# Gendered Informational Inequality in Elite Networks: Evidence from Tunisia

Mohamed Dhia Hammami*

June 16, 2026

**Abstract**

How does gender shape access to political information among elites? I argue that even as formal institutions advance gender equality, men preserve de facto political power by maintaining structurally advantageous positions in elite networks that grant them superior control over information flows. Drawing on Acemoglu and Robinson's distinction between de jure and de facto power, I propose that when gender regimes shift through quotas, parity clauses, and expanded access to elite education, historically dominant groups preserve advantage through informal channels of informational control. Using a novel dataset of 15,940 elite entities in Tunisia, I operationalize gendered informational inequality through betweenness centrality, which captures an individual's structural capacity to broker information between otherwise disconnected network segments. Women occupy significantly less central brokerage positions than men ($\beta = -0.264$, $p < 0.001$), a finding that holds across multiple model specifications and survives controls for network size, reach, local density, and ethnic background. Comparing the gap across centrality measures locates it in brokerage: it is largest for betweenness, exceeds the degree gap in the predicted direction, and coincides with higher local clustering among women, the structural signature of ties that close existing groups instead of bridging disconnected ones. Women, in this sense, are positioned within the network where their ties fail to bridge, not excluded from it.

*Department of Political Science, Maxwell School of Citizenship and Public Affairs, Syracuse University.

I thank Lisa Blaydes, Mark Beissinger, Dhouha Djerbi, Marwa Shalaby, Aili Mari Tripp, Daniel Tavana, and Isabelle Werenfels for constructive feedback. Earlier versions were presented at the 2024 and 2025 APSA Annual Meetings, the 2024 APSA MENA Workshop at Kuwait University, the LR-MASE Seminar in Tunisia, and the POMEPS 2025 Virtual Workshop. This version will be presented at 2026 MoPED at the WZB Berlin Social Science Center.

One of the puzzling questions in the study of gender and politics is the persistence of a comparatively high level of gender inequalities in Muslim and Arab societies. Shifting away from early work that attributed women's disadvantage in the region as stemming from oil rents (Ross, 2008) and whether or not Islam is the problem (Fish, 2002; Alexander and Welzel, 2011), the recent literature on Muslim and Arab women's involvement in politics and the public sphere has focused on women's representation in public office at the local and national levels (Shalaby, 2018; Benstead, 2019*b*,*a*), and their participation in contentious politics (Allam, 2018; Tezcür, 2020; Charrad and Zarrugh, 2014; Moghadam, 2014; Langohr, 2013; Sadiqi, 2016). Recently advanced theories (Clark, Blackman and Şaşmaz, 2024) center party or voters' choices (Blackman and Jackson, 2021; Lust and Benstead, 2024). While formal institutions and electoral politics remain important, political scientists increasingly recognize that informal networks and behind-the-scenes dynamics shape political outcomes across all regime types. Understanding how gender shapes access to these informal channels of power is essential for explaining persistent inequalities even in contexts with progressive formal institutions.

There has been growing focus on both elite women (Keister, Thébaud and Yavorsky, 2022) and the views and behaviors of elites more broadly (Kertzer and Renshon, 2022), as well as their roles in shaping political outcomes (Saunders, 2022). Despite these advancements, the centrality of women within "networks of privilege" (Heydemann, 2004) remains insufficiently understood. Do these networks, which seem to provide women access to circles of power, continue to disadvantage them? While inequalities within elite circles can manifest in various ways, this paper examines a significant yet often overlooked dimension: gendered

informational inequality among elites. By informational inequality I mean not unequal access to media or education, but structural differences in the capacity to access, control, and broker the privileged political information circulating through informal elite networks. This focus is valuable because information access and control are fundamental to political influence and decision-making. While overt manifestations of gender disparities in politics, such as representation in public office, have received considerable attention, the less visible but equally consequential domain of informational power has remained largely unexplored at the micro level.

I examine a specific micro-mechanism perpetuating gender inequalities in political influence and decision-making processes at a national level, similar to those identified in workplaces (Brass, 1985; Brands et al., 2022) and informal organizations (Smith, 2019; Diviák, Coutinho and Stivala, 2020). By focusing on informational inequality, I move beyond symbolic representation in public offices and the macro-level impediments to women's participation in elections, toward how the position of women in network structure shapes their access to the information necessary for the negotiation of de facto political power. I suggest that compared with men who have historically dominated the public sphere, and despite recent progress in gender equality, women continue to be disadvantaged when it comes to accessing privileged information circulating in elite networks. Organizational studies have explored informational power in theoretical and experimental terms (Baldwin, Kiviniemi and Snyder, 2009; Brands and Kilduff, 2014), and I bring these theoretical insights into political science, providing a framework for understanding gendered power dynamics in elite circles.

The paper advances two contributions. The first one is theoretical: I develop a theory

of gendered informational inequality in elite networks, specifying four analytically distinct mechanisms, namely spatial exclusion from male-coded deliberation venues, reputational sanctions against women in mixed-gender spaces, discriminatory gatekeeping in the opaque internal processes that govern advancement, and dependency on male sponsors producing redundant rather than bridging ties, which jointly constrain women's capacity to occupy the bridging positions and form the cross-cutting ties that generate brokerage power. The second one is empirical: using a novel dataset of over 15,940 elite entities in Tunisia, I demonstrate that women occupy significantly less central brokerage positions than men, and that the gap is brokerage-specific: it is larger for betweenness, the brokerage measure, than for degree, the volume-of-connections measure, and coincides with higher local clustering among women, locating the disadvantage in the structure of the ties women form and not reducing it to their number.[1]

The paper finds that across four model specifications (linear, quasi-Poisson, zero-inflated Poisson, and zero-inflated negative binomial), women's betweenness centrality is significantly lower than men's ($p < 0.01$). A permutation test with 100,000 iterations confirms this result is not an artifact of network dependencies, yielding a Cohen's $d$ of 0.23, which matches the median effect size for published gender differences in social psychology (Lovakov and Agadullina, 2021). The gender gap survives controls for network size, reach, local density, and ethnic background, and is largest for betweenness among the centrality measures tested.[2]

The rest of the paper is structured as follows. I first situate the argument within the literature

[1]The argument generalizes to settings where formal change has expanded women's access to elite positions while informal political life remains gendered; I focus on Tunisia, where these conditions are documented and network data can be constructed.

[2]To my knowledge, this cross-measure comparison—isolating a brokerage-specific gap rather than general marginality—is the first such test in the literature on gender and elite networks.

on gender, networks, and political power. I then develop the theoretical framework, specifying the mechanisms linking gender to brokerage disadvantage. Turning to Tunisia, I describe the country's gender regime change and illustrate the theory through a biographical network analysis of Wassila Ben Ammar. I then present the social network analysis, including data construction, the operationalization of betweenness centrality, and the regression results. The discussion interprets the findings, addresses alternative explanations, and considers implications, before I conclude with directions for future research.

## Gender, Networks, and Political Power

The relationship between gender and political power has been a central focus in political science for decades (Brown and Samuels, 2018), including in the study of Middle East and North African politics. Earlier work centered primarily on the underrepresentation of women in public office (Norris and Lovenduski, 1995; Lawless and Fox, 2005; Paxton, Kunovich and Hughes, 2007) and on the macro-level cultural and economic factors held to produce it (Krook, 2010; Hughes, Paxton and Krook, 2017; Ross, 2008; Blaydes and Linzer, 2008; Eastin and Prakash, 2013), emphasizing barriers such as religion, the mode of production, electoral systems, and party gatekeepers that disadvantage women across polities.[3]

While this tradition accounts for cross-national variation in women's formal representation, it leaves unexplained why women embedded in the same institutional setting attain different degrees of informal influence, the question a relational turn in the study of gender and power has begun to address (Brands et al., 2022). In a foundational study of managerial networks,

[3]Unlike the cross-national macro literature, the network approach examines within-country, individual-level variation: why women in the same institutional setting attain different levels of influence.

Ibarra (1992) demonstrated that men and women occupy different structural positions within organizational networks, with men drawing primarily on other men for both instrumental and expressive support while women's networks tend to cross gender lines.[4] Building on this, McPherson, Smith-Lovin and Cook (2001) showed that homophily, the tendency for similar individuals to form ties, structures network composition along gender lines and creates systematically different information environments for men and women. Political scientists have established that the same relational tools travel to the national level, using centrality measures to capture informal influence in legislative cosponsorship (Fowler, 2006) and formal participation (Krook, 2010; Djupe, Mcclurg and Sokhey, 2018).[5]

Where these studies establish that relations structure influence, a more specific body of organizational research demonstrates that network position itself is gendered, and the evidence is substantial. In an early demonstration, Brass (1985) showed that men occupy more central positions in organizational networks and are perceived as more influential, establishing network centrality as a source of gendered power differentials. Extending this, Brands and Kilduff (2014) demonstrated that even after controlling for actual network positions, men are perceived to occupy brokerage roles more than women, so that cognitive bias compounds structural disadvantage, and their finding that "brokerage is man's work" bears directly on how women's structural positions are discounted even once attained. In related work, Brands and Mehra (2019) showed that men and women receive different performance returns from

[4]Ibarra's finding that women's networks are more gender-heterogeneous would seem to predict higher betweenness for women. Yet where men are the majority (76% here), women's cross-gender ties largely connect them to the same male-dominated core rather than bridging distinct clusters.

[5]Fowler (2006) mapped U.S. congressional cosponsorship networks (1973–2004) using centrality measures to identify influential legislators, establishing their viability at national scale, although it did not examine gender.

equivalent brokerage positions, indicating that the disadvantage operates both through access to positions and through the returns to occupying them.

In a synthesis of this body of work, Woehler et al. (2021) distinguish unequal network characteristics (UNC), where men and women differ in the structural features of their networks, from unequal network returns (UNR), where equivalent positions yield different career outcomes by gender. This paper falls within the UNC tradition, in that I demonstrate that women occupy less advantageous positions in national elite networks. A complementary reading from a different setting comes from Solano and Rooks (2018), who examine bidirectional flows within networks of Ugandan entrepreneurs and demonstrate that gender shapes not only what resources individuals extract from networks but also what obligations they incur, with male contacts providing significantly more financial resources to female entrepreneurs than female contacts provide to male entrepreneurs.

All of these organizational studies, however, operate within single firms or professional associations with samples ranging from 33 to 140 individuals, while the political science studies that deploy centrality at national scale, such as Fowler (2006) on congressional cosponsorship or Hafner-Burton and Montgomery (2010) on brokerage power in international networks, do not examine gender. The intersection of national-scale elite networks, betweenness centrality as a measure of informational inequality, and gender is the gap this paper addresses, and to the best of my knowledge no prior study has examined gender inequality among national elites with the network tools developed for smaller organizations.

It is in this context that Acemoglu and Robinson (2008)'s argument becomes useful, according to which old elites rely on de facto political power to preserve their status when political

regimes change. I retain from their work the hypothesis that historically dominant groups conserve advantage through informal channels when formal institutions shift, and I extend it to gender by treating elite networks as the informal arrangements through which masculine elites preserve systemic advantage as gender regimes (Walby, 2004, 2020) change through quotas, parity clauses, and anti-discrimination law.[6] In this sense networks are not simply organizations in which public officeholders are embedded, but sources of de facto political power (Ulziisukh and Wei, 2022; Naidu, Robinson and Young, 2021) that warrant more attention from political scientists. From this expectation I derive, in what follows, the mechanisms that locate women's disadvantage in the structure of their ties and the testable hypotheses through which the network analysis evaluates them.

## Informational Power and Gendered Brokerage

Political power stems not only from formal authority but also from actors' ability to influence outcomes through informal means. Among these sources of de facto political power, informational power, theorized by French (1959) as an agent's capacity to influence others' attitudes or behaviors through the possession and strategic use of relevant information, is particularly important. In political contexts, control over information about rival factions' strengths, potential realignments, evidence of malfeasance, or upcoming institutional decisions directly shapes actors' strategic choices and decision-making capabilities.[7] The resulting information

[6] By gender regime I mean the interconnected institutions, policies, norms, and practices that shape gender hierarchies (Walby, 2004), with regime change occurring when these shift through quotas, anti-discrimination laws, or evolving norms.

[7] Such information includes intelligence on rivals' resources and divisions, advance warning of defections, leverageable evidence of corruption, and the mapping of patronage networks—flowing through professional networks in democracies and personal loyalty networks in autocracies.

dependencies between political actors create and maintain power hierarchies that can persist even when formal institutions change.

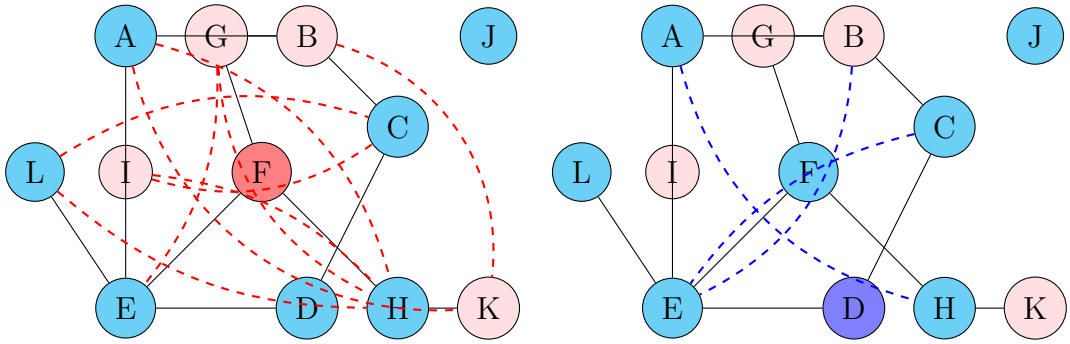
This informational dimension of de facto political power becomes systematically unequal when certain actors gain structural advantages in accessing, controlling, and leveraging politically relevant information. Such informational inequality operates through several mechanisms. Strategic actors can deliberately accumulate valuable information, creating knowledge monopolies that make others dependent on their cooperation (Bendor, Taylor and Van Gaalen, 1987; Ban, Park and You, 2023) or maintain authority by undermining others' access to power (Vidal and Möller, 2007; Delgado-Vega and Shaver, 2024). Well-positioned actors can act as gatekeepers, controlling information flow between otherwise disconnected groups and determining who gets access to what information and when.[8] Most significantly, actors at the intersection of different network segments can generate new, synthesized information by combining insights from multiple sources, further enhancing their strategic value to other network members and reinforcing their power position.

I define gendered informational inequality as systematic differences between men and women in their ability to access, control, and leverage information essential for political influence. This concept extends beyond simple information asymmetry to encompass the structural positioning that allows actors to serve as information brokers or gatekeepers within elite networks. Through these informal mechanisms of informational control, gender-based power hierarchies can persist even as formal barriers to women's participation fall.[9]

[8]Burt (1992)'s structural holes formalize this: actors bridging disconnected clusters gain advantage by controlling non-redundant information. The mechanisms below explain why women are less likely to occupy these positions.

