The old boy network: gender differences in the impact of social networks on remuneration in top executive jobs

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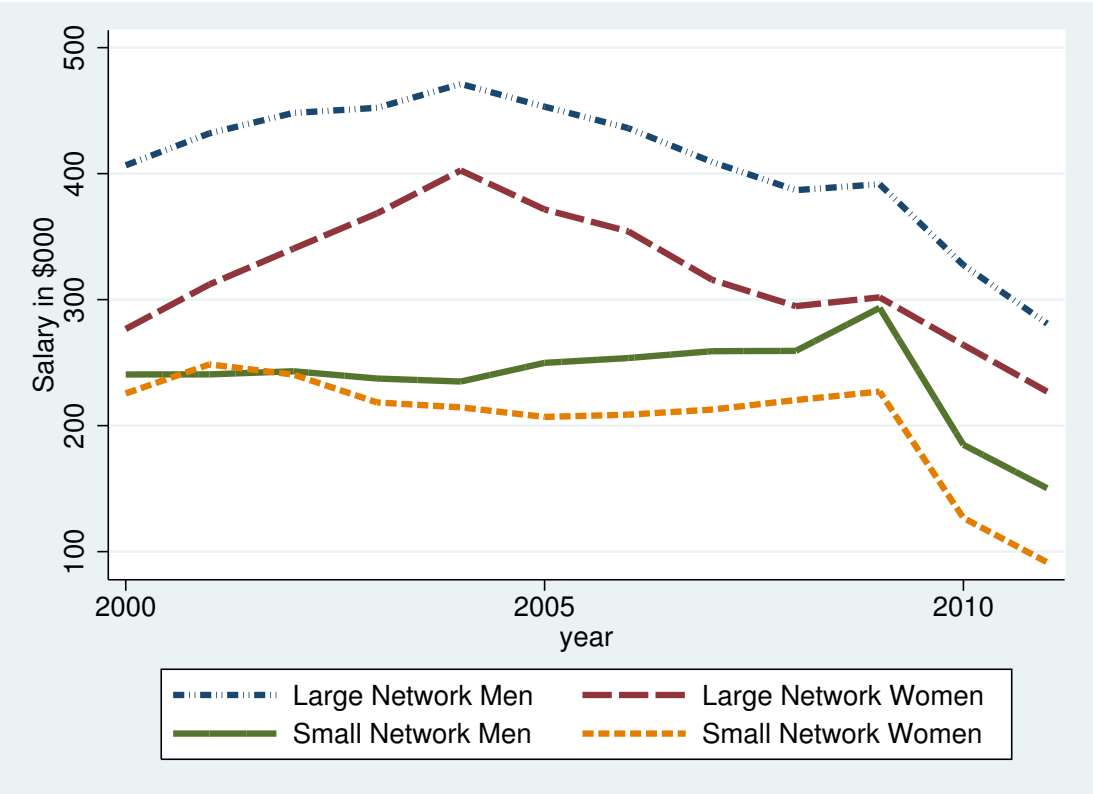
Main Question of our Research

Do men and women network differently, and if so could this explain (part of) the continuing differences in remuneration in top executive positions?

Answer

For executives, yes!



Why does this matter?

- The transformation of labor markets by women's participation since WWII has been spectacular:
  - Women's labor force participation has risen from just over 30% to just under 60%
  - In 2009 women made up 51.4% of "management and professional" jobs
  - Women's participation in higher education now well ahead of men's
- But some occupations have continuing low participation of women
- Women's salaries are lower even within occupations
- Women are scarce at the very top: 15,7% of board members and 2,4% of CEOs of Fortune 500 companies in 2010
- Despite similar participation and success in education, as well as similar career motivation and commitment
- Explanations so far: Bertrand et al. (2010), Goldin (2014)....

Why we expect networking to be part of the answer

- The logic of sexual selection: women are more selective than men about entering into many partnerships, but invest more in those partnerships they choose to undertake
- Trivers (1972): asymmetric parental investment
- Low (2000): this logic applies to non-sexual relationships
- Evidence from primatology and sociology: women invest relatively more in *strong ties*, men relatively more in *weak ties* (Granovetter)
- But weak ties matter more for professional advancement
- In separate experimental work with Guido Friebel, Bernard RIchter and Peter Schwardmann (2013) we find evidence that, when deciding with whom to collaborate, women respond differently from men to the outcome of prior interactions, in ways that are likely to create differences in social networks

This paper

- Tests for effect of networking opportunities on remuneration
- Tricky statistical issues
  - how do we know that gender differences are not just capturing unobservable differences in talent?
  - reverse causality: people switch jobs and thus acquire larger networks
- Various ways to control for these (none of them perfect)
- Our best test: the creation of placebo networking opportunities
- We find strong evidence that real networks matter for executive remuneration, and placebo networks do not
- We find a strong, robust gender difference in effect size
- Non-executive remuneration behaves very differently; some evidence of a “window dressing” approach
- Evidence for efficiency benefits of female friendly policies

Data Description

- Our dataset: more than 22 000 top executives and board members working for nearly 4000 US and UK companies from 1999 to 2012 (22219 individuals in 3760 firms for 2008).
- Whole dataset: around 380 000 individuals from boards of directors and senior management from roughly 15 000 publicly quoted companies, mainly from North America, Europe and Australia (cut-off criterion of inclusion: market capitalization higher than 1 million USD).
- Demographic and educational characteristics, employment history, firm characteristics.
- Social network information from previous and current colleagues.
- Links should be interpreted as opportunities for interactions; we do not observe actual investment in social interactions.

