Online Appendix: Stabilizing the Financial Markets through Communication and Informed Trading

Qi Guo* Shao'an Huang† Gaowang Wang‡

S1. Government intervention with partial information disclosure

In this section of the online appendix, we solve the model economies of three scenarios of partial information disclosure, present the equilibrium results and prove them.

Partially releasing the price target

In this case, we assume that the government releases the price target signal to the financial market partially. Specifically, before trading, the government releases a noisy signal of the price target to the insider and the market maker, namely, $\widetilde{p}_T = p_T + \varepsilon_1$, with $\varepsilon_1 \sim N(0, \sigma^2_{\varepsilon_1})$, where $\{v, p_T, \varepsilon, \varepsilon_1\}$ are mutually independent.

With the enlarged information set $\{v, \widetilde{p}_T\}$, the insider's maximization problem is changed as:

$$\max_{\{x\}} E[(v-p)x|v, \widetilde{p}_T]. \tag{B1}$$

Meanwhile, the market maker also sees the signal released by the government, $\{\widetilde{p}_T\}$, and uses her new information set $\{y, \widetilde{p}_T\}$ to update the conditional expectations about the

*Center for Economic Research, Shandong University, Jinan, China. Email: qi.guo230@gmail.com.
†Center for Economic Research, Shandong University, Jinan, China. Email: shaoanhuang@sdu.edu.cn.
‡Corresponding author. Center for Economic Research, Shandong University, Jinan, China. Email: gaowang.wang@sdu.edu.cn.

fundamentals. Thus the pricing rule of market efficiency is changed into:

$$p = E(v|y, \widetilde{p}_T). \tag{B2}$$

Conjecture the decision rules for the insider and the government and the pricing rule for the market maker as follows:

$$\begin{aligned} x &= \beta_T(v - p_0) + \xi_T(\widetilde{p}_T - \bar{p}_T), && \text{(B3)} \\ g &= \gamma_T(s - p_0) + \alpha_T(p_T - \bar{p}_T) + \omega_T(\widetilde{p}_T - \bar{p}_T) + \eta_T, && \text{(B4)} \\ p &= p_0 + \lambda_T[y - E(y|\widetilde{p}_T)], \text{ with } y = x + g + u, && \text{(B5)} \end{aligned}$$

where

$$E(y|\widetilde{p}_T) = \left(\xi_T + \omega_T + \alpha_T \frac{\sigma_T^2}{\sigma_T^2 + \sigma_{\varepsilon_1}^2}\right)(\widetilde{p}_T - \bar{p}_T) + \eta_T.$$

First, we solve the insider's problem. Using equation (B4) and (B5), we compute:

$$\begin{aligned} & E[(v-p)x|v, \widetilde{p}_T] \\ = \ & E\left[v - p_0 - \lambda_T \begin{pmatrix} x + \gamma_T(s - p_0) + \alpha_T(p_T - \bar{p}_T) + \omega_T(\widetilde{p}_T - \bar{p}_T) + \\ \eta_T + u - \left(\xi_T + \omega_T + \alpha_T \frac{\sigma_T^2}{\sigma_T^2 + \sigma_{\varepsilon_1}^2}\right)(\widetilde{p}_T - \bar{p}_T) - \eta_T \end{pmatrix} |v, \widetilde{p}_T\right] x \\ = \ & [(1 - \lambda_T\gamma_T)(v - p_0) - \lambda_T x + \lambda_T \xi_T(\widetilde{p}_T - \bar{p}_T)]\, x. \end{aligned}$$

The FOC for x yields:

$$x = \frac{1 - \lambda_T\gamma_T}{2\lambda_T}(v - p_0) + \frac{\xi_T}{2}(\widetilde{p}_T - \bar{p}_T). \tag{B6}$$

The SOC is $\lambda_T > 0$. Comparing the FOC (B6) with the conjectured strategy (B3) leads to:

$$\beta_T = \frac{1 - \lambda_T\gamma_T}{2\lambda_T}, \tag{B7}$$

$$\xi_T = \frac{\xi_T}{2} = 0. \tag{B8}$$

Second, we solve the government's problem. Using equations (B3) and (B5), the loss function of the government is computed as:

$$E[\phi(p-p_T)^2+(p-v)g|s,p_T,\widetilde{p}_T]$$

$$= \left(\begin{array}{c} \phi E\left[\left(p_0-p_T+\lambda_T\left(\begin{array}{c}\beta_T(v-p_0)+\xi_T(\widetilde{p}_T-\bar{p}_T)+g+u\\ -\left(\xi_T+\omega_T+\alpha_T\frac{\sigma_T^2}{\sigma_T^2+\sigma_{\varepsilon_1}^2}\right)(\widetilde{p}_T-\bar{p}_T)-\eta_T\end{array}\right)\right)^2|s,p_T,\widetilde{p}_T\right]+\\ E\left[p_0-v+\lambda_T\left(\begin{array}{c}\beta_T(v-p_0)+\xi_T(\widetilde{p}_T-\bar{p}_T)+g+u\\ -\left(\xi_T+\omega_T+\alpha_T\frac{\sigma_T^2}{\sigma_T^2+\sigma_{\varepsilon_1}^2}\right)(\widetilde{p}_T-\bar{p}_T)-\eta_T\end{array}\right)|s,p_T,\widetilde{p}_T\right]g \end{array}\right)$$

$$= \left(\begin{array}{c} \phi\left[p_0-p_T+\lambda_T g-\lambda_T\left(\omega_T+\alpha_T\frac{\sigma_T^2}{\sigma_T^2+\sigma_{\varepsilon_1}^2}\right)(\widetilde{p}_T-\bar{p}_T)-\lambda_T\eta_T\right]^2+\phi\lambda_T^2\beta_T^2E[(v-p_0)^2|s,p_T,\widetilde{p}_T]\\ +2\phi\lambda_T\beta_T\left[p_0-p_T+\lambda_T g-\lambda_T\left(\omega_T+\alpha_T\frac{\sigma_T^2}{\sigma_T^2+\sigma_{\varepsilon_1}^2}\right)(\widetilde{p}_T-\bar{p}_T)-\lambda_T\eta_T\right]E(v-p_0|s,p_T,\widetilde{p}_T)+\\ \phi\lambda_T^2\sigma_u^2+\left[(\lambda_T\beta_T-1)E(v-p_0|s,p_T,\widetilde{p}_T)+\lambda_T g-\lambda_T\left(\omega_T+\alpha_T\frac{\sigma_T^2}{\sigma_T^2+\sigma_{\varepsilon_1}^2}\right)(\widetilde{p}_T-\bar{p}_T)-\lambda_T\eta_T\right]g \end{array}\right)$$

where

$$E(v-p_0|s,p_T,\widetilde{p}_T)=E(v-p_0|s,p_T,\varepsilon_1)=E(v-p_0|s,p_T)=E(v-p_0|s)=\delta(s-p_0),$$

$$var(v-p_0|s,p_T,\widetilde{p}_T)=var(v-p_0|s,p_T,\varepsilon_1)=var(v-p_0|s,p_T)=var(v-p_0|s)=\frac{\sigma_v^2\sigma_\varepsilon^2}{\sigma_v^2+\sigma_\varepsilon^2},$$

$$E\left[(v-p_0)^2|s,p_T,\widetilde{p}_T\right]=\left[E(v-p_0|s,p_T,\widetilde{p}_T)\right]^2+var(v-p_0|s,p_T,\widetilde{p}_T)=\delta^2(s-p_0)^2+\frac{\sigma_v^2\sigma_\varepsilon^2}{\sigma_v^2+\sigma_\varepsilon^2},$$

$$\delta\equiv\frac{\sigma_v^2}{\sigma_v^2+\sigma_\varepsilon^2}.$$

The FOC for g yields:

$$g=\frac{1}{2\phi\lambda_T^2+2\lambda_T}\left(\begin{array}{c}(1-\lambda_T\beta_T-2\phi\lambda_T^2\beta_T)\delta(s-p_0)+2\phi\lambda_T(p_T-\bar{p}_T)+2\phi\lambda_T(\bar{p}_T-p_0)\\ +(2\phi\lambda_T^2+\lambda_T)\left(\omega_T+\alpha_T\frac{\sigma_T^2}{\sigma_T^2+\sigma_{\varepsilon_1}^2}\right)(\widetilde{p}_T-\bar{p}_T)+(2\phi\lambda_T^2+\lambda_T)\eta_T\end{array}\right).$$

The SOC is $2\phi\lambda_T^2+2\lambda_T>0$, which holds accordingly if $\lambda_T>0$ holds. Comparing the FOC of the government with the conjectured trading strategy of the government (B4), we have:

$$\gamma_T = \frac{1 - \lambda_T\beta_T - 2\phi\lambda_T^2\beta_T}{2\phi\lambda_T^2 + 2\lambda_T}\delta, \tag{B9}$$

$$\alpha_T = \frac{2\phi\lambda_T}{2\phi\lambda_T^2 + 2\lambda_T} = \frac{\phi}{1 + \phi\lambda_T}, \tag{B10}$$

$$\omega_T = \frac{2\phi\lambda_T^2 + \lambda_T}{2\phi\lambda_T^2 + 2\lambda_T}\left(\omega_T + \alpha_T\frac{\sigma_T^2}{\sigma_T^2 + \sigma_{\varepsilon_1}^2}\right) = (1 + 2\phi\lambda_T)\alpha_T\frac{\sigma_T^2}{\sigma_T^2 + \sigma_{\varepsilon_1}^2}, \tag{B11}$$

$$\eta_T = \frac{(2\phi\lambda_T^2 + \lambda_T)\eta_T + 2\phi\lambda_T(\bar{p}_T - p_0)}{2\phi\lambda_T^2 + 2\lambda_T} = 2\phi(\bar{p}_T - p_0). \tag{B12}$$

Third, we solve the market maker's problem. By the projection theorem, equation (B2) gives rise to:

$$p = E(v|\widetilde{p}_T) + \frac{cov(v, y|\widetilde{p}_T)}{var(y|\widetilde{p}_T)}[y - E(y|\widetilde{p}_T)] = p_0 + \frac{cov(v, y|\widetilde{p}_T)}{var(y|\widetilde{p}_T)}[y - E(y|\widetilde{p}_T)].$$

Combining it with (B5) gives us:

$$\lambda_T = \frac{cov(v, y|\widetilde{p}_T)}{var(y|\widetilde{p}_T)} = \frac{(\beta_T + \gamma_T)\sigma_v^2}{(\beta_T + \gamma_T)^2\sigma_v^2 + \gamma_T^2\sigma_\varepsilon^2 + \alpha_T^2\frac{\sigma_T^2\sigma_{\varepsilon_1}^2}{\sigma_T^2 + \sigma_{\varepsilon_1}^2} + \sigma_u^2}. \tag{B13}$$

By the similar procedure to derive the polynomial in Theorem 1, we change the equation system composed of (B7)-(B13) into the polynomial about λ_T presented in the following Proposition S1 and solve other endogenous parameters as functions of λ_T.

Finally, we compute the moments listed in Proposition S1. The measure of price stability is solved as:

$$
\begin{aligned}
& E[(p-p_T)^2] \\
= \; & E\left[p_0+\lambda_T\left(\beta_T(v-p_0)+\gamma_T(s-p_0)+\alpha_T(p_T-\bar{p}_T)-\alpha_T\frac{\sigma_T^2}{\sigma_T^2+\sigma_{\varepsilon_1}^2}(\widetilde{p}_T-\bar{p}_T)+u\right)-p_T\right]^2 \\
= \; & E\left[\left(\begin{array}{c} p_0-\bar{p}_T+\lambda_T(\beta_T+\gamma_T)(v-p_0)+\lambda_T\gamma_T\varepsilon+\lambda_T u \\ +\left(\lambda_T\alpha_T\frac{\sigma_{\varepsilon_1}^2}{\sigma_T^2+\sigma_{\varepsilon_1}^2}-1\right)(p_T-\bar{p}_T)-\lambda_T\alpha_T\frac{\sigma_T^2}{\sigma_T^2+\sigma_{\varepsilon_1}^2}\varepsilon_1 \end{array}\right)^2\right] \\
= \; & \left(\begin{array}{c} (p_0-\bar{p}_T)^2+\lambda_T^2(\beta_T+\gamma_T)^2\sigma_v^2+\lambda_T^2\gamma_T^2\sigma_\varepsilon^2+\lambda_T^2\sigma_u^2 \\ +\left(\lambda_T\alpha_T\frac{\sigma_{\varepsilon_1}^2}{\sigma_T^2+\sigma_{\varepsilon_1}^2}-1\right)^2\sigma_T^2+\lambda_T^2\alpha_T^2\left(\frac{\sigma_T^2}{\sigma_T^2+\sigma_{\varepsilon_1}^2}\right)^2\sigma_{\varepsilon_1}^2 \end{array}\right) \\
= \; & \lambda_T^2\left[(\beta_T+\gamma_T)^2\sigma_v^2+\gamma_T^2\sigma_\varepsilon^2+\sigma_u^2+\alpha_T^2\frac{\sigma_T^2\sigma_{\varepsilon_1}^2}{\sigma_T^2+\sigma_{\varepsilon_1}^2}\right]+\left(1-2\lambda_T\alpha_T\frac{\sigma_{\varepsilon_1}^2}{\sigma_T^2+\sigma_{\varepsilon_1}^2}\right)\sigma_T^2+(p_0-\bar{p}_T)^2 \\
= \; & \lambda_T(\beta_T+\gamma_T)\sigma_v^2+\left(1-2\lambda_T\alpha_T\frac{\sigma_{\varepsilon_1}^2}{\sigma_T^2+\sigma_{\varepsilon_1}^2}\right)\sigma_T^2+(p_0-\bar{p}_T)^2.
\end{aligned}
$$

The measure for price discovery/efficiency is:

$$
\begin{aligned}
& var(v|p) \\
= \; & var(v)-\frac{[cov(v,p)]^2}{var(p)} \\
= \; & var(v)-\frac{\left[cov\left(v,p_0+\lambda_T\left(\begin{array}{c}\beta_T(v-p_0)+\gamma_T(s-p_0)+ \\ \alpha_T(p_T-\bar{p}_T)-\alpha_T\frac{\sigma_T^2}{\sigma_T^2+\sigma_{\varepsilon_1}^2}(s_T-\bar{p}_T)+u\end{array}\right)\right)\right]^2}{var\left(p_0+\lambda_T\left(\begin{array}{c}\beta_T(v-p_0)+\gamma_T(s-p_0)+ \\ \alpha_T(p_T-\bar{p}_T)-\alpha_T\frac{\sigma_T^2}{\sigma_T^2+\sigma_{\varepsilon_1}^2}(s_T-\bar{p}_T)+u\end{array}\right)\right)} \\
= \; & \sigma_v^2-\frac{[\lambda_T(\beta_T+\gamma_T)\sigma_v^2]^2}{\lambda_T^2\left[(\beta_T+\gamma_T)^2\sigma_v^2+\gamma_T^2\sigma_\varepsilon^2+\sigma_u^2+\alpha_T^2\frac{\sigma_T^2\sigma_{\varepsilon_1}^2}{\sigma_T^2+\sigma_{\varepsilon_1}^2}\right]} \\
= \; & [1-\lambda_T(\beta_T+\gamma_T)]\sigma_v^2.
\end{aligned}
$$

The expected profit of the insider is:

$$
\begin{aligned}
& E(\pi) \\
= \;& E[(v-p)x] \\
= \;& E\left[\left(v-p_0-\lambda_T\left[\begin{array}{c}\beta_T(v-p_0)+\gamma_T(s-p_0)+\alpha_T(p_T-\bar{p}_T) \\ -\alpha_T\frac{\sigma_T^2}{\sigma_T^2+\sigma_{\varepsilon_1}^2}(\widetilde{p}_T-\bar{p}_T)+u\end{array}\right]\right)\left(\begin{array}{c}\beta_T(v-p_0) \\ +\xi_T(\widetilde{p}_T-\bar{p}_T)\end{array}\right)\right] \\
= \;& [1-\lambda_T(\beta_T+\gamma_T)]\beta_T\sigma_v^2-\lambda_T\alpha_T\xi_T\frac{\sigma_{\varepsilon_1}^2}{\sigma_T^2+\sigma_{\varepsilon_1}^2}\sigma_T^2+\lambda_T\alpha_T\xi_T\frac{\sigma_T^2}{\sigma_T^2+\sigma_{\varepsilon_1}^2}\sigma_{\varepsilon_1}^2 \\
= \;& [1-\lambda_T(\beta_T+\gamma_T)]\beta_T\sigma_v^2.
\end{aligned}
$$

The expected cost of the government is:

$$
\begin{aligned}
& E(c) \\
= \;& E[(p-v)g] \\
= \;& E\left[\left(p_0-v+\lambda_T\left[\begin{array}{c}\beta_T(v-p_0)+\gamma_T(s-p_0)+u+ \\ \alpha_T(p_T-\bar{p}_T)-\alpha_T\frac{\sigma_T^2}{\sigma_T^2+\sigma_{\varepsilon_1}^2}(\widetilde{p}_T-\bar{p}_T)\end{array}\right]\right)\left(\begin{array}{c}\gamma_T(s-p_0)+\alpha_T(p_T-\bar{p}_T) \\ +\omega_T(\widetilde{p}_T-\bar{p}_T)+\eta_T\end{array}\right)\right] \\
= \;& E\left[\left(\begin{array}{c}[\lambda_T(\beta_T+\gamma_T)-1](v-p_0)+\lambda_T\gamma_T\varepsilon+\lambda_T u \\ +\lambda_T\alpha_T\frac{\sigma_{\varepsilon_1}^2}{\sigma_T^2+\sigma_{\varepsilon_1}^2}(p_T-\bar{p}_T)-\lambda_T\alpha_T\frac{\sigma_T^2}{\sigma_T^2+\sigma_{\varepsilon_1}^2}\varepsilon_1\end{array}\right)\left(\begin{array}{c}\gamma_T(v-p_0)\;+\gamma_T\varepsilon+\eta_T+ \\ (\alpha_T+\omega_T)(p_T-\bar{p}_T)+\omega_T\varepsilon_1\end{array}\right)\right] \\
= \;& [\lambda_T(\beta_T+\gamma_T)-1]\gamma_T\sigma_v^2+\lambda_T\gamma_T^2\sigma_\varepsilon^2+\lambda_T\alpha_T(\alpha_T+\omega_T)\frac{\sigma_{\varepsilon_1}^2\sigma_T^2}{\sigma_T^2+\sigma_{\varepsilon_1}^2}-\lambda_T\alpha_T\omega_T\frac{\sigma_T^2\sigma_{\varepsilon_1}^2}{\sigma_T^2+\sigma_{\varepsilon_1}^2} \\
= \;& [\lambda_T(\beta_T+\gamma_T)-1]\gamma_T\sigma_v^2+\lambda_T\gamma_T^2\sigma_\varepsilon^2+\lambda_T\alpha_T^2\frac{\sigma_{\varepsilon_1}^2\sigma_T^2}{\sigma_T^2+\sigma_{\varepsilon_1}^2}.
\end{aligned}
$$

The correlation coefficient between the trading position of the insider and the government is:

$$
\begin{aligned}
& corr(x,g) \\
= \quad & \frac{cov(x,g)}{\sqrt{var(x)}\sqrt{var(g)}} \\
= \quad & \frac{cov\left(\beta_T(v-p_0)+\xi_T(\widetilde{p}_T-\bar{p}_T), \gamma_T(s-p_0)+\alpha_T(p_T-\bar{p}_T)+\omega_T(\widetilde{p}_T-\bar{p}_T)+\eta_T\right)}{\sqrt{var(\beta_T(v-p_0)+\xi_T(\widetilde{p}_T-\bar{p}_T))}\sqrt{var\left(\gamma_T(s-p_0)+\alpha_T(p_T-\bar{p}_T)+\omega_T(\widetilde{p}_T-\bar{p}_T)+\eta_T\right)}} \\
= \quad & \frac{\beta_T\gamma_T\sigma_v^2}{\sqrt{\beta_T^2\sigma_v^2}\sqrt{\gamma_T^2(\sigma_v^2+\sigma_\varepsilon^2)+(\alpha_T+\omega_T)^2\sigma_T^2+\omega_T^2\sigma_{\varepsilon_1}^2}}.
\end{aligned}
$$

Thus we have proven the following

Proposition S1. *If the government partially releases a noisy signal about the price target signal, namely,* $\widetilde{p}_T \equiv p_T+\varepsilon_T$*, then a linear equilibrium is defined by seven unknowns* $(\beta_T, \xi_T, \gamma_T, \alpha_T, \omega_T, \eta_T, \lambda_T) \in R^7$*, which are characterized by seven equations (B7)-(B13), together with the SOC,* $\lambda_T > 0$*. The system of equations can be solved as the following six-order polynomial for* λ_T*:*

$$
b_6\lambda_T^6 + b_5\lambda_T^5 + b_4\lambda_T^4 + b_3\lambda_T^3 + b_2\lambda_T^2 + b_1\lambda_T + b_0 = 0,
$$

where the coefficients $b_i's$ *are:*

$$
\begin{aligned}
b_6 &= 4(2-\delta_1)^2\phi^4\sigma_u^2, b_5 = 4(8-3\delta_1)(2-\delta_1)\phi^3\sigma_u^2, \\
b_4 &= \begin{pmatrix} (4\delta-4)\phi^4\sigma_v^2 + 4\phi^4\delta^2\sigma_\varepsilon^2 + 4\phi^4(2-\delta)^2\frac{\sigma_T^2\sigma_{\varepsilon_1}^2}{\sigma_T^2+\sigma_{\varepsilon_1}^2} \\ +\left[(8-3\delta)^2+4(2-\delta)(4-\delta)\right]\phi^2\sigma_u^2 \end{pmatrix}, \\
b_3 &= \begin{pmatrix} (-2\delta^2+14\delta-16)\phi^3\sigma_v^2 + 4\phi^3\delta^2\sigma_\varepsilon^2 + \\ 4\phi^3(2-\delta)(4-\delta)\frac{\sigma_T^2\sigma_{\varepsilon_1}^2}{\sigma_T^2+\sigma_{\varepsilon_1}^2} + 2(4-\delta)(8-3\delta)\phi\sigma_u^2 \end{pmatrix}, \\
b_2 &= (-4\delta^2+18\delta-24)\phi^2\sigma_v^2 - 3\phi^2\delta^2\sigma_\varepsilon^2 + \phi^2(4-\delta)^2\frac{\sigma_T^2\sigma_{\varepsilon_1}^2}{\sigma_T^2+\sigma_{\varepsilon_1}^2} + (4-\delta)^2\sigma_u^2, \\
b_1 &= (-2\delta^2+10\delta-16)\phi\sigma_v^2 - 2\phi\delta^2\sigma_\varepsilon^2, b_0 = (2\delta-4)\sigma_v^2 + \delta^2\sigma_\varepsilon^2,
\end{aligned}
$$

where $\delta \equiv \frac{\sigma_v^2}{\sigma_v^2+\sigma_\varepsilon^2}$. *All other variables can be solved as expressions of* λ_T as follows:

$$\begin{aligned}
\beta_T &= \frac{2\phi\lambda_T + 2 - \delta}{4\phi\lambda_T^2 + 4\lambda_T - (\lambda_T + 2\phi\lambda_T^2)\delta},\ \xi_T = 0, \\
\gamma_T &= \frac{(1 - 2\phi\lambda_T)\delta}{4\phi\lambda_T^2 + 4\lambda_T - (\lambda_T + 2\phi\lambda_T^2)\delta}, \alpha_T = \frac{\phi}{1+\phi\lambda_T}, \\
\omega_T &= \frac{(1+2\phi\lambda_T)\phi}{1+\phi\lambda_T}\frac{\sigma_T^2}{\sigma_T^2+\sigma_{\varepsilon_1}^2}, \eta_T = 2\phi(\bar{p}_T - p_0).
\end{aligned}$$

The measure of price stability is:

$$E[(p-p_T)^2] = \lambda_T(\beta_T+\gamma_T)\sigma_v^2 + \left(1 - 2\lambda_T\alpha_T\frac{\sigma_{\varepsilon_1}^2}{\sigma_T^2+\sigma_{\varepsilon_1}^2}\right)\sigma_T^2 + (p_0 - \bar{p}_T)^2.$$

The measure of price discovery/efficiency is:

$$var(v|p) = [1 - \lambda_T(\beta_T+\gamma_T)]\sigma_v^2.$$

The expected profits of the insider and the expected costs of the government are:

$$\begin{aligned}
E(\pi) &= [1 - \lambda_T(\beta_T+\gamma_T)]\beta_T\sigma_v^2, \\
E(c) &= [\lambda_T(\beta_T+\gamma_T) - 1]\gamma_T\sigma_v^2 + \lambda_T\gamma_T^2\sigma_\varepsilon^2 + \lambda_T\alpha_T^2\frac{\sigma_T^2\sigma_{\varepsilon_1}^2}{\sigma_T^2+\sigma_{\varepsilon_1}^2}.
\end{aligned}$$

The correlation coefficient between the trading position of the insider and the government is:

$$corr(x,g) = \frac{\beta_T\gamma_T\sigma_v^2}{\sqrt{\beta_T^2\sigma_v^2}\sqrt{\gamma_T^2(\sigma_v^2+\sigma_\varepsilon^2) + (\alpha_T+\omega_T)^2\sigma_T^2 + \omega_T^2\sigma_{\varepsilon_1}^2}}.$$

Partially releasing the fundamental signal

Now suppose that the government partially releases its fundamental signal to the financial market before trading. Specifically, the government releases a noisy signal, $\widetilde{s} = s + \varepsilon_2$, to the insider and the market maker, with $\varepsilon_2 \sim N(0, \sigma_{\varepsilon_2}^2)$, where $\{v, p_T, \varepsilon, \varepsilon_2\}$ are mutually independent.