[9]The formulation is structural, not individual: the claim is not that women are less skilled or motivated, but that gendered network structures position them where brokerage is difficult regardless of ability.

Network analysis provides a powerful tool for measuring these dynamics empirically. Betweenness centrality, which captures how often an actor lies on the shortest paths between other network members, directly measures an individual's potential to broker information flow (Freeman, 1977).[10] While degree centrality captures the volume of direct connections and closeness centrality measures proximity to others, betweenness centrality uniquely captures an actor's capacity to broker information between otherwise disconnected groups, which is the bridging function that constitutes the core of informational power. High betweenness centrality indicates not just access to information, but the structural capacity to act as an information gatekeeper. Figure 1 illustrates this distinction.




(a) High Betweenness Centrality (b) Moderate Betweenness Centrality

Figure 1. Illustration of betweenness centrality. Blue nodes represent men; pink nodes represent women. Solid lines are direct connections; dashed lines highlight shortest paths passing through a focal node. In (a), node F (a woman, highlighted in red) lies on many shortest paths, indicating high brokerage potential. In (b), node D (a man, highlighted in dark blue) lies on fewer shortest paths. If women systematically occupy positions like D rather than F, they have lower betweenness centrality and less structural capacity to broker information. The figure fixes the distinction the paper turns on: brokerage is bridging position, not the number of ties, which the centrality comparison later tests empirically.

[10]Formally, $C_B(v) = \sum_{s \neq v \neq t} \sigma_{st}(v)/\sigma_{st}$, where $\sigma_{st}$ is the number of shortest paths from $s$ to $t$ and $\sigma_{st}(v)$ the number passing through $v$. I compute it on the one-mode projection of the bipartite (individual $\times$ organization) network in Cytoscape (Shannon et al., 2003), which uses Brandes' algorithm (Brandes, 2001)—as do all modern packages (Python's NetworkX, R's `igraph`, Gephi).

Betweenness centrality also has clear limits. It cannot capture the quality of information an actor receives, their ability to verify information through multiple sources, or their skill at strategically deploying it.[11] Rather, it specifically measures the structural aspect of informational power: an actor's potential to serve as an intermediary based on their network position. This focus on structural position rather than individual characteristics makes betweenness centrality particularly valuable for studying systematic inequalities. When aggregated by social categories like gender, differences in betweenness can reveal how network structures themselves, rather than just individual attributes or choices, contribute to persistent power disparities.

## Four Mechanisms Linking Gender to Low Betweenness

I argue that in societies witnessing a transition in gender regimes as a result of formal efforts to address gender inequalities, men maintain their dominance by preserving informal advantages in information control through strategic network positioning. Specifically, even as women gain increased representation in public office, men preserve their de facto political power by maintaining, on average, structurally advantageous positions in national elite networks that grant them superior access to and control over political information. Four analytically distinct mechanisms constrain women's capacity to occupy the bridging positions and form the cross-cutting ties that generate high betweenness centrality.

The first mechanism operates through the spatial and temporal organization of informal political life. Political deliberations in Tunisia frequently occur in cafés, which a 2019 IRI

[11] Betweenness captures the structural potential to broker information, not its quality; I treat it as necessary but not sufficient for informational power.

survey identified as the primary venue for political discussion for 41% of respondents (Zolman et al., 2020).[12] Meetings in working-class bars, late-night party gatherings, and after-hours networking events follow a similar pattern (Cherif, 2014; Grosso and Sato, 2017). These spaces are culturally coded as masculine, and women who attend them incur reputational costs that men do not face. As a result, women form ties within a narrower range of settings, reducing the probability that their connections span the distinct clusters visible in the network data. In betweenness terms, this means fewer geodesic paths pass through women's nodes.

The second mechanism is social sanctioning and reputational policing. Women who participate actively in mixed-gender political spaces report facing rumors and social disapproval (Zolman et al., 2020). Familial gatekeeping reinforces this: husbands and fathers sometimes actively prevent women from attending political gatherings.[13] These sanctions do not only reduce the number of ties women form but discourage the particular ties that generate high betweenness, those that reach into male-dominated clusters where women are underrepresented. A woman whose networking is confined to spaces her family deems acceptable will tend to form ties within a limited, relatively homogeneous segment of the network, which is the pattern that produces low betweenness centrality.

The third mechanism operates not on the ties women form but on the positions the network's internal processes allow them to reach. Advancement to the senior posts that sit atop the brokerage hierarchy is governed in Tunisia by candidate-selection and leadership-designation procedures that women describe as opaque and discriminatory, with the absence of transparent

[12]Households ranked second (18%), so the most common venue outside the home is one women enter at a social cost—a concentration of deliberation in male-coded spaces that is regional, not uniquely Tunisian (Singerman, 1995).

[13]Zolman et al. (2020) report that husbands and fathers who object to women frequenting coffeeshops and public political spaces often actively prevent their participation.

criteria disproportionately reducing their chances of moving into the roles where cross-cutting ties are concentrated (Grosso and Sato, 2017). While the spatial, reputational, and dependency mechanisms each shape which ties a woman can build, gatekeeping determines whether she can occupy the structural location from which brokerage is exercised in the first place, so that even a woman who has assembled non-redundant connections may be filtered out before she reaches the apex of the network. Because this exclusion bites hardest at the senior positions that command the densest bridging opportunities, it predicts a disadvantage that is not distributed evenly across the betweenness distribution but concentrated at its upper end, the structural form a glass ceiling takes when it is read off a brokerage hierarchy.

The fourth mechanism is dependency on male sponsors. Zolman et al. (2020) report that women consistently cited male support as a precondition for involvement in political activities.[14] When women's access to the network is mediated through a small number of male patrons, their ties tend to be redundant with those patrons' ties rather than independently bridging to new clusters. In network terms, a woman who enters the elite through her husband's or father's connections will share many of the same neighbors, limiting her betweenness even if her raw number of connections (degree centrality) is comparable.[15] This pattern helps explain why the gender gap may appear specifically in betweenness rather than necessarily in other centrality measures.

These four mechanisms generate two interrelated and testable predictions, the first concerning whether the gap exists and the second where in the network's structure it is located.

[14]This dependency is not uniquely Tunisian: Benbelli (2023) documents a Moroccan candidate whose extensive party experience was undercut by limited family and tribal networks functioning as electoral capital.

[15]This redundancy mechanism predicts a larger gap for betweenness (which needs non-redundant ties) than for degree (which counts all ties)—the prediction the centrality comparison tests.

**Hypothesis 1.** Elite women have lower betweenness centrality than elite men in national elite networks, reflecting persistent gender disparities in information brokerage despite gender regime change.

**Hypothesis 2.** The gap is brokerage-specific rather than a matter of sheer connectivity: it is larger for betweenness than for degree, and it is accompanied by higher local clustering among women, the structural signature of ties that reinforce existing clusters rather than bridge disconnected ones.

Because these mechanisms suppress non-redundant, cross-cutting ties in particular and not connections in general, H2 is the sharper test, separating a positional account of women's disadvantage from one that reduces it to smaller networks.

# Women in Tunisian Elite Networks

## Gender Regime Change in Tunisia

Tunisia has long been recognized as a pioneer in advancing gender equality within the region. Since gaining independence in 1956, the country has made significant strides in promoting women's rights and progressively facilitating a transition from traditional gender roles to a more egalitarian society. One of the earliest and most consequential measures was the introduction of the Code of Personal Status in 1956. This progressive set of laws banned polygamy, gave women the right to divorce, and set a minimum age for marriage, reforms that were revolutionary for the time and region. Over the decades, Tunisia continued to build on this foundation. Women gained the right to vote in 1957 and saw a continuously

increased representation in politics and the workforce.

During the last two decades, Tunisia witnessed progress in the representation of women in leadership positions (Benstead, 2019*b*) that can be assimilated to a gender regime change. The ruling party (RCD) introduced a gender quota system in 1999, and a more developed system of vertical (Larserud and Taphorn, 2007) and horizontal electoral quotas at national and local levels was introduced during the 2011–2021 democratic experience. Women's advocacy led to the adoption of a constitutional parity clause mandating at least 50 percent women's representation in elected bodies, and triggered a debate on equal inheritance aimed at increasing women's access to generational wealth (Zaki, 2019).

While the ratio of women in parliament dropped with the collapse of the party-based electoral system (Grubman and Şaşmaz, 2021) in 2021, women continue to position themselves in strategic positions within the state apparatus (Klibi, 2015; Benstead, 2019*b*; Ben Achour, 2007). This pattern aligns with what Tripp (2024) identifies as a deliberate strategy of authoritarian regimes, as when President Sa"id appointed Najla Bouden as prime minister in 2021 after suspending parliament and the constitution, an appointment designed to soften the regime's image while consolidating autocratic power.[16] Tunisia is also witnessing a feminization of the prestigious National School of Administration (ENA) student body, with women now outnumbering men by more than 2-to-1, leading to increased representation of women in senior bureaucratic positions (Figure A1).[17] More broadly, since the 2000s, more Tunisian women have been enrolled in universities than men.

[16]Bouden's appointment captures the de jure/de facto distinction: a female prime minister is a formal milestone, but a constrained information network limits de facto autonomy—which, in Tripp's framework, is what makes such appointments useful to the regime.

[17]ENA enrollment by gender and higher-education trends appear in the appendix (Figure A1).

Yet, as women improve their representation in the tightly networked upper echelons of society, they report facing new challenges related to access to information circulating within those networks. When asked about the barriers that prevent them from having the same opportunities as men, Tunisian women in politics cited the prevalence of informal meetings held late at night, which women with childcare responsibilities find challenging to attend (Grosso and Sato, 2017). Those who do manage to participate in these late gatherings often face social repercussions, including rumors and damage to their reputation. Tunisian women also report that internal decision-making processes for candidate selection and leadership positions within political parties tend to discriminate against women, with a lack of transparency disproportionately affecting their chances of advancement.[18]

## Wassila Ben Ammar: Brokerage Power Without Public Office

To illustrate how betweenness centrality translates into de facto political power, I examine Wassila Ben Ammar, who wielded significant influence as an information broker without ever holding public office. Her career demonstrates both the potential and the rarity of women achieving high betweenness in Tunisia's elite networks.[19]

Born into a Tunisian family descended from Husseinite notables, Wassila started expanding her personal network when her father died and she had to manage her inherited business, gaining first-hand practice in maintaining relationships across different social circles. In 1932,

[18]Gribaa, Depaoli and Baklouti (2009) notes that girls' tighter family ties limit their access to extra-family networks, leaving them with fewer connections and less informal information for political projects.

[19]Sources include biographies (Gaspar, 2012; Dougui, 2020; Saad, 2021), newspaper articles (Borsten, 1985), and U.S. State Department cables (U.S. Department of State, 1978; *Madame Bourguiba "Reappears" in Tunisian Media*, 1978; U.S. Department of State, 1977; *Libyan Efforts to Subvert President Bourguiba*, 1978), contributing to the revival of biographical methods in leadership research (Krcmaric, Nelson and Roberts, 2020; Walter, 2014).

she co-founded the Society of Muslim Ladies, strategically establishing connections with both the Beylical Palace and the French Residency, positioning herself at the intersection of traditional and colonial power structures (Marzouki, 1993, pp. 50–51). The organization's founding event brought together diverse groups of influential women (Muslims, Jews, and Western women representing various political currents), and Wassila's central role as organizer and keynote speaker positioned her as a key information broker among elite women who did not hold public office but had access to different male-dominated power centers.[20]

By the mid-1940s, the colonial apparatus started seeing Wassila as a threatening central node. Police reports noted that "under the impetus of Bchira Ben Mrad, Wassila Ben Ammar, and Princess Jeneina... a very active nationalist and Moncefist propaganda was being conducted in women's circles of the haute bourgeoisie" (Dougui, 2020, p. 59). By being at the center of this effort, Wassila facilitated information flow between the royalty, the bourgeoisie, and emerging politicizing female students from a less advantaged background who needed both material aid and information from circles they did not have access to.

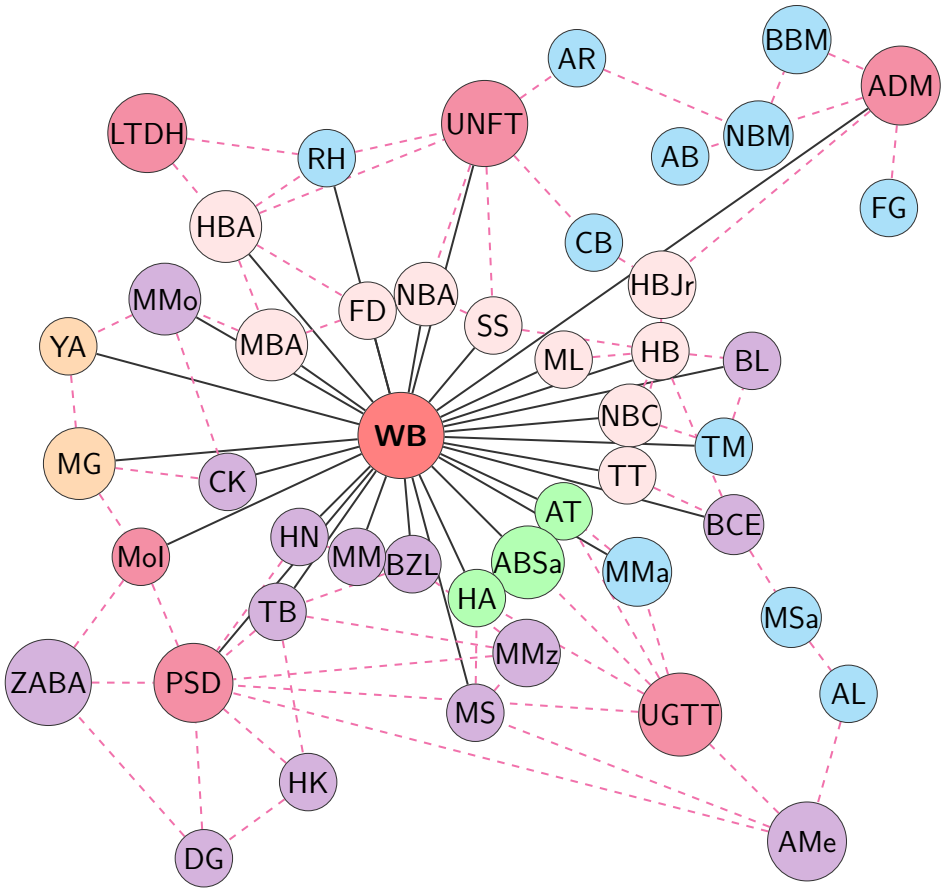
Her betweenness centrality grew through deliberate cross-cutting tie formation. She organized a protest in B'eja in 1952, a city in Tunisia's northern interior with lesser political importance than the coastal cities, bridging coastal elites with the interior and demonstrating her capacity to act as a bridge between geographically and socially separated communities. She maintained correspondence with the exiled Bourguiba while networking with French socialists, Neo-Destour representatives, and international Arab leaders. In 1955, she arranged for her

[20]The Society of Muslim Ladies prefigures the "compensatory network strategy"—women building parallel channels around male-dominated networks. Whether such individual successes close the aggregate gap is this paper's question.

cousin by marriage, Zeineb Keba"ili, whose husband was close to François Mitterrand, to meet Bourguiba, leveraging family ties for diplomatic purposes.

