

# Interpersonal Connections and Political Ties in Bureaucratic Networks: Evidence from Brazil\*

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## Abstract

Interpersonal networks are pervasive in state bureaucracies around the world. To what extent do they explain 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 2000-18. 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 they comprise only a small fraction of each individual's overall stock of connections. Instead, the cumulative influence of individuals' networks on their career trajectories is dominated by their stock of non-political connections to their peers, not connections to bosses or party colleagues. These patterns are similar for politically appointed and career positions. We discuss theoretical implications and methodological applications.

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# 1 Introduction

Interpersonal networks are pervasive in state bureaucracies around the world, exerting a strong influence on which individuals work in various public service positions at any given point in time. Existing research has mainly examined bureaucrats’ interpersonal connections primarily through a patron-client lens (e.g. Grindle 2012; Shih *et al* 2012; Oliveros 2021; Hassan *et al* 2022; Toral 2023), typically regarding them as negative deviations from meritocratic ideals (e.g. Xu 2018; Colonnelli *et al* 2020; Akhtari *et al* 2022).<sup>1</sup> In contrast, the more mundane interpersonal connections *among* bureaucrats, built up through shared work experience within the bureaucracy, have received relatively less attention. The literature that does exist on such networks tends to emphasize their potentially positive roles in disseminating information and building the informal relationships of trust that are crucial for effective governance (e.g. Moynihan and Pandey 2007; Hu *et al* 2016; Kapucu and Garayev 2016; Marques 2017). However, research on how these interpersonal networks affect bureaucrats’ career trajectories has been limited due to challenges of data and measurement. How important are these interpersonal networks, and to what extent is their effect on bureaucrats’ careers driven by links to influential bosses and copartisans, as opposed to the more generalized “weak tie” (Granovetter 1973) interpersonal networks among peers?

We address this question by examining the effects of different types of interpersonal connections on bureaucrats’ mobility within and across government institutions, using administrative data on the universe of over 440,000 Brazilian federal civil servants for the period 2000-18. We define an interpersonal connection between two individuals as a period of shared work experience within the same unit in an organization, and construct a quarterly measure of each individual’s stock of connections across all other units in the federal civil service. We then combine this with other data on individual characteristics (including political party membership) and bureaucratic hierarchies to disaggregate this into connections to bosses, to copartisans, and to ordinary coworkers. Our rich data allows us to use a powerful combination of time-varying individual and unit fixed effects to isolate the effects of networks from other potential confounders and minimize concerns of bias from endogenous network formation.

We find that individuals’ networks are highly predictive of future transfers: a one-standard-

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<sup>1</sup>A subset of studies does, however, identify some positive effects of political-bureaucratic patronage connections (Brollo *et al* 2017; Jiang 2018; Toral 2023).

deviation increase in the number of interpersonal connections an individual has in a given unit is associated with a 12.7 percent increase in their likelihood of transferring into that unit in that quarter. As expected, this effect is much stronger if the connection is to an officer of superior rank or a co-partisan. But while this might seem to confirm 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 bureaucrats’ interpersonal connections are not to superior officers or co-partisans, but to ordinary coworkers. When considered cumulatively, these type of non-political, horizontal connections to peers are actually stronger predictors of bureaucratic mobility than connections to superior officers or copartisans.

Finally, we investigate the role of institutional rules by examining how these dynamics differ for bureaucrats in politically appointed versus career roles. While connections to superior officers are relatively more important for appointed officers, shared-political party networks are (perhaps surprisingly) not more influential.

Our paper makes several contributions. On a theoretical level, we demonstrate the importance not just of examining vertical patron-client ties within government bureaucracies, but also horizontal ties among coworkers. Our empirical findings also emphasize the importance of the positive-valence mechanisms of information sharing and trust-building among colleagues in driving the functioning of interpersonal connections in bureaucracies, rather than the generally negative-valence mechanisms of political patronage and faction-building that much previous literature has focused on. While the latter are important in many bureaucracies worldwide, they are not necessarily the dominant dynamic even in systems like Brazil’s that have relatively high levels of political appointments. Rather, our findings suggest that the relationships that matter most for an individual’s career trajectory may well be with their peers. This indicates a need for more research focusing on these more mundane forms of connection.

