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Interpersonal Connections and Career Mobility in Bureaucratic Labor Markets: Evidence From Brazil

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ABSTRACT

Interpersonal networks are pervasive in state bureaucracies around the world. To what extent do they explain bureaucratic career trajectories? And are they driven more by political patronage and connections to influential bosses, or by information-sharing and trust-building among peers? We address these questions by constructing measures of the stock of interpersonal connections for the universe of over 440,000 Brazilian federal civil servants for the period 2000–2018. Individuals' networks strongly predict their future career mobility. Connections to higher-ranking officers or to members of the same political party have a strong effect, but the overall influence of individuals' networks on their career trajectories is dominated by non-political connections to their peers, not connections to bosses or party colleagues. We show that these patterns are similar for politically appointed and career positions, and explore heterogeneity across various demographic groups. We discuss implications for theory and policy, as well as potential wider methodological applications.

1 | Introduction

Career mobility in bureaucratic labor markets is a classic topic in public administration (e.g., Grandjean 1981; Stark 1986; DiPrete 1989) that is currently experiencing a revival of interest (e.g., Teodoro 2009; Yi et al. 2018; Yi and Chen 2022). In this paper, we investigate one important driver of career mobility: interpersonal networks. A wealth of qualitative and limited-scale survey evidence from several countries has demonstrated that such networks can influence officials' career paths (e.g., Grindle 1977; Olivieri 2007; Marques 2003, 2017), but limitations of data and measurement mean that there is little evidence about the role of interpersonal connections in shaping career trajectories across the whole of government. How important are such networks in the public service, what factors drive them, how do they differ for career versus appointed officials, and what are their implications for fairness and equality?

We address these questions by examining the effects of different types of interpersonal connections on officials' mobility within and across government institutions across the whole of Brazil's federal civil service, using administrative data on the universe of over 440,000 individuals for the period 2000–2018. In particular, we examine interpersonal connections that are generated endogenously within the workplace, through periods of shared work experience within the same unit in the same organization, constructing a quarterly measure of each individual's stock of such connections to other individuals across all other organizations and

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Evidence for Practice

- Interpersonal networks are important drivers of career mobility in government bureaucracies.
- Networks are driven mainly by ties to peers that facilitate trust-building and information-sharing, rather than political patronage or favoritism.
- These effects are similar for both politically appointed and career officials, but may differ in their importance according to demographic characteristics.

units in the federal civil service. We then estimate the impact of having an interpersonal connection within a given unit on the individual's likelihood of transferring to that unit in a given quarter. We use a powerful combination of time-varying individual and unit fixed effects to isolate the effects of networks from other potential confounding factors and minimize concerns of bias from endogenous network formation that often bedevil causal inference in network analysis (c.f. Whetsell and Siciliano 2025). Our rich data also enables us to disaggregate our network measure and examine how the effects of interpersonal connections vary depending on the characteristics of the individual moving as well as the individuals to whom they are connected.

We find that individuals' networks are highly predictive of future transfers: a one-standard-deviation increase in the number of interpersonal connections an individual has in a given unit is associated with a 12.7% increase in their likelihood of transferring into that unit in that quarter. Connections are common though not necessarily pervasive vectors for career mobility, with only 22.8% of all transfers being to units in which the individual has at least one connection with prior shared work experience.

We then disaggregate our network measure to distinguish between two types of connections that might be especially influential: connections to superior (i.e., higher-ranking) officials, and connections to officials who are co-partisans (i.e., members of the same political party). As expected, the effect of each individual connection is much stronger if it is to an officer of superior rank or a co-partisan, particularly when the party of which the individuals are members is in power. But while this might seem to confirm widely held priors about bureaucratic networks revolving around faction-building or political patronage, this comparison risks "missing the forest for the trees" because the vast majority of officials' interpersonal connections are to ordinary coworkers rather than to superior officers or co-partisans. When their effects are considered cumulatively, therefore, non-political connections to peers are actually much stronger predictors of bureaucratic mobility than connections to superior officers or copartisans.

Next, we investigate the role of institutional rules by examining how these dynamics differ for officials in career roles, for whom career mobility is tightly regulated as part of Brazil's merit-based selection and tenure-protection systems, with officials in politically appointed roles, who are subject to many fewer restrictions. Connections are significant predictors of career mobility for both types of officials. While connections to superior officers are relatively more important for appointed officers than career officers, connections to co-partisans are (perhaps surprisingly) not more influential. Thus, we do not find evidence that the more flexible appointment procedures are associated with more strongly politicized career trajectories for these roles. Or, put another way, there is little indication that the rigid personnel regulations applied to non-appointed roles through Brazil's career system reduce the (relatively small, in cumulative terms) effect of party connections on transfers.

Finally, we disaggregate the impact of network connections by the age, sex, and race of officials in order to shed light on the implications of networks for considerations of equality and representative bureaucracy (c.f. Riccucci and Van Ryzin 2017; Marvel 2021). Network connections are increasingly powerful and important for older workers, perhaps because they have had more time to accumulate network connections and also to build their own reputations, although younger officials tend to benefit more from connections to superior officers. Black workers' future career trajectories are more strongly predicted by connections to (non-superior, non-copartisan) coworkers than White workers, and connections are more powerful predictors for men than for women. Of course, these findings do not enable us to disentangle the effects of discrimination or bias from other factors, and pertain only to interpersonal connections generated endogenously through shared work experience rather than other types of connections. But they nonetheless provide rare large-scale evidence of the ways that interpersonal networks play different roles for different people at different points in their career. Further theorizing and exploring these dynamics represents a fertile avenue for future research.