As First Lady, Wassila exploited her bridging position systematically. According to Hopwood and Hopwood (1992), she maintained an information network "greater it was rumored, than that of the Ministry of the Interior, and it was personal and informal, maintained largely on the telephone." She screened Bourguiba's visitors, shaped his understanding of political events, and orchestrated appointments to key security positions, including Tahar Belkhoja as Minister of the Interior, to consolidate her access to the intelligence apparatus.[21] A journalist observed: "She has created alliances. There are men, even ministers, who owe her a debt. She made them. Her power doesn't exist just because of her husband" (Kristof, 1984). During the lead-up to Tunisia's first free elections in November 1981, Wassila's intelligence network alerted her to a potential threat from opposition forces, and she supported the manipulation of results to prevent the Democratic Socialist Movement from gaining power (Khiari, 2004).

[21]Belkhoja's appointment shows brokerage power being built, not simply inherited: placing allies in information-controlling posts gave Wassila a parallel intelligence network.




**Groups:**

| | | | |
|---|---|---|---|
| WB | Wassila Bourguiba | Org | Organizations |
| PE | Political Elites | LL | Labor Leaders |
| GO | Gov. Officials | IF | Int'l Figures |
| FM | Family Members | | |

**Connections:** — Wassila Ben Ammar's ties · Other ties

Figure 2. Wassila Ben Ammar's ego network, illustrating her bridging position across otherwise disconnected spheres: the Beylical elite, nationalist movements, colonial authorities, feminist organizations, labor unions, and international diplomatic circles. Her high betweenness centrality, evident in how she connected groups separated by social, political, and institutional boundaries, gave her unique control over information flow in Tunisia's political sphere. Her case illustrates the mechanism in reverse: the cross-cutting ties the mechanisms normally suppress can, exceptionally, be built, so the aggregate gap reflects a structural tendency rather than an absolute barrier.

As illustrated in Figure 2, Wassila's political influence shows how structural position in social networks can translate into real political power. She is the mechanism in reverse: a woman who achieved what most women in the network could not, precisely by forming the cross-cutting ties that the mechanisms described above typically suppress. Her case demonstrates that high betweenness is possible for women, but only through exceptional effort to overcome the spatial, reputational, gatekeeping, and dependency barriers that constrain most women in the network.

# Social Network Analysis

## Network Data

Following Razafindrakoto, Roubaud and Rua (2021) and Rua, Razafindrakoto and Roubaud (2023)'s network-based approach of elite identification to study the "powerful upper tail of hyper-elites" in Madagascar, I build a novel dataset on Tunisian elites. The data capture the most powerful interconnected subgroup of the Tunisian population. Relying on various sources, I systematically identify elites through their organizational and family connections.[22] Table I summarizes the data sources.

The dataset comprises 15,940 unique entities.[23] To code individuals by gender, I used a gender identification API that explicitly supports Arabic names, even those written in Arabic

[22]Data collection ran 2020–2021 and covers entities active between 2010 and 2021.

[23]These comprise commercial enterprises (15,642), individuals (13,666), non-profits (480), government institutions (116), and political groups (34). The four individual elite categories—officials, party leaders, business elites, and civil-society actors—occupy apex positions in Tunisia's main power centers.

Table I. Relational Information by Data Source

| | JORT | Registre des Entreprises | Watchdog NGOs | Newspapers | Electoral Register | Other Websites |
|---|---|---|---|---|---|---|
| Political parties | • | | | • | | • |
| Cabinet | • | | | | | |
| Parliament | | | • | | | |
| Non-Profits | • | | • | • | | • |
| Shareholding | | • | | • | | • |
| Board membership | | • | • | | | • |
| Family ties | • | | • | • | • | • |

A bullet (*bullet*) indicates that the source provides data on the corresponding relation. Data on board members and shareholders of publicly listed companies are gathered from the Tunis Stock Exchange (BVMT) and the Financial Market Council (CMF); data on family ties from Rodovid, a genealogical site. Every relation in the network is reconstructed from public registries, records, and filings rather than assumed, which establishes the dataset as a novel and reproducible map of Tunisia's elite. The column placement is reconstructed and should be verified against the original manuscript.

script, supplemented by a secondary layer of hand coding for ambiguous cases.[24]

I visualized the bipartite network composed of individuals and organizations using Cytoscape (Shannon et al., 2003) to distinguish the core (giant) elite community from peripheral entities.[25] Table II presents the demographic distribution.

The gender composition reflects the male dominance of formal elite positions: men constitute

[24]Gender was coded Unknown when information was insufficient (0.15% of cases); perceived ethnicity was inferred from names, using Forebears.io for ambiguous first names.

[25]The one-mode projection links individuals who share an organizational affiliation. This may inflate centrality for members of large organizations—a concern addressed among the alternative explanations and by the permutation test.

Table II. Demographic Breakdown of Individuals in the Giant Network

| Category | Count | Percentage (%) |
|---|---|---|
| **Ethnicity** | | |
| Arab | 6,338 | 93.15 |
| European | 454 | 6.67 |
| Other | 12 | 0.18 |
| **Gender** | | |
| Man | 5,178 | 76.10 |
| Woman | 1,616 | 23.75 |
| Unknown | 10 | 0.15 |

Counts and percentages of coded individuals in the giant component by ethnicity and gender. Women are present in the elite but heavily outnumbered, about 76

approximately 76% of the network. Women are present, they are not excluded from the network, but the question is whether they occupy structurally advantageous positions within it. Approximately 66% of all individuals have zero betweenness centrality, indicating that the majority of network members do not occupy any bridging position.[26]

## Operationalization and Empirical Strategy

Betweenness centrality measures the extent to which a node lies on the shortest paths between other nodes (Freeman, 1977). It quantifies how frequently an individual serves as a bridge connecting others who are not directly connected themselves. I set the reference category for gender to Male, so that the coefficient on Female directly represents the female disadvantage. A negative coefficient means women have lower betweenness centrality than men.

The analysis proceeds in four stages. The first one establishes the baseline gender gap, and because the outcome makes a single ordinary least squares regression inappropriate,

[26]A high share of zeros is typical for betweenness: only nodes on others' shortest paths score above zero. The ZINB handles this by modeling the zero-generating process separately.

it does so across four model specifications that make different distributional assumptions. Betweenness centrality is bounded below at zero, takes the value zero for the majority of the elite, since 66% of individuals lie on no shortest path between others, and is severely right-skewed among the remainder, so a linear model fit by ordinary least squares would impose a functional form the data violate, would predict negative brokerage for many individuals, and would return standard errors distorted by the non-normal, heteroskedastic residuals such a distribution generates. The four specifications, a linear model on scaled betweenness centrality, a quasi-Poisson model handling overdispersion, a Zero-Inflated Poisson (ZIP) model explicitly modeling the excess zeros, and a Zero-Inflated Negative Binomial (ZINB) model accounting for both zero-inflation and overdispersion, each treat these features differently, so that agreement among them shows the gender gap to be a property of the data rather than an artifact of any one distributional assumption.[27]

The second stage adds controls for network structure, specifically degree (network size), closeness centrality (network reach), and clustering coefficient (local density), alongside ethnic background.[28] A note of caution on these controls: degree, closeness, and clustering are themselves potentially caused by gender, since the mechanisms described above shape the ties women form. Conditioning on them may absorb part of the causal effect, which is why the baseline models without controls are the primary specification, while the controlled models demonstrate that gender predicts brokerage above and beyond raw network structure.

The third stage compares the gender coefficient across four centrality measures (betweenness,

[27]The ZINB models the two processes, whether an individual brokers at all and how much conditional on brokering, separately. All count models use betweenness scaled by 1,000 and rounded to integers.

[28]Network controls are standardized (mean 0, SD 1); ethnicity is collapsed to Arab vs. non-Arab given small non-Arab cells.

degree, closeness, and clustering) to test whether the gap is specific to brokerage or reflects general network marginality, which is the decisive test of the theoretical mechanism. The fourth stage confronts a problem that the model-based standard errors of the first three stages cannot, namely that the observations are not independent. Because every individual's centrality is computed from one shared network, a given person's position is mechanically bound up with everyone else's, and the conventional standard errors that assume independent and identically distributed observations would understate the true uncertainty. To obtain inference that does not rest on that assumption, I run a permutation test with 100,000 iterations that asks how often a gender gap as large as the observed one would arise if gender were unrelated to network position. On each iteration I hold the network and its centrality scores fixed and randomly reassign the gender labels across the nodes, recomputing the mean difference in log betweenness each time, so that the 100,000 reshuffled differences trace out the distribution the gap would follow under the null hypothesis of no association while preserving the dependence structure of the observed network. Locating the actual difference against this null distribution yields a $p$-value that is robust to network dependence rather than reliant on the i.i.d. assumption.[29]

These four stages establish the gap and locate it, but a single cross-section of affiliation ties cannot rule out by design the rival accounts that observational network data invite, which is why a battery of robustness analyses reported in the appendix accompanies the main models. Some address the possibility that the gap reflects sectoral composition rather than gender, some that it is an artifact of projecting the two-mode affiliation data into a one-mode

[29]This label-permutation test and the Freedman-Lane residual-permutation procedure reported among the robustness analyses approach the same dependence problem from two directions and reach the same conclusion.

network of individuals, and some that an unmeasured confounder rather than gender drives the association, since none of these can be dismissed without a direct test in a design that observes the network at a single point in time. I motivate each analysis alongside the result it qualifies and draw them together when adjudicating the mechanisms in the discussion.

# Results

## Baseline Models

Table III and Figure A3 present the baseline results. Women have significantly lower betweenness centrality scores compared to men ($\beta = -0.264$, $p < 0.001$) in the linear specification. The gender effect is negative and statistically significant across all four specifications ($p < 0.01$), confirming that the finding is not driven by distributional assumptions.

Table III. Gender as a Determinant of Network Centrality

| | Linear | Quasi-Poisson | ZIP | ZINB |
|---|---|---|---|---|
| Female (vs. Male) | $-0.264^{***}$ | $-1.159^{***}$ | $-0.621^{***}$ | $-0.879^{***}$ |
| | (0.045) | (0.197) | (0.100) | (0.201) |
| Constant | $0.407^{***}$ | $-0.941^{***}$ | $0.950^{***}$ | $-0.941^{***}$ |
| | (0.022) | (0.059) | (0.025) | (0.052) |
| Framework | Gaussian | Non-normal | Zero-inflated | Zero-inflated |
| Transformation | Scaled | Count | Count | Count |
| Observations | 6,794 | 6,794 | 6,794 | 6,794 |
| $R^2$ | 0.005 | | | |

$^{***}p < 0.001$, $^{**}p < 0.01$, $^{*}p < 0.05$. Reference category: Male. Count models use betweenness scaled by 1,000 and rounded. The female coefficient is negative and significant across the linear, quasi-Poisson, ZIP, and ZINB specifications, indicating that the gap is not an artifact of any single distributional assumption.

Because the four baseline models rest on different assumptions about how betweenness is

distributed, I assess how well each reproduces the observed data before relying on any one of them, and Figure A2 reports the comparison across the log-normal and count specifications. The figure is read column by column, one model to a column, and row by row. The top row plots each individual's observed brokerage against the value the model predicts for that same person, so that a model whose points cluster along the diagonal is one whose predictions track what is actually observed, while points drifting systematically above or below the diagonal mark a model that misses. The middle row plots the prediction errors against the predicted values, where a well-behaved model leaves its errors scattered evenly around the horizontal zero line with no visible pattern, and a curved or fanning cloud signals that the model fits some ranges of brokerage better than others. The bottom row shows how the errors themselves are distributed, and the feature that separates the models here is whether each can reproduce the large share of individuals who do no brokering at all, the spike of zeros that dominates the data and that a model must place its predictions on top of rather than smear across small positive values. Judged on all three rows, the specification that best honors both the wall of zeros and the long right tail among those who do broker is the one I carry forward.[30]

## Extended Models with Controls

Table IV presents models controlling for key network characteristics. Even after accounting for network size, reach, local density, and ethnic background, gender differences remain significant. The log-normal model shows that being female is associated with a 3.9% decrease

[30]The ZINB outperforms the log-normal, whose residuals are systematically biased, and the quasi-Poisson, which fails to capture the range of the data, and it is adopted as the primary count model, while a Vuong test confirms its advantage over the ZIP by accounting for overdispersion among the non-zero values.

in betweenness centrality, while the controlled ZINB estimates a multiplicative effect of 0.80 (exp(−0.226)) for women compared to men. Figures A4 and A5 visualize these effects.

Table IV. Structural Determinants of Network Centrality

| | Log-Normal | Zero-Inflated NB |
|---|---|---|
| Female (vs. Male) | $-0.039^{***}$ | $-0.226^{*}$ |
| | (0.008) | (0.106) |
| Non-Arab (vs. Arab) | $-0.032^{*}$ | $-0.508^{*}$ |
| | (0.013) | (0.243) |
| Degree (std) | $0.279^{***}$ | $0.236^{***}$ |
| | (0.003) | (0.018) |
| Closeness (std) | $0.044^{***}$ | $0.414^{***}$ |
| | (0.003) | (0.032) |
| Clustering (std) | $-0.033^{***}$ | $-0.774^{***}$ |
| | (0.003) | (0.070) |
| Constant | $0.164^{***}$ | $-0.148^{**}$ |
| | (0.004) | (0.053) |
| Observations | 6,794 | 6,794 |
| $R^2$ | 0.553 | |
| Log-likelihood | | -2226.1 |

$^{***}p < 0.001$, $^{**}p < 0.01$, $^{*}p < 0.05$. Reference category: Male, Arab. Network metrics standardized (mean 0, SD 1). The female gap persists after adjustment for network size, reach, local density, and ethnicity, indicating an association beyond raw connectivity.

## Centrality Measure Comparison

The decisive test of the theoretical mechanism is whether the gender gap is specific to brokerage or reflects general network marginality. Figure A7, with the underlying estimates reported in Table A1, presents the female coefficient from separate bivariate regressions on four standardized centrality measures: betweenness, degree, closeness, and clustering. The gender gap is largest in magnitude for betweenness. The difference-in-coefficients test in Table A2 reports each measure's gap relative to the betweenness gap. The betweenness

gap exceeds the degree gap in the direction the redundancy mechanism predicts (one-tailed $p \approx 0.04$; two-tailed $p = 0.079$); the closeness contrast is weakly identified and not informative either way; and the clustering contrast is decisive ($p < 0.001$), with women scoring *higher* on clustering than men. The pattern, denser and more closed local neighborhoods alongside lower brokerage, is consistent with male-sponsor dependency, under which women's ties are mediated through shared patrons and therefore overlap rather than bridge. I develop the interpretation, and the mediation evidence that complicates the "not in their number" reading, in the discussion.