With the enlarged information set $\{v, \widetilde{s}\}$, the insider's maximization problem is changed as:

$$\max_{\{x\}} E[(v-p)x|v, \widetilde{s}]. \tag{B14}$$

Meanwhile, observing the signal released by the government, $\{\widetilde{s}\}$, the market maker uses the information set $\{y, \widetilde{s}\}$ to update her conditional expectations about the fundamentals. Thus the pricing rule of market efficiency is transformed into:

$$p = E(v|y, \widetilde{s}). \tag{B15}$$

Conjecture instead the decision rules and the pricing rule as follows:

$$x = \beta_s(v-p_0) + \xi_s(\widetilde{s}-p_0), \tag{B16}$$

$$g = \gamma_s(s-p_0) + \alpha_s(p_T - \bar{p}_T) + \omega_s(\widetilde{s}-p_0) + \eta_s, \tag{B17}$$

$$p = p_0 + \delta_3(\widetilde{s}-p_0) + \lambda_s[y - E(y|\widetilde{s})], \text{ with } y = x + g + u, \tag{B18}$$

where

$$\begin{aligned} E(y|\widetilde{s}) &= \beta_s E(v-p_0|\widetilde{s}) + \gamma_s E(s-p_0|\widetilde{s}) + (\xi_s+\omega_s)(\widetilde{s}-p_0) + \eta_s \\ &= (\beta_s\delta_1 + \gamma_s\delta_2 + \xi_s + \omega_s)(\widetilde{s}-p_0) + \eta_s, \\ \delta_1 &\equiv \frac{\sigma_v^2}{\sigma_v^2+\sigma_\varepsilon^2+\sigma_{\varepsilon 2}^2}, \delta_2 \equiv \frac{\sigma_v^2+\sigma_\varepsilon^2}{\sigma_v^2+\sigma_\varepsilon^2+\sigma_{\varepsilon 2}^2}. \end{aligned}$$

First, we solve the insider's problem. Using equation (B17) and (B18), we compute:

$$\begin{aligned} & E[(v-p)x|v,\widetilde{s}] \\ = \;& E\left\{\left[v-p_0-\delta_1(\widetilde{s}-p_0)-\lambda_s\begin{pmatrix} x+\gamma_s(s-p_0)+\alpha_s(p_T-\bar{p}_T)+\omega_s(\widetilde{s}-p_0)+\eta_s \\ +u-(\beta_s\delta_1+\gamma_s\delta_2+\xi_s+\omega_s)(\widetilde{s}-p_0)-\eta_s\end{pmatrix}\right]x|v,\widetilde{s}\right\} \\ = \;& [v-p_0-\delta_1(\widetilde{s}-p_0)-\lambda_s x - \lambda_s\gamma_s E(s-p_0|v,\widetilde{s}) + \lambda_s(\beta_s\delta_1+\gamma_s\delta_2+\xi_s)(\widetilde{s}-p_0)]\,x \\ = \;& \{[1-\lambda_s\gamma_s(1-\delta_3)](v-p_0) - \lambda_s x - [\delta_1+\lambda_s\gamma_s\delta_3 - \lambda_s(\beta_s\delta_1+\gamma_s\delta_2+\xi_s)](\widetilde{s}-p_0)\}x, \end{aligned}$$

where

$$E(s-p_0|v,\widetilde{s}) = v - p_0 + \delta_3(\widetilde{s}-v), \delta_3 \equiv \frac{\sigma_\varepsilon^2}{\sigma_\varepsilon^2+\sigma_{\varepsilon 2}^2}.$$

The FOC for x yields

$$x = \frac{1-\lambda_s\gamma_s(1-\delta_3)}{2\lambda_s}(v-p_0) - \frac{\delta_1+\lambda_s\gamma_s\delta_3 - \lambda_s(\beta_s\delta_1+\gamma_s\delta_2+\xi_s)}{2\lambda_s}(\widetilde{s}-p_0). \quad \text{(B19)}$$

The SOC is $\lambda_s > 0$. Comparing equation (B19) with the conjectured strategy (B16) leads to

$$\beta_s = \frac{1-\lambda_s\gamma_s(1-\delta_3)}{2\lambda_s}, \quad \text{(B20)}$$

$$\xi_s = -\frac{\delta_1}{2\lambda_s} + \gamma_s\left[\delta_2 - \delta_3 - \frac{\delta_1}{2}(1-\delta_3)\right]. \quad \text{(B21)}$$

Second, we solve the government's problem. Using equations (B16) and (B18), the objective function of the government is derived as:

$$E[\phi(p-p_T)^2 + (p-v)g|s,p_T,\widetilde{s}]$$
$$= \left(\begin{array}{c} \phi\{p_0 - p_T - \lambda_s\eta_s + \lambda_s g + [\delta_1 - \lambda_s(\beta_s\delta_1+\gamma_s\delta_2+\omega_s)](\widetilde{s}-p_0)\}^2 + \\ 2\phi\lambda_s\beta_s\{p_0 - p_T - \lambda_s\eta_s + \lambda_s g + [\delta_1 - \lambda_s(\beta_s\delta_1+\gamma_s\delta_2+\omega_s)](\widetilde{s}-p_0)\}E(v-p_0|s,p_T,\widetilde{s}) \\ +\phi\lambda_s^2\sigma_u^2 + \phi\lambda_s^2\beta_s^2 E[(v-p_0)^2|s,p_T,\widetilde{s}] + \lambda_s g^2 - \lambda_s\eta_s g + \\ [\delta_1 - \lambda_s(\beta_s\delta_1+\gamma_s\delta_2+\omega_s)](\widetilde{s}-p_0)g + (\lambda_s\beta_s - 1)E(v-p_0|s,p_T,\widetilde{s})g \end{array}\right),$$

where

$$E(v-p_0|s,p_T,\widetilde{s}) = E(v-p_0|s,\varepsilon_2) = E(v-p_0|s) = \delta(s-p_0), \delta \equiv \frac{\sigma_v^2}{\sigma_v^2+\sigma_\varepsilon^2}.$$

The FOC for g yields:

$$g = \frac{1}{2\phi\lambda_s^2 + 2\lambda_s}\left(\begin{array}{c} (1-\lambda_s\beta_s - 2\phi\lambda_s^2\beta_s)\delta_1(s-p_0) + 2\phi\lambda_s(p_T - \bar{p}_T) \\ -(1+2\phi\lambda_s)[\delta_1 - \lambda_s(\beta_s\delta_1+\gamma_s\delta_2+\omega_s)](\widetilde{s}-p_0) \\ +(2\phi\lambda_s^2+\lambda_s)\eta_s + 2\phi\lambda_s(\bar{p}_T - p_0) \end{array}\right).$$

The SOC is $2\phi\lambda_s^2 + 2\lambda_s > 0$, which holds accordingly if $\lambda_s > 0$ holds. Comparing (B17) with the FOC w.r.t g, we obtain:

$$\gamma_s = \frac{(1 - \lambda_s\beta_s - 2\phi\lambda_s^2\beta_s)\delta}{2\phi\lambda_s^2 + 2\lambda_s}, \tag{B22}$$

$$\alpha_s = \frac{\phi}{1 + \phi\lambda_s}, \tag{B23}$$

$$\omega_s = (1 + 2\phi\lambda_s)\left(\beta_s\delta_1 + \gamma_s\delta_2 - \frac{\delta_1}{\lambda_s}\right), \tag{B24}$$

$$\eta_s = 2\phi(\bar{p}_T - p_0). \tag{B25}$$

Third, by the projection theorem, equation (B15) gives rise to:

$$p = E(v|\widetilde{s}) + \frac{cov(v, y|\widetilde{s})}{var(y|\widetilde{s})}[y - E(y|\widetilde{s})] = p_0 + \delta_1(\widetilde{s} - p_0) + \frac{cov(v, y|\widetilde{s})}{var(y|\widetilde{s})}[y - E(y|\widetilde{s})],$$

where

$$\begin{aligned}
&\frac{cov(v, y|\widetilde{s})}{var(y|\widetilde{s})} = \frac{cov(v - E(v|\widetilde{s}), y - E(y|\widetilde{s}))}{var(y - E(y|\widetilde{s}))} \\
= &\frac{cov(v - p_0 - \delta_1(\widetilde{s} - p_0), \beta_s(v - p_0) + \gamma_s(s - p_0) + \alpha_s(p_T - \bar{p}_T) + u - (\beta_s\delta_1 + \gamma_s\delta_2)(\widetilde{s} - p_0))}{var(\beta_s(v - p_0) + \gamma_s(s - p_0) + \alpha_s(p_T - \bar{p}_T) + u - (\beta_s\delta_1 + \gamma_s\delta_2)(\widetilde{s} - p_0))} \\
= &\frac{(1 - \delta_1)(\beta_s + \gamma_s - \beta_s\delta_1 - \gamma_s\delta_2)\sigma_v^2 - \delta_1(\gamma_s - \beta_s\delta_1 - \gamma_s\delta_2)\sigma_\varepsilon^2 + \delta_1(\beta_s\delta_1 + \gamma_s\delta_2)\sigma_{\varepsilon_2}^2}{(\beta_s + \gamma_s - \beta_s\delta_1 - \gamma_s\delta_2)^2\sigma_v^2 + (\gamma_s - \beta_s\delta_1 - \gamma_s\delta_2)^2\sigma_\varepsilon^2 + (\beta_s\delta_1 + \gamma_s\delta_2)^2\sigma_{\varepsilon_2}^2 + \alpha_s^2\sigma_T^2 + \sigma_u^2}.
\end{aligned}$$

Combining equation (B18) and the above equation gives us

$$\lambda_s = \frac{(1 - \delta_1)(\beta_s + \gamma_s - \beta_s\delta_1 - \gamma_s\delta_2)\sigma_v^2 - \delta_1(\gamma_s - \beta_s\delta_1 - \gamma_s\delta_2)\sigma_\varepsilon^2 + \delta_1(\beta_s\delta_1 + \gamma_s\delta_2)\sigma_{\varepsilon_2}^2}{(\beta_s + \gamma_s - \beta_s\delta_1 - \gamma_s\delta_2)^2\sigma_v^2 + (\gamma_s - \beta_s\delta_1 - \gamma_s\delta_2)^2\sigma_\varepsilon^2 + (\beta_s\delta_1 + \gamma_s\delta_2)^2\sigma_{\varepsilon_2}^2 + \alpha_s^2\sigma_T^2 + \sigma_u^2}. \tag{B26}$$

We solve the equation system composed of (B20)-(B26) as a polynomial about λ_s

presented in Proposition S2, where the coefficients are as follows:

$$c_6 = 4[2-(1-\delta_3)\delta]^2\phi^4\sigma_u^2, c_5 = 4[2-(1-\delta_3)\delta][8-3(1-\delta_3)\delta]\phi^3\sigma_u^2,$$

$$c_4 = \begin{pmatrix} 4\left[((1-\delta_3)\delta-1)(1-\delta_1)^2+\delta^2(1-\delta_2)^2-\delta^2(1-\delta_3)(1-\delta_2)(1-\delta_1)\right]\phi^4\sigma_v^2 \\ +4\left[((1-\delta_3)\delta-1)\delta_1^2+\delta^2(1-\delta_2)^2+\delta^2(1-\delta_3)(1-\delta_2)\delta_1\right]\phi^4\sigma_\varepsilon^2 \\ +4\left[((1-\delta_3)\delta-1)\delta_1^2+\delta^2\delta_2^2-\delta^2(1-\delta_3)\delta_2\delta_1\right]\phi^4\sigma_{\varepsilon_2}^2+4[2-(1-\delta_3)\delta]^2\phi^4\sigma_T^2 \\ +[(8-3(1-\delta_3)\delta)^2+4(2-(1-\delta_3)\delta)(4-(1-\delta_3)\delta)]\phi^2\sigma_u^2 \end{pmatrix},$$

$$c_3 = \begin{pmatrix} 2\begin{pmatrix} \left[7(1-\delta_3)\delta-(1-\delta_3)^2\delta^2-8\right](1-\delta_1)^2+ \\ 2\delta^2(1-\delta_2)^2-2\delta^2(1-\delta_3)(1-\delta_2)(1-\delta_1) \end{pmatrix}\phi^3\sigma_v^2 \\ +2\begin{pmatrix} \left[7(1-\delta_3)\delta-(1-\delta_3)^2\delta^2-8\right]\delta_1^2+ \\ 2\delta^2(1-\delta_2)^2+2\delta^2(1-\delta_3)(1-\delta_2)\delta_1 \end{pmatrix}\phi^3\sigma_\varepsilon^2 \\ +2\left(\left[7(1-\delta_3)\delta-(1-\delta_3)^2\delta^2-8\right]\delta_1^2+2\delta^2\delta_2^2-2\delta^2(1-\delta_3)\delta_2\delta_1\right)\phi^3\sigma_{\varepsilon_2}^2 \\ +4\left[8-6(1-\delta_3)\delta+(1-\delta_3)^2\delta^2\right]\phi^3\sigma_T^2+2[4-(1-\delta_3)\delta][8-3(1-\delta_3)\delta]\phi\sigma_u^2 \end{pmatrix},$$

$$c_2 = \begin{pmatrix} \begin{pmatrix} \left[18(1-\delta_3)\delta-4(1-\delta_3)^2\delta^2-24\right](1-\delta_1)^2 \\ -3\delta^2(1-\delta_2)^2+3\delta^2(1-\delta_3)(1-\delta_2)(1-\delta_1) \end{pmatrix}\phi^2\sigma_v^2+ \\ \left(\left[18(1-\delta_3)\delta-4(1-\delta_3)^2\delta^2-24\right]\delta_1^2-3\delta^2(1-\delta_2)^2-3\delta^2(1-\delta_3)(1-\delta_2)\delta_1\right)\phi^2\sigma_\varepsilon^2 \\ +\left(\left[18(1-\delta_3)\delta-4(1-\delta_3)^2\delta^2-24\right]\delta_1^2-3\delta^2\delta_2^2+3\delta^2(1-\delta_3)\delta_2\delta_1\right)\phi^2\sigma_{\varepsilon_2}^2 \\ +[4-(1-\delta_3)\delta]^2\phi^2\sigma_T^2+[4-(1-\delta_3)\delta]^2\sigma_u^2 \end{pmatrix},$$

$$c_1 = \begin{pmatrix} 2\begin{pmatrix} \left[5(1-\delta_3)\delta-(1-\delta_3)^2\delta^2-8\right](1-\delta_1)^2 \\ -\delta^2(1-\delta_2)^2+\delta^2(1-\delta_3)(1-\delta_2)(1-\delta_1) \end{pmatrix}\phi\sigma_v^2 \\ +2\left(\left[5(1-\delta_3)\delta-(1-\delta_3)^2\delta^2-8\right]\delta_1^2-\delta^2(1-\delta_2)^2-\delta^2(1-\delta_3)(1-\delta_2)\delta_1\right)\phi\sigma_\varepsilon^2 \\ +2\left(\left[5(1-\delta_3)\delta-(1-\delta_3)^2\delta^2-8\right]\delta_1^2-\delta^2\delta_2^2+\delta^2(1-\delta_3)\delta_2\delta_1\right)\phi\sigma_{\varepsilon_2}^2 \end{pmatrix},$$

$$c_0 = \begin{pmatrix} \left[(2(1-\delta_3)\delta-4)(1-\delta_1)^2+\delta^2(1-\delta_2)^2-\delta^2(1-\delta_3)(1-\delta_2)(1-\delta_1)\right]\sigma_v^2 \\ +\left[(2(1-\delta_3)\delta-4)\delta_1^2+\delta^2(1-\delta_2)^2+\delta^2(1-\delta_3)(1-\delta_2)\delta_1\right]\sigma_\varepsilon^2 \\ +\left[(2(1-\delta_3)\delta-4)\delta_1^2+\delta^2\delta_2^2-\delta^2(1-\delta_3)\delta_2\delta_1\right]\sigma_{\varepsilon_2}^2 \end{pmatrix}.$$

By substitions, we solve other parameters as functions of λ_s as follows. The measure for price stability is computed as:

$$
\begin{aligned}
& E[(p-p_T)^2] \\
= \; & E\left[\left(\begin{array}{c} p_0+\delta_1(\widetilde{s}-p_0)+\lambda_s\beta_s(v-p_0)+\lambda_s\gamma_s(s-p_0)+\lambda_s\alpha_s(p_T-\bar{p}_T) \\ +\lambda_s u-\lambda_s(\beta_s\delta_1+\gamma_s\delta_2)(\widetilde{s}-p_0)-p_T \end{array}\right)^2\right] \\
= \; & E\left[\left(\begin{array}{c} [\delta_1+\lambda_s(\beta_s+\gamma_s-\beta_s\delta_1-\gamma_s\delta_2)](v-p_0)+[\delta_1+\lambda_s(\gamma_s-\beta_s\delta_1-\gamma_s\delta_2)]\varepsilon \\ +[\delta_1-\lambda_s(\beta_s\delta_1+\gamma_s\delta_2)]\varepsilon_2+(\lambda_s\alpha_s-1)(p_T-\bar{p}_T)+\lambda_s u+(p_0-\bar{p}_T) \end{array}\right)^2\right] \\
= \; & \left(\begin{array}{c} [\delta_1+\lambda_s(\beta_s+\gamma_s-\beta_s\delta_1-\gamma_s\delta_2)]^2\sigma_v^2+[\delta_1+\lambda_s(\gamma_s-\beta_s\delta_1-\gamma_s\delta_2)]^2\sigma_\varepsilon^2 \\ +[\delta_1-\lambda_s(\beta_s\delta_1+\gamma_s\delta_2)]^2\sigma_{\varepsilon_2}^2+(\lambda_s\alpha_s-1)^2\sigma_T^2+\lambda_s^2\sigma_u^2+(p_0-\bar{p}_T)^2 \end{array}\right) \\
= \; & \left(\begin{array}{c} \lambda_s^2\left[(\beta_s+\gamma_s-\beta_s\delta_1-\gamma_s\delta_2)^2\sigma_v^2+(\gamma_s-\beta_s\delta_1-\gamma_s\delta_2)^2\sigma_\varepsilon^2+(\beta_s\delta_1+\gamma_s\delta_2)^2\sigma_{\varepsilon_2}^2+\alpha_s^2\sigma_T^2+\sigma_u^2\right] \\ +[\delta_1^2+2\lambda_s(\beta_s+\gamma_s-\beta_s\delta_1-\gamma_s\delta_2)\delta_1]\sigma_v^2+[\delta_1^2+2\lambda_s(\gamma_s-\beta_s\delta_1-\gamma_s\delta_2)\delta_1]\sigma_\varepsilon^2 \\ +[\delta_1^2-2\lambda_s(\beta_s\delta_1+\gamma_s\delta_2)\delta_2]\sigma_{\varepsilon_2}^2+(1-2\lambda_s\alpha_s)\sigma_T^2+(p_0-\bar{p}_T)^2 \end{array}\right) \\
= \; & \left(\begin{array}{c} \left[\delta_1^2+\lambda_s(1+\delta_1)(\beta_s+\gamma_s-\beta_s\delta_1-\gamma_s\delta_2)\right]\sigma_v^2+[\delta_1^2+\lambda_s\delta_1(\gamma_s-\beta_s\delta_1-\gamma_s\delta_2)]\sigma_\varepsilon^2 \\ +[\delta_1^2-\lambda_s(\beta_s\delta_1+\gamma_s\delta_2)\delta_1]\sigma_{\varepsilon_2}^2+(1-2\lambda_s\alpha_s)\sigma_T^2+(p_0-\bar{p}_T)^2 \end{array}\right).
\end{aligned}
$$

Using the projection theorem, we have that:

$$
\begin{aligned}
var(v|p) &= var(v)-\frac{[cov(v,p)]^2}{var(p)} \\
&= var(v)-\frac{\left[cov\left(v,p_0+\delta_1(\widetilde{s}-p_0)+\lambda_s\left(\begin{array}{c}\beta_s(v-p_0)+\gamma_s(s-p_0)+\alpha_s(p_T-\bar{p}_T)\\ +u-(\beta_s\delta_1+\gamma_s\delta_2)(\widetilde{s}-p_0)\end{array}\right)\right)\right]^2}{var\left(p_0+\delta_1(\widetilde{s}-p_0)+\lambda_s\left(\begin{array}{c}\beta_s(v-p_0)+\gamma_s(s-p_0)+\alpha_s(p_T-\bar{p}_T)\\ +u-(\beta_s\delta_1+\gamma_s\delta_2)(\widetilde{s}-p_0)\end{array}\right)\right)} \\
&= \sigma_v^2-\frac{[\delta_1+\lambda_s(\beta_s+\gamma_s-\beta_s\delta_1-\gamma_s\delta_2)]^2\sigma_v^4}{\left(\begin{array}{c}[\delta_1+\lambda_s(\beta_s+\gamma_s-\beta_s\delta_1-\gamma_s\delta_2)]^2\sigma_v^2+[\delta_1+\lambda_s(\gamma_s-\beta_s\delta_1-\gamma_s\delta_2)]^2\sigma_\varepsilon^2\\ +[\delta_1-\lambda_s(\beta_s\delta_1+\gamma_s\delta_2)]^2\sigma_{\varepsilon_2}^2+\lambda_s^2\alpha_s^2\sigma_T^2+\lambda_s^2\sigma_u^2\end{array}\right)} \\
&= \sigma_v^2-\frac{[\delta_1+\lambda_s(\beta_s+\gamma_s-\beta_s\delta_1-\gamma_s\delta_2)]^2\sigma_v^4}{\left(\begin{array}{c}\left[\delta_1^2+\lambda_s(1+\delta_1)(\beta_s+\gamma_s-\beta_s\delta_1-\gamma_s\delta_2)\right]\sigma_v^2\\ +[\delta_1^2+\lambda_s\delta_1(\gamma_s-\beta_s\delta_1-\gamma_s\delta_2)]\sigma_\varepsilon^2+[\delta_1^2-\lambda_s(\beta_s\delta_1+\gamma_s\delta_2)\delta_1]\sigma_{\varepsilon_2}^2\end{array}\right)}.
\end{aligned}
$$

The expected profits of the insider and the expected costs of the government are:

$$\begin{aligned}
E(\pi) &= E[(v-p)x] \\
&= E\left[\left(v - p_0 - \delta_1(\widetilde{s}-p_0) - \lambda_s \left[\begin{array}{c} \beta_s(v-p_0)+\gamma_s(s-p_0)+\alpha_s(p_T-\bar{p}_T) \\ +u-(\beta_s\delta_1+\gamma_s\delta_2)(\widetilde{s}-p_0) \end{array}\right]\right)\left(\begin{array}{c} \beta_s(v-p_0) \\ +\xi_s(\widetilde{s}-p_0) \end{array}\right)\right] \\
&= E\left[\left(\begin{array}{c} [1-\delta_1-\lambda_s(\beta_s+\gamma_s-\beta_s\delta_1-\gamma_s\delta_2)]\,(v-p_0) \\ -[\delta_1+\lambda_s(\gamma_s-\beta_s\delta_1-\gamma_s\delta_2)]\,\varepsilon-\lambda_s\alpha_s(p_T-\bar{p}_T) \\ -[\delta_1-\lambda_s(\beta_s\delta_1+\gamma_s\delta_2)]\,\varepsilon_2-\lambda_s u \end{array}\right)\left(\begin{array}{c} (\beta_s+\xi_s)(v-p_0) \\ +\xi_s(\varepsilon+\varepsilon_2) \end{array}\right)\right] \\
&= \left(\begin{array}{c} [1-\delta_1-\lambda_s(\beta_s+\gamma_s-\beta_s\delta_1-\gamma_s\delta_2)]\,(\beta_s+\xi_s)\sigma_v^2 \\ -[\delta_1+\lambda_s(\gamma_s-\beta_s\delta_1-\gamma_s\delta_2)]\,\xi_s\sigma_\varepsilon^2-[\delta_1-\lambda_s(\beta_s\delta_1+\gamma_s\delta_2)]\,\xi_s\sigma_{\varepsilon_2}^2 \end{array}\right).
\end{aligned}$$

The expression for the expected cost of the government is found as follows:

$$\begin{aligned}
&E(c) = E[(p-v)g] \\
&= E\left[\left(p_0+\delta_1(\widetilde{s}-p_0)+\lambda_s\left(\begin{array}{c} \beta_s(v-p_0)+\gamma_s(s-p_0)+\alpha_s(p_T-\bar{p}_T) \\ +u-(\beta_s\delta_1+\gamma_s\delta_2)(\widetilde{s}-p_0) \end{array}\right)-v\right)\left(\begin{array}{c} \gamma_s(s-p_0)\ + \\ \alpha_s(p_T-\bar{p}_T)+ \\ \omega_s(\widetilde{s}-p_0)+\eta_s \end{array}\right)\right] \\
&= \left(\begin{array}{c} [\lambda_s(\beta_s+\gamma_s-\beta_s\delta_1-\gamma_s\delta_2)+\delta_1-1](\gamma_s+\omega_s)\sigma_v^2+\lambda_s\alpha_s^2\sigma_T^2 \\ +[\lambda_s(\gamma_s-\beta_s\delta_1-\gamma_s\delta_2)+\delta_1](\gamma_s+\omega_s)\sigma_\varepsilon^2+[\delta_1-\lambda_s(\beta_s\delta_1+\gamma_s\delta_2)]\omega_s\sigma_{\varepsilon_2}^2 \end{array}\right).
\end{aligned}$$

The correlation coefficient between the trading position of the insider and the government is

$$\begin{aligned}
corr(x,g) &= \frac{cov(x,g)}{\sqrt{var(x)}\sqrt{var(g)}} \\
&= \frac{cov\left(\beta_s(v-p_0)+\xi_s(\widetilde{s}-p_0),\gamma_s(s-p_0)+\alpha_s(p_T-\bar{p}_T)+\omega_s(\widetilde{s}-p_0)+\eta_s\right)}{\sqrt{var(\beta_s(v-p_0)+\xi_s(\widetilde{s}-p_0))}\sqrt{var(\gamma_s(s-p_0)+\alpha_s(p_T-\bar{p}_T)+\omega_s(\widetilde{s}-p_0)+\eta_s)}} \\
&= \frac{(\beta_s+\xi_s)(\gamma_s+\omega_s)\sigma_v^2+\xi_s(\gamma_s+\omega_s)\sigma_\varepsilon^2+\xi_s\omega_s\sigma_{\varepsilon_2}^2}{\sqrt{(\beta_s+\xi_s)^2\sigma_v^2+\xi_s^2(\sigma_\varepsilon^2+\sigma_{\varepsilon_2}^2)}\sqrt{(\gamma_s+\omega_s)^2(\sigma_v^2+\sigma_\varepsilon^2)+\omega_s^2\sigma_{\varepsilon_2}^2+\alpha_s^2\sigma_T^2}}.
\end{aligned}$$

We summarize the equilibrium results in Proposition S2.

