Management Rotation as a Mechanism to Support Favor Exchanges in Organizations

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Abstract

We model exchanges of favors between division managers in a multidivisional organization. The model shows that rotating managers across divisions periodically can better support such exchanges as compared to a policy of fixed managerial roles. We show that rotation dominates fixed roles when agents' discount rates are at moderate levels, and when divisions' needs for favors are asymmetric. We discuss several empirical implications of the model, as well as applications to other kinds of organizations such as government agencies and strategic alliances.

Keywords: Divisions; Rotation; Favors; Relational Contracts; Roles; Organization.

Introduction

Rotating employees through different jobs in an organization is a widespread management practice. A 2021-22 survey conducted by CRANET, a major human resource management (HRM) research organization, found that 70% of the over 8000 companies in 38 countries that responded to its survey included job rotation as an HRM policy. Earlier research documents the spread of job rotation practices in the U.S. and Europe beginning in the 1980s, following the Japanese model (Ouchi 1981; Ostermann 1994, 2000; Frazis, et al. 1998; OECD 1999; Cappelli 2001; Cappelli & Neumark 2003).

Literatures in human resource management and economics discuss several benefits of job rotation practices to organizations: employee and employer learning and perspective-taking (Campion, Churaskin & Stevens 1994; Ortega 2001; Eriksson & Ortega); employee motivation and job satisfaction (Cosgel & Miceli 1999); improved employee monitoring, information provision, and incentives (Prescott & Townsend 2006; Hertzberg, Liberti & Paravisini 2010; Hakenes & Katolnik 2017); and prevention of employee poaching (Battison, Espinosa & Liu 2025). In this paper, we explore a novel rationale for job rotation: sustaining and enhancing cooperative relationships between the managers of an organization's divisions or business units. While existing research is primarily concerned with the rotation of employees at lower organizational levels, we apply our theory to higher managerial levels such as division general managers.

Our premise is that in multidivisional organizations, unforeseen contingencies often lead divisions to request temporary transfers of resources from other divisions -- transfers that are

unplanned and unpriced. These resources can include personnel, equipment and facilities, as well as services such as expedited delivery or product redesign. For example, Rolls Royce's aerospace division temporarily assigned its engineers to the company's marine and nuclear divisions in order to help develop those businesses (CIPD 2015). Telecommunication companies such as Verizon and AT&T share test and measurement equipment between regional divisions when rolling out a new technology.[1] Accenture and PwC temporarily assign consultants to their foreign units in order to transfer knowledge to them, and the flow is often reversed (Meister & Davenport 2005; PwC 2025). Construction companies often temporarily move equipment between construction sites run by different business units in order to spread fixed costs.[2] Short-term visits by researchers to other divisions' R&D centers are also common (Kang & Eklund 2025).

Because cooperation between divisions is usually not part of a manager's job definition and may be difficult for top management to monitor and evaluate, division managers typically have wide discretion to satisfy, deny, or delay another division's cooperation requests. Moreover, because organizations often prevent divisions from paying for temporary resource transfers for accounting reasons, inter-divisional cooperation cannot be easily sustained through an internal "relational incentive contract" sustained by the promise of monetary rewards (Baker *et al*., 1994, 2002; Levin, 2003).

Our key contention is that when financial payments cannot be used, cooperation can be sustained through a different type of relational contract – namely, "favor exchanges" in which a

[1] https://www.customtruck.com/blog/what-is-telecom-infrastructure-sharing/#:~:text=Active%20Sharing:%20Sharing%20electronic%20components,the%20industry's%20success%20is%20crucial.
[2] https://www.constructiondive.com/spons/the-benefits-of-sharing-resources-across-multiple-offices/648249/#:~:text=The%20best%20way%20to%20get,employee%20availability%20in%20each%20location.

divisional manager provides resources to another divisional manager because she expects to receive favors from that manager in the future. A division manager is thus motivated to give a favor because she is concerned about losing the future cooperation of her counterpart if she fails to do so. While standard favor exchange models (e.g., Kandori 1992) take the alternation of giver and receiver roles in a community as given, we show that in an organization, the endogenous rotation of managers across divisions can be used to optimally reassign these roles over time, and through that channel, make cooperation between divisions easier to sustain.

We model an organization containing pairs of divisions that are naturally pre-disposed to cooperate with each other. Examples of such pairs are a purchasing and a supplying division, or business units that are co-located or have fungible assets or employees. We show that rotating managers across divisions in a pair replaces the payoffs those managers would receive under fixed roles with a convex combination of them. We then study the conditions under which rotation promotes more interdivisional favor exchanges, relative to a policy of fixed managerial roles.

We first show that rotation is more likely to be optimal the greater the asymmetry among divisions in their likelihood to need cooperation from one another. Asymmetry strengthens the role of rotation as a cooperation mechanism because it is the prospect of managing a favor-receiving unit in the future that creates incentives for giving favors today. Second, we show that there is a non-monotonic relationship between use of rotation and the extent and value of the managers' future interactions in the organization. Rotation does not help when divisional managers are so impatient that they are unwilling to cooperate even when their division is mostly in the position of favor receiver. As the managers' patience grows, rotation becomes useful because it allows to use the profits of the usual favor-receiving division to "subsidize" the favor-

giving one. When patience grows high enough, though, the managers are willing to cooperate even under fixed roles and thus, rotation no longer helps. The model therefore predicts a certain complementarity between repeated intrafirm interactions (due, for instance, to limited external mobility of managers) and the adoption of rotation policies.