## Permutation Test

The analysis revealed a statistically significant gender difference. Cohen's $d = 0.229$ falls between conventional small and medium thresholds. Recent meta-analytic work examining over 6,400 effect sizes in social psychology provides context: $d = 0.15$ represents a small effect (25th percentile), $d = 0.36$ a medium effect (50th percentile), and $d = 0.65$ a large effect (75th percentile). The observed effect matches the median effect size for published studies on gender differences (Lovakov and Agadullina, 2021). Figure A6 illustrates these findings: the observed difference falls well outside the 95% interval of the null distribution.[31] The modest effect size is consistent with the theoretical prediction: the disadvantage is persistent but not deterministic; many women achieve high centrality positions despite structural constraints.

[31]The median effect for unpublished gender-difference studies is $d = 0.19$, suggesting minimal publication bias in the benchmark (Lovakov and Agadullina, 2021).

## Additional Robustness

Several further analyses, reported in the appendix, probe the structure and robustness of the gender gap; I draw on them directly when interpreting the mechanisms in the discussion. Two decompose the gap into distinct components. A two-part hurdle model (Table A8) separates whether an individual occupies any bridging position at all from how much they broker conditional on occupying one, and a causal mediation analysis (Table A9) partitions the penalty into a portion transmitted through network size (degree) and a direct portion operating on brokerage net of size. Three trace the shape of the gap across the brokerage distribution: a quantile regression (Figure A8; Table A6) estimates the female coefficient at the 25th through 95th percentiles of non-zero betweenness, the apex-tier models (Table A10) extend this with logistic regressions for membership in the top ten and top five percent of brokers, and a Gender $\times$ network-size interaction (Table A13; Figure A12) estimates the marginal brokerage return to each additional tie by gender. Two examine tie composition: a homophily analysis using the E-I index (Tables A4 and A5) reports the distribution of same- and cross-gender ties, and a Gender $\times$ Ethnicity interaction (Table A3; Figure A11) tests whether the gap differs for Arab and non-Arab elites. Finally, three address inferential threats specific to network data: a model controlling for the size of the largest organization each individual belongs to (Table A12) tests whether the gap is an artifact of the bipartite projection, a Freedman-Lane permutation procedure (Table A11) generates network-robust $p$-values that relax the assumption of independent observations, and an E-value sensitivity analysis (Table A7) quantifies how strong an unmeasured confounder would need to be to explain away the effect.

# Discussion

The analyses converge on a single substantive claim and locate it precisely within the architecture of the elite network: women's disadvantage in Tunisia's elite is not a deficit of connections but a deficit of the particular connections that confer brokerage. Women score 0.167 of a standard deviation lower than men in betweenness, a gap that holds across four distributional specifications, survives controls for network structure and ethnicity, and is confirmed by a 100,000-iteration permutation test (Cohen's $d = 0.229$). The magnitude is modest, but its incidence is not, since it falls on the one centrality dimension through which privileged political information is controlled rather than only received. What follows interprets that result. I argue that its concentration in brokerage is what makes it theoretically decisive, marshal the appendix analyses to adjudicate among the four mechanisms, weigh its political stakes, confront the explanations that would attribute it to something other than gender, and delimit the conditions under which it should travel.

## The Brokerage-Specificity of the Gender Gap

The centrality comparison (Figure A7; Table A1) is the paper's most theoretically consequential result, and its interpretation turns on a distinction the three measures draw sharply. Degree centrality captures how many connections an individual holds, closeness centrality how quickly information can reach them from any point in the network, and betweenness centrality whether they sit on the shortest paths between others. The gender gap is largest in magnitude for betweenness, and the difference-in-coefficients test (Table A2) reads in support of H2 once the directional nature of the prediction is taken seriously, since the

redundancy mechanism predicts a signed ordering, betweenness gap larger than degree gap, so that the relevant test is one-tailed, and on that test the betweenness gap exceeds the degree gap in the predicted direction ($p \approx 0.04$, the two-tailed $p = 0.079$ being its marginal counterpart). The contrast with closeness is weakly identified, with a standard error more than twice that of the degree contrast, and so is uninformative rather than evidence of equivalence. The decisive contrast is with clustering. Women's local clustering is significantly *higher* than men's, and that gap differs from the betweenness gap at $p < 0.001$ and in the opposite direction. This combination is the structural signature the redundancy logic predicts. Women's ties sit in denser, more closed neighborhoods (higher clustering) and bridge less (lower betweenness), which is precisely the configuration that suppresses brokerage, because ties folded into overlapping groups close triangles rather than span structural holes. Women are in this sense not absent from the network so much as positioned within it where their ties reinforce existing clusters rather than bridge disconnected ones.

The two-part hurdle model (Table A8) sharpens this reading by separating two disadvantages the pooled specifications combine. Women are significantly less likely than men to occupy any bridging position at all, 69.0% of women holding zero betweenness against 65.1% of men, and, conditional on holding a non-zero position, they still broker less. Such a penalty operates at both the extensive margin, whether a woman ever bridges, and the intensive margin, how much she bridges when she does. A disadvantage of this form is difficult to reconcile with accounts that reduce women's marginality to lower participation or smaller networks, since those accounts predict a gap in volume rather than one that persists in the structural role of the ties themselves.

## Adjudicating Among the Four Mechanisms

The cross-sectional design cannot identify which mechanism does the most work, but the four I theorize generate analytically distinct observable implications, and the appendix analyses let me weigh their relative plausibility rather than leaving the mechanism to assertion. The spatial-exclusion mechanism predicts that women's ties should concentrate in a narrower range of organizational settings, and the gender-specific distribution of betweenness (Figure A9) shows the compression this implies, since a woman whose deliberation is confined to a limited set of venues forms ties that cannot reach across the distinct clusters a bridging position requires, leaving her betweenness shifted toward the lower end of the distribution. The reputational-sanction mechanism predicts that the gap should widen where the most cross-cutting, often male-coded tie formation is required, namely at the top of the brokerage distribution, because the social cost a woman pays for entering male-dominated clusters rises with the prominence of the position she contests. The discriminatory-gatekeeping mechanism predicts the same upper-tail concentration through a different channel, operating not on which ties a woman forms but on whether the opaque candidate-selection and advancement processes allow her to occupy the senior posts where bridging opportunities are densest, so that women are filtered out before they reach the apex of the network even when they have built the requisite ties. The male-sponsor-dependency mechanism generates the most distinctive prediction: women whose access is mediated through a small number of male patrons should carry a disadvantage concentrated in the positioning of their ties rather than reducible to their number, showing up as markedly higher clustering and a betweenness penalty that persists after network size is held constant, because their ties are redundant

with their sponsors' rather than independently bridging.

The causal mediation analysis (Table A9) decomposes the total penalty into a portion transmitted through network size and a direct portion operating on brokerage net of size. Both channels contribute. The larger share runs through degree, roughly three-quarters of the total penalty, reflecting women's smaller average networks, while the remaining quarter is a direct effect that is statistically significant ($p = 0.002$), capturing a positional penalty that survives holding network size constant. The two channels are complementary and not rival, the volume channel registering the many women excluded at the low-degree end, while the direct channel registers the redundant placement of the ties that the modal, sponsor-dependent woman does hold. Because degree is a near-mechanical precondition for betweenness, the degree-mediated share is best read as an upper bound on the volume story, while the significant direct effect is the sharper evidence that position, not number alone, is at work. This decomposition characterizes the average elite woman. Whether the return to building a network itself differs by gender is a separate question, taken up by the interaction below.

The shape of the gap across the distribution bears on both the gatekeeping and the reputational mechanisms, which predict the same upper-tail concentration. Were the disadvantage uniform, the female coefficient would be roughly constant across quantiles. Instead, the quantile regression (Table A6; Figure A8) and the apex-tier models (Table A10) indicate that the penalty intensifies in the upper tail and that women are markedly under-represented among the top five and ten percent of brokers. This glass ceiling in brokerage is what discriminatory gatekeeping produces directly, since opaque selection and advancement processes filter women

out of the senior posts that sit atop the brokerage hierarchy, so that the disadvantage concentrates exactly where formal ascent is decided rather than spreading evenly down the distribution. The reputational mechanism predicts the same widening by a separate route, sanctioning bearing most forcefully where the densest cross-cluster ties and the greatest reputational exposure are required to ascend, and because both channels drive the penalty into the upper tail, the cross-sectional data locate the glass ceiling without telling me how much of it is exclusion from positions and how much is the social cost of contesting them.

The Gender × network-size interaction (Table A13; Figure A12) turns from the average penalty to the marginal return on tie formation, and the two estimates describe different parameters. The Female main effect remains negative, so that at average network size women still trail men, while the interaction term is positive and significant (0.225 in the ZINB), meaning each additional tie yields more brokerage for women than for men. The negative average and the positive slope are reconciled by where women sit. Most are concentrated at low degree and in the zero-brokerage mass, which pulls the mean down, while the slope describes the smaller set of women who do build networks. For that subset the steeper return is what strategic compensation would produce, since the women who clear the baseline barriers do so by forming non-redundant, cross-cutting ties rather than the more redundant ties typical of men's larger networks, the strategy the Wassila Ben Ammar case illustrates in the extreme. This reading is the most substantively important, though the interaction identifies an association and not agency, since it is equally consistent with composition, with high-degree women concentrated in a few genuinely cross-sector bodies that bridge by construction, and since it is leveraged by a small number of high-degree women. In

this sense the redundancy of the average woman's existing ties and the efficiency of the network-builder's marginal tie are not in tension, the former being a statement about the intercept and the excluded majority, the latter about the slope and a strategic minority. The finding coexists with the glass ceiling reported above rather than undercutting it, since the apex of the brokerage distribution stays male-dominated precisely because so few women reach the high degree at which the steeper return would pay off. Such a disadvantage is structural without being deterministic. A complementary dynamic, identified by Laugier (2025) as the motherhood network penalty, may compound the baseline barriers: mothers experience a decline in employed contacts after first childbirth while fathers' networks remain unchanged, and although Laugier examines friendship ties, similar attrition would restrict women's access to the informal, after-hours gatherings where privileged information circulates.

Two further mechanisms could generate part of the same pattern, and the design speaks to neither. The first one is cognitive bias in how brokerage is perceived. Brands and Kilduff (2014) find that the activity of brokering is itself coded as masculine, so that observers credit women with less centrality than identically placed men, a bias that operates on the recognition of a bridging position rather than on its structural existence, and because betweenness computed from affiliation ties registers the position and not how others read it, my measure cannot capture a penalty of this kind even where it operates. The second one is inherited network endowment. A person born into an already densely connected family enters the elite with a brokerage head start that owes nothing to their own tie-building, and since cross-sectional affiliation data record the network as it stands rather than how each node arrived at its position, I cannot separate an advantage transmitted through natal

networks from one produced by gender, a confound that would matter most were men disproportionately the heirs of well-connected lineages. What the analysis identifies, then, is inequality in structural position, not inequality in how that position is perceived or in the endowments through which it was reached, and a fuller account of either would require perceptual data on attributed centrality and genealogical data on network inheritance that a single cross-section of affiliations does not contain.

## Substantive Magnitude and Political Stakes

What does an effect of this size mean in concrete political terms? In the controlled ZINB specification, being female is associated with a multiplicative effect of 0.80 on betweenness, so a woman with otherwise identical network characteristics to a male counterpart holds, on average, roughly 80% of his brokerage capacity. That gap compounds across the thousands of information-transmission events that constitute everyday elite politics. Candidate selection within Tunisian parties, for instance, proceeds through informal consultation that relies on exactly the privileged information flowing through brokerage positions, so that an actor who sits on fewer of these pathways is systematically less able to shape such decisions even while holding formal membership or a leadership title. The disadvantage is structural, not absolute: women remain over-represented in zero-brokerage positions (Figure A10), yet the right tail of the gender-specific distribution (Figure A9) confirms that the ceiling is permeable for those who pay its price.

## Comparison with Existing Literature

These findings return to the relational tradition the introduction entered and revise one of its foundational inferences rather than only extending its scale. Ibarra (1992) established that women's instrumental networks cross gender lines more than men's, and McPherson, Smith-Lovin and Cook (2001) traced the homophily that sorts men into predominantly male networks, a pairing that would seem to predict higher betweenness for women, since ties spanning social categories are the raw material of brokerage. My data confirm the heterophily at national scale, women's ties being markedly more cross-gender than men's (an E-I index of 0.349 against 0.082, Table A5), and yet women broker less and cluster more, the reverse of what the heterophily-to-brokerage inference anticipates. The resolution is that heterophily raises brokerage only where cross-category ties connect otherwise separated clusters, while in an elite that is 76% male the cross-gender ties women form do not bridge distinct groups but route them back into a single male-dominated core. In this sense the same heterophily Ibarra read as an asset becomes, under a skewed sex ratio, a conduit into the dominant group rather than a bridge between groups, so that heterophily is necessary but not sufficient for brokerage and its payoff is conditional on the very composition McPherson, Smith-Lovin and Cook's homophily produces.

Against the organizational literature that established network position as itself gendered, the contribution is one of decomposition rather than replication. Brass (1985) showed that men occupy more central positions in a single 140-person organization, a finding his design could not resolve into which centrality carried the gap, whereas the cross-measure comparison locates the disadvantage specifically in betweenness and reverses it for clustering, separating

brokerage from the volume of connections that a pooled measure conflates. The result complements Brands and Kilduff (2014), whose experimental subjects credited women with less brokerage than identically placed men, in that women face disadvantage both in attaining bridging positions, which I document, and in having them recognized once attained, which Brands and Kilduff document, the former structural and the latter perceptual. Within the synthesis of Woehler et al. (2021) the paper falls on the unequal-network-characteristics side, since women occupy less advantageous positions, but the strategic-compensation interaction complicates their unequal-network-returns category in an unexpected direction, the women who do build networks earning a higher structural return per tie than men even as the downstream career returns their UNR designates would run the other way, so that returns can favor women at the level of brokerage formation while disfavoring them beyond it. At national scale Fowler (2006) and Hafner-Burton and Montgomery (2010) established that centrality captures informal influence without examining gender, and it is by introducing gender as an axis of inequality in network position that the present analysis extends them.