In addition to these empirical contributions, our paper makes methodological contributions to the study of bureaucratic labor markets and networks in public sector institutions. In particular, our network measurement approach (and code to compute it, available online) opens new avenues for research in the growing number of governments with comprehensive administrative personnel datasets, from the United States (e.g., Bolton et al. 2021) to Indonesia (Pierskalla et al. 2021), Kenya (Hassan et al. 2022), municipal government in Brazil (Brollo et al. 2017; Colonnelli et al. 2020; Akhtari et al. 2022), and even private firms in some countries (e.g., Colonnelli et al. 2022). Such datasets make it possible not only to replicate our analysis in other contexts, but also to ask and answer a rich set of potential questions about the dynamics and effects of interpersonal connections in large bureaucracies.

The remainder of our paper proceeds as follows. Section 2 briefly surveys existing theory and evidence on interpersonal connections and career mobility in public bureaucracies, and Section 3 presents details of our data and the context of Brazil's federal civil service. Section 4 presents our estimation strategy and our empirical findings, and discusses robustness to alternative specifications and measurement issues. Section 5 concludes.

2 | Theory and Evidence on Interpersonal Networks and Career Mobility

The importance of interpersonal connections in shaping public sector career paths has been noted by a range of authors. For example, Grindle documents the importance of such connections in Mexico's bureaucracy in the 1970s, quoting an interviewee: "If someone has a chief who is capable and has

the prospects for a good future, then that person will probably think, 'Perhaps I can go with him...'" (1977, 37). Similarly, in the Brazilian case, Marques (2003, 2017) has examined how interpersonal networks shaped the career trajectories of several thousand top executives in São Paolo state, and Olivieri (2007) shows how interpersonal connections among top executives at Brazil's Central Bank built up through shared work experience were important in shaping their career trajectories. Outside academic research, the influence of built-up interpersonal networks for career mobility is an anecdotal feature of public servants' lived experience in governments around the world. However, challenges of measuring networks at scale have thus far limited researchers' ability to study the generalizability of these results, to disaggregate the various mechanisms through which they might affect career trajectories, and to understand when, for whom, and which types of such networks are most important.

Research on the role of interpersonal connections in bureaucratic labor markets more broadly tends to be bifurcated into two camps: one that views interpersonal connections as broadly helpful and positive for governance outcomes, and one that views them as negative deviations from impersonal norms. Most research in public administration falls in the former camp. In the Brazilian case, for instance, Marques (2017, 471) writes that "Networks of this kind weave agencies, policy areas and administrations together and are responsible for a substantial part of the informal practices and processes that construct governance and underlie formal governmental procedures", and Loureiro and Abrucio (1999) view interpersonal networks as helping to organize policy work, complementing formal delegation and career management structures. Literature from other contexts emphasizes the positive effects of strong interpersonal networks for everything from reducing turnover intention (Moynihan and Pandey 2008) to improving disaster response (Kapucu and Garayev 2016; Ku 2026), diffusing management innovations (Yi et al. 2018; Yang and Zhu 2025), and disseminating information and building the informal relationships of trust that are crucial for effective governance (c.f. Siciliano 2015; Hu et al. 2016). From this perspective, interpersonal networks are seen largely as beneficial, and governments should find ways to encourage and foster them.

Most literature in political science and economics, on the other hand, tends to view interpersonal connections through a patron-client lens and thus assigns a more negative valence to networks (Oliveros 2021). These studies typically theorize and explore two mechanisms through which this can occur: first, systematic favoring of co-partisans as a part of strategies of patronage, clientelism, or politicization of the bureaucracy (e.g., Colonnelli et al. 2020; Akhtari et al. 2022; Riaño 2022); and second, personal favoritism by bosses to subordinates to whom they are connected in an effort to build factions and reward loyalty (e.g., Grindle 2012; Shih et al. 2012; Xu 2018).[1] From this perspective, interpersonal networks are seen largely as pernicious deviations from meritocratic ideals, and something to be stamped out by governments—although a subset of studies does identify some positive effects of political-bureaucratic patronage connections due to the reputational concerns and relational contracts they enable (e.g., Jia et al. 2015; Brollo et al. 2017; Jiang 2018; Toral 2022).

The balance between these positive and negative views on the role of interpersonal networks in government—and the different underlying theoretical mechanisms they represent—is ultimately an empirical question. Since networks can be used for multiple purposes, there is likely to be some evidence of multiple mechanisms (and hence valences) in any given context. However, the different questions, contexts, data sources, and methods used by these studies make it difficult to weight these effects against each other. This empirical gap has implications not only for policy and practice but also for theory, since the relative empirical importance of each of these mechanisms matters for directing future theoretical development and for integrating findings from different studies. Our study advances these debates by juxtaposing these theoretical mechanisms against each other and analyzing their relative importance in a single study using the same data source, analytical method, and outcome.

We can formalize the theoretical synthesis above into a set of testable hypotheses as follows:

H1. *The number of interpersonal connections an individual has in a potential destination unit is positively associated with the likelihood of them transferring to that unit in any given period, ceteris paribus.*

H1 thus addresses the general question of whether interpersonal networks matter for individuals' career mobility, and we expect it to hold in our context (consistent with the existing literature).

We can then disentangle three mechanisms through which these networks operate by setting out three hypotheses that correspond to these mechanisms and can be operationalized in our empirical setting. The first two of these correspond to the negative-valence mechanisms examined by much of the political science and economics literature:

H2a. *The number of interpersonal connections with superior (i.e., higher-ranking) officers in a potential destination unit is positively associated with the likelihood of them transferring to that unit in any given period, ceteris paribus.*

H2b. *The number of interpersonal connections with co-partisans (i.e., individuals with the same partisan affiliation) in a potential destination unit is positively associated with the likelihood of them transferring to that unit in any given period, ceteris paribus.*

The more positive-valence public administration literature, which focuses on the positive effects of networks due to the way they facilitate information-sharing, trust, and reputation-building in turn can be operationalized as follows:

H2c. *The number of interpersonal connections with ordinary co-workers (i.e., non-superiors, non-co-partisans) in a potential destination unit is positively associated with the likelihood of them transferring to that unit in any given period, ceteris paribus.*