Our model was inspired in part by an interview of a senior contract manager at a large Chinese builder of electric power stations.[3] The company consists of a main contractor division, as well as several subsidiaries that act as subcontractors. In explaining one reason why there are not more disputes between the main contractor and the subsidiaries, the interviewee said that,

> *"In internal group management, the execution of internal contracts can also affect some management careers. I might be here today, there tomorrow, and then I could be in a leadership position that I need to serve on the side of the current projects. Their roles change every two to three years. Therefore, this rotation can help avoid the issues mentioned earlier. Currently, many adjustments in leadership positions follow certain patterns... There is a rotation mechanism in place. Adjusting leadership roles appropriately while ensuring professionalism is beneficial for executing internal contracts because you might become my Party A, and I could become your Party B."*

While multidivisional firms are our leading application, management rotation to sustain favor exchanges may also occur in other important settings.[4] For example, rotation of leadership within organizations' top management teams, as well as in political organizations such as the Swiss Government or the European Union Council, is sometimes observed (e.g., Eichenberger & Frey 2024). Our model suggests that one benefit of such rotations may be to strengthen

[3] The interview was conducted by Wenqiang Wang (Hong Kong Baptist University) and Ying Gao (Tianjin University).

[4] We are unaware of research on the rotation of employees between buying firms and their independent suppliers in order to sustain buyer-supplier cooperation. To the contrary, the literature in strategy has emphasized the wide range of methods firms use to restrict employee mobility across firm boundaries in order to prevent the leakage of proprietary information and internal disruption (e.g., Liebeskind 1996; Coff 1997; Agarwal, Ganco & Ziedonis 2009). In addition, because suppliers typically serve more than one buyer, rotating managers with any one buyer is likely to alienate other buyers.

incentives for subordinates to provide favors to leaders in anticipation of becoming leaders themselves, and receiving favors from former leaders, in the future.

As another example, government agencies must often address social problems that span agency boundaries (e.g., Linden 2003; Goldsmith & Eggers 2004). Rotation of managers across such agencies may be important in incentivizing the kind of favor-giving required to address these problems effectively. Consistent with this, the U.S.'s Office of Personnel Management (OPM) requires some candidates for promotion to the Senior Executive Service to spend at least four months in a rotation program with another federal government agency (OPM, 5 CFR 412.302).

The rest of this paper is organized as follows. In the next section, we discuss how our paper relates and contributes to the literature. Then, we present our formal model of managerial rotation. We discuss applications and empirical implications in our Discussion/Conclusion section.

Literature Review

Various literatures highlight a number of rationales for job rotation policies in organizations, most of which apply to management rotation as well. Theoretical models and case study evidence suggest that job rotation, by exposing employees to a wider range of the organization's operations, improves their job skills and perspective-taking (e.g., Meyer 1994; Campion et al. 1994; Kusunoki & Numagami 1998; Cosgel & Miceli 1999). A large-scale survey provides evidence for effect of job rotation on employee learning, but consistent with Ortega (2001), indicates that job rotation is more important for employers to learn about their employees' skills (Eriksson & Ortega 2006). It has also been argued that job rotation improves employee satisfaction and motivation by providing the employee a wider variety of job

experiences (Andrews 1963), but the evidence for this effect is mixed (Campion et al. 1994; Eriksson & Ortega 2006).

Other theoretical models in economics focus on the role of job rotation in providing incentives to employees, and in relieving problems of private information. For example, rotation may break the link between an employee's current productivity and the future performance targets set for her by the employer, thus softening the ratchet effect (Ickes & Samuelson 1987); incentivize employees to exert effort in their current job in order to build their reputations with supervisors in the next job (Hanekes & Katolnik 2017); obtain information from employees (Hirao 1993; Mittendorf 2004); or prevent employees from gaining access to private information (Prescott & Townsend 2006). To our knowledge, the literature on job rotation has not examined whether and how it can help to sustain cooperation between managers and units in an organization, which is our contribution in this paper.

By modeling rotation as a mechanism to enforce relational contracts between units, our paper also contributes to the literature on relational contracts and relational governance in management and economics (Argyres, Lumineau & Zanarone 2025). Relational governance involves informal agreements between parties that are enforced by trust or norms of reciprocity (Macaulay 1963; Macneil 1978; Cao & Lumineau 2015), or in economic models of relational contracts, by the parties' desire to preserve valuable future interactions (Klein 1996; Baker et al. 2002; Levin 2003). The existence of relational contracts as treated in economics is supported by empirical evidence (e.g., Gil & Marion 2013; Barron et al. 2020; Gil, Kim & Zanarone 2022; Macchiavello & Morjaria 2015, 2021; for reviews, see Gil & Zanarone 2017, 2018).

Most relational contracting models consider self-enforcing agreements between an employer and an employee, or a buyer and a supplier, in which one party promises to take

productive actions and the other party promises a monetary reward. The threat of terminating future interactions is used to make both parties' promises credible. These models focus on how the value of future interactions and the parties' outside options affect the credibility and dynamics of relational contracts (e.g., Levin 2003; Halac 2012; Li & Matouschek 2013). A few papers explore how the design and scope of formal contracts and the choice of firm boundaries can help enforce relational contracts (e.g., Klein & Murphy 1988; Baker, Gibbons & Murphy 1994, 2002; Argyres, Bercovitz & Zanarone 2020). Our model contributes to this literature by studying a novel dimension of formal governance – job rotation policies – that can facilitate internal relational contracts. Relatedly, while existing papers primarily focus on relational contracts with monetary incentives and rewards, our model shows that a well-designed rotation policy can support relational contracts even when monetary transfers are infeasible.