## Ruling Out Alternative Explanations

Three alternatives would attribute the gap to something other than gendered network position, and the appendix analyses address each in turn. The first one is sectoral composition: if women cluster in civil-society organizations while men dominate business networks, the betweenness gap could reflect segregation rather than gender. The persistence of the coefficient after controls for degree, closeness, clustering, and ethnicity (Table IV) speaks against this, and the bipartite-projection model provides a more direct test. The second one is that the one-mode

projection itself manufactures the gap: if men belong to systematically larger organizations, projection would inflate their betweenness through the dense cliques large affiliations create. The model in Table A12 controls for the size of the largest organization each individual belongs to, and the female coefficient remains negative and significant, indicating that the gap is not an artifact of male concentration in large formal bodies. The third concerns the dependence inherent in network data, which violates the independence assumption underlying conventional standard errors. The Freedman-Lane permutation procedure (Table A11) generates network-robust empirical $p$-values by permuting restricted-model residuals, and the gender effect remains significant once the i.i.d. assumption is relaxed, and the 100,000-iteration label-permutation test reaches the same conclusion by an independent route. The E-value sensitivity analysis (Table A7) addresses unmeasured confounding by quantifying how strong a hidden confounder would need to be, on the risk-ratio scale, to nullify the association. One alternative the design cannot fully neutralize is cohort timing: women entered segments of the elite later than men, and cumulative advantage in tie formation means earlier entrants have had longer to accumulate bridging ties. Distinguishing gender from cohort requires longitudinal network data, a limitation I return to in the conclusion.

## Scope Conditions and Generalizability

The argument is calibrated to a specific configuration, and its portability depends on how widely that configuration recurs rather than on Tunisia as such. The theory should hold where two conditions co-occur: formal institutional change has expanded women's access to elite positions, and informal political life remains organized around male-coded venues and

sponsorship. Tunisia is an unusually clean instance because the first condition is documented from the 1956 Code of Personal Status onward while the second persists in the caf'e-and-after-hours geography of elite deliberation, but the same pairing characterizes much of the region and a broader class of partial gender-regime transitions. The mechanism should attenuate where informal deliberation is less spatially segregated by gender, where women's network entry does not depend on male sponsors, or where the female share of the elite approaches parity, since the cross-gender ties that presently route women back into a male-dominated core would then bridge genuinely distinct clusters. Two features of the measurement also bound the claim. Betweenness on a one-mode projection captures the structural potential to broker, not the quality or content of the information brokered, so the analysis identifies positional inequality and not its full informational payoff. In addition, the affiliation structure I project to a one-mode network could be analyzed directly with two-mode centralities (Faust, 1997), an extension that would test whether the gap survives an alternative treatment of the bipartite data. The finding is, in this sense, an instance of a general logic of de facto power persistence under formal change, and its external validity is a question of where that logic's scope conditions are met, not of Tunisia's idiosyncrasies.

## Implications for Gender Regimes and De Facto Power

These findings speak to a broader puzzle in the study of gender and politics: why does increased formal representation not reliably translate into proportional policy influence? The betweenness centrality gap offers one answer. Formal inclusion places women inside elite networks but does not guarantee that they occupy the bridging positions where information

brokerage and informal influence concentrate. The experience of quota systems in comparable contexts reinforces this point. In the Moroccan case, Zaanoun (2022) found that the quota system did not help female parliamentarians build the networks necessary for reelection, and Benbelli (2023) documented cases where women with extensive formal credentials still lacked the family and tribal networks that function as political capital. This pattern maps directly onto the framework drawn from Acemoglu and Robinson (2008): when formal institutions shift, historically dominant groups preserve advantage through informal channels of de facto power. In the gendered version I propose, masculine elites preserve informational power through network position when formal gender institutions shift through quotas and parity clauses. As Tripp (2024) argues, women's appointment to high office in authoritarian contexts can serve regime interests rather than women's interests, particularly when those appointments are "unmoored from women's movements and activists." The network perspective adds specificity: it is not only that women leaders may lack movement backing, but that their position in information networks may limit their access to the information needed for independent political action.

The result also speaks back to the literature on women in Arab politics from which the puzzle was drawn. Having moved past the accounts that located women's regional disadvantage in oil rents (Ross, 2008) or in Islam (Fish, 2002; Alexander and Welzel, 2011), that literature has concentrated on representation in office (Shalaby, 2018; Benstead, 2019*b*) and on the party and voter choices that govern who attains it (Clark, Blackman and Şaşmaz, 2024; Blackman and Jackson, 2021; Lust and Benstead, 2024), each locating the disadvantage at the level of formal selection. The betweenness gap operates beneath that level, on the

informal informational structure that persists whatever the formal selection produces, so that the finding does not displace these accounts but bounds their sufficiency, since even where gatekeeping and voter preference are formally equalized through quotas and parity clauses the informational disadvantage remains, which is why formal inclusion underdelivers on influence. Such a residual is what the network perspective is positioned to detect and a literature observing outcomes at the point of selection is not.

# Conclusion

This study has examined gendered informational inequality within Tunisia's elite networks. The quantitative network analysis, centered on betweenness centrality as a measure of informational power, demonstrates a statistically significant gender gap that is robust across model specifications, survives controls for network structure, and is confirmed by a permutation test with 100,000 iterations. The centrality comparison reveals that this gap is concentrated in brokerage rather than general connectivity, confirming that women are excluded from bridging positions rather than from the network itself, a finding that directly supports the theoretical prediction.

Several extensions follow directly from the limitations of the present design. The most pressing is temporal: a panel of elite affiliations would separate the gender penalty from cohort timing and reveal whether women's brokerage deficit narrows, persists, or widens as a gender regime matures, a dynamic the single cross-section cannot recover. A second extension concerns measurement: analyzing the affiliation data as a two-mode network with bipartite centralities, rather than through the one-mode projection used here, would test whether the

gap is robust to a fundamentally different operationalization of brokerage. A third moves from structure to content: betweenness identifies the positional capacity to broker, but pairing network position with the substance of what flows through it, through elite interviews or archival reconstruction of specific information episodes, would adjudicate whether positional disadvantage translates into the informational disadvantage the theory ultimately concerns. Finally, the design is portable: because the data-construction procedure relies only on public registries, electoral records, and corporate filings, it can be reproduced in any setting where formal inclusion has outpaced informal access, allowing the scope conditions advanced above to be tested comparatively rather than asserted from a single case.

The persistence of gendered informational inequality despite formal progress in women's rights and representation points to the resilience of informal exclusionary mechanisms. Spatial exclusion from male-coded deliberation venues, reputational sanctions against women's participation in mixed-gender political spaces, lack of transparency in internal party processes, and women's reliance on male sponsors all contribute to a system that marginalizes women in information networks. These findings expose the limits of focusing solely on formal representation and point to the need for approaches to gender equality that address the informal power structures through which political influence is exercised. More broadly, this study demonstrates the value of applying network-analytic tools developed in organizational research to the study of national-level political elites.

# Appendix: Additional Tables and Figures

## Figures

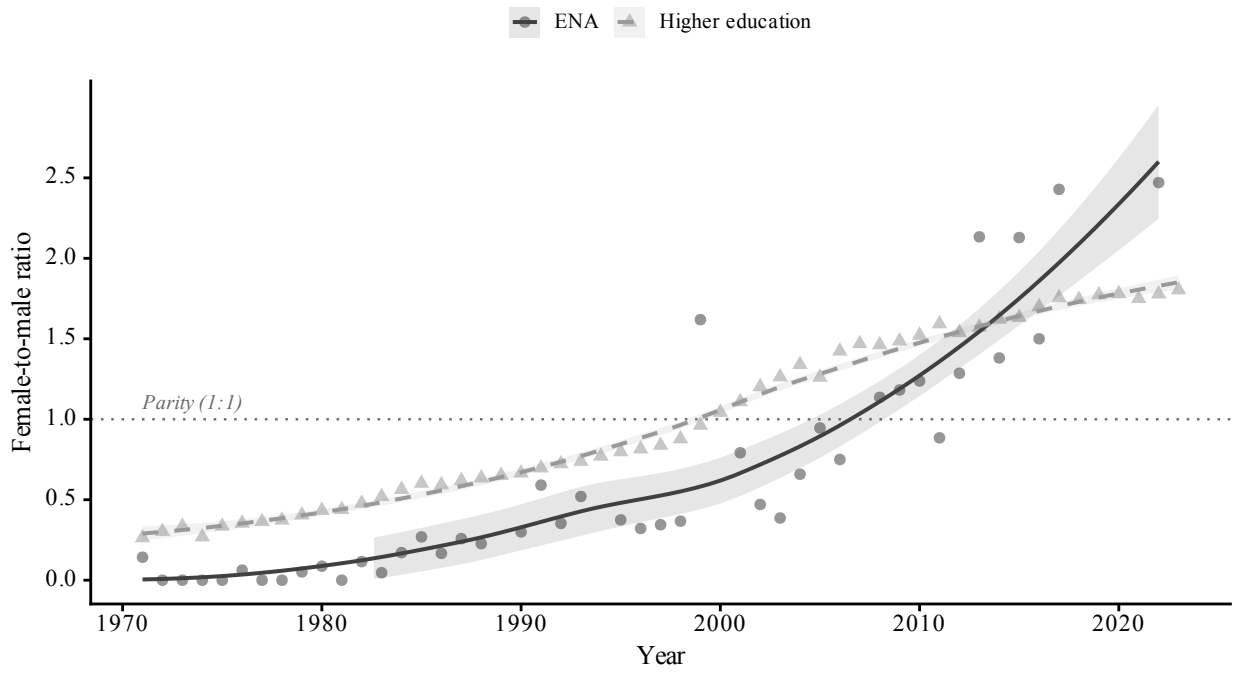



Figure A1. Trends in women's representation in Tunisia's ENA and higher education, 1971–2022, measured as the female-to-male ratio. Points are annual ratios; lines are loess trends with 95% confidence bands. The dotted line marks parity (equal numbers of women and men); values above it indicate a female majority. Higher-education ratios are computed from World Bank/UNESCO tertiary gross enrollment (SE.TER.ENRR.FE / SE.TER.ENRR.MA). Women now outnumber men in elite training and higher education, so the brokerage gap documented below cannot be attributed to a shortage of qualified women.

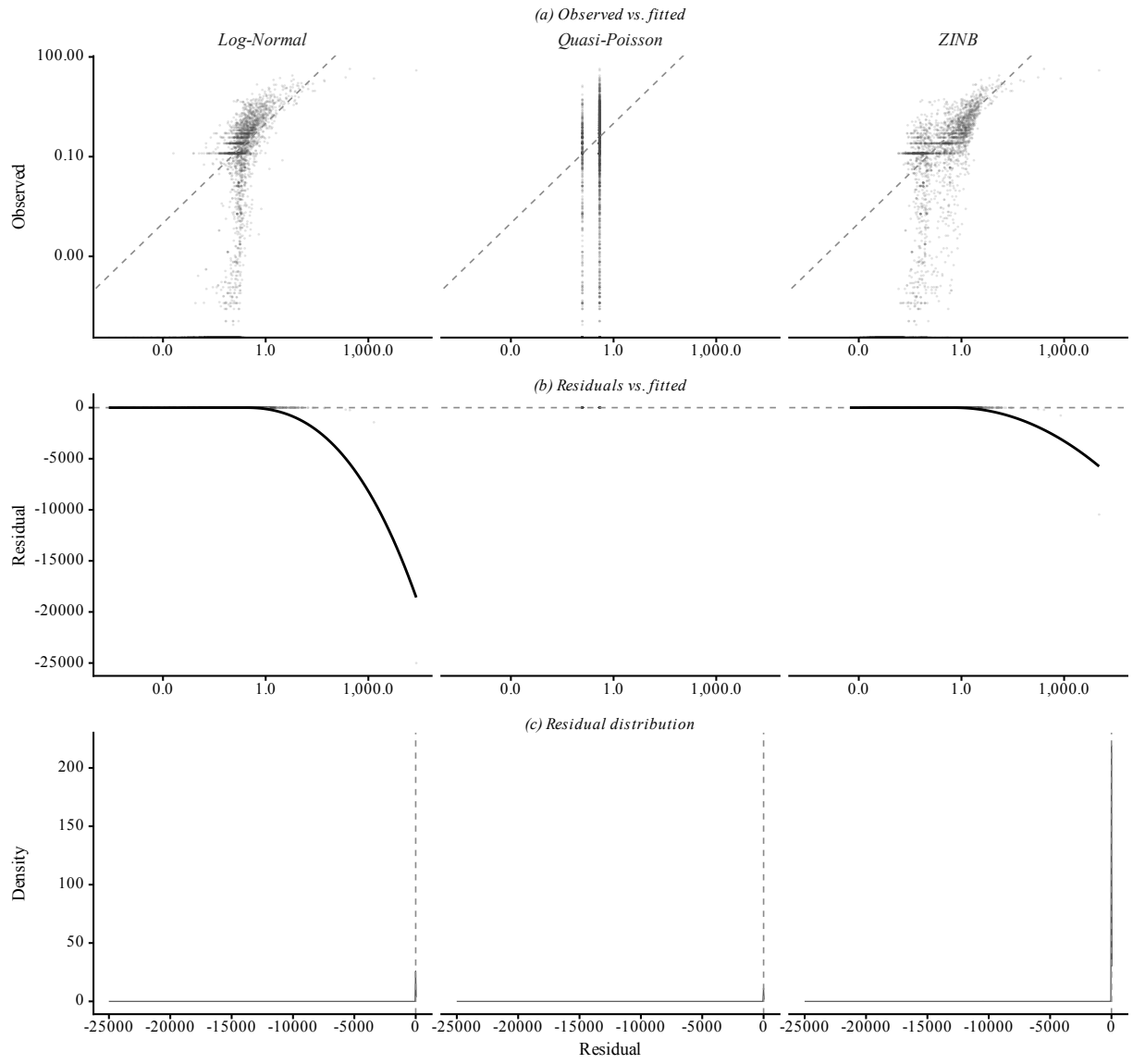



Figure A2. Model diagnostics comparing Log-Normal, Quasi-Poisson, and ZINB specifications. Top row: observed vs. fitted (log scale). Middle row: residuals vs. fitted with LOESS smoother. Bottom row: residual density. The ZINB shows the narrowest residual spike at zero. The ZINB is adopted as the primary count model; its fit indicates the gap is not an artifact of a mis-specified error distribution.

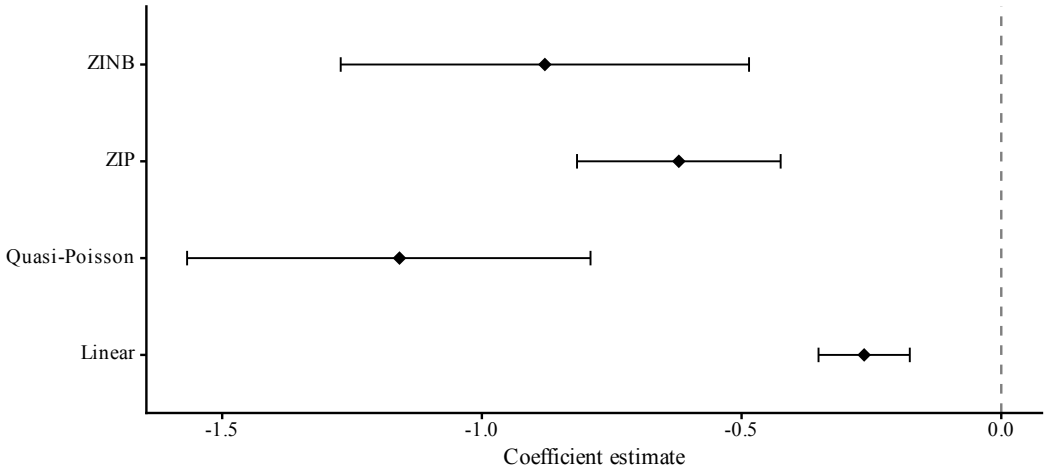



Figure A3. Model coefficients for Female (vs. Male) across four baseline specifications. Points show estimates; horizontal lines show 95% confidence intervals. The female deficit is negative and significant in every baseline specification.