While we expect H2a, H2b, and H2c all to hold (i.e., for all three types of connections to be positively associated with transfer likelihood), our main interest is in comparing the effects we observe across these three hypotheses. To the extent that H2a and/

or H2b dominate empirically, scholars and practitioners should be relatively more concerned about the potential negative drivers and effects of such networks and focus on ways to counteract them. In contrast, to the extent that H2c predominates, we should be relatively more positive about the overall operation of networks and seek ways to foster them.[2]

Finally, our study also contributes to a broader literature in public administration on the determinants of career trajectories. One strand of research examines how politicization and officials' political alignment affect turnover (Bertelli and Lewis 2012; Doherty et al. 2019; Bolton et al. 2021); we extend this by examining the influence of political alignment and connections on career mobility. Another strand of research focuses on understanding career mobility and on the incentives that mobility opportunities create for bureaucrats (Teodoro 2009; Yi and Chen 2022); we complement this by examining officials' interpersonal networks as drivers of transfers to different positions. In doing so, our study suggests fertile potential avenues for further theory development and empirical inquiry.

A final and more specific conversation to which we contribute is the (mostly Portuguese-language) discussion on career structures and advancement in Brazil's federal bureaucracy in particular (e.g., Loureiro and Abrucio 1999; L. Monteiro 2013; Cavalcante and Lotta 2015; Bersch et al. 2016; Cavalcante and Carvalho 2017; Fernandes and Palotti 2019; Batista and Lopez 2021; Peci et al. 2020; Gaetani et al. 2021). A key debate in this literature and in public and policy discourse (e.g., Renan Monteiro 2024) is whether regulations on public officials' career mobility should be loosened or tightened. Whether interpersonal connections are mainly positive or mainly negative factors in career progression is relevant for this debate. While we do not provide direct evidence on the effects of career mobility restrictions or of changing them, by presenting large-scale evidence on the role of interpersonal networks and the mechanisms through which they shape career mobility, we aim also to contribute to this important conversation.

3 | Bureaucratic Networks: Context, Data, and Measurement

3.1 | Context

As with most civil services worldwide, Brazil's federal civil service is composed of a mix of positions staffed by career officials who have strong tenure protections and were hired through non-political bureaucratic mechanisms, and appointed positions (Direção e Assessoramento Superiores, DAS) for which hiring and termination decisions are largely at the discretion of political leaders. For brevity we refer to these as "career" and "appointed" positions, respectively.

Officials in career positions are selected through highly competitive examinations into one of over 300 career tracks based on their skills and bureaucratic specialization. Some career tracks can serve across multiple organizations while others must serve only in one organization (but can transfer across units within the organization). Most of these officials are white-collar professionals, with 75% possessing at least a university degree as of 2018. For all of them, transfers to different units must receive central bureaucratic approval, but in practice individuals can request transfers to specific units and units can request specific individuals to be transferred to them.

Appointed positions relate mostly to senior management and policy advising roles, and bureaucrats serving in them can be hired, transferred, or fired with much greater flexibility by political leaders. While many of them are appointed from outside the civil service, a federal decree requires that at least 50% of senior-level (DAS4) appointees and at least 75% of less-senior (DAS1-DAS3) appointees be permanent civil servants (in aggregate across the service).[3] These bureaucrats and their employing units have much more discretion in requesting and arranging transfers than for career positions.

Existing research in Brazil's federal civil service (Fernandes and Palotti 2019; Reis 2023) and in other countries' bureaucracies (e.g., Grindle 1977) has noted the importance of the interpersonal networks that officials build up during their service in driving their career trajectories, mainly using qualitative or survey data, and Brazil's federal civil service has long been a site for foundational studies of patronage in personnel management (e.g., Geddes 1994). Our key contribution is to distinguish, measure, and compare the importance of different types of such interpersonal connections for explaining bureaucratic transfers based on administrative data.

3.2 | Data and Measurement

The primary data we use for this is Brazil's main federal personnel database (Sistema Integrado de Administração de Pessoal, SIAPE), which records the organization, sub-organizational unit, and state in which all Federal civil servants worked at any point in time. This dataset also contains a set of basic demographic variables (including age, sex, and race) as well as information on each individual's rank and whether their current position is an appointed (DAS) or career (non-DAS) position.

The SIAPE dataset required only minimal cleaning and preparation for analysis. After conducting data quality checks, we created a new unit variable that defined individuals as being in the same unit if they were working in the same organization, same sub-organizational unit, and same state (since many federal institutions have state-level offices in addition to their headquarters office in the capital) in the same quarter. Defined this way, the average size of a unit hovers around five people across our sample period, so it is plausible that individuals in these units are likely to know each other and interact regularly. In addition, we imposed some sample restrictions to exclude categories of individuals and organizations (e.g., faculty in federal universities) who are functionally separate from the core civil service and not relevant for our analysis. Appendices A and B discuss these restrictions more fully and present additional descriptive statistics.

After these sample restrictions, we have information on over 440,000 unique civil servants, with an average of 220,000 in active service at any time (cf. Figure 1). We focus on the years 2000–2018, with our start date determined by data availability

(during the administration of Fernando Henrique Cardoso) and end date corresponding to the end of the administration of Michel Temer. This period covers four presidents from three different parties, so that our results represent a general picture of Brazil's modern federal bureaucracy rather than a specific administration or historical moment.

We combine SIAPE with public records of individuals' political party membership compiled by Brazil's Tribunal Superior Eleitoral (Superior Electoral Court, TSE).[4] This dataset is the official source of partisan affiliation in Brazil, analogous to voter registration records in the United States, and has been widely used in academic research on topics such as political patronage (e.g., Brollo et al. 2017; Colonnelli et al. 2020; Akhtari et al. 2022), the politicization of the federal bureaucracy and its effects on the turnover of federal managers (Lopez and Moreira 2022), the formation of professionalized bureaucracies in federal bodies (Bersch et al. 2016) and the management of political coalitions in Brazil (Pereira et al. 2017; Batista and Lopez 2021; Bersch et al. 2022).