Methodologically, our network measurement approach (and code, available online) opens new avenues for research in the growing number of governments with comprehensive administrative personnel datasets, such as the United States (e.g. Bolton *et al* 2021), Indonesia (Pierskalla *et al* 2021), Kenya (Hassan *et al* 2022), and municipalities in Brazil (Brollo *et al* 2017; Colonnelli *et al* 2020; Akhtari *et al* 2022).

In the remainder of our short paper we describe our context, data, and measurement of bureaucratic networks, then present our empirical analysis and discussion. We conclude by discussing limitations and future directions for research using our method.

## 2 Bureaucratic Networks: Context, Data, and Measurement

### 2.1 Context

As with most civil services worldwide, Brazil’s federal civil service is composed of a mix of career bureaucrats with strong tenure protections hired through non-political bureaucratic mechanisms, as well as six levels of appointed positions (Direção e Assessoramento Superiores, or DAS) for which appointments are largely at the discretion of political leaders. For brevity we refer to these as “career” and “appointed” positions, respectively.

Bureaucrats in career positions are selected through highly competitive examinations into one of over three hundred 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 bureaucrats are white-collar professionals, with 75 percent possessing at least a university degree as of 2018 (ENAP 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 required that at least 50 percent of senior-level (DAS4-DAS6) appointees and at least 75 percent of less-senior (DAS1-DAS3) appointees be permanent civil servants (in aggregate across the service).<sup>2</sup> 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 bureaucrats’ 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 adminis-

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<sup>2</sup>These regulations came into force in 2005, and in 2017 these percentages changed to 60 percent of senior-level (DAS5-DAS6) and 50% of less-senior appointees (DAS1-DAS4) be permanent civil servants.

trative data.

## 2.2 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 unit in which each all Federal civil servants worked at any point in time. After some sample restrictions explained in Online Appendix A, we have information on over 440,000 unique civil servants, with an average of 220,000 in active service at any time. 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, following Bersch *et al* (2016), Brollo *et al* (2017), and Colonnelli *et al* (2020), among others.

To proxy 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 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 5 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.

This allows us construct a vector  $N_{i,l,t}$  for each individual-quarter observation that is defined as that individual’s stock of connections in every unit  $l$  in the civil service (aside from the origin unit  $j$  in which they currently work). 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

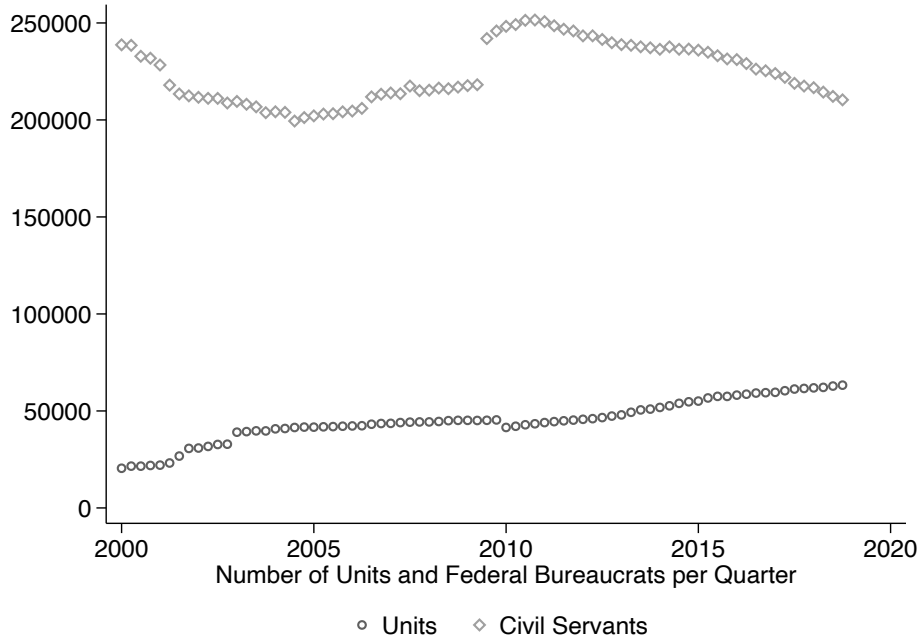


Figure 1: Number of individuals and units over time

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 in the order of  $7 \times 10^{16}$ . 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. 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. 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.