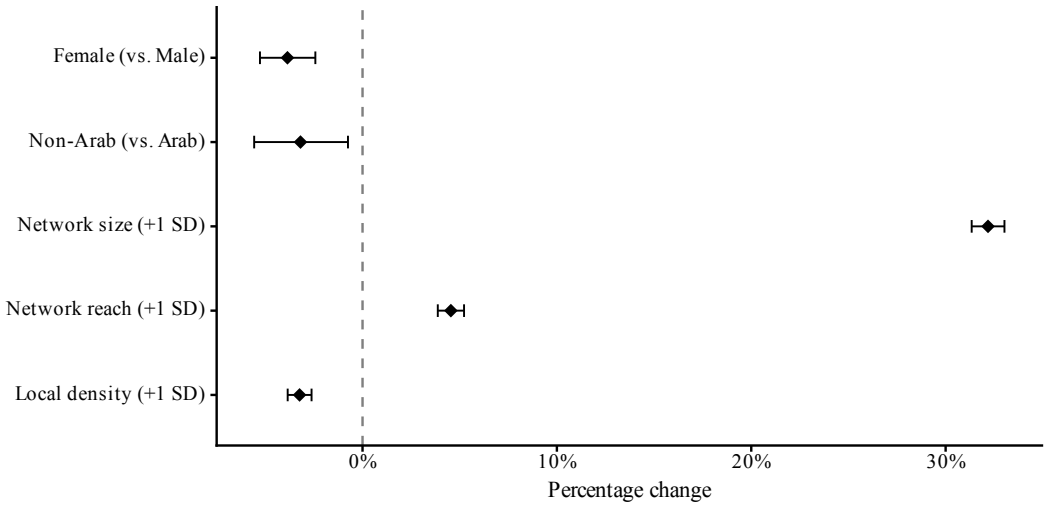



Figure A4. Log-Normal model: percentage change in betweenness centrality for each predictor. Horizontal lines show 95% confidence intervals. The female gap holds alongside the other predictors, indicating an association net of network structure.

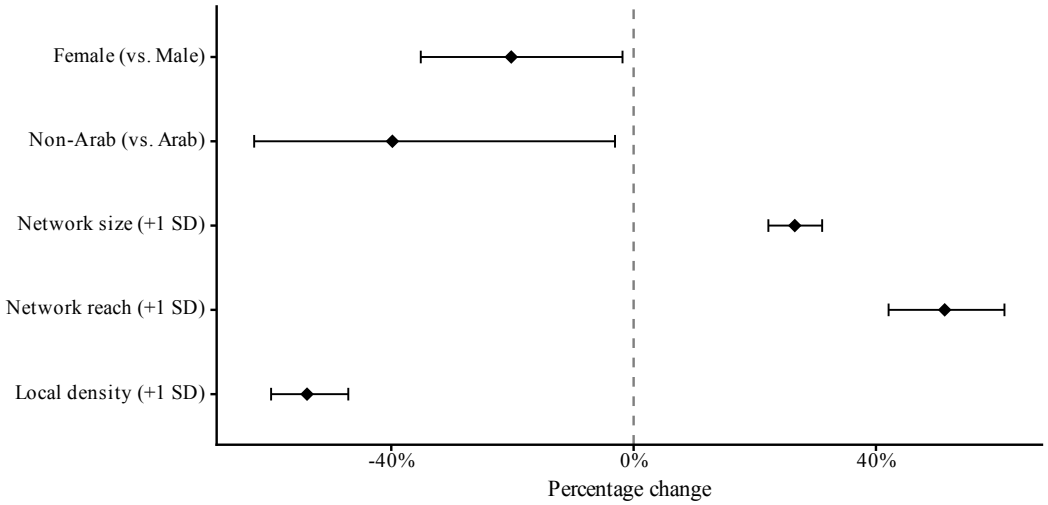



Figure A5. Zero-Inflated NB model: percentage change in non-zero betweenness values. Horizontal lines show 95% confidence intervals. The count-model counterpart to the previous figure confirms the female deficit among those who broker at all.

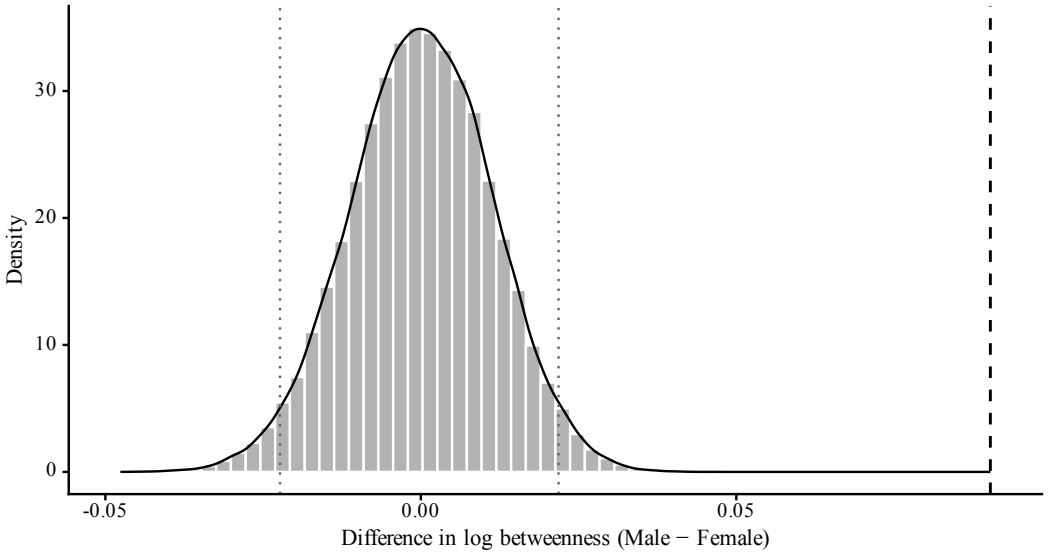



Figure A6. Null distribution of gender differences in log-transformed betweenness centrality from 100,000 permutations. Dashed line: observed difference; dotted lines: 95% interval of the null. The observed difference lies far outside the null built by reshuffling gender on the fixed network, so the gap is not an artifact of network dependence.

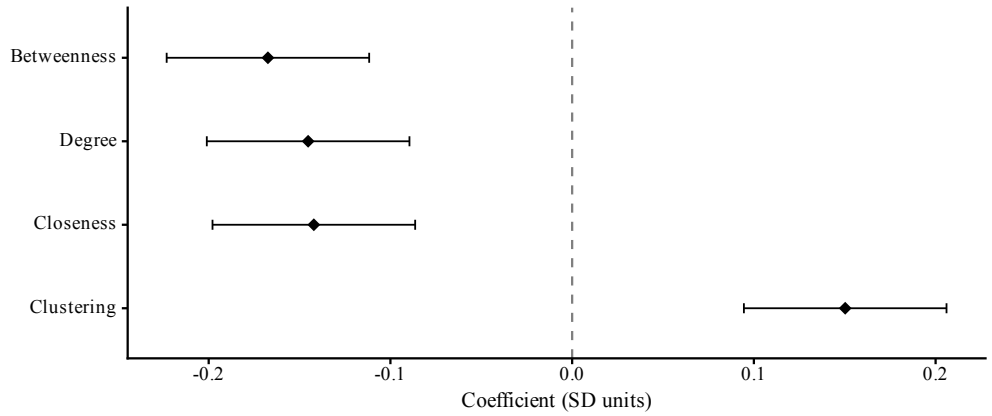



Figure A7. Standardised gender coefficient (Female vs. Male) for four centrality measures, from separate bivariate regressions. Betweenness shows the largest negative gap and clustering reverses to a positive one; the formal difference test is in Table A2.

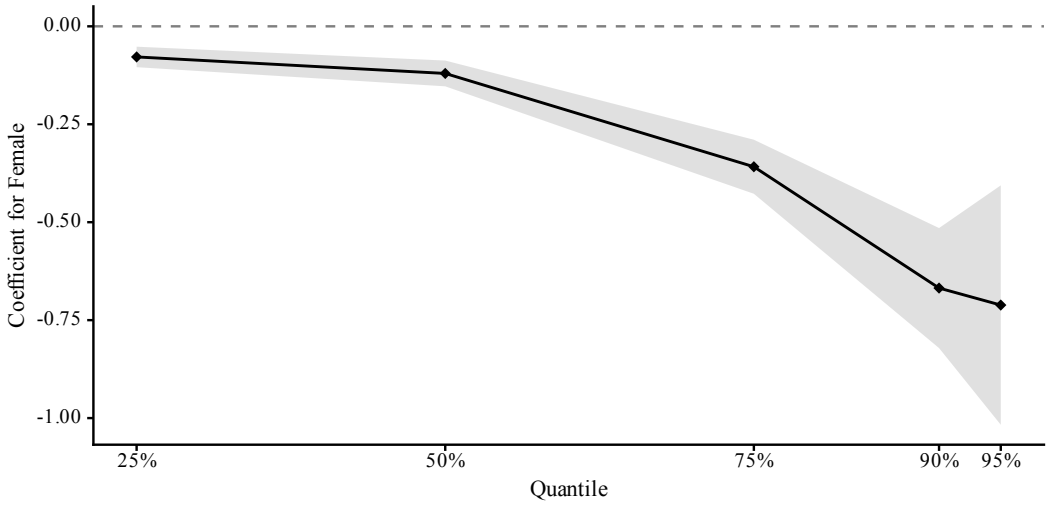



Figure A8. Female coefficient at different quantiles of log betweenness among individuals with non-zero centrality. A widening gap at upper quantiles indicates a glass ceiling in brokerage. The penalty intensifies at the upper quantiles, the concentration that the gatekeeping and reputational mechanisms both predict.

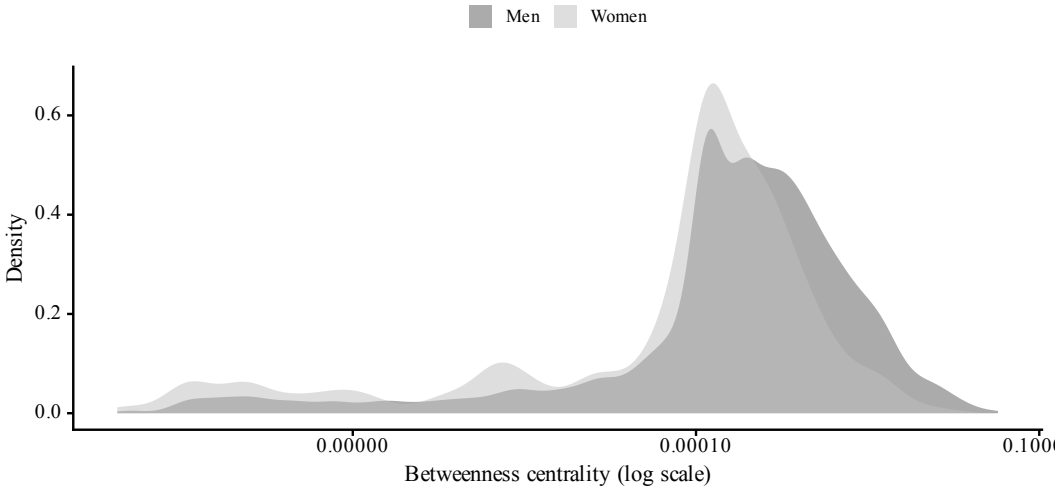



Figure A9. Distribution of betweenness centrality by gender (non-zero values, log scale). Women's distribution is compressed relative to men's, while its right tail shows that high betweenness remains attainable, so the disadvantage is structural rather than absolute.

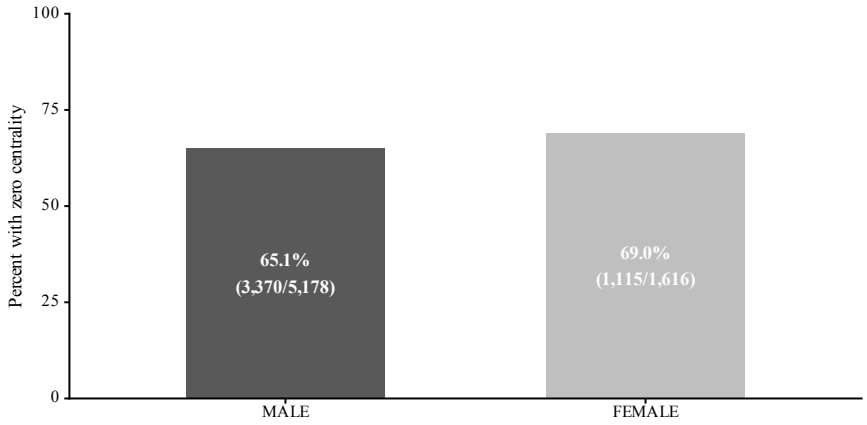



Figure A10. Proportion of individuals with zero betweenness centrality by gender. Women are over-represented among those holding no bridging position at all, the extensive margin of the gap.

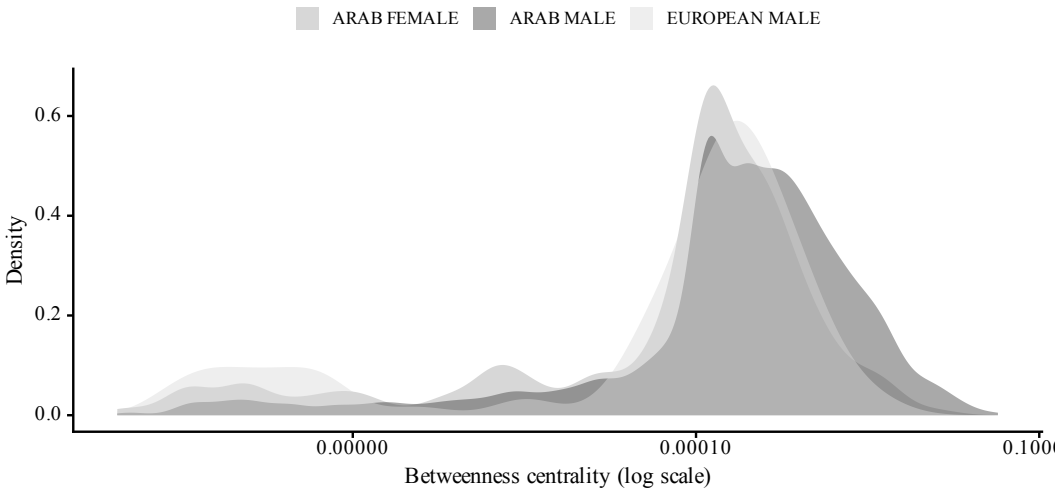



Figure A11. Distribution of betweenness centrality by ethnicity and gender (non-zero values, log scale). The female compression holds within the Arab majority and is not driven by ethnic composition, complementing the Gender × Ethnicity interaction.