To measure individuals' networks of interpersonal connections, we construct the network of people with whom they have previously worked in the same unit in the same quarter, and thus are highly likely to know each other. While most individuals are likely to have some interpersonal connections through other means, using shared work history as a proxy has the advantage of allowing us to be both precise and comprehensive. It also captures the main way that individuals develop interpersonal connections within the civil service, and given the large average number of such connections—as we show below—likely constitutes the vast majority of most individuals' interpersonal bureaucratic networks.

We define the origin unit j of each individual i as the sub-organizational division in which they are recorded as working in each quarter t. On average each unit has five people working in it in any quarter, making plausible our assumption that working in the same unit at the same time leads to individuals knowing each other personally. We thus define two individuals as connected if they have previously worked in the same unit in the same quarter. In cases where officers are recorded as being in the same unit but are based in different states (as is common in Brazil's federal civil service), we treat them as being in separate units since they are less likely to know each other and have strong interpersonal connections.

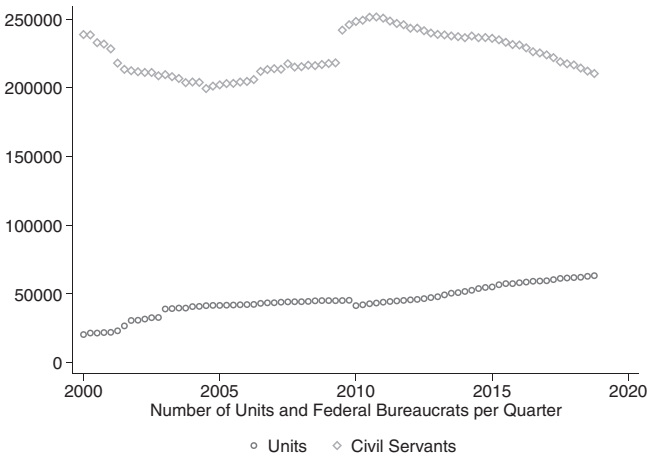

FIGURE 1 | Number of individuals and units over time.

This allows us to construct a vector $N_{i,l,t}$ for each individual-quarter observation that is defined as individual i's stock of connections in every unit l in the civil service (aside from the origin unit j in which they currently work) in quarter t. We additionally construct variants of $N_{i,l,t}$ which count only connections to individuals who are higher in rank than the individual (i.e., superior officers) and connections to individuals who are members of the same political party, to allow us to explore which types of interpersonal connections are most important at predicting career paths.

Calculation of this network measure is extremely computationally intensive, since the number of origin-potential destination unit pairs j, l multiplied by the number of individual-quarter observations i, t is on the order of 7×10^{16}. To overcome this we made two simplifying assumptions discussed below and used a programming approach that minimizes computational time. First, we constrained the potential number of unit pairs j, l by assuming that transfers were only feasible between unit pairs for which we actually observe a transfer during our 19-year study period. This assumption reflects the numerous regulatory constraints imposed on personnel mobility by Brazil's complicated career system as well as the practical constraints related to sector- and activity-specific expertise that would prevent (for example) an environmental scientist in the Ministry of Environment transferring into the human resources division of the Ministry of Education. This assumption has the effect of slightly reducing our measures of individuals' interpersonal networks and means that our estimates are likely a lower-bound estimate of the impact of networks on transfers (though this assumption is neutral with respect to the effect of different types of network connections).

Second, we only calculate our network measure $N_{i,l,t}$ for a randomly drawn sub-sample of 134,000 individuals (30% of the total number of civil servants in our sample period). However, for these individuals, we measure *all* connections (including to individuals outside the sub-sample), so this assumption does not lead us to "miss" any connections. The only substantive effect on our analysis is that our sample size is artificially small and thus our standard errors are biased upwards, so the p-values associated with coefficients reported below are less precise than they would be if we used the full sample—although our large sample means that most of our estimates are highly statistically significant anyway. Online Appendix A gives further details of our definitions, assumptions, and calculations, and Online Appendix B presents descriptive statistics and shows that our main results are robust to alternative ways of calculating connections.

4 | Importance and Dynamics of Bureaucratic Networks

4.1 | Empirical Methodology

To estimate the effects of bureaucratic networks on bureaucratic transfers, we run a series of individual*destination unit*quarter regressions of the form:

$$Y_{i,j,l,t} = \beta_1 N_{i,l,t-1} + u_{i,t} + v_{j,t} + w_{l,t} + z_{i,j,l,t} \quad (1)$$

where $Y_{i,j,l,t}$ is a binary indicator variable capturing whether individual i moved from origin unit j to potential destination unit l in quarter t. $N_{i,j,l,t-1}$ is our main network measure: the number of former colleagues of individual i who worked in potential destination unit l in the previous quarter.[5]

β_1 is the main parameter of interest, corresponding in this specification to H1 (that a greater stock of interpersonal connections in the destination unit is positively associated with the probability of moving to that unit). To make our results tables easier to read and more intuitive, we multiply the dependent variable by 100, so that the coefficient β_1 captures the percentage point increase in the likelihood of moving to a given unit in a given quarter associated with a one-unit increase in $N_{i,j,l,t-1}$.[6]

The vector $u_{i,t}$ represents individual*quarter fixed effects, $v_{j,t}$ are origin unit*quarter fixed effects, and $w_{l,t}$ are destination unit*quarter fixed effects. Together these fixed effects are extremely powerful in controlling for potential endogeneity related to: heterogeneity in individuals' propensity to transfer across units, both in general and at each point in time; heterogeneity in the propensity of bureaucrats to transfer out of certain units, both in general and at each point in time; and heterogeneity in the propensity of bureaucrats to transfer into certain units, both in general and at each point in time. These time-variant fixed effects thus capture all the variation that would be explained by standard non-time-variant fixed effects plus quarter fixed effects, as well as the ways in which individual, origin unit, and destination unit transfer probabilities vary across quarters. Appendix B demonstrates robustness to even more demanding combinations of fixed effects (Table A5), and to various ways of clustering standard errors (Tables A6 and A7). Collectively these fixed effects make it highly unlikely that our results are driven by omitted variable bias.

