Black-White Marital Matching:
Race, Anthropometrics, and Socioeconomics

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What do we do?

We document "**who inter-marries whom**":

- based on **observed** differences in socioeconomic status and physical fitness

- using PSID data 1999-2009 on education, wage and body mass index of **both** spouses.

Matching patterns by race

I.ACS 2009

Husband-Wife	**White**	**Black**	Total
White	89.21	0.46	89.67
Black	1.63	8.70	10.33
Total	90.84	9.16	100
			N=35,263

II.PSID 1999-2009

Husband-Wife	**White**	**Black**	Total
White	88.90	0.30	89.20
Black	1.64	9.16	10.80
Total	90.54	9.46	100
			N=2,907

Recently married couples ($\leq$ 4 years), both spouses aged 23-50. Sampling weights are used.

Open questions

1. Why still so few black-white marriages?

2. Why even fewer (white man-black woman) marriages?

Previous research on inter-racial marriages

Economics

- Becker (1991); Fryer (2007); Grossbard et al. (2011); Wong (2003): inter-marriage cost/distaste to cross racial boundaries
- Banks (2011); Charles & Louh (2010); Neal (2004); Seitz (2009): unfavorable sex-ratio imbalance of black women

Sociology

- Fu (2001); Kalmijn (1993); Qian & Lichter (2007): racial status hierarchy and social status exchange (in inter-marriages blacks provide economic status in exchange for race status)

Relevant matching characteristics in the marriage market

Traditional matching models

- One dimension (education, income, etc.): Choo & Siow (2006); Qian (1998); Weiss & Willis (1997).

Recent multidimensional matching models

- One-dimensional index model (COQ, 2010).
- Product-separable surplus function: Galichon-Salanié (2010)
- Truly multi-dimensional model (COQ, 2011).
- Multiple dimensions in dating: online and speed dating (Hitsch et al., 2010; Fisman et al., 2006, 2008).

Measuring quality

Two main dimensions: socioeconomic status (SES) and physical fitness (PF)

- Wage as a proxy for male SES (ability in the labor market to generate income)
- Education as a proxy for female SES (ability in household & market production)
- BMI as a proxy for both male and female PF (e.g., Gregory & Rhum, 2011; Mansour & McKinnish, 2011; Rooth, 2009)

Data: PSID 1999-2009

- The PSID is a biannual longitudinal household survey.
- Information on socioeconomic and anthropometric characteristics for **both** spouses.
- Information on duration of marriages from "Marital History Supplement".
- White and Black (race first mention), married men and women 23-50 years old, recently married.
- All the information reported by the household head.
- Body Mass Index (BMI): normal, overweight, and obese (class I) individuals (i.e., $18.5 \leq BMI < 35$)

Descriptive statistics

Table: Descriptive statistics by type of couple

| | White man, White woman [N=1,493] | | Black man, White woman [N=48] | |
	Mean	SD	Mean	SD
Wife's Age	30.23	6.09	31.35	5.99
Husband's Age	31.92	6.27	32.66	5.48
Wife's BMI	23.85	3.93	25.75	3.83
Husband's BMI	26.66	3.47	26.02	3.40
Wife's Education	14.47	2.08	13.72	2.49
Husband's log wage	2.99	0.64	2.72	0.49

Descriptive statistics

Table: Descriptive statistics by type of couple

| | Black man, Black woman | | White man, Black woman | |
| | [N=443] | | [N=10] | |
	Mean	SD	Mean	SD
Wife's Age	31.39	6.07	32.45	5.65
Husband's Age	33.32	6.79	32.96	4.36
Wife's BMI	25.99	4.08	23.06	3.87
Husband's BMI	26.93	3.35	25.41	2.00
Wife's Education	13.50	2.06	14.74	1.17
Husband's log wage	2.77	0.54	2.72	0.21