Proposition S2. *If the government releases a noisy signal about its fundamental signal,* *namely,* $\widetilde{s} \equiv s + \varepsilon_2$*, a linear equilibrium is defined by seven unknowns* $(\beta_s, \xi_s, \gamma_s, \alpha_s, \omega_s, \eta_s, \lambda_s) \in R^7$*, which are characterized by seven equations (B20)-(B26), together with one SOC,* $\lambda_s > 0$*. The system of equations can be changed as a six-order polynomial of* λ_s*:*

$$c_6\lambda_s^6 + c_5\lambda_s^5 + c_4\lambda_s^4 + c_3\lambda_s^3 + c_2\lambda_s^2 + c_1\lambda_s + c_0 = 0,$$

where the coefficients $c_i's$ *are listed above. All the other variables can be solved as expressions for* λ_s *as follows:*

$$\begin{aligned}
\beta_s &= \frac{2\phi\lambda_s + 2 - (1-\delta_3)\delta}{4\phi\lambda_s^2 + 4\lambda_s - (\lambda_s + 2\phi\lambda_s^2)(1-\delta_3)\delta}, \\
\xi_s &= -\frac{\delta_1}{2\lambda_s} + \frac{(1-2\phi\lambda_s)\delta}{4\phi\lambda_s^2 + 4\lambda_s - (\lambda_s + 2\phi\lambda_s^2)(1-\delta_3)\delta}\left[\delta_2 - \delta_3 - \frac{\delta_1}{2}(1-\delta_3)\right], \\
\gamma_s &= \frac{(1-2\phi\lambda_s)\delta}{4\phi\lambda_s^2 + 4\lambda_s - (\lambda_s + 2\phi\lambda_s^2)(1-\delta_3)\delta}, \alpha_s = \frac{\phi}{1+\phi\lambda_s}, \eta_s = 2\phi(\bar{p}_T - p_0), \\
\omega_s &= (1+2\phi\lambda_s)\left(\frac{[2\phi\lambda_s + 2 - (1-\delta_3)\delta]\delta_1 + (1-2\phi\lambda_s)\delta\delta_2}{4\phi\lambda_s^2 + 4\lambda_s - (\lambda_s + 2\phi\lambda_s^2)(1-\delta_3)\delta} - \frac{\delta_1}{\lambda_s}\right),
\end{aligned}$$

where $\delta \equiv \frac{\sigma_v^2}{\sigma_v^2 + \sigma_\varepsilon^2}$ and $\delta_3 \equiv \frac{\sigma_\varepsilon^2}{\sigma_\varepsilon^2 + \sigma_{\varepsilon_2}^2}$*.The measure of price stability is then:*

$$E[(p - p_T)^2] = \begin{pmatrix} [\delta_1^2 + \lambda_s(1+\delta_1)(\beta_s + \gamma_s - \beta_s\delta_1 - \gamma_s\delta_2)]\sigma_v^2 + [\delta_1^2 - \lambda_s\delta_1(\beta_s\delta_1 + \gamma_s\delta_2)]\sigma_{\varepsilon_2}^2 \\ +[\delta_1^2 + \lambda_s\delta_1(\gamma_s - \beta_s\delta_1 - \gamma_s\delta_2)]\sigma_\varepsilon^2 + (1 - 2\lambda_s\alpha_s)\sigma_T^2 + (p_0 - \bar{p}_T)^2 \end{pmatrix}.$$

The measure of price discovery/efficiency is:

$$var(v|p) = \sigma_v^2 - \frac{[\delta_1 + \lambda_s(\beta_s + \gamma_s - \beta_s\delta_1 - \gamma_s\delta_2)]^2\sigma_v^4}{\begin{pmatrix} [\delta_1^2 + \lambda_s(1+\delta_1)(\beta_s + \gamma_s - \beta_s\delta_1 - \gamma_s\delta_2)]\sigma_v^2 + [\delta_1^2 - \lambda_s\delta_1(\beta_s\delta_1 + \gamma_s\delta_2)]\sigma_{\varepsilon_2}^2 \\ +[\delta_1^2 + \lambda_s\delta_1(\gamma_s - \beta_s\delta_1 - \gamma_s\delta_2)]\sigma_\varepsilon^2 \end{pmatrix}}.$$

The expected profit of the insider and expected cost of the government are:

$$E(\pi) = \begin{pmatrix} [1 - \delta_1 - \lambda_s(\beta_s + \gamma_s - \beta_s\delta_1 - \gamma_s\delta_2)](\beta_s + \xi_s)\sigma_v^2 \\ -[\lambda_s(\gamma_s - \beta_s\delta_1 - \gamma_s\delta_2) + \delta_1]\xi_s\sigma_\varepsilon^2 - [\delta_1 - \lambda_s(\beta_s\delta_1 + \gamma_s\delta_2)]\xi_s\sigma_{\varepsilon_2}^2 \end{pmatrix},$$

$$E(c) = \left(\begin{array}{c} [\lambda_s(\beta_s + \gamma_s - \beta_s\delta_1 - \gamma_s\delta_2) + \delta_1 - 1](\gamma_s + \omega_s)\sigma_v^2 + \lambda_s\alpha_s^2\sigma_T^2 \\ +[\lambda_s(\gamma_s - \beta_s\delta_1 - \gamma_s\delta_2) + \delta_1](\gamma_s + \omega_s)\sigma_\varepsilon^2 + [\delta_1 - \lambda_s(\beta_s\delta_1 + \gamma_s\delta_2)]\omega_s\sigma_{\varepsilon_2}^2 \end{array} \right).$$

The correlation coefficient between the trading position of the insider and the government is:

$$corr(x,g) = \frac{(\beta_s + \xi_s)(\gamma_s + \omega_s)\sigma_v^2 + \xi_s(\gamma_s + \omega_s)\sigma_\varepsilon^2 + \xi_s\omega_s\sigma_{\varepsilon_2}^2}{\sqrt{(\beta_s + \xi_s)^2\sigma_v^2 + \xi_s^2(\sigma_\varepsilon^2 + \sigma_{\varepsilon_2}^2)}\sqrt{(\gamma_s + \omega_s)^2(\sigma_v^2 + \sigma_\varepsilon^2) + \omega_s^2\sigma_{\varepsilon_2}^2 + \alpha_s^2\sigma_T^2}}.$$

Partially releasing both signals

Suppose instead that the government releases its both signals partially. Specifically, the government releases two noisy signals, $\widetilde{p}_T = p_T + \varepsilon_1$ and $\widetilde{s} = s + \varepsilon_2$ with $\varepsilon_1 \sim N(0, \sigma_{\varepsilon_1}^2)$, $\varepsilon_2 \sim N(0, \sigma_{\varepsilon_2}^2)$, in the financial market, where $\{v, p_T, \varepsilon, \varepsilon_1, \varepsilon_2\}$ are mutually independent.

With the enlarged information set $\{v, \widetilde{p}_T, \widetilde{s}\}$, the insider's maximization problem is changed as

$$\max_{\{x\}} E[(v - p)x | v, \widetilde{p}_T, \widetilde{s}]. \tag{B27}$$

In this case, the market maker sees both signals released by the government, and uses her new information set $\{y, \widetilde{p}_T, \widetilde{s}\}$ to update her conditional expectations about the fundamentals. Then the pricing rule of market efficiency is transformed into:

$$p = E(v | y, \widetilde{p}_T, \widetilde{s}). \tag{B28}$$

Conjecture the decision rules and the pricing rule of the economy:

$$x = \beta_{s,T}(v - p_0) + \xi_{s,T}^{(1)}(\widetilde{s} - p_0) + \xi_{s,T}^{(2)}(\widetilde{p}_T - \bar{p}_T), \tag{B29}$$

$$g = \gamma_{s,T}(s - p_0) + \alpha_{s,T}(p_T - \bar{p}_T) + \omega_{s,T}^{(1)}(\widetilde{s} - p_0) + \omega_{s,T}^{(2)}(\widetilde{p}_T - \bar{p}_T) + \eta_{s,T}, \tag{B30}$$

$$p = p_0 + \delta_1(\widetilde{s} - p_0) + \lambda_{s,T}[y - E(y | \widetilde{p}_T, \widetilde{s})], \text{ with } y = x + g + u, \tag{B31}$$

where

$$
\begin{aligned}
E(y|\widetilde{p}_T,\widetilde{s}) &= \begin{pmatrix} \beta_{s,T}E(v-p_0|\widetilde{p}_T,\widetilde{s})+\gamma_{s,T}E(s-p_0|\widetilde{p}_T,\widetilde{s})+\alpha_{s,T}E(p_T-\bar{p}_T|\widetilde{p}_T,\widetilde{s}) \\ +(\xi^{(1)}_{s,T}+\omega^{(1)}_{s,T})(\widetilde{s}-p_0)+(\xi^{(2)}_{s,T}+\omega^{(2)}_{s,T})(\widetilde{p}_T-\bar{p}_T)+\eta_{s,T} \end{pmatrix} \\
&= \left(\beta_{s,T}\delta_1+\gamma_{s,T}\delta_2+\xi^{(1)}_{s,T}+\omega^{(1)}_{s,T}\right)(\widetilde{s}-p_0)+(\alpha_{s,T}\delta_4+\xi^{(2)}_{s,T}+\omega^{(2)}_{s,T})(\widetilde{p}_T-\bar{p}_T)+\eta_{s,T}, \\
\delta_1 &\equiv \frac{\sigma_v^2}{\sigma_v^2+\sigma_\varepsilon^2+\sigma_{\varepsilon_2}^2}, \delta_2 \equiv \frac{\sigma_v^2+\sigma_\varepsilon^2}{\sigma_v^2+\sigma_\varepsilon^2+\sigma_{\varepsilon_2}^2}, \delta_4 \equiv \frac{\sigma_T^2}{\sigma_T^2+\sigma_{\varepsilon_1}^2}.
\end{aligned}
$$

First, we solve the insider's problem. Given his information set $\{v,\widetilde{p}_T,\widetilde{s}\}$, the insider solves the problem (B27). Using equations (B30) and (B31), we compute:

$$
\begin{aligned}
& E[(v-p)x|v,\widetilde{p}_T,\widetilde{s}] \\
= \; & E\left[\begin{pmatrix} v-p_0-\delta_1(\widetilde{s}-p_0) \\ -\lambda_{s,T}\begin{pmatrix} x+\gamma_{s,T}(s-p_0)+\alpha_{s,T}(p_T-\bar{p}_T)+u \\ -(\beta_{s,T}\delta_1+\gamma_{s,T}\delta_2+\xi^{(1)}_{s,T})(\widetilde{s}-p_0)-(\xi^{(2)}_{s,T}+\alpha_{s,T}\delta_4)(\widetilde{p}_T-\bar{p}_T) \end{pmatrix} \end{pmatrix} x|v,\widetilde{p}_T,\widetilde{s}\right] \\
= \; & \begin{pmatrix} [1-\lambda_{s,T}\gamma_{s,T}(1-\delta_3)](v-p_0)-\lambda_{s,T}x+\lambda_{s,T}\xi^{(2)}_{s,T}(\widetilde{p}_T-\bar{p}_T) \\ -[\delta_1+\lambda_{s,T}\gamma_{s,T}\delta_3-\lambda_{s,T}(\beta_{s,T}\delta_1+\gamma_{s,T}\delta_2+\xi^{(1)}_{s,T})](\widetilde{s}-p_0) \end{pmatrix} x.
\end{aligned}
$$

The FOC for x yields

$$
x=\frac{1}{2\lambda_{s,T}}\begin{pmatrix} [1-\lambda_{s,T}\gamma_{s,T}(1-\delta_3)](v-p_0)+\lambda_{s,T}\xi^{(2)}_{s,T}(\widetilde{p}_T-\bar{p}_T) \\ -[\delta_1+\lambda_{s,T}\gamma_{s,T}\delta_3-\lambda_{s,T}(\beta_{s,T}\delta_1+\gamma_{s,T}\delta_2+\xi^{(1)}_{s,T})](\widetilde{s}-p_0) \end{pmatrix}. \tag{B32}
$$

The SOC is $\lambda_{s,T}>0$. Comparing equation (B32) with the conjectured strategy (B29) leads to:

$$
\begin{aligned}
\beta_{s,T} &= \frac{1-\lambda_{s,T}\gamma_{s,T}(1-\delta_3)}{2\lambda_{s,T}}, && \text{(B33)} \\
\xi^{(1)}_{s,T} &= -\frac{\delta_1}{2\lambda_{s,T}}+\gamma_{s,T}\left[\delta_2-\delta_3-\frac{\delta_1}{2}(1-\delta_3)\right], && \text{(B34)} \\
\xi^{(2)}_{s,T} &= 0. && \text{(B35)}
\end{aligned}
$$

Second, we solve the government's problem. Using equations (B29) and (B31), the objective function of the government is computed as:

$$
\begin{aligned}
&E[\phi(p-p_T)^2+(p-v)g|s,p_T,\widetilde{p}_T,\widetilde{s}] \\
=&\left(\begin{array}{c}
\phi\left(\begin{array}{c} p_0-p_T+[\delta_1-\lambda_{s,T}(\beta_{s,T}\delta_1+\gamma_{s,T}\delta_2+\omega^{(1)}_{s,T})](\widetilde{s}-p_0) \\ -\lambda_{s,T}(\alpha_{s,T}\delta_4+\omega^{(2)}_{s,T})(\widetilde{p}_T-\bar{p}_T)-\lambda_{s,T}\eta_{s,T}+\lambda_{s,T}g \end{array}\right)^2 \\
+\phi\lambda^2_{s,T}\beta^2_{s,T}E[(v-p_0)^2|s,p_T,\widetilde{p}_T,\widetilde{s}]+\phi\lambda^2_{s,T}\sigma^2_u \\
+2\phi\lambda_{s,T}\beta_{s,T}\left(\begin{array}{c} p_0-p_T+[\delta_1-\lambda_{s,T}(\beta_{s,T}\delta_1+\gamma_{s,T}\delta_2+\omega^{(1)}_{s,T})](\widetilde{s}-p_0) \\ -\lambda_{s,T}(\alpha_{s,T}\delta_4+\omega^{(2)}_{s,T})(\widetilde{p}_T-\bar{p}_T)-\lambda_{s,T}\eta_{s,T}+\lambda_{s,T}g \end{array}\right)E(v-p_0|s,p_T,\widetilde{p}_T,\widetilde{s}) \\
+\left(\begin{array}{c} (\lambda_{s,T}\beta_{s,T}-1)E(v-p_0|s,p_T,\widetilde{p}_T,\widetilde{s})-\lambda_{s,T}(\alpha_{s,T}\delta_4+\omega^{(2)}_{s,T})(\widetilde{p}_T-\bar{p}_T) \\ +[\delta_1-\lambda_{s,T}(\beta_{s,T}\delta_1+\gamma_{s,T}\delta_2+\omega^{(1)}_{s,T})](\widetilde{s}-p_0)+\lambda_{s,T}g-\lambda_{s,T}\eta_{s,T} \end{array}\right)g
\end{array}\right)
\end{aligned}
$$

where

$$
E(v-p_0|s,p_T,\widetilde{p}_T,\widetilde{s})=E(v-p_0|s,p_T,\varepsilon_1,\varepsilon_2)=E(v-p_0|s)=\delta(s-p_0),\ \delta\equiv\frac{\sigma^2_v}{\sigma^2_v+\sigma^2_\varepsilon}.
$$

The first-order-condition (FOC) for g gives

$$
g=\frac{1}{2\phi\lambda^2_{s,T}+2\lambda_{s,T}}\left(\begin{array}{c}
(1-\lambda_{s,T}\beta_{s,T}-2\phi\lambda^2_{s,T}\beta_{s,T})\delta(s-p_0)+2\phi\lambda_{s,T}(p_T-\bar{p}_T)+2\phi\lambda_{s,T}(\bar{p}_T-p_0) \\
-(1+2\phi\lambda_{s,T})[\delta_1-\lambda_{s,T}(\beta_{s,T}\delta_1+\gamma_{s,T}\delta_2+\omega^{(1)}_{s,T})](\widetilde{s}-p_0) \\
+(1+2\phi\lambda_{s,T})\lambda_{s,T}(\alpha_{s,T}\delta_4+\omega^{(2)}_{s,T})(\widetilde{p}_T-\bar{p}_T)+(2\phi\lambda^2_{s,T}+\lambda_{s,T})\eta_{s,T}
\end{array}\right),
$$

The SOC is $2\phi\lambda^2_{s,T}+2\lambda_{s,T}>0$, which holds accordingly if $\lambda_{s,T}>0$ holds. Comparing the above equation with the conjectured decision rule of the government (B30), we obtain

$$
\begin{aligned}
\gamma_{s,T} &= \frac{(1-\lambda_{s,T}\beta_{s,T}-2\phi\lambda^2_{s,T}\beta_{s,T})\delta}{2\phi\lambda^2_{s,T}+2\lambda_{s,T}}, && \text{(B36)}\\
\alpha_{s,T} &= \frac{\phi}{1+\phi\lambda_{s,T}}, && \text{(B37)}\\
\omega^{(1)}_{s,T} &= (1+2\phi\lambda_{s,T})\left(\beta_{s,T}\delta_1+\gamma_{s,T}\delta_2-\frac{\delta_1}{\lambda_{s,T}}\right), && \text{(B38)}\\
\omega^{(2)}_{s,T} &= (1+2\phi\lambda_{s,T})\alpha_{s,T}\delta_4, && \text{(B39)}\\
\eta_{s,T} &= 2\phi(\bar{p}_T-p_0). && \text{(B40)}
\end{aligned}
$$

Third, we consider the market maker's problem. By the projection theorem, equation (B28) gives rise to

$$\begin{aligned} p &= E(v|\widetilde{p}_T, \widetilde{s}) + \frac{cov(v, y|\widetilde{p}_T, \widetilde{s})}{var(y|\widetilde{p}_T, \widetilde{s})}[y - E(y|\widetilde{p}_T, \widetilde{s})] \\ &= p_0 + \delta_1(\widetilde{s} - p_0) + \frac{cov(v, y|\widetilde{p}_T, \widetilde{s})}{var(y|\widetilde{p}_T, \widetilde{s})}[y - E(y|\widetilde{p}_T, \widetilde{s})], \end{aligned}$$

where

$$\frac{cov(v, y|\widetilde{p}_T, \widetilde{s})}{var(y|\widetilde{p}_T, \widetilde{s})} = \frac{cov(v - E(v|\widetilde{p}_T, \widetilde{s}), y - E(y|\widetilde{p}_T, \widetilde{s}))}{var(y - E(y|\widetilde{p}_T, \widetilde{s}))}$$

$$= \frac{cov\left(v - p_0 - \delta_1(\widetilde{s} - p_0), \begin{pmatrix} \beta_{s,T}(v - p_0) + \gamma_{s,T}(s - p_0) + \alpha_{s,T}(p_T - \bar{p}_T) + u \\ -(\beta_{s,T}\delta_1 + \gamma_{s,T}\delta_2)(\widetilde{s} - p_0) - \alpha_{s,T}\delta_4(\widetilde{p}_T - \bar{p}_T) \end{pmatrix}\right)}{var\begin{pmatrix} \beta_{s,T}(v - p_0) + \gamma_{s,T}(s - p_0) + \alpha_{s,T}(p_T - \bar{p}_T) + u \\ -(\beta_{s,T}\delta_1 + \gamma_{s,T}\delta_2)(\widetilde{s} - p_0) - \alpha_{s,T}\delta_4(\widetilde{p}_T - \bar{p}_T) \end{pmatrix}}$$

$$= \frac{\begin{pmatrix} (1 - \delta_1)(\beta_{s,T} + \gamma_{s,T} - \beta_{s,T}\delta_1 - \gamma_{s,T}\delta_2)\sigma_v^2 \\ -\delta_1(\gamma_{s,T} - \beta_{s,T}\delta_1 - \gamma_{s,T}\delta_2)\sigma_\varepsilon^2 + \delta_1(\beta_{s,T}\delta_1 + \gamma_{s,T}\delta_2)\sigma_{\varepsilon_2}^2 \end{pmatrix}}{\begin{pmatrix} (\beta_{s,T} + \gamma_{s,T} - \beta_{s,T}\delta_1 - \gamma_{s,T}\delta_2)^2\sigma_v^2 + (\gamma_{s,T} - \beta_{s,T}\delta_1 - \gamma_{s,T}\delta_2)^2\sigma_\varepsilon^2 \\ +(\beta_{s,T}\delta_1 + \gamma_{s,T}\delta_2)^2\sigma_{\varepsilon_2}^2 + \alpha_{s,T}^2(1 - \delta_4)^2\sigma_T^2 + \alpha_{s,T}^2\delta_4^2\sigma_{\varepsilon_1}^2 + \sigma_u^2 \end{pmatrix}}.$$

Combining (B31) and the above equation gives rise to:

$$\lambda_{s,T} = \frac{\begin{pmatrix} (1 - \delta_1)(\beta_{s,T} + \gamma_{s,T} - \beta_{s,T}\delta_1 - \gamma_{s,T}\delta_2)\sigma_v^2 \\ -\delta_1(\gamma_{s,T} - \beta_{s,T}\delta_1 - \gamma_{s,T}\delta_2)\sigma_\varepsilon^2 + \delta_1(\beta_{s,T}\delta_1 + \gamma_{s,T}\delta_2)\sigma_{\varepsilon_2}^2 \end{pmatrix}}{\begin{pmatrix} (\beta_{s,T} + \gamma_{s,T} - \beta_{s,T}\delta_1 - \gamma_{s,T}\delta_2)^2\sigma_v^2 + (\gamma_{s,T} - \beta_{s,T}\delta_1 - \gamma_{s,T}\delta_2)^2\sigma_\varepsilon^2 \\ +(\beta_{s,T}\delta_1 + \gamma_{s,T}\delta_2)^2\sigma_{\varepsilon_2}^2 + \alpha_{s,T}^2(1 - \delta_4)^2\sigma_T^2 + \alpha_{s,T}^2\delta_4^2\sigma_{\varepsilon_1}^2 + \sigma_u^2 \end{pmatrix}}. \quad \text{(B41)}$$

