Graduating During the Great Recession:

The Effect of Student Loan Debt on the Wages, Wage Growth, and Labor Force Status of Recent College Graduates

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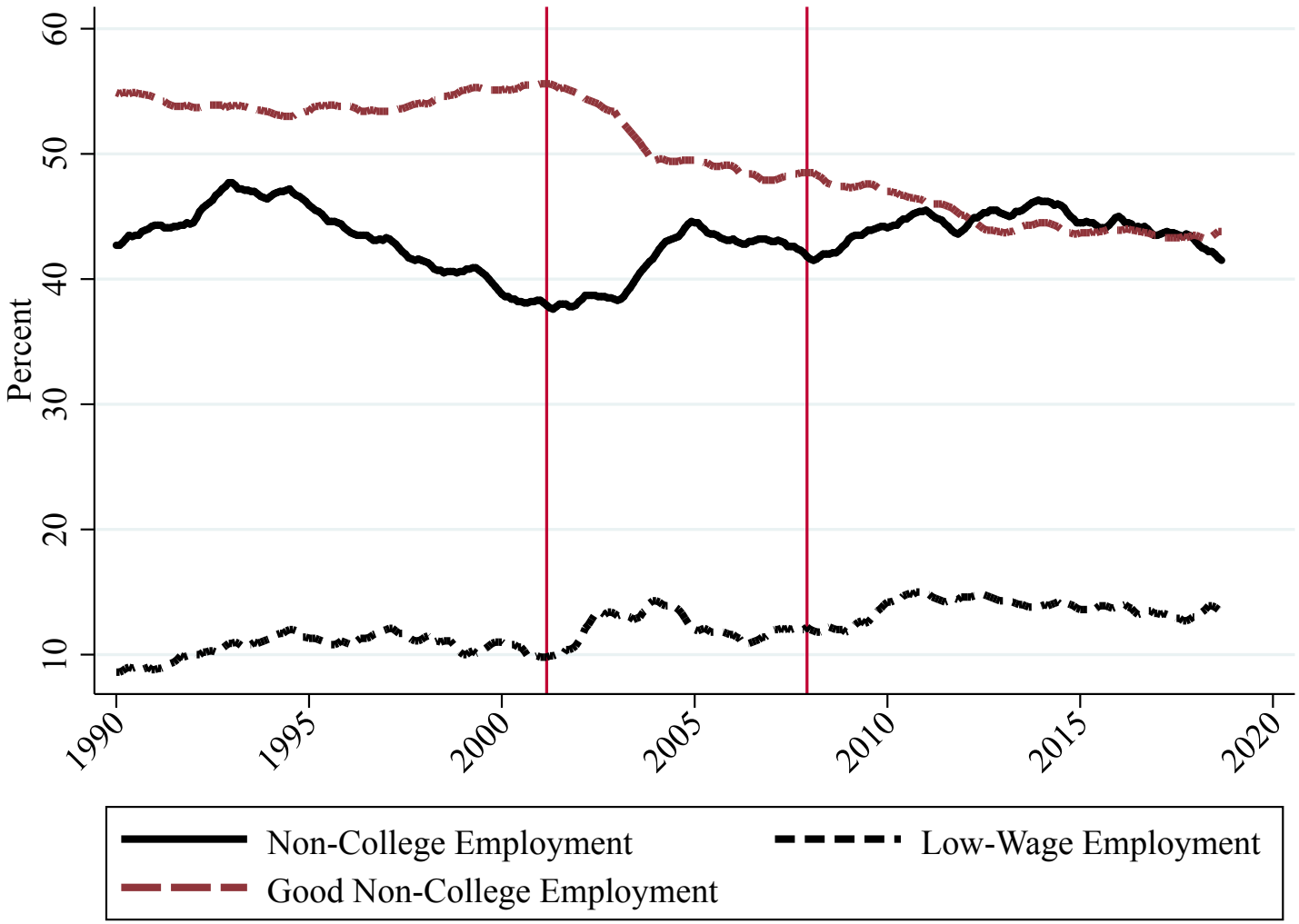
Figure: Underemployment Rate of Recent U.S. Bachelor's Degree Recipients



Source: Federal Reserve Bank of New York. Red lines indicate start of recessions.