As explained in the accounting literature, spontaneous monetary transfers are usually infeasible in multidivisional firms because divisional budgets are approved in advance (Datar & Rajan 2021, ch. 16, 22). Unplanned cash transfers therefore cannot be properly accounted for, distorting the "profits" that divisional profit centers report to top management. The profitability of a division giving a favor will be deflated because the payment it receives for it was excluded from its budget. The profitability of a division receiving a favor will be inflated because the payment it makes for it was excluded from its budget. Because of these distortions, profit center managers cannot be held fully accountable for unit performance, weakening the incentives they face. In addition, the distortions may lead the firm to underinvest in the favor-giving division, and overinvest in the favor-receiving division.

Finally, our paper relates to a small but important literature in economics, which models favor exchanges – that is, self-enforcing agreements in which monetary incentives are not

feasible and current favors are sustained by the fear of losing future favors.[5] Papers in this literature typically model cooperation between individuals in a community, taking the roles of each individual and the frequency with which pairs of individuals need each other's favors as given. Most of these models ask which mechanisms can make favor exchanges self-enforcing under private monitoring – that is, when a party's favor giving is difficult for the other parties to observe (Kandori 1992; Mobius 2001; Hauser & Hopenhayn 2005; Abdulkadiroglu & Bagwell 2013). Li and Powell (2020) study a favor exchange model with perfect information and show that playing multiple favor exchange games makes each individual favor exchange game easier to sustain even when the games are identical, and thus the standard logic of multimarket contacts (Bernheim & Whinston 1990) does not apply. Our paper differs from these models in that we endogenize the players' favor giver and favor receiver roles and ask how rotating players across roles may sustain favor exchange agreements between them. Our model therefore brings the logic of favor exchanges into organizational settings (such as multidivisional firms) in which it is natural to think of players' roles as being endogenously determined by organizational policies.

To summarize, our review of the literature supports the main premises and assumptions of our management rotation model. Management rotation has not as yet been modeled as a mechanism to enforce internal relational contracts. Such rotation becomes important in the many cases in which cash payments for unplanned, internally provided services are infeasible. This gap

[5] Our model of favor exchange is thus different from early models of "gift exchange" in which supra-normal wages are gifts to workers as a reward for their effort (Akerlof 1982, 1984). This work is close in spirit to the logic of relational contracts sustained by monetary payments rather than the pure exchanges of cooperative actions studied here. Other papers, such as Carmichael and MacLeod (1997), study gift-giving as an institution in which unsolicited and often not particularly useful goods are offered as a signal of reciprocity and altruism.

in the literature is thus important to fill because unpriced, voluntary transfers requiring cooperation between division managers are often important for organizational performance.

Model

Consider an organization with two units, 1 and 2, and two identical agents, each of whom manages a unit. Both agents are risk-neutral, live forever, and discount next-period payoffs at the rate $\delta \in (0,1)$. Time evolves in discrete periods: $t = 1,2, ...$

In any given period, one of the two units may need the other to take an unscheduled cooperative action, which we label hereafter as a "favor". For instance, the two units may operate at different stages of the vertical chain of production, and the downstream (manufacturing) unit may need the upstream one to expedite component deliveries due to a demand spike. Alternatively, the two units may be responsible for different but related products or locations, and one unit may occasionally need to borrow know-how and personnel from the other. While we assume only two units for simplicity, the model would readily extend to an organization with n pairs of units where given the technology and firm structure, the units in a pair are naturally positioned to cooperate with each other.

We assume unit 2 needs a favor from unit 1 with probability p_1, unit 1 needs a favor from unit 2 with probability p_2, and neither unit needs a favor with probability $1 - p_1 - p_2$ (we rule out simultaneous favors for simplicity). Without loss of generality, we assume hereafter that unit 1 is the more frequent favor-giver (and unit 2 the more frequent favor-receiver): $p_1 \geq p_2$.

A unit receiving a favor receives benefit $b > 0$, a unit giving a favor incurs cost $c < b$, and a unit that is not involved in favor exchanges receives a payoff of zero. We assume agents internalize the benefits of the units they manage, implying that if favor decisions are efficient

(i.e., a favor is given whenever needed), the expected payoffs of the agents in charge of units 1 and 2 in a given period are, respectively,

$\pi_1 \equiv p_2 b - p_1 c$, and (1)

$\pi_2 \equiv p_1 b - p_2 c$. (2)

It is clear from identities (1) and (2) that being the usual favor-receiver is a blessing: $\pi_2 \geq \pi_1$, with the inequality holding strictly if $p_1 > p_2$. Unfortunately, the unique static Nash equilibrium of this game is one where nobody ever does favors: once nature has determined which unit needs the favor in a given period, the agent in charge of the giving unit has no incentive to incur the cost necessary to satisfy the receiving unit's request. The question is then how to construct governance mechanisms that implement favors in equilibrium.

We assume that favors and their realized benefits and costs are observable to the agents but non-verifiable, implying that the organization cannot elicit favor-giving by offering formal contracts to the agents. This assumption is consistent with the unscheduled and idiosyncratic nature of much inter-unit cooperation, which makes it unlikely that favors can be accurately specified in the unit managers' job descriptions or planned in advance, or that their execution and the benefits and costs they generate can be objectively measured in a way that would enable formal piece-rate incentives.