We solve the equation system composed of (G07)-(G15) as a polynomial about $\lambda_{s,T}$

presented in Proposition S3, where the coefficients are as follows:

$$d_6 = 4[2-(1-\delta_3)\delta]^2\phi^4\sigma_u^2, d_5 = 4[2-(1-\delta_3)\delta][8-3(1-\delta_3)\delta]\phi^3\sigma_u^2,$$

$$d_4 = \begin{pmatrix} 4\left[((1-\delta_3)\delta-1)(1-\delta_1)^2+\delta^2(1-\delta_2)^2-\delta^2(1-\delta_3)(1-\delta_2)(1-\delta_1)\right]\phi^4\sigma_v^2 \\ +4\left[((1-\delta_3)\delta-1)\delta_1^2+\delta^2(1-\delta_2)^2+\delta^2(1-\delta_3)(1-\delta_2)\delta_1\right]\phi^4\sigma_\varepsilon^2 \\ +4\left[((1-\delta_3)\delta-1)\delta_1^2+\delta^2\delta_2^2-\delta^2(1-\delta_3)\delta_2\delta_1\right]\phi^4\sigma_{\varepsilon_2}^2+4[2-(1-\delta_3)\delta]^2(1-\delta_4)\phi^4\sigma_T^2 \\ +[(8-3(1-\delta_3)\delta)^2+4(2-(1-\delta_3)\delta)(4-(1-\delta_3)\delta)]\phi^2\sigma_u^2 \end{pmatrix},$$

$$d_3 = \begin{pmatrix} 2\begin{pmatrix} \left[7(1-\delta_3)\delta-(1-\delta_3)^2\delta^2-8\right](1-\delta_1)^2+ \\ 2\delta^2(1-\delta_2)^2-2\delta^2(1-\delta_3)(1-\delta_2)(1-\delta_1) \end{pmatrix}\phi^3\sigma_v^2 \\ +2\begin{pmatrix} \left[7(1-\delta_3)\delta-(1-\delta_3)^2\delta^2-8\right]\delta_1^2+ \\ 2\delta^2(1-\delta_2)^2+2\delta^2(1-\delta_3)(1-\delta_2)\delta_1 \end{pmatrix}\phi^3\sigma_\varepsilon^2 \\ +2\left(\left[7(1-\delta_3)\delta-(1-\delta_3)^2\delta^2-8\right]\delta_1^2+2\delta^2\delta_2^2-2\delta^2(1-\delta_3)\delta_2\delta_1\right)\phi^3\sigma_{\varepsilon_2}^2 \\ +4\left[8-6(1-\delta_3)\delta+(1-\delta_3)^2\delta^2\right](1-\delta_4)\phi^3\sigma_T^2+2[4-(1-\delta_3)\delta][8-3(1-\delta_3)\delta]\phi\sigma_u^2 \end{pmatrix},$$

$$d_2 = \begin{pmatrix} \begin{pmatrix} \left[18(1-\delta_3)\delta-4(1-\delta_3)^2\delta^2-24\right](1-\delta_1)^2 \\ -3\delta^2(1-\delta_2)^2+3\delta^2(1-\delta_3)(1-\delta_2)(1-\delta_1) \end{pmatrix}\phi^2\sigma_v^2+ \\ \left(\left[18(1-\delta_3)\delta-4(1-\delta_3)^2\delta^2-24\right]\delta_1^2-3\delta^2(1-\delta_2)^2-3\delta^2(1-\delta_3)(1-\delta_2)\delta_1\right)\phi^2\sigma_\varepsilon^2 \\ +\left(\left[18(1-\delta_3)\delta-4(1-\delta_3)^2\delta^2-24\right]\delta_1^2-3\delta^2\delta_2^2+3\delta^2(1-\delta_3)\delta_2\delta_1\right)\phi^2\sigma_{\varepsilon_2}^2 \\ +[4-(1-\delta_3)\delta]^2(1-\delta_4)\phi^2\sigma_T^2+[4-(1-\delta_3)\delta]^2\sigma_u^2 \end{pmatrix},$$

$$d_1 = \begin{pmatrix} 2\begin{pmatrix} \left[5(1-\delta_3)\delta-(1-\delta_3)^2\delta^2-8\right](1-\delta_1)^2 \\ -\delta^2(1-\delta_2)^2+\delta^2(1-\delta_3)(1-\delta_2)(1-\delta_1) \end{pmatrix}\phi\sigma_v^2 \\ +2\left(\left[5(1-\delta_3)\delta-(1-\delta_3)^2\delta^2-8\right]\delta_1^2-\delta^2(1-\delta_2)^2-\delta^2(1-\delta_3)(1-\delta_2)\delta_1\right)\phi\sigma_\varepsilon^2 \\ +2\left(\left[5(1-\delta_3)\delta-(1-\delta_3)^2\delta^2-8\right]\delta_1^2-\delta^2\delta_2^2+\delta^2(1-\delta_3)\delta_2\delta_1\right)\phi\sigma_{\varepsilon_2}^2 \end{pmatrix},$$

$$d_0 = \begin{pmatrix} \left[(2(1-\delta_3)\delta-4)(1-\delta_1)^2+\delta^2(1-\delta_2)^2-\delta^2(1-\delta_3)(1-\delta_2)(1-\delta_1)\right]\sigma_v^2 \\ +\left[(2(1-\delta_3)\delta-4)\delta_1^2+\delta^2(1-\delta_2)^2+\delta^2(1-\delta_3)(1-\delta_2)\delta_1\right]\sigma_\varepsilon^2 \\ +\left[(2(1-\delta_3)\delta-4)\delta_1^2+\delta^2\delta_2^2-\delta^2(1-\delta_3)\delta_2\delta_1\right]\sigma_{\varepsilon_2}^2 \end{pmatrix}.$$

By substitutions, we have those expressions for $(\beta_{s,T}, \xi_{s,T}^{(1)}, \xi_{s,T}^{(2)}, \gamma_{s,T}, \alpha_{s,T}, \omega_{s,T}^{(1)}, \omega_{s,T}^{(2)}, \eta_{s,T})$

listed in Proposition S3. The measure for price stability can be computed by

$$
\begin{aligned}
& E[(p-p_T)^2] \\
= \; & E\left[\left(\begin{array}{c} p_0+\delta_1(\widetilde{s}-p_0)+\lambda_{s,T}\beta_{s,T}(v-p_0)+\lambda_{s,T}\gamma_{s,T}(s-p_0)+\lambda_{s,T}\alpha_{s,T}(p_T-\bar{p}_T) \\ +\lambda_{s,T}u-\lambda_{s,T}(\beta_{s,T}\delta_1+\gamma_{s,T}\delta_2)(\widetilde{s}-p_0)-\lambda_{s,T}\alpha_{s,T}\delta_4(\widetilde{p}_T-\bar{p}_T)-p_T \end{array}\right)^2\right] \\
= \; & E\left[\left(\begin{array}{c} p_0-\bar{p}_T+[\delta_1+\lambda_{s,T}(\beta_{s,T}+\gamma_{s,T}-\beta_{s,T}\delta_1-\gamma_{s,T}\delta_2)](v-p_0) \\ +[\delta_1+\lambda_{s,T}(\gamma_{s,T}-\beta_{s,T}\delta_1-\gamma_{s,T}\delta_2)]\varepsilon+[\delta_1-\lambda_{s,T}(\beta_{s,T}\delta_1+\gamma_{s,T}\delta_2)]\varepsilon_2 \\ +[\lambda_{s,T}\alpha_{s,T}(1-\delta_4)-1](p_T-\bar{p}_T)-\lambda_{s,T}\alpha_{s,T}\delta_4\varepsilon_1+\lambda_{s,T}u \end{array}\right)^2\right] \\
= \; & \left(\begin{array}{c} \lambda_{s,T}^2\left(\begin{array}{c} (\beta_{s,T}+\gamma_{s,T}-\beta_{s,T}\delta_1-\gamma_{s,T}\delta_2)^2\sigma_v^2+(\gamma_{s,T}-\beta_{s,T}\delta_1-\gamma_{s,T}\delta_2)^2\sigma_\varepsilon^2 \\ +(\beta_{s,T}\delta_1+\gamma_{s,T}\delta_2)^2\sigma_{\varepsilon_2}^2+\alpha_{s,T}^2(1-\delta_4)^2\sigma_T^2+\alpha_{s,T}^2\delta_4^2\sigma_{\varepsilon_1}^2+\sigma_u^2 \end{array}\right) \\ +[\delta_1^2+2\lambda_{s,T}(\beta_{s,T}+\gamma_{s,T}-\beta_{s,T}\delta_1-\gamma_{s,T}\delta_2)\delta_1]\sigma_v^2+[\delta_1^2-2\lambda_{s,T}(\beta_{s,T}\delta_1+\gamma_{s,T}\delta_2)\delta_1]\sigma_{\varepsilon_2}^2 \\ +[\delta_1^2+2\lambda_{s,T}(\gamma_{s,T}-\beta_{s,T}\delta_1-\gamma_{s,T}\delta_2)\delta_1]\sigma_\varepsilon^2+[1-2\lambda_{s,T}\alpha_{s,T}(1-\delta_4)]\sigma_T^2+(p_0-\bar{p}_T)^2 \end{array}\right) \\
= \; & \left(\begin{array}{c} [\delta_1^2+\lambda_{s,T}(1+\delta_1)(\beta_{s,T}+\gamma_{s,T}-\beta_{s,T}\delta_1-\gamma_{s,T}\delta_2)]\sigma_v^2 \\ +[\delta_1^2-\lambda_{s,T}\delta_1(\beta_{s,T}\delta_1+\gamma_{s,T}\delta_2)]\sigma_{\varepsilon_2}^2+[\delta_1^2+\lambda_{s,T}\delta_1(\gamma_{s,T}-\beta_{s,T}\delta_1-\gamma_{s,T}\delta_2)]\sigma_\varepsilon^2 \\ +[1-2\lambda_{s,T}\alpha_{s,T}(1-\delta_4)]\sigma_T^2+(p_0-\bar{p}_T)^2 \end{array}\right).
\end{aligned}
$$

By the projection theorem, we have that

$$
\begin{aligned}
var(v|p) \; = \; & var(v)-\frac{[cov(v,p)]^2}{var(p)} \\
= \; & var(v)-\frac{\left[cov\left(v, p_0+\delta_1(\widetilde{s}-p_0)+\lambda_{s,T}\left(\begin{array}{c} \beta_{s,T}(v-p_0)+\gamma_{s,T}(s-p_0) \\ +\alpha_{s,T}(p_T-\bar{p}_T)+u-\alpha_{s,T}\delta_4(\widetilde{p}_T-\bar{p}_T) \\ -(\beta_{s,T}\delta_1+\gamma_{s,T}\delta_2)(\widetilde{s}-p_0) \end{array}\right)\right)\right]^2}{var\left(p_0+\delta_1(\widetilde{s}-p_0)+\lambda_{s,T}\left(\begin{array}{c} \beta_{s,T}(v-p_0)+\gamma_{s,T}(s-p_0) \\ +\alpha_{s,T}(p_T-\bar{p}_T)+u-\alpha_{s,T}\delta_4(\widetilde{p}_T-\bar{p}_T) \\ -(\beta_{s,T}\delta_1+\gamma_{s,T}\delta_2)(\widetilde{s}-p_0) \end{array}\right)\right)} \\
= \; & \sigma_v^2-\frac{[\delta_1+\lambda_{s,T}(\beta_{s,T}+\gamma_{s,T}-\beta_{s,T}\delta_1-\gamma_{s,T}\delta_2)]^2\sigma_v^4}{\left(\begin{array}{c} [\delta_1^2+\lambda_{s,T}(1+\delta_1)(\beta_{s,T}+\gamma_{s,T}-\beta_{s,T}\delta_1-\gamma_{s,T}\delta_2)]\sigma_v^2 \\ +[\delta_1^2-\lambda_{s,T}\delta_1(\beta_{s,T}\delta_1+\gamma_{s,T}\delta_2)]\sigma_{\varepsilon_2}^2+[\delta_1^2+\lambda_{s,T}\delta_1(\gamma_{s,T}-\beta_{s,T}\delta_1-\gamma_{s,T}\delta_2)]\sigma_\varepsilon^2 \end{array}\right.}.
\end{aligned}
$$

The expected profits of the insider and the expected costs of the government are computed as follows:

$$
\begin{aligned}
E(\pi) &= E[(v-p)x] \\
&= E\left[\begin{pmatrix} v - p_0 - \delta_1(\widetilde{s} - p_0) - \lambda_{s,T}u - \lambda_{s,T}\beta_{s,T}(v - p_0) \\ -\lambda_{s,T}\gamma_{s,T}(s - p_0) - \lambda_{s,T}\alpha_{s,T}(p_T - \bar{p}_T) \\ +\lambda_{s,T}(\beta_{s,T}\delta_1 + \gamma_{s,T}\delta_2)(\widetilde{s} - p_0) + \lambda_{s,T}\alpha_{s,T}\delta_4(\widetilde{p}_T - \bar{p}_T) \end{pmatrix}\begin{pmatrix} \beta_{s,T}(v - p_0) \\ +\xi^{(1)}_{s,T}(\widetilde{s} - p_0) \\ +\xi^{(2)}_{s,T}(\widetilde{p}_T - \bar{p}_T) \end{pmatrix}\right] \\
&= E\left[\begin{pmatrix} \left[1 - \delta_1 - \lambda_{s,T}(\beta_{s,T} + \gamma_{s,T} - \beta_{s,T}\delta_1 - \gamma_{s,T}\delta_2)\right](v - p_0) \\ -\left[\delta_1 + \lambda_{s,T}(\gamma_{s,T} - \beta_{s,T}\delta_1 - \gamma_{s,T}\delta_2)\right]\varepsilon \\ -\left[\delta_1 - \lambda_{s,T}(\beta_{s,T}\delta_1 + \gamma_{s,T}\delta_2)\right]\varepsilon_2 - \lambda_{s,T}u \\ -\lambda_{s,T}\alpha_{s,T}(1-\delta_4)(p_T - \bar{p}_T) + \lambda_{s,T}\alpha_{s,T}\delta_4\varepsilon_1 \end{pmatrix}\begin{pmatrix} (\beta_{s,T} + \xi^{(1)}_{s,T})(v - p_0) \\ +\xi^{(2)}_{s,T}(p_T - \bar{p}_T) \\ +\xi^{(1)}_{s,T}(\varepsilon + \varepsilon_2) + \xi^{(2)}_{s,T}\varepsilon_1 \end{pmatrix}\right] \\
&= \begin{pmatrix} [1 - \delta_1 - \lambda_{s,T}(\beta_{s,T} + \gamma_{s,T} - \beta_{s,T}\delta_1 - \gamma_{s,T}\delta_2)](\beta_{s.T} + \xi^{(1)}_{s,T})\sigma^2_v \\ -[\delta_1 + \lambda_{s,T}(\gamma_{s,T} - \beta_{s,T}\delta_1 - \gamma_{s,T}\delta_2)]\xi^{(1)}_{s,T}\sigma^2_\varepsilon - [\delta_1 - \lambda_{s,T}(\beta_{s,T}\delta_1 + \gamma_{s,T}\delta_2)]\xi^{(1)}_{s,T}\sigma^2_{\varepsilon_2} \end{pmatrix}.
\end{aligned}
$$

$$
\begin{aligned}
& E(c) = E[(p-v)g] \\
&= E\left[\left(p_0 + \delta_1(\widetilde{s} - p_0) + \lambda_{s,T}\begin{pmatrix} \beta_{s,T}(v - p_0) + \gamma_{s,T}(s - p_0) \\ +\alpha_{s,T}(p_T - \bar{p}_T) + u \\ -(\beta_{s,T}\delta_1 + \gamma_{s,T}\delta_2)(\widetilde{s} - p_0) \\ -\alpha_{s,T}\delta_4(\widetilde{p}_T - \bar{p}_T) \end{pmatrix} - v\right)\begin{pmatrix} \gamma_{s,T}(s - p_0) \\ +\alpha_{s,T}(p_T - \bar{p}_T) \\ +\omega^{(1)}_{s,T}(\widetilde{s} - p_0) \\ +\omega^{(2)}_{s,T}(\widetilde{p}_T - \bar{p}_T) + \eta_{s,T} \end{pmatrix}\right] \\
&= E\left[\begin{pmatrix} [\lambda_{s,T}(\beta_{s,T} + \gamma_{s,T} - \beta_{s,T}\delta_1 - \gamma_{s,T}\delta_2) + \delta_1 - 1](v - p_0) \\ +[\lambda_{s,T}(\gamma_{s,T} - \beta_{s,T}\delta_1 - \gamma_{s,T}\delta_2) + \delta_1]\varepsilon \\ +[\delta_1 - \lambda_{s,T}(\beta_{s,T}\delta_1 + \gamma_{s,T}\delta_2)]\varepsilon_2 + \lambda_{s,T}u \\ +\lambda_{s,T}\alpha_{s,T}(1-\delta_4)(p_T - \bar{p}_T) - \lambda_{s,T}\alpha_{s,T}\delta_4\varepsilon_1 \end{pmatrix}\begin{pmatrix} (\gamma_{s,T} + \omega^{(1)}_{s,T})(v - p_0) \\ +(\gamma_{s,T} + \omega^{(1)}_{s,T})\varepsilon + \omega^{(1)}_{s,T}\varepsilon_2 \\ +(\alpha_{s,T} + \omega^{(2)}_{s,T})(p_T - \bar{p}_T) \\ +\omega^{(2)}_{s,T}\varepsilon_1 + \eta_{s,T} \end{pmatrix}\right] \\
&= \begin{pmatrix} [\lambda_{s,T}(\beta_{s,T} + \gamma_{s,T} - \beta_{s,T}\delta_1 - \gamma_{s,T}\delta_2) + \delta_1 - 1](\gamma_{s,T} + \omega^{(1)}_{s,T})\sigma^2_v + \lambda_{s,T}\alpha^2_{s,T}(1-\delta_4)\sigma^2_T + \\ [\lambda_{s,T}(\gamma_{s,T} - \beta_{s,T}\delta_1 - \gamma_{s,T}\delta_2) + \delta_1](\gamma_{s,T} + \omega^{(1)}_{s,T})\sigma^2_\varepsilon + [\delta_1 - \lambda_{s,T}(\beta_{s,T}\delta_1 + \gamma_{s,T}\delta_2)]\omega^{(1)}_{s,T}\sigma^2_{\varepsilon_2} \end{pmatrix}.
\end{aligned}
$$

The correlation coefficient between the trading position of the insider and the government is

$$
\begin{aligned}
corr(x,g) &= \frac{cov(x,g)}{\sqrt{var(x)}\sqrt{var(g)}} \\
&= \frac{cov\left(\left(\begin{array}{c}\beta_{s,T}(v-p_0)+\xi_{s,T}^{(1)}(\widetilde{s}-p_0)\\ +\xi_{s,T}^{(2)}(\widetilde{p}_T-\bar{p}_T)\end{array}\right),\left(\begin{array}{c}\gamma_{s,T}(s-p_0)\quad+\alpha_{s,T}(p_T-\bar{p}_T)\\ +\omega_{s,T}^{(1)}(\widetilde{s}-p_0)+\omega_{s,T}^{(2)}(\widetilde{p}_T-\bar{p}_T)+\eta_{s,T}\end{array}\right)\right)}{\sqrt{var\left(\begin{array}{c}\beta_{s,T}(v-p_0)+\xi_{s,T}^{(1)}(\widetilde{s}-p_0)\\ +\xi_{s,T}^{(2)}(\widetilde{p}_T-\bar{p}_T)\end{array}\right)}\sqrt{var\left(\begin{array}{c}\gamma_{s,T}(s-p_0)\quad+\alpha_{s,T}(p_T-\bar{p}_T)\\ +\omega_{s,T}^{(1)}(\widetilde{s}-p_0)+\omega_{s,T}^{(2)}(\widetilde{p}_T-\bar{p}_T)+\eta_{s,T}\end{array}\right)}} \\
&= \frac{(\beta_{s,T}+\xi_{s,T}^{(1)})(\gamma_{s,T}+\omega_{s,T}^{(1)})\sigma_v^2+\xi_{s,T}^{(1)}(\gamma_{s,T}+\omega_{s,T}^{(1)})\sigma_\varepsilon^2+\xi_{s,T}^{(1)}\omega_{s,T}^{(1)}\sigma_{\varepsilon_2}^2}{\sqrt{(\beta_{s,T}+\xi_{s,T}^{(1)})^2\sigma_v^2+(\xi_{s,T}^{(1)})^2(\sigma_\varepsilon^2+\sigma_{\varepsilon_2}^2)}\sqrt{\left(\begin{array}{c}(\gamma_{s,T}+\omega_{s,T}^{(1)})^2(\sigma_v^2+\sigma_\varepsilon^2)+(\omega_{s,T}^{(1)})^2\sigma_{\varepsilon_2}^2\\ +(\alpha_{s,T}+\omega_{s,T}^{(2)})^2\sigma_T^2+(\omega_{s,T}^{(2)})^2\sigma_{\varepsilon_1}^2\end{array}\right)}}.
\end{aligned}
$$

Then we summarize the equilibrium results in Proposition S3.