Overview

Underemployment among recent graduates worsened during 2001 and 2008: **The "Barista Economy"?** (Vedder, Denhart, and Robe 2013)

No work has directly addressed the impact of student debt burden on labor market outcomes in a recession.

We address this gap using longitudinal data on graduates entering the labor market in 2008, with attention to heterogeneity by **gender and household structure**.

Student Debt in the Neoclassical Framework

Debt repayment given **short-run credit constraints** may change labor market choices.

Previous work has argued that indebted graduates...
(Minicozzi 2002, Rothstein and Rouse 2006)

1. Trade off amenities for higher wages
2. Choose occupations with higher wages but slower wage growth

An Alternative Approach

Can college graduates **feasibly** make these trade-offs during a recession?

- Variation in labor market prospects
  (Altonji, Kahn, and Speer 2016; Thomas and Zhang 2005)
- Cyclical downgrading (Oreopoulos, von Wachter, and Heisz 2012)

Graduates facing imminent debt repayment may instead...

- minimize **search effort**
- avoid **relocation costs**
- work multiple jobs **outside their major**

resulting in lower wages and wage growth.

Gender and Household Structure

Women are disproportionately affected by student debt. They...

- earn 57% of bachelor's degrees
- borrow 15% more per year than men
  (AAUW, 2017)
- have lower average wages

Men's and women's labor market choices also vary with household structure: **breadwinner ideology** and **secondary earner effects**

Data

2008/12 Baccalaureate and Beyond Longitudinal Study

- National Center for Education Statistics
- Representative U.S. sample of students who completed bachelor's degree requirements in 2007/08 academic year

Analytic sample excludes students enrolled in **graduate or professional school**.

About 50% of indebted graduates in the sample report that debt influenced their employment plans. ▸ Employment Plans

Empirical Strategy

Four sets of OLS regressions:

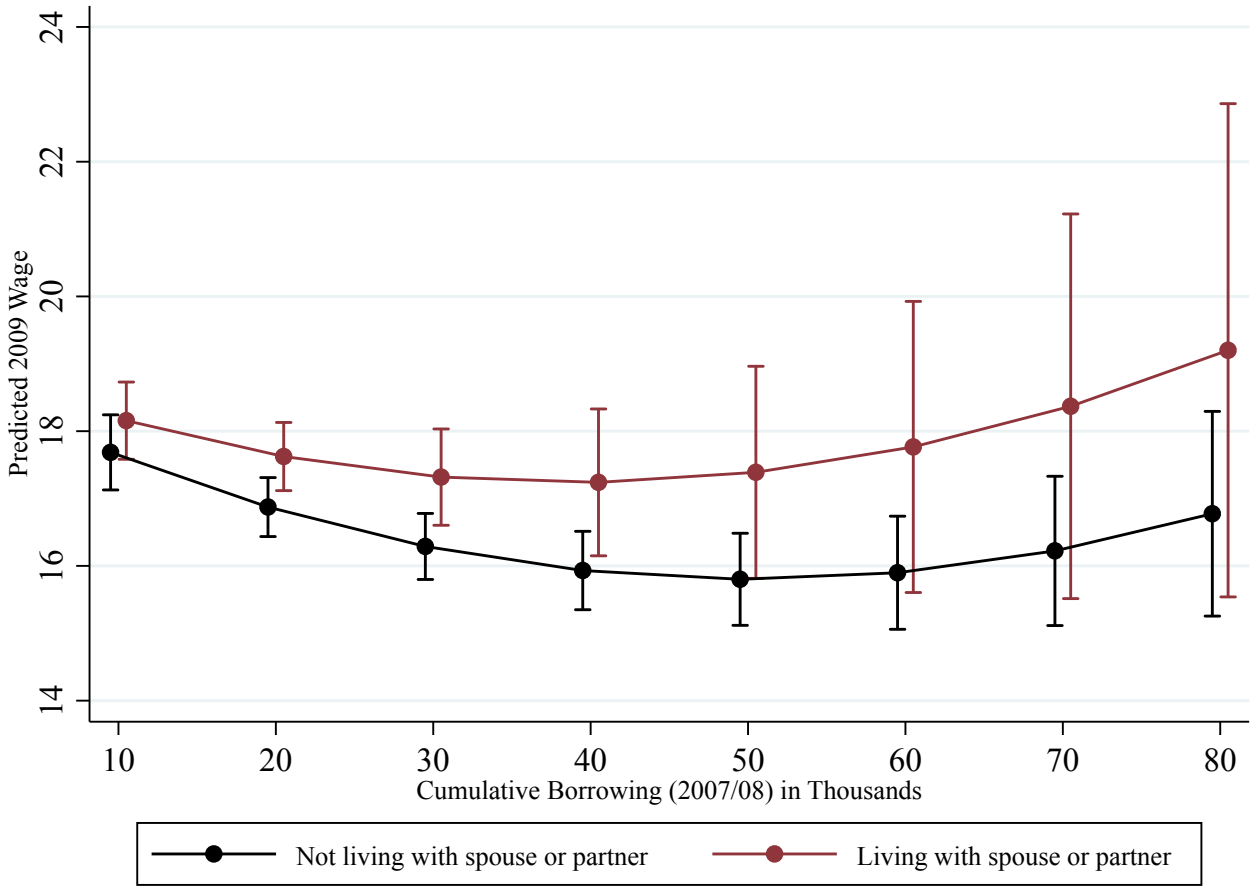
1. Wage (2009, natural log)
2. Wage Growth (2009 - 2012, percent)
3. Time Out of the Labor Force (2007/08 - 2009, percent)
4. Time Unemployed (2007/08 - 2009, percent)

Controls: demographics, household structure, education, employment characteristics, graduate school plans. ▸ Controls

We assume that the impact of debt may vary by gender, household structure, and initial wage.

Wage Results

Borrowing has a **negative** and **weakly quadratic** relationship with wages: \$40,000 of borrowing is associated with a 8.2% wage penalty

