of a strategic monetary authority tends to decline, due to its propensity to misreport its signal. Nonetheless, its performance in stabilizing the economy is superior to stabilization under symmetric information. These stabilization gains come at the cost of reduced stabilization by a truth-telling monetary authority, and degraded long-run performance of the economy.

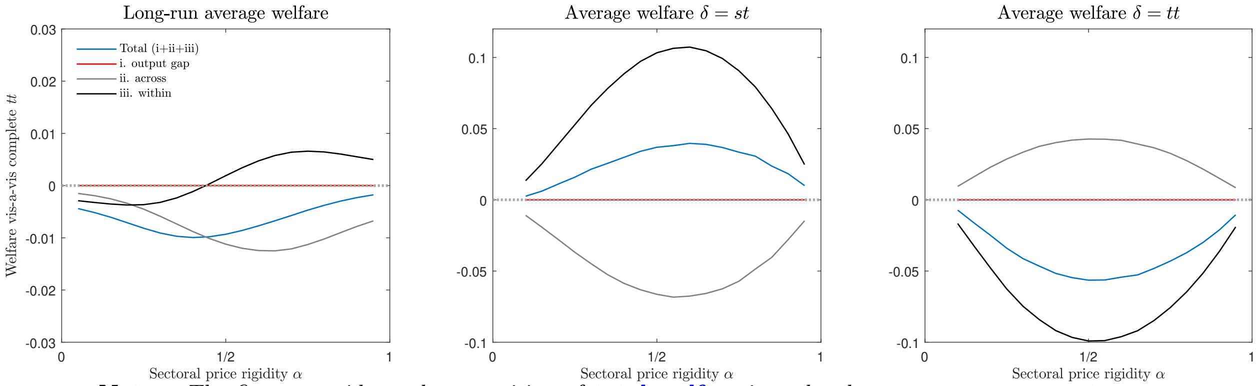
Sensitivity to Parameters. Table 2 presents key statistics—average propensity to report truthfully, reputation and welfare—for the baseline economy (calibrated as shown in Table 1) and a set of alternative parameterizations. These alternatives highlight the role of price rigidities, sectoral elasticities, and the characteristics of monetary authorities in shaping communication incentives and equilibrium implications. The following observations emerge.

First, lower price rigidities reduce the cost of price dispersion within sectors, thereby decreasing incentives for strategic reporting. This is associated with a higher average reputation for the strategic monetary authority, but lower conditional welfare.

Asymmetric price rigidities encourage strategic disclosure behavior. In these cases, the strategic monetary authority achieves substantial welfare gains, largely at the expense of lower welfare under a truth-telling authority, but not necessarily long run degraded performance.

Differences in elasticities across and within sectors alter the trade-off between stabilizing within-sector

Figure 4: 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** (panel a). Panels b and c provide a similar decomposition conditional on the monetary authority's type $\delta \in \{tt, st\}$.

Table 2: 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 1 assumes standard parameters and symmetric price rigidities across sectors. Average welfare is reported relative to an economy with symmetric information.

price dispersion and maintaining efficient relative prices across sectors. A lower elasticity of substitution across sectors (e.g., $\eta = 3$) increases the cost of price dispersion within sectors, incentivizing more strategic release of information. This is reflected in lower average reputation for a strategic monetary authority, but associated to moderate welfare gains.

Regarding the characteristics of monetary authorities, higher *competence* (lower σ_ε) increases the likelihood that strategic misreporting is suspected upon realization of fundamentals, which reduces incentives to misreport but still yields net welfare gains. Lower *prevalence* of truth-telling types (lower ρ) and lower *persistence* (lower λ) both increase the incentives of strategic release of information. In both cases though, reputation is degraded due to to parameters and strategic communication, which translates into more modest welfare gains for the strategic monetary authority.

5 Conclusions

A major philosophical debate in the XIXth century opposed Immanuel Kant to Benjamin Constant on "a supposed right to tell lies from benevolent motives". Immanuel Kant held that truth-telling is an absolute duty, impervious to context or consequence, whereas Benjamin Constant argued that a benevolent lie or misrepresentation may be justified to avert greater harm.[21]

This classic controversy between uncompromising honesty and tactical misrepresentation in moral philosophy offers an interesting lens on our analysis of modern central-bank communication confronted with the difficult trade-offs associated to stabilizing an economy subject to sector specific shocks. The normative perspective exhorts policy-makers to commit unconditionally to truth, deploying robust institutional 'commitment technologies' that mirror Kant's moral absolutism. Yet the positive analysis reminds us that the temptation to bend announcements for short-term benevolent benefits is ever present, and that such strategic discretion can yield immediate benefits at the cost of long-run credibility and economic instability.

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[21] Immanuel Kant, *Über ein vermeintes Recht aus Menschenliebe zu lügen* (1797) and Benjamin Constant, *Des réactions politiques* (1796). We thank Stephanie Ettmeier for pointing at the parallel between our study and this classic philosophical controversy.

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A Economic Environment

A.1 Quadratic Approximation of Households' Welfare

Key steps in deriving a quadratic welfare criterion. To begin, derive a generic criterion that does not rely on the specific price-setting protocol.

A.1.1 Welfare Criterion

Rewrite the utility function using labor market clearing and the production function as follows:

$$U \equiv \log C - L_1 - L_2 = \log Y - \int_{N_1} \frac{Y(i)}{A_1} di - \int_{N_2} \frac{Y(i)}{A_2} di \tag{A.1}$$

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

$$\log Y \approx \log \bar{Y} + \hat{y} \tag{A.2}$$

$$\frac{Y(i)}{A_j} \approx \bar{Y}\left[1 + \hat{y}(i) + \frac{1}{2}\hat{y}(i)^2 - \hat{a}_j \hat{y}(i) - \frac{1}{2}\hat{a}_j^2\right] \tag{A.3}$$

Aggregating up disutility from labor

$$\int_{N_j} \frac{Y(i)}{A_j} di \approx n_j \bar{Y}\left[\hat{y}_j + \frac{1}{2}\hat{y}_j^2 - \hat{a}_j \hat{y}_j + \frac{1}{2}\frac{1}{\theta}\mathrm{var}_i^j \hat{y}(i)\right] + \text{t.i.p.} \tag{A.4}$$

$$\sum_j \int_{N_j} \frac{Y(i)}{A_j} di \approx \bar{Y}\left[\hat{y} + \frac{1}{2}\hat{y}^2 - \sum_j n_j \hat{a}_j \hat{y}_j + \frac{1}{2}\frac{n_1 n_2}{\eta}(\hat{y}_2 - \hat{y}_1)^2 + \frac{1}{2}\frac{1}{\theta}\sum_j n_j \mathrm{var}_i^j \hat{y}(i)\right] + \text{t.i.p.} \tag{A.5}$$

Put things together

$$U \approx (1 - \bar{Y})\hat{y} - \frac{1}{2}\left[\hat{y}^2 - 2\sum_j n_j \hat{a}_j \hat{y}_j + \frac{n_1 n_2}{\eta}(\hat{y}_2 - \hat{y}_1)^2 + \frac{1}{\theta}\sum_j n_j \mathrm{var}_i^j \hat{y}(i)\right] + \text{t.i.p.} \tag{A.6}$$

Rewrite, assuming an efficient steady state ($\mathcal{M}(1-\tau) = 1$) and using natural variables

$$U \approx -\frac{1}{2}\left[(\hat{y} - \hat{y}^n)^2 + n_1 n_2 \eta (\hat{p}_R - \hat{p}_R^n)^2 + \theta \sum_j n_j \mathrm{var}_i^j \hat{p}(i)\right] + \text{t.i.p.} \tag{A.7}$$

Set $n_1 = n_2 = \frac{1}{2}$ to get (2.15). The first term reflects the objective of output stabilization, the second stabilization of prices across sectors and the minimization of price dispersion within sectors.

A.1.2 Dichotomous Price-setting

The variance of sectoral prices in sector j becomes

$$\text{var}_i^j(\hat{p}_{ij}) = \alpha_j(1-\alpha_j)\left(\hat{p}_j^f - \hat{p}_j^s\right)^2 \tag{A.8}$$

Then the welfare criterion becomes (2.19):

$$U \approx -\frac{1}{2}\left[(\hat{y}-\hat{y}^n)^2 + \frac{\eta}{4}(\hat{p}_R - \hat{p}_R^n)^2 + \frac{\theta}{2}\sum_j \alpha_j(1-\alpha_j)\left(\hat{p}_j^f - \hat{p}_j^s\right)^2\right] + \text{t.i.p.} \tag{A.9}$$

A.2 Review of distributions

TFP and natural variables Let $\hat{a}_i \sim \mathcal{N}(0,\sigma^2)$, then $\hat{y}^n = \frac{\hat{a}_1+\hat{a}_2}{2} \sim \mathcal{N}(0, \frac{\sigma^2}{2})$ 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.,

$$\hat{v}^n = \begin{pmatrix} \hat{y}^n \\ \hat{p}_R^n \end{pmatrix} \sim \mathcal{N}\left(\begin{pmatrix} 0 \\ 0 \end{pmatrix}, \begin{pmatrix} \frac{1}{2} & 0 \\ 0 & 2 \end{pmatrix}\sigma^2\right) = \mathcal{N}\left(0, \Sigma\sigma^2\right) \tag{A.10}$$

Noisy signals Let $s_i = \hat{a}_i + \varepsilon_i$ with $\varepsilon_i \sim \mathcal{N}(0,\sigma_\varepsilon^2)$, then $s_y = \hat{y}^n + \frac{\varepsilon_1+\varepsilon_2}{2} \sim \mathcal{N}\left(0, \frac{\sigma^2+\sigma_\varepsilon^2}{2}\right)$ 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.,

$$s = \hat{v}^n + \varepsilon \sim \mathcal{N}\left(0, \Sigma(\sigma^2+\sigma_\varepsilon^2)\right) \tag{A.11}$$

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

$$\hat{y}^n | s_y \sim \mathcal{N}\left(s_y \frac{\sigma^2/2}{\sigma^2/2 + \sigma_\varepsilon^2/2}, \frac{\sigma^2/2 \cdot \sigma_\varepsilon^2/2}{\sigma^2/2+\sigma_\varepsilon^2/2}\right) \tag{A.12}$$

and

$$\hat{p}_R^n | s_p \sim \mathcal{N}\left(s_p \frac{2\sigma^2}{2\sigma^2 + 2\sigma_\varepsilon^2}, \frac{2\sigma^2 \cdot 2\sigma_\varepsilon^2}{2\sigma^2+2\sigma_\varepsilon^2}\right) \tag{A.13}$$

i.e.