Proposition S3. *If the government partially releases two private signals $\{\widetilde{p}_T,\widetilde{s}\}$, a linear equilibrium is defined by nine unknowns $(\beta_{s,T},\xi_{s,T}^{(1)},\xi_{s,T}^{(2)},\gamma_{s,T},\alpha_{s,T},\omega_{s,T}^{(1)},\omega_{s,T}^{(2)},\eta_{s,T},\lambda_{s,T})\in R^9$, which are characterized by nine equations (B33)-(B41), together with one SOC, $\lambda_{s,T}>0$. The system of equations can be solved as a six-order polynomial for $\lambda_{s,T}$:*

$$d_6\lambda_{s,T}^6+d_5\lambda_{s,T}^5+d_4\lambda_{s,T}^4+d_3\lambda_{s,T}^3+d_2\lambda_{s,T}^2+d_1\lambda_{s,T}+d_0=0,$$

where the coefficients $d_i's$ are listed above. All the other variables can be solved as *expressions of* $\lambda_{s,T}$ as follows:

$$
\begin{aligned}
\beta_{s,T} &= \frac{2\phi\lambda_{s,T} + 2 - (1-\delta_3)\delta}{4\phi\lambda_{s,T}^2 + 4\lambda_{s,T} - (\lambda_{s,T} + 2\phi\lambda_{s,T}^2)(1-\delta_3)\delta}, \\
\xi_{s,T}^{(1)} &= -\frac{\delta_1}{2\lambda_{s,T}} + \frac{(1-2\phi\lambda_{s,T})\delta}{4\phi\lambda_{s,T}^2 + 4\lambda_{s,T} - (\lambda_{s,T} + 2\phi\lambda_{s,T}^2)(1-\delta_3)\delta}\left[\delta_2 - \delta_3 - \frac{\delta_1}{2}(1-\delta_3)\right], \\
\xi_{s,T}^{(2)} &= 0, \\
\gamma_{s,T} &= \frac{(1-2\phi\lambda_{s,T})\delta}{4\phi\lambda_{s,T}^2 + 4\lambda_{s,T} - (\lambda_{s,T} + 2\phi\lambda_{s,T}^2)(1-\delta_3)\delta}, \\
\alpha_{s,T} &= \frac{\phi}{1+\phi\lambda_{s,T}}, \\
\omega_{s,T}^{(1)} &= (1+2\phi\lambda_{s,T})\left(\frac{[2\phi\lambda_{s,T} + 2 - (1-\delta_3)\delta]\delta_1 + (1-2\phi\lambda_{s,T})\delta\delta_2}{4\phi\lambda_{s,T}^2 + 4\lambda_{s,T} - (\lambda_{s,T} + 2\phi\lambda_{s,T}^2)(1-\delta_3)\delta} - \frac{\delta_1}{\lambda_{s,T}}\right), \\
\omega_{s,T}^{(2)} &= \frac{\phi(1+2\phi\lambda_{s,T})\delta_4}{1+\phi\lambda_{s,T}}, \\
\eta_{s,T} &= 2\phi(\bar{p}_T - p_0),
\end{aligned}
$$

where $\delta \equiv \frac{\sigma_v^2}{\sigma_v^2+\sigma_\varepsilon^2}$ and $\delta_3 \equiv \frac{\sigma_\varepsilon^2}{\sigma_\varepsilon^2+\sigma_{\varepsilon_2}^2}$. *The measure of price stability is then:*

$$
E[(p-p_T)^2] = \left(\begin{array}{c}
[\delta_1^2 + \lambda_{s,T}(1+\delta_1)(\beta_{s,T} + \gamma_{s,T} - \beta_{s,T}\delta_1 - \gamma_{s,T}\delta_2)]\sigma_v^2 \\
+[\delta_1^2 - \lambda_{s,T}\delta_1(\beta_{s,T}\delta_1 + \gamma_{s,T}\delta_2)]\sigma_{\varepsilon_2}^2 + [\delta_1^2 + \lambda_{s,T}\delta_1(\gamma_{s,T} - \beta_{s,T}\delta_1 - \gamma_{s,T}\delta_2)]\sigma_\varepsilon^2 \\
+[1 - 2\lambda_{s,T}\alpha_{s,T}(1-\delta_4)]\sigma_T^2 + (p_0 - \bar{p}_T)^2
\end{array}\right).
$$

The measure of price discovery/efficiency is:

$$
var(v|p) = \sigma_v^2 - \frac{[\delta_1 + \lambda_{s,T}(\beta_{s,T} + \gamma_{s,T} - \beta_{s,T}\delta_1 - \gamma_{s,T}\delta_2)]^2\sigma_v^4}{\left(\begin{array}{c}
[\delta_1^2 + \lambda_{s,T}(1+\delta_1)(\beta_{s,T} + \gamma_{s,T} - \beta_{s,T}\delta_1 - \gamma_{s,T}\delta_2)]\sigma_v^2 \\
+[\delta_1^2 - \lambda_{s,T}\delta_1(\beta_{s,T}\delta_1 + \gamma_{s,T}\delta_2)]\sigma_{\varepsilon_2}^2 + [\delta_1^2 + \lambda_{s,T}\delta_1(\gamma_{s,T} - \beta_{s,T}\delta_1 - \gamma_{s,T}\delta_2)]\sigma_\varepsilon^2
\end{array}\right)}.
$$

The expected profit of the insider and expected cost of the government are:

$$
E(\pi) = \left(\begin{array}{c}
[1 - \delta_1 - \lambda_{s,T}(\beta_{s,T} + \gamma_{s,T} - \beta_{s,T}\delta_1 - \gamma_{s,T}\delta_2)](\beta_{s.T} + \xi_{s,T}^{(1)})\sigma_v^2 \\
-[\lambda_{s,T}(\gamma_{s,T} - \beta_{s,T}\delta_1 - \gamma_{s,T}\delta_2) + \delta_1]\xi_{s,T}^{(1)}\sigma_\varepsilon^2 - [\delta_1 - \lambda_{s,T}(\beta_{s,T}\delta_1 + \gamma_{s,T}\delta_2)]\xi_{s,T}^{(1)}\sigma_{\varepsilon_2}^2
\end{array}\right),
$$

$$E(c) = \begin{pmatrix} [\lambda_{s,T}(\beta_{s,T} + \gamma_{s,T} - \beta_{s,T}\delta_1 - \gamma_{s,T}\delta_2) + \delta_1 - 1](\gamma_{s,T} + \omega_{s,T}^{(1)})\sigma_v^2 + \lambda_{s,T}\alpha_{s,T}^2(1-\delta_4)\sigma_T^2 + \\ [\lambda_{s,T}(\gamma_{s,T} - \beta_{s,T}\delta_1 - \gamma_{s,T}\delta_2) + \delta_1](\gamma_{s,T} + \omega_{s,T}^{(1)})\sigma_\varepsilon^2 + [\delta_1 - \lambda_{s,T}(\beta_{s,T}\delta_1 + \gamma_{s,T}\delta_2)]\omega_{s,T}^{(1)}\sigma_{\varepsilon_2}^2 \end{pmatrix}$$

The correlation coefficient between the trading position of the insider and the government is:

$$corr(x,g) = \frac{(\beta_{s,T} + \xi_{s,T}^{(1)})(\gamma_{s,T} + \omega_{s,T}^{(1)})\sigma_v^2 + \xi_{s,T}^{(1)}(\gamma_{s,T} + \omega_{s,T}^{(1)})\sigma_\varepsilon^2 + \xi_{s,T}^{(1)}\omega_{s,T}^{(1)}\sigma_{\varepsilon_2}^2}{\sqrt{(\beta_{s,T} + \xi_{s,T}^{(1)})^2\sigma_v^2 + (\xi_{s,T}^{(1)})^2(\sigma_\varepsilon^2 + \sigma_{\varepsilon_2}^2)}\sqrt{\begin{pmatrix} (\gamma_{s,T} + \omega_{s,T}^{(1)})^2(\sigma_v^2 + \sigma_\varepsilon^2) + (\omega_{s,T}^{(1)})^2\sigma_{\varepsilon_2}^2 \\ +(\alpha_{s,T} + \omega_{s,T}^{(2)})^2\sigma_T^2 + (\omega_{s,T}^{(2)})^2\sigma_{\varepsilon_1}^2 \end{pmatrix}}}.$$

S2. Government intervention with correlated signals

In this section of online appendix, we solve the model economies with correlated signals. We extend the baseline model to the case with correlated government signals. Then we solve the three scenerios with full information disclosure.

The baseline model with correlated signals

We extend the baseline model of government intervention to the case with correlated signals. For this purpose, we assume that the liquidation value v and price target p_T follow a bivariate normal distribution, namely, $(v, p_T) \sim N(p_0, \overline{p}_T, \sigma_v^2, \sigma_T^2, \rho)$. Thus the government's two private signals follow a bivariate normal distribution, namely, $(s, p_T) \sim N(p_0, \overline{p}_T, \sigma_v^2 + \sigma_\varepsilon^2, \sigma_T^2, \rho)$.

In this case, we conjecture the decision rules for the insider and the government and the pricing rule for the market maker as follows:

$$x = \beta(v - p_0), \tag{B42}$$

$$g = \gamma(s - p_0) + \alpha(p_T - \bar{p}_T) + \eta, \tag{B43}$$

$$p = p_0 + \lambda(y - \eta), \text{with } y = x + g + u. \tag{B44}$$

First, we solve the insider's problem. Using equations (B43), (B44) and the projection theorem, we can compute

$$E\left[(v-p)x|v\right]=[\left(1-\lambda\gamma-\lambda\alpha\rho\frac{\sigma_T}{\sigma_v}\right)(v-p_0)-\lambda x]x.$$

Taking the FOC results in the following solution

$$x=\frac{1-\lambda\gamma-\lambda\alpha\rho\frac{\sigma_T}{\sigma_v}}{2\lambda}(v-p_0). \tag{B45}$$

The SOC is $\lambda>0$. Comparing the FOC (B45) with the conjectured strategy (B42), we have

$$\beta=\frac{1-\lambda\gamma-\lambda\alpha\rho\frac{\sigma_T}{\sigma_v}}{2\lambda}. \tag{B46}$$

Second, we solve the government's problem. Using equations (B42) and (B44), we can compute:

$$E\left[\phi(p-p_T)^2+(p-v)g|s,p_T\right]=\left\{\begin{array}{c}2\phi\lambda\beta(p_0-p_T-\lambda\eta+\lambda g)E(v-p_0|s,p_T)+\\ \phi(p_0-p_T-\lambda\eta+\lambda g)^2+(\lambda\beta-1)gE(v-p_0|s,p_T)\\ +\phi\lambda^2\sigma_u^2+\phi\lambda^2\beta^2E[(v-p_0)^2|s,p_T]+\lambda g^2-\lambda\eta g\end{array}\right\},$$

where

$$\begin{aligned}E(v-p_0|s,p_T) &= E(v-p_0|p_T)+\frac{cov(v-p_0,s|p_T)}{var(s|p_T)}[s-E(s|p_T)]\\ &= (1-\delta)\frac{\rho\sigma_v}{\sigma_T}(p_T-\bar{p}_T)+\delta(s-p_0),\end{aligned}$$

$$\begin{aligned}E[(v-p_0)^2|s,p_T] &= [E(v-p_0|s,p_T)]^2+var(v-p_0|s,p_T)\\ &= \left\{\begin{array}{c}\left[(1-\delta)\frac{\rho\sigma_v}{\sigma_T}(p_T-\bar{p}_T)+\delta(s-p_0)\right]^2\\ +(1-\delta)(1-\rho^2)\sigma_v^2\end{array}\right\},\end{aligned}$$

$$\delta\equiv\frac{cov(v,s|p_T)}{var(s|p_T)}=\frac{(1-\rho^2)\sigma_v^2}{(1-\rho^2)\sigma_v^2+\sigma_\varepsilon^2}.$$

The FOC for g yields:

$$g = \frac{1}{2\phi\lambda^2 + 2\lambda} \left\{ \begin{array}{c} (1 - \lambda\beta - 2\phi\lambda^2\beta)\delta(s - p_0) + (2\phi\lambda^2 + \lambda)\eta + 2\phi\lambda(\bar{p}_T - p_0) \\ +[(1 - \lambda\beta - 2\phi\lambda^2\beta)(1 - \delta)\frac{\rho\sigma_v}{\sigma_T} + 2\phi\lambda](p_T - \bar{p}_T) \end{array} \right\}.$$

Comparing the FOC with the conjectured trading strategy (B43), we have:

$$\gamma = \frac{1 - \lambda\beta - 2\phi\lambda^2\beta}{2\phi\lambda^2 + 2\lambda}\delta, \tag{B47}$$

$$\alpha = \frac{1 - \lambda\beta - 2\phi\lambda^2\beta}{2\phi\lambda^2 + 2\lambda}(1 - \delta)\frac{\rho\sigma_v}{\sigma_T} + \frac{\phi}{1 + \phi\lambda}, \tag{B48}$$

$$\eta = 2\phi\left(\bar{p}_T - p_0\right). \tag{B49}$$

The SOC for the government $2\phi\lambda^2 + 2\lambda > 0$ holds accordingly if the SOC for the insider (i.e., $\lambda > 0$) holds.

Third, we examine the market maker's problem. The market maker observes the aggregate order flow y and sets $p = E[v|y]$. Using equations (B42)-(B44) and the projection theorem, we have

$$\lambda = \frac{(\beta + \gamma)\sigma_v^2 + \alpha\rho\sigma_v\sigma_T}{(\beta + \gamma)^2\sigma_v^2 + \gamma^2\sigma_\varepsilon^2 + \alpha^2\sigma_T^2 + \sigma_u^2 + 2(\beta + \gamma)\alpha\rho\sigma_v\sigma_T}. \tag{B50}$$

Fourth, we use the similar procedure in the proof of Theorem 1 to solve the system composed of equations (B46)-(B50) as a polynomial about λ presented in Proposition S4, with the following coefficients:

$$
\begin{aligned}
a_6 &= [4-2\delta-2(1-\delta)\rho^2]^2\phi^4\sigma_u^2, \\
a_5 &= 2(4-2\delta-2(1-\delta)\rho^2)(8-3\delta-3(1-\delta)\rho^2)\phi^3\sigma_u^2, \\
a_4 &= \left(\begin{array}{c}
\phi^4\sigma_v^2[(8-4\delta)(1-\delta)\rho^2+4\delta-4-4(1-\delta)^2\rho^4]+\phi^4\sigma_T^2[4(\delta-3)(1-\delta)\rho^2+(4-2\delta)^2] \\
+\phi^4\rho\sigma_v\sigma_T[20\delta-8\delta^2-16+(12-20\delta+8\delta^2)\rho^2]+\phi^4\delta^2\sigma_\varepsilon^2(4-8\rho\sigma_T/\sigma_v+4\rho^2\sigma_T^2/\sigma_v^2) \\
+[(8-3\delta-3(1-\delta)\rho^2)^2+2(4-2\delta-2(1-\delta)\rho^2)(4-\delta-(1-\delta)\rho^2)]\phi^2\sigma_u^2
\end{array}\right), \\
a_3 &= \left(\begin{array}{c}
\phi^3\sigma_v^2\left[-16+14\delta-2\delta^2+\left(8\delta^2-26\delta+18\right)\rho^2+\left(-6+12\delta-6\delta^2\right)\rho^4\right]+ \\
\phi^3\sigma_T^2\left[4(2-\delta)(4-\delta)+(-24+24\delta-4\delta^2)\rho^2\right]+\phi^3\delta^2\sigma_\varepsilon^2\left(4-8\rho\sigma_T/\sigma_v+4\rho^2\sigma_T^2/\sigma_v^2\right) \\
+\phi^3\rho\sigma_v\sigma_T\left[26\delta-24-8\delta^2+(18-26\delta+8\delta^2)\rho^2\right] \\
+2\phi\sigma_u^2(4-\delta-(1-\delta)\rho^2)(8-3\delta-3(1-\delta)\rho^2)
\end{array}\right), \\
a_2 &= \left(\begin{array}{c}
\phi^2\sigma_v^2[-24+18\delta-4\delta^2+(15-20\delta+5\delta^2)\rho^2-(1-2\delta+\delta^2)\rho^4]+ \\
\phi^2\sigma_T^2[(4-\delta)^2+(-12+8\delta-\delta^2)\rho^2]+\phi^2\rho\sigma_v\sigma_T[(2\delta-2\delta^2)\rho^2+2\delta^2-2\delta] \\
+\phi^2\delta^2\sigma_\varepsilon^2(-3+2\rho\sigma_T/\sigma_v+\rho^2\sigma_T^2/\sigma_v^2)+[4-\delta-(1-\delta)\rho^2]^2\sigma_u^2
\end{array}\right), \\
a_1 &= \left(\begin{array}{c}
\phi\sigma_v^2[-16+10\delta-2\delta^2+(8-10\delta+2\delta^2)\rho^2]+ \\
\phi\delta^2\sigma_\varepsilon^2(-2+2\rho\sigma_T/\sigma_v)+\phi\rho\sigma_v\sigma_T\left[2\delta^2-8\delta+8+(-6+8\delta-2\delta^2)\rho^2\right]
\end{array}\right), \\
a_0 &= [2\delta-4+(3-4\delta+\delta^2)\rho^2-(1-2\delta+\delta^2)\rho^4]\sigma_v^2+\delta^2\sigma_\varepsilon^2.
\end{aligned}
$$

Finally, we compute those theoretical moments listed in the following

Proposition S4. *A linear pure strategy equilibrium is defined by five unknowns β, γ, α, η and λ, which are characterized by five equations (B46)-(B50), together with one SOC, $\lambda > 0$. The equation system can be changed as a polynomial of λ. Specifically, λ solves the following polynomial:*

$$a_6\lambda^6+a_5\lambda^5+a_4\lambda^4+a_3\lambda^3+a_2\lambda^2+a_1\lambda+a_0=0,$$

where the coefficients $a_i's$ are listed above. All the other variables can be solved as *expressions for λ as follows:*

$$\begin{aligned}
\beta &= \frac{2\phi\lambda + 2 - [\delta + (1-\delta)\rho^2] - 2\phi\lambda\frac{\rho\sigma_T}{\sigma_v}}{4\phi\lambda^2 + 4\lambda - [\delta + (1-\delta)\rho^2](\lambda + 2\phi\lambda^2)}, \\
\gamma &= \frac{1 - 2\phi\lambda + (\lambda + 2\phi\lambda^2)\frac{\rho\sigma_T}{\sigma_v}\frac{\phi}{1+\phi\lambda}}{4\phi\lambda^2 + 4\lambda - [\delta + (1-\delta)\rho^2](\lambda + 2\phi\lambda^2)}\delta, \\
\alpha &= \frac{1 - 2\phi\lambda + (\lambda + 2\phi\lambda^2)\frac{\rho\sigma_T}{\sigma_v}\frac{\phi}{1+\phi\lambda}}{4\phi\lambda^2 + 4\lambda - [\delta + (1-\delta)\rho^2](\lambda + 2\phi\lambda^2)}(1-\delta)\frac{\rho\sigma_v}{\sigma_T} + \frac{\phi}{1+\phi\lambda}, \\
\eta &= 2\phi(\bar{p}_T - p_0),
\end{aligned}$$

where $\delta \equiv \frac{cov(v,s|p_T)}{var(s|p_T)} = \frac{(1-\rho^2)\sigma_v^2}{(1-\rho^2)\sigma_v^2+\sigma_\varepsilon^2}$. *Then, the measure of price stability is:*

$$E[(p-p_T)^2] = \lambda(\beta+\gamma)\sigma_v^2 + (1-2\lambda\alpha)\sigma_T^2 + \lambda[\alpha - 2(\beta+\gamma)]\rho\sigma_v\sigma_T + (p_0 - \bar{p}_T)^2.$$

The measure of price discovery/efficiency is:

$$var(v|p) = var(v|y) = [1 - \lambda(\beta+\gamma)]\sigma_v^2 - \lambda\alpha\rho\sigma_v\sigma_T.$$

The expected profit of the insider and expected cost of the government are:

$$\begin{aligned}
E(\pi) &= [1 - \lambda(\beta+\gamma)]\beta\sigma_v^2 - \lambda\alpha\beta\rho\sigma_v\sigma_T, \\
E(c) &= [\lambda(\beta+\gamma) - 1]\gamma\sigma_v^2 + \lambda\gamma^2\sigma_\varepsilon^2 + \lambda\alpha^2\sigma_T^2 + (\lambda\beta + 2\lambda\gamma - 1)\alpha\rho\sigma_v\sigma_T.
\end{aligned}$$

The correlation coefficient of the trading positions between the insider and the government is:

$$corr(x,g) = \frac{\beta\gamma\sigma_v^2 + \beta\alpha\rho\sigma_v\sigma_T}{\sqrt{\beta^2\sigma_v^2\left[\gamma^2\left(\sigma_v^2 + \sigma_\varepsilon^2\right) + \alpha^2\sigma_T^2 + 2\gamma\alpha\rho\sigma_v\sigma_T\right]}}.$$

Releasing the price target

In this case, we assume that the government releases the price target signal before trading. With the enlarged information set $\{v, p_T\}$, the insider's maximization problem is changed as follows:

$$\max_{\{x\}} E[(v-p)x|v,p_T]. \tag{B51}$$

Moreover, the market maker also sees the signal released by the government, $\{p_T\}$, and uses her new information set $\{y, p_T\}$ to update the conditional expectations about the fundamentals. Thus, the pricing rule of market efficiency is transformed into:

$$p = E(v|y, p_T). \tag{B52}$$

We conjecture the decision rules for the insider and the government and the pricing rule for the market maker as follows:

$$\begin{aligned} x &= \beta_T(v-p_0) + \xi_T(p_T - \bar{p}_T), & \text{(B53)} \\ g &= \gamma_T(s-p_0) + \alpha_T(p_T - \bar{p}_T) + \eta_T, & \text{(B54)} \\ p &= p_0 + \frac{\rho\sigma_v}{\sigma_T}(p_T - \bar{p}_T) + \lambda_T[y - E(y|p_T)], \text{ with } y = x + g + u, & \text{(B55)} \end{aligned}$$

where

$$E(y|p_T) = [(\beta_T + \gamma_T)\frac{\rho\sigma_v}{\sigma_T} + \xi_T + \alpha_T](p_T - \bar{p}_T) + \eta_T.$$

First, we solve the insider's problem. Using equation (B54) and (B55), we compute:

$$\begin{aligned} & E[(v-p)x|v,p_T] \\ = \; & E\left(\left\{ \begin{array}{c} v - p_0 - \frac{\rho\sigma_v}{\sigma_T}(p_T - \bar{p}_T) - \lambda_T[x + \gamma_T(s-p_0) + \alpha_T(p_T - \bar{p}_T) \\ +\eta_T + u - \left[(\beta_T + \gamma_T)\frac{\rho\sigma_v}{\sigma_T} + \xi_T + \alpha_T\right](p_T - \bar{p}_T) - \eta_T \end{array} \right\} x|v,p_T \right) \\ = \; & \left\{(1-\lambda_T\gamma_T)(v-p_0) - \lambda_T x + \left[\lambda_T\xi_T + (\lambda_T(\beta_T+\gamma_T) - 1)\frac{\rho\sigma_v}{\sigma_T}\right](p_T - \bar{p}_T)\right\} x. \end{aligned}$$

The FOC for x yields:

$$x = \frac{1-\lambda_T\gamma_T}{2\lambda_T}(v-p_0) + \frac{1}{2\lambda_T}[\lambda_T\xi_T + (\lambda_T(\beta_T+\gamma_T)-1)\frac{\rho\sigma_v}{\sigma_T}](p_T - \bar{p}_T). \tag{B56}$$

The SOC is $\lambda_T > 0$. Comparing the FOC (B56) with the conjectured strategy (B53) leads to:

$$\beta_T = \frac{1-\lambda_T\gamma_T}{2\lambda_T}, \tag{B57}$$

$$\xi_T = \frac{\lambda_T\xi_T + [\lambda_T(\beta_T+\gamma_T)-1]\frac{\rho\sigma_v}{\sigma_T}}{2\lambda_T} = (\beta_T+\gamma_T-\frac{1}{\lambda_T})\frac{\rho\sigma_v}{\sigma_T}. \tag{B58}$$

Second, we solve the government's problem. Using equations (B53) and (B55), the loss function of the government is computed as:

$$E[\phi(p-p_T)^2+(p-v)g|s,p_T]$$

$$= \left(\begin{array}{c} \phi E\left[\left(\begin{array}{c} p_0+\frac{\rho\sigma_v}{\sigma_T}(p_T-\bar{p}_T)+\lambda_T[\beta_T(v-p_0)+\xi_T(p_T-\bar{p}_T)+g \\ +u-((\beta_T+\gamma_T)\frac{\rho\sigma_v}{\sigma_T}+\xi_T+\alpha_T)(p_T-\bar{p}_T)-\eta_T]-p_T \end{array}\right)^2 |s,p_T\right]+ \\ E\left[p_0+\frac{\rho\sigma_v}{\sigma_T}(p_T-\bar{p}_T)+\lambda_T\left(\begin{array}{c} \beta_T(v-p_0)+\xi_T(p_T-\bar{p}_T)+g+u- \\ ((\beta_T+\gamma_T)\frac{\rho\sigma_v}{\sigma_T}+\xi_T+\alpha_T)(p_T-\bar{p}_T)-\eta_T \end{array}\right)-v|s,p_T\right]g \end{array} \right)$$

$$= \left(\begin{array}{l} \phi\left[p_0-p_T+(\frac{\rho\sigma_v}{\sigma_T}-\lambda_T(\beta_T+\gamma_T)\frac{\rho\sigma_v}{\sigma_T}-\lambda_T\alpha_T)(p_T-\bar{p}_T)+\lambda_T g-\lambda_T\eta_T\right]^2+\phi\lambda_T^2\beta_T^2 E[(v-p_0)^2|s \\ +2\phi\lambda_T\beta_T[p_0-p_T+(\frac{\rho\sigma_v}{\sigma_T}-\lambda_T(\beta_T+\gamma_T)\frac{\rho\sigma_v}{\sigma_T}-\lambda_T\alpha_T)(p_T-\bar{p}_T)+\lambda_T g-\lambda_T\eta_T]E(v-p_0|s,p_T) \\ \phi\lambda_T^2\sigma_u^2+[(\lambda_T\beta_T-1)E(v-p_0|s,p_T)+\lambda_T g-\lambda_T\eta_T+(\frac{\rho\sigma_v}{\sigma_T}-\lambda_T(\beta_T+\gamma_T)\frac{\rho\sigma_v}{\sigma_T}-\lambda_T\alpha_T)(p_T-\bar{p}_T \end{array} \right.$$

where

$$E(v-p_0|s,p_T) = (1-\delta)\frac{\rho\sigma_v}{\sigma_T}(p_T-\bar{p}_T)+\delta(s-p_0),$$

$$var(v-p_0|s,p_T) = var(v-p_0|p_T) - \frac{cov(v-p_0,s|p_T)^2}{var(s|p_T)} = \frac{(1-\rho^2)\sigma_v^2\sigma_\varepsilon^2}{(1-\rho^2)\sigma_v^2+\sigma_\varepsilon^2},$$

$$\begin{aligned} E\left[(v-p_0)^2|s,p_T\right] &= [E(v-p_0|s,p_T)]^2+var(v-p_0|s,p_T) \\ &= \left[(1-\delta)\frac{\rho\sigma_v}{\sigma_T}(p_T-\bar{p}_T)+\delta(s-p_0)\right]^2+\frac{(1-\rho^2)\sigma_v^2\sigma_\varepsilon^2}{(1-\rho^2)\sigma_v^2+\sigma_\varepsilon^2}, \end{aligned}$$

$$\delta \equiv \frac{cov(v,s|p_T)}{var(s|p_T)} = \frac{(1-\rho^2)\sigma_v^2}{(1-\rho^2)\sigma_v^2+\sigma_\varepsilon^2}.$$

The first-order-condition (FOC) for g gives:

$$g = \frac{1}{2\phi\lambda_T^2 + 2\lambda_T} \left\{ \begin{array}{c} (1 - \lambda_T\beta_T - 2\phi\lambda_T^2\beta_T)\delta(s - p_0) + (2\phi\lambda_T^2 + \lambda_T)\eta_T + 2\phi\lambda_T(\bar{p}_T - p_0) \\ + \left[\begin{array}{c} (1 + 2\phi\lambda_T)(\lambda_T\alpha_T - \frac{\rho\sigma_v}{\sigma_T} + \lambda_T(\beta_T + \gamma_T)\frac{\rho\sigma_v}{\sigma_T}) \\ +2\phi\lambda_T + (1 - \lambda_T\beta_T - 2\phi\lambda_T^2\beta_T)(1 - \delta)\frac{\rho\sigma_v}{\sigma_T} \end{array} \right] (p_T - \bar{p}_T) \end{array} \right\}.$$

The SOC is $2\phi\lambda_T^2 + 2\lambda_T > 0$, which holds accordingly if $\lambda_T > 0$ holds. Comparing the above FOC of the government with its conjectured trading strategy (B54), we have:

$$\gamma_T = \frac{1 - \lambda_T\beta_T - 2\phi\lambda_T^2\beta_T}{2\phi\lambda_T^2 + 2\lambda_T}\delta, \tag{B59}$$

$$\alpha_T = \frac{(1 + 2\phi\lambda_T)[\lambda_T(\beta_T + \gamma_T) - 1] + (1 - \lambda_T\beta_T - 2\phi\lambda_T^2\beta_T)(1 - \delta)}{\lambda_T}\frac{\rho\sigma_v}{\sigma_T} + 2\phi, \tag{B60}$$

$$\eta_T = \frac{(2\phi\lambda_T^2 + \lambda_T)\eta_T + 2\phi\lambda_T(\bar{p}_T - p_0)}{2\phi\lambda_T^2 + 2\lambda_T} = 2\phi(\bar{p}_T - p_0). \tag{B61}$$

Third, we consider the market maker's problem. By the projection theorem, equation (B52) gives rise to:

$$\begin{aligned} p &= E(v|p_T) + \frac{cov(v, y|p_T)}{var(y|p_T)}[y - E(y|p_T)] \\ &= E(v) + \frac{cov(v, p_T)}{var(p_T)}(p_T - \bar{p}_T) + \frac{cov(v, y|p_T)}{var(y|p_T)}[y - E(y|p_T)] \\ &= p_0 + \frac{\rho\sigma_v}{\sigma_T}(p_T - \bar{p}_T) + \frac{cov(v, y|p_T)}{var(y|p_T)}[y - E(y|p_T)]. \end{aligned}$$

Combining the above equation with equation (J05) gives us

$$\lambda_T = \frac{cov(v, y|p_T)}{var(y|p_T)} = \frac{(\beta_T + \gamma_T)(1 - \rho^2)\sigma_v^2}{(\beta_T + \gamma_T)^2(1 - \rho^2)\sigma_v^2 + \gamma_T^2\sigma_\varepsilon^2 + \sigma_u^2}. \tag{B62}$$

By a procedure similar to that used to derive the polynomial in Proposition S4, we change the system composed of equations (B57)-(B62) into the polynomial about λ_T presented in Proposition S5, solve other endogenous parameters as functions of λ_T, and compute the moments listed in Proposition S5. We summarize the equilibrium results in Proposition S5.