Given these assumptions, the only way for the organization to motivate favors between units is through relational contracts – that is, self-enforcing agreements sustained by repeated interaction that condition each agent's future benefits to her present decision to honor a favor request. How should such relational contracts be designed, and what can they accomplish?

Relational incentive contracts (and why they may fail)

In the canonical economic model of relational contracts (Baker *et al*., 1994, 2002; Levin, 2003), a firm can incentivize agents to take observable but non-verifiable actions by promising to reward those actions with discretionary bonuses, while using upfront fixed transfers to distribute surplus as desired. If any agent deviates (by failing to take the promised action or pay the promised bonus), the relationship terminates and all parties revert to the static Nash equilibrium forever after. In our setting, this relational contract could be implemented either by having the organization pay a bonus to the agent in charge of the unit from which a favor is needed (i.e., "vertically") or by having the agent in charge of the favor-receiving unit pay a bonus to the agent in charge of the favor-giving unit (i.e. "horizontally").

A relational incentive contract is self-enforcing -- in the sense that it is a subgame perfect equilibrium of the repeated game -- if each party's present discounted gains from continuing the relationship outweigh the present gains from deviating. Levin (2003) shows that when it is feasible for parties to pay monetary incentive bonuses as well as fixed upfront transfers to distribute the surplus, an optimal contract has two important properties: (1) conditional on a given contingency being realized, the parties' actions and payments are the same in every period (i.e. the contract is stationary), and (2) the sum of all players' individual payoffs -- i.e. the equilibrium surplus---– can be used to sustain the contract, implying that by supporting it the parties who stand to gain more from the relationship can "subsidize" those who stand to gain less (Levin 2003). Applied to our setting, Levin's general result has the following implication:

> **Proposition 1**: Suppose that which unit needs a favor, and whether the favor is given, is observable to the organization's upper management or to the units' agents (or both). Suppose, also, that monetary payments between the organization and the agents or

between the agents themselves (or both) are feasible. Then, an optimal relational contract prescribes that each unit either does a favor in every period in which it is asked to do so or never does. Moreover, the optimal contract prescribes favor-giving if and only if the discounted value of the two units' joint per period surplus offsets the present cost of a favor:

$$\frac{\delta}{1-\delta}[\pi_1 + \pi_2 = (p_1 + p_2)(b - c)] \geq c. \quad (3)$$

Proof: in Appendix.

Condition (3) expresses Levin's (2003) second property above: the discounted sum of the agents' payoffs are greater than either unit's costs of giving a favor. Rearranging condition (3) implies that favor-giving can be implemented through a relational incentive contract if and only if the agents (and the organization) are patient enough:

$$\delta \geq \delta^{RIC} \equiv \frac{c}{\pi_1 + \pi_2 + c}, \quad (4)$$

where δ^{RIC} is the minimum discount rate required to implement a relational incentive contract (*RIC)*.

Notice that condition (4) is completely independent of which agent manages which unit. Intuitively, a bonus equal to c, the favor's cost, will induce the agent at either unit to do the favor provided the promise to pay the bonus is credible. While the agent managing unit 2 (the more frequent favor receiver) requires more expected future profits than the agent at unit 1 to bond the bonus promise, so long as the two units' per period joint surplus, $\pi_1 + \pi_2$, is large enough, fixed transfers can be used to split it in such a way that the agent at either unit is willing to pay the bonus.

The feasibility of relational incentive contracts requires at least one of two conditions to be met: (1) that the organization can monitor favors between units and thus reward them through

bonuses or (2) absent such monitoring, the agent in charge of one unit has the discretion to make monetary payments to the other unit in order to reward favors and appropriately split the surplus.

Condition (1) is unlikely to hold in most cases. In an organization that has delegated decision making authority to unit managers, top management may be unable to observe whether a unit needs a favor from another. Even if it can observe the need for favors, it is unlikely to have the information and wherewithal to verify that a favor request has been satisfactorily addressed, and to resolve any disputes about it. In fact, reducing top management's span of control and economizing on headquarter resources and monitoring costs is a major rationale for delegating authority to divisions in the first place (Chandler 1962; Williamson 1975). Additionally, companies often commit themselves not to interfere with unit operations in order to stimulate initiative and innovation (Aghion & Tirole 1997) and reduce politicking and strategic communication (Milgrom & Roberts 1988; Dessein 2002).

Condition (2) is unlikely to hold as well. As noted above, divisional profit centers within decentralized, multidivisional firms generally cannot use company cash to pay for unplanned interdivisional resource transfers (Datar & Rajan 2021, ch. 16, 22). Divisional budgets are approved in advance; payments for spontaneous transfers are not permitted without a lengthy re-approval process because they threaten to distort reported divisional profits.

Favor-exchange relational contracts

Absent the possibility to use vertical or horizontal monetary incentives, relational contracts for interunit cooperation must take the form of favor exchanges: the agent in one unit is motivated to give favors to the agent in another unit by the fear of losing the latter's future favors upon termination of the relationship between the two agents. Our analysis therefore assumes that

any trust between agents is purely calculative, that is, it is driven entirely by the shadow of future exchanges (Williamson 1993).[6]

Formally, we define a favor-exchange relational contract as a subgame-perfect equilibrium (SPE) of the infinitely repeated game described above, where in any given period t: (a) the agent in charge of the unit called upon to give a favor to the other unit does so, and (b) if the agent deviates, no further favors are exchanged from period $t + 1$ and thereafter.