## Robustness Tables

Table A1. Gender Gap Across Centrality Measures (Standardised, Female vs. Male)

| Measure | $\hat{\beta}$ | SE | $p$ | CI low | CI high |
|---|---|---|---|---|---|
| Betweenness | -0.167 | 0.028 | $< 0.001$ | -0.223 | -0.112 |
| Degree | -0.145 | 0.028 | $< 0.001$ | -0.201 | -0.090 |
| Closeness | -0.142 | 0.028 | $< 0.001$ | -0.198 | -0.086 |
| Clustering | 0.150 | 0.028 | $< 0.001$ | 0.095 | 0.206 |

*hatbeta* is the standardised coefficient on Female (SD units) from a bivariate regression; 95

Table A2. Difference-in-Coefficients Test: Is the Betweenness Gap Distinct? (Female vs. Male, SD units, SEs clustered by individual)

| Contrast | Difference | SE | $p$ |
|---|---|---|---|
| Degree − Betweenness | 0.022 | 0.013 | 0.079 |
| Closeness − Betweenness | 0.025 | 0.032 | 0.427 |
| Clustering − Betweenness | 0.318 | 0.037 | $< 0.001$ |

Each row is the difference between a measure's Female gap and the betweenness Female gap (reference). Because the redundancy hypothesis predicts a signed ordering (betweenness gap larger than degree gap), the relevant test is one-sided. The betweenness gap exceeds the degree gap in the predicted direction (one-sided $papprox0.04$; two-sided 0.079) and reverses sharply against clustering ($p <$ 0.001), while the closeness contrast is weakly identified and uninformative. Together these support brokerage-specificity over uniform marginality.

Table A3. Gender × Ethnicity Interaction

| | Log-Normal | Zero-Inflated NB |
|---|---|---|
| Female | $-0.041^{***}$ | $-0.225^{*}$ |
| | (0.008) | (0.106) |
| Non-Arab | $-0.039^{**}$ | $-0.506^{*}$ |
| | (0.014) | (0.251) |
| Degree (std) | $0.279^{***}$ | $0.236^{***}$ |
| | (0.003) | (0.018) |
| Closeness (std) | $0.044^{***}$ | $0.414^{***}$ |
| | (0.003) | (0.032) |
| Clustering (std) | $-0.033^{***}$ | $-0.775^{***}$ |
| | (0.003) | (0.070) |
| Female × Non-Arab | 0.036 | −0.020 |
| | (0.034) | (0.731) |
| Constant | $0.164^{***}$ | $-0.148^{**}$ |
| | (0.004) | (0.053) |
| Observations | 6,794 | 6,794 |
| $R^2$ | 0.553 | |
| Log-likelihood | | -2226.1 |

$^{***}p < 0.001$, $^{**}p < 0.01$, $^{*}p < 0.05$. Reference category: Arab Male. The small, non-significant Female × Non-Arab term indicates the gap is not confined to one ethnic group, and so is not an artifact of ethnic composition.

Table A4. Person-to-Person Ties by Gender Composition

| Tie type | $N$ | % |
|---|---|---|
| Cross-gender | 502 | 60% |
| F–F | 121 | 14.5% |
| M–M | 213 | 25.5% |

Counts of direct person-to-person ties by the gender of the two endpoints. These counts feed the homophily analysis in Table reftab:ei; the predominance of cross-gender and male–male ties over female–female ties reflects the male-centered structure within which women must broker.

Table A5. E-I Index: Gender Homophily

| | Cross-gender ($E$) | Same-gender ($I$) | E-I index |
|---|---|---|---|
| FEMALE | 502 | 242 | 0.349 |
| MALE | 502 | 426 | 0.082 |
| **Overall** | 502 | 334 | 0.201 |

E-I ranges from $-1$ (complete homophily) to $+1$ (complete heterophily). Women's ties are markedly more cross-gender than men's, routing them into the male-dominated core rather than bridging distinct female clusters, which bears on the male-sponsor-dependency mechanism.

Table A6. Quantile Regression: Female Coefficient (Non-Zero Observations)

| Quantile | $\hat{\beta}$ | SE | CI low | CI high |
|---|---|---|---|---|
| 25% | -0.078 | 0.013 | -0.104 | -0.052 |
| 50% | -0.120 | 0.017 | -0.153 | -0.087 |
| 75% | -0.358 | 0.035 | -0.427 | -0.289 |
| 90% | -0.668 | 0.078 | -0.821 | -0.515 |
| 95% | -0.712 | 0.156 | -1.017 | -0.406 |

Estimated among individuals with non-zero betweenness only; this subsample is gender-selected. The female coefficient grows more negative from the 25th to the 95th percentile, the tabular form of the glass-ceiling result.

Table A7. Sensitivity to Unmeasured Confounding

| | |
|---|---|
| Cohen's $d$ | 0.229 |
| E-value (point estimate) | 1.767 |
| E-value (95% CI lower bound) | 1.618 |

The E-value is the minimum association (risk-ratio scale) an unmeasured confounder would need with both gender and betweenness to nullify the result. The larger the value, the more robust the estimate is to such confounding.

Table A8. Two-Part Hurdle Model: Structural Zeros vs. Continuous Brokerage Power

| | Zero Hurdle (Logit) | Continuous (Log-Normal) |
|---|---|---|
| Female (vs. Male) | $-0.177^{**}$ | $-0.228^{***}$ |
| | (0.061) | (0.028) |
| Constant | $-0.623^{***}$ | $0.498^{***}$ |
| | (0.029) | (0.013) |
| Observations | 6,794 | 2,309 |

$^{***}p < 0.001$, $^{**}p < 0.01$, $^{*}p < 0.05$. The 'Zero Hurdle' models the log-odds of having betweenness strictly greater than zero. The 'Continuous' model estimates the log-betweenness score conditional on having a non-zero value. The two parts separate the disadvantages the pooled models combine: women are both less likely to occupy any bridging position (extensive margin) and broker less when they do (intensive margin), which is hard to reconcile with accounts that reduce the gap to lower participation alone.

Table A9. Causal Mediation Analysis: Decomposing the Gender Penalty

| Effect | Estimate | 95% CI Lower | 95% CI Upper | p-value |
|---|---|---|---|---|
| Mediated Effect via Network Size (ACME) | -0.201 | -0.278 | -0.129 | $< 0.001$ |
| Direct Effect on Brokerage (ADE) | -0.074 | -0.121 | -0.027 | 0.002 |
| Total Effect of Gender | -0.275 | -0.365 | -0.181 | $< 0.001$ |
| Proportion Mediated | 0.731 | 0.583 | 0.886 | $< 0.001$ |

ACME is the portion of the gender penalty transmitted through reduced network size (degree); ADE is the direct penalty on betweenness net of network size; the proportion mediated is the ACME share of the total. The decomposition splits the average penalty into a volume channel (the larger share, reflecting women's smaller networks) and a positional channel (the significant ADE). Because degree is a near-mechanical precondition for betweenness, the mediated share is best read as an upper bound on the volume story, and the significant direct effect is the sharper evidence that position, not number alone, is at work.

Table A10. The Glass Ceiling: Full Distribution of the Brokerage Penalty

| | 25th Pct. | 50th Pct. | 75th Pct. | 90th Pct. | 95th Pct. | Top 10% | Top 5% |
|---|---|---|---|---|---|---|---|
| Female (vs. Male) | −0.078*** | −0.120*** | −0.358*** | −0.668*** | −0.712*** | −0.787*** | −0.972*** |
| | (0.011) | (0.012) | (0.038) | (0.091) | (0.165) | (0.171) | (0.259) |
| Constant | 0.118*** | 0.238*** | 0.678*** | 1.357*** | 1.750*** | −2.687*** | −3.698*** |
| | (0.005) | (0.010) | (0.028) | (0.051) | (0.064) | (0.072) | (0.102) |
| Observations | 6,794 | 6,794 | 6,794 | 6,794 | 6,794 | 6,794 | 6,794 |

Columns report the Female coefficient from quantile regressions at the 25th–95th percentiles of non-zero betweenness and from logistic models for membership in the top 10% and top 5% of brokers. The intensifying negative coefficient at higher percentiles demonstrates a 'glass ceiling' in informational power. The apex-tier models extend the quantile evidence: women are increasingly under-represented the closer one looks to the very top of the brokerage distribution, the upper-tail concentration that the gatekeeping and reputational mechanisms both predict. See Table A13 for the complementary 'strategic compensation' interaction, which concerns the return per tie rather than the distribution of outcomes.

Table A11. Freedman-Lane Permutation Test for Network Autocorrelation

| Metric | Baseline (Linear) | Extended (Log-Normal) |
|---|---|---|
| **Observed $\hat{\beta}$ for Female** | **-0.264** | **-0.039** |
| Naive IID $p$-value | $< 0.001$ | $< 0.001$ |
| Network-Robust Empirical $p$ | $< 0.001$ | $< 0.001$ |

Empirical $p$-values derived from 10,000 permutations of the restricted model residuals (Freedman-Lane procedure), which isolates the marginal penalty of being female while generating a null distribution that does not assume independent and identically distributed network nodes. The female effect remains significant once the i.i.d. assumption is relaxed, so the gap is not an artifact of the dependence inherent in network data.

Table A12. Robustness to Bipartite Projection Artifacts

| | Baseline Control | Bipartite Robust |
|---|---|---|
| Female (vs. Male) | $-0.226^{*}$ | $-0.209^{*}$ |
| | (0.106) | (0.104) |
| Non-Arab (vs. Arab) | $-0.508^{*}$ | $-0.495^{*}$ |
| | (0.243) | (0.241) |
| Degree (std) | $0.236^{***}$ | $0.235^{***}$ |
| | (0.018) | (0.018) |
| Max Org Size (std) | | $0.130^{***}$ |
| | | (0.036) |
| Constant | $-0.148^{**}$ | $-0.115^{*}$ |
| | (0.053) | (0.053) |
| Observations | 6,794 | 6,794 |
| Log-likelihood | -2226.1 | -2213.8 |

$^{***}p < 0.001$, $^{**}p < 0.01$, $^{*}p < 0.05$. The 'Bipartite Robust' model controls for the size of the largest organization each individual belongs to. With the largest-organization control added, the female coefficient remains negative and significant, so the gap is not an artifact of the one-mode projection inflating men's betweenness through membership in very large organizations.

Table A13. Strategic Compensation: The Brokerage Payoff of Tie Formation

| | Log-Normal (Interaction) | ZINB (Interaction) |
|---|---|---|
| Female (vs. Male) | $-0.027^{***}$ | $-0.504^{***}$ |
| | (0.008) | (0.144) |
| Degree (std) | $0.274^{***}$ | $0.226^{***}$ |
| | (0.003) | (0.018) |
| Female × Degree | $0.115^{***}$ | $0.225^{**}$ |
| | (0.016) | (0.079) |
| Non-Arab (vs. Arab) | $-0.032^{*}$ | $-0.507^{*}$ |
| | (0.013) | (0.242) |
| Constant | $0.164^{***}$ | $-0.125^{*}$ |
| | (0.004) | (0.053) |
| Observations | 6,794 | 6,794 |
| $R^2$ | 0.557 | |
| Log-likelihood | | -2222.0 |

$^{***}p < 0.001$, $^{**}p < 0.01$, $^{*}p < 0.05$. The model interacts gender with network size (standardized degree). The negative Female main effect is the gap at average network size; the positive Female × Degree term means each additional tie yields more brokerage for women than for men. The estimates separate the *level* of the penalty (women trail on average) from the *slope* (the women who do build networks earn a steeper return per tie), consistent with strategic compensation among a strategic minority rather than uniform redundancy. The interaction identifies an association, not agency, and is equally consistent with high-degree women being concentrated in a few genuinely cross-sector organizations.

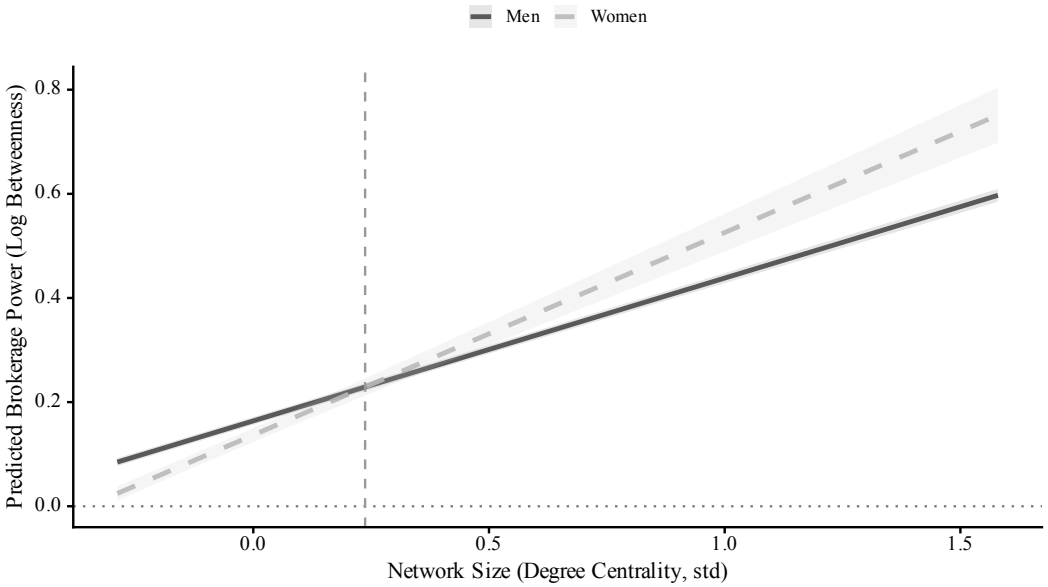



Figure A12. Marginal effect of network size on brokerage by gender, from the log-normal interaction model in Table A13. Lines are predicted log betweenness as network size (standardized degree) increases, holding ethnicity, closeness, and clustering at reference values; the horizontal axis is restricted to the range women actually occupy (up to the 99th percentile of female degree) to avoid extrapolating into a high-degree region populated almost entirely by male hubs. Women start below men (the negative Female main effect) but gain more brokerage per additional tie (the positive interaction), so the lines cross near 0.24 SD of degree (dashed vertical line). The figure shows that the average female penalty documented in the main text coexists with a steeper female return on tie formation. The mean gap is driven by the many women at low degree and at zero betweenness, while the smaller set of women who build larger networks convert ties into brokerage more efficiently than men, consistent with strategic compensation rather than uniform exclusion.