Proposition S5. *If the government releases the price target signal $\{p_T\}$, then a linear equilibrium is defined by six unknowns $(\beta_T, \xi_T, \gamma_T, \alpha_T, \eta_T, \lambda_T) \in R^6$, which are characterized by six equations (B57)-(B62), together with the SOC, $\lambda_T > 0$. The system of equations can be solved as the following fourth-order polynomial for λ_T:*

$$\begin{pmatrix} \phi^2(4-2\delta)^2\sigma_u^2\lambda_T^4 + 4\phi(2-\delta)(4-\delta)\sigma_u^2\lambda_T^3 + \\ [(4-\delta)^2\sigma_u^2 + 4\phi^2\delta^2\sigma_\varepsilon^2 - 4\phi^2(1-\delta)(1-\rho^2)\sigma_v^2]\lambda_T^2 - \\ [4\phi\delta^2\sigma_\varepsilon^2 + (8+2\delta^2-6\delta)\phi(1-\rho^2)\sigma_v^2]\lambda_T + \delta^2\sigma_\varepsilon^2 + 2(\delta-2)(1-\rho^2)\sigma_v^2 \end{pmatrix} = 0.$$

All other endogenous parameters can be solved as expressions of λ_T as follows:

$$\begin{aligned}
\beta_T &= \frac{2\phi\lambda_T + 2 - \delta}{4\phi\lambda_T^2 + 4\lambda_T - (\lambda_T + 2\phi\lambda_T^2)\delta}, \\
\xi_T &= \frac{-2\phi\lambda_T - 2 + \delta}{4\phi\lambda_T^2 + 4\lambda_T - (\lambda_T + 2\phi\lambda_T^2)\delta}\frac{\rho\sigma_v}{\sigma_T}, \\
\gamma_T &= \frac{(1-2\phi\lambda_T)\delta}{4\phi\lambda_T^2 + 4\lambda_T - (\lambda_T + 2\phi\lambda_T^2)\delta}, \\
\alpha_T &= \frac{(1+2\phi\lambda_T)(-2\phi\lambda_T - 2 + \delta) + (2+2\phi\lambda_T)(1-2\phi\lambda_T)(1-\delta)}{4\phi\lambda_T^2 + 4\lambda_T - (\lambda_T + 2\phi\lambda_T^2)\delta}\frac{\rho\sigma_v}{\sigma_T} + 2\phi, \\
\eta_T &= 2\phi(\bar{p}_T - p_0),
\end{aligned}$$

where $\delta \equiv \frac{(1-\rho^2)\sigma_v^2}{(1-\rho^2)\sigma_v^2 + \sigma_\varepsilon^2}$. The measure of price stability is then:

$$E[(p-p_T)^2] = \lambda_T(\beta_T + \gamma_T)(1-\rho^2)\sigma_v^2 + \rho^2\sigma_v^2 + \sigma_T^2 - 2\rho\sigma_v\sigma_T + (p_0 - \bar{p}_T)^2.$$

The measure of price discovery/efficiency is:

$$var(v|p) = [1 - \lambda_T(\beta_T + \gamma_T)](1-\rho^2)\sigma_v^2.$$

The expected profits of the insider and expected costs of the government are as follows:

$$\begin{aligned}
E(\pi) &= [1 - \lambda_T(\beta_T + \gamma_T)]\beta_T(1-\rho^2)\sigma_v^2, \\
E(c) &= [\lambda_T(\beta_T + \gamma_T) - 1]\gamma_T(1-\rho^2)\sigma_v^2 + \lambda_T\gamma_T^2\sigma_\varepsilon^2.
\end{aligned}$$

The correlation coefficient of the trading positions between the insider and the government is:

$$corr\,(x,g) = \frac{\beta_T\gamma_T\sigma_v^2 + (\beta_T\alpha_T + \xi_T\gamma_T)\,\rho\sigma_v\sigma_T + \xi_T\alpha_T\sigma_T^2}{\sqrt{\beta_T^2\sigma_v^2 + \xi_T^2\sigma_T^2 + 2\beta_T\xi_T\rho\sigma_v\sigma_T}\sqrt{\gamma_T^2\left(\sigma_v^2+\sigma_\varepsilon^2\right) + \alpha_T^2\sigma_T^2 + 2\gamma_T\alpha_T\rho\sigma_v\sigma_T}}.$$

Releasing the noisy signal about the fundamental

Now, let us suppose that the government releases its noisy signal about the fundamental before trading. With the enlarged information set $\{v, s\}$, the insider's maximization problem is transformed as follows:

$$\max_{\{x\}} E[(v-p)x|v,s].$$

Moreover, observing the signal released by the government, $\{s\}$, the market maker uses the information set $\{y, s\}$ to update her conditional expectations about the fundamentals. Thus, the pricing rule of market efficiency is transformed into:

$$p = E(v|y,s). \tag{B63}$$

Let us conjecture, instead, the decision and pricing rules as follows:

$$x = \beta_s(v-p_0) + \xi_s(s-p_0), \tag{B64}$$

$$g = \gamma_s(s-p_0) + \alpha_s(p_T - \bar{p}_T) + \eta_s, \tag{B65}$$

$$p = p_0 + \delta_1(s-p_0) + \lambda_s[y - E(y|s)], \text{ with } y = x+g+u, \tag{B66}$$

where

$$\begin{aligned} E(y|s) &= \beta_s E(v-p_0|s) + (\xi_s+\gamma_s)(s-p_0) + \alpha_s E(p_T - \bar{p}_T|s) + \eta_s \\ &= (\beta_s\delta_1 + \xi_s + \gamma_s + \alpha_s\delta_2)(s-p_0) + \eta_s. \end{aligned}$$

Firstly, we solve the insider's problem. Using equations (B65) and (B66), we compute:

$$
\begin{aligned}
& E[(v-p)x|v,s] \\
= \;& E\left\{\left[v-p_0-\delta_1(s-p_0)-\lambda_s\begin{pmatrix} x+\gamma_s(s-p_0)+\alpha_s(p_T-\bar{p}_T)+\eta_s+ \\ u-(\beta_s\delta_1+\xi_s+\gamma_s+\alpha_s\delta_2)(s-p_0)-\eta_s \end{pmatrix}\right] x|v,s\right\} \\
= \;& [v-p_0-\delta_1(s-p_0)-\lambda_s x+\lambda_s(\beta_s\delta_1+\xi_s+\alpha_s\delta_2)(s-p_0)-\lambda_s\alpha_s E(p_T-\bar{p}_T|v,s)]\,x \\
= \;& \left[v-p_0-\lambda_s x-\lambda_s\alpha_s\frac{\rho\sigma_T}{\sigma_v}(v-p_0)+(\lambda_s\beta_s\delta_1+\lambda_s\xi_s+\lambda_s\alpha_s\delta_2-\delta_1)(s-p_0)\right]x,
\end{aligned}
$$

where

$$E(p_T-\bar{p}_T|v,s)=E(p_T-\bar{p}_T|v)=\frac{\rho\sigma_T}{\sigma_v}(v-p_0).$$

The FOC for x yields:

$$x=\frac{1-\lambda_s\alpha_s\rho\sigma_T/\sigma_v}{2\lambda_s}(v-p_0)+\frac{\lambda_s\beta_s\delta_1+\lambda_s\xi_s+\lambda_s\alpha_s\delta_2-\delta_1}{2\lambda_s}(s-p_0).$$

The SOC is $\lambda_s>0$. Comparing the FOC with the conjectured strategy (B64) leads to:

$$\beta_s=\frac{1-\lambda_s\alpha_s\frac{\rho\sigma_T}{\sigma_v}}{2\lambda_s}=\frac{1}{2\lambda_s}-\frac{\alpha_s}{2}\frac{\rho\sigma_T}{\sigma_v}, \tag{B67}$$

$$\xi_s=\frac{\lambda_s\beta_s\delta_1+\lambda_s\xi_s+\lambda_s\alpha_s\delta_2-\delta_1}{2\lambda_s}=-\frac{\delta_1}{2\lambda_s}-\frac{\delta_1\alpha_s}{2}\frac{\rho\sigma_T}{\sigma_v}+\alpha_s\delta_2, \tag{B68}$$

Secondly, we solve the government's problem. Using equations (B64) and (B66), the objective function of the government is derived as:

$$
\begin{aligned}
& E[\phi(p-p_T)^2+(p-v)g|s,p_T] \\
= \;& \begin{pmatrix}
\phi\{p_0-p_T-\lambda_s\eta_s+\lambda_s g+[\delta_1-\lambda_s(\beta_s\delta_1+\gamma_s+\alpha_s\delta_2)](s-p_0)\}^2+ \\
2\phi\lambda_s\beta_s\{p_0-p_T-\lambda_s\eta_s+\lambda_s g+[\delta_1-\lambda_s(\beta_s\delta_1+\gamma_s+\alpha_s\delta_2)](s-p_0)\}E[v-p_0|s,p_T] \\
+\phi\lambda_s^2\sigma_u^2+\phi\lambda_s^2\beta_s^2E[(v-p_0)^2|s,p_T]+\lambda_s g^2-\lambda_s\eta_s g+ \\
[\delta_1-\lambda_s(\beta_s\delta_1+\gamma_s+\alpha_s\delta_2)](s-p_0)g+(\lambda_s\beta_s-1)E[v-p_0|s,p_T]g
\end{pmatrix},
\end{aligned}
$$

where:

$$E[v-p_0|s,p_T]=(1-\delta)\frac{\rho\sigma_v}{\sigma_T}(p_T-\bar{p}_T)+\delta(s-p_0),\delta\equiv\frac{(1-\rho^2)\sigma_v^2}{(1-\rho^2)\sigma_v^2+\sigma_\varepsilon^2}.$$

The FOC for g yields:

$$g=\frac{1}{2\phi\lambda_s^2+2\lambda_s}\begin{pmatrix}[(1-\lambda_s\beta_s-2\phi\lambda_s^2\beta_s)\delta+(1+2\phi\lambda_s)(\lambda_s\beta_s\delta_1+\lambda_s\gamma_s+\lambda_s\alpha_s\delta_2-\delta_1)](s-p_0)\\ +[(1-\lambda_s\beta_s-2\phi\lambda_s^2\beta_s)(1-\delta)\frac{\rho\sigma_v}{\sigma_T}+2\phi\lambda_s](p_T-\bar{p}_T)\\ +(2\phi\lambda_s^2+\lambda_s)\eta_s+2\phi\lambda_s(\bar{p}_T-p_0)\end{pmatrix},$$

The SOC is $2\phi\lambda_s^2+2\lambda_s>0$, which holds accordingly if $\lambda_s>0$ holds. Comparing equation (B65) with the FOC w.r.t g, we obtain:

$$\gamma_s=\frac{(1-\lambda_s\beta_s-2\phi\lambda_s^2\beta_s)\delta+(1+2\phi\lambda_s)(\lambda_s\beta_s\delta_1+\lambda_s\gamma_s+\lambda_s\alpha_s\delta_2-\delta_1)}{2\phi\lambda_s^2+2\lambda_s}, \tag{B69}$$

$$\alpha_s=\frac{(1-\lambda_s\beta_s-2\phi\lambda_s^2\beta_s)(1-\delta)\frac{\rho\sigma_v}{\sigma_T}+2\phi\lambda_s}{2\phi\lambda_s^2+2\lambda_s}, \tag{B70}$$

$$\eta_s=\frac{2\phi\lambda_s(\bar{p}_T-p_0)+(2\phi\lambda_s^2+\lambda_s)\eta_s}{2\phi\lambda_s^2+2\lambda_s}=2\phi(\bar{p}_T-p_0), \tag{B71}$$

Thirdly, we consider the market maker's problem. By the projection theorem, equation (B63) gives rise to:

$$p=E(v|s)+\frac{cov(v,y|s)}{var(y|s)}[y-E(y|s)]=p_0+\delta_1(s-p_0)+\frac{cov(v,y|s)}{var(y|s)}[y-E(y|s)],$$

where:

$$\begin{aligned}
& \frac{cov(v,y|s)}{var(y|s)} \\
= \quad & \frac{cov(v-E(v|s),y-E(y|s))}{var(y-E(y|s))} \\
= \quad & \frac{cov(v-p_0-\delta_1(s-p_0),\beta_s(v-p_0)+\alpha_s(p_T-\bar{p}_T)+u-(\beta_s\delta_1+\alpha_s\delta_2)(s-p_0))}{var(\beta_s(v-p_0)+\alpha_s(p_T-\bar{p}_T)+u-(\beta_s\delta_1+\alpha_s\delta_2)(s-p_0))} \\
= \quad & \frac{\left(\begin{array}{c} (1-\delta_1)(\beta_s-\beta_s\delta_1-\alpha_s\delta_2)\sigma_v^2+ \\ (1-\delta_1)\alpha_s\rho\sigma_v\sigma_T+\delta_1(\beta_s\delta_1+\alpha_s\delta_2)\sigma_\varepsilon^2 \end{array}\right)}{\left(\begin{array}{c} (\beta_s-\beta_s\delta_1-\alpha_s\delta_2)^2\sigma_v^2+(\beta_s\delta_1+\alpha_s\delta_2)^2\sigma_\varepsilon^2 \\ +\alpha_s^2\sigma_T^2+\sigma_u^2+2(\beta_s-\beta_s\delta_1-\alpha_s\delta_2)\alpha_s\rho\sigma_v\sigma_T \end{array}\right)}.
\end{aligned}$$

Combining equation (B66) and the above equation gives us:

$$\lambda_s=\frac{cov(v,y|s)}{var(y|s)}=\frac{\left(\begin{array}{c} (1-\delta_1)(\beta_s-\beta_s\delta_1-\alpha_s\delta_2)\sigma_v^2+ \\ (1-\delta_1)\alpha_s\rho\sigma_v\sigma_T+\delta_1(\beta_s\delta_1+\alpha_s\delta_2)\sigma_\varepsilon^2 \end{array}\right)}{\left(\begin{array}{c} (\beta_s-\beta_s\delta_1-\alpha_s\delta_2)^2\sigma_v^2+(\beta_s\delta_1+\alpha_s\delta_2)^2\sigma_\varepsilon^2 \\ +\alpha_s^2\sigma_T^2+\sigma_u^2+2(\beta_s-\beta_s\delta_1-\alpha_s\delta_2)\alpha_s\rho\sigma_v\sigma_T \end{array}\right)}. \tag{B72}$$

We solve the system composed of equations (B67)-(B72) as a polynomial about λ_s, presented in Proposition S6, where the coefficients are as follows:

$$a_4 = 4\phi^2[2-(1-\delta)\rho^2]^2\sigma_u^2, a_3 = 4\phi[2-(1-\delta)\rho^2][4-(1-\delta)\rho^2]\sigma_u^2,$$

$$a_2 = \begin{pmatrix} [4-(1-\delta)\rho^2]^2\sigma_u^2 + 4\phi^2[(1-\delta)\rho^2 - \frac{\rho\sigma_T}{\sigma_v} - 1](1-\frac{\rho\sigma_T}{\sigma_v})[(1-\delta_1)^2\sigma_v^2 + \delta_1^2\sigma_\varepsilon^2] - \\ 4\phi^2[-2\frac{\rho\sigma_T}{\sigma_v} + (1-\delta)\rho^2][2-(1-\delta)\frac{\rho\sigma_v}{\sigma_T}][(1-\delta_1)\delta_2\sigma_v^2 - \delta_1\delta_2\sigma_\varepsilon^2 - (1-\delta_1)\rho\sigma_v\sigma_T] \\ +4\phi^2[2-(1-\delta)\frac{\rho\sigma_v}{\sigma_T}]^2(\delta_2^2\sigma_v^2 + \delta_2^2\sigma_\varepsilon^2 + \sigma_T^2 - 2\delta_2\rho\sigma_v\sigma_T) \end{pmatrix},$$

$$a_1 = \begin{pmatrix} 2\phi\{[(1-\delta)\rho^2 - \frac{\rho\sigma_T}{\sigma_v} - 1][2-(1-\delta)\rho^2] - 2(1-\frac{\rho\sigma_T}{\sigma_v})\}[(1-\delta_1)^2\sigma_v^2 + \delta_1^2\sigma_\varepsilon^2] - \\ 2\phi\begin{bmatrix} \left(-2\frac{\rho\sigma_T}{\sigma_v} + (1-\delta)\rho^2\right)(1-\delta)\frac{\rho\sigma_v}{\sigma_T} \\ -(1-\delta)\rho^2\left(2-(1-\delta)\frac{\rho\sigma_v}{\sigma_T}\right) \end{bmatrix}[(1-\delta_1)\delta_2\sigma_v^2 - \delta_1\delta_2\sigma_\varepsilon^2 - (1-\delta_1)\rho\sigma_v\sigma_T] \\ +4\phi[2-(1-\delta)\frac{\rho\sigma_v}{\sigma_T}](1-\delta)\frac{\rho\sigma_v}{\sigma_T}(\delta_2^2\sigma_v^2 + \delta_2^2\sigma_\varepsilon^2 + \sigma_T^2 - 2\delta_2\rho\sigma_v\sigma_T) \end{pmatrix},$$

$$a_0 = \begin{pmatrix} -2\left[2-(1-\delta)\rho^2\right]\left[(1-\delta_1)^2\sigma_v^2 + \delta_1^2\sigma_\varepsilon^2\right] + \\ (1-\delta)^2\rho^2\frac{\rho\sigma_v}{\sigma_T}\left[(1-\delta_1)\delta_2\sigma_v^2 - \delta_1\delta_2\sigma_\varepsilon^2 - (1-\delta_1)\rho\sigma_v\sigma_T\right] \\ +(1-\delta)^2\frac{\rho^2\sigma_v^2}{\sigma_T^2}(\delta_2^2\sigma_v^2 + \delta_2^2\sigma_\varepsilon^2 + \sigma_T^2 - 2\delta_2\rho\sigma_v\sigma_T) \end{pmatrix}.$$

Finally, through substitutions, we solve the other parameters as functions of λ_s and computed the moments listed in Proposition S6.