Distributions of Wives' BMI
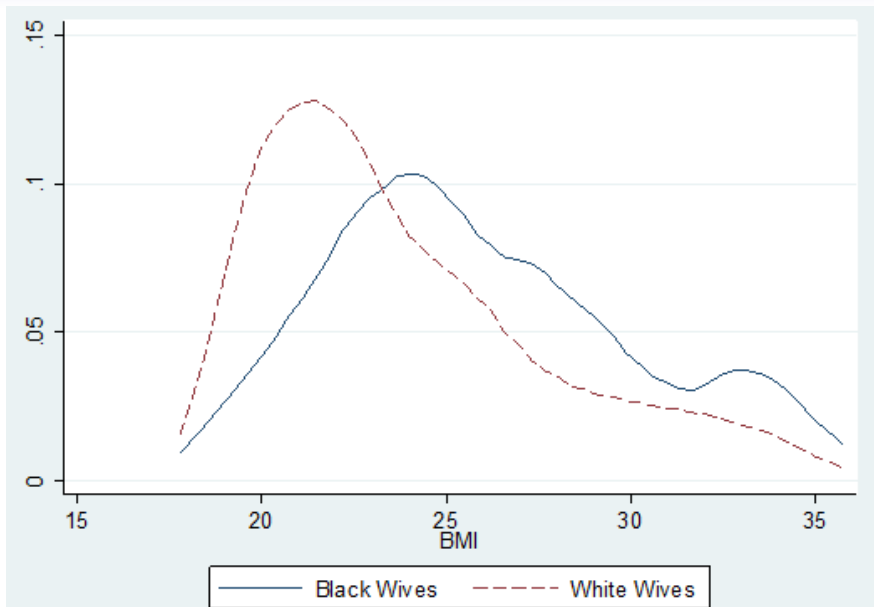
Distributions of Husbands' BMI
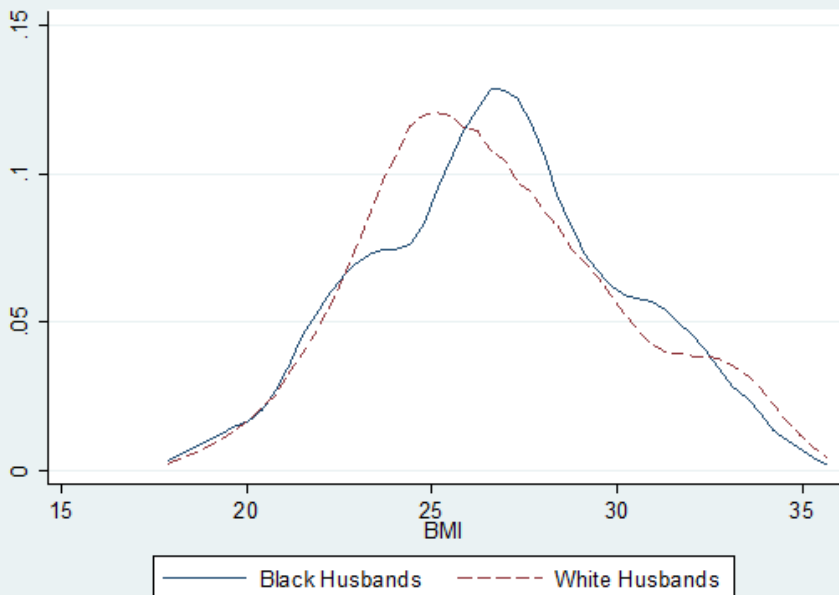
Who does intermarry?

Table: Regressions of wife's characteristics on husband's characteristics

	SUR Black women		SUR White women	
	Wife's BMI	Wife's Education	Wife's BMI	Wife's Education
Wife's Age	0.035 (0.029)	−0.024* (0.014)	0.022 (0.016)	−0.025*** (0.009)
Husband's BMI	0.150*** (0.054)	0.091*** (0.025)	0.247*** (0.028)	−0.001 (0.015)
Husband's log wage	−1.25*** (0.353)	1.38*** (0.166)	−0.751*** (0.166)	0.705*** (0.090)
Husband is white	−3.41 (1.19)*** [1.61]**	1.92 (0.558)*** [0.538]***	−1.93 (0.697)*** [0.854]**	0.691 (0.378)* [0.797]
State Fixed Effects	✓	✓	✓	✓
Year Fixed Effects	✓	✓	✓	✓
Number of Observations ((Couples))	453 ((320))		1,541 ((1,031))	

