Appendix A. Model Parameters and Descriptions

Parameter	Description
γ	Baseline task success probability without effort, $0 < \gamma < \beta < 1$.
β	Task success probability with effort but without AI knowledge, $\gamma < \beta < 1$.
α	Task success probability with effort and AI knowledge, $\beta < \alpha < 1$.
c	Cost to an agent of exerting effort ($e_i = 1$).
ρ	Probability that one agent acquires AI-generated knowledge, $\rho \in [0,1]$.
c_r	Cost of knowledge sharing when working remotely ($c_r > 0$), $c_r = 0$ in-person.
Δ	Flexibility benefit of remote work to agents, captured by employer in equilibrium.
K	Direct employer cost savings from remote work (e.g., reduced overhead).
w_i	Base wage for agent *i*.
P	Project completion bonus awarded to both agents when both tasks succeed.
R	Employer's revenue from project success.
m	Fraction of remote work, $m \in [0,1]$.
η	Convexity parameter of remote knowledge-sharing cost function, $\eta > 1$.
$c_r(m)$	Remote knowledge-sharing cost as a function of remote share: $c_r \cdot [(1 + m)^{\eta} - 1]$.
$\underline{c}_r$	Critical remote cost threshold separating in-person vs. remote optimality.
Π_{arr}^{info}	Employer's profit under information structure *info* (*info* $\in \{unobs, obs\}$) and workplace arrangement *arr* (*arr* $\in \{ip, rm, hb\}$).

Appendix B. Formal Proofs

Proof of Lemma 1:

With effort observable, the employer sets $w_i = c$ for an agent exerting effort when she is not the knowledge holder, and $w_i = c + mc_r$ for the knowledge holder under remote work (i.e., when $m = 1$).[19] If an agent does not exert effort (i.e., $e_i = 0$), she receives no compensation, $w_i = 0$. This renders each agent's expected utility zero, regardless of action. An arbitrarily small tie-breaking payment therefore induces the high-effort profile $(e_1, e_2) = (1, 1)$.

With probability ρ, one agent acquires AI knowledge. Because knowledge-sharing decisions do not affect her compensation and (weakly) raise expected output, AI knowledge is always shared. The project succeeds with probability $(1-\rho)\beta^2 + \rho\alpha^2$. Expected revenue equals this probability times R. The total wage bill is $2c$ plus the reimbursement of knowledge-sharing costs c_r to the knowledge holder, which occurs with probability ρ in the remote work setting (i.e., when $m = 1$). Furthermore, the employer earns savings of $K + \Delta$. The employer's expected profit is therefore

$$\Pi^{obs} = [(1-\rho)\beta^2 + \rho\alpha^2]R - 2c - \rho mc_r + m(K + \Delta).$$

Thus, workplace location affects profit only through the expected knowledge-sharing cost ρc_r and location-specific benefits $K+\Delta$. The compensation scheme itself is independent of knowledge-sharing costs when effort is observable. ☐

Proof of Lemma 2:

For the in-person setting, assign each agent a success-contingent $w_i = \dfrac{c}{\beta - \gamma}$ wage and set the project bonus $P = 0$.[20] Because effort raises the task-success probability from γ to β, the expected incremental payoff satisfies $(\beta - \gamma)w_i = c$. A small tie-breaking benefit (i.e. $\varepsilon > 0$) makes $e_i = 1$ strictly optimal, yielding $(e_1, e_2) = (1, 1)$. AI knowledge sharing is cost-free in-person ($c_r = 0$) and raises the project success likelihood from β^2 to α^2; hence AI knowledge is always shared. Project success occurs with probability $(1-\rho)\beta^2 + \rho\alpha^2$, and an individual task succeeds with probability $(1-\rho)\beta + \rho\alpha$. Expected revenue

---

[19] The employer can contract on knowledge status and sharing decisions. The wage mc_r is paid only if the knowledge-holding agent shares, covering the sharing cost c_r.