Network variables

- Social network measures: employment connections and weighted employment connections.

$$\begin{aligned} interaction_{ijt} &= 1\_if\_i\_and\_j\_worked\_in\_the\_same\_firm\_at\_time\_t \\ &= 0\_otherwise \end{aligned}$$

$$interaction_{ij}^{t} = Max\{interaction_{ijt_0}, ..., interaction_{ijt}\}$$

$$connections_{i}^{t} = \sum_{j, j \neq i} interaction_{ij}^{t}$$

Network variables

$$overlap_{ijt} = end\_date\_interaction_{ijt} - start\_date\_interaction_{ijt} + 1$$

$$oldness_{ijt} = t - \arg\max_{s, s \leqslant t} \{interaction_{ijs}\}\_when\_interaction_{ijs} = 1$$

$$weighted\_connections_i^t = \sum_j \frac{interaction_{ijt} * overlap_{ijt}}{oldness_{ijt} + 1}$$

Methodology

- First analysis: cross section on the year 2008 (salary and non-salary compensation measures)
- We use a sample of 22 219 individuals, for data availability reasons.
- We measure the effect of connections on remuneration
- Then we interact remuneration with gender
- We compare coefficient on connections with coefficient on placebo connections
- Finally we explore multiple years, robustness, mechanisms

Placebo connections

- The basic idea: connections variable might reflect unobserved individual characteristics leading individuals with talent, who are likely to be successful, to be hired by the same firms
- Their success would not be the result of their having worked together but a joint result of their unobserved characteristics
- The test: build variable that captures clustering of similar individuals by employer without working together
- Placebo connections are those individuals who worked in the same firm but not at the same time

$$\begin{aligned} interaction_{ijt} &= 1\_if\_i\_and\_j\_ever\_worked\_in\_the\_same\_firm \\ &= 0\_otherwise \end{aligned}$$

$$samefirm_{ij}^{t} = Max\{interaction_{ijt_0}, ..., interaction_{ijt}\}$$

$$placeboconnections_{i}^{t} = \sum_{j,j\neq i} samefirm_{ij}^{t} - \sum_{j,j\neq i} interaction_{ij}^{t}$$

Placebo connections (contd.)

- The difference between the coefficients on connections and on placebo connections therefore captures (by analogy with "treatment effect over placebo" in clinicial trials) the additional impact on remuneration of having worked in the same firm *at the same time*
- This can be considered a *proximity* effect
- If we see a proximity effect we should also expect that the more prolonged and recent the proximity the greater the impact
- So the coefficient on weighted connections should also exceed that on connections

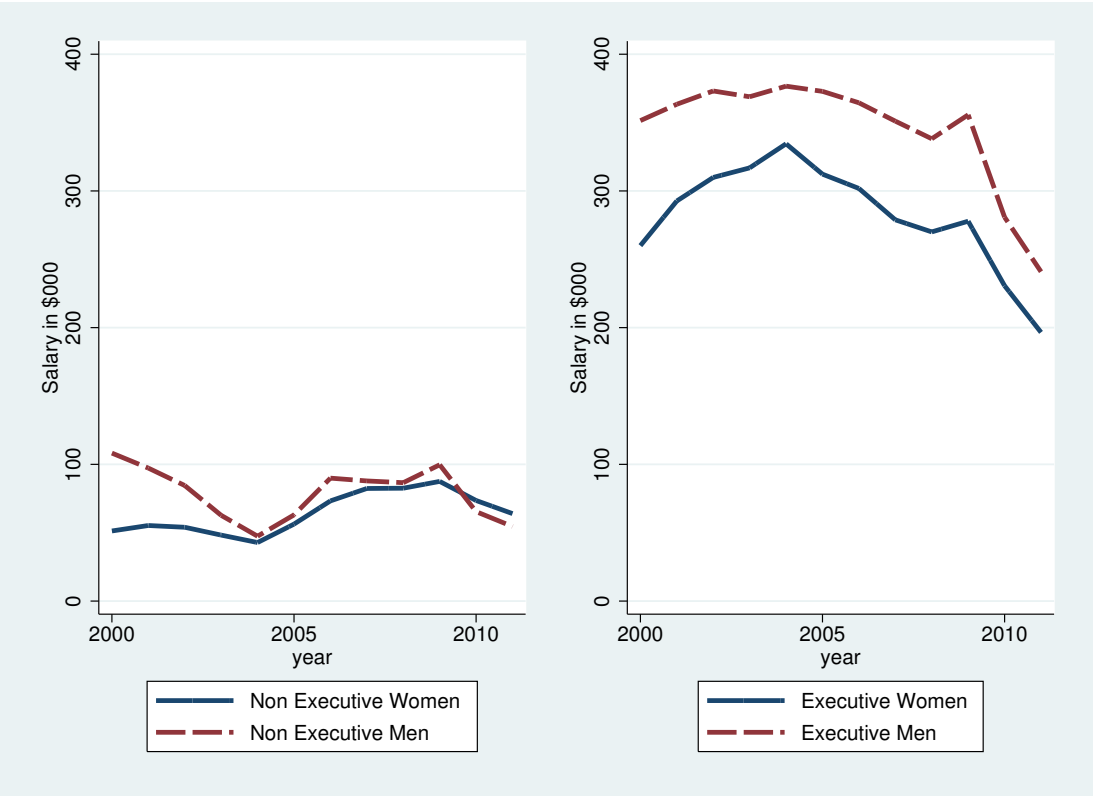
Some basic facts: a dramatic gender disparity in salaries