Without loss of generality (given that the agents are identical), we assume that the organization randomly assigns agents to units in the first period of the game. In the remaining periods, the allocation of agents to units is determined by the organization's rotation policy.

Favor exchanges under fixed roles

We begin by analyzing the case in which there is no rotation policy, and the agents are permanently assigned to a unit. This is the standard setting in economic models of favor exchanges (e.g., Kandori, 1992; Mobius, 2001). Under fixed roles, the sequence of events in a given period t is as follows:

1. Nature determines which unit (if any) must give a favor to the other.
2. If a unit is called upon to give a favor, the agent at that unit decides whether to do so.
3. The agents at the receiving and giving units receive payoffs b and $-c$, respectively, if a favor has been requested and done, and zero payoffs otherwise.

[6] If non-calculative trust and norms of reciprocity are particularly strong among managers, then rotation may damage rather than stimulate cooperation between them. The reason is that fixed roles may better enable those managers to develop the kinds of trust and shared norms that support mutual favor-giving (McShulskis 2005; Apedzi & Casad 2020). However, in practice it is often the case that managers compete with each other for advancement. In these cases, non-calculative trust among them will be limited, and analyses (like ours) that assume calculative trust are useful.

The agent at the favor-giving unit will honor a favor request if and only if *her own individual* continuation payoff – that is, the present value of receiving her unit's expected equilibrium payoff in each future period – exceeds the present cost of doing a favor. For the agent at unit 1, this condition is:

$$V_1^{FR} = \frac{\delta}{1-\delta}(\pi_1 = p_2 b - p_1 c) \geq c. \quad (5)$$

Similarly, the favor-giving condition for the agent at unit is:

$$V_2^{FR} = \frac{\delta}{1-\delta}(\pi_2 = p_1 b - p_2 c) \geq c, \quad (6)$$

where *FR* indicates fixed roles.

For the favor-exchange relational contract to be an equilibrium, both incentive constraints must be satisfied. Let $\delta_1^{FR} \equiv \frac{c}{\pi_1 + c}$ and $\delta_2^{FR} \equiv \frac{c}{\pi_2 + c}$ be the minimum values of the discount factor δ that satisfy incentive constraints (5) and (6), respectively. Since unit 1 is the usual favor-giver and unit 2 is the usual favor-receiver ($p_1 \geq p_2$), constraint (5) is at least as stringent as (6), that is, $\delta_1^{FR} \geq \delta_2^{FR}$. Thus, (5) is thus the relevant condition for mutual favor exchanges to be sustainable. Notice that if (5) is violated, not only it is impossible to sustain mutual favors – it is also impossible to sustain unilateral favors from unit 2 in the event that (6) is satisfied: if only unit 2 is required to do favors, the equilibrium payoff of the agent at unit 2 drops from π_2 to $\tilde{\pi}_2 = -p_2 c \leq 0$, and thus the favor-giving agent has negative continuation value. Our second proposition follows from these observations:

Proposition 2: Suppose each agent is permanently assigned to a unit. Then, a favor-exchange relational contract prescribes that each unit either does a favor in every period in which it is asked to do so or never does. Moreover, the optimal contract prescribes favor-giving if and only if the discounted value of the usual favor-giving unit offsets the present cost of a favor:

$$\delta \geq \delta_1^{FR}. \quad (7)$$

Note that the denominator in (4) is greater than that in (7), which implies that $\delta_1^{FR} > \delta^{RIC}$: there is a range of discount factors (namely, $\delta \in [\delta^{RIC}, \delta_1^{FR})$) where favors can be implemented through a relational incentive contract but not through a favor-exchange contract with fixed roles. Intuitively, because there are no monetary transfers in the favor-exchange contract, it is not possible to use the unit 2 agent's high future expected payoff to "subsidize" the unit 1 agent's low payoff. This constrains the agents' ability to sustain cooperation.

Favor exchanges with managerial rotation

While assuming that agents have fixed roles is standard in the economic literature on favor exchanges, in our organizational setting it is more natural to think of the agents' roles as endogenous: top management has the discretion to rotate divisional managers across units as it sees fit. The question we then ask is whether rotation can facilitate favor-exchange relational contracts.

The fact that the incentive constraint is more stringent when unit 1 gives the favor (condition 5) than when unit 2 does (condition 6) suggests that the organization may strengthen favor-giving incentives by making the two agents occasionally switch roles. To make this intuition precise, and to characterize the optimal rotation rule, let us assume that the organization can commit to a rotation policy whereby at the end of any given period t, the agents switch units in period $t+1$ with probability $\rho \in [0,1]$, and stay in the same unit as in period t with probability $1-\rho$. A policy of fixed roles as analyzed in the previous section corresponds to the limit case in which $\rho = 0$. Consistent with our discussion above on the infeasibility of favor-

contingent bonus contracts, we rule out policies in which rotation decisions are conditional on realized states (i.e., which unit gives or receives favors).

