Bridging the Gap: Financial Support, Careers, and Gender Equity

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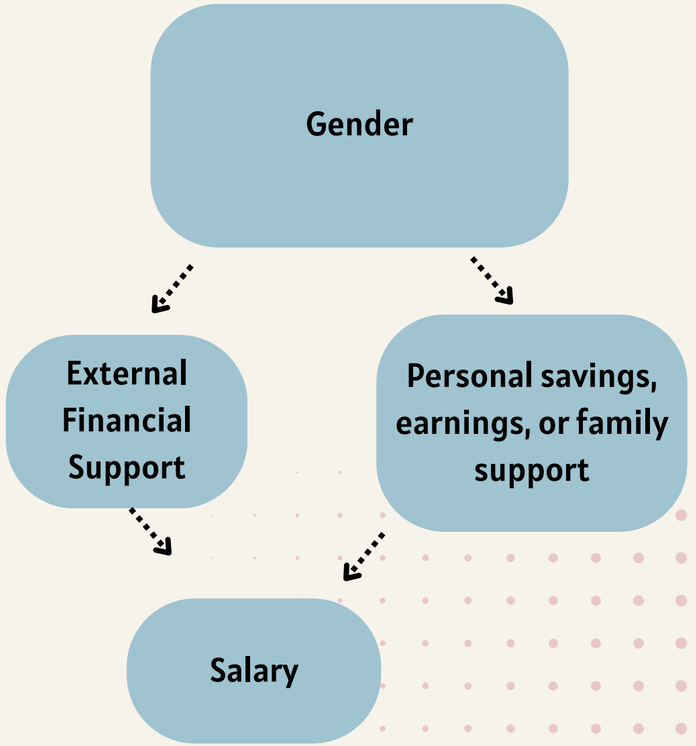
Computational Social Science IB

BACKGROUND

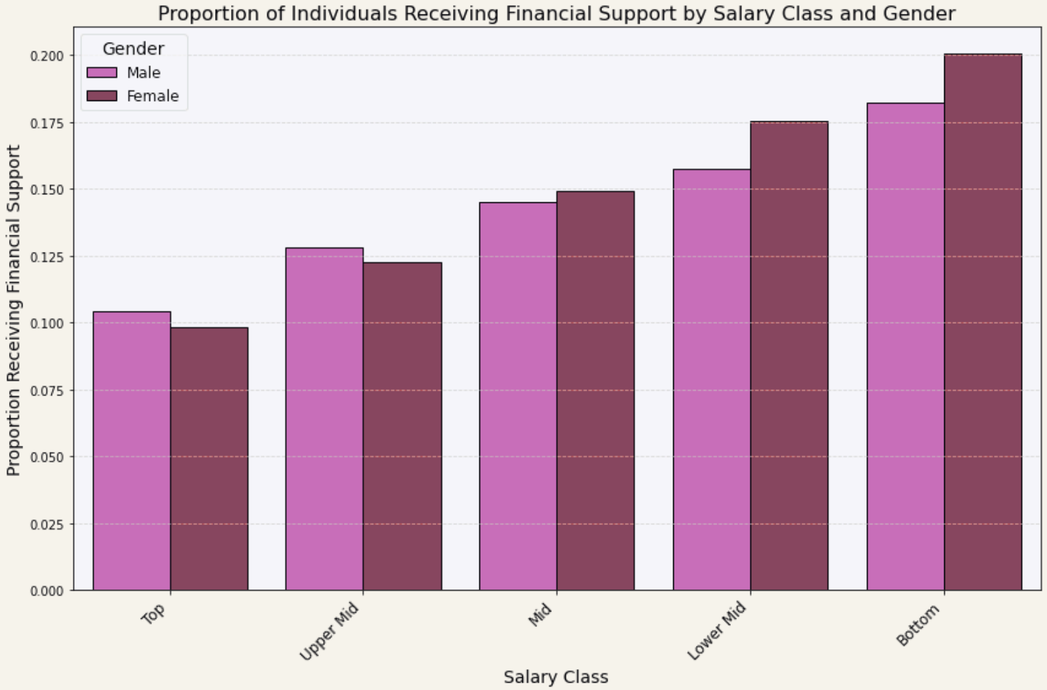
- Research has shown that receiving financial aid may encourage graduate school enrollment (Yang, 2011).
- Higher educational attainment is associated- to varying degrees for men versus women- with higher pay.
- Others like Purohit et al. (2020) have found that career choice is dependent of a combination of factors; their financial and economic condition while making their job choice is a significant one although it is more important for men than women.
- Thus, we want to know: To what extent does financial support for education mitigate gender differences in salary, and what types of support benefit women versus men?"