Part of this is a composition effect

Table : Gender by executive status in 2008

Gender	Non executives	Executives	Total
Men	11 568 (57.20%)	8 656 (42.80%)	20 224 (91.02%)
Women	1 457 (73.03%)	538 (26.97%)	1 995 (8.98%)
Total	13 025 (58.62%)	9 194 (41.38%)	22 219 (100%)

Executive and non-executive pay are very different



But women do not lag behind in terms of human capital or network opportunities

- Men and women are similar in terms of education.
- Women are roughly 2 years old younger than men and have roughly 2 years less of seniority. However, their experience in the position is similar to men's.
- Women have a slightly higher number of employment links, compared to men (238 employments links on average for women, compared to 197 for men). ▸ Cola industry
- There is no significant gender difference in job mobility.
- But women work for larger firms (17% more employees, 18% more market capitalization).
- They also work in larger board and top management teams (43% more compared to men).

4 types of results

- Impact of networks by gender for executives
- Are non-executives different?
- What features of networks matter?
- What are the mechanisms?

Basic specification

$$
\begin{aligned}
ln(salary_i) &= \alpha_1 + \alpha_2 ln(\widehat{connections}_i) \\
&+ \alpha_3 female_i + \alpha_4 female_i * ln(\widehat{connections}_i) \\
&+ \alpha_5 human\_capital_i + \epsilon_i
\end{aligned} \tag{1}
$$

$$
ln(connections_i) = \beta_1 + \beta_2 ln(lagged\_connections_i) + \eta_i \tag{2}
$$

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&+ \alpha_5 human\_capital_i + \epsilon_i \qquad (1)
\end{aligned}
$$

$$
ln(connections_i) = \beta_1 + \beta_2 ln(lagged\_connections_i) + \eta_i \qquad (2)
$$

Networks and salary, executives 2008 (IV estimation)

	Salary (2008)	Salary (2008)	Salary (2008)
Ln connections (2008)	0.156***		0.165***
	(0.0111)		(0.0114)
Ln placebo connections (2008)		0.00291	
		(0.00565)	
Female*ln connections (2008)			-0.127**
			(0.0391)
Constant	31.98***	35.46***	31.68***
	(3.516)	(3.524)	(3.516)
Female	-0.373***	-0.337***	0.191
	(0.0409)	(0.0410)	(0.179)
Controls	Yes	Yes	Yes
Observations	10737	10737	10737

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Pooled regressions of salary for executives, IV estimation

	I	II	III
Ln connections	0.184***		
	(0.00778)		
Female*ln connections	-0.107***		
	(0.0289)		
Ln weighted connections		0.334***	
		(0.00947)	
Female*ln weighted connections		-0.128***	
		(0.0376)	
Ln placebo connections			0.0255***
			(0.00406)
Female*ln placebo connections			-0.0612***
			(0.0158)
Female	0.133	0.351	-0.0994
	(0.125)	(0.202)	(0.0550)
Constant	99.59***	91.76***	89.01***
	(5.994)	(5.776)	(5.999)
Controls	Yes	Yes	Yes
Observations	66213	66212	66213

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Networks and salary for executives, several years (IV estimation)

	Salary 2005	Salary 2006	Salary 2007	Salary 2008	Salary 2009	Salary 2010	Salary 2011
Ln connections	0.103***	0.129***	0.152***	0.165***	0.176***	0.284***	0.324***
	(0.0116)	(0.0113)	(0.0113)	(0.0114)	(0.0112)	(0.0127)	(0.0134)
Female*	-0.232***	-0.0853*	-0.114**	-0.127**	-0.0525	-0.0795	-0.101*
ln connections	(0.0426)	(0.0416)	(0.0402)	(0.0391)	(0.0383)	(0.0417)	(0.0430)
Female	0.632***	0.129	0.169	0.191	-0.133	0.0466	0.0155
	(0.184)	(0.181)	(0.179)	(0.179)	(0.173)	(0.195)	(0.204)
Constant	34.99***	30.91***	29.09***	31.68***	31.13***	47.50***	54.59***
	(3.560)	(3.428)	(3.458)	(3.516)	(3.351)	(4.357)	(4.855)
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	9925	10178	10630	10737	11195	7403	6145

Placebo networks and salary for executives, several years (IV estimation)

	2005	2006	2007	2008	2009	2010
Ln placebo connections	0.0257***	0.0221***	0.0109	0.00817	0.00878	0.0586***
	(0.00600)	(0.00582)	(0.00572)	(0.00584)	(0.00575)	(0.00732)
Female*ln placebo connections	-0.101***	-0.0468*	-0.0712***	-0.0736***	-0.0420*	-0.0412
	(0.0225)	(0.0217)	(0.0208)	(0.0204)	(0.0202)	(0.0247)
Female	-0.00872	-0.0684	-0.0694	-0.0869	-0.193*	-0.114
	(0.0836)	(0.0806)	(0.0794)	(0.0806)	(0.0788)	(0.102)
Constant	35.75***	32.14***	31.73***	36.88***	35.96***	53.97***
	(3.564)	(3.434)	(3.463)	(3.523)	(3.365)	(4.445)
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Observations	9925	10178	10630	10737	11195	7403