Let $V_1^R(\rho)$ and $V_2^R(\rho)$ be the continuation payoffs of the agents assigned to units 1 and 2, respectively, where R indicates rotation. Given the stationary environment, these payoffs are the same in every period. Favor exchanges can be sustained under rotation policy ρ if and only if the incentive constraint of the agent at the favor-giving unit is satisfied in each state:

$V_1^R(\rho) \geq c$ when unit 1 gives the favor, and (8)

$V_2^R(\rho) \geq c$ when unit 2 gives the favor. (9)

To analyze these constraints, we must compute the continuation payoffs as a function of the rotation policy. Given our stationary setting, we can write the payoffs recursively, as follows:

$V_1^R(\rho) = \rho\delta\big(\pi_2 + V_2^R(\rho)\big) + (1-\rho)\delta\big(\pi_1 + V_1^R(\rho)\big)$, and

$V_2^R(\rho) = \rho\delta\big(\pi_1 + V_1^R(\rho)\big) + (1-\rho)\delta\big(\pi_2 + V_2^R(\rho)\big)$.

The first equation says that the unit 1 agent's continuation payoff from period $t+1$ onwards is equal to unit 2's per period profit plus the continuation payoff of the agent at unit 2 whenever rotation occurs, and to unit 1's profit plus the continuation payoff of the agent at unit 1 when rotation does not occur. The second equation provides a mirror-image definition for the continuation payoff of the agent at unit 2.

After solving this system, we obtain the following payoff formulas:

$V_1^R(\rho) = \frac{\delta}{1-\delta}(w_2\pi_1 + w_1\pi_2) = w_2V_1^{FR} + w_1V_2^{FR}$, and (10)

$V_2^R(\rho) = \frac{\delta}{1-\delta}(w_1\pi_1 + w_2\pi_2) = w_1V_1^{FR} + w_2V_2^{FR}$, (11)

where $w_1 = \frac{\rho}{1-\delta(1-2\rho)}$ and $w_2 = \frac{1-\rho-\delta(1-2\rho)}{1-\delta(1-2\rho)}$ are weights, with $w_1 \in [0,1]$, $w_2 \in [0,1]$, and $w_1 + w_2 = 1$.

Therefore, the continuation payoffs under rotation are convex combinations of the continuation payoffs under fixed roles. Notice that w_1 increases in ρ while w_2 decreases in it, implying that relative to fixed roles, more frequent managerial rotation raises the continuation payoff of the agent at unit 1 (by more frequently making her the receiver) at the expense of the agent at unit 2.

We now ask under what conditions a rotation policy that implements mutual favor-giving (that is, one that satisfies both (8) and (9)) exists. To do so, we first compute the minimum rotation frequency ρ^* that satisfies (8). We then verify that ρ^* also satisfies (9). This policy is given by:

$V_1^R(\rho) = c$.

Substituting (10) into this equation yields:

$$\rho^* = \frac{(1-\delta)(c-V_1^{FR})}{V_2^{FR}-V_1^{FR}-2\delta(c-V_1^{FR})}. \quad (12)$$

This rotation policy satisfies the unit 2 agent's incentive constraint, (9), if

$V_2^R(\rho^*) \geq c$.

Substituting (11) into this inequality allows us to rewrite it as:

$$\delta \geq \frac{2c}{\pi_1+\pi_2+2c} = \frac{2c}{(p_1+p_1)(b-c)+2c} \equiv \delta^R. \quad (13)$$

It is easy to check that if condition (13) holds, $\rho^* \in [0,1]$ and thus a rotation policy that implements bilateral favor giving exists. Condition (13) implies that so long as the slack in the

unit-2 incentive constraint (6) under fixed roles, $V_2^{FR} - c$, is at least as large as the gap in the unit-1 constraint (5), $c - V_1^{FR}$, in which case favor exchanges can be implemented in every state through managerial rotation. If instead condition (13) is violated, there is no rotation policy that induces the agents at both units to give favors when needed.

Notice that $\delta^R \in (\delta_2^{FR}, \delta_1^{FR})$, which is the critical discount factor for both agents to be willing to exchange favors under rotation, lies between the agents' individual critical discount factors under fixed roles. Combined with the fact that only the unit 1 agent's incentive constraint binds under fixed roles (Proposition 2), this implies that mutual favor exchanges cannot be sustained under any policy (fixed roles or rotation) when $\delta < \delta^R$. Such exchanges can be sustained only under positive rotation when $\delta^R \leq \delta < \delta_1^{FR}$, and can be sustained under both fixed roles and rotation when $\delta \geq \delta_1^{FR}$. Intuitively, rotation cannot implement favor exchanges when even the agent at unit 2, the usual favor receiver, is unwilling to give favors under fixed roles ($\delta < \delta_2^{FR}$). This follows immediately from expressions (10) and (11) above: if both units' continuation values, V_1^{FR} and V_2^{FR}, are lower than the cost of a favor, their convex combination will also be lower than this cost. If the agent at unit 2 is willing to give favors under fixed roles whereas the agent at unit 1 is not ($\delta_2^{FR} < \delta < \delta_1^{FR}$), replacing the fixed roles payoffs with their convex combination via rotation can help, provided the excess "relational capital" coming from unit 2 is large enough ($\delta \geq \delta^R$). Lastly, if both agents are willing to give favors under fixed roles ($\delta \geq \delta_1^{FR}$), rotation can implement favor exchanges, but it is not necessary for that purpose.

The results of our analysis of managerial rotation are summarized below.