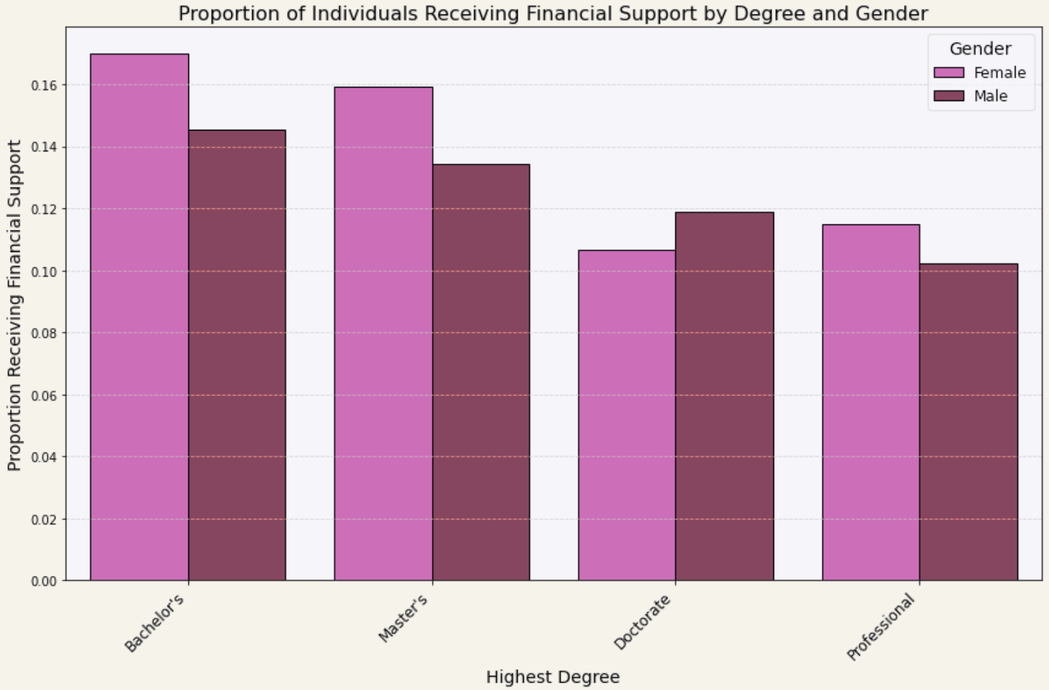
INTRODUCTION

- DATA: NSCG
- Primary Hypotheses
  - H_0: Financial support from external sources does not significantly predict salary.
  - H_1: Financial support from external sources significantly predicts salary.
  -
- Secondary Hypotheses
  - H_0: The effect of gender on salary is not significantly explained by the type of financial support received.
  - H_1: The effect of gender on salary is significantly explained by the type of financial support received.