[20] Because $\beta - \gamma$ is the smallest marginal increase in success probability from exerting effort (occurring when no knowledge is present), setting ensures the effort incentive compatibility constraint holds in all knowledge states, regardless of whether knowledge arrives.

is $[(1-\rho)\beta^2+\rho\alpha^2]R$, while the expected wage bill is $2[(1-\rho)\beta+\rho\alpha]w_i$. Substituting $w_i = \frac{c}{\beta-\gamma}$ gives the employer's profit:

$$\Pi_{ip}^{unobs} = [(1-\rho)\beta^2+\rho\alpha^2]R - 2[(1-\rho)\beta+\rho\alpha]\frac{c}{\beta-\gamma}.$$

For the remote setting, the same success-contingent $w_i = \frac{c}{\beta-\gamma}$ wage continues to induce effort. If AI knowledge is acquired, the informed agent compares withholding versus sharing. Withholding yields the informed agent an expected bonus $\alpha\beta P$ (joint success only if both succeed at α and β), whereas sharing yields $\alpha^2 P - c_r$ (higher joint success probability minus sharing cost). The sharing $P \geq \frac{c_r}{\alpha(\alpha-\beta)}$ incentive constraint is satisfied if. Project success still occurs with probability $(1-\rho)\beta^2+\rho\alpha^2$; a single task succeeds with probability $(1-\rho)\beta+\rho\alpha$. The wage bill remains $2[(1-\rho)\beta+\rho\alpha]w_i$, and the expected project-bonus bill is $2[(1-\rho)\beta^2+\rho\alpha^2]P$.

Additionally, relative to in-person work, the employer gains K from reduced overhead costs and captures Δ in competitive equilibrium benefits due to the flexibility of remote work. Substituting $w_i = \frac{c}{\beta-\gamma}$ and $P = \frac{c_r}{\alpha(\alpha-\beta)}$ gives the employer's profit: $\Pi_{rm}^{unobs} = \Pi_{ip}^{unobs} - 2[(1-\rho)\beta^2 + \rho\alpha^2]\frac{c_r}{\alpha(\alpha-\beta)} + K + \Delta.$ □

Proof of Proposition 1:

To determine the critical threshold for remote knowledge-sharing costs, we compare the employer's expected profit under the in-person and remote work arrangements. From Lemma 2, the in-person profit includes no knowledge-sharing bonus because $c_r = 0$, whereas the remote profit requires a joint success bonus $P = \frac{c_r}{\alpha(\alpha-\beta)}$ to induce sharing. The employer also realizes cost savings K from reduced office space and captures Δ in flexibility benefits in competitive equilibrium.

Thus, the profit difference between remote and in-person arrangements is:

$$\Pi_{rm}^{unobs} - \Pi_{ip}^{unobs} = -2\big[(1-\rho)\beta^2+\rho\alpha^2\big]\frac{c_r}{\alpha(\alpha-\beta)} + K + \Delta.$$

The employer is indifferent between arrangements when this difference equals zero, yielding the threshold: $\underline{c_r} = \frac{\alpha(\alpha-\beta)(K+\Delta)}{2[(1-\rho)\beta^2+\rho\alpha^2]}$.

Hence, if $c_r > \underline{c_r}$, in-person work is preferred; if $c_r < \underline{c_r}$, remote work is preferred. □

Proof of Proposition 2:

Under a hybrid arrangement with remote share $m \in [0,1]$, the employer's expected profit is:

$\Pi_{hb}^{unobs}(m) = \Pi_{ip}^{unobs} + m(K + \Delta) - 2\big[(1 - \rho)\beta^2 + \rho\alpha^2\big]\frac{c_r[(1+m)^\eta - 1]}{\alpha(\alpha-\beta)}$, where Π_{ip}^{unobs} is the expected profit under the optimal in-person arrangement, K is the employer's cost saving from reduced overhead, Δ is the flexibility benefit to agents (that the employer captures in competitive equilibrium), and $c_r(m) = c_r[(1 + m)^\eta - 1]$ represents the convex knowledge-sharing costs with $\eta > 1$. To find the optimal remote share m^*, differentiate $\Pi_{hb}^{unobs}(m)$ with respect to m:

$$\frac{\partial \Pi_{hb}^{unobs}}{\partial m} = (K + \Delta) - 2\big[(1-\rho)\beta^2 + \rho\alpha^2\big]\frac{c_r\eta(1+m)^{\eta-1}}{\alpha(\alpha-\beta)}.$$