Proposition 3: There exist cutoffs δ^R and δ_1^{FR}, with $\delta^R < \delta_1^{FR}$, such that mutual favor exchanges between divisions: (1) cannot be implemented under either fixed role or rotation if the parties are highly impatient ($\delta < \delta^R$), (2) can be implemented through some rotation policy $\rho \geq$

ρ^*, but not under fixed roles, if the parties are moderately patient ($\delta^R \leq \delta < \delta_1^{FR}$), and (3) can be implemented under both fixed roles and rotation if the parties are highly patient ($\delta \geq \delta_1^{FR}$).

To derive predictions from Proposition 3 on the use and optimal pace of managerial rotation, we take the view that all else equal, the organization prefers less rotation to more. This is a natural assumption given that the literature has highlighted costs of rotation in terms of organizational instability and social cohesion from which our model abstracts (McShulskis 2005; Apedzi & Casad 2020). Given this assumption, Proposition 3 implies that rotation should only be observed when it adds value to fixed roles – that is, when the agents are moderately patient ($\delta^R \leq \delta < \delta_1^{FR}$).

A second implication of our analysis is that rotation should only be observed when the two units differ in the extent to which they need favors from one another ($p_1 > p_2$). To see this point, suppose to the contrary that the units benefit equally from favors ($p_1 = p_2$). In such a scenario, expressions (10) and (11) imply that the agents' continuation payoffs are the same ($V_1^R(\rho) = V_2^R(\rho) = V_1^{FR} = V_1^{FR}$) under fixed roles and any rotation rule, and thus favors can either be implemented under both fixed roles and rotation or under neither of these two policies. The larger the asymmetry between divisions, $p_1 - p_2$, the larger the distance between the fixed roles and rotation cutoffs, $\delta_1^{FR} - \delta^R$, and thus the region in which rotation is optimal.

A third implication is that when rotation is used (that is, in the intermediate patience region), the optimal rotation policy is given precisely by ρ^*, the minimum rotation rate that implements mutual favor exchanges.

A last implication of our analysis, which follows from the comparison of the δ^R and δ^{RIC} thresholds, is that while rotation can be a second best policy in the absence of relational

monetary incentives, it is still not as good as those incentives: $\delta^R > \delta^{RIC}$. In other words, there is a region in which rotation cannot implement favors, but relational incentive contracts can implement them. This implies that organizational policies aimed at strengthening top management monitoring of divisions, or divisions' discretion to make transfers to each other, may be more efficient than managerial rotation as a means to promote favor exchanges between divisions.

Discussion and Conclusion

While much has been written about the benefits of job rotation policies within organizations, we are unaware of any academic literature analyzing their role in fostering cooperation between divisional managers. This is an important gap because of the many instances in which unplanned cooperation between divisions cannot be incentivized by top management or through interdivisional payments. In these cases, exchanges of favors arguably become important. Our theory thus builds a bridge between repeated game models of favor exchanges and models of relational contracting to derive conditions under which management rotation improves interdivisional cooperation relative to a policy of fixed managerial roles. Models of favor exchanges in the literature emphasize favors in the absence of monetary incentives, and assume roles are exogenous. Relational contracting models emphasize the role of endogenous governance choices in sustaining cooperative equilibria. Our model contributes by combining favor exchange with endogenous governance.

As discussed above, a first prediction of our model is that the value of rotation increases in the asymmetry in the demand for favors by each division. If $p_1 = p_2$, the two units generate the same expected payoff and thus the agents' continuation payoffs and incentives to cooperate are the same under every possible rotation policy. Rotation does not dominate fixed roles in this

case. The larger the asymmetry between divisions, the larger the region in which rotation dominates fixed roles.

One setting in which demands for favors are likely to be asymmetric is when divisions are vertically related to each other: a supplying division regularly provides inputs to a buying division, whereas the reverse is less frequently the case. A transfer pricing mechanism might exist to compensate the supply division for providing these inputs, but the buying division might often need favors that cannot be foreseen at the beginning of a divisional budget cycle. Such favors might include expedited delivery, late changes to input specifications or input quantity, and the like. If this assumption holds, our model predicts that management rotation will be more often observed among vertically related units than among horizontally related ones, all else equal.

A second prediction of our model is that there is a non-monotonic relationship between the presence of rotation and the likelihood and value of future interactions between agents within the organization (measured by the intertemporal discount factor δ): rotation should not be observed when δ is very low ($\delta < \delta^R$), it should be observed at some point as δ grows ($\delta \in (\delta^R, \delta_1^{FR})$), and it should disappear again as δ grows further ($\delta \geq \delta_1^{FR}$).

At least two implications follow from this second result. First, management rotation is less likely to be observed in industries in which employee mobility across firms is high. The reason is that in this case, managers anticipate that they are likely to leave the firm in the short or medium term, so the rate at which they discount the future value of cooperation with current colleagues is high. Second, when employee mobility is very low, managers value future cooperation so highly that rotation is unnecessary to incentivize their cooperation. This condition

might apply to organizations that face little competition, such as regulated utilities or government bureaucracies.

While our analysis treats management rotation within organizations, some form of role rotation could also occur in strategic alliances in which mutual exchanges of knowledge approach the levels of such exchanges within a firm. This rotation is unlikely to be direct: the literature in strategy has emphasized the wide range of methods firms use to restrict employee mobility across firm boundaries in order to prevent the leakage of proprietary information and internal disruption (e.g., Liebeskind 1996; Coff 1997; Agarwal, Ganco & Ziedonis 2009). However, firms in an alliance may rotate roles indirectly by periodically changing who takes the lead on the alliance's projects. For example, Davis and Eisenhardt (2011) studied four technological collaborations between pairs of independent firms in which decision rights in the collaboration alternated between employees of each partner firm. Such alternation achieves a similar effect to the kind of management rotation we model within organizations, in the sense that even though managers do not rotate across firms, the firm that is today's main favor giver (the one without decision rights, who may be asked to cooperate by the leading firm) may be tomorrow's favor receiver, and vice versa. Davis and Eisenhardt (2001) found that decision rights alternation stimulated innovation by better leveraging each firm's technological capabilities, as compared to collaborations that did not feature such alternation.