Standard errors in parentheses
IV estimation with lagged values of placebo connections as excluded instruments
Controls include age, age squared, degree, degree field
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

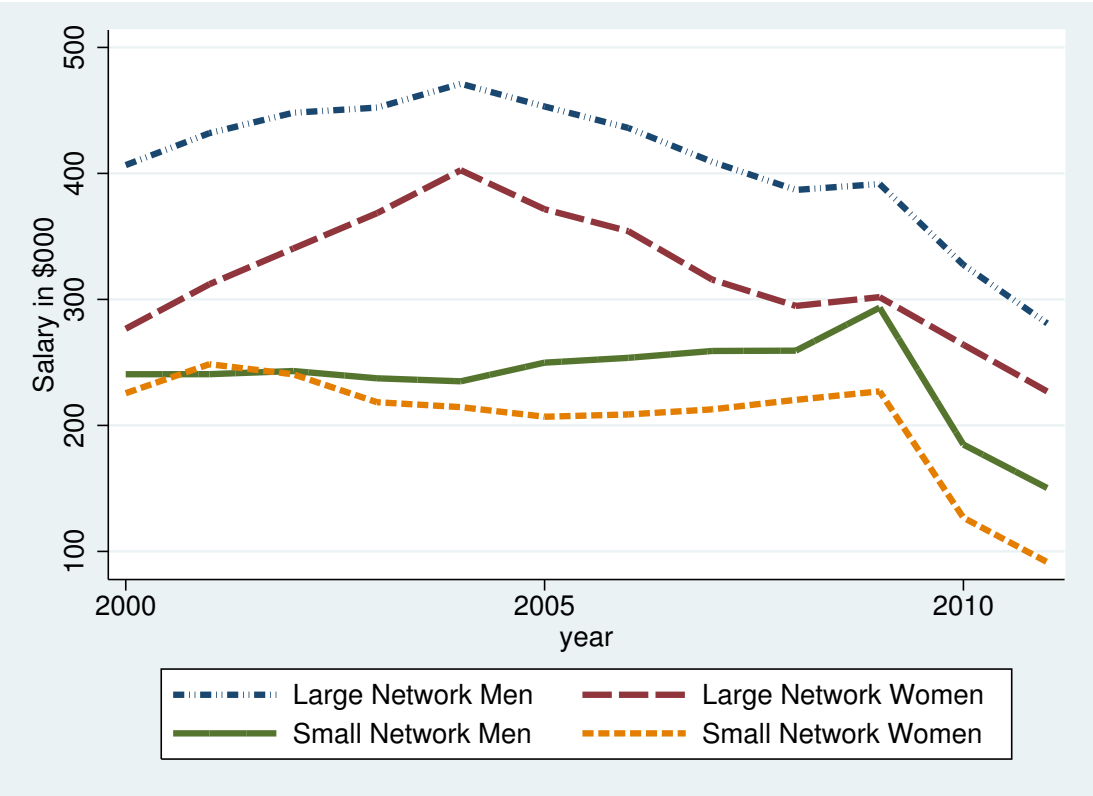
Results are stronger using non-salary measures of compensation

	Total Compensation (2008)	Total Wealth (2008)
Ln connections (2008)	0.399***	0.453***
	(0.0170)	(0.0245)
Female*ln connections (2008)	-0.188**	-0.234**
	(0.0580)	(0.0828)
Female	0.285	0.300
	(0.265)	(0.375)
Constant	63.98***	-2.284
	(5.193)	(7.475)
Controls	Yes	Yes
Observations	10928	10552

Are non-executives different? YES!

	Salary (2008)	Total Compensation (2008)	Total Wealth (2008)
Ln connections (2008)	0.359***	0.464***	0.383***
	(0.00930)	(0.0110)	(0.0233)
Female*ln connections (2008)	0.0606*	0.0938**	0.102
	(0.0260)	(0.0309)	(0.0651)
Female	-0.293*	-0.409**	-0.677*
	(0.124)	(0.147)	(0.313)
Constant	10.02***	7.486*	-45.83***
	(2.487)	(2.982)	(6.914)
Controls	Yes	Yes	Yes
Observations	11482	11970	10365