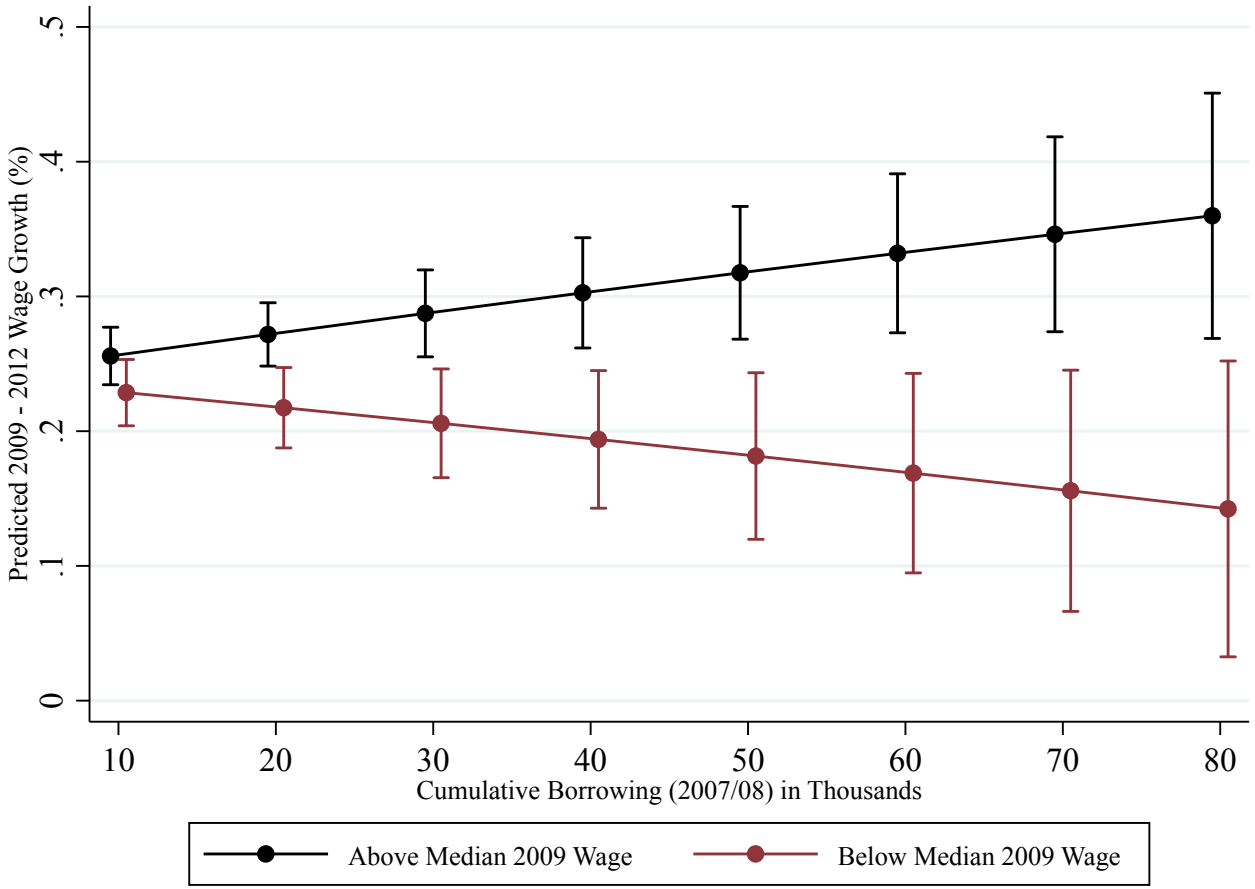


The penalty is slightly lessened for **married or cohabiting individuals**.

▸ Regression Results

Wage Growth Results

Borrowing has a significant **negative** relationship with wage growth for those with below median wages, partly offset by a "catching-up" effect.