Proposition S6. *If the government releases the noisy signal about the fundamental* $\{s\}$*, then a linear equilibrium is defined by six unknowns* $(\beta_s, \xi_s, \gamma_s, \alpha_s, \eta_s, \lambda_s) \in R^6$*, which are characterized by six equations (B67)-(B72), together with one SOC,* $\lambda_s > 0$*. The system of equations degenerates to the following fourth-order polynomial for* λ_s*:*

$$a_4\lambda_s^4 + a_3\lambda_s^3 + a_2\lambda_s^2 + a_1\lambda_s + a_0 = 0,$$

where coefficients $a_i's$ *are listed above. All the other variables can be solved as* *expressions of* λ_s *as follows:*

$$\begin{aligned}
\beta_s &= \frac{2\phi\lambda_s(1-\frac{\rho\sigma_T}{\sigma_v})+2-(1-\delta)\rho^2}{4\phi\lambda_s^2+4\lambda_s-(\lambda_s+2\phi\lambda_s^2)(1-\delta)\rho^2}, \\
\xi_s &= -\frac{2\phi\lambda_s[1-(1-\delta)\rho^2+\frac{\rho\sigma_T}{\sigma_v}]+2}{4\phi\lambda_s^2+4\lambda_s-(\lambda_s+2\phi\lambda_s^2)(1-\delta)\rho^2}\delta_1+\frac{(1-2\phi\lambda_s)(1-\delta)\frac{\rho\sigma_v}{\sigma_T}+4\phi\lambda_s}{4\phi\lambda_s^2+4\lambda_s-(\lambda_s+2\phi\lambda_s^2)(1-\delta)\rho^2}\delta_2, \\
\gamma_s &= (1+2\phi\lambda_s)\begin{pmatrix} -\frac{2\phi\lambda_s[1-(1-\delta)\rho^2+\frac{\rho\sigma_T}{\sigma_v}]+2}{4\phi\lambda_s^2+4\lambda_s-(\lambda_s+2\phi\lambda_s^2)(1-\delta)\rho^2}\delta_1 \\ +\frac{(1-2\phi\lambda_s)(1-\delta)\frac{\rho\sigma_v}{\sigma_T}+4\phi\lambda_s}{4\phi\lambda_s^2+4\lambda_s-(\lambda_s+2\phi\lambda_s^2)(1-\delta)\rho^2}\delta_2 \end{pmatrix}+\frac{\left[(-2\phi\lambda_s-4\phi^2\lambda_s^2)(1-\frac{\rho\sigma_T}{\sigma_v})+2\right]\delta}{4\phi\lambda_s^2+4\lambda_s-(\lambda_s+2\phi\lambda_s^2)(1-\delta)\rho^2}, \\
\alpha_s &= \frac{(1-2\phi\lambda_s)(1-\delta)\frac{\rho\sigma_v}{\sigma_T}+4\phi\lambda_s}{4\phi\lambda_s^2+4\lambda_s-(\lambda_s+2\phi\lambda_s^2)(1-\delta)\rho^2}, \\
\eta_s &= 2\phi(\bar{p}_T-p_0),
\end{aligned}$$

where $\delta_1 \equiv \frac{\sigma_v^2}{\sigma_v^2+\sigma_\varepsilon^2}$, $\delta_2 \equiv \frac{\rho\sigma_v\sigma_T}{\sigma_v^2+\sigma_\varepsilon^2}$, and $\delta \equiv \frac{(1-\rho^2)\sigma_v^2}{(1-\rho^2)\sigma_v^2+\sigma_\varepsilon^2}$. *The measure of price stability is then:*

$$E[(p-p_T)^2] = \begin{pmatrix} [\delta_1^2+\lambda_s(1+\delta_1)(\beta_s-\beta_s\delta_1-\alpha_s\delta_2)]\sigma_v^2+(1-2\lambda_s\alpha_s)\sigma_T^2 \\ +[\lambda_s\alpha_s(1+\delta_1)-2\delta_1-2\lambda_s(\beta_s-\beta_s\delta_1-\alpha_s\delta_2)]\rho\sigma_v\sigma_T \\ +[\delta_1^2-\lambda_s\delta_1(\beta_s\delta_1+\alpha_s\delta_2)]\sigma_\varepsilon^2+(p_0-\bar{p}_T)^2 \end{pmatrix}.$$

The measure of price discovery/efficiency is

$$var(v|p) = \frac{\begin{pmatrix} \lambda_s(\beta_s-\beta_s\delta_1-\alpha_s\delta_2)[1-\delta_1-\lambda_s(\beta_s-\beta_s\delta_1-\alpha_s\delta_2)]\sigma_v^2+[\delta_1^2-\lambda_s\delta_1(\beta_s\delta_1 \\ +\alpha_s\delta_2)]\sigma_\varepsilon^2+\lambda_s[1-\delta_1-2\lambda_s(\beta_s-\beta_s\delta_1-\alpha_s\delta_2)]\alpha_s\rho\sigma_v\sigma_T-\lambda_s^2\alpha_s^2\rho^2\sigma_T^2 \end{pmatrix}}{\begin{pmatrix} [\delta_1^2+\lambda_s(1+\delta_1)(\beta_s-\beta_s\delta_1-\alpha_s\delta_2)]\sigma_v^2+[\delta_1^2-\lambda_s\delta_1(\beta_s\delta_1+\alpha_s\delta_2)]\sigma_\varepsilon^2 \\ +\lambda_s(1+\delta_1)\alpha_s\rho\sigma_v\sigma_T \end{pmatrix}}\sigma_v^2.$$

The expected profit of the insider and expected cost of the government are:

$$E(\pi) = \begin{pmatrix} [1-\delta_1-\lambda_s(\beta_s-\beta_s\delta_1-\alpha_s\delta_2)](\beta_s+\xi_s)\sigma_v^2+ \\ [\lambda_s(\beta_s\delta_1+\alpha_s\delta_2)-\delta_1]\xi_s\sigma_\varepsilon^2-\lambda_s\alpha_s(\beta_s+\xi_s)\rho\sigma_v\sigma_T \end{pmatrix},$$

$$E(c) = \begin{pmatrix} [\lambda_s(\beta_s-\beta_s\delta_1-\alpha_s\delta_2)+\delta_1-1](\gamma_s\sigma_v^2+\alpha_s\rho\sigma_v\sigma_T)+ \\ [\delta_1-\lambda_s(\beta_s\delta_1+\alpha_s\delta_2)]\gamma_s\sigma_\varepsilon^2+\lambda_s\alpha_s\gamma_s\rho\sigma_v\sigma_T+\lambda_s\alpha_s^2\sigma_T^2 \end{pmatrix}.$$

The correlation coefficient of the trading positions between the insider and the government is:

$$corr\,(x,g)=\frac{(\beta_s+\xi_s)\,\gamma_s\sigma_v^2+(\beta_s+\xi_s)\,\alpha_s\rho\sigma_v\sigma_T+\xi_s\gamma_s\sigma_\varepsilon^2}{\sqrt{(\beta_s+\xi_s)^2\,\sigma_v^2+\xi_s^2\sigma_\varepsilon^2}\sqrt{\gamma_s^2\,(\sigma_v^2+\sigma_\varepsilon^2)+\alpha_s^2\sigma_T^2+2\alpha_s\gamma_s\rho\sigma_v\sigma_T}}.$$

Releasing two private signals

Let us suppose that the government releases the price target and its noisy signal about the fundamental before trading. With the enlarged information set $\{v, p_T, s\}$, the insider's maximization problem is transformed as follows:

$$\max_{\{x\}} E[(v-p)x|v,p_T,s].$$

In this case, the market maker sees both signals released by the government and uses her new information set $\{y, p_T, s\}$ to update her conditional expectations about the fundamentals. Then, the pricing rule of market efficiency is transformed into:

$$p=E(v|y,p_T,s). \tag{B73}$$

Let us conjecture the decision and pricing rules of the economy:

$$x = \beta_{s,T}(v-p_0)+\xi_{s,T}^{(1)}(s-p_0)+\xi_{s,T}^{(2)}(p_T-\bar{p}_T), \tag{B74}$$

$$g = \gamma_{s,T}(s-p_0)+\alpha_{s,T}(p_T-\bar{p}_T)+\eta_{s,T}, \tag{B75}$$

$$p = p_0+(1-\delta)\frac{\rho\sigma_v}{\sigma_T}(p_T-\bar{p}_T)+\delta(s-p_0)+\lambda_{s,T}[y-E(y|s,p_T)], \tag{B76}$$

with $y = x + g + u$, where

$$\begin{aligned} E(y|s,p_T) &= \beta_{s,T}E(v-p_0|s,p_T)+(\xi_{s,T}^{(1)}+\gamma_{s,T})(s-p_0)+(\xi_{s,T}^{(2)}+\alpha_{s,T})(p_T-\bar{p}_T)+\eta_{s,T} \\ &= \left(\begin{array}{c} \beta_{s,T}\left[(1-\delta)\frac{\rho\sigma_v}{\sigma_T}(p_T-\bar{p}_T)+\delta(s-p_0)\right] \\ +(\xi_{s,T}^{(1)}+\gamma_{s,T})(s-p_0)+(\xi_{s,T}^{(2)}+\alpha_{s,T})(p_T-\bar{p}_T)+\eta_{s,T} \end{array}\right), \end{aligned}$$

$$\delta \equiv \frac{cov(v,s|p_T)}{var(s|p_T)} = \frac{(1-\rho^2)\,\sigma_v^2}{(1-\rho^2)\,\sigma_v^2+\sigma_\varepsilon^2}.$$

First of all, we solve the insider's problem. Using equations (B75) and (B76), we compute:

$$\begin{aligned}
& E[(v-p)x|v,p_T,s] \\
= \ & E\left[\left(\begin{array}{c} v-p_0-(1-\delta)\frac{\rho\sigma_v}{\sigma_T}(p_T-\bar{p}_T)-\delta(s-p_0) \\ -\lambda_{s,T}\left(\begin{array}{c} x+\gamma_{s,T}(s-p_0)+\alpha_{s,T}(p_T-\bar{p}_T)+\eta_{s,T}+u \\ -\beta_{s,T}[(1-\delta)\frac{\rho\sigma_v}{\sigma_T}(p_T-\bar{p}_T)+\delta(s-p_0)] \\ -(\xi_{s,T}^{(1)}+\gamma_{s,T})(s-p_0)-(\xi_{s,T}^{(2)}+\alpha_{s,T})(p_T-\bar{p}_T)-\eta_{s,T} \end{array}\right) \end{array}\right) x|v,p_T,s\right] \\
= \ & \left(\begin{array}{c} v-p_0-(1-\delta)\frac{\rho\sigma_v}{\sigma_T}(p_T-\bar{p}_T)-\delta(s-p_0) \\ -\lambda_{s,T}\left[x-\left(\beta_{s,T}(1-\delta)\frac{\rho\sigma_v}{\sigma_T}+\xi_{s,T}^{(2)}\right)(p_T-\bar{p}_T)-(\beta_{s,T}\delta+\xi_{s,T}^{(1)})(s-p_0)\right] \end{array}\right)x.
\end{aligned}$$

The FOC for x yields

$$x=\frac{1}{2\lambda_{s,T}}\left\{\begin{array}{c} v-p_0+\left[(\lambda_{s,T}\beta_{s,T}-1)(1-\delta)\frac{\rho\sigma_v}{\sigma_T}+\lambda_{s,T}\xi_{s,T}^{(2)}\right](p_T-\bar{p}_T) \\ +\left[(\lambda_{s,T}\beta_{s,T}-1)\delta+\lambda_{s,T}\xi_{s,T}^{(1)}\right](s-p_0) \end{array}\right\}.$$

The SOC is $\lambda_{s,T}>0$. Comparing the above FOC with the conjectured strategy (B74) leads to:

$$\beta_{s,T} = \frac{1}{2\lambda_{s,T}}, \tag{B77}$$

$$\xi_{s,T}^{(1)} = \frac{(\lambda_{s,T}\beta_{s,T}-1)\delta+\lambda_{s,T}\xi_{s,T}^{(1)}}{2\lambda_{s,T}} = -\frac{\delta}{2\lambda_{s,T}}, \tag{B78}$$

$$\xi_{s,T}^{(2)} = \frac{(\lambda_{s,T}\beta_{s,T}-1)(1-\delta)\frac{\rho\sigma_v}{\sigma_T}+\lambda_{s,T}\xi_{s,T}^{(2)}}{2\lambda_{s,T}} = -\frac{1-\delta}{2\lambda_{s,T}}\frac{\rho\sigma_v}{\sigma_T}. \tag{B79}$$

Secondly, using equations (B74) and (B76), the objective function of the government is computed as:

$$
\begin{aligned}
& E[\phi(p-p_T)^2 + (p-v)g|s,p_T] \\
= & \left(\begin{array}{c}
\phi \left(\begin{array}{c} p_0 - p_T - \lambda_{s,T}\eta_{s,T} + \lambda_{s,T} g + \left[(1-\lambda_{s,T}\beta_{s,T})\delta - \lambda_{s,T}\gamma_{s,T}\right](s-p_0) \\ + \left[(1-\lambda_{s,T}\beta_{s,T})(1-\delta)\frac{\rho\sigma_v}{\sigma_T} - \lambda_{s,T}\alpha_{s,T}\right](p_T - \bar{p}_T) \end{array} \right)^2 \\
+\phi\lambda_{s,T}^2\beta_{s,T}^2 E[(v-p_0)^2|s,p_T] + \phi\lambda_{s,T}^2\sigma_u^2 \\
+2\phi\lambda_{s,T}\beta_{s,T} \left(\begin{array}{c} p_0 - p_T - \lambda_{s,T}\eta_{s,T} + \left[(1-\lambda_{s,T}\beta_{s,T})\delta - \lambda_{s,T}\gamma_{s,T}\right](s-p_0) \\ + \left[(1-\lambda_{s,T}\beta_{s,T})(1-\delta)\frac{\rho\sigma_v}{\sigma_T} - \lambda_{s,T}\alpha_{s,T}\right](p_T-\bar{p}_T) + \lambda_{s,T} g \end{array} \right) E[v-p_0|s,p_T] \\
+ \left(\begin{array}{c} (\lambda_{s,T}\beta_{s,T} - 1)E[v-p_0|s,p_T] + \left[(1-\lambda_{s,T}\beta_{s,T})(1-\delta)\frac{\rho\sigma_v}{\sigma_T} - \lambda_{s,T}\alpha_{s,T}\right](p_T-\bar{p}_T) \\ + \left[(1-\lambda_{s,T}\beta_{s,T})\delta - \lambda_{s,T}\gamma_{s,T}\right](s-p_0) + \lambda_{s,T} g - \lambda_{s,T}\eta_{s,T} \end{array} \right) g
\end{array} \right),
\end{aligned}
$$

where

$$
E[v-p_0|s,p_T] = (1-\delta)\frac{\rho\sigma_v}{\sigma_T}(p_T-\bar{p}_T) + \delta(s-p_0),
$$

$$
\delta \equiv \frac{cov(v,s|p_T)}{var(s|p_T)} = \frac{(1-\rho^2)\sigma_v^2}{(1-\rho^2)\sigma_v^2 + \sigma_\varepsilon^2}.
$$

The first-order-condition (FOC) for g gives rise to

$$
g = \frac{1}{2\phi\lambda_{s,T}^2 + 2\lambda_{s,T}} \left(\begin{array}{c} \left(-2\phi\lambda_{s,T}\delta + (1+2\phi\lambda_{s,T})\lambda_{s,T}\gamma_{s,T}\right)(s-p_0) \\ + \left(2\phi\lambda_{s,T}\left[1-(1-\delta)\frac{\rho\sigma_v}{\sigma_T}\right] + (1+2\phi\lambda_{s,T})\lambda_{s,T}\alpha_{s,T}\right)(p_T-\bar{p}_T) \\ +(2\phi\lambda_{s,T}^2 + \lambda_{s,T})\eta_{s,T} + 2\phi\lambda_{s,T}(\bar{p}_T - p_0) \end{array} \right),
$$

The SOC is $2\phi\lambda_{s,T}^2 + 2\lambda_{s,T} > 0$, which holds accordingly if $\lambda_{s,T} > 0$ holds. Comparing equation (B75) with the FOC w.r.t g, we obtain:

$$
\gamma_{s,T} = \frac{-2\phi\lambda_{s,T}\delta + (1+2\phi\lambda_{s,T})\lambda_{s,T}\gamma_{s,T}}{2\phi\lambda_{s,T}^2 + 2\lambda_{s,T}} = -2\phi\delta, \tag{B80}
$$

$$
\alpha_{s,T} = \frac{2\phi\lambda_{s,T}\left[1-(1-\delta)\frac{\rho\sigma_v}{\sigma_T}\right] + (1+2\phi\lambda_{s,T})\lambda_{s,T}\alpha_{s,T}}{2\phi\lambda_{s,T}^2 + 2\lambda_{s,T}} = 2\phi\left[1-(1-\delta)\frac{\rho\sigma_v}{\sigma_T}\right] \tag{B81}
$$

$$
\eta_{s,T} = \frac{2\phi\lambda_{s,T}(\bar{p}_T - p_0) + (2\phi\lambda_{s,T}^2 + \lambda_{s,T})\eta_{s,T}}{2\phi\lambda_{s,T}^2 + 2\lambda_{s,T}} = 2\phi(\bar{p}_T - p_0), \tag{B82}
$$

Thirdly, we consider the market maker's problem. By the projection theorem, equation (B73) gives rise to:

$$\begin{aligned} p &= E(v|p_T, s) + \frac{cov(v, y|p_T, s)}{var(y|p_T, s)}[y - E(y|p_T, s)] \\ &= p_0 + (1-\delta)\frac{\rho\sigma_v}{\sigma_T}(p_T - \bar{p}_T) + \delta(s - p_0) + \frac{cov(v, y|p_T, s)}{var(y|p_T, s)}[y - E(y|p_T, s)], \end{aligned}$$

where

$$\begin{aligned} & \frac{cov(v, y|p_T, s)}{var(y|p_T, s)} \\ = \ & \frac{cov(v - E(v|p_T, s), y - E(y|p_T, s))}{var(y - E(y|p_T, s))} \\ = \ & \frac{cov\begin{pmatrix} (1-\delta)(v-p_0) - \delta\varepsilon - (1-\delta)\frac{\rho\sigma_v}{\sigma_T}(p_T - \bar{p}_T), \\ \beta_{s,T}(1-\delta)(v-p_0) - \beta_{s,T}\delta\varepsilon - \beta_{s,T}(1-\delta)\frac{\rho\sigma_v}{\sigma_T}(p_T - \bar{p}_T) \end{pmatrix}}{var\left(\beta_{s,T}(1-\delta)(v-p_0) - \beta_{s,T}\delta\varepsilon - \beta_{s,T}(1-\delta)\frac{\rho\sigma_v}{\sigma_T}(p_T - \bar{p}_T) + u\right)} \\ = \ & \frac{\beta_{s,T}\left[(1-\rho^2)(1-\delta)^2\sigma_v^2 + \delta^2\sigma_\varepsilon^2\right]}{\beta_{s,T}^2\left[(1-\rho^2)(1-\delta)^2\sigma_v^2 + \delta^2\sigma_\varepsilon^2\right] + \sigma_u^2}. \end{aligned}$$

Combining equation (B76) and the above equation gives rise to:

$$\lambda_{s,T} = \frac{cov(v, y|s, p_T)}{var(y|s, p_T)} = \frac{\beta_{s,T}\left[(1-\rho^2)(1-\delta)^2\sigma_v^2 + \delta^2\sigma_\varepsilon^2\right]}{\beta_{s,T}^2\left[(1-\rho^2)(1-\delta)^2\sigma_v^2 + \delta^2\sigma_\varepsilon^2\right] + \sigma_u^2}. \tag{B83}$$

Finally, substituting equation (B77) into (B83) leads to the expression for $\lambda_{s,T}$ presented in Proposition S7, further substitutions lead to those expressions for ($\beta_{s,T}, \xi_{s,T}^{(1)}, \xi_{s,T}^{(2)}$, $\gamma_{s,T}, \alpha_{s,T}, \eta_{s,T}$), and we compute the theoretical moments correspondingly.

We summarize the model equilibrium in Proposition S7.

Proposition S7. *If the government releases two private signals* $\{p_T, s\}$*, then a linear equilibrium is defined by seven unknowns* $(\beta_{s,T}, \xi_{s,T}^{(1)}, \xi_{s,T}^{(2)}, \gamma_{s,T}, \alpha_{s,T}, \eta_{s,T}, \lambda_{s,T}) \in R^7$*, which are characterized by seven equations (B77)-(B83), together with one SOC,*

$\lambda_{s,T} > 0$. *The system of equations can be solved explicitly as follows:*

$$\begin{aligned}
\beta_{s,T} &= \frac{\sigma_u}{\sqrt{(1-\rho^2)(1-\delta)^2\sigma_v^2 + \delta^2\sigma_\varepsilon^2}}, \\
\xi_{s,T}^{(1)} &= -\frac{\delta\sigma_u}{\sqrt{(1-\rho^2)(1-\delta)^2\sigma_v^2 + \delta^2\sigma_\varepsilon^2}}, \\
\xi_{s,T}^{(2)} &= -\frac{(1-\delta)\sigma_u}{\sqrt{(1-\rho^2)(1-\delta)^2\sigma_v^2 + \delta^2\sigma_\varepsilon^2}}\frac{\rho\sigma_v}{\sigma_T}, \\
\gamma_{s,T} &= -2\phi\delta, \\
\alpha_{s,T} &= 2\phi\left[1-(1-\delta)\frac{\rho\sigma_v}{\sigma_T}\right], \\
\eta_{s,T} &= 2\phi(\bar{p}_T - p_0), \\
\lambda_{s,T} &= \frac{\sqrt{(1-\rho^2)(1-\delta)^2\sigma_v^2 + \delta^2\sigma_\varepsilon^2}}{2\sigma_u}.
\end{aligned}$$

The measure of price stability is then:

$$E[(p-p_T)^2] = \left[\frac{1}{2}(1-\delta)(1+\rho^2)+\delta\right]\sigma_v^2 + \sigma_T^2 - 2\rho\sigma_v\sigma_T + (p_0 - \bar{p}_T)^2.$$

The measure of price discovery/efficiency is:

$$var(v|p) = \frac{(1-\rho^4)(1-\delta)^2\sigma_v^2 + 2\delta^2\sigma_\varepsilon^2}{2(1-\rho^2)\delta^2\sigma_v^2 + 2(1+\rho^2)\sigma_v^2 + 2\delta^2\sigma_\varepsilon^2}\sigma_v^2.$$

The expected profit of the insider and expected cost of the government are:

$$E(\pi) = \frac{\sigma_u\sqrt{(1-\rho^2)(1-\delta)^2\sigma_v^2 + \delta^2\sigma_\varepsilon^2}}{2}, E(c) = 0.$$

The correlation coefficient of the trading positions between the insider and the government is:

$$corr(x,g) = 0.$$

S3. Disclosing the trading plan

S3.1. Model and equilibrium

For simplicity, we assume that there is a pre-trade period, in which the government sees its two signals $\{p_T, s\}$, sets up its trading plan $\{g\}$ based on the two signals, and discloses the trading plan to the financial market. When trade occurs, the government with commitment submits the disclosed trading position $\{g\}$ and trades alongside with other market participants.

With the enlarged information set $\{v, g\}$, the insider's maximization problem is changed as follows:

$$\max_{\{x\}} E[(v-p)x|v,g]. \tag{B84}$$

Moreover, the market maker also sees the trading position released by the government, $\{g\}$, and uses her new information set $\{y, g\}$ to update the conditional expectations about the fundamentals. Thus, the pricing rule of market efficiency is transformed into:

$$p = E(v|y,g). \tag{B85}$$

Conjecture the decision rules for the insider and the government and the pricing rule for the market maker as follows:

$$x = \beta_g(v-p_0)+\xi_g(g-\eta_g), \tag{B86}$$

$$g = \gamma_g(s-p_0)+\alpha_g(p_T-\bar{p}_T)+\eta_g, \tag{B87}$$

$$p = p_0+\delta_g(g-\eta_g)+\lambda_g[y-E(y|g)], \text{ with } y=x+g+u, \tag{B88}$$

where

$$E(y|g) = (\beta_g\delta_g+\xi_g)(g-\eta_g)+g, \delta_g \equiv \frac{\gamma_g\sigma_v^2}{\gamma_g^2\left(\sigma_v^2+\sigma_\varepsilon^2\right)+\alpha_g^2\sigma_T^2}.$$

First of all, we solve the government's problem. Using equations (B86) and (B88), the loss function of the government is computed as:

$$
\begin{aligned}
& E[\phi(p-p_T)^2+(p-v)g|s,p_T] \\
= & \left(\begin{array}{c}
\phi\lambda_g^2\beta_g^2 E[(v-p_0)^2|s,p_T]+\phi\left[(1-\lambda_g\beta_g)\delta_g\left(g-\eta_g\right)-p_T+p_0\right]^2 \\
+2\phi\lambda_g\beta_g\left[(1-\lambda_g\beta_g)\delta_g\left(g-\eta_g\right)-p_T+p_0\right]E(v-p_0|s,p_T) \\
+\phi\lambda_g^2\sigma_u^2+\left[\left(\lambda_g\beta_g-1\right)E(v-p_0|s,p_T)+(1-\lambda_g\beta_g)\delta_g\left(g-\eta_g\right)\right]g
\end{array}\right),
\end{aligned}
$$

where

$$
E(v-p_0|s,p_T)=E(v-p_0|s)=\delta(s-p_0),\delta\equiv\frac{\sigma_v^2}{\sigma_v^2+\sigma_\varepsilon^2}.
$$

The FOC for g gives:

$$
g=\frac{\left(\begin{array}{c}
\left[1-\lambda_g\beta_g-2\phi\lambda_g\beta_g(1-\lambda_g\beta_g)\delta_g\right]\delta(s-p_0) \\
+2\phi(1-\lambda_g\beta_g)\delta_g\left(p_T-\bar{p}_T\right) \\
+2\phi(1-\lambda_g\beta_g)\delta_g\left(\bar{p}_T-p_0\right) \\
+(1-\lambda_g\beta_g)\delta_g\eta_g+2\phi(1-\lambda_g\beta_g)^2\delta_g^2\eta_g
\end{array}\right)}{2\phi(1-\lambda_g\beta_g)^2\delta_g^2+2(1-\lambda_g\beta_g)\delta_g}.
$$

The SOC for g is:

$$
2\phi(1-\lambda_g\beta_g)^2\delta_g^2+2(1-\lambda_g\beta_g)\delta_g>0. \tag{B89}
$$

Comparing the FOC of the government with the conjectured trading strategy of the government (B87), we have:

$$
\gamma_g = \frac{\left[1-\lambda_g\beta_g-2\phi\lambda_g\beta_g(1-\lambda_g\beta_g)\delta_g\right]\delta}{2\phi(1-\lambda_g\beta_g)^2\delta_g^2+2(1-\lambda_g\beta_g)\delta_g}=\frac{(1-\phi\delta_g)\,\delta}{\phi\delta_g^2+2\delta_g}, \tag{B90}
$$

$$
\alpha_g = \frac{2\phi(1-\lambda_g\beta_g)\delta_g}{2\phi(1-\lambda_g\beta_g)^2\delta_g^2+2(1-\lambda_g\beta_g)\delta_g}=\frac{2\phi}{\phi\delta_g+2}, \tag{B91}
$$

$$
\eta_g = \frac{\left[\begin{array}{c}
2\phi(1-\lambda_g\beta_g)\delta_g\left(\bar{p}_T-p_0\right)+ \\
(1-\lambda_g\beta_g)\delta_g\eta_g+2\phi(1-\lambda_g\beta_g)^2\delta_g^2\eta_g
\end{array}\right]}{2\phi(1-\lambda_g\beta_g)^2\delta_g^2+2(1-\lambda_g\beta_g)\delta_g}=2\phi(\bar{p}_T-p_0). \tag{B92}
$$

Secondly, we solve the insider's problem. Using equation (B88), we compute:

$$
\begin{aligned}
& E[(v-p)x|v,g] \\
= \; & E\left[v - p_0 - \delta_g(g-\eta_g) - \lambda_g[x - (\beta_g\delta_g + \xi_g)(g-\eta_g) + u]|v,g\right] x \\
= \; & \left\{v - p_0 + \left[\left(\lambda_g\beta_g - 1\right)\delta_g + \lambda_g\xi_g\right](g-\eta_g) - \lambda_g x\right\} x.
\end{aligned}
$$