Networks and salaries over time for executives, by gender



Networks and wealth over time for executives, by gender

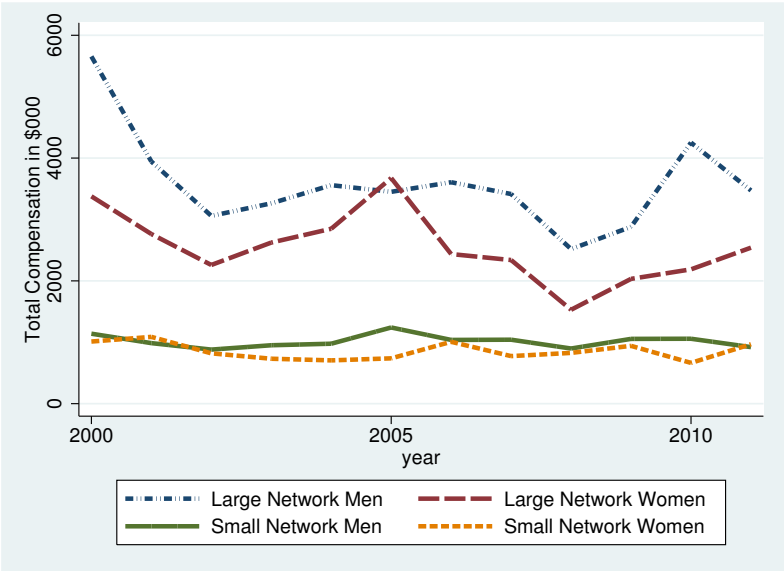


Figure : Total compensation

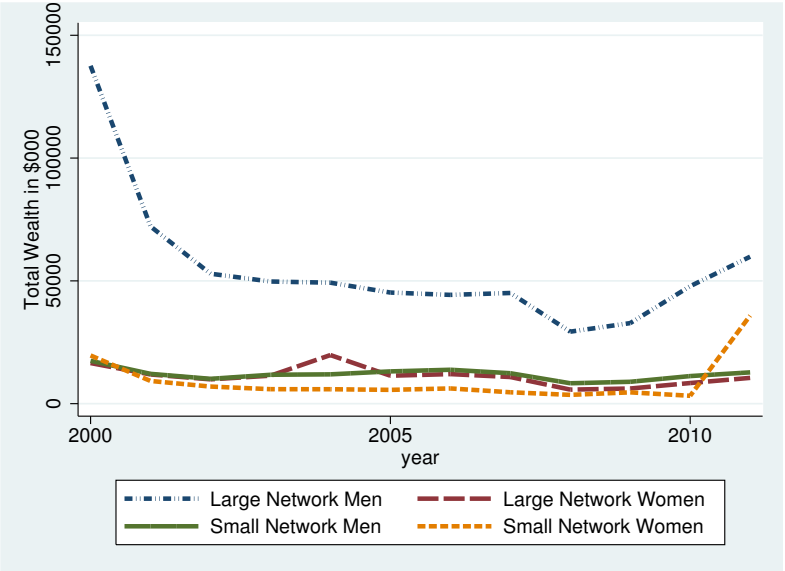


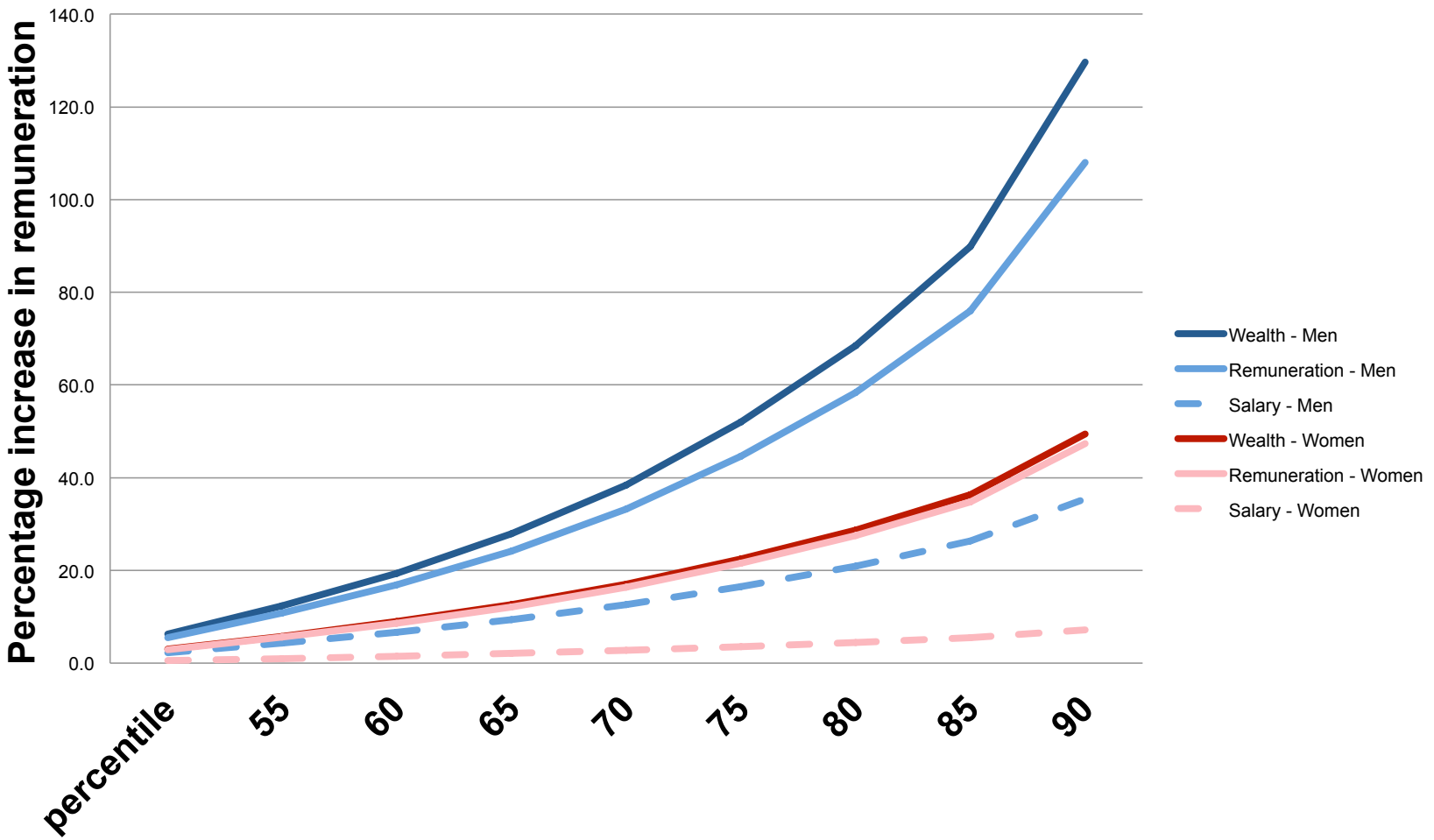
Figure : Total wealth

Summary: a comparison of the effects of placebo, real and weighted connections (all years)