Standard errors in parentheses. Robust standard errors clustered at the couple level from individual regressions in brackets. Sampling weights are used. * significant at 10%; ** significant at 5%; *** significant at 1%.
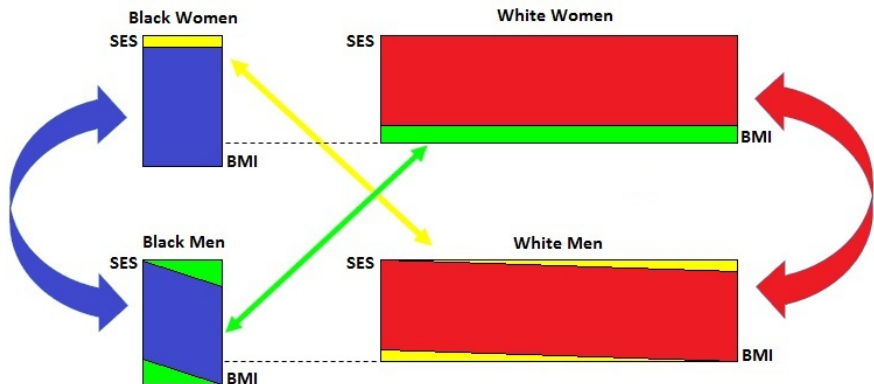
Who does intermarry?

Table: Regressions of husband's characteristics on wife's characteristics

	SUR Black men		SUR White men	
	Husband's BMI	Husband's log wage	Husband's BMI	Husband's log wage
Husband's Age	0.056**	0.010***	0.032**	0.015***
	(0.022)	(0.003)	(0.014)	(0.002)
Wife's BMI	0.103***	−0.017***	0.200***	−0.013***
	(0.039)	(0.005)	(0.023)	(0.004)
Wife's Education	0.116*	0.065***	0.063	0.054***
	(0.067)	(0.009)	(0.043)	(0.007)
Wife is white	−1.68	−0.119	1.07	0.374
	(0.413)***	(0.057)**	(2.10)	(0.353)
	[0.803]**	[0.089]	[0.706]	[0.155]**
State Fixed Effects	✓	✓	✓	✓
Year Fixed Effects	✓	✓	✓	✓
Number of Observations ((Couples))	491 ((351))		1,503 ((1,001))	

Standard errors in parentheses. Robust standard errors clustered at the couple level from individual regressions in brackets. Sampling weights are used. * significant at 10%; ** significant at 5%; *** significant at 1%.

Observed Matches

Whom do women intermarry?

Table: Regressions of husband's characteristics on his race controlling for spousal "quality"

	SUR Black women		SUR White women	
	Husband's BMI	Husband's log wage	Husband's BMI	Husband's log wage
Husband's Age	0.037*	0.012***	0.034**	0.015***
	(0.022)	(0.003)	(0.014)	(0.002)
Wife's BMI	0.122***	−0.015***	0.197***	−0.012***
	(0.039)	(0.006)	(0.022)	(0.004)
Wife's Education	0.309***	0.091***	0.049	0.051***
	(0.078)	(0.011)	(0.042)	(0.007)
Husband is white	−2.34	−0.416	0.816	0.315
	(1.01)**	(0.147)***	(0.624)	(0.104)***
	[0.831]***	[0.165]***	[0.762]	[0.081]***
State Fixed Effects	✓	✓	✓	✓
Year Fixed Effects	✓	✓	✓	✓
Number of Observations ((Couples))	453 ((320))		1,541 ((1,031))	

Standard errors in parentheses. Robust standard errors clustered at the couple level from individual regressions in brackets. Sampling weights are used. * significant at 10%; ** significant at 5%; *** significant at 1%.

Whom do men intermarry?

Table: Regressions of wife's characteristics on her race controlling for spousal "quality"

	SUR Black men		SUR White men	
	Wife's BMI	Wife's Education	Wife's BMI	Wife's Education
Wife's Age	0.039	−0.060***	0.021	−0.021**
	(0.027)	(0.015)	(0.016)	(0.009)
Husband's BMI	0.133***	0.041	0.251***	0.003
	(0.050)	(0.028)	(0.028)	(0.015)
Husband's log wage	−1.28***	1.46***	−0.753***	0.704***
	(0.347)	(0.194)	(0.167)	(0.089)
Wife is white	0.195	0.573	1.05	−0.180
	(0.476)	(0.266)**	(2.36)	(1.26)
	[0.834]	[0.725]	[2.00]	[0.476]
State Fixed Effects	✓	✓	✓	✓
Year Fixed Effects	✓	✓	✓	✓
Number of Observations ((Couples))	491 ((351))		1,503 ((1,001))	

Standard errors in parentheses. Robust standard errors clustered at the couple level from individual regressions in brackets. Sampling weights are used. * significant at 10%; ** significant at 5%; *** significant at 1%.