The FOC for x yields:

$$
x = \frac{1}{2\lambda_g}(v - p_0) + \frac{\left(\lambda_g\beta_g - 1\right)\delta_g + \lambda_g\xi_g}{2\lambda_g}\left(g - \eta_g\right). \tag{B93}
$$

The SOC for x is $\lambda_g > 0$. Comparing the FOC (B93) with the conjectured strategy (B86) leads to:

$$
\beta_g = \frac{1}{2\lambda_g}, \tag{B94}
$$

$$
\xi_g = \frac{\left(\lambda_g\beta_g - 1\right)\delta_g + \lambda_g\xi_g}{2\lambda_g} = -\frac{\delta_g}{2\lambda_g}. \tag{B95}
$$

Thirdly, we solve the market maker's problem. By the projection theorem, equation (B85) gives rise to:

$$
\begin{aligned}
p &= E(v|y,g) = E(v|g) + \frac{cov(v,y|g)}{var(y|g)}\left[y - E(y|g)\right] \\
&= p_0 + \frac{cov(v,g)}{var(g)}\left(g - \eta_g\right) + \frac{cov(v,y|g)}{var(y|g)}\left[y - E(y|g)\right],
\end{aligned}
$$

where

$$
\begin{aligned}
\frac{cov(v,g)}{var(g)} &= \frac{cov(v, \gamma_g(s-p_0) + \alpha_g(p_T - \bar{p}_T) + \eta_g)}{var(\gamma_g(s-p_0) + \alpha_g(p_T - \bar{p}_T) + \eta_g)} = \frac{\gamma_g\sigma_v^2}{\gamma_g^2(\sigma_v^2 + \sigma_\varepsilon^2) + \alpha_g^2\sigma_T^2}, \\
\frac{cov(v,y|g)}{var(y|g)} &= \frac{cov\left(v, \beta_g(v-p_0) + \xi_g(g-\eta_g) + g + u|g\right)}{var\left(\beta_g(v-p_0) + \xi_g(g-\eta_g) + g + u|g\right)} = \frac{\beta_g var(v|g)}{\beta_g^2 var(v|g) + \sigma_u^2}, \\
var(v|g) &= var(v) - \frac{\left[cov(v,g)\right]^2}{var(g)} = \left(1 - \frac{cov(v,g)}{var(g)}\gamma_g\right)\sigma_v^2.
\end{aligned}
$$

Combining it with equation (B88) gives us:

$$\delta_g = \frac{\gamma_g \sigma_v^2}{\gamma_g^2(\sigma_v^2 + \sigma_\varepsilon^2) + \alpha_g^2 \sigma_T^2}, \tag{B96}$$

$$\lambda_g = \frac{\beta_g \left(1 - \delta_g \gamma_g\right) \sigma_v^2}{\beta_g^2 \left(1 - \delta_g \gamma_g\right) \sigma_v^2 + \sigma_u^2}. \tag{B97}$$

Substituting equations (B90) and (B91) into (B96) leads to:

$$\delta_g = \frac{\phi \delta \sigma_v^2 \pm \sqrt{9\phi^2 \delta^2 \sigma_v^4 + 16\phi^2 \delta \sigma_v^2 \sigma_T^2}}{4\phi^2 \left(\delta \sigma_v^2 + 2\sigma_T^2\right)}. \tag{B98}$$

Substituting equation (B84) into (B97) leads to

$$\lambda_g = \frac{\sqrt{\left(1 - \delta_g \gamma_g\right) \sigma_v^2}}{2\sigma_u} \left(> 0\right),$$

which stems from the SOC (i.e., $\lambda_g > 0$) and $1 - \delta_g \gamma_g = \frac{\gamma_g^2 \sigma_\varepsilon^2 + \alpha_g^2 \sigma_T^2}{\gamma_g^2(\sigma_v^2 + \sigma_\varepsilon^2) + \alpha_g^2 \sigma_T^2} > 0$. Combining the two SOCs and (M10) establishes that δ_g is positive and thus

$$\delta_g = \frac{\phi \delta \sigma_v^2 + \sqrt{9\phi^2 \delta^2 \sigma_v^4 + 16\phi^2 \delta \sigma_v^2 \sigma_T^2}}{4\phi^2 \left(\delta \sigma_v^2 + 2\sigma_T^2\right)}. \tag{B99}$$

By substitutions, we solve other endogenous parameters as functions of δ_g.

Finally, we compute the moments. The measure of price stability is solved as:

$$\begin{aligned}
& E[(p - p_T)^2]_g \\
= \; & E\left[\left(\begin{array}{c} \lambda_g \beta_g (v - p_0) + \left(\delta_g + \lambda_g \xi_g\right) \gamma_g (s - p_0) + \\ \left(\delta_g + \lambda_g \xi_g\right) \alpha_g (p_T - \bar{p}_T) + \lambda_g u - p_T + p_0 \end{array}\right)^2\right] \\
= \; & E\left[\left(\begin{array}{c} \left(\lambda_g \beta_g + \delta_g \gamma_g + \lambda_g \xi_g \gamma_g\right)(v - p_0) + \left(\delta_g \gamma_g + \lambda_g \xi_g \gamma_g\right) \varepsilon \\ + \left(\delta_g \alpha_g + \lambda_g \xi_g \alpha_g - 1\right)(p_T - \bar{p}_T) + \lambda_g u + (p_0 - \bar{p}_T) \end{array}\right)^2\right] \\
= \; & \frac{1}{2}\left(1 + \delta_g \gamma_g\right) \sigma_v^2 + \left(1 - \delta_g \alpha_g\right) \sigma_T^2 + (p_0 - \bar{p}_T)^2.
\end{aligned}$$

The measure for price discovery/efficiency is:

$$
\begin{aligned}
var\left(v|p\right)_g &= var(v) - \frac{[cov(v,p)]^2}{var(p)} \\
&= var(v) - \frac{\left[cov\left(v,\left(\begin{array}{c} p_0+\lambda_g\beta_g(v-p_0)+\lambda_g u+ \\ \left(\delta_g+\lambda_g\xi_g\right)\left[\gamma_g(s-p_0)+\alpha_g(p_T-\bar{p}_T)\right]\end{array}\right)\right)\right]^2}{var\left(\begin{array}{c} p_0+\lambda_g\beta_g(v-p_0)+\lambda_g u+ \\ \left(\delta_g+\lambda_g\xi_g\right)\left[\gamma_g(s-p_0)+\alpha_g(p_T-\bar{p}_T)\right]\end{array}\right)} \\
&= \sigma_v^2 - \frac{\left(\lambda_g\beta_g+\delta_g\gamma_g+\lambda_g\xi_g\gamma_g\right)^2\sigma_v^4}{\left[\begin{array}{c} \left(\lambda_g\beta_g+\delta_g\gamma_g+\lambda_g\xi_g\gamma_g\right)^2\sigma_v^2+\left(\delta_g\gamma_g+\lambda_g\xi_g\gamma_g\right)^2\sigma_\varepsilon^2 \\ +\lambda_g^2\sigma_u^2+\left(\delta_g\alpha_g+\lambda_g\xi_g\alpha_g\right)^2\sigma_T^2\end{array}\right]} \\
&= \frac{1}{2}\left(1-\delta_g\gamma_g\right)\sigma_v^2.
\end{aligned}
$$

The expected profits of the insider and the expected costs of the government are computed as follows:

$$
\begin{aligned}
E\left(\pi\right) &= E[(v-p)x] \\
&= E\left[\left(\begin{array}{c} v-p_0-\lambda_g\beta_g(v-p_0) \\ -\lambda_g u-\left(\delta_g+\lambda_g\xi_g\right)\left(g-\eta_g\right)\end{array}\right)\left(\begin{array}{c} \beta_g(v-p_0) \\ +\xi_g\left(g-\eta_g\right)\end{array}\right)\right] \\
&= E\left[\left(\begin{array}{c} \left(1-\lambda_g\beta_g-\delta_g\gamma_g-\lambda_g\xi_g\gamma_g\right)(v-p_0)- \\ \left(\delta_g+\lambda_g\xi_g\right)\gamma_g\varepsilon-\left(\delta_g+\lambda_g\xi_g\right)\alpha_g(p_T-\bar{p}_T)\end{array}\right)\left(\begin{array}{c} \left(\beta_g+\xi_g\gamma_g\right)(v-p_0) \\ +\xi_g\gamma_g\varepsilon \\ +\xi_g\alpha_g(p_T-\bar{p}_T)\end{array}\right)\right] \\
&= \frac{1}{2}\left(1-\delta_g\gamma_g\right)\beta_g\sigma_v^2,
\end{aligned}
$$

$$
\begin{aligned}
E(c) &= E[(p-v)g] \\
&= E\left[\begin{pmatrix} \left(\lambda_g\beta_g - 1\right)(v-p_0) + \lambda_g u + \\ \left(\delta_g + \lambda_g\xi_g\right)\left[\gamma_g(s-p_0) + \alpha_g(p_T - \bar{p}_T)\right] \end{pmatrix}\begin{pmatrix} \gamma_g(s-p_0) + \eta_g \\ +\alpha_g(p_T - \bar{p}_T) \end{pmatrix}\right] \\
&= E\left[\begin{pmatrix} \left(\lambda_g\beta_g - 1 + \delta_g\gamma_g + \lambda_g\xi_g\gamma_g\right)(v-p_0) \\ + \left(\delta_g\gamma_g + \lambda_g\xi_g\gamma_g\right)\varepsilon \\ + \left(\delta_g\alpha_g + \lambda_g\xi_g\alpha_g\right)(p_T - \bar{p}_T) \end{pmatrix}\begin{pmatrix} \gamma_g(v-p_0) + \gamma_g\varepsilon \\ +\alpha_g(p_T - \bar{p}_T) \end{pmatrix}\right] \\
&= \frac{1}{2}\left(\delta_g\gamma_g - 1\right)\gamma_g\sigma_v^2 + \frac{1}{2}\delta_g\gamma_g^2\sigma_\varepsilon^2 + \frac{1}{2}\delta_g\alpha_g^2\sigma_T^2 = 0.
\end{aligned}
$$

The correlation coefficient between the trading position of the insider and the government is

$$
\begin{aligned}
corr(x,g) &= \frac{cov(x,g)}{\sqrt{var(x)}\sqrt{var(g)}} \\
&= \frac{cov\left(\begin{pmatrix} \beta_g(v-p_0) + \xi_g\gamma_g(s-p_0) \\ +\xi_g\alpha_g(p_T - \bar{p}_T) \end{pmatrix}, \begin{pmatrix} \gamma_g(s-p_0) + \eta_g \\ +\alpha_g(p_T - \bar{p}_T) \end{pmatrix}\right)}{\sqrt{var\begin{pmatrix} \beta_g(v-p_0) + \xi_g\gamma_g(s-p_0) \\ +\xi_g\alpha_g(p_T - \bar{p}_T) \end{pmatrix}}\sqrt{var\begin{pmatrix} \gamma_g(s-p_0) + \eta_g \\ +\alpha_g(p_T - \bar{p}_T) \end{pmatrix}}} \\
&= \frac{\beta_g\gamma_g\sigma_v^2 - \beta_g\delta_g\left[\gamma_g^2\left(\sigma_v^2 + \sigma_\varepsilon^2\right) + \alpha_g^2\sigma_T^2\right]}{\sqrt{\left(\beta_g + \xi_g\gamma_g\right)^2\sigma_v^2 + \xi_g^2\gamma_g^2\sigma_\varepsilon^2 + \xi_g^2\alpha_g^2\sigma_T^2}\sqrt{\gamma_g^2\left(\sigma_v^2 + \sigma_\varepsilon^2\right) + \alpha_g^2\sigma_T^2}} = 0.
\end{aligned}
$$

Then we summarize the above results in Proposition S8.

Proposition S8. *If the government releases its trading position $\{g\}$, a linear equilibrium is defined by seven unknowns $(\beta_g, \xi_g, \gamma_g, \alpha_g, \eta_g, \delta_g, \lambda_g) \in R^7$, which are characterized by seven equations (B90)-(B92) and (B94)-(B97), together with two SOCs, $\lambda_g > 0$ and Equation (B89). The system of equations can be solved explicity as follows:*

$$
\begin{aligned}
\beta_g &= \frac{\sigma_u}{\sqrt{\frac{(1+\delta)\phi\delta_g + 2 - \delta}{\phi\delta_g + 2}\sigma_v^2}}, \xi_g = -\frac{\sigma_u\delta_g}{\sqrt{\frac{(1+\delta)\phi\delta_g + 2 - \delta}{\phi\delta_g + 2}\sigma_v^2}}, \gamma_g = \frac{(1-\phi\delta_g)\,\delta}{\phi\delta_g^2 + 2\delta_g}, \alpha_g = \frac{2\phi}{\phi\delta_g + 2}, \\
\eta_g &= 2\phi(\bar{p}_T - p_0), \lambda_g = \frac{\sqrt{\frac{(1+\delta)\phi\delta_g + 2 - \delta}{\phi\delta_g + 2}\sigma_v^2}}{2\sigma_u}, \delta_g = \frac{\phi\delta\sigma_v^2 + \sqrt{9\phi^2\delta^2\sigma_v^4 + 16\phi^2\delta\sigma_v^2\sigma_T^2}}{4\phi^2\left(\delta\sigma_v^2 + 2\sigma_T^2\right)},
\end{aligned}
$$

where $\delta \equiv \frac{\sigma_v^2}{\sigma_v^2+\sigma_\varepsilon^2}$. *The measure of price stability is then:*

$$E[(p-p_T)^2]_g = \frac{1}{2}\left(1+\delta_g\gamma_g\right)\sigma_v^2 + \left(1-\delta_g\alpha_g\right)\sigma_T^2 + (p_0-\bar{p}_T)^2.$$

The measure of price discovery/efficiency is:

$$var\,(v|p)_g = \frac{1}{2}\left(1-\delta_g\gamma_g\right)\sigma_v^2.$$

The expected profit of the insider and expected cost of the government are:,

$$E\,(\pi)_g = \frac{1}{2}\left(1-\delta_g\gamma_g\right)\beta_g\sigma_v^2, E\,(c)_g = 0.$$

The correlation coefficient between the trading position of the insider and the government is:

$$corr\,(x,g)_g = 0.$$

S3.2. Comparisons among the baseline model, disclosing trading plan and releasing both signals

In this subsection, we make two comparisions. First, we make the distinctions between disclosing the trading plan and releasing both signals. Second, we compare the three cases: the baseline case without communication, releasing both signals, and disclosing the trading plans.

First, since both disclosure scenarios have explicit solutions, as shown in Proposition 3 and Proposition S8, we directly compare their mathematical expressions. Thus, we have the following

Corollary S1. *Compared to the situation of releasing two signals, the government's disclosing the trading plan stabilizes the financial market more effectively, but obtains more inefficient asset prices and less market liquidity. Namely,* $E[(p-p_T)^2]_g < E[(p-p_T)^2]_{p_T,s}$, $1/var\,(v|p)_g < 1/var\,(v|p)_{p_T,s}$, *and* $1/\lambda_g < 1/\lambda_{p_T,s}$.

Proof. From Proposition 3 and Proposition S8, we know that

$$E[(p-p_T)^2]_g - E[(p-p_T)^2]_{p_T,s} = \frac{1}{2}\gamma_g\delta_g\sigma_v^2 - \alpha_g\delta_g\sigma_T^2 - \frac{1}{2}\delta\sigma_v^2 = -\frac{1}{\phi\delta_g+2}\left[\left(\phi\delta_g+\frac{1}{2}\right)\delta\sigma_v^2 + 2\phi\delta_g\sigma_T^2\right] < 0,$$

$$\lambda_g - \lambda_{p_T,s} = \frac{\sqrt{1-\gamma_g\delta_g}\sigma_v}{2\sigma_u} - \frac{\sqrt{1-\delta}\sigma_v}{2\sigma_u} > 0, \text{ (due to } \delta - \gamma_g\delta_g = \frac{1+2\phi\delta_g}{2+\phi\delta_g}\delta > 0)$$

$$\begin{aligned} var\left(v|p\right)_g - var\left(v|p\right)_{p_T,s} &= \frac{1}{2}\left(1-\delta_g\gamma_g - \frac{\left(1-\delta\right)^2\sigma_v^2 + 2\delta^2\sigma_\varepsilon^2}{\left(1+\delta^2\right)\sigma_v^2+\delta^2\sigma_\varepsilon^2}\right)\sigma_v^2 \\ &= \frac{1}{2}\frac{\left(\delta-\gamma_g\delta_g\right)\left(1+\delta\right)}{\left(1+\delta^2\right)\sigma_v^2+\delta^2\sigma_\varepsilon^2}\sigma_v^4 \\ &= \frac{1}{2}\frac{\left(1+\delta\right)\sigma_v^4}{\left(1+\delta^2\right)\sigma_v^2+\delta^2\sigma_\varepsilon^2}\frac{1+2\phi\delta_g}{2+\phi\delta_g}\delta > 0.\square \end{aligned}$$

We discuss the intuitions of Proposition S8 and Corollary S1. Releasing both signals implies that the government abandons all its information advantages. However, in the situation of disclosing the trading plan, other market participants cannot know the composition of the government's trading position and the realization of each signal, the government has relative information advantages to the case of releasing both signals. Hence, the government's disclosing the trading plan stabilizes the financial market more effectively than releasing both signals, namely, $E[(p-p_T)^2]_g < E[(p-p_T)^2]_{p_T,s}$. Compared to the policy of disclosing the trading position, price is more efficient in the situation of releasing both signals, since releasing the fundamental signal has dominating positive effects on price efficiency. Government intervention with communication affects market liquidity through an information channel and a noise channel. Relative to the policy of releasing both signals, the policy of disclosing the trading plan has larger negative noise effect on market liquidity. Thus we have $1/\lambda_g < 1/\lambda_{p_T,s}$.

Second, we compare the market performance of government intervention among three cases: the baseline model without communication, disclosing the trading plan and releasing both signals. Since the baseline model has so explicit solutions, we simulate these three cases and plot Figure 10 ($\phi = 1$) and Figure 11 ($\phi = 3$), respectively.

Compared to the baseline setting without information disclosure, as shown in Figure 10 and Figure 11, both disclosure policies negatively affect financial stability. Intuitively, communication, whether disclosing the trading plan or releasing two signals, deteriorates the information advantages of the government and does harm to the stabilizing effect of government intervention on price stability.

[Insert Figure 10 and Figure 11 here.]

Relative to the baseline setting without information disclosure, both disclosure policies improve price efficiency. With enlarged information set (i.e., $\{y, g\}$ or $\{y, p_T, s\}$), the market maker more easily uncovers the economic fundamentals and the price becomes more efficient.

As shown in Section 3.3, the effects on market liquidity of releasing both signals rely on the relative weight placed by the government on its policy motives: if the government places an equal weight on both goals, the positive effects on market liquidity of releasing the fundamental signal dominate and the financial market is deeper; if the government places more weight on its policy goals, the negative effects on market liquidity of releasing the price target dominate, and market liquidity is less than that of the benchmark setting. However, relative to the baseling setting, disclosing the trading plan decreases market liquitity. Intuitively, government intervention affects market liquidity through two channels (noise and information), and in this case the negative noise effect dominates the positive information effect.

S4. Sketch of numerical solutions

Now we provide a sketch of the numerical analysis in this paper. There are eight exogenous variables in the model: the variance in the liquidation value of the risky asset, σ_v^2; variance in noisy trading, σ_u^2; variance of the information noise of the government, σ_ε^2; variance of the price target, σ_T^2; mean of the fundamental value, p_0; mean of the price target, $\bar{p}_T$; policy weight of the government, ϕ; and correlation coefficient between the price target and liquidation value of the fundamental, ρ. For analytical convenience, we make several specifications about these parameters. First, we define $\theta \equiv \sigma_u^2/\sigma_v^2$ as the amount of noisy trading per unit of private information and change its values continuously in $[1, 2]$. Second, we set $\sigma_\varepsilon^2 = \sigma_v^2 = \sigma_T^2 = 1$, which are the same as those used in Pasquariello et al. (2020). Third, p_0 and $\bar{p}_T$ enter only the measure for price volatility $E[(p - p_T)^2]$ as their squared difference $(p_0 - \bar{p}_T)^2$. We set $(p_0 - \bar{p}_T)^2 = 1$. Fourth, we choose three possible values for $\phi : \{0, 1, 3\}$. When $\phi = 0$, the government is another insider. When $\phi = 1$, the government places equal weight on its policy goal and on profit maximization. When $\phi = 3$, the government cares more about the policy goal than about profit maximization. Fifth, we choose three possible values for $\rho : \{0, 0.1, 0.5\}$. When $\rho = 0$, the two signals of the government are independent. When $\rho = 0.1$, the two signals have a low positive correlation. When $\rho = 0.5$, the two signals have a high positive correlation.

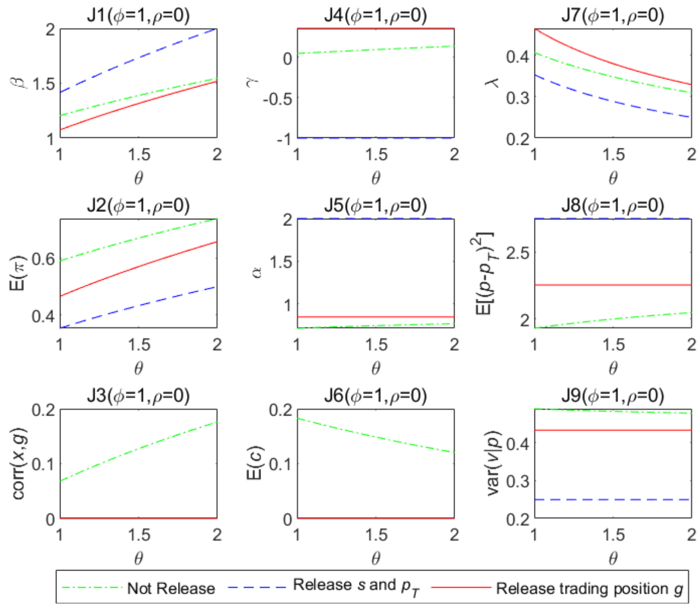

Figure 1: Comparisons between releasing two signals $\{p_T, s\}$ and releasing trading position $\{g\}$ ($\phi = 1$, $\rho = 0$). In each panel, the dotted and dashed line represents the case with no disclosure, the dashed line represents the case with releasing $\{p_T, s\}$, and the solid line represents the case with releasing $\{g\}$. The parameter values used in this model are: $\sigma_\varepsilon^2 = \sigma_v^2 = \sigma_T^2 = 1$, and $(p_0 - \bar{p}_T)^2 = 1$.

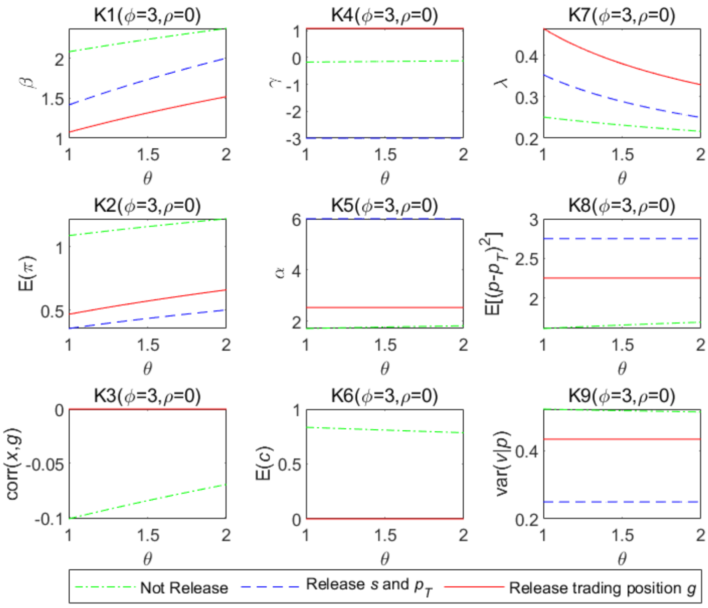

Figure 2: Comparisons between releasing two signals $\{p_T, s\}$ and releasing trading position $\{g\}$ ($\phi = 3$, $\rho = 0$). In each panel, the dotted and dashed line represents the case with no disclosure, the dashed line represents the case with releasing $\{p_T, s\}$, and the solid line represents the case with releasing $\{g\}$. The parameter values used in this model are: $\sigma_\varepsilon^2 = \sigma_v^2 = \sigma_T^2 = 1$, and $(p_0 - \bar{p}_T)^2 = 1$.