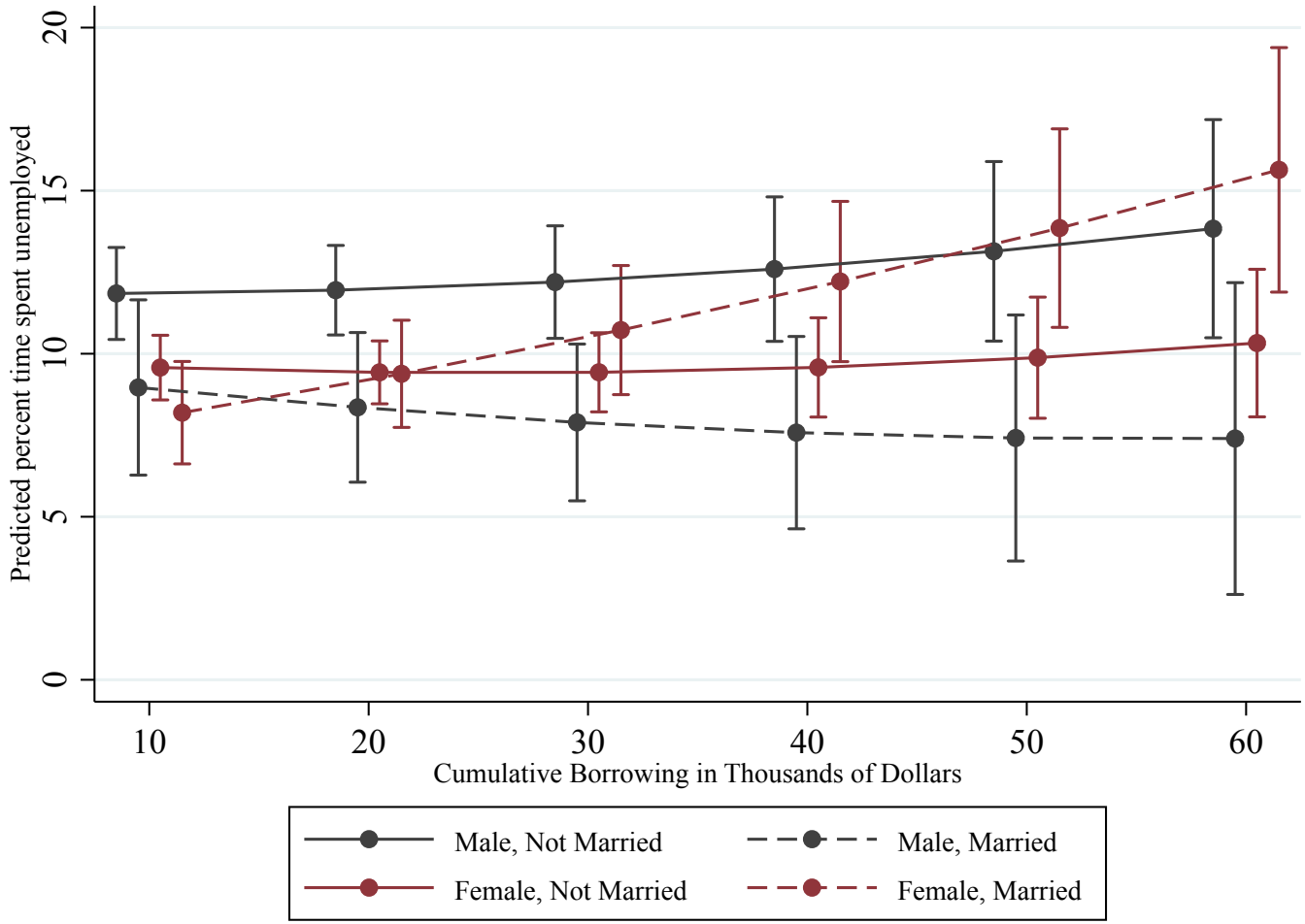
$40,000 of borrowing results in 5 pp net reduction in wage growth.

▸ Regression Results

Search Effort Results

Married women who borrowed maintain greater search effort (spend more time unemployed) than other individuals.

- This may explain the reduced wage penalty for M/C individuals.



▸ Unemployment Regressions ▸ Time OLF Regressions

Gender Differential Outcomes

Married/cohabiting men's greater wage penalty per dollar of borrowing does not result in a greater **overall** wage penalty on average.

	Non-Borrowing Wage Effect	Average Borrowing ($1000s)	Borrowing Wage Effect	**Average Total Wage Effect**
Single men	0.00%	14.464	-5.42%	**-5.42%**
M/C men	6.32%	16.683	-2.96%	**3.36%**
Single women	0.00%	17.106	-6.18%	**-6.18%**
M/C women	-1.54%	18.518	-3.12%	**-4.66%**

Reference Group: Single men with zero cumulative borrowing.

Women have **lower predicted wages** and are more likely to receive a **wage growth penalty** from borrowing. ▸ Predicted Wages ▸ Wage Growth Decomposition

Conclusions

Our results provide evidence of **adverse labor market** outcomes for bachelor's degree recipients graduating into a recession with debt.

- Contrasts with previous findings and neoclassical theory

We find evidence of differential impacts by gender and marital status.

- Possibility of backwards causality or selection bias (e.g., marriage market penalties of debt)

This work points to an mechanism for **rising income inequality.** Future work should investigate intersectional inequality (e.g., race and ethnicity).

References

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Table: Respondent perceptions of student debt's impact on employment

Did debt influence your employment plans?

	All	Women	Men
Yes	47.69%	50.36%	43.87%
n (rounded)	*7400*	*4340*	*3070*

How did debt influence your employment plans?