### 3 Importance and Dynamics of Bureaucratic Networks

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

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

where  $Y_{i,j,l,t}$  is a dummy equal to one if individual  $i$  moved from origin unit  $j$  to potential destination unit  $l$  in quarter  $t$ .  $\alpha$  is our parameter of interest and  $N_{i,j,l,t-1}$  is our preferred network measure: the number of former colleagues of individual  $i$  who worked in potential destination unit  $l$  in the previous quarter. 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. Collectively these fixed effects make it highly unlikely that our results are driven by omitted variable bias or reverse causality.<sup>3</sup>

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 a full array of fixed effects, which reduces this estimated percentage point increase to 0.0076. This parameter estimate 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,

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<sup>3</sup>Appendix B demonstrates robustness to even more demanding combinations of fixed effects, and to various ways of clustering standard errors.

Table 1: Connections and Transfers for Co-Workers and Superiors

	(1)	(2)	(3)
Connections	0.00012*** (0.000003)	0.000076*** (0.000004)	
Connections to Coworkers			0.000065*** (0.000005)
Connections to Superiors			0.00040*** (0.000044)
Individual*Quarter FE	No	Yes	Yes
Origin Unit*Quarter FE	No	Yes	Yes
Destination Unit*Quarter FE	No	Yes	Yes
Mean	0.018	0.018	0.018
Obs	11407507	10237251	10237251
R2	0.0015	0.53	0.53

Notes: Individual\*unit\*quarter regressions. Dependent variable is a dummy equal to one 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.

equivalent to about 12.7 percent of the mean.

Column 3 then adds a new connection measure  $N_{i,l,t-1}^s$  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). We find that the effect of 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.<sup>4</sup>

Table 2 examines how connections between members of the same political party differ in their effects from connections between members of different parties or non-affiliated individuals.

<sup>4</sup>Another way of making this comparison is to re-estimate this regression using normalized connections measures (Table A.2, 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 A.2, Column 2) and obtain similar results and relative magnitudes.



Table 2: Connections and Transfers for Partymates and Non-Partymates

	(1)	(2)
Connections (non-party)	0.000069*** (0.000004)	0.000071*** (0.000004)
Connections (same party)	0.0083*** (0.000733)	0.0077*** (0.000913)
Connections (not same party)*Party in Power		-0.000092*** (0.000016)
Connections (same party)*Party in Power		0.0041*** (0.001530)
Individual*Quarter FE	Yes	Yes
Origin Unit*Quarter FE	Yes	Yes
Destination Unit*Quarter FE	Yes	Yes
Mean	0.018	0.018
Obs	10237251	10237251
R2	0.53	0.53

Notes: Individual\*unit\*quarter regressions. Dependent variable is a dummy equal to one 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.

To do so, we compute another connection stock measure  $N_{i,l,t-1}^p$  which counts only shared-party connections, and add this into our regressions (using the full fixed-effects specification). Column 1 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 2, 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 unimportant for non-shared-party connections but does increase transfer likelihood for shared-party connections.

In Table 2, we thus observe evidence consistent with the existence of both potential mechanisms of networks' influence: 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.<sup>5</sup> Although party-based network connections can be very powerful for the individuals

<sup>5</sup>One concern might be that some individuals might be informally affiliated with a party without being

involved in them, the operation of party networks captures only a tiny fraction of the effect of civil servants' built-up professional networks.

Finally, Table 3 compares bureaucrats in career positions (non-DAS) versus appointed positions (DAS) to examine how their different appointment and transfer rules influence network dynamics. Columns 1 and 2 show 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. Columns 3 and 4 show 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). 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) effect of party connections on transfers.

## 4 Discussion

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

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formally registered as a member. While we cannot measure this directly, we think it is unlikely that this is driving our findings as individuals for whom party connections are likely to be most influential are also likely to be those who are actual party members. 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.