Surplus

$$\Sigma_{ij} = \Sigma(E_i, E_j, R_i, R_j, F_i, F_j) \tag{1}$$

where E=education (high or low), R=race (black or white), and F=fatness (obese or non-obese).

- Socioeconomic dimension: Surplus is supermodular in education
- Racial dimension: Surplus is lower for inter-racial couples
- Fatness dimension: Surplus is lower for whites with fat spouses

Surplus Numerical Example

$$\Sigma_{ij} = F(E_i, E_j) - G(R_i, R_j) - H(R_i, R_j, F_i, F_j) \qquad (2)$$

where $E=\{H, L\}$, $R=\{B, W\}$, and $F=\{0, 1\}$.

- $F(E_i, E_j) = 16$ if $E_i = E_j = H$
- $F(E_i, E_j) = 13$ if $E_i \neq E_j$
- $F(E_i, E_j) = 11$ if $E_i = E_j = L$
- $G(R_i, R_j) = -3$ if $R_i \neq R_j$
- $G(R_i, R_j) = 0$, otherwise
- $H(R_i, R_j, F_i, F_j) = -6$, if $(R_i = R_j = W) \cap (F_i = F_j = 1)$
- $H(R_i, R_j, F_i, F_j) = -3$ if $(R_i = W, R_j = B) \cap (F_j = 1) \quad \forall i, j$
- $H(R_i, R_j, F_i, F_j) = -3$ if $(R_i = R_j = W) \cap (F_j \neq F_j) \quad \forall i, j$
- $H(R_i, R_j, F_i, F_j) = 0$, otherwise

Surplus Matrix

Men	Women								Number of women
	1 (H,W,T)	2 (L,W,T)	3 (H,B,T)	4 (L,B,T)	5 (H,W,F)	6 (L,W,F)	7 (H,B,F)	8 (L,B,F)	
1 (H,W,T)	16	13	13	10	13	10	10	7	**797**
2 (L,W,T)	13	11	10	8	10	8	7	5	**394**
3 (H,B,T)	13	10	16	13	13	10	16	13	**163**
4 (L,B,T)	10	8	13	11	10	8	13	11	**202**
5 (H,W,F)	13	10	13	10	10	7	10	7	**173**
6 (L,W,F)	10	8	10	8	7	5	7	5	**89**
7 (H,B,F)	10	7	16	13	10	7	16	13	**49**
8 (L,B,F)	7	5	13	11	7	5	13	11	**59**
Number of Men	**993**	**335**	**210**	**156**	**108**	**53**	**39**	**32**	**1926**

Optimal Assignment

$$\max_{n_{ij}} \sum_i \sum_j n_{ij} \Sigma_{ij} \tag{3}$$

s.t.

$$\sum_j n_{ij} = \pi_i \quad i = 1, ..., 8 \tag{4}$$

$$\sum_i n_{ij} = \pi_j \quad j = 1, ..., 8 \tag{5}$$

Optimal Assignment

Men	Women							
	1 (H,W,T)	2 (L,W,T)	3 (H,B,T)	4 (L,B,T)	5 (H,W,F)	6 (L,W,F)	7 (H,B,F)	8 (L,B,F)
1 (H,W,T)	0,41							
2 (L,W,T)	0,07	0,14						
3 (H,B,T)			0,08					
4 (L,B,T)			0,02	0,07		0,02		
5 (H,W,F)	0,03				0,06			
6 (L,W,F)		0,04				0,01		
7 (H,B,F)			0,01				0,02	
8 (L,B,F)				0,01				0,02

Remaining Single, Intra-marrying or Inter-marrying?

Table: Female characteristics by marital status

	SUR Black women		SUR White women	
	Female Education	Female BMI	Female Education	Female BMI
Inter-married	2.00**	−4.96***	−0.958**	1.38*
	(0.823)	(1.71)	(0.450)	(0.837)
Intra-married	0.739***	−1.55***	0.028	−0.410***
	(0.128)	(0.264)	(0.085)	(0.159)
State Fixed Effects	✓	✓	✓	✓
Year Fixed Effects	✓	✓	✓	✓
Number of Observations	2,565		2,604	

All regressions include individual age. Standard errors in parentheses. Sampling weights are used. * significant at 10%; ** significant at 5%; *** significant at 1%.