$$\hat{v}^n | s \sim \mathcal{N}\left(s\frac{\sigma^2}{\sigma^2+\sigma_\varepsilon^2}, \Sigma\frac{\sigma^2\sigma_\varepsilon^2}{\sigma^2+\sigma_\varepsilon^2}\right) \tag{A.14}$$

so that

$$\mathbb{E}\left(\hat{v}^n | s\right) = s\frac{\sigma^2}{\sigma^2+\sigma_\varepsilon^2} \tag{A.15}$$

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

$$\bar{\upsilon}^n \sim \mathcal{N}\left(0, \Sigma \frac{\sigma^4}{\sigma^2 + \sigma_\varepsilon^2}\right) \tag{A.16}$$

and

$$\hat{\upsilon}^n | \bar{\upsilon}^n \sim \mathcal{N}\left(\bar{\upsilon}^n, \Sigma \frac{\sigma^2 \sigma_\varepsilon^2}{\sigma^2 + \sigma_\varepsilon^2}\right) \tag{A.17}$$

A.3 Information control

A.3.1 Proof of Lemma 1

Start from $\hat{p}_j^r = \mathbb{E}_{\tilde{\mu}}(\hat{q} - \hat{a}_j) = \mathbb{E}_{\tilde{\mu}}\left(\hat{q} - \hat{y}^n + \frac{1}{2}(a_k - \hat{a}_j)\right)$, insert $\hat{p}_R^n = \hat{a}_1 - \hat{a}_2$ and get:

$$\hat{p}_1^r = (\hat{q} - \mathbb{E}_{\tilde{\mu}}\hat{y}^n) - \frac{1}{2}\mathbb{E}_{\tilde{\mu}}\hat{p}_R^n, \qquad \hat{p}_2^r = (\hat{q} - \mathbb{E}_{\tilde{\mu}}\hat{y}^n) + \frac{1}{2}\mathbb{E}_{\tilde{\mu}}\hat{p}_R^n, \tag{A.18}$$

$$\hat{p} = (1 - \bar{\alpha})(\hat{q} - \mathbb{E}_{\tilde{\mu}}\hat{y}^n) + \frac{\alpha_1 - \alpha_2}{4}\mathbb{E}_{\tilde{\mu}}\hat{p}_R^n, \qquad \hat{p}_R = (\alpha_1 - \alpha_2)(\hat{q} - \mathbb{E}_{\tilde{\mu}}\hat{y}^n) + (1 - \bar{\alpha})\mathbb{E}_{\tilde{\mu}}\hat{p}_R^n, \tag{A.19}$$

where $\bar{\alpha} = \frac{\alpha_1 + \alpha_2}{2}$. The welfare function then writes:

$$U(\hat{\upsilon}^n, \hat{q}, \mathbb{E}_{\tilde{\mu}}\hat{\upsilon}^n) \approx -\frac{1}{2}\left[\left(\hat{q} - \hat{p} - \hat{y}^n\right)^2 + \frac{\eta}{4}\left(\hat{p}_R - \hat{p}_R^n\right)^2 + \frac{\theta}{2}\sum_j \alpha_j(1 - \alpha_j)\left(\hat{p}_j^r\right)^2\right] + \text{t.i.p.} \tag{A.20}$$

A.3.2 Proof of Lemma 2

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

$$U \approx -\frac{1}{2}\left[\left(\hat{q} - \hat{p} - \mathbb{E}_{\tilde{\mu}}\hat{y}^n\right)^2 + \text{Var}_{\tilde{\mu}}\hat{y}^n + \frac{\eta}{4}\left(\hat{p}_R - \mathbb{E}_{\tilde{\mu}}\hat{p}_R^n\right)^2 + \frac{\eta}{4}\text{Var}_{\tilde{\mu}}\hat{p}_R^n + \frac{\theta}{2}\sum_j \alpha_j(1 - \alpha_j)\left(\hat{p}_j^r\right)^2\right] + \text{t.i.p.} \tag{A.21}$$

The first order conditions w.r.t. $\hat{q}$:

$$\bar{\alpha}\left(\hat{q} - \mathbb{E}_{\tilde{\mu}}\hat{y}^n - \hat{p}\right) + (\alpha_1 - \alpha_2)\frac{\eta}{4}\left(\hat{p}_R - \mathbb{E}_{\tilde{\mu}}\hat{p}_R^n\right) + \frac{\theta}{2}\sum_j \alpha_j(1 - \alpha_j)\left(\hat{p}_j^r\right) = 0 \tag{A.22}$$

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

$$\bar{\alpha}^2 + (\alpha_1 - \alpha_2)^2\frac{\eta}{4} + \frac{\theta}{2}\sum_j \alpha_j(1 - \alpha_j) = \frac{\alpha_1^2 + \alpha_2^2}{2}\left(\frac{1 + \eta}{2} - \theta\right) + \frac{\alpha_1\alpha_2(1 - \eta)}{2} + \frac{\theta}{2}(\alpha_1 + \alpha_2) \tag{A.23}$$

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

$$-\bar{\alpha}\frac{\alpha_1-\alpha_2}{4}-\bar{\alpha}(\alpha_1-\alpha_2)\frac{\eta}{4}-\frac{\theta}{4}\left(\alpha_1(1-\alpha_1)-\alpha_2(1-\alpha_2)\right)=-\frac{\alpha_1-\alpha_2}{4}\left((\alpha_1+\alpha_2)\left(\frac{1+\eta}{2}-\theta\right)+\theta\right) \tag{A.24}$$

Reorganizing these terms, the optimal monetary rule writes:

$$\hat{q}=\mathbb{E}_{\tilde{\mu}}\hat{y}^n+\gamma_q\cdot\mathbb{E}_{\tilde{\mu}}\hat{p}_R^n \tag{A.25}$$

with

$$\gamma_q=\frac{1}{2}\frac{(\alpha_1^2-\alpha_2^2)\left(\frac{1+\eta}{2}-\theta\right)+\theta(\alpha_1-\alpha_2)}{(\alpha_1^2+\alpha_2^2)\left(\frac{1+\eta}{2}-\theta\right)+\alpha_1\alpha_2(1-\eta)+\theta(\alpha_1+\alpha_2)} \tag{A.26}$$

Next, we show $\gamma_q\in(-1/2,1/2)$, i.e. $2\gamma_q\in(-1,1)$. Note N and D respectively the numerator and denominator of $2\gamma_q$. Get:

$$D=\frac{(\alpha_1+\alpha_2)^2}{2}+\frac{\eta}{2}(\alpha_1-\alpha_2)^2+\theta\left(\alpha_1(1-\alpha_1)+\alpha_2(1-\alpha_2)\right)>0$$

$$N=\frac{\alpha_1^2-\alpha_2^2}{2}+\frac{\eta}{2}(\alpha_1^2-\alpha_2^2)+\theta\left(\alpha_1(1-\alpha_1)-\alpha_2(1-\alpha_2)\right)$$

Given $D>0$, w.t.s. $-D<N<D$. First consider $N-D$:

$$N-D=-\alpha_2\left[\alpha_1+\alpha_2+\theta(1-\alpha_2)+\theta(1-\alpha_2)-\eta(\alpha_1-\alpha_2)\right]$$

Since $1>\alpha_1$ and $\theta>\eta$, one has $\theta(1-\alpha_2)-\eta(\alpha_1-\alpha_2)>0$, which yields $N<D$, i.e. $\gamma_q<\frac{1}{2}$. A similar argument allows to derive $\gamma_q>-\frac{1}{2}$.

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:

$$\hat{p}_1^r=\left(\gamma_q-\frac{1}{2}\right)\mathbb{E}_{\tilde{\mu}}\hat{p}_R^n,\qquad \hat{p}_2^r=\left(\gamma_q+\frac{1}{2}\right)\mathbb{E}_{\tilde{\mu}}\hat{p}_R^n, \tag{A.27}$$

aggregate and relative price

$$\hat{p}=\left[\gamma_q-\frac{\alpha_1}{2}\left(\gamma_q-\frac{1}{2}\right)-\frac{\alpha_2}{2}\left(\gamma_q+\frac{1}{2}\right)\right]\mathbb{E}_{\tilde{\mu}}\hat{p}_R^n=\gamma_p\mathbb{E}_{\tilde{\mu}}\hat{p}_R^n, \tag{A.28}$$

$$\hat{p}_R=\left[1+\alpha_1\left(\gamma_q-\frac{1}{2}\right)-\alpha_2\left(\gamma_q+\frac{1}{2}\right)\right]\mathbb{E}_{\tilde{\mu}}\hat{p}_R^n=\gamma_{p_R}\mathbb{E}_{\tilde{\mu}}\hat{p}_R^n, \tag{A.29}$$

and output

$$\hat{y}=\mathbb{E}_{\tilde{\mu}}\hat{y}^n+\left[\frac{\alpha_1}{2}\left(\gamma_q-\frac{1}{2}\right)+\frac{\alpha_2}{2}\left(\gamma_q+\frac{1}{2}\right)\right]\mathbb{E}_{\tilde{\mu}}\hat{p}_R^n. \tag{A.30}$$

where

$$\gamma_q - \frac{1}{2} = -\frac{\alpha_2\left(\alpha_1+\alpha_2+\eta(\alpha_2-\alpha_1)+2\theta(1-\alpha_2)\right)}{(\alpha_1+\alpha_2)^2+\eta(\alpha_1-\alpha_2)^2+2\theta\left(\alpha_1(1-\alpha_1)+\alpha_2(1-\alpha_2)\right)} \tag{A.31}$$

$$\gamma_q + \frac{1}{2} = \frac{\alpha_1\left(\alpha_1+\alpha_2+\eta(\alpha_1-\alpha_2)+2\theta(1-\alpha_1)\right)}{(\alpha_1+\alpha_2)^2+\eta(\alpha_1-\alpha_2)^2+2\theta\left(\alpha_1(1-\alpha_1)+\alpha_2(1-\alpha_2)\right)} \tag{A.32}$$

$$\alpha_1\left(\gamma_q-\frac{1}{2}\right)+\alpha_2\left(\gamma_q+\frac{1}{2}\right) = \frac{\alpha_1\alpha_2(\alpha_1-\alpha_2)\left(\eta-\theta\right)}{(\alpha_1^2+\alpha_2^2)\left(\frac{1+\eta}{2}-\theta\right)+\alpha_1\alpha_2(1-\eta)+\theta(\alpha_1+\alpha_2)} \tag{A.33}$$

B Normative Analysis

B.1 Optimal disclosure policy - Proposition 1

Setting the problem To derive the optimal disclosure policy, one needs to derive the welfare criterion $\mathbb{E}_{\tilde{\mu}}U(\cdot)$ as a function of posterior beliefs $\mathbb{E}_{\tilde{\mu}}(\hat{v}^n)$.