Effect of 10 per cent increase in:	Total Salary (men)	Total Salary (women)	Total Remuneration (men)	Total Remuneration (men)
Placebo Connections	0.2%	-0.4%	1.0%	0.03%
Real Connections	1.8%	0.7%	4.4%	2.9%
Weighted Connections	3.3%	2.0%	7.0%	5.2%

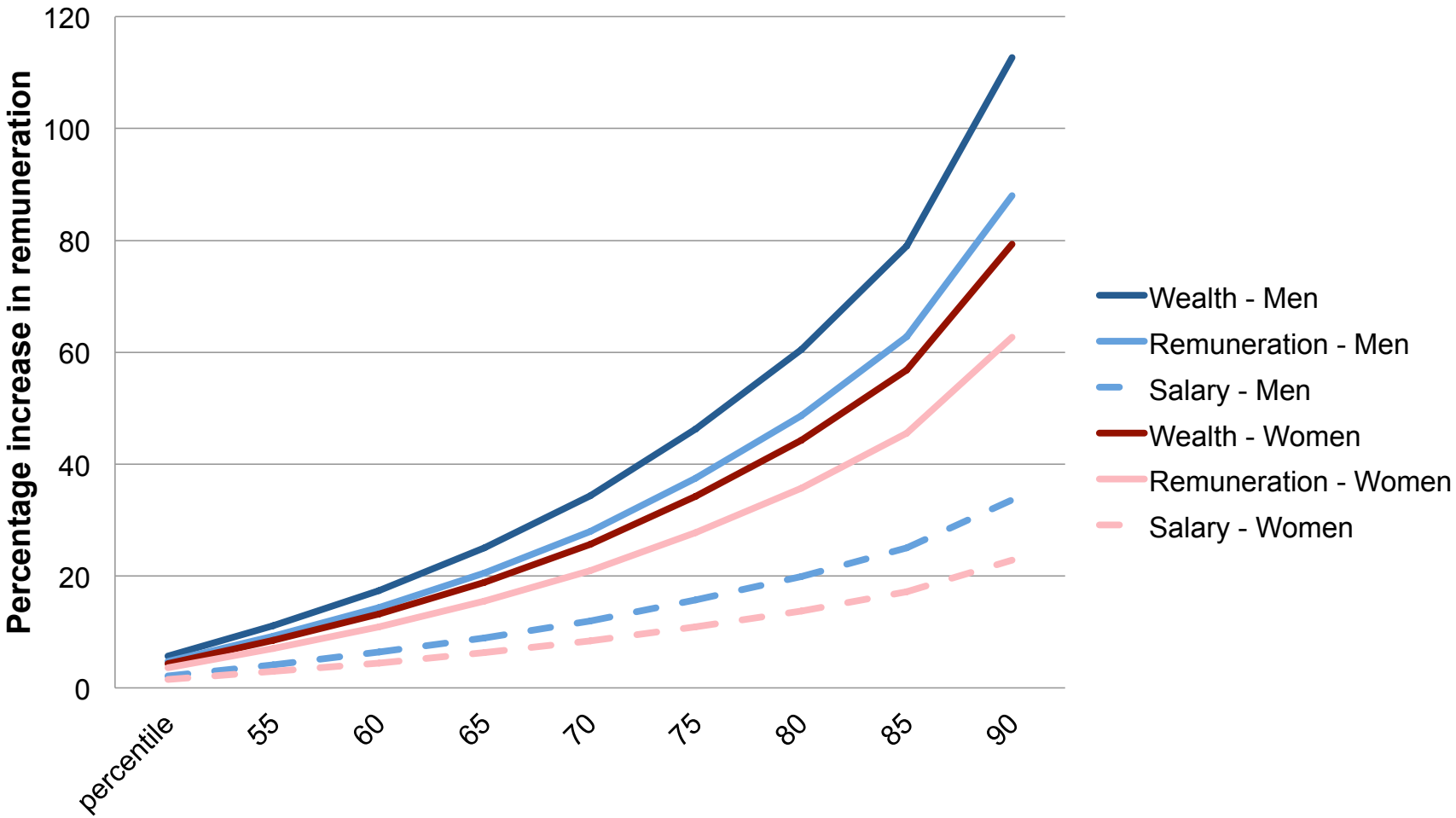
How big are these effects? (I)

Increase in remuneration implied by increases in connections above the median, 2008 estimates only; no adjustment for placebo



How big are these effects? (II)

Increase in remuneration implied by increases in connections above the median, All-year estimates; adjustment for placebo



Is this driven by mobility and/or board-TMT size? NO!