Remaining Single, Intra-marrying or Inter-marrying?

Table: Male characteristics by marital status

| | SUR Black men | | SUR White men | |
	Male log wage	Male BMI	Male log wage	Male BMI
Inter-married	0.204** (0.088)	−1.30*** (0.451)	−0.092 (0.479)	−0.395 (2.59)
Intra-married	0.230*** (0.045)	0.096 (0.232)	0.195*** (0.025)	0.902*** (0.133)
State Fixed Effects	✓	✓	✓	✓
Year Fixed Effects	✓	✓	✓	✓
Number of Observations	1,333		2,867	

All regressions include individual age. Standard errors in parentheses. Sampling weights are used.
* significant at 10%; ** significant at 5%; *** significant at 1%.

Robustness checks

- Controlling for additional spousal and household characteristics: smoking, health status, and number of children.

- Considering BMI up to 40.

- Adding height as additional physical dimension.

- Non-hispanics (excluding immigrant sample).

Conclusions

- We document matching patterns between and within blacks and whites by BMI and education-wage.
- People have a preference for their own race
- Physical dimension is important to rationalize inter-marriages:

  1. BMI is a neutral characteristic for black people.
 2. High BMI is perceived as a defect by white people.

Appendix

- The relevance of BMI
- Distributions of Wives' Education
- Distributions of Husbands' Log Wage
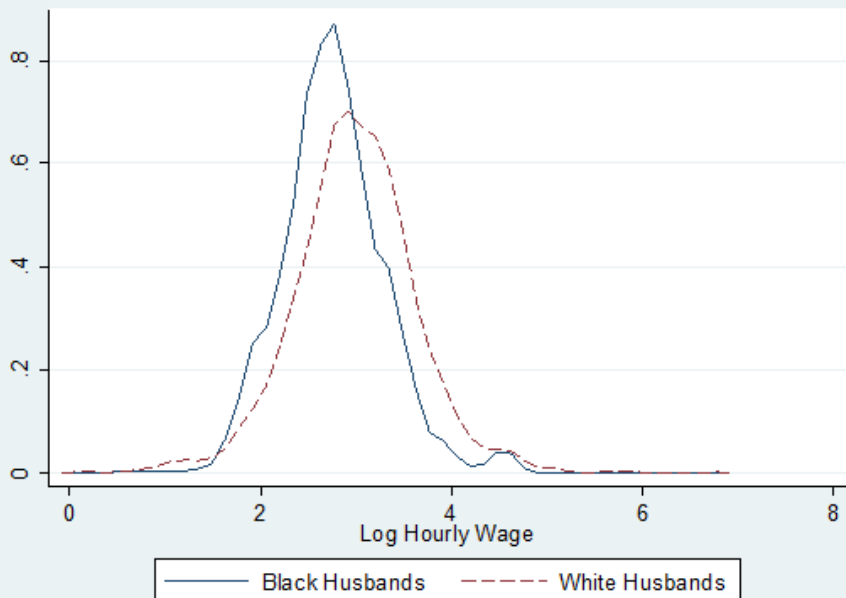- Cohabitants

The relevance of physical characteristics

TABLE A5—REGRESSIONS OF INDIVIDUAL SOCIOECONOMIC STATUS ON SPOUSAL CHARACTERISTICS

	ACS 2009[a]			
	Black women Education	White women Education	Black men Log Earnings	White men Log Earnings
Husband's Log Earnings	0.486 (0.064)***	0.569 (0.019)***	--	--
Wife's Education	--	--	0.091 (0.010)***	0.090 (0.003)***
Spouse is White	0.254 (0.213)	0.593 (0.114)***	−0.043 (0.052)	0.158 (0.107)
State Fixed Effects	Yes	Yes	Yes	Yes
Number of observations	2,151	30,091	2,442	29,800

	PSID 1999–2009[b]			
	Black women Education	White women Education	Black men Log Wage	White men Log Wage
Husband's Log Wage	1.29 [0.174]***	0.750 [0.111]***	--	--
Wife's Education	--	--	0.076 [0.014]***	0.059 [0.009]***
Spouse is White	0.428 [0.764]	0.492 [0.742]	−0.087 [0.083]	0.046 [0.135]
State Fixed Effects	Yes	Yes	Yes	Yes
Year Fixed Effects	Yes	Yes	Yes	Yes
Number of observations (couples)	639 (421)	1,899 (1,207)	676 (452)	1,862 (1,177)