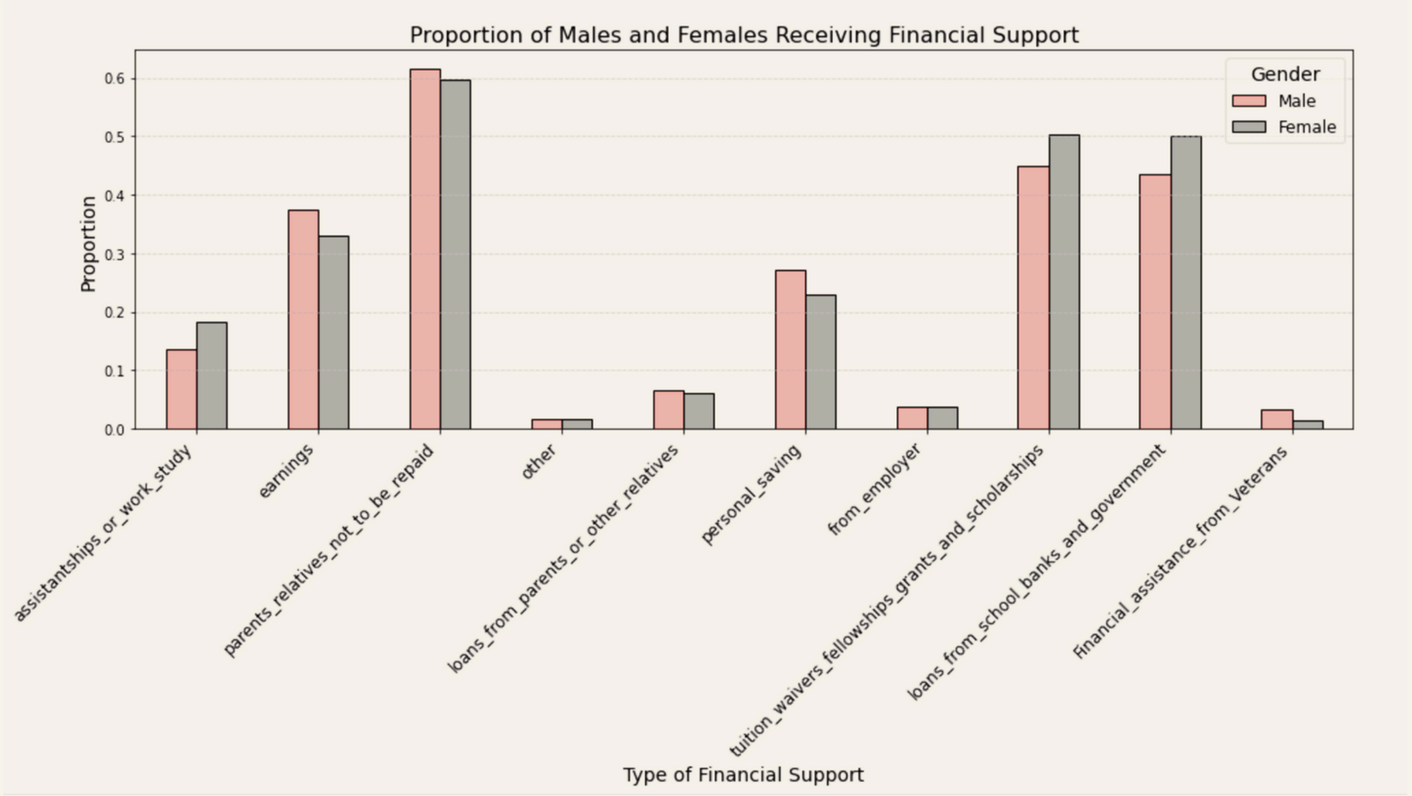
DESCRIPTIVE STATS





DESCRIPTIVE STATS

- Men are more likely to rely on:
  - Financial assistance from parents/relatives not to be repaid.
  - Personal savings.
- Women are more likely to rely on:
  - Loans from schools, banks, or government.
- Highlights potential gender disparities in access to and reliance on financial resources.



METHODS OVERVIEW

- **Regression Analysis**
  We used OLS to estimate the effects of gender, financial support types, and controls like years at the job and race on log-transformed salary.

- **Mediation**
  We analyzed the indirect effects of gender on salary through various types of financial support, using interaction terms. We checked for multicollinearity using VIF values, and residuals plot to check for heteroskedasticity; we use WLS regression to ensure robustness.