	All	Women	Men
Took less desirable job	39.63%	35.35%	46.66%
Took job outside major	37.63%	36.35%	39.72%
Worked more hours	33.67%	33.96%	33.20%
Other outcome	29.61%	28.85%	30.86%
Worked more than one job	25.73%	26.49%	24.48%
n (rounded)	*4120*	*2500*	*1620*

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Controls

	2009		2012	
Wage	$17.80	(8.696)	$23.17	(10.542)
Wage growth			45.10%	(97.016)
Cumulative borrowing (2007/08)	16.60	(15.825)	16.48	(14.965)
Labor market status variables				
Time Spent Out of Labor Force	7.64%	(14.881)		
Time Spent Unemployed	10.25%	(15.573)		
Demographic, family background, and household structure controls				
Age (2009)	26.960	(5.931)	27.112	(5.787)
Female	55.92%	(0.423)	53.75%	(0.411)
Family Income (2007/08)	74.998	(55.623)	73.364	(52.325)
Married	26.89%	(0.378)	43.83%	(0.409)
Living with spouse/partner	36.10%	(0.409)	54.49%	(0.411)
Number of dependents	0.285	(0.629)	0.449	(0.714)
White	81.06%	(0.334)	82.40%	(0.314)
Black or African-American	7.81%	(0.229)	6.90%	(0.209)
Asian	5.25%	(0.190)	4.99%	(0.179)
Other race	5.87%	(0.200)	5.72%	(0.191)
n (rounded)	7670		5230	

Controls

	2009		2012	
Immigrant status (2007/08)				
Foreign student with visa	0.66%	(0.069)	0.56%	(0.062)
Resident alien	2.00%	(0.119)	1.98%	(0.115)
Foreign born citizen	6.58%	(0.211)	6.42%	(0.202)
U.S. born citizen, foreign born parents	11.71%	(0.274)	11.01%	(0.258)
All other citizens	79.04%	(0.347)	80.03%	(0.330)
Educational controls				
Cumulative GPA (2007/08)	3.232	(0.412)	3.218	(0.403)
Private undergraduate institution	32.98%	(0.401)	32.37%	(0.386)
Selectivity of undergraduate institution (2007/08)				
Not public or private nonprofit 4-year	5.24%	(0.190)	5.20%	(0.183)
Very selective	27.16%	(0.379)	26.12%	(0.362)
Moderately selective	52.68%	(0.425)	54.36%	(0.411)
Minimally selective	10.89%	(0.265)	10.36%	(0.251)
Open admission	4.02%	(0.167)	3.96%	(0.161)
n (rounded)	7670		5230	

▸ Back

Controls

	2009		2012	
Plan to apply to graduate school in future (2007/08)				
No	14.15%	(0.297)	16.24%	(0.304)
Yes	45.97%	(0.425)	42.54%	(0.408)
Maybe	39.88%	(0.417)	41.21%	(0.406)
Employment controls				
Months employed	15.085	(4.266)	38.632	(16.067)
Full-time	75.26%	(0.368)	92.44%	(0.218)
Part-time	10.11%	(0.257)	7.56%	(0.218)
Multiple jobs	14.64%	(0.301)	7.45%	(0.216)
n (rounded)	7670		5230	

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Wage Regression

Ln(2009 Wage)	1: Married	2: M/C	3: M/C
Cumulative Borrowing (07/08)	-0.00404***	-0.00439***	-0.00447***
	(0.00110)	(0.00119)	(0.000994)
Female # Borrowing	-0.00122	-0.00142	-0.00129
	(0.00118)	(0.00125)	(0.00105)
Marital Status (2009)	0.0993**	0.0665	0.0632**
	(0.0446)	(0.0409)	(0.0298)
Female # MS	-0.0973*	-0.0842*	-0.0786**
	(0.0501)	(0.0495)	(0.0340)
MS # Borrowing	0.000200	0.00165	0.00186*
	(0.00239)	(0.00208)	(0.000976)
Female # MS # Borrowing	0.000482	0.000337	
	(0.00251)	(0.00229)	
Borrowing # Borrowing	0.00005***	0.00005***	0.00005***
	(0.0000139)	(0.0000139)	(0.0000135)
Observations	7670	7670	7670
R-squared	0.239	0.240	0.240