Table 3: Connections and Transfers for Career Versus Appointed Roles

	non-DAS (1)	DAS (2)	non-DAS	DAS
Connections to Coworkers	0.000075*** (0.000006)	-0.00000064 (0.000013)		
Connections to Superiors	0.00021*** (0.000046)	0.0013*** (0.000142)		
Connections (non-party)			0.000073*** (0.000005)	0.00010*** (0.000012)
Connections (same party)			0.0073*** (0.000938)	0.0073 (0.005947)
Connections (not same party)*Party in Power			-0.000081*** (0.000014)	-0.00013* (0.000075)
Connections (same party)*Party in Power			0.0043*** (0.001608)	0.0038 (0.006846)
Individual*Quarter FE	Yes	Yes	Yes	Yes
Origin Unit*Quarter FE	Yes	Yes	Yes	Yes
Destination Unit*Quarter FE	Yes	Yes	Yes	Yes
Mean	0.019	0.014	0.019	0.014
Obs	7145246	2854303	7145246	2854303
R2	0.59	0.50	0.59	0.50

Notes: Individual\*unit\*quarter regressions. Dependent variable is a dummy equal to one 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.

Our paper’s main limitation is that 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). Bureaucrats 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 hard to conduct at the same scale. Similarly, 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 using our method.

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# Online Appendix A: Further Details of Data and Method

## Data and Sample

### SIAPE Dataset

The Integrated System for Personnel Administration (*SIAPE*) is the payroll system for all public servants in the Federal Government. For each individual we have information on the unit they worked for in a given quarter. The *SIAPE* data includes information about the unit the individual works for. The average unit size in *SIAPE* varies over time, but is never far from 10 persons per unit.

We excluded all post-retirement observations, all civil servants working for Federal Universities and Federal Teaching Institutes and all civil servants transferred to agencies that are not part of the Federal Executive Branch.<sup>6</sup>

We also excluded positions linked to the Ministry of Health as it is part of the Executive but operates in a decentralized manner. Specifically we excluded observations with values “*Guarda De Endemias, Agente De Combate A Endemias, Agente De Combate As Endemias, Programa Mais Medicos, Residencia Multiprofissional*” in the variable position.

Finally, we further restricted the sample, removing temporary contracts and individuals who were transferred to other agencies.

The sample covers all quarters in the period from March 2000 to December 2018. About 440,000 unique civil servants (with varying periods of tenure) were considered for the study.

### Party Affiliation Dataset

We use data on political party affiliation made public along with individuals’ national ID numbers by Brazil’s Superior Electoral Court in Brazil (TSE), following Bersch *et al* (2016), Brollo *et al* (2017), and Colonnelli *et al* (2020), among others.<sup>7</sup> We can thus merge this information into the *SIAPE* data.

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<sup>6</sup>Specifically we excluded observations with values “CEDIDO, GDF, TRE, TRT, TRF, TST, PREFEITURA, ESTADO, EBSEH, DPF, DPRF, EX-TER, E/M/AD.A.F, E/M/EMP ” in the agency variable.

<sup>7</sup>Publication of this data was discontinued in late 2021, after the period covered by our sample.

## Network Computation

Using the SIAPE data, we create a panel dataset capturing the unit each individual was working for in each quarter. We also extracted other individual characteristics (race, gender, rank, and year of birth).

For each individual in our sample, we extract the list of coworkers in each quarter. Then for each quarter\*available destination unit, we compute the number of previous coworkers currently working in the destination unit. Given the restrictions on potential destination units, we loop through each individual in the sample rather than trying to compute everything at once (which cuts down computing time as well).

We end up with an individual\*destination dataset that includes:

- Individual ID
- Individual information (sex, age, education, race, political party, position level, party in power, party in coalition)
- Name of the unit
- A dummy capturing whether the individual works in that unit
- A dummy capturing whether the individual moved to that unit in that quarter (ie was not working in that unit in the previous quarter)
- Number of individuals currently working in that unit
- Number of individuals currently working in that unit who previously worked with the individual (broken down by coworker, supervisor and party-mates or not)

In order to reduce computation time, we make the following simplifying assumptions:

- Instead of calculating the data for everybody, we randomly select a subset of individuals to be studied.
- We restrict the number of potential destination units. In particular if individual  $i$  is currently working in unit  $j$  we only consider unit  $l$  as a potential destination unit if at least one individual moved from  $j$  to  $l$  over the sample period.



- Some units are very small (at most 2 people). Within each ministry we group those units into a larger “virtual unit”. Our results are robust to excluding these from our calculations.

Our network calculation code, along with an explanatory note, is available online for researchers who wish to adapt it in order to conduct similar analysis in other contexts.

