INTERSTATE MIGRATION OF COLLEGE FRESHMEN: AN ECONOMIC ANALYSIS

by

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Abstract: We examine the economic determinants of interstate migration of college-bound freshmen, using state-level data. Our analysis provides a richer explanation of the striking differences among the U.S. states in out-migration of college-bound freshmen. States that provide more educational choices and higher quality education services, charge lower tuition, have broad-based merit scholarship programs and have lower income levels tend to retain a higher percentage of their college-bound freshmen at home.

Interstate migration of college students is important: to students for the opportunities they seek, to institutions for diversity in their student body and the revenue they add, and to communities and states for economic benefits they gain or lose from students who come to a state to enroll or leave a state to enroll elsewhere.

Postsecondary Education OPPORTUNITY

August, 1996

During the last two decades there has been a steady rise in the number of freshmen leaving their home states to enroll in colleges and universities in other states. Currently, about 1 in 5 college freshmen who graduated from high school in the previous 12 months enroll in a college or university in another state. However, there are striking differences among the states in the emigration rates of these college-bound freshmen (see Figure 1). For instance, in 1998, 66.8% of college-bound freshmen in Alaska left home to attend colleges and universities in other states; by contrast, the emigration rate in

Mississippi was 8.1%.[1] The median emigration rate among the 50 states was 18%.

Reasons for the differences in observed emigration rates among the states have not been carefully studied. The August 1996 and April 1998 issues of *Postsecondary Education OPPORTUNITY* suggest that differences in the net migration (i.e. out-migration minus in-migration) of college-bound freshmen among states reflect differences in the relative attractiveness of postsecondary opportunities among the states. Some states provide relatively attractive secondary education opportunities and thus draw more students from out-of-state than they export. In contrast, some states have net outflows of students to other states because they provide relatively unattractive postsecondary education opportunities. The articles did not define the meaning of "attractiveness." Attractiveness could mean lower tuition, more prestigious schools, greater educational choices, better post-graduation job prospects, and so forth.

In this paper, we employ economic analysis to explain differences among the states in the emigration rate of college-bound freshmen in 1996 and 1998, the most recent years for which emigration data are available. We do not attempt to explain why individual students choose to go away to school; the reasons underlying individual student decisions to go away to college are more diverse.[2]

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[1] "Interstate Migration of College Freshmen," *Postsecondary Education OPPORTUNITY*, January 2001; the original source of this data is the U.S. Department of Education, National Center for Education Statistics, *Digest of Education Statistics, 2000*, Chapter 3a, and is accessible on line at: http://nces.ed.gov/pubs2001/digest/list_tables.html The emigration rates in this paper refer to those college-bound freshmen who graduated from high school within the previous twelve months.

[2] See, for example, "Freshmen Enrolling in College Farther from Home But Who Can Afford to Go So Far Away," *Postsecondary Education OPPORTUNITY,* August 1996, p.4. For example,

(continued...)

Model

The decision either to attend a home state institution or go away to college is determined by both economic and non-economic (i.e. general educational development) reasons. Going away means being on your own and learning first hand about other peoples and places, but it also means incurring additional financial and psychic costs of being away from home, family and friends. For some students, going away to college may reflect more importantly a labor migration (i.e. human capital investment) decision.[3] Migration is primarily a search for jobs.[4] Some students seek better job opportunities elsewhere, and going to school in another state is part of that relocation process.[5] Spatial analysis of student college choices indicate that non-pecuniary factors such as "going away from home," "becoming more cultured person", "gain general education", and "learn more about things" are relatively more important than financial considerations such as "couldn't find a job", "to get a better job", or "to make more money" in choosing to enroll in a distant college. Those who attend colleges near their homes are generally from less affluent families and assign a relatively greater importance to the future

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(...continued)
the father's educational attainment is an important determinant of where a student goes to school.

[3] In the typical labor migration model, a potential migrant chooses to migrate if the difference in the present value of future life-time earnings between moving and staying minus moving costs is greater than zero. See for example Borjas, (2000, pp. 304-05), and Borjas, (1999, especially pp. 1710-1711.) These models typically assume that the migration decision is irreversible.

[4] Assuming a homogeneous country (Schwartz, 1976, p. 706.)

[5] McCann and Sheppard (2001).

economic returns from their higher education.[6]

We model freshman migration with the following function:

$$\%OUT_i = \alpha_0 + \alpha_1 NUMEDU_i + \alpha_2 HIED\$_i + \alpha_3 TUITION_i + \alpha_4 MERIT_i + \alpha_5 Y_i + \alpha_6 UNEMP_i + \alpha_7 ALASKA_i + \alpha_8 HAWAII_i + \varepsilon_i$$

where:

$\%OUT_i$ = percent of college-bound high school graduates (within the past twelve months) from state *i* enrolling in college in another state

$NUMEDU_i$ = number of degree-granting institutions of higher education, state *i*

$HIED\$_i$ = per capita state and local government expenditure on higher education in state *i,* adjusted for inflation[7]

$TUITION_i$ = ratio of resident tuition and fees at "the University of ..." state *i* to the average nonresident tuition and fees in the other 49 states

$MERIT_i$ = 1 if state *i* has a broad-based merit scholarship program, 0 otherwise

Y_i = per capita personal income, state *i*, adjusted for inflation

$UNEMP_i$ = unemployment rate

$ALASKA_i$ = 1 if state *i* is Alaska, 0 otherwise

$HAWAII_i$ = 1 if state *i* is Hawai'i, 0 otherwise

ε_i = error term

NUMEDU—the number of degree granting institutions of post-secondary education in the home state—is a proxy for higher education options. We surmise that

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[6] "Freshmen Enrolling in College Farther from Home But Who Can Afford to Go So Far Away," *Postsecondary Education OPPORTUNITY,* August 1996, pp. 3-4.