To this base equation, we add additional terms to Equation (1) that distinguish between the effects of different types of connections. First, we compute a new connection measure $N^s_{i,l,t-1}$ which captures the number of the individuals' connections in each potential destination unit who are higher-ranked than the individual, since superior officers may be in a better position to influence the destination unit's personnel decisions than non-superior officers (c.f. Grindle 1977). Adding this to our base specification yields an estimation equation of the following form:

$$Y_{i,j,l,t} = \beta_1 N^{ns}_{i,l,t-1} + \beta_2 N^{s}_{i,l,t-1} + u_{i,t} + v_{j,t} + w_{l,t} + z_{i,j,l,t} \quad (2)$$

where $N^{ns}_{i,l,t-1} = N_{i,l,t-1} - N^s_{i,l,t-1}$. In this specification, β_2 captures the effect of each additional superior officer in a destination unit on transfer probability, and β_1 becomes the effect of each additional ordinary (non-superior) coworker.

Finally, to examine the effect of shared-party connections, we compute another connection stock measure $N^p_{i,l,t-1}$ which counts the number of interpersonal connections an individual has who share the same party affiliation, and add this into our regressions. As with our superior/non-superior regressions, this also yields the term $N^{np}_{i,l,t-1} = N_{i,l,t-1} - N^p_{i,l,t-1}$, which captures the number of connections the individual has with whom they do not share a party affiliation. We can also interact our connection measures $N^{np}_{i,l,t-1}$ and $N^p_{i,l,t-1}$ with a dummy variable $P_{i,t}$ indicating whether the party that the individual is affiliated with was in power during the quarter in question, since that party has greater control of appointments. Doing so yields two additional estimation equations:

$$Y_{i,j,l,t} = \beta_1 N^{np}_{i,l,t-1} + \beta_3 N^{p}_{i,l,t-1} + u_{i,t} + v_{j,t} + w_{l,t} + z_{i,j,l,t} \quad (3)$$

$$Y_{i,j,l,t} = \beta_1 N^{np}_{i,l,t-1} + \beta_3 N^{p}_{i,l,t-1} + \beta_4 \left(N^{np}_{i,l,t-1} \times P_{i,t} \right) + \beta_5 \left(N^{p}_{i,l,t-1} \times P_{i,t} \right) + u_{i,t} + v_{j,t} + w_{l,t} + z_{i,j,l,t} \quad (4)$$

These specifications and parameters correspond to our hypotheses. Equation (1) tests the impact of connections of all types (H1), Equation (2) distinguishes between the impact of superior connections (H1) and ordinary coworker connections (H2a and H2c), and Equations (3) and (4) distinguish between the impact of shared-party connections (H2) and non-shared-party connections (H2a and H2c). The remainder of this section presents the results of this analysis.

4.2 | Main Results

Table 1 presents our estimates of the effect of connections. Column 1 estimates the base specification with no fixed effects. It implies that each additional connection in a destination unit is associated with an increase of 0.012 percentage points in an individual's probability of transferring to that unit in a given quarter. This estimate is highly statistically significant, as with all our main estimates. Column 2 adds our full array of fixed effects, which reduces this estimated percentage point increase to 0.0076. This specification corresponds to H1 and is consistent with our expectation that connections have a positive effect on transfer probability.

While the size of this effect may appear small at first glance, this is because the probability that an individual transfers to a given unit in a given quarter is also very small, and because individuals have many connections across which these effects apply. Put another way, the parameter estimate from Column 2 implies that a one standard deviation increase in an individual's connections in a given potential destination unit increases their likelihood of transferring to that unit in a given quarter by 0.23 percentage-points, equivalent to about 12.7% of the mean. And overall, 22.8% of transfers are to a unit in which an individual has at least one connection. So while connections are far from the only factor driving career mobility, they are nonetheless relevant for a substantial share of them.

Column 3 then adds the new connection measure for connections to superior officers (H2a), in order to distinguish the effect of these connections from that of connections to ordinary coworkers of equal or lower rank (H2c). We find that the effect of

TABLE 1 | Connections and transfers.

	(1)	(2)	(3)	(4)	(5)
Connections	0.012***	0.0076***			
	(0.0003)	(0.0004)			
Connections to Coworkers			0.0065***		
			(0.0005)		
Connections to Superiors			0.040***		
			(0.0044)		
Connections (non-party)				0.0069***	0.0071***
				(0.0004)	(0.0004)
Connections (same party)				0.83***	0.77***
				(0.0733)	(0.0913)
Connections (not same party)*Party in Power					−0.0092***
					(0.0016)
Connections (same party)*Party in Power					0.41***
					(0.1530)
Individual*Quarter FE	No	Yes	Yes	Yes	Yes
Origin Unit*Quarter FE	No	Yes	Yes	Yes	Yes
Destination Unit*Quarter FE	No	Yes	Yes	Yes	Yes
Mean	1.78	1.78	1.78	1.78	1.78
Obs	11,407,507	10,237,251	10,237,251	10,237,251	10,237,251
R^2	0.0015	0.53	0.53	0.53	0.53

Note: Individual*unit*quarter regressions. Dependent variable is equal to 100 if the bureaucrat moved to the unit in the current quarter. Linear regressions. Robust standard errors in parentheses. * denotes significance at the 10%, ** at the 5% and *** at the 1% level.