Start from (A.21), substitute prices (2.16), (2.18), and belief-consistent monetary policy (2.20), and get that flow utility function as a function of posterior beliefs is:

$$U \approx -\frac{1}{2}\left[-\left(\mathbb{E}_{\tilde{\mu}}\hat{y}^n\right)^2+\left([\gamma_q]^2+\frac{1}{4}\eta\left[\left[\gamma_R^R-1+\gamma_R^Y\gamma_q\right]^2-1\right]+\frac{1}{2}\theta\sum_j\left[\alpha_j(1-\alpha_j)\left[\gamma_j^{fR}+\gamma^{fY}\gamma_q\right]^2\right]\right)\left(\mathbb{E}_{\tilde{\mu}}\hat{p}_R^n\right)^2\right]+\text{t.i.p.} \tag{B.1}$$

Note Γ the term associated to $\left(\mathbb{E}_{\tilde{\mu}}\hat{p}_R^n\right)^2$:

$$\Gamma = -\left([\gamma_q]^2+\frac{1}{4}\eta\left[\left[\gamma_R^R-1+\gamma_R^Y\gamma_q\right]^2-1\right]+\frac{1}{2}\theta\sum_j\left[\alpha_j(1-\alpha_j)\left[\gamma_j^{fR}+\gamma^{fY}\gamma_q\right]^2\right]\right) \tag{B.2}$$

where γ_q is given by (2.21) and other coefficients satisfy:

$$\gamma_1^{fR} \equiv \frac{-\alpha_2}{\alpha_1+\alpha_2} \in (-1,0) \tag{B.3}$$

$$\gamma_2^{fR} \equiv \frac{\alpha_1}{\alpha_1+\alpha_2} \in (0,1) \tag{B.4}$$

$$\gamma^{fY} \equiv \frac{2}{\alpha_1+\alpha_2} \in (1,+\infty) \tag{B.5}$$

$$\gamma_R^R \equiv \frac{\alpha_2(1-\alpha_1)+\alpha_1(1-\alpha_2)}{\alpha_1+\alpha_2} \in (0,1) \tag{B.6}$$

$$\gamma_R^Y \equiv \frac{2(\alpha_1-\alpha_2)}{\alpha_1+\alpha_2} \tag{B.7}$$

In particular, if $\alpha_1=\alpha_2$, get

$$\Gamma = -\frac{1-\alpha}{4}\left[\theta\alpha-\eta(1+\alpha)\right] \tag{B.8}$$

Optimal disclosure policy The program becomes:

$$\max_{\varphi} \mathbb{E}U(\mathbb{E}_{\tilde{\mu}}\hat{v}^n) = -\frac{1}{2}\mathbb{E}\left[-\left(\mathbb{E}_{\tilde{\mu}}\hat{y}^n\right)^2 - \Gamma\left(\mathbb{E}_{\tilde{\mu}}\hat{p}_R^n\right)^2\right] \tag{B.9}$$

It is straightforward to characterize optimal disclosure of information using Proposition 2 in Tamura (2018) which considers the case of the two-dimensional state drawn out of a bivariate normal distribution. First, natural aggregate output is always disclosed, so that $\hat{y}^n = \mathbb{E}_{\tilde{\mu}}\hat{y}^n$. Second, the natural relative price is either disclosed if $\Gamma > 0$ or not disclosed if $\Gamma < 0$. In particular, if $\alpha_1 = \alpha_2$, the natural relative price is disclosed if and only if $\frac{\theta}{\eta} \leq \frac{1+\alpha}{\alpha}$.

B.2 Incentives to deviate - Proposition 2

B.2.1 Full disclosure is optimal, $\Gamma > 0$

(1) Optimal messages Given $\hat{v}^n$,

$$\max_{m_1,m_2} U(\hat{v}^n, \hat{q}, \mathbb{E}_{\tilde{\mu}}\hat{v}^n) \tag{B.10}$$

subject to $\hat{q} = \mathbb{E}_{\tilde{\mu}}\hat{y}^n + \gamma_q \mathbb{E}_{\tilde{\mu}}\hat{p}_R^n$, $\mathbb{E}_{\tilde{\mu}}\hat{y}^n = m_1$ and $\mathbb{E}_{\tilde{\mu}}\hat{p}_R^n = m_2$. Substituting the constraints into the objective function:

$$\begin{aligned}\max_{m_1,m_2} -\frac{1}{2}\Bigg[&\Big(m_1 + (\gamma_q - \gamma_p)m_2 - \hat{y}^n\Big)^2 + \frac{\eta}{4}\Big(\gamma_{p_R} m_2 - \hat{p}_R^n\Big)^2 \\ &+ \frac{\theta}{2}\alpha_1(1-\alpha_1)\left(\left(\gamma_q - \frac{1}{2}\right)m_2\right)^2 + \frac{\theta}{2}\alpha_2(1-\alpha_2)\left(\left(\gamma_q + \frac{1}{2}\right)m_2\right)^2\Bigg],\end{aligned} \tag{B.11}$$

where γ_p and γ_{p_R} are defined in (A.28) and (A.29). The F.O.C. w.r.t. m_1:

$$m_1 = \hat{y}^n - (\gamma_q - \gamma_p)m_2 = \hat{y}^n - \left(\bar{\alpha}\gamma_q - \frac{\alpha_1 - \alpha_2}{4}\right)m_2 \tag{B.12}$$

The F.O.C. w.r.t. m_2:

$$\gamma_{p_R}\frac{\eta}{2}\Big(\gamma_{p_R} m_2 - \hat{p}_R^n\Big) + \theta\alpha_1(1-\alpha_1)\left(\gamma_q - \frac{1}{2}\right)^2 m_2 + \theta\alpha_2(1-\alpha_2)\left(\gamma_q + \frac{1}{2}\right)^2 m_2 = 0 \tag{B.13}$$

i.e.,

$$m_2 = \kappa_2 \hat{p}_R^n \tag{B.14}$$

where

$$\kappa_2 = \frac{\frac{\eta}{2}\gamma_{p_R}}{\frac{\eta}{2}\gamma_{p_R}^2 + \theta\alpha_1(1-\alpha_1)\left(\gamma_q - \frac{1}{2}\right)^2 + \theta\alpha_2(1-\alpha_2)\left(\gamma_q + \frac{1}{2}\right)^2} \tag{B.15}$$

and $m_1 = \hat{y}^n + \kappa_1 \hat{p}_R^n$ where

$$\kappa_1 = -\left(\bar{\alpha}\gamma_q - \frac{\alpha_1 - \alpha_2}{4}\right)\kappa_2 = -\frac{1}{2}\left(\alpha_1\left(\gamma_q - \frac{1}{2}\right) + \alpha_2\left(\gamma_q + \frac{1}{2}\right)\right)\kappa_2 \tag{B.16}$$

Overall,

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

Once $\kappa_2 \in (0, 1)$ is established, one can show $\kappa_1 \in \left(-\frac{\alpha_2}{2}, \frac{\alpha_1}{2}\right)$, a fortiori $\kappa_1 \in \left(-\frac{1}{2}, \frac{1}{2}\right)$.

(2) Special cases .

- <u>One sector economy $\eta = \theta$</u>

With $\eta = \theta$, (A.33) is null, hence using (B.16) $\kappa_1 = 0$. Also, using (A.33), one has

$$\alpha_1\left(\gamma_q - \frac{1}{2}\right) + \alpha_2\left(\gamma_q + \frac{1}{2}\right) = 0$$

so that

$$\gamma_{p_R} = 1 + 2\alpha_1\left(\gamma_q - \frac{1}{2}\right)$$

Then

$$\kappa_2 = \frac{\frac{\eta}{2}\gamma_{p_R}}{\frac{\eta}{2}\gamma_{p_R}^2 + \theta\alpha_1(1-\alpha_1)\left(\gamma_q - \frac{1}{2}\right)^2 + \theta\alpha_2(1-\alpha_2)\left(\gamma_q + \frac{1}{2}\right)^2}$$

$$\kappa_2 = \frac{\frac{1}{2}\gamma_{p_R}}{\frac{1}{2}\gamma_{p_R}^2 + \alpha_1(1-\alpha_1)\left(\gamma_q - \frac{1}{2}\right)^2 + \alpha_2(1-\alpha_2)\left(\gamma_q + \frac{1}{2}\right)^2}$$

$$\kappa_2 = \frac{\gamma_{p_R}}{\gamma_{p_R}^2 + 2\alpha_1(1-\alpha_1)\left(\gamma_q - \frac{1}{2}\right)^2 + 2\alpha_2(1-\alpha_2)\left(\gamma_q + \frac{1}{2}\right)^2}$$

$$\kappa_2 = \frac{\gamma_{p_R}}{1 + 4\alpha_1^2\left(\gamma_q - \frac{1}{2}\right)^2 + 4\alpha_1\left(\gamma_q - \frac{1}{2}\right) + 2\alpha_1(1-\alpha_1)\left(\gamma_q - \frac{1}{2}\right)^2 + 2\alpha_2(1-\alpha_2)\left(\gamma_q + \frac{1}{2}\right)^2}$$

$$\kappa_2 = \frac{\gamma_{p_R}}{\gamma_{p_R} + 4\alpha_1^2\left(\gamma_q - \frac{1}{2}\right)^2 + 2\alpha_1\left(\gamma_q - \frac{1}{2}\right) + 2\alpha_1(1-\alpha_1)\left(\gamma_q - \frac{1}{2}\right)^2 + 2\alpha_2(1-\alpha_2)\left(\gamma_q + \frac{1}{2}\right)^2}$$