RESULTS: BASIC REGRESSION

OLS Regression Results

Dep. Variable:	external_financial_support	R-squared:	0.001
Model:	OLS	Adj. R-squared:	0.001
Method:	Least Squares	F-statistic:	51.35
Date:	Mon, 16 Dec 2024	Prob (F-statistic):	7.82e-13
Time:	17:10:28	Log-Likelihood:	-22869.
No. Observations:	60087	AIC:	4.574e+04
Df Residuals:	60085	BIC:	4.576e+04
Df Model:	1		
Covariance Type:	nonrobust		

	coef	std err	t	P>|t|	[0.025	0.975]
const	0.1383	0.002	73.138	0.000	0.135	0.142
gender	0.0210	0.003	7.166	0.000	0.015	0.027

Omnibus:	20338.802	Durbin-Watson:	1.985
Prob(Omnibus):	0.000	Jarque-Bera (JB):	49363.378
Skew:	1.990	Prob(JB):	0.00
Kurtosis:	4.968	Cond. No.	2.47

Notes:
[1] Standard Errors assume that the covariance matrix of the errors is correctly specified.

OLS Regression Results

Dep. Variable:	ln_salary	R-squared:	0.101
Model:	OLS	Adj. R-squared:	0.100
Method:	Least Squares	F-statistic:	373.3
Date:	Mon, 16 Dec 2024	Prob (F-statistic):	0.00
Time:	17:10:59	Log-Likelihood:	-45816.
No. Observations:	60087	AIC:	9.167e+04
Df Residuals:	60068	BIC:	9.184e+04
Df Model:	18		
Covariance Type:	nonrobust		

	coef	std err	t	P>|t|	[0.025	0.975]
const	11.5338	0.007	1682.026	0.000	11.520	11.547
assistantships_or_work_study	0.0345	0.006	5.485	0.000	0.022	0.047
earnings	0.0389	0.005	7.757	0.000	0.029	0.049
parents_relatives_not_to_be_repaid	0.0550	0.005	11.929	0.000	0.046	0.064
other	0.0124	0.017	0.751	0.453	-0.020	0.045
loans_from_parents_or_other_relatives	-0.0320	0.009	-3.666	0.000	-0.049	-0.015
personal_saving	-0.0424	0.005	-8.022	0.000	-0.053	-0.032
from_employer	0.0577	0.011	5.105	0.000	0.036	0.080
tuition_waivers_fellowships_grants_and_scholarships	-0.0167	0.005	-3.640	0.000	-0.026	-0.008
loans_from_school_banks_and_government	-0.0763	0.005	-16.228	0.000	-0.086	-0.067
Financial_assistance_from_Veterans	-0.0226	0.014	-1.661	0.097	-0.049	0.004
gender	-0.2273	0.004	-52.208	0.000	-0.236	-0.219
years_at_job	0.0084	0.000	28.162	0.000	0.008	0.009
racethm_Black	-0.2522	0.010	-26.270	0.000	-0.271	-0.233
racethm_Hispanic	-0.2337	0.008	-29.265	0.000	-0.249	-0.218
racethm_Indian Native	-0.3387	0.037	-9.137	0.000	-0.411	-0.266
racethm_Multiple Race	-0.1783	0.012	-14.585	0.000	-0.202	-0.154
racethm_Native Hawaiian	-0.2136	0.038	-5.551	0.000	-0.289	-0.138
racethm_White	-0.1097	0.006	-19.150	0.000	-0.121	-0.098

Omnibus:	1097.021	Durbin-Watson:	1.772
Prob(Omnibus):	0.000	Jarque-Bera (JB):	2227.900
Skew:	-0.064	Prob(JB):	0.00
Kurtosis:	3.935	Cond. No.	180.