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Wage Growth Regression

Ln(2012 Wage) - Ln(2009 Wage)	1: Married	2: M/C
Cumulative Borrowing (07/08)	0.00243	0.00231
	(0.00199)	(0.00211)
Female # Borrowing	-0.000839	-0.000755
	(0.00160)	(0.00169)
MS # Borrowing	-0.000592	-0.000391
	(0.00184)	(0.00185)
Female # MS # Borrowing	-0.000193	-0.000337
	(0.00222)	(0.00210)
Below median 2009 Wage # Borrowing	-0.00272***	-0.00274***
	(0.000868)	(0.000862)
Ln(2009 Wage)	-0.599***	-0.598***
	(0.0319)	(0.0319)
Borrowing # Borrowing	-0.00000189	-0.0000005
	(0.0000151)	(0.0000151)
Observations	5230	5230
R-squared	0.269	0.267

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Time OLF Regression

Time Spent OLF (07/08 - 09, %)	1: Married	2: M/C	3: M/C
Cumulative Borrowing (07/08)	-0.104***	-0.117***	-0.0934**
	(0.0379)	(0.0376)	(0.0361)
Female	-1.890**	-1.989**	-1.429
	(0.905)	(0.957)	(0.905)
Marital Status (2009)	-4.544***	-4.679***	-3.635***
	(1.293)	(1.307)	(1.159)
Female # MS	10.90***	8.936***	7.195***
	(1.878)	(1.768)	(1.214)
Female # Borrowing	0.0430	0.0388	0.00276
	(0.0308)	(0.0305)	(0.0277)
MS # Borrowing	0.0611	0.0767**	0.0120
	(0.0372)	(0.0385)	(0.0328)
Female # MS # Borrow	-0.120*	-0.103*	
	(0.0652)	(0.0552)	
Borrowing # Borrowing	0.000800**	0.000865**	0.000800**
	(0.000374)	(0.000374)	(0.000368)
Observations	8490	8499	8490
R-squared	0.0687	0.0647	0.0640

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Time Unemployed Regression

Time Unemployed (07/08 - 09, %)	1: Married	2: M/C	3: M/C
Cumulative Borrowing (07/08)	-0.0122	-0.0149	-0.0384
	(0.0556)	(0.0551)	(0.0494)
Female	-2.026*	-2.515**	-3.085***
	(1.164)	(1.269)	(1.140)
Marital Status (2009)	-2.172	-4.747***	-5.809***
	(2.024)	(1.374)	(1.134)
Female # MS	-0.550	1.566	3.337***
	(2.184)	(1.676)	(1.243)
Female # Borrowing	-0.0247	-0.0129	0.0238
	(0.0452)	(0.0503)	(0.0359)
MS # Borrowing	-0.0711	-0.0102	0.0556*
	(0.0706)	(0.0587)	(0.0308)
Female # MS # Borrowing	0.205**	0.105	
	(0.0847)	(0.0746)	
Borrowing # Borrowing	0.000743	0.000577	0.000644
	(0.000538)	(0.000507)	(0.000506)
Observations	8490	8490	8490
R-squared	0.0561	0.0588	0.0582