Another setting in which management rotation to support favor exchanges is likely important is interagency cooperation in government. An example is the successful joint effort by the U.S. Department of Veteran Affairs (V.A.) and the Department of Housing and Urban Development (H.U.D.) to reduce veteran homelessness (e.g., Rosenheck et al. 2003; O'Connell and Rosenheck 2019). This objective was not included in either department's original mission set

by Congress, and neither department had authority over the other. Moreover, financial incentives were not legally allowed to incentivize cooperation. Cooperation was therefore mostly voluntary, and initiated by senior government executives. Many of these executives served in both departments are various times. For example, Gordon Mansfield, Richard Cho, Jennifer Ho and Anthony Love first served in senior roles at H.U.D. and later in senior roles at the V.A., while Adrianne Todman and Matthew Doherty moved from H.U.D. to the V.A. These moves may have fostered favor exchanges across executives in the two agencies.

In conclusion, future research should continue to investigate the role and importance of management rotation in fostering cooperation between units of an organization, or between firms engaged in a close relationship such as an alliance. Our model produces several implications that could in principle be examined empirically. We encourage scholars to pursue this new line of research.

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Appendix: Proof of Proposition 1

We prove Proposition 1 for the case in which the relational incentive contracts is between the two units' agents. The proof for the case in which the contract is between the organization and the two agents is identical.

Consider a stationary relational incentive contract that prescribes favors to be given whenever requested, as well as the following monetary payments: (1) at the beginning of each period, the agent at unit 2 must make a transfer w to the agent at unit 1 (which could be negative); (2) if unit $i \in \{1,2\}$ is called upon to give a favor, the agent at unit i must be paid a bonus b_i by the agent at the other unit if and only if she does the requested favor. If at any point in time an agent deviates (by not making or accepting a prescribed payment or by not doing a prescribed favor), both agents revert to the static Nash equilibrium with no favors forever after.

In order to be part of a subgame perfect equilibrium of the repeated game, this relational contract must be individually rational for both agents:

$\pi_1 + w + p_1 b_1 - p_2 b_2 \geq 0$ for the agent at unit 1, and (A1)

$\pi_2 - w - (p_1 b_1 - p_2 b_2) \geq 0$ for the agent at unit 2. (A2)

Additionally, complying with the relational contract must be incentive compatible for both agents in every state of the world. If the realized state is one where unit 1 must give the favor, the incentive constraints are:

$-c + b_1 + \frac{\delta}{1-\delta}[\pi_1 + w + p_1 b_1 - p_2 b_2] \geq 0$ for the agent at unit 1, and (A3)

$-b_1 + \frac{\delta}{1-\delta}[\pi_2 - w - (p_1 b_1 - p_2 b_2)] \geq 0$ for the agent at unit 2. (A4)

In words, the favor-giving agent must prefer to do the prescribed favor and receive the bonus today, while continuing to receive her equilibrium payoff in subsequent periods, over saving the favor's cost and forgoing the bonus today, while receiving a payoff of zero in subsequent periods.

Similarly, if the realized state is one where unit 2 must give the favor, the incentive constraints are:

$-c + b_2 + \frac{\delta}{1-\delta}[\pi_2 - w - (p_1 b_1 - p_2 b_2)] \geq 0$ for the agent at unit 2, and (A5)

$-b_1 + \frac{\delta}{1-\delta}[\pi_1 + w + p_1 b_1 - p_2 b_2] \geq 0$ for the agent at unit 1. (A6)

Given that the two units and agents are identical and monetary payments are a mere transfer of utility between the agents, the sum of the first state's incentive constraints, (A3) and (A4), is identical to the sum of the second state's constraints, (A5) and (A6), and coincides with condition (3) from Proposition 1:

$\frac{\delta}{1-\delta}(\pi_1 + \pi_2) \geq c.$

This condition is necessary for all the incentive constraints to be satisfied, and hence for the proposed relational contract to be self-enforcing. Additionally, this condition is also sufficient in the sense that provided it holds, there exist payments (for instance, $b_1 = 0$, $b_2 = c$, and $w = \pi_2 + p_2 c$) that satisfy (A1) through (A6).

Notice that within the class of stationary contracts (i.e., contracts with the same actions and payments in every period, conditional on the realized state), the proposed relational contract (in which both agents give favors when requested) is optimal: if the parties entered an asymmetric agreement in which only one agent gives favors when requested while the other

never does, the equilibrium surplus would be lower and the aggregate incentive constraint (condition (3)) would be more stringent.

Lastly, recall that by Theorem 2 in Levin (2003), in a repeated game (like ours) with symmetric information and unrestrained monetary payments, stationary contracts are optimal in the sense that for any optimal (surplus-maximizing) relational contract, there is a stationary contract that is optimal. We can therefore conclude that the optimal relational contract is one where both agents always do favors when requested if condition (3) holds, and one where favors are never exchanged if condition (3) does not hold. This completes the proof of Proposition 1.