- **Employer financial support is significantly positively associated with higher salaries, while all other external supports: tuition waivers, fellowships, grants, scholarships, and loans predict significantly lower salaries (p< 0.001).**
- **In contrast, personal sources of support—savings, earnings, and family/relatives—are significantly associated with higher salaries (p<0.001)**
- **These findings suggest deeper structural issues, as students from lower socioeconomic backgrounds are more likely to rely on need-based external aid, potentially impacting their long-term salary outcomes.**
- **Gender is a significant predictor of reliance on external financial support: women are significantly more likely than men to rely on sources such as employer funding, tuition waivers, scholarships, loans, and veterans' assistance (p<0.001) to finance their education.**

RESULTS: MEDIATION EFFECT

- Gender × Parents/Relatives Not to Be Repaid: financial support from parents or relatives significantly benefits women's salaries more than men's.
- Gender × Employer Support: financial support from employer is associated with higher salary benefits for women compared to men.
- Gender × Personal Savings: personal savings marginally benefit women's salaries more than men's.
- Thus, women benefit more from relying on personal financial sources rather than external sources like loans/grants/scholarships etc.

Weighted Least Squares Model Summary:
WLS Regression Results

Dep. Variable:	ln_salary	R-squared:	0.101
Model:	WLS	Adj. R-squared:	0.101
Method:	Least Squares	F-statistic:	241.0
Date:	Mon, 16 Dec 2024	Prob (F-statistic):	0.00
Time:	17:53:32	Log-Likelihood:	-45803.
No. Observations:	60087	AIC:	9.166e+04
Df Residuals:	60058	BIC:	9.192e+04
Df Model:	28		
Covariance Type:	nonrobust		

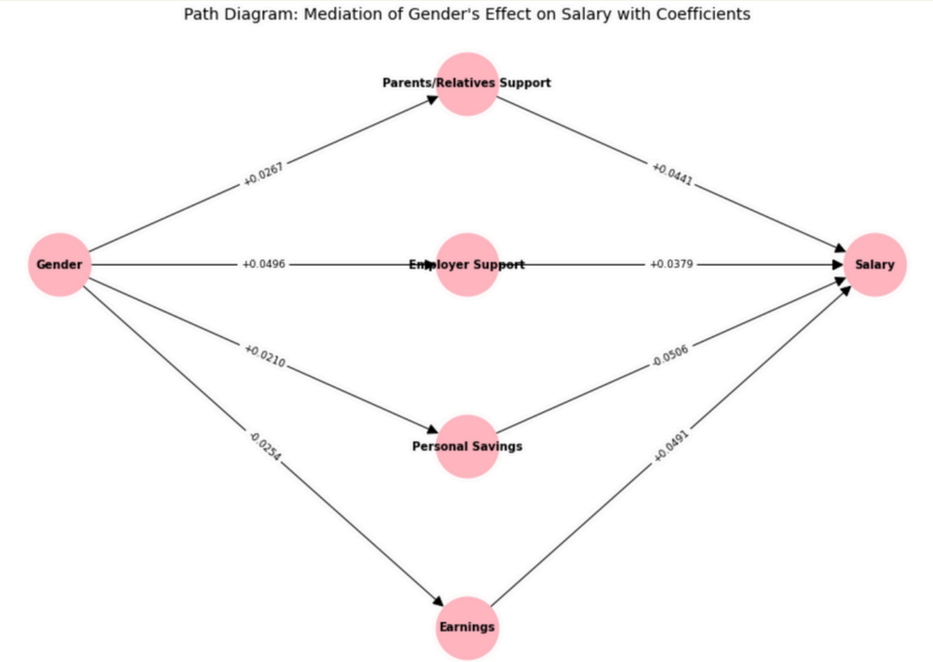
	coef	std err	t	P>|t|	[0.025	0.975]
const	11.5418	0.008	1481.364	0.000	11.527	11.557
assistantships_or_work_study	0.0272	0.009	3.146	0.002	0.010	0.044
earnings	0.0491	0.006	7.580	0.000	0.036	0.062
parents_relatives_not_to_be_repaid	0.0441	0.006	7.328	0.000	0.032	0.056
other	0.0327	0.022	1.498	0.134	-0.010	0.076
loans_from_parents_or_other_relatives	-0.0301	0.011	-2.676	0.007	-0.052	-0.008
personal_saving	-0.0506	0.007	-7.462	0.000	-0.064	-0.037
from_employer	0.0379	0.015	2.578	0.010	0.009	0.067
tuition_waivers_fellowships_grants_and_scholarships	-0.0164	0.006	-2.742	0.006	-0.028	-0.005
loans_from_school_banks_and_government	-0.0798	0.006	-13.127	0.000	-0.092	-0.068
Financial_assistance_from_Veterans	-0.0152	0.016	-0.963	0.335	-0.046	0.016
gender	-0.2469	0.010	-24.141	0.000	-0.267	-0.227
years_at_job	0.0084	0.000	28.102	0.000	0.008	0.009
gender_assistantships_or_work_study	0.0149	0.013	1.186	0.236	-0.010	0.040
gender_earnings	-0.0254	0.010	-2.511	0.012	-0.045	-0.006
gender_parents_relatives_not_to_be_repaid	0.0267	0.009	2.878	0.004	0.009	0.045
gender_other	-0.0481	0.033	-1.441	0.150	-0.114	0.017
gender_loans_from_parents_or_other_relatives	-0.0057	0.018	-0.319	0.749	-0.041	0.029
gender_personal_saving	0.0210	0.011	1.945	0.052	-0.000	0.042
gender_from_employer	0.0496	0.023	2.160	0.031	0.005	0.095
gender_tuition_waivers_fellowships_grants_and_scholarships	0.0002	0.009	0.018	0.986	-0.018	0.018
gender_loans_from_school_banks_and_government	0.0097	0.009	1.037	0.300	-0.009	0.028
gender_Financial_assistance_from_Veterans	-0.0368	0.031	-1.180	0.238	-0.098	0.024
racethm_Black	-0.2524	0.010	-26.251	0.000	-0.271	-0.234
racethm_Hispanic	-0.2337	0.008	-29.272	0.000	-0.249	-0.218
racethm_Indian Native	-0.3385	0.037	-9.130	0.000	-0.411	-0.266
racethm_Multiple Race	-0.1782	0.012	-14.583	0.000	-0.202	-0.154
racethm_Native Hawaiian	-0.2121	0.038	-5.514	0.000	-0.288	-0.137
racethm_White	-0.1102	0.006	-19.225	0.000	-0.121	-0.099