Let

$$D = 4\alpha_1^2\left(\gamma_q - \frac{1}{2}\right)^2 + 2\alpha_1\left(\gamma_q - \frac{1}{2}\right) + 2\alpha_1(1-\alpha_1)\left(\gamma_q - \frac{1}{2}\right)^2 + 2\alpha_2(1-\alpha_2)\left(\gamma_q + \frac{1}{2}\right)^2$$

$$D = 2\alpha_1\left(\gamma_q - \frac{1}{2}\right) + 2\alpha_1(1+\alpha_1)\left(\gamma_q - \frac{1}{2}\right)^2 + 2\alpha_2(1-\alpha_2)\left(\gamma_q + \frac{1}{2}\right)^2$$

$$D = 2\alpha_1\left(\gamma_q - \frac{1}{2}\right) + 2\alpha_1(1+\alpha_1)\left(\gamma_q - \frac{1}{2}\right)^2 + 2\alpha_2(1-\alpha_2)\frac{\alpha_1^2}{\alpha_2^2}\left(\gamma_q - \frac{1}{2}\right)^2$$

$$D = 2\alpha_1\left(\gamma_q - \frac{1}{2}\right) + 2\alpha_1(1+\alpha_1)\left(\gamma_q - \frac{1}{2}\right)^2 + 2(1-\alpha_2)\frac{\alpha_1^2}{\alpha_2}\left(\gamma_q - \frac{1}{2}\right)^2$$

$$D = 2\alpha_1\left(\gamma_q - \frac{1}{2}\right)\left[1 + (1+\alpha_1)\left(\gamma_q - \frac{1}{2}\right) + (1-\alpha_2)\frac{\alpha_1}{\alpha_2}\left(\gamma_q - \frac{1}{2}\right)\right]$$

$$D = 2\frac{\alpha_1}{\alpha_2}\left(\gamma_q - \frac{1}{2}\right)\left[\alpha_2 + (\alpha_1+\alpha_2)\left(\gamma_q - \frac{1}{2}\right)\right]$$

The term in brackets:

$$[\cdot] = \alpha_2 + (\alpha_1+\alpha_2)\left(\gamma_q - \frac{1}{2}\right)$$

$$[\cdot] = \alpha_2 - \frac{(\alpha_1+\alpha_2)\alpha_2\left(\alpha_1+\alpha_2+\eta(\alpha_2-\alpha_1)+2\eta(1-\alpha_2)\right)}{(\alpha_1+\alpha_2)^2+\eta(\alpha_1-\alpha_2)^2+2\eta\left(\alpha_1(1-\alpha_1)+\alpha_2(1-\alpha_2)\right)}$$

$$[\cdot] = \alpha_2\left(1 - \frac{(\alpha_1+\alpha_2)\left(\alpha_1+\alpha_2+\eta(2-\alpha_1-\alpha_2)\right)}{(\alpha_1+\alpha_2)^2+\eta\left(\alpha_1^2+\alpha_2^2-2\alpha_1\alpha_2+2\alpha_1-2\alpha_1^2+2\alpha_2-\alpha_2^2\right)}\right)$$

$$[\cdot] = \alpha_2\left(1 - \frac{(\alpha_1+\alpha_2)\left(\alpha_1+\alpha_2+\eta(2-\alpha_1-\alpha_2)\right)}{(\alpha_1+\alpha_2)^2+\eta\left(-\alpha_1^2-\alpha_2^2-2\alpha_1\alpha_2+2\alpha_1+2\alpha_2\right)}\right)$$

Note that $(\alpha_1+\alpha_2)(2-\alpha_1-\alpha_2) = \left(-\alpha_1^2-\alpha_2^2-2\alpha_1\alpha_2+2\alpha_1+2\alpha_2\right)$ so that:

$$[\cdot] = \alpha_2\left(1 - \frac{\alpha_1+\alpha_2+\eta(2-\alpha_1-\alpha_2)}{\alpha_1+\alpha_2+\eta\left(2-\alpha_1-\alpha_2\right)}\right) = 0$$

which yields

$$\kappa_2 = \frac{\gamma_{p_R}}{\gamma_{p_R}} = 1$$

- Symmetric price rigidities $\alpha_1 = \alpha_2$

From (A.26), $\gamma_q = 0$, i.e., $\kappa_1 = 0$, $\gamma_{p_R} = 1 - \frac{\alpha_1+\alpha_2}{2}$ and using (B.15), get $\kappa_2 = \frac{\eta}{\eta(1-\alpha)+\theta\alpha}$.

(3) Bounds on κ_2 W.t.s. $\kappa_2 \in (0,1)$.

(i) First show $\kappa_2 > 0$, i.e., $\gamma_{p_R} > 0$

$$\gamma_{p_R} = 1 + \alpha_1\left(\gamma_q - \frac{1}{2}\right) - \alpha_2\left(\gamma_q + \frac{1}{2}\right) \tag{B.18}$$

$$= 1 - \left(\frac{2\alpha_1\alpha_2(\alpha_1+\alpha_2)+2\theta\alpha_1\alpha_2\left((1-\alpha_1)+(1-\alpha_2)\right)}{(\alpha_1+\alpha_2)^2+\eta(\alpha_1-\alpha_2)^2+2\theta\left(\alpha_1(1-\alpha_1)+\alpha_2(1-\alpha_2)\right)}\right) \tag{B.19}$$

Both the numerator and denominator of the fraction are positive. Need to show then that the fraction is smaller than 1, i.e.,

$$(\alpha_1+\alpha_2)(2\alpha_1\alpha_2-\alpha_1-\alpha_2) + 2\theta\left((1-\alpha_1)(\alpha_1\alpha_2-\alpha_1)+(1-\alpha_2)(\alpha_1\alpha_2-\alpha_2)\right) < \eta(\alpha_1-\alpha_2)^2 \tag{B.20}$$

Equivalently,

$$(\alpha_1+\alpha_2)(2\alpha_1\alpha_2-\alpha_1-\alpha_2)-2\theta(\alpha_1+\alpha_2)(1-\alpha_1)(1-\alpha_2)<\eta(\alpha_1-\alpha_2)^2 \tag{B.21}$$

The LHS is negative for all $(\alpha_1,\alpha_2)\in(0,1)^2$ and all $1\leq\eta\leq\theta$ because the following term is negative,

$$2\alpha_1\alpha_2-\alpha_1-\alpha_2=\alpha_1(\alpha_2-1)+\alpha_2(\alpha_1-1)\leq 0, \tag{B.22}$$

i.e., $\kappa_2>0$.

(ii) Next, show $\kappa_2<1$. Since the denominator of κ_2 is positive, $\kappa_2<1$ is equivalent to :

$$\eta\gamma_{p_R}(1-\gamma_{p_R})-2\theta\alpha_1(1-\alpha_1)\left(\gamma_q-\frac{1}{2}\right)^2-2\theta\alpha_2(1-\alpha_2)\left(\gamma_q+\frac{1}{2}\right)^2<0 \tag{B.23}$$

with

$$\begin{aligned}\gamma_{p_R}(1-\gamma_{p_R})=&-\alpha_1\left(\gamma_q-\frac{1}{2}\right)+\alpha_2\left(\gamma_q+\frac{1}{2}\right)-\alpha_1^2\left(\gamma_q-\frac{1}{2}\right)^2-\alpha_2^2\left(\gamma_q+\frac{1}{2}\right)^2\\&+2\alpha_1\left(\gamma_q-\frac{1}{2}\right)\alpha_2\left(\gamma_q+\frac{1}{2}\right)\end{aligned} \tag{B.24}$$

The expression of interest rewrites then

$$\begin{aligned}=&-\eta\alpha_1\left(\gamma_q-\frac{1}{2}\right)+\eta\alpha_2\left(\gamma_q+\frac{1}{2}\right)+2\eta\alpha_1\alpha_2\left(\gamma_q-\frac{1}{2}\right)\left(\gamma_q+\frac{1}{2}\right)\\&-\alpha_1\left(\eta\alpha_1+2\theta(1-\alpha_1)\right)\left(\gamma_q-\frac{1}{2}\right)^2-\alpha_2\left(\eta\alpha_2+2\theta(1-\alpha_2)\right)\left(\gamma_q+\frac{1}{2}\right)^2\end{aligned} \tag{B.25}$$

Decomposing this expression in four terms:

$$\begin{aligned}T_1=&-\eta\alpha_1\left(\gamma_q-\frac{1}{2}\right)+\eta\alpha_2\left(\gamma_q+\frac{1}{2}\right)\\=&\frac{2\eta\alpha_1\alpha_2\left((\alpha_1+\alpha_2)+\theta(2-\alpha_1-\alpha_2)\right)}{(\alpha_1^2+\alpha_2^2+2\alpha_1\alpha_2)+\eta(\alpha_1^2+\alpha_2^2-2\alpha_1\alpha_2)+2\theta\left(\alpha_1(1-\alpha_1)+\alpha_2(1-\alpha_2)\right)}\end{aligned} \tag{B.26}$$

$$\begin{aligned}T_2=&2\eta\alpha_1\alpha_2\left(\gamma_q-\frac{1}{2}\right)\left(\gamma_q+\frac{1}{2}\right)\\=&-2\eta\alpha_1^2\alpha_2^2\frac{\left[\alpha_1+\alpha_2+\eta(\alpha_1-\alpha_2)+2\theta(1-\alpha_1)\right]\left[\alpha_2+\alpha_1+\eta(\alpha_2-\alpha_1)+2\theta(1-\alpha_2)\right]}{\left[(\alpha_1^2+\alpha_2^2+2\alpha_1\alpha_2)+\eta(\alpha_1^2+\alpha_2^2-2\alpha_1\alpha_2)+2\theta\left(\alpha_1(1-\alpha_1)+\alpha_2(1-\alpha_2)\right)\right]^2}\end{aligned} \tag{B.27}$$

$$\begin{aligned}T_3=&-\alpha_1\left(\eta\alpha_1+2\theta(1-\alpha_1)\right)\left(\gamma_q-\frac{1}{2}\right)^2\\=&\frac{-\alpha_1\alpha_2^2\left(\eta\alpha_1+2\theta(1-\alpha_1)\right)\left[\alpha_2+\alpha_1+\eta(\alpha_2-\alpha_1)+2\theta(1-\alpha_2)\right]^2}{\left[(\alpha_1^2+\alpha_2^2+2\alpha_1\alpha_2)+\eta(\alpha_1^2+\alpha_2^2-2\alpha_1\alpha_2)+2\theta\left(\alpha_1(1-\alpha_1)+\alpha_2(1-\alpha_2)\right)\right]^2}\end{aligned} \tag{B.28}$$

$$
\begin{aligned}
T_4 =& - \alpha_2 \left(\eta\alpha_2 + 2\theta(1-\alpha_2)\right) \left(\gamma_q + \frac{1}{2}\right)^2 \\
=& \frac{-\alpha_2\alpha_1^2 \left(\eta\alpha_2 + 2\theta(1-\alpha_2)\right) \left[\alpha_1 + \alpha_2 + \eta(\alpha_1 - \alpha_2) + 2\theta(1-\alpha_1)\right]^2}{\left[(\alpha_1^2 + \alpha_2^2 + 2\alpha_1\alpha_2) + \eta(\alpha_1^2 + \alpha_2^2 - 2\alpha_1\alpha_2) + 2\theta\left(\alpha_1(1-\alpha_1) + \alpha_2(1-\alpha_2)\right)\right]^2}
\end{aligned}
\tag{B.29}
$$