## Online Appendix B: Robustness and Extensions

In this Online Appendix we provide some additional tables. Brief explanations of each table are available below:

- Table A.1: provides descriptive statistics for the sample described in Online Appendix A.
- Table A.2 shows robustness of our main results to using two alternative connections measures: (i) measures normalised to be standard deviation 1 and (ii) measures winsorized at the 99 percentile.
- Table A.3 shows robustness of our main results to excluding all virtual units (recall that those units combine all units in a ministry with at most 2 employees at a given point in time, as described in Appendix A).
- Table A.4 shows robustness of our main results to the inclusion of more demanding fixed effects. Results are indeed robust to including Origin Unit\*Destination Unit FE (reducing concerns that our results are merely capturing common moves between some units) and Individual\*Ministry\*Quarter FE (capturing time and ministry-specific shocks).
- Tables A.5 and A.6 provide standard errors computed with alternative assumptions about clustering.

Table A.1: Descriptive Statistics

	Obs. (1)	Mean (2)	Std. Dev. (3)
Connections	11,407,507	2.1769	30.1767
Connections to Superiors	11,407,507	.2162	2.2176
Connections to Coworkers	11,407,507	1.9607	29.6663
Connections (non-party)	11,407,507	2.1726	30.1303
Connections (same party)	11,407,507	.0042	.2683
Connections to Superiors (winsorized)	11,407,507	.1407	.5473
Connections to Coworkers (winsorized)	11,407,507	.6411	3.8129

Notes: Authors' calculations

Table A.2: Connections and Transfers: Alternative Connections Measures

	(1)	(2)
Normalised Connections to Coworkers	0.0019*** (0.000141)	
Normalised Connections to Superiors	0.00089*** (0.000099)	
Connections to Coworkers (winsorized)		0.00077*** (0.000134)
Connections to Superiors (winsorized)		0.0011*** (0.000028)
Individual*Quarter FE	Yes	Yes
Origin Unit*Quarter FE	Yes	Yes
Destination Unit*Quarter FE	Yes	Yes
Mean	0.018	0.018
Obs	10237251	10237251
R2	0.53	0.53

Notes: Individual\*unit\*quarter regressions. Dependent variable is a dummy equal to one 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.

Table A.3: Connections and Transfers:Excluding Virtual Units

	(1)	(2)
Connections to Coworkers	0.000062*** (0.000005)	
Connections to Superiors	0.00033*** (0.000038)	
Connections (non-party)		0.000064*** (0.000004)
Connections (same party)		0.0075*** (0.000946)
Connections (not same party)*Party in Power		-0.000089*** (0.000015)
Connections (same party)*Party in Power		0.0038** (0.001612)
Individual*Quarter FE	Yes	Yes
Origin Unit*Quarter FE	Yes	Yes
Destination Unit*Quarter FE	Yes	Yes
Mean	0.018	0.018
Obs	9598487	9598487
R2	0.54	0.54

Notes:Individual\*unit\*quarter regressions. Dependent variable is a dummy equal to one 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.

Table A.4: Connections and Transfers: Alternative FE

	(1)	(2)	(3)	(4)
Connections to Coworkers	0.000019*** (0.000003)	0.000066*** (0.000005)		
Connections to Superiors	0.000027 (0.000035)	0.00063*** (0.000061)		
Connections (non-party)			0.000017*** (0.000003)	0.000074*** (0.000005)
Connections (same party)			0.0027*** (0.000623)	0.0077*** (0.000942)
Connections (not same party)*Party in Power			-0.000029*** (0.000009)	-0.000096*** (0.000014)
Connections (same party)*Party in Power			0.0020* (0.001033)	0.0048*** (0.001550)
Individual*Quarter FE	Yes	Yes	Yes	Yes
Origin Unit*Quarter FE	Yes	Yes	Yes	Yes
Destination Unit*Quarter FE	Yes	Yes	Yes	Yes
Origin Unit*Destination Unit	Yes	No	Yes	No
Individual*Ministry*Quarter FE	No	Yes	No	Yes
Observations	10176270	9188619	10176270	9188619
R <sup>2</sup>	0.63	0.55	0.63	0.55

Notes:Individual\*unit\*quarter regressions. Dependent variable is a dummy equal to one 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.