Distributions of Wives' Education
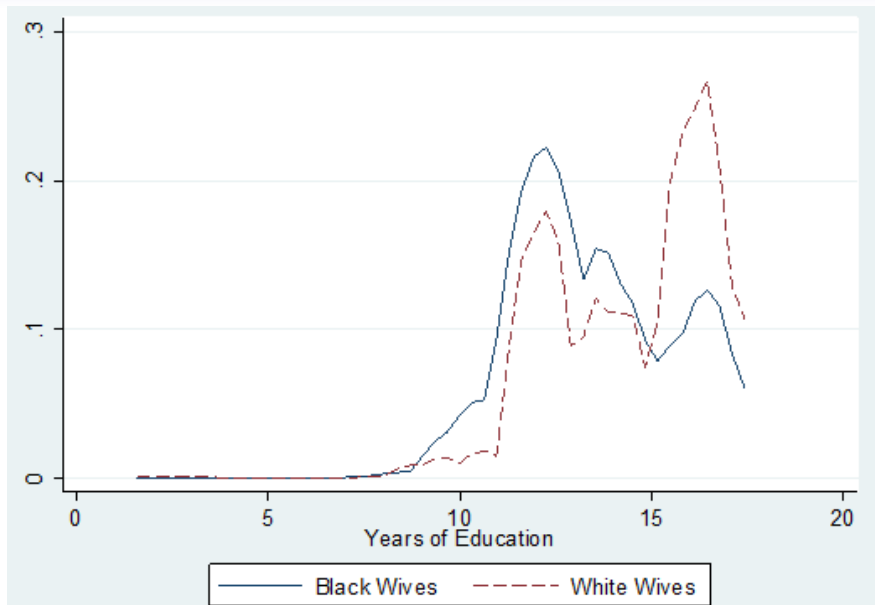
Distributions of Husbands' Log Wage

Matching patterns by race, cohabitants

ACS 2009 Husband-Wife	**White**	**Black**	Total
White	82.45	0.67	83.12
Black	3.68	13.20	16.88
Total	86.13	13.87	100 N=20,982

Both partners aged 23-50. Sampling weights are used.

Who does cohabit by race?

Table: Regressions of female characteristics on partner's characteristics, cohabitants

	SUR Black women		SUR White women	
	Female BMI	Female Education	Female BMI	Female Education
Female Age	0.046 (0.030)	−0.002 (0.010)	0.091*** (0.021)	−0.072*** (0.012)
Partner's BMI	0.051 (0.067)	0.040* (0.023)	0.103** (0.044)	−0.003 (0.025)
Partner's log wage	−0.709** (0.318)	0.284*** (0.109)	−0.856*** (0.279)	1.13*** (0.159)
Partner is white	−3.02 (1.60)*	2.34 (0.549)***	−0.319 (0.778)	−0.280 (0.444)
State Fixed Effects	✓	✓	✓	✓
Year Fixed Effects	✓	✓	✓	✓
Number of Observations	331		526	

Standard errors in parentheses. Sampling weights are used. * significant at 10%; ** significant at 5%; *** significant at 1%.

Who does cohabit by race?

Table: Regressions of male characteristics on partner's characteristics, cohabitants

	SUR Black men		SUR White men	
	Male BMI	Male log wage	Male BMI	Male log wage
Male Age	0.006 (0.026)	0.022*** (0.005)	0.038* (0.022)	0.021*** (0.003)
Partner's BMI	0.017 (0.046)	−0.021** (0.009)	0.098** (0.045)	−0.016** (0.007)
Partner's Education	0.260** (0.115)	0.035 (0.022)	0.071 (0.074)	0.071*** (0.011)
Partner is white	0.979 (0.536)*	0.186 (0.102)*	−0.811 (2.61)	0.009 (0.393)
State Fixed Effects	✓	✓	✓	✓
Year Fixed Effects	✓	✓	✓	✓
Number of Observations	365		492	

Standard errors in parentheses. Sampling weights are used. * significant at 10%; ** significant at 5%; *** significant at 1%.