Omnibus:	1100.595	Durbin-Watson:	1.772
Prob(Omnibus):	0.000	Jarque-Bera (JB):	2239.124
Skew:	-0.063	Prob(JB):	0.00
Kurtosis:	3.937	Cond. No.	180.

RESULTS: MEDIATION EFFECT (CONTD.)

- Being a woman is associated with a 24.69% lower salary (log-transformed) compared to men, with mediators failing to substantially narrow this persistent disparity.
- Financial supports interact with gender in complex ways: parental/relative support (+0.0267, $p<0.01$) and employer support (+0.0496, $p<0.05$) benefit women more, while earnings (-0.0254, $p<0.05$) favor men. Personal savings show a marginally positive effect (+0.0210, $p=0.052$) for women.
- The model explains 10.1% of the variance in salaries ($R^2 = 0.101$) without mediators, with mediators failing to significantly increase explanatory power, reflecting gendered resource allocation patterns rather than reducing salary disparities.
- Financial supports highlight a dual effect: while some benefit women, others favor men, ultimately reinforcing existing salary disparities rather than closing the gender gap.

DISCUSSION & CONCLUSION



- This project analyzed the effects of financial support on salary outcomes, focusing on gender disparities and whether financial aid reduces the gender salary gap.
- External financial supports, such as tuition waivers, scholarships, and loans, were generally associated with lower salaries, except for employer support, which significantly predicted higher salaries.
- Internal financial supports, such as savings, earnings, and family contributions, were positively associated with higher salaries.
- Women were significantly more likely than men to rely on external financial support, reflecting gendered patterns in resource access.
- Significant interactions showed that employer support and parental/relative support benefited women more, while earnings favored men, suggesting that financial supports impact genders differently.
- While external supports improve women's salary outcomes, they do not close the gender salary gap, leading to rejection of the primary null hypothesis but failure to reject the secondary null. Structural inequities remain a major factor in persistent wage disparities.

THANK YOU!