one additional connection to superiors is about 6.2 times stronger than the effect of an additional connection to non-superior bureaucrats. However, non-superior connections remain important predictors, and since individuals have on average 9.1 times more connections to non-superiors than superiors, their stock of connections to peers is collectively 1.5 times more influential than their connections to superiors. Since non-superior officers in potential destination units are unlikely to have direct control over personnel decisions, this suggests that mere information-sharing (e.g., about vacancies or characteristics of units and individuals) among connected officers is an important channel through which this mechanism operates—although we cannot measure this directly.[7]

One potential concern about our results is that the network effects we observe could be driven by homophily, or the idea that similar individuals are drawn to similar working environments. This would be the case if, for instance, two statisticians in the research unit of the Ministry of Health moved, one after another, to the research unit of the Ministry of Education, not because they were connected to each other but because they both preferred similar work environments. A way to control for this would be to control for unit pair fixed effects (i.e., origin unit*destination unit), which would capture all unobserved factors that make transfers between these unit pairs more likely. In Appendix Table A5, we include these unit pair fixed effects and show that our results are robust to controlling for them (Columns 1 and 3 of Table A5). Our results therefore do not seem to be entirely driven by homophily or other similar mechanisms.[8]

4.3 | Shared-Party Connections

Columns 4 and 5 of Table 1 examine how connections between members of the same political party (H2b) differ in their effects from connections between members of different parties or non-affiliated individuals (H2c). Column 4 shows that the point estimate on non-party connections is positive and significant, and is very similar in size to the effect of coworker connections estimated in Table 1 Column 3. It also shows that shared-party connections have much stronger effects on transfer likelihood—approximately 120 times stronger. In Column 5, we interact our connection measures with a dummy variable indicating whether the political party of which the individual is a member (if any) controlled the presidency in that time period. As expected, this interaction is relatively unimportant (indeed, slightly negative) for non-shared-party connections but does increase transfer likelihood for shared-party connections.

In Table 1, we thus observe evidence consistent with the existence of two potential mechanisms of networks' influence:

TABLE 2 | Connections and transfers for career versus appointed roles.

	Non-DAS	DAS	Non-DAS	DAS	Non-DAS	DAS
	(1)	(2)	(3)	(4)	(5)	(6)
Connections	0.0078***	0.010***				
	(0.0005)	(0.0012)				
Connections to Coworkers			0.0075***	−0.000064		
			(0.0006)	(0.0013)		
Connections to Superiors			0.021***	0.13***		
			(0.0046)	(0.0142)		
Connections (non-party)					0.0073***	0.010***
					(0.0005)	(0.0012)
Connections (same party)					0.73***	0.73
					(0.0938)	(0.5947)
Connections (not same party)*in Power					−0.0081***	−0.013*
					(0.0014)	(0.0075)
Connections (same party)*in Power					0.43***	0.38
					(0.1608)	(0.6846)
Mean	1.94	1.39	1.94	1.39	1.94	1.39
Obs	7,145,246	2,854,303	7,145,246	2,854,303	7,145,246	2,854,303
R^2	0.59	0.50	0.59	0.50	0.59	0.50

Note: Individual*unit*quarter regressions. Dependent variable is equal to 100 if the bureaucrat moved to the unit in the current quarter. Linear regressions with Individual*Quarter fixed effects, Origin Unit*Quarter fixed effects and Destination Unit*Quarter fixed effects. Robust standard errors in parentheses. * denotes significance at the 10%, ** at the 5% and *** at the 1% level.

information-sharing and built-up trust among non-political interpersonal connections on the one hand, and political patronage and faction-building among political party members on the other. But while the strong effect of shared-party connections may seem to be evidence in favor of the patronage hypothesis predominating, the substantive magnitude of shared-party connections is dwarfed by that of non-shared-party interpersonal connections. This is because individuals have many more non-political than political connections—517 times as many on average. So while each individual non-political connection is weaker, our estimates suggest that collectively they are 4.3 times more influential in driving transfers. Although party-based network connections can be very powerful for the individuals involved in them, the operation of party networks captures only a tiny fraction of the effect of civil servants' built-up professional networks. In addition, if the story was purely one of patronage we would not expect to see an effect of party connections when the party is not in power.

A potential concern with the previous results is that we might be under-counting the number of party connections as individuals might be informally affiliated with a party without being formally registered as a member (although our measure of party affiliation is the standard measure used in academic literature on Brazil, as noted above). While we cannot measure this directly, it is unlikely to be completely driving our findings on the relative importance of general vs. party connections. First, individuals for whom party connections are likely to be most influential are also likely to be those who are actual party members. Second, given the magnitude of the effects we see, the actual levels of partisan affiliation would need to be approximately four times higher than observed in order to equalize the cumulative effects of political and of non-political connections, which seems implausible. In any case, the differences in connection stocks are so large that a marginal increase in shared-party connections would be unlikely to reverse the overall pattern of results.

4.4 | Career Versus Appointed Positions

Table 2 compares bureaucrats in career positions (non-DAS) versus appointed positions (DAS) to examine how their different appointment and transfer rules influence network dynamics. Existing survey-based evidence from Brazil suggests that interpersonal bonds of trust are as important as experience and expertise for appointed officers (Fernandes and Palotti 2019), but neither in Brazil nor in other countries (to our knowledge) is there evidence about how the strength of these connections' effects for appointed roles compares to non-appointed roles.

To examine this, we split our sample into career (non-DAS) and appointed (DAS) bureaucrats and re-estimate Equations (1, 2, and 4) (corresponding to Tables 1 and 2) for each group separately. Columns 1 and 2 show that the overall effect of each

TABLE 3 | Connections and transfers for females versus males.