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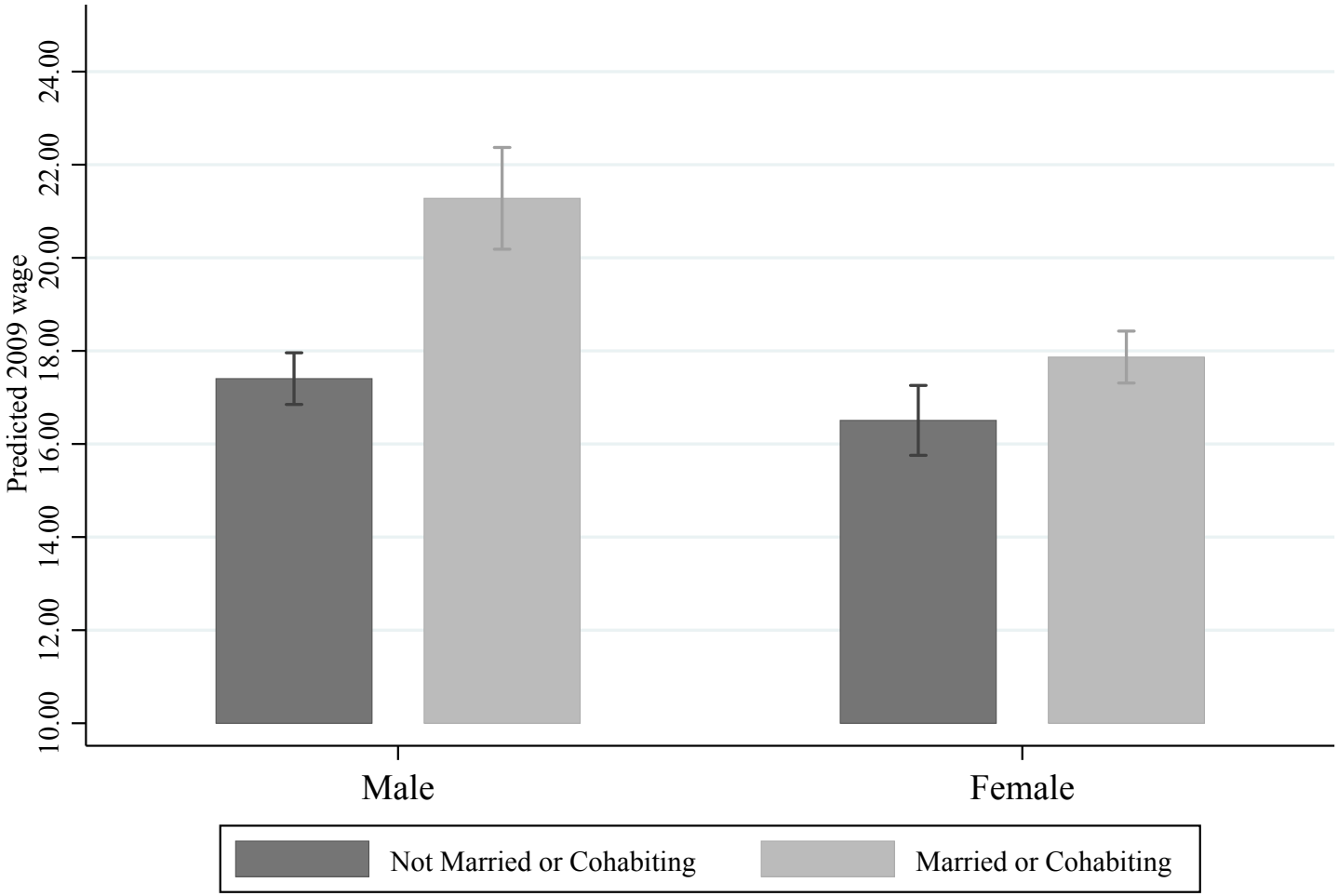
Figure: Predicted 2009 wages by gender and marital status at subsample means



Notes: Predicted wages calculated at subsample means.

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Table: Predicted indirect, direct, and total wage growth effects by gender and marital status

	Indirect Growth Effect	Direct Growth Effect	**Total Growth Effect**	Proportion with 2009 wage below median
Single men	3.24 pp	-3.96 pp	**-0.72 pp**	50.5%
M/C men	-2.01 pp	-4.57 pp	**-6.58 pp**	36.6%
Single women	3.70 pp	-4.69 pp	**-0.99 pp**	62.5%
M/C women	2.79 pp	-5.07 pp	**-2.29 pp**	52.6%

Reference Group: Single men with zero cumulative borrowing.
Notes: All calculations assume group-specific average borrowing and hold other variables constant.

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