T_2, T_3 and T_4 have the same denominator, hence we can simply sum their numerators. Gathering terms in η first:

$$
-4\eta\alpha_1^2\alpha_2^2 \left[(\alpha_1 + \alpha_2) + \theta(2 - \alpha_1 - \alpha_2)\right]^2 \tag{B.30}
$$

and terms in θ:

$$
-2\theta\alpha_1\alpha_2 \Big(\alpha_2(1-\alpha_1)\left[\alpha_2 + \alpha_1 + \eta(\alpha_2 - \alpha_1) + 2\theta(1-\alpha_2)\right]^2 + \alpha_1(1-\alpha_2)\left[\alpha_1 + \alpha_2 + \eta(\alpha_1 - \alpha_2) + 2\theta(1-\alpha_1)\right]^2\Big) \tag{B.31}
$$

Finally, set the same denominator for T_1, get

$$
2\eta\alpha_1\alpha_2 \left((\alpha_1 + \alpha_2) + \theta(2 - \alpha_1 - \alpha_2)\right)\big((\alpha_1 + \alpha_2)^2 + \eta(\alpha_1 - \alpha_2)^2 + 2\theta\left(\alpha_1(1-\alpha_1) + \alpha_2(1-\alpha_2)\right)\big) \tag{B.32}
$$

Divide each term by $2\alpha_1\alpha_2$, and get that the following expression needs be negative for all $(\alpha_1, \alpha_2) \in (0,1)^2$ and $\theta \geq \eta \geq 1$

$$
\begin{aligned}
&\eta\left[(\alpha_1 + \alpha_2) + \theta(2 - \alpha_1 - \alpha_2)\right]\big[(\alpha_1 + \alpha_2)(\alpha_1 + \alpha_2 - 2\alpha_1\alpha_2) + \eta(\alpha_1 - \alpha_2)^2 + 2\theta(\alpha_1 + \alpha_2)(1 - (\alpha_1 + \alpha_2) + \alpha_1\alpha_2)\big] \\
&- \theta\Big(\alpha_2(1-\alpha_1)\left[\alpha_2 + \alpha_1 + \eta(\alpha_2 - \alpha_1) + 2\theta(1-\alpha_2)\right]^2 + \alpha_1(1-\alpha_2)\left[\alpha_1 + \alpha_2 + \eta(\alpha_1 - \alpha_2) + 2\theta(1-\alpha_1)\right]^2\Big)
\end{aligned}
\tag{B.33}
$$

This is a third degree polynomial in α_1. It writes:

$$
P(\eta, \theta, \alpha_1, \alpha_2) = (\theta - \eta)\left[a(\eta, \theta, \alpha_2)\alpha_1^3 + b(\eta, \theta, \alpha_2)\alpha_1^2 + c(\eta, \theta, \alpha_2)\alpha_1 + d(\eta, \theta, \alpha_2)\right] \tag{B.34}
$$

where coefficients satisfy:

$$
\begin{aligned}
a(\cdot) &= -\big(\eta + 2(\eta+2)\theta(\alpha_2 - 1) - 4\theta^2(\alpha_2 - 1) - 2\alpha_2 + 1\big) = \big(-2\eta\theta + 4\theta^2 - 4\theta + 2\big)\alpha_2 + 2\eta\theta - \eta - 4\theta^2 - 1 \\
b(\cdot) &= \big(2\theta(\alpha_2 - 1)(\eta + 2(\eta - 2)\alpha_2 + 2) + \alpha_2(\eta + 4\alpha_2 - 3) - 8\theta^2(\alpha_2 - 1)\big) \\
c(\cdot) &= -\big(\alpha_2^2(-(\eta + 2\alpha_2 - 3)) + 2\theta(\alpha_2 - 1)\alpha_2\left(2(\eta - 2) + (\eta + 2)\alpha_2\right) - 4\theta^2(\alpha_2 - 1)\left((\alpha_2 - 1)\alpha_2 + 1\right)\big) \\
d(\cdot) &= \alpha_2(-2\theta + 2\theta\alpha_2 - \alpha_2)(2\theta + \eta\alpha_2 - 2\theta\alpha_2 + \alpha_2)
\end{aligned}
$$

First note that if $\eta = \kappa$, then $P(\cdot) = 0$, i.e., $\kappa_2 = 0$ and a fortiori $\kappa_1 = 0$. With $\theta > \eta$, the following properties for all $\alpha_2 \in (0,1)$ are sufficient to establish $\kappa_2 < 1$:

i. $P(\eta, \theta, 0, \alpha_2) < 0$. Indeed $d(\cdot) < 0$ since the factors of $d(\cdot)$ are respectively positive, negative and positive.

ii. $P(\eta,\theta,1,\alpha_2)<0$. Indeed $a(\cdot)+b(\cdot)+c(\cdot)+d(\cdot)=-(\alpha_2^2-1)(\eta(\alpha_2-1)-(1+\alpha_2))<0$.

iii. $a(\eta,\theta,\alpha_2)<0$. Indeed, $a(\eta,\theta,1)=1-4\theta-\eta<0$ and the slope $-2\eta\theta+4\theta^2-4\theta+2$ is positive, since $1\leq\eta\leq\theta\Rightarrow -2\eta\theta+4\theta^2-4\theta+2\geq 2(\theta^2-2\theta+2)\geq 0$.

iv. $\left.\frac{dP(\cdot)}{d\alpha_1}\right|_{\alpha_1=1}>0$, i.e., $3a(\cdot)+2b(\cdot)+c(\cdot)>0$. This expression is a second order polynominal in α_2, that writes:

$$\alpha_2^2\left[6\eta\theta+\eta-8\theta^2-4\theta+5\right]+\alpha_2\left[-6\eta\theta+2\eta+4\theta^2+4\theta\right]+\left[2\eta\theta-3\eta+4\theta-3\right] \tag{B.35}$$

One can verify using $1\leq\eta\leq\theta$ that the coefficient in α_2^2 is negative, and the polynominal evaluated in $\alpha_2=0$ and $\alpha_2=1$ is positive, so that it is positive for all $\alpha_2\in(0,1)$.

Properties (i)-(iv) ensure that the third degree polynomial in α_1 is negative for all $(\alpha_1,\alpha_2)\in(0,1)^2$ and $1\leq\eta\leq\theta$. Overall, this completes the proof of $\kappa_2<1$.

(4) Equilibrium outcome Esp. $\hat{y}=\hat{y}^n$ and $\hat{p}\neq 0$.

$$\hat{y}=\mathbb{E}_{\tilde{\mu}}\hat{y}^n+\left[\frac{\alpha_1}{2}\left(\gamma_q-\frac{1}{2}\right)+\frac{\alpha_2}{2}\left(\gamma_q+\frac{1}{2}\right)\right]\mathbb{E}_{\tilde{\mu}}\hat{p}_R^n \tag{B.36}$$

with $\mathbb{E}_{\tilde{\mu}}\hat{y}^n=\hat{y}^n+\kappa_1\hat{p}_R^n$ and $\mathbb{E}_{\tilde{\mu}}\hat{p}_R^n=\kappa_2\hat{p}_R^n$, i.e.,

$$\hat{y}=\hat{y}^n+\left[\kappa_1+\left(\frac{\alpha_1}{2}\left(\gamma_q-\frac{1}{2}\right)+\frac{\alpha_2}{2}\left(\gamma_q+\frac{1}{2}\right)\right)\kappa_2\right]\hat{p}_R^n \tag{B.37}$$

Since

$$\kappa_1=-\frac{1}{2}\left(\alpha_1\left(\gamma_q-\frac{1}{2}\right)+\alpha_2\left(\gamma_q+\frac{1}{2}\right)\right)\kappa_2 \tag{B.38}$$

one gets $\hat{y}=\hat{y}^n$. Next,

$$\hat{p}=\left[\gamma_q-\frac{\alpha_1}{2}\left(\gamma_q-\frac{1}{2}\right)-\frac{\alpha_2}{2}\left(\gamma_q+\frac{1}{2}\right)\right]\kappa_2\hat{p}_R^n \tag{B.39}$$

which gives $\hat{p}\neq 0$ if $\hat{p}_R^n\neq 0$.

(5) Incentives to deviate with noise Given $\bar{v}^n$,

$$\max_{m_1,m_2}\mathbb{E}_{\hat{v}^n|\bar{v}^n}U(\hat{v}^n,\hat{q},\mathbb{E}_{\tilde{\mu}}\hat{v}^n)$$

subject to $\hat{q}=m_1+\gamma_q m_2$ and $\mathbb{E}_{\tilde{\mu}}\hat{v}^n=m$.

$$\max_{m_1,m_2}-\frac{1}{2}\mathbb{E}_{\hat{v}^n|\bar{v}^n}\left[\left(\hat{q}-\hat{p}-\hat{y}^n\right)^2+\frac{\eta}{4}\left(\hat{p}_R-\hat{p}_R^n\right)^2+\frac{\theta}{2}\sum_j\alpha_j(1-\alpha_j)\left(\hat{p}_j^r\right)^2\right]$$

Substituting prices and instrument:

$$\max_{m_1,m_2} -\frac{1}{2}\mathbb{E}_{\hat{v}^n|\bar{v}^n}\left[\left(m_1+(\gamma_q-\gamma_p)m_2-\hat{y}^n\right)^2+\frac{\eta}{4}\left(\gamma_{pR}m_2-\hat{p}_R^n\right)^2+\frac{\theta}{2}\alpha_1(1-\alpha_1)\left(\gamma_q-\frac{1}{2}\right)^2 m_2^2+\frac{\theta}{2}\alpha_2(1-\alpha_2)\left(\gamma_q+\frac{1}{2}\right)^2 m_2^2\right]$$

The objective is linear quadratic, hence the FOC are linear, the expectation are simply turning $\hat{x}$ variables into $\bar{x}$ variables so that one gets $m = \kappa\bar{v}^n$.

B.2.2 Partial disclosure is optimal, $\Gamma < 0$

The program is (B.11) with the additional constraint $m_2 = 0$. It is straightforward to get $m_1 = \hat{y}^n$, i.e., when there is a prior commitment not to report dispersion shock, then it is credible to disclose the natural level of output truthfully.