	Female	Male	Female	Male	Female	Male
	(1)	(2)	(3)	(4)	(5)	(6)
Connections	0.0068***	0.0081***				
	(0.0008)	(0.0006)				
Connections to Coworkers			0.0051***	0.0072***		
			(0.0009)	(0.0006)		
Connections to Superiors			0.057***	0.032***		
			(0.0070)	(0.0059)		
Connections (non-party)					0.0065***	0.0076***
					(0.0008)	(0.0006)
Connections (same party)					0.68***	0.65***
					(0.1817)	(0.0986)
Connections (not same party)*in Power					−0.0088	−0.0086***
					(0.0062)	(0.0015)
Connections (same party)*in Power					0.62	0.41***
					(0.4379)	(0.1554)
Mean	1.62	1.93	1.62	1.93	1.62	1.93
Obs	4,603,313	5,347,625	4,603,313	5,347,625	4,603,313	5,347,625
R^2	0.54	0.57	0.54	0.57	0.54	0.57

Note: Individual*unit*quarter regressions. Dependent variable is equal to 100 if the bureaucrat moved to the unit in the current quarter. Linear regressions with Individual*Quarter fixed effects, Origin Unit*Quarter fixed effects and Destination Unit*Quarter fixed effects. Robust standard errors in parentheses. * denotes significance at the 10%, ** at the 5% and *** at the 1% level.

connection is actually stronger for career than appointed bureaucrats. However, Columns 3 and 4 shows that the effect of one additional connection to a superior officer is 6.2 times stronger for appointed than career roles, while the effect of non-superior connections is stronger for career roles. This is consistent with the idea that appointed roles' greater flexibility gives officers and their superiors greater discretion in arranging transfers, while also suggesting that information-sharing among connected bureaucrats is important for both types of roles.

Perhaps surprisingly, Columns 5 and 6 shows that shared-party connections do not appear to be substantially more important for appointed than career bureaucrats, despite the political appointment process—the point estimates are almost identical. This is consistent with survey-based evidence in Brazil that finds that technical ability and experience are more important factors than partisan affiliation for selection, even for politically appointed roles (Cavalcante and Lotta 2015).

Taken together, these findings push back against common assumptions about appointment-based versus career-based selection processes in two ways. First, we do not find evidence consistent with the idea that rigid, career-based promotion and transfer rules reduce the role of interpersonal connections. And second, we do not find evidence consistent with the idea that the looser promotion and transfer rules for appointed bureaucrats increase the role of partisan politics in shaping bureaucratic networks and career trajectories—at least during the 2000–2018 period we study. Of course, there are other factors and potential confounds, so the potential policy implications should be regarded as suggestive rather than definitive. But they should nonetheless spur questioning of the assumptions and evidence base underlying these perceived benefits of rigid personnel management rules.

4.5 | Demographic Characteristics

Finally, we examine how the effects of different types of interpersonal connections differ according to officials' demographic characteristics. To do so, we split our sample and re-estimate Equations (1), (2), and (4) for each group separately, as with the previous sub-section.

Table 3 shows that men tend to benefit more (0.0081) from connections overall than women (0.0068). However, disaggregating this by connection type reveals sharply different dynamics: men benefit more than women from connections to coworkers, whereas women benefit almost twice as much as men from connections to superior officers. The effects of shared-party connections are nearly identical for both women and men.

Table 4 breaks down the effect of different types of connections according to the official's race. Connections are relatively more powerful predictors of career mobility for Black officials (0.012)

than White officials (0.0079).[9] This difference is entirely driven by the effect of coworker connections; the effect of connections to superiors is actually slightly stronger for White than Black officials. We find no meaningful differences in the dynamics of shared-party connections for officials of different races.

These findings connect to a policy debate in Brazil regarding the sufficiency of affirmative action at the hiring stage to reduce race-based inequalities in the civil service. In particular, one concern is that even once hired, Black officials' career mobility may suffer due to a lack of connections. Our findings suggest that, at least with respect to connections that are generated through shared work experience, this does not seem to be the case. While their career mobility may still be hampered by inequalities in pre-hiring connections or other factors, our results provide some reassurance that endogenously generated interpersonal connections are effective vectors for career mobility once hired into the civil service.

The starkest demographic differences pertain to age. To illustrate, Table 5 breaks workers into above-median and below-median age categories. Each connection is almost three times more powerful for above-median (0.0096) versus below-median (0.0036) age officials. But whereas older workers benefit more from connections to non-superiors, younger workers benefit more from connections to superiors—potentially because more senior officials' peers are also relatively senior and thus in a better position to communicate information and affect hiring decisions. We also find that older workers benefit far more from shared-party connections than younger workers, and that this effect is less conditioned by whether the party is in power than for younger workers—consistent with the idea that officials learn how to and/or are better able to cluster into groups with people of similar political orientations as they spend longer in the service. But this finding should also be interpreted in the context of our broader finding about the relatively minor overall role of shared-party connections in interpersonal bureaucratic networks in Brazil.

5 | Conclusion

Our paper makes theoretical, empirical, and methodological contributions to the study of bureaucratic networks and bureaucratic politics. We introduce novel theoretical distinctions with associated measurement strategies and use them to shed new empirical light on the role of interpersonal bureaucratic networks. Brazil presents an interesting case for this, given its combination of a large number of politically appointed positions with rigid career structures for non-appointed positions. While we can only speculate about the generalizability of our findings to other contexts, the fact that we find similar network dynamics for bureaucrats in both appointed and non-appointed positions that operate under very different institutional rules

TABLE 4 | Connections and transfers by race.