	Salary (2008)	Salary (2008)	Salary (2008)
Ln connections (2008)	0.262***	0.153***	0.258***
	(0.0149)	(0.0123)	(0.0166)
Female*ln connections (2008)	-0.123**	-0.126**	-0.123**
	(0.0384)	(0.0391)	(0.0384)
Ln nb of moves (2008)	-0.336***		-0.330***
	(0.0335)		(0.0348)
Ln avg board size (2008)		0.103**	0.0155
		(0.0345)	(0.0352)
Female	0.168	0.186	0.169
	(0.175)	(0.178)	(0.175)
Constant	27.99***	31.99***	28.95***
	(3.468)	(3.524)	(3.474)
Controls	Yes	Yes	Yes
Observations	10737	10737	10737

Effect of network composition and structure on salary

	Salary (2008)	Salary (2008)	Salary (2008)
Ln connections (2008)	0.152***	0.155***	0.142***
	(0.0116)	(0.0116)	(0.0117)
Female*ln connections (2008)	-0.132***	-0.124**	-0.128**
	(0.0394)	(0.0395)	(0.0397)
Sex Ratio (2008)	1.087***		1.099***
	(0.161)		(0.161)
Female*Sex Ratio (2008)	0.905		0.860
	(0.531)		(0.531)
Closeness (2008)		3384.2***	3380.8***
		(644.4)	(642.5)
Female*closeness (2008)		2993.1	3319.3
		(4367.3)	(4349.8)
Female	0.0419	-0.846	-1.104
	(0.186)	(1.480)	(1.473)
Constant	31.95***	31.57***	30.21***
	(3.506)	(3.523)	(3.513)
Controls	Yes	Yes	Yes
Observations	10737	10737	10737

What are the mechanisms?

- Is it having more women in your network or working for a female friendly firm (FFF) that matters?
- We can define FFF in two ways:
  - FFF board: measured by % of women on board
  - FFF TMT: measured by % of women in top management team (TMT)

Table : FFF measures by gender (means and standard deviations)

	FFF board	**FFF TMT**
Men	0.108 (0.092)	0.124 (0.107)
Women	0.177 (0.105)	0.251 (0.111)

FFFs: A paradox - they help men!

What we find:

		FFF board	FFF TMT
Men	Do networks help recruitment into FFFs?	Yes (strongly)	No
	Do FFFs boost salary?	Yes	Yes
Women	Do networks help recruitment into FFFs?	Yes (slightly)	No
	Do FFFs boost salary?	No	Yes

How to explain this?

- Female-friendly boards
  - Are using networks for recruitment
  - But are not associated with better remuneration for women
  - This is consistent with the “window dressing” theory of non-executive appointments.
- Female-friendly top management teams
  - Are not using networks for recruitment
  - Are associated with better remuneration for BOTH women and men
  - Maybe both phenomena are a by-product of better managed firms
  - Work of Bloom et al (2011) provides some corroboration

Discussion

- Questions of interpretation
  - Women flying “beneath the radar” of executive recruiters
  - Is it the way they fly?
  - Or the way the radar is calibrated?
  - Or a story of couple dynamics?
- Further work
  - Work on conspicuousness using difference in name frequencies
  - Experimental elicitation of gender differences in preferences for social contacts
  - Work on the impact of network opportunities on board appointments
  - Testing for the impact of network recruitment on firm performance

Conclusion

- It seems that employment links matter for the remuneration of top executives and board members.
- The effect of links is very different for executives and non-executives:
  - for non-executives, the impact of links is large and there is no gender difference;
  - for executives, the effect of links for women is around half or less of that for men.
- It seems that having more women in their network helps women.
- Women's success is helped by firms with female friendly top management teams.
- But their networks don't particularly help them to be recruited by such firms!

Table : Human capital characteristics by gender and executive status for 2008

	Men			Women		
	Mean	Std.Dev.	N	Mean	Std.Dev.	N
Executives						
Age	53.42	7.45	8656	50.85	6.43	538
Number of degrees	1.98	0.87	7028	2.05	0.87	443
Degree level: BA (percentage)	22.26%	-	8656	25.65%	-	538
Degree level: MA (percentage)	30.34%	-	8656	28.07%	-	538
Degree level: PhD (percentage)	15.92%	-	8656	17.84%	-	538
Degree speciality: Science (percentage)	1.41%	-	8656	0.56%	-	538
Degree speciality: Social science (percentage)	7.69%	-	8656	14.13%	-	538
Degree speciality: Business (percentage)	22.37%	-	8656	21.75%	-	538
Degree speciality: Finance (percentage)	9.76%	-	8656	7.62%	-	538
Non executives						
Age	62.04	8.14	11568	56.90	7.86	1457
Number of degrees	2.14	1.02	9514	2.35	1.09	1205
Degree level: BA (percentage)	22.28%	-	11568	18.12%	-	1457
Degree level: MA (percentage)	30.39%	-	11568	35.90%	-	1457
Degree level: PhD (percentage)	21.84%	-	11568	23.61%	-	1457
Degree speciality: Science (percentage)	1.77%	-	11568	1.24%	-	1457
Degree speciality: Social science (percentage)	8.85%	-	11568	10.71%	-	1457
Degree speciality: Business (percentage)	20.69%	-	11568	21.83%	-	1457
Degree speciality: Finance (percentage)	5.42%	-	11568	3.16%	-	1457