C Positive Analysis

C.1 Proof of Lemma 3

In the following developments, $P(X = x)$ refers to the probability of a discrete random variable X taking value x and $p(x)$ is the density function of a continuous random variable.

Given a message m, the law of total probability implies:

$$\begin{aligned}\mathbb{E}_{\tilde{\mu}}(\hat{v}^n|m) &= \mathbb{E}(\hat{v}^n|m\cap\delta=tt)P(\delta=tt|m)\\ &+\mathbb{E}(\hat{v}^n|m\cap\delta=st\cap\bar{v}^n=m)P(\delta=st\cap\bar{v}^n=m|m)\\ &+\mathbb{E}(\hat{v}^n|m\cap\delta=st\cap\kappa\bar{v}^n=m)P(\delta=st\cap\kappa\bar{v}^n=m|m)\end{aligned} \tag{C.1}$$

i.e.,

$$\mathbb{E}_{\tilde{\mu}}(\hat{v}^n|m) = m\cdot[P(\delta=tt|m)+P(\delta=st\cap\bar{v}^n=m|m)]+\kappa^{-1}m\cdot P(\delta=st\cap\kappa\bar{v}^n=m|m) \tag{C.2}$$

Using Bayes' rule:

$$P(\delta=tt|m) = \frac{P(\delta=tt\cap m)}{P(\delta=tt\cap m)+P(\delta=st\cap m)} \tag{C.3}$$

Now consider the following term, using Bayes' rule and the law of total probability to the continuous random variable $\bar{v}^n$:

$$\begin{aligned}P(\delta = st \cap m) &= \int_{\bar{v}^n} P(\delta = st \cap m \cap \bar{v}^n) d\bar{v}^n \\ &= \int_{\bar{v}^n} p(m|\delta = st \cap \bar{v}^n) p(\bar{v}^n) P(\delta = st) d\bar{v}^n \\ &= p(m|\delta = st \cap \bar{v}^n = m) p(\bar{v}^n = m) P(\delta = st) \\ &+ p(m|\delta = st \cap \bar{v}^n = \kappa^{-1} m) p(\kappa \bar{v}^n = m) P(\delta = st) \\ &= \left[p(\xi, m) f_{\bar{v}^n}(m) + \left(1 - p(\xi, \kappa^{-1} m)\right) f_{\kappa \bar{v}^n}(m)\right] (1 - \xi)\end{aligned} \tag{C.4}$$

Similar derivations yield

$$P(\delta = tt \cap m) = f_{\bar{v}^n}(m)\xi \tag{C.5}$$

so that

$$P(\delta = tt|m) = \frac{f_{\bar{v}^n}(m)\xi}{f_{\bar{v}^n}(m)\left[\xi + (1-\xi)p(\xi, m)\right] + f_{\kappa\bar{v}^n}\left(1 - p(\xi, \kappa^{-1}m\right)(1-\xi)} \tag{C.6}$$

Previous derivations allow to establish

$$P(\delta = st \cap \bar{v}^n = m|m) p(m) = f_{\bar{v}^n}(m) p(\xi, m)(1 - \xi) \tag{C.7}$$

$$P(\delta = st \cap \kappa\bar{v}^n = m|m) p(m) = f_{\kappa\bar{v}^n}(m) \left(1 - p(\xi, \kappa^{-1}m)\right)(1 - \xi) \tag{C.8}$$

$$p(m) = p(m \cap \delta = tt) + p(m \cap \delta = st) \tag{C.9}$$

Overall,

$$\mathbb{E}\left(\hat{v}^n|m\right) = \frac{m \cdot f_{\bar{v}^n}(m)\left[\xi + (1-\xi)p(\xi, m)\right] + \kappa^{-1} m \cdot f_{\kappa\bar{v}^n}(m)(1-\xi)\left[1 - p(\xi, \kappa^{-1}m)\right]}{f_{\bar{v}^n}(m)\left[\xi + (1-\xi)p(\xi, m)\right] + f_{\kappa\bar{v}^n}(m)(1-\xi)\left[1 - p(\xi, \kappa^{-1}m)\right]}. \tag{C.10}$$

where using (A.16), $f_{\bar{v}^n}(\cdot)$ is the pdf 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 pdf of $\kappa\bar{v}^n \sim \mathcal{N}\left(0, \Sigma_\kappa\frac{\sigma^4}{\sigma^2 + \sigma_\varepsilon^2}\right)$, with

$$\Sigma_\kappa = \kappa\Sigma\kappa^T = \begin{pmatrix} \frac{1}{2} + 2\kappa_1^2 & 2\kappa_1\kappa_2 \\ 2\kappa_1\kappa_2 & 2\kappa_2^2 \end{pmatrix} \tag{C.11}$$

C.2 Proof of Lemma 4

Given prior reputation ξ, received message m and observed shocks $\hat{v}^n$, private firms update their belief about the type of the monetary authority

$$\bar{\xi} = P(\delta = tt|\hat{v}^n, m) = \frac{P(\delta = tt \cap \hat{v}^n \cap m)}{P(\delta = tt \cap \hat{v}^n \cap m) + P(\delta = st \cap \hat{v}^n \cap m)} \tag{C.12}$$

Applying Bayes' rule

$$P(\delta = tt \cap \hat{v}^n \cap m) = p(\hat{v}^n|m \cap \delta = tt)p(m|\delta = tt)P(\delta = tt) \tag{C.13}$$

The last two terms are respectively $f_{\bar{v}^n}(m)$ and ξ. Next $p(\hat{v}^n|m \cap \delta = tt) = p(\hat{v}^n|m = \bar{v}^n)$, and because $\hat{v}^n|\bar{v}^n \sim \mathcal{N}\left(\bar{v}^n, \Sigma\frac{\sigma^2\sigma_\varepsilon^2}{\sigma^2\sigma_\varepsilon^2}\right)$ using (A.14), one gets $\hat{v}^n|m\cap\delta = tt \sim \mathcal{N}\left(m, \Sigma\frac{\sigma^2\sigma_\varepsilon^2}{\sigma^2\sigma_\varepsilon^2}\right)$, whose probability distribution function is noted $f_m(\hat{v}^n)$, i.e.,

$$P(\delta = tt \cap \hat{v}^n \cap m) = f_m(\hat{v}^n)f_{\bar{v}^n}(m)\xi \tag{C.14}$$

Similarly,

$$\begin{aligned} P(m \cap \hat{v}^n \cap \delta = st) &= P(m \cap \hat{v}^n \cap \delta = st \cap \bar{v}^n = m) + P(m \cap \hat{v}^n \cap \delta = st \cap \kappa\bar{v}^n = m) \\ &= p(\hat{v}^n|m \cap \delta = st \cap \bar{v}^n = m)P(m \cap \delta = st \cap \bar{v}^n = m) \\ &+ p(\hat{v}^n|m \cap \delta = st \cap \kappa\bar{v}^n = m)P(m \cap \delta = st \cap \kappa\bar{v}^n = m) \end{aligned} \tag{C.15}$$

One has $p(\hat{v}^n|m\cap\delta = st\cap\bar{v}^n = m) = p(\hat{v}^n|m\cap\delta = tt) = f_m(\hat{v}^n)$ and $p(\hat{v}^n|m\cap\delta = st\cap\kappa\bar{v}^n = m) = p(\hat{v}^n|m = \kappa\bar{v}^n)$, so that $\hat{v}^n|m \cap \delta = st \cap \kappa\bar{v}^n = m \sim \mathcal{N}\left(\kappa^{-1}m, \Sigma\frac{\sigma^2\sigma_\varepsilon^2}{\sigma^2+\sigma_\varepsilon^2}\right)$ whose probability distribution function is noted $f_{\kappa^{-1}m}(\hat{v}^n)$. Hence, using derivations from C.1,

$$P(\delta = st \cap \hat{v}^n \cap m) = \left(f_m(\hat{v}^n)f_{\bar{v}^n}(m)p(\xi, m) + f_{\kappa^{-1}m}(\hat{v}^n)f_{\kappa\bar{v}^n}(m)\left(1 - p(\xi, \kappa^{-1}m)\right)\right)(1 - \xi) \tag{C.16}$$

which yields overall

$$\bar{\xi} = \frac{f_m(\hat{v}^n)f_{\bar{v}^n}(m) \cdot \xi}{f_m(\hat{v}^n)f_{\bar{v}^n}(m)\left[\xi + (1 - \xi)p(\xi, m)\right] + f_{\kappa^{-1}m}(\hat{v}^n)f_{\kappa\bar{v}^n}(m)\left(1 - p(\xi, \kappa^{-1}m)\right)(1 - \xi)} \tag{C.17}$$

where $f_m(\hat{v}^n)$ is the pdf of $\hat{v}^n|m \sim \mathcal{N}\left(m, \Sigma\frac{\sigma^2\sigma_\varepsilon^2}{\sigma^2+\sigma_\varepsilon^2}\right)$ and $f_{\kappa^{-1}m}(\hat{v}^n)$ is the pdf of $\hat{v}^n|\kappa^{-1}m \sim \mathcal{N}\left(\kappa^{-1}m, \Sigma\frac{\sigma^2\sigma_\varepsilon^2}{\sigma^2+\sigma_\varepsilon^2}\right)$.

C.3 Proof of Proposition 3

We need to show:

(i) with $\lambda = 0$, then reputation is constant from one period to the other and $\xi = \rho$.

(ii) a strategic monetary authority systematically misreport its signal.

(iii) a strategic monetary authority achieves stabilization gain relative to SI at the expense of the stabilization of truth-telling monetary authority,

(iv) and at the expense of the long run stabilization of the economy.

Proof of point (i) From (4.1), set $\lambda = 0$ and get $\xi = \rho$.