The first-order condition for an interior optimum satisfies:

$$(K + \Delta) = 2\big[(1-\rho)\beta^2 + \rho\alpha^2\big]\frac{c_r\eta(1+m)^{\eta-1}}{\alpha(\alpha-\beta)}.$$

Solving for m^* gives:

$$m^* = \left(\frac{\alpha(\alpha-\beta)(K+\Delta)}{2\eta c_r\big[(1-\rho)\beta^2 + \rho\alpha^2\big]}\right)^{\frac{1}{\eta-1}} - 1.$$

If the stationary point m^* falls within the specified range, $m^* \in (0,1)$, it is the optimal remote share. If $m^* \leq 0$, the boundary solution $m = 0$ (fully in-person) is optimal; if $m^* \geq 1$, the boundary solution $m = 1$ (fully remote) is optimal. ☐

Appendix C.

Only the Overall Project Outcome is Observable

In many settings, managers cannot observe the success of individual tasks—for example, under remote work or when they are unfamiliar with the specifics of a task or its method of execution—and can only observe whether the overall project succeeds. Intuitively, compensation in such settings can only be linked to the overall project outcome, which is observable to the manager.

We consider the case in which neither agent effort nor individual task outcomes are observable; only overall project success is. For simplicity, we assume limited liability and normalize agents's minimum wage to 0, so pay is a success-contingent bonus paid only when the project succeeds. In this setting, as shown below, the optimal compensation contract uses a wage hierarchy to induce effort: the high-wage agent is paid enough that—even if their teammate shirks and the project success probability falls—exerting effort leads to sufficiently high expected returns to cover effort cost. For the lower-wage agent, anticipating that the high-wage agent will exert effort, a smaller success-contingent wage is sufficient to induce effort. In this way, the wage hierarchy supports an equilibrium dynamic that sustains effort from both agents despite the limited observability of individual task success. The wages are set at the minimum levels that satisfy each agent's incentive compatibility constraint—requiring that each agent's expected return from exerting effort is at least as high as their payoff from shirking.

Proposition 3. *If only the overall project outcome is observable, the optimal contract sets success-contingent wages*

$$w_H = \frac{c}{\gamma(\beta-\gamma)}, \qquad w_L = \frac{c}{\beta(\beta-\gamma)},$$

together with a project-success contingent bonus to induce knowledge sharing,

$$P(m) = \max\left\{0, \frac{c_r[(1+m)^\eta - 1]}{\alpha(\alpha-\beta)} - w_L\right\},$$

where m is the remote work share and $c_r(m) = c_r[(1+m)^\eta - 1]$ *is the cost of knowledge sharing.*

The optimal remote work share is given by:

$$m^* = \min\left\{1, \max\left\{0, \left[\frac{\alpha(\alpha-\beta)(K+\Delta)}{2\eta\, c_r\left((1-\rho)\beta^2 + \rho\alpha^2\right)}\right]^{1/(\eta-1)} - 1\right\}\right\}.$$

Fully remote work (m = 1) *is optimal if and only if*

$$c_r \leq \frac{\alpha(\alpha-\beta)}{2^\eta - 1}\left(w_L + \frac{K+\Delta}{2\big[(1-\rho)\beta^2 + \rho\alpha^2\big]}\right).$$

Proof. Consider first the high-wage agent. When the other agent shirks, the project succeeds with probability $\beta\gamma$ if she exerts effort, and with probability γ^2 if she shirks. Her incentive compatibility condition is therefore

$$\beta\gamma\, w_H - c \geq \gamma^2\, w_H \Longrightarrow w_H = \frac{c}{\gamma(\beta-\gamma)}.$$

Next, consider the low-wage agent. Given that the high-wage agent exerts effort, the project succeeds with probability β^2 if she also exerts effort, and with probability $\gamma\beta$ if she shirks. Her IC condition is

$$\beta^2\, w_L - c \geq \gamma\beta\, w_L \Longrightarrow w_L = \frac{c}{\beta(\beta-\gamma)}.$$

Together, these results imply the optimal wage hierarchy:

$$w_H = \frac{c}{\gamma(\beta-\gamma)} \quad \text{and} \quad w_L = \frac{c}{\beta(\beta-\gamma)}$$

Given the arrival of new knowledge with probability ρ, the project success probability is $\alpha\beta$ if the knowledge is not shared and both agents exert effort, and α^2 if it is shared. Sharing requires the knowledge holder to incur a remote-sharing cost $c_r(m) = c_r[(1+m)^\eta - 1]$. Since payments are made only upon project success, the knowledge holder's private benefit from sharing is $\alpha(\alpha-\beta)(w_k + P(m))$, where $k \in \{H,L\}$. The knowledge-sharing incentive compatibility constraint is $\alpha(\alpha-\beta)(w_k + P(m)) \geq c_r[(1+m)^\eta - 1]$.