# References


Acemoglu, Daron and James A Robinson. 2008. "Persistence of power, elites, and institutions." *American Economic Review* 98(1):267–293.

Alexander, Amy C and Christian Welzel. 2011. "Islam and patriarchy: how robust is Muslim support for patriarchal values?" *International Review of Sociology* 21(2):249–276.

Allam, Nermin. 2018. *Women and the Egyptian revolution: Engagement and activism during the 2011 Arab uprisings*. Cambridge University Press.

Baldwin, Austin S, Marc T Kiviniemi and Mark Snyder. 2009. "A subtle source of power: The effect of having an expectation on anticipated interpersonal power." *The Journal of social psychology* 149(1):82–104.

Ban, Pamela, Ju Yeon Park and Hye Young You. 2023. "How are politicians informed? Witnesses and information provision in congress." *American Political Science Review* 117(1):122–139.

Ben Achour, Sana. 2007. "La féminisation de la magistrature en Tunisie entre émancipation féminine et autoritarisme politique." *L'Année du Maghreb* pp. 55–74.

Benbelli, Sana. 2023. "Women's Experiences of Representation and Marginalization in Morocco: Taking Stock and Outlining Future Trajectories." *Arab Reform Initiative* .
**URL:** *https://www.arab-reform.net/publication/womens-experiences-of-representation-and-marginalization-in-morocco-taking-stock-and-outlining-future-trajectories/*

Bendor, Jonathan, Serge Taylor and Roland Van Gaalen. 1987. "Politicians, bureaucrats, and asymmetric information." *American Journal of Political Science* pp. 796–828.

Benstead, Lindsay J. 2019*a*. "Do female local councilors improve women's representation?" *The journal of the Middle East and Africa* 10(2):95–119.

Benstead, Lindsay J. 2019*b*. "Tunisia: changing patterns of women's representation." *The Palgrave handbook of women's political rights* pp. 517–530.

Blackman, Alexandra Domike and Marlette Jackson. 2021. "Gender stereotypes, political leadership, and voting behavior in Tunisia." *Political Behavior* 43(3):1037–1066.

Blaydes, Lisa and Drew A Linzer. 2008. "The political economy of women's support for fundamentalist Islam." *World Politics* 60(4):576–609.

Borsten, Joan. 1985. "Arab World's Most Powerful Woman: Fiery Moslem First Lady Lets Her Conscience Be Her Guide." *Chicago Tribune* p. 1. Dateline: La Marsa, Tunisia, North Africa, Section: Tempo.

Brandes, Ulrik. 2001. "A faster algorithm for betweenness centrality." *Journal of mathematical sociology* 25(2):163–177.

Brands, Raina A and Ajay Mehra. 2019. "Gender, brokerage, and performance: A construal approach." *Academy of Management Journal* 62(1):196–219.

Brands, Raina A and Martin Kilduff. 2014. "Just like a woman? Effects of gender-biased perceptions of friendship network brokerage on attributions and performance." *Organization Science* 25(5):1530–1548.

Brands, Raina, Gokhan Ertug, Fabio Fonti and Stefano Tasselli. 2022. "Theorizing gender in social network research: What we do and what we can do differently." *Academy of Management Annals* 16(2):588–620.

Brass, Daniel J. 1985. "Men's and women's networks: A study of interaction patterns and influence in an organization." *Academy of Management journal* 28(2):327–343.

Brown, Nadia E and David Samuels. 2018. "Introduction to gender in the journals, continued: Evidence from five Political Science journals." *PS: Political Science & Politics* 51(4):847–848.

Burt, Ronald S. 1992. *Structural Holes: The Social Structure of Competition*. Harvard University Press.

Charrad, Mounira M. and Amina Zarrugh. 2014. "Equal or Complementary? Women in the New Tunisian Constitution after the Arab Spring." *Journal of North African Studies* 19(2):230–243.

Cherif, Nedra. 2014. Tunisian women in politics: From constitution makers to electoral contenders. Policy Brief 189 FRIDE and Hivos.

Clark, Julia Michal, Alexandra Domike Blackman and Aytuğ Şaşmaz. 2024. "What Men Want: Parties' Strategic Engagement With Gender Quotas." *Comparative Political Studies* .

Delgado-Vega, Alvaro and Benjamin Shaver. 2024. "A Model of Succession and Policy Concerns." Working Paper.

Diviák, Tomáš, James A Coutinho and Alex D Stivala. 2020. "A Man's world? Comparing the structural positions of men and women in an organized criminal network." *Crime, Law and Social Change* 74(5):547–569.

Djupe, Paul, Scott Mcclurg and Anand Edward Sokhey. 2018. "The political consequences of gender in social networks." *British Journal of Political Science* 48(3):637–658.

Dougui, Noureddine. 2020. *Wassila Bourguiba La Main Invisible*. Sud Editions.

Eastin, Joshua and Aseem Prakash. 2013. "Economic development and gender equality: Is there a gender Kuznets curve?" *World Politics* 65(1):156–186.

Faust, Katherine. 1997. "Centrality in affiliation networks." *Social networks* 19(2):157–191.

Fish, M Steven. 2002. "Islam and authoritarianism." *World politics* 55(1):4–37.

Fowler, James H. 2006. "Connecting the congress: A study of cosponsorship networks." *Political analysis* 14(4):456–487.

Freeman, Linton C. 1977. "A set of measures of centrality based on betweenness." *Sociometry* pp. 35–41.

French, John RP. 1959. "The bases of social power." *Studies in social power/University of Michigan Press* .

Gaspar, Jacqueline. 2012. *Entretiens avec Wassila Bourguiba à Carthage de novembre 1972 à mars 1973*. Déméter. Édition originale, trimestre 2012.

Gribaa, Boutheina, Giorgia Depaoli and Malek Baklouti. 2009. *Mapping of the situation of women participation in politics in Algeria, Morocco and Tunisia*. Santo Domingo, Dominican Republic: United Nations International Research and Training Institute for the Advancement of Women (UN-INSTRAW) and Centre for Arab Women Training and Research (CAWTAR).

**URL:** *http://www.un-instraw.org*

Grosso, Sarah and Kuni Sato. 2017. "Counting (on) women in politics: experiences from

Morocco & Tunisia: Compter (sur) les femmes dans la vie politique: expériences du Maroc et de la Tunisie.".

Grubman, Nate and Aytuğ Şaşmaz. 2021. "The Collapse of Tunisia's Party System and the Rise of Kais Saied." *Middle East Report Online* .

Hafner-Burton, Emilie M and Alexander H Montgomery. 2010. "Centrality in politics: How networks confer power.".

Heydemann, Steven. 2004. *Networks of privilege in the Middle East: The politics of economic reform revisited*. Springer.

Hopwood, Derek and Derek Hopwood. 1992. "Tunisia under Bourguiba." *Habib Bourguiba of Tunisia: The Tragedy of Longevity* pp. 80–94.

Hughes, Melanie M, Pamela Paxton and Mona Lena Krook. 2017. "Gender quotas for legislatures and corporate boards." *Annual Review of Sociology* 43(1):331–352.

Ibarra, Herminia. 1992. "Homophily and differential returns: Sex differences in network structure and access in an advertising firm." *Administrative Science Quarterly* pp. 422–447.

Keister, Lisa A, Sarah Thébaud and Jill E Yavorsky. 2022. "Gender in the Elite." *Annual Review of Sociology* 48(1):149–169.

Kertzer, Joshua D and Jonathan Renshon. 2022. "Experiments and surveys on political elites." *Annual Review of Political Science* 25(1):529–550.

Khiari, Sadri. 2004. "De Wassila à Leïla, Premières dames et pouvoir en Tunisie." *Politique*

*africaine* 95(3):55–70.

**URL:** *https://shs.cairn.info/revue-politique-africaine-2004-3-page-55?lang=fr*

Klibi, Salsabil. 2015. Tunisia: A New Constitution and more women judges. In *Gender and the Judiciary in Africa*. Routledge pp. 80–92.

Krcmaric, Daniel, Stephen C Nelson and Andrew Roberts. 2020. "Studying leaders and elites: The personal biography approach." *Annual Review of Political Science* 23(1):133–151.

Kristof, Nicholas. 1984. "Arab World's Female Wheeler-Dealer Loses a Power Struggle in Tunisia." *The Washington Post* .

Krook, Mona Lena. 2010. "Studying political representation: A comparative-gendered approach." *Perspectives on Politics* 8(1):233–240.

Langohr, Vickie. 2013. "'This Is Our Square': Fighting Sexual Assault at Cairo Protests." *Middle East Report* .

Larserud, Stina and Rita Taphorn. 2007. "Designing for Equality: Women's quotas and women's political participation." *Development* 50(1):36–42.

Laugier, Iris. 2025. "Social Ties and First Child's Birth: A Motherhood Network Penalty." Working Paper.

Lawless, Jennifer L and Richard L Fox. 2005. *It takes a candidate: Why women don't run for office*. Cambridge University Press.

*Libyan Efforts to Subvert President Bourguiba*. 1978. Cable.

Lovakov, Andrey and Elena R Agadullina. 2021. "Empirically derived guidelines for effect size interpretation in social psychology." *European Journal of Social Psychology* 51(3):485–504.

Lust, Ellen and Lindsay J Benstead. 2024. "Is the Future Female? Lessons from a Conjoint Experiment on Voter Preferences in Six Arab Countries." *Comparative Political Studies* .

*Madame Bourguiba "Reappears" in Tunisian Media*. 1978. Cable.

Marzouki, Ilhem. 1993. *Le mouvement des femmes en Tunisie au XXème siècle*. Cérès Productions Paris: Maisonneuve et Larose. Exclusivité pour la France, la Suisse et le Québec.

McPherson, Miller, Lynn Smith-Lovin and James M. Cook. 2001. "Birds of a feather: Homophily in social networks." *Annual review of sociology* 27(1):415–444.

Moghadam, Valentine M. 2014. "Modernising Women and Democratisation after the Arab Spring." *Journal of North African Studies* 19(2):137–142.

Naidu, Suresh, James A Robinson and Lauren E Young. 2021. "Social origins of dictatorships: Elite networks and political transitions in Haiti." *American Political Science Review* 115(3):900–916.

Norris, Pippa and Joni Lovenduski. 1995. *Political Recruitment: Gender, Race and Class in the British Parliament*. Cambridge University Press.

Paxton, Pamela, Sheri Kunovich and Melanie M Hughes. 2007. "Gender in politics." *Annu. Rev. Sociol.* 33(1):263–284.

Razafindrakoto, Mireille, François Roubaud and Linda Rua. 2021. "Hyper-elites and network:

Capturing the powerful upper tail in Madagascar." *World Development* 147.

Ross, Michael L. 2008. "Oil, Islam, and women." *American political science review* 102(1):107–123.

Rua, Linda, Mireille Razafindrakoto and François Roubaud. 2023. "Hyper-elite network building in Madagascar: amplification or compensatory strategy?" *Socio-Economic Review* 21(1):183–212.

Saad, Nizar Ben. 2021. *Un destin, la Mejda: une femme de charme dans les coulisses de l'histoire : Wassila Ben Ammar, seconde épouse de Bourguiba (1912-1999)*. KA' éditions.

Sadiqi, Fatima. 2016. *Women's Movements in Post-"Arab Spring" North Africa*. New York: Springer.

Saunders, Elizabeth N. 2022. "Elites in the making and breaking of foreign policy." *Annual Review of Political Science* 25(1):219–240.

Shalaby, Marwa M. 2018. "Women's representation in the Middle East and North Africa." *Oxford Bibliographies in Political Science* pp. 1–4.

Shannon, Paul, Andrew Markiel, Owen Ozier, Nitin S Baliga, Jonathan T Wang, Daniel Ramage, Nada Amin, Benno Schwikowski and Trey Ideker. 2003. "Cytoscape: a software environment for integrated models of biomolecular interaction networks." *Genome research* 13(11):2498–2504.

Singerman, Diane. 1995. *Avenues of participation: Family, politics, and networks in urban quarters of Cairo*. Princeton University Press.

Smith, Chris M. 2019. *Syndicate women: Gender and networks in Chicago organized crime.* University of California Press.

Solano, Giacomo and Gerrit Rooks. 2018. "Social capital of entrepreneurs in a developing country: The effect of gender on access to and requests for resources." *Social Networks* 54:279–290.

Tezcür, Güneş Murat. 2020. "A path out of patriarchy? Political agency and social identity of women fighters." *Perspectives on Politics* 18(3):722–739.

Tripp, Aili Mari. 2024. "How African autocracies instrumentalize women leaders." *Politics & Gender* 20(1):217–222.

Ulziisukh, Selenge and Zelong Wei. 2022. "Behind the political connections under emerging democracies." *Management and Organization Review* 18(4):686–716.

U.S. Department of State. 1977. "The Tunisian Governmental Crisis– A Description and Assessment." Diplomatic Cable. Declassified/Released US Department of State EO Systematic Review 22 May 2009.

U.S. Department of State. 1978. "President Bourguiba's Health." Diplomatic Cable. Cable Number: TUNIS 7496, Declassified/Released US Department of State EO Systematic Review 20 Mar 2014.

Vidal, Jordi Blanes I and Marc Möller. 2007. "When should leaders share information with their subordinates?" *Journal of Economics & Management Strategy* 16(2):251–283.

Walby, Sylvia. 2004. "The European Union and gender equality: Emergent varieties of gender regime." *Social Politics: International Studies in Gender, State & Society* 11(1):4–29.

Walby, Sylvia. 2020. "Varieties of gender regimes." *Social Politics: International Studies in Gender, State and Society* 27(3):414–431.

Walter, James. 2014. "Biographical analysis." *The Oxford Handbook of Political Leadership* pp. 314–327.

Woehler, Meredith L, Kristin L Cullen-Lester, Caitlin M Porter and Katherine A Frear. 2021. "Whether, how, and why networks influence men's and women's career success: Review and research agenda." *Journal of Management* 47(1):207–236.

Zaanoun, Abderrafie. 2022. "The impact of the quota system on women parliamentary representation in Morocco: A series of reforms or a regressive path?" *Arab Reform Initiative* .

**URL:** *https://www.arab-reform.net/publication/the-impact-of-the-quota-system-on-women-parliamentary-representation-in-morocco-a-series-of-reforms-or-a-regressive-path/*

Zaki, Hind Ahmed. 2019. "Why Did Women's Rights Expand in Post-Revolutionary Tunisia?" *Middle East Brief* 131:1–7.

Zolman, Keri, Ashley Bruggemann, Elizabeth O'Bagy and Sierra Smith. 2020. SheVotes: Tunisia Understanding Barriers to Women's Political Participation. Technical report International Republican Institute. Available at: https://www.iri.org/sites/default/files/tunisia_final_slides.pdf.