	Black	White	Black	White	Black	White
	(1)	(2)	(3)	(4)	(5)	(6)
Connections	0.012***	0.0079***				
	(0.0011)	(0.0006)				
Connections to Coworkers			0.011***	0.0066***		
			(0.0012)	(0.0007)		
Connections to Superiors			0.041***	0.043***		
			(0.0106)	(0.0057)		
Connections (non-party)					0.012***	0.0074***
					(0.0010)	(0.0006)
Connections (same party)					0.78***	0.77***
					(0.1755)	(0.1294)
Connections (not same party)*in Power					−0.0094***	−0.011***
					(0.0035)	(0.0019)
Connections (same party)*in Power					0.46*	0.46**
					(0.2502)	(0.2188)
Mean	1.65	1.98	1.65	1.98	1.65	1.98
Obs	2,340,029	6,000,024	2,340,029	6,000,024	2,340,029	6,000,024
R^2	0.61	0.53	0.61	0.53	0.61	0.53

Note: Individual*unit*quarter regressions. Dependent variable is equal to 100 if the bureaucrat moved to the unit in the current quarter. Linear regressions with Individual*Quarter fixed effects, Origin Unit*Quarter fixed effects and Destination Unit*Quarter fixed effects. Robust standard errors in parentheses. * denotes significance at the 10%, ** at the 5% and *** at the 1% level.

TABLE 5 | Connections and transfers by age.

	Above Median	Below Median	Above Median	Below Median	Above Median	Below Median
Age	**(1)**	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**
Connections	0.0096***	0.0036***				
	(0.0006)	(0.0006)				
Connections to Coworkers			0.0088***	0.0014**		
			(0.0007)	(0.0007)		
Connections to Superiors			0.035***	0.056***		
			(0.0062)	(0.0068)		
Connections (non-party)					0.0090***	0.0036***
					(0.0006)	(0.0006)
Connections (same party)					0.60***	0.13
					(0.0867)	(0.2113)
Connections (not same party)*in Power					−0.0081***	−0.026***
					(0.0017)	(0.0090)
Connections (same party)*in Power					0.28**	1.94***
					(0.1324)	(0.7206)
Mean	2.10	1.45	2.10	1.45	2.10	1.45
Obs	4,932,245	5,019,860	4,932,245	5,019,860	4,932,245	5,019,860
R^2	0.60	0.52	0.60	0.52	0.60	0.52

Note: Individual*unit*quarter regressions. Dependent variable is equal to 100 if the bureaucrat moved to the unit in the current quarter. Linear regressions with Individual*Quarter fixed effects, Origin Unit*Quarter fixed effects and Destination Unit*Quarter fixed effects. Robust standard errors in parentheses. * denotes significance at the 10%, ** at the 5% and *** at the 1% level.

suggests built-up interpersonal connections to peers are likely to be important in a wide range of bureaucratic contexts.

Our paper has several limitations that also represent fertile avenues for further research. First, our use of large-scale administrative data means that we are only able to examine one type of interpersonal connection: interpersonal networks formed through work experience in the bureaucracy. Public officials also have connections from other spheres of social interaction—upward to patrons, horizontally to colleagues, and outward to society—that may also affect career trajectories, but these are hard to measure without additional surveys or fieldwork that are not feasible to conduct at the same scale. Second, we only measure the stock of each individual's network connections in each potential destination unit, rather than the sequence in which each of these connections arrived in that unit and how that might affect the timing of transfers. Exploring these temporal dynamics could lead to a richer understanding of the creation and operation of interpersonal networks with respect to career progression. Finally, while the structure of our data did not enable us to measure outcomes other than career mobility, bureaucratic networks may impact other important outcomes like procurement efficiency (Dahlström et al. 2021), task completion (Rasul et al. 2021), and policy diffusion (e.g., Shipan and Volden 2012). The impact of interpersonal bureaucratic networks on these and other measures of performance—and understanding how these networks are promoted or constrained by personnel management structures and rules—offers a rich agenda for future research.

Conflicts of Interest

The authors declare no conflicts of interest.

Endnotes

[1] Of course, in practice these two mechanisms can coincide, and some studies examine both simultaneously.

[2] Note that H2a and H2b do not exclude the possibility that relationships with superior officers and/or co-partisans are also mechanisms for sharing information or building trust, as found for instance by Toral (2022).

[3] These regulations came into force in 2005, and in 2017 these percentages changed to require 60% of most-senior-level (DAS5-DAS6) and 50% of less-senior appointees (DAS1-DAS4) to be permanent civil servants.

[4] Publication of this data was discontinued in late 2021, after the period covered by our sample.

[5] Since our main independent variable is the total stock of connections an individual has in a potential destination unit in the previous quarter, rather than the number of connections who moved to that unit in the previous quarter, our estimation strategy does not

assume that the effect of an additional connection operates only in the quarter after they join the potential destination unit. Rather, our empirical approach allows for the possibility that individuals' connections can influence their likelihood of transferring to a destination unit in the quarter following any quarter in which they are still in the destination unit.

[6] We estimate our model using OLS rather than logit, since our use of fixed effects would make a logit regression suffer from the incidental parameters problem and it is not possible to estimate a conditional logit regression for the high number of fixed effects in our specifications. However, when we estimate our models with conditional logit using only a subset of our fixed effects, the results are consistent with our OLS results.

[7] Another way of making this comparison is to re-estimate this regression using normalized connections measures (Table A3, Column 1). Doing so yields a point estimate on connections to coworkers that is twice as large as for connections to superiors. To check robustness to outliers, we also winsorize our connections measure at the 99 percentile (Table A3, Column 2) and obtain similar results and relative magnitudes.

[8] One other related concern is that some apparent transfers might actually be driven by the renaming, splitting, or merging of units. To the extent this occurs, however, the main effect would be to artificially inflate the number of transfers that occur rather than the estimated coefficients on connection stocks, either overall or of different types, so it is unlikely to explain our results.

[9] These two groups together comprise 80.7% of observations in our dataset, with other groups together comprising 3.2% and 16.2% lacking information (figures do not sum to 100 due to rounding). The effects for other/missing racial groups fall in between and are not shown in the main text for brevity, but are available as Appendix (Table A8).

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Supporting Information

Additional supporting information can be found online in the Supporting Information section. **Data S1:** Supplementary Appendix.