Because $w_H > w_L$, the high-wage agent receives a larger payment upon project success, giving them stronger incentives to share knowledge compared to the low-wage agent. If the low-wage agent is willing to share under the given payment scheme, the high-wage agent will also find it optimal to share. Therefore, the incentive compatibility constraint for the low-wage agent is the binding one, and solving it yields the minimum project-contingent bonus

$$P(m) = \max\left\{0,\ \frac{c_r[(1+m)^\eta - 1]}{\alpha(\alpha-\beta)} - w_L\right\}$$

Note that $P(m) > 0$ when $(1+m)^\eta - 1 > \frac{\alpha(\alpha-\beta)w_L}{c_r}$. Thus, only for $m > \underline{m} \equiv$

$\left(1+\frac{\alpha(\alpha-\beta)w_L}{c_r}\right)^{1/\eta}-1$ will the project-contingent bonus be paid.

Let R denote the project revenue and $K+\Delta$ the employer's gain from offering remote work. If new AI knowledge is obtained, the above bonus facilitates knowledge sharing, whereby the project succeeds with probability α^2; without new knowledge arrival, the success probability is β^2. The expected profit is

$$\Pi_{hb}^{proj}(m)=\big[(1-\rho)\beta^2+\rho\alpha^2\big]\cdot\big[R-w_H-w_L-2P(m)\big]+m\cdot(K+\Delta).$$

When the "max{·,0}" term in $P(m)$ is binding, substituting

$$P(m)=\frac{c_r[(1+m)^\eta-1]}{\alpha(\alpha-\beta)}-w_L$$

and taking the derivative with respect to m gives

$$\frac{\mathrm{d}\Pi_{hb}^{proj}}{\mathrm{d}m}=-2\big[(1-\rho)\beta^2+\rho\alpha^2\big]\cdot\frac{c_r\,\eta\,(1+m)^{\eta-1}}{\alpha(\alpha-\beta)}+(K+\Delta)=0,$$

which yields the stationary point

$$m^{FOC}=\left[\frac{\alpha(\alpha-\beta)(K+\Delta)}{2\eta\,c_r\big((1-\rho)\beta^2+\rho\alpha^2\big)}\right]^{\frac{1}{\eta-1}}-1$$

The optimal remote share is given by

$$m^*=\begin{cases} m^{FOC}, & \text{if } \bar{m}\le m^{FOC}\le 1,\\ \bar{m}, & \text{if } m^{FOC}<\bar{m} \text{ and } K+\Delta>0,\\ 0, & \text{if } m^{FOC}<\bar{m} \text{ and } K+\Delta\le 0,\\ 1, & \text{if } m^{FOC}>1\ . \end{cases}$$

When the stationary point, m^{FOC}, is an interior point in the region where $P(m)>0$ (i.e., $\underline{m}\le m\le 1$), it is the optimal remote share. When $m^{FOC}<\underline{m}$, $P(m)=0$, and the employer's profit is linear. If it is increasing in

m (i.e., $K+\Delta > 0$), the optimal share is $\underline{m}$. If it is decreasing in m (i.e., $K+\Delta \leq 0$), fully in-person is optimal. When $m^{FOC} > 1$, then fully remote is optimal.