Table : Network characteristics by gender and executive status for 2008

	Men			Women		
	Mean	Std.Dev.	N	Mean	Std.Dev.	N
Executives						
Number of connections	104.7	148.1	8656	128.8	173.8	538
Number of colleagues	49.6	50.9	8656	53.0	54.1	538
Mean overlap	3.21	1.18	8656	3.04	0.93	538
Mean oldness	4.88	3.25	8656	4.92	3.08	538
Weighted connections	278.4	268.7	8656	299.8	304.8	538
Sex ratio	0.11	0.074	8656	0.15	0.090	538
Closeness*	0.00034	0.000025	8656	0.00034	0.000021	538
Betweenness**	0.000025	0.000073	8656	0.000028	0.000071	538
Eigenvector***	0.0058	0.059	8656	0.0065	0.059	538
Non executives						
Number of connections	150.0	184.7	11568	184.7	214.2	1457
Number of colleagues	62.7	61.3	11568	77.4	69.3	1457
Mean overlap	3.43	1.07	11568	3.31	1.01	1457
Mean oldness	4.64	3.77	11568	4.18	3.37	1457
Weighted connections	352.3	338.7	11568	414.3	393.1	1457
Sex ratio	0.11	0.067	11568	0.14	0.069	1457
Closeness*	0.00034	0.000017	11568	0.00034	0.000013	1457
Betweenness**	0.000071	0.00015	11568	0.000082	0.00017	1457
Eigenvector***	0.0077	0.065	11568	0.0097	0.069	1457

*Closeness centrality is the inverse of the average distance between and individual and all other individuals in the network.
**Betweenness centrality captures how important an individual is in reducing the distance between all pairs of other individuals.
***Eigenvector centrality is a weighted sum of the direct links an individual has, with the weights being the importance of the individuals in the network.

Table : Job characteristics by gender and executive status for 2008

	Men				Women			
	Median	Mean	Std.Dev.	N	Median	Mean	Std.Dev.	N
Executives								
Total salary*	319.92	394.24	302.01	8656	296.73	353.19	250.83	538
Total compensation*	942.17	2254.96	6003.07	8656	845.39	1795.28	3443.25	538
Total wealth*	2627.35	21658.66	448547.25	8265	2064.29	6461.74	16048.70	511
Years in company	10.00	12.83	9.39	8478	9.70	11.27	7.64	522
Years in role	4.10	5.31	5.17	8478	3.65	4.55	4.08	522
Years on board	7.20	9.24	8.20	5114	6.70	7.76	7.14	203
Number of moves**	2.00	2.29	1.87	8656	2.00	2.25	1.73	538
Non executives								
Total salary*	49.59	75.18	123.57	11568	51.99	69.89	62.52	1457
Total compensation*	83.18	145.01	349.92	11568	90.38	140.54	179.19	1457
Total wealth*	244.74	6031.72	191964.98	9585	213.55	4407.20	61027.50	1249
Years in company	7.40	9.46	7.76	11476	6.00	7.88	6.41	1448
Years in role	5.50	6.99	6.08	11476	5.50	6.86	5.51	1448
Years on board	7.30	9.04	7.07	11476	5.90	7.60	5.85	1448
Number of moves**	3.00	3.65	2.82	11568	3.00	3.39	2.61	1457

*in thousands USD
**from beginning of career until 2008

Networks and FFFs in 2008 (IV estimation)

	Salary (2008)	Salary (2008)
Ln connections (2008)	0.147***	0.166***
	(0.0123)	(0.0116)
Female*ln connections (2008)	-0.108**	-0.00530
	(0.0398)	(0.0580)
Female friendly board (2008)	0.863***	
	(0.188)	
Female*female friendly board (2008)	-0.576	
	(0.684)	
Female friendly TMT (2008)		1.535**
		(0.547)
Female*female friendly TMT (2008)		1.756
		(1.241)
Female	0.136	-0.648
	(0.205)	(0.346)
Constant	30.80***	32.91***
	(3.553)	(3.566)
Controls	Yes	Yes
Observations	10499	10492

Networks and FFFs in 2008 (first stage regressions - IV estimation)

	Female friendly board	Female friendly TMT
Ln connections (2004)	0.006***	-0.001
	(0.001)	(0.001)
Female*ln connections (2004)	-0.003	-0.022***
	(0.003)	(0.002)
Female friendly board (2004)	0.629***	
	(0.010)	
Female*female friendly board (2004)	-0.088**	
	(0.030)	
Female friendly TMT (2004)		0.327***
		(0.009)
Female*female friendly TMT (2004)		0.011
		(0.020)
Constant	0.796**	-0.309
	(0.286)	(0.173)
Observations	10 499	10 492

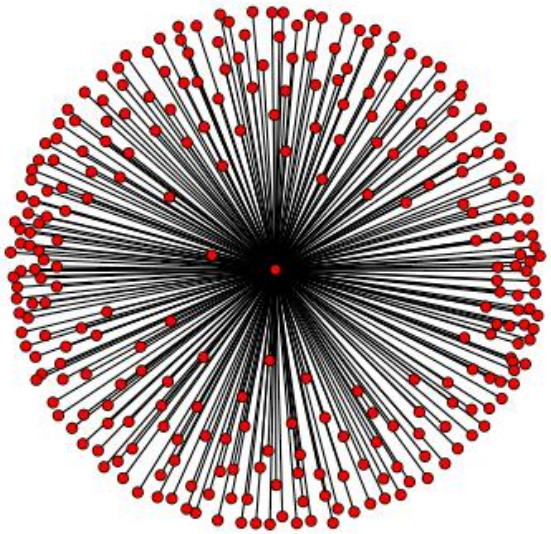
CEOs of Coca-Cola and Pepsi-Cola

Back

CEOs of Coca-Cola and Pepsi-Cola

Back

CEOs of Coca-Cola and Pepsi-Cola



CEOs of Coca-Cola and Pepsi-Cola