Proof of point (ii) Given $\hat{v}^n$ and $\hat{q}$ that satisfies (2.20), $U(\hat{v}^n, \hat{q}, \mathbb{E}_{\tilde{\mu}}\hat{v}^n)$ is a second order polynomial in $\mathbb{E}_{\tilde{\mu}}\hat{v}^n$ which is maximized at $\kappa\hat{v}^n$ (Proposition 2). Similarly, $\mathbb{E}_{\hat{v}^n|\bar{v}^n}U(\hat{v}^n, \hat{q}, \mathbb{E}_{\tilde{\mu}\hat{v}^n})$ is a second order polynomial in $\mathbb{E}_{\hat{v}^n|\bar{v}^n}\mathbb{E}_{\tilde{\mu}\hat{v}^n})$ maximized at $\kappa\bar{v}^n$. We want to show that for any communication policy $p(\xi, \hat{v}^n)$ "as perceived by" private agents, then

$$\mathbb{E}_{\hat{v}^n}U(\hat{v}^n, \hat{q}(m), \mathbb{E}_{\tilde{\mu}}\hat{v}^n|m = \kappa\bar{v}^n) \geq \mathbb{E}_{\hat{v}^n}U(\hat{v}^n, \hat{q}(m), \mathbb{E}_{\tilde{\mu}}\hat{v}^n|m = \bar{v}^n), \tag{C.18}$$

which implies that $p = 0$ is the optimal solution to the discretionary choice of the propensity to misreport, and eventually $p(\xi, \bar{v}^n) = 0$ is the equilibrium policy under discretion.

First note the following simplified expression for (4.2)

$$\mathbb{E}(\hat{v}^n|m) = \begin{pmatrix} m_1 \\ m_2 \end{pmatrix} \omega + \kappa^{-1} \begin{pmatrix} m_1 \\ m_2 \end{pmatrix} (1 - \omega), \tag{C.19}$$

where $\omega = \frac{f(m)p(\xi,m)}{f(m)p(\xi,m)+f(\kappa^{-1}m)p(\xi,\kappa^{-1}m)} \in (0, 1)$ is the probability weight associated to the perceived communication policy and exogenous draws of state and

$$\kappa^{-1} = \begin{pmatrix} 1 & -\frac{\kappa_1}{\kappa_2} \\ 0 & \frac{1}{\kappa_2} \end{pmatrix}. \tag{C.20}$$

Now, given the conditional mean $\bar{v}^n = (\bar{y}^n, \bar{p}^n_R)$ induced by a signal s, if a monetary authority reports $m = \bar{v}^n$, then using (4.2),

$$\mathbb{E}_{\tilde{\mu}}\hat{v}^n = \begin{pmatrix} \mathbb{E}_{\tilde{\mu}}\hat{y}^n \\ \mathbb{E}_{\tilde{\mu}}\hat{p}^n_R \end{pmatrix} = \begin{pmatrix} \bar{y}^n - \frac{\kappa_1}{\kappa_2}\bar{p}^n_R(1 - \omega) \\ \bar{p}^n_R\omega + \frac{\bar{p}^n_R}{\kappa_2}(1 - \omega) \end{pmatrix}, \tag{C.21}$$

whereas if a monetary authority reports $m = \kappa\bar{v}^n$, then

$$\mathbb{E}_{\tilde{\mu}}\hat{v}^n = \begin{pmatrix} \mathbb{E}_{\tilde{\mu}}\hat{y}^n \\ \mathbb{E}_{\tilde{\mu}}\hat{p}^n_R \end{pmatrix} = \begin{pmatrix} \bar{y}^n + \kappa_1\bar{p}^n_R\tilde{\omega} \\ \kappa_2\bar{p}^n_R\tilde{\omega} + \bar{p}^n_R(1 - \tilde{\omega}) \end{pmatrix}, \tag{C.22}$$

where ω and $\tilde{\omega}$ can take arbitrary values in $(0, 1)$ (note that in equilibrium, these depends on the probabilities associated to states and actual probabilities of a monetary authority communication strategy).

Suppose $\bar{p}^n_R > 0$, then for any $(\omega, \tilde{\omega}) \in (0, 1)^2$

$$0 \leq \kappa_2\bar{p}^n_R \leq \mathbb{E}(\hat{p}^n_R|m = \kappa\bar{v}^n) \leq \bar{p}^n_R \leq \mathbb{E}(\hat{p}^n_R|m = \hat{v}^n) \leq \kappa_2^{-1}\bar{p}^n_R, \tag{C.23}$$

because $\kappa_2 \in (0, 1)$. Inequalities are reversed if $\bar{p}^n_R < 0$. In both cases, misreporting yields posterior beliefs $\mathbb{E}_{\tilde{\mu}}\hat{p}^n_R$ closer to the level $\kappa_2\bar{p}^n_R$ that maximizes welfare than reporting truthfully. Since the objective function is quadratic in $\mathbb{E}_{\tilde{\mu}}\hat{p}^n_R$, misreporting yields higher welfare than truth-telling.

A similar argument holds for the benefits of misreporting $\bar{y}^n$ rather than reporting truthfully, with the additional subtlety that κ_1 is either positive or negative. For instance, suppose $\kappa_1 \in (0, \frac{1}{2})$ and $\bar{p}_R^n > 0$, then

$$-\frac{\kappa_1}{\kappa_2}\bar{p}_R^n \leq \mathbb{E}(\hat{y}^n|m = \bar{v}^n) - \bar{y}^n \leq 0 \leq \mathbb{E}(\hat{y}^n|m = \kappa\bar{v}^n) - \bar{y}^n \leq \kappa_1\bar{p}_R^n \leq \bar{p}_R^n, \tag{C.24}$$

which again, given the polynomial nature of the objective function, ensures that misreporting is preferable to truth-telling for all $(\omega, \tilde{\omega}) \in (0,1)^2$.

Generalizing the argument to the other possible cases

$$\bar{p}_R^n \leq \kappa_1\bar{p}_R^n \leq \mathbb{E}(\hat{y}^n|m = \kappa\bar{v}^n) - \bar{y}^n \leq 0 \leq \mathbb{E}(\hat{y}^n|m = \bar{v}^n) \leq -\frac{\kappa_1}{\kappa_2}\bar{p}_R^n \quad \text{if } \kappa_1 \in (0, \frac{1}{2}) \text{ and } \bar{p}_R^n < 0 \tag{C.25}$$

$$\kappa_1\bar{p}_R^n \leq \mathbb{E}(\hat{y}^n|m = \kappa\bar{v}^n) - \bar{y}^n \leq 0 \leq \mathbb{E}(\hat{y}^n|m = \bar{v}^n) - \bar{y}^n \leq \bar{p}_R^n \quad \text{if } \kappa_1 \in (-\frac{1}{2}, 0) \text{ and } \bar{p}_R^n > 0 \tag{C.26}$$

$$\bar{p}_R^n \leq \mathbb{E}(\hat{y}^n|m = \bar{v}^n) - \bar{y}^n \leq 0 \leq \mathbb{E}(\hat{y}^n|m = \kappa\bar{v}^n) - \bar{y}^n \leq \kappa_1\bar{p}_R^n \quad \text{if } \kappa_1 \in (-\frac{1}{2}, 0) \text{ and } \bar{p}_R^n > 0 \tag{C.27}$$

All inequalities concur to the same conclusion: whatever the perceived communication policy by private firms, a monetary authority acting under a lack of commitment wants to misreport its information, i.e., $p(\xi, \bar{v}^n) = 0$. In equilibrium then $\mathbb{E}(\hat{v}^n|m) = \kappa^{-1}m$.

Proof of point (iii)

- If $\rho \approx 1$, then private firms take messages at face value, i.e., $\mathbb{E}_{\tilde{\mu}}(\hat{v}^n|m) = m$. If $\delta = tt$, then the equilibrium outcome coincides with full information, while if $\delta = st$, then the monetary authority achieves the opportunistic outcome characterized in Section 3.2. Overall,

$$W_{tt}(1) = W^{SI} < W_{st}(1) \tag{C.28}$$

- If $\rho \approx 0$, then private firms take any message as opportunistic and adjust posterior beliefs accordingly, i.e., $\mathbb{E}_{\tilde{\mu}}(\hat{v}^n|m) = \kappa^{-1}m$. Accordingly, if $\delta = st$, then given $\bar{v}^n$, $m = \kappa\bar{v}^n$ and posterior $\mathbb{E}_{\tilde{\mu}}(\hat{v}^n|m) = \bar{v}^n$, which correspond to the symmetric information outcome. In contrast, if $\delta = tt$, then given $\bar{v}^n$, $m = \bar{v}^n$ and posterior $\mathbb{E}_{\tilde{\mu}}(\hat{v}^n|m) = \kappa^{-1}\bar{v}^n$, which is a worse outcome than symmetric information because of the drift in private firms beliefs. Overall,

$$W_{tt}(0) < W^{SI} = W_{st}(0) \tag{C.29}$$

- For $0 < \rho < 1$, consider the polynomial property of the objective function in posterior beliefs (4.2) and the systematic propensity to misreport $p(\rho, \bar{v}^n) = 0$ to appreciate how beliefs and welfare are sensitive to messages sent by each type of policymaker. Remember that the polynomial objective function is maximized given $\bar{v}^n$ at $\mathbb{E}_{\tilde{\mu}}(\hat{v}^n) = \kappa\bar{v}^n$. In particular, suppose $\delta = tt$, the signal indicates $\bar{v}^n$ and the message is $m = \bar{v}^n$. As ρ is decreasing, private firms put more weight on the possibility that the monetary authority is strategic, hence posterior beliefs drift away from $\bar{v}^n$ toward $\kappa^{-1}\bar{v}^n$, i.e., welfare is getting lower. In contrast, for a strategic monetary authority that sends message $m = \kappa\bar{v}^n$, beliefs are drifting away from $\mathbb{E}_{\tilde{\mu}}(\hat{v}^n) = \bar{v}^n$ toward $\mathbb{E}_{\tilde{\mu}}(\hat{v}^n) = \kappa\bar{v}^n$, i.e. welfare is increasing. Since W^{SI} is not sensitive to ρ , one gets:

$$W_{tt}(\rho) < W^{SI} < W_{st}(\rho) \tag{C.30}$$

Proof of point (iv) Consider the average welfare in this economy under stochastic turnover of monetary authorities:

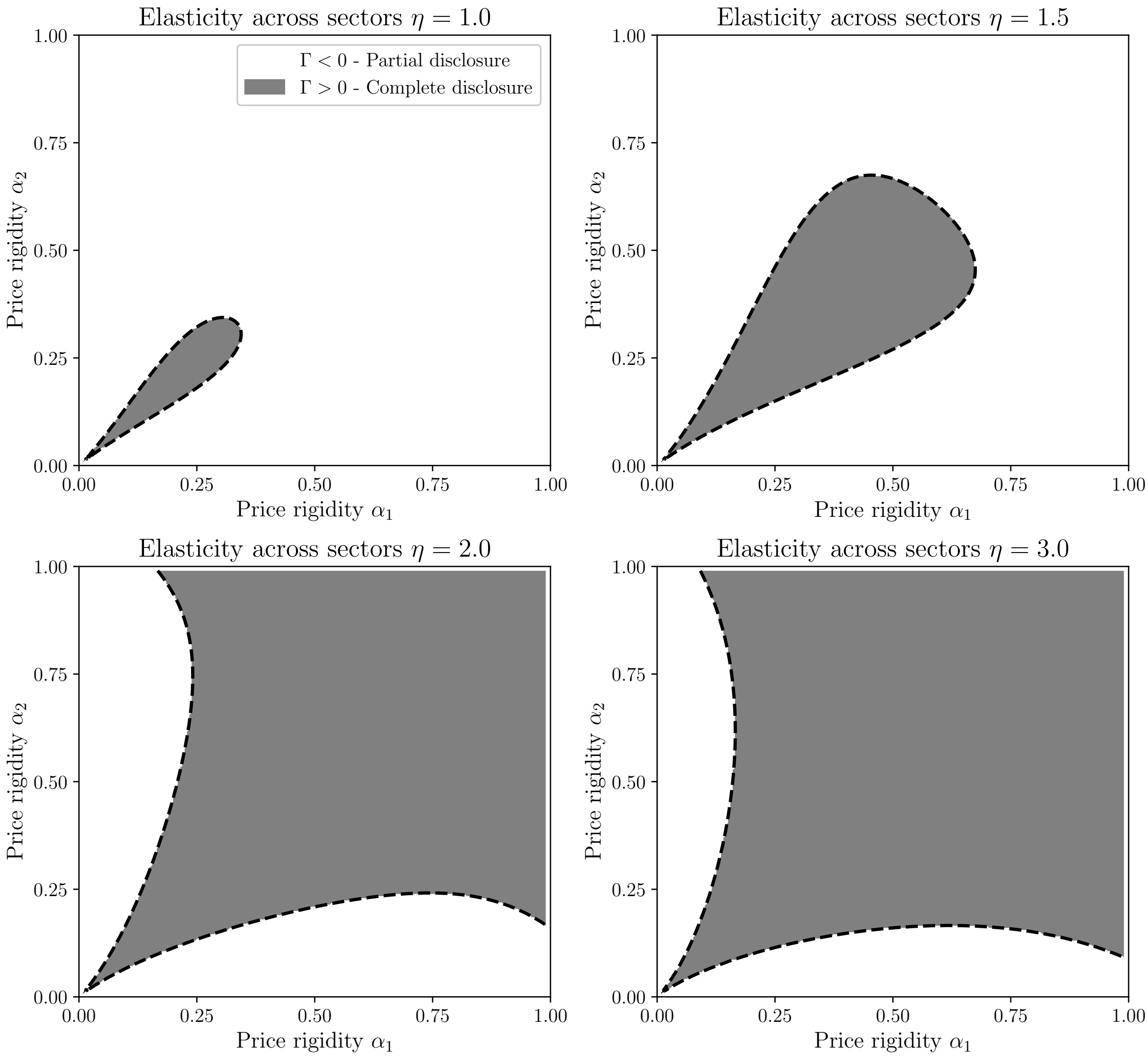
$$W(\rho) = \rho \cdot W_{tt}(\rho) + (1-\rho) \cdot W_{st}(\rho). \tag{C.31}$$

Given that complete and truthful release of information is optimal, welfare for any communication practice is bounded above by W^{SI}, i.e., $W(\rho) \leq W^{SI}$. The strict inequality for $0 < \rho < 1$ derives from point (iii).

D Supplementary Material

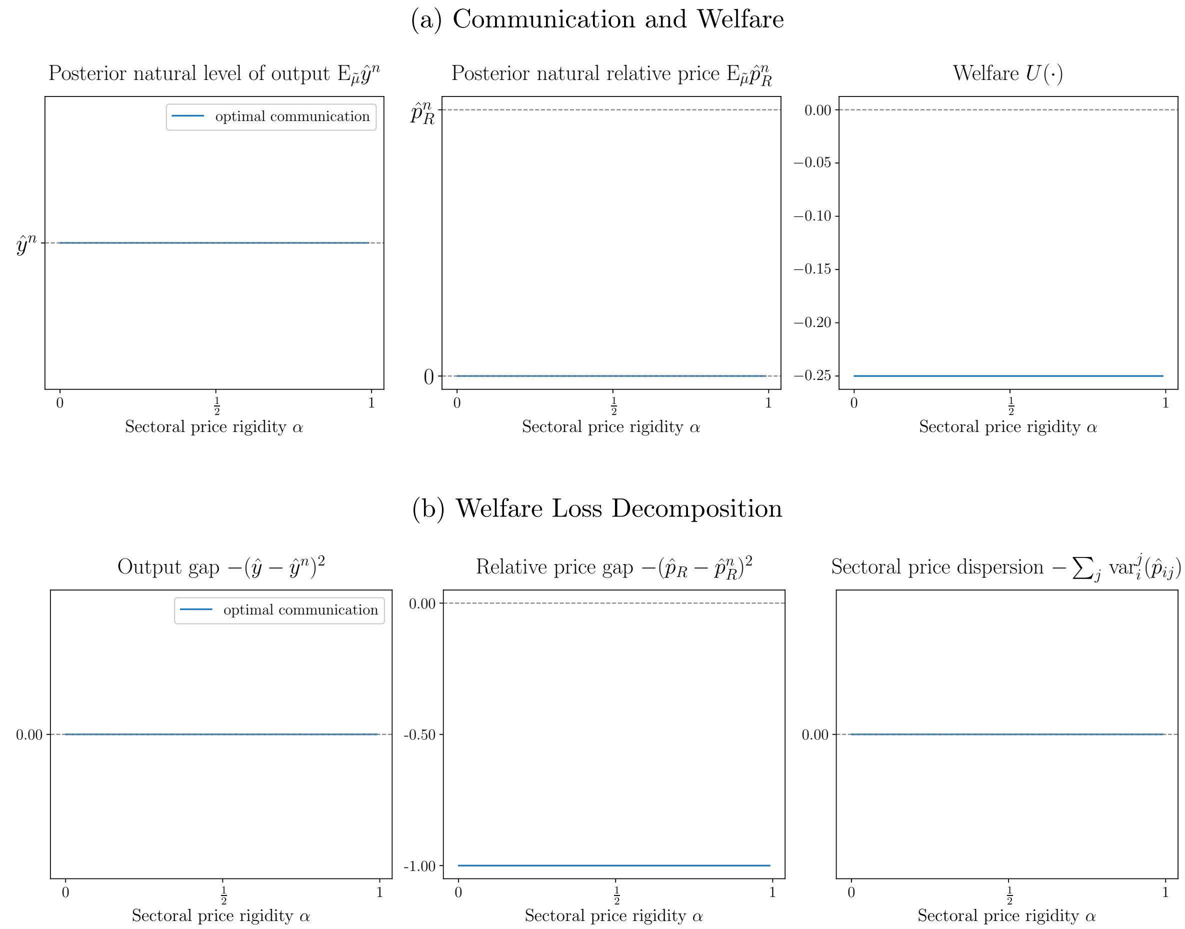
D.1 Additional figures

Figure 5: Sign of Γ



Notes.

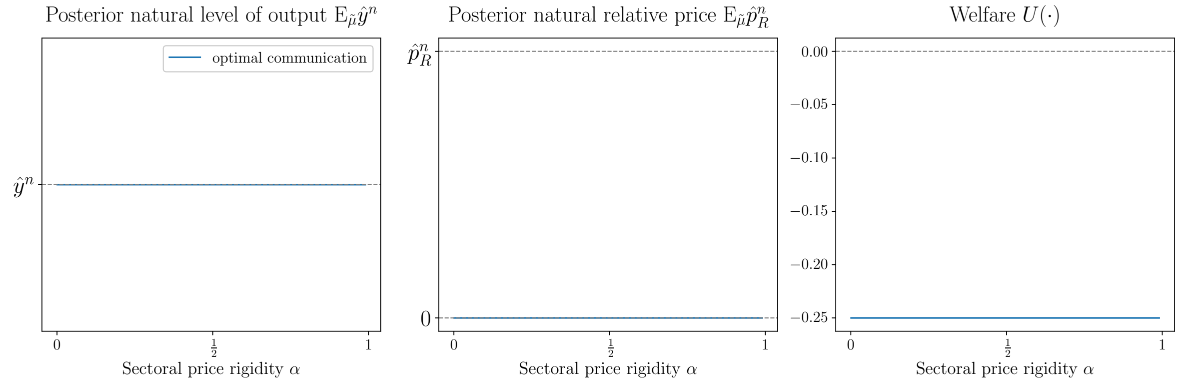
Figure 6: Communication with Symmetric Price Rigidity and $\Gamma < 0$



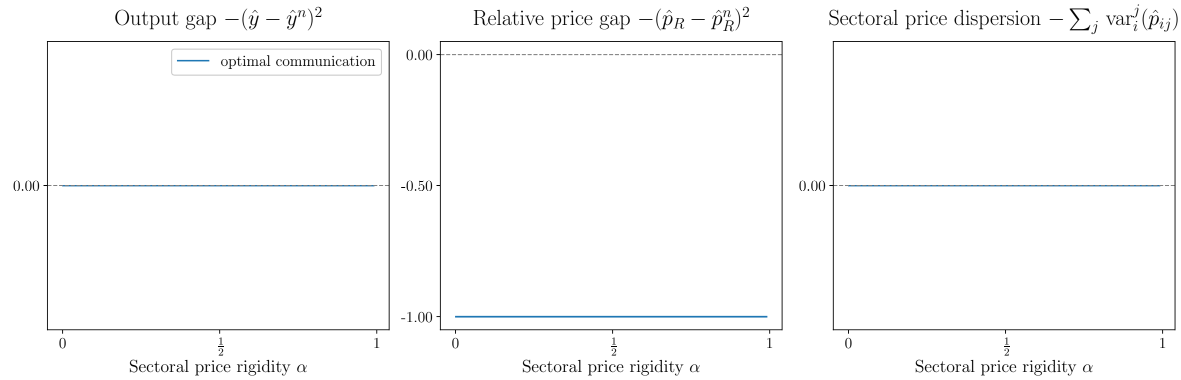
Notes. Given $\hat{y}^n = 0$ and $\hat{p}^n_R = \hat{a}_1 - \hat{a}_2 > 0$, this figure illustrates communication and aggregate economic outcomes under the **optimal** disclosure of information, as a function of symmetric sectoral price rigidity $\alpha_1 = \alpha_2 = \alpha$.

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

(a) Communication and Welfare



(b) Welfare Loss Decomposition



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