Finally, comparing the employer's profit at $m = 1$ to $m = 0$,

$$\Pi_{hb}^{proj}(1) - \Pi_{hb}^{proj}(0) = \big((1-\rho)\beta^2 + \rho\alpha^2\big)\left(2w_L - \frac{2c_r[2^\eta - 1]}{\alpha(\alpha-\beta)}\right) + (K+\Delta),$$

gives the condition for fully remote work ($m = 1$) to be optimal:

$$c_r \leq \frac{\alpha(\alpha-\beta)}{2^\eta - 1} \cdot \left[w_L + \frac{K+\Delta}{2\big((1-\rho)\beta^2 + \rho\alpha^2\big)}\right].$$

□

Intuitively, the project success contingent bonus is determined as the minimal additional success-contingent pay that will incentivize knowledge sharing should new knowledge be obtained, as a function of the fraction of remote work, whereas the wages are set to be the minimal wages that will induce high effort, independent of whether new knowledge is obtained. The optimal share of remote work here, m^*, at its interior, is increasing in the benefits from remote work, $K + \Delta$, decreasing in the cost of remote knowledge sharing, c_r, as well as in the likelihood of occurrence of new AI knowledge being obtained, ρ, as in the observable task outcome regime.

Appendix D. Executive-Branch Return-to-Office (RTO) Status Across U.S. States & the District of Columbia

Status definitions (executive branch only, as of August 8, 2025):

Yes = a statewide directive requiring every covered employee of the executive branch to be on site full time (five days a week, i.e., 100% of scheduled hours).

Partial = the statewide rule either mandates fewer than five on-site days or applies only to part of the executive workforce.

No = no statewide mandate for the executive branch is in force, even if relevant legislation is still pending.

Jurisdiction	**Status**	**Evidence / Notes (official link if applicable)**
Alabama	No	No publicly advertised statewide or agency RTO mandate as of 2025-08-08.
Alaska	No	No publicly advertised statewide or agency RTO mandate as of 2025-08-08.
Arizona	No	SB 1237 died when the 2025 session adjourned (2025-06-27); no advertised RTO mandate as of 2025-08-08. Arizona Senate Bill 1237.
Arkansas	No	No publicly advertised statewide or agency RTO mandate as of 2025-08-08.
California	Partial	CalHR statewide guidance sets a default of at least four on-site days per week (effective 2025-07-01). Governor Newsom orders return to office.
Colorado	No	No publicly advertised statewide or agency RTO mandate as of 2025-08-08.

Table continues on next page

Jurisdiction	Status	Evidence / Notes (official link if applicable)
Connecticut	No	No publicly advertised statewide or agency RTO mandate as of 2025-08-08.
Delaware	No	No publicly advertised statewide or agency RTO mandate as of 2025-08-08.
District of Columbia	Partial	E-DPM policy requires agencies to ensure at least 50% of office-based staff are on site during regular business hours (effective 2024-01-08). DC E-DPM Telework/Work Schedules.
Florida	No	No publicly advertised statewide or agency RTO mandate as of 2025-08-08.
Georgia	No	No publicly advertised statewide or agency RTO mandate as of 2025-08-08.
Hawaii	No	No publicly advertised statewide or agency RTO mandate as of 2025-08-08.
Idaho	Partial	Statewide policy limits telework to no more than 20% of office-based staff on any given day (effective 2024-03). Idaho DHR Section 7 Telecommuting Policy.
Illinois	No	No publicly advertised statewide or agency RTO mandate as of 2025-08-08.
Indiana	Yes	Executive Order EO-25-16 (2025) requires all full-time state employees to return to the office (effective 2025-07-01). Indiana SPD “The Torch” — Remote Work Policy Update.
Iowa	No	No publicly advertised statewide or agency RTO mandate as of 2025-08-08.
Kansas	No	Senate Bill 256 is still in committee and has not advanced; no advertised RTO mandate as of 2025-08-08. SB 256 bill.
Kentucky	No	Senate Bill 79 is still in committee and has not advanced; no advertised RTO mandate as of 2025-08-08. SB 79 bill.

Table continues on next page

Jurisdiction	Status	Evidence / Notes (official link if applicable)
Louisiana	Yes	Executive Order JML 25-048 ends telework; employees must work at designated offices (effective 2025-07-01). Executive Order JML 25-048.
Maine	Partial	Baseline telework policy allows discretionary scheduling per agency; Union sources suggest two-day in-office expectation. (effective June 2024). Maine Executive Branch Baseline Telework Policy.
Maryland	Partial	Telework policy requires hybrid employees to work at least two on-site days per week (effective 2024-05-15). Maryland Telework Policy.
Massachusetts	No	No publicly advertised statewide or agency RTO mandate as of 2025-08-08.
Michigan	No	No publicly advertised statewide or agency RTO mandate as of 2025-08-08.
Minnesota	Partial	Telework policy requires most state agency employees to work in-person for at least 50% of scheduled workdays (effective 2025-06-01). Change to State Telework Policy.
Mississippi	No	No publicly advertised statewide or agency RTO mandate as of 2025-08-08.
Missouri	Yes	Memo requires supervisors and managers to return on Feb 25 2025, with all remaining remote workers returning by Mar 24 2025. Governor calls state workers back to offices.
Montana	No	No publicly advertised statewide or agency RTO mandate as of 2025-08-08.
Nebraska	Yes	Executive Order No. 23-17 requires state employees to return in-person (effective 2024-01-02). Executive Order No. 23-17.

Table continues on next page

Jurisdiction	Status	Evidence / Notes (official link if applicable)
Nevada	Partial	Statewide policy makes remote work "exception, not the rule"—designated as "limited discretionary privilege" approved case-by-case, can be revoked anytime (effective 2023-12). Remote Work Policy.
New Hampshire	No	No publicly advertised statewide or agency RTO mandate as of 2025-08-08.
New Jersey	Partial	CSC telework rules allow up to 2 days per week remote work Model Telework Pilot Program Extension.
New Mexico	Yes	State Personnel Office announced all state employees would return to in-person work on Jan 3 2023; the deadline for most was later extended to Feb 2 2023. Return to office for state workers delayed.
New York	No	No publicly advertised statewide or agency RTO mandate as of 2025-08-08.
North Carolina	No	No publicly advertised statewide or agency RTO mandate as of 2025-08-08.
North Dakota	No	No publicly advertised statewide or agency RTO mandate as of 2025-08-08.
Ohio	Yes	Executive Order 2025-01D mandates that all permanent state employees return to in-person work (effective 2025-03-17). Executive Order 2025-01D.
Oklahoma	Yes	Executive Order 2024-29 mandates that all permanent state employees return to in-person work (effective 2025-02-01). Executive Order Requiring State Employees to Return to Office.
Oregon	No	No publicly advertised statewide or agency RTO mandate as of 2025-08-08.

Table continues on next page

Jurisdiction	Status	Evidence / Notes (official link if applicable)
Pennsylvania	Partial	Hoteling Pilot Program required at least three days per week in-office for senior management, Governor's Office staff, and Cabinet members (effective 2023-03). Hoteling Pilot Program.
Rhode Island	Partial	State policy allows telework only when operationally justified or in emergencies; requires formal agency-level agreements. HR Teleworking Policy.
South Carolina	No	No publicly advertised statewide or agency RTO mandate as of 2025-08-08.
South Dakota	No	No publicly advertised statewide or agency RTO mandate as of 2025-08-08.
Tennessee	No	No publicly advertised statewide or agency RTO mandate as of 2025-08-08.
Texas	No	Originally banned remote work by executive order, then allowed agency discretion under HB 5196 (effective 202509-01); no advertised RTO mandate as of 2025-08-08. HB 5196.
Utah	No	No publicly advertised statewide or agency RTO mandate as of 2025-08-08. [22]
Vermont	Partial	Department for Children and Families ordered over 100 economic services employees to return to full-time in-person work (effective 2024-11-21). Vermont state workers ordered back to office.

Table continues on next page

22

Utah recently repealed its “surge remote work” policy, which had allowed state employees to work from home on poor air-quality days. See Utah News Dispatch, April 11, 2025.

Jurisdiction	Status	Evidence / Notes (official link if applicable)
Virginia	Yes	Executive memo directed all executive-branch employees to return to office (effective 2022-07-05) Chief of Staff Memo.
Washington	No	No publicly advertised statewide or agency RTO mandate as of 2025-08-08.
West Virginia	Yes	Telework eliminated as of April 1 2024; all executive-branch state employees required to return full-time in-person. WV administration orders return-to-office.
Wisconsin	No	No publicly advertised statewide or agency RTO mandate as of 2025-08-08.
Wyoming	No	No publicly advertised statewide or agency RTO mandate as of 2025-08-08.