[7] Adjusted to 1996 price levels using the Bureau of Labor Statistics' Consumer Price Index CPI-U, available at ftp://ftp.bls.gov/pub/special.requests/cpi/cpiai.txt

states that have more degree granting institutions provide more educational choices at home to potential students and thus are more likely to keep a higher percentage of their students at home.

We used *HIED$*—per capita state and local government expenditures on higher education in the home state—as a crude proxy for the (perceived) quality of the home state institutions. It is assumed that states that spend more public money (per capita) on higher education have higher quality institutions and thus are likely to keep a higher percentage of their college-bound students at home.[8] We acknowledge that public expenditures do not capture the quality of private colleges and universities. Unfortunately, we were unsuccessful in devising an overall quality index for higher education in each state. Nonetheless, while private schools comprise nearly 60 percent of all degree granting post-secondary education institutions in the U.S., public institutions enroll nearly 80 percent of all undergraduate students.[9]

TUITION measures the relative price of going to college in the home state versus going to college in another state. It is defined as the ratio of resident tuition and fees at "The University of [state *i*]" (the flagship university in state *i*) to average non-resident

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[8] Higher per capita public financial support for higher education can also mean lower average tuition thus encouraging more students to stay home. However, the simple correlation between average resident tuition at in-state public supported universities and per capita state and local government spending on higher education is only -0.11 for 1996 and -0.19 for 1998.

[9] These are based on fall, 1997 enrollment data and 1998-99 data on degree granting post-secondary institutions. U.S. Department of Education, National Center for Education Statistics, *Digest of Education Statistics, 2000*, Chapter 3a. One researcher argues that to the extent that public institutions compete successfully against private institutions in many cases, it is difficult to argue that on average private schools hold a dramatic quality edge over public schools. (Miron, 2001 p. 84).

tuition and fees at the flagship universities of the other 49 states.[10] Economic theory predicts that the higher the ratio of resident tuition and fees at home to nonresident tuition and fees in other states, the more likely students will emigrate from their own states.

In addition to financial support of public colleges and universities, state policies also directly affect the demand for higher education through student aid programs.[11] A growing number of states (13 currently) have implemented broad-based merit (as opposed to need-based) scholarships that provide free or reduced tuition at in-state institutions to their high school graduates who have achieved grades above some minimum threshold.[12] These programs are designed to increase higher education access in response to sharply rising (real) tuition and fees since the 1980s[13] and to keep more of the brighter students at home by reducing the relative price of going to college in the home states. The *Chronicle of Higher Education* notes that "states have produced little hard evidence of those successes—except for Georgia."[14] In 1993, Georgia pioneered the movement by offering to pay the college tuition at any institution in the state for any

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[10] Our data source (described below) provides three measures of tuition and fees, none of which is comprehensive. The variable we use here is tuition and fees at the state's flagship public university. Also available are tuition and fees at a selected list of other public colleges and universities in the state; and at a selected list of community colleges. Flagship university tuition tends to be highly correlated with those of comprehensive universities in each state (see Heller, 1999.)

[11] See, for example, Clotfelter (1991).

[12] Selingo (2001).

[13] Heller, *op. cit.* and "Undergraduate tuition and fees at state flagship universities 1965 to 2001," *Postsecondary Education OPPORTUNITY,* April 2001.

[14] Selingo, *op. cit.*

Georgia high school graduate who had attained a grade of B or above. By fall 2000, over 75,000 Georgia college students were recipients of the state's HOPE scholarships; at the University of Georgia, ninety-six percent of the in-state freshmen are on HOPE scholarships. Three-fourths of the state's high school graduates who scored higher than 1500 on the SAT now attend a Georgia institution compared to 23 percent before HOPE was implemented.[15] By 1996, two other states, Arkansas and Mississippi, had implemented broad-based merit scholarship programs. Two years later, five additional states—Florida, Louisiana, Missouri, New Mexico and South Carolina—had introduced similar programs.[16] The popularity of merit scholarship programs is quickly spreading to other states. In this paper, the variable *MERIT* takes the value 1 if the home state has a broad-based merit scholarship program, 0 otherwise. We also tried an alternative model specification to capture the retention effect of merit scholarships by replacing the binary variable *MERIT* with *YRSMERIT,* the number of years since each program was first implemented.

Since going away to college is usually more costly than staying at home, we expect states with higher per capita incomes *Y* to have higher emigration rates of college-bound freshmen. To capture the labor migration aspect of college location choice, we

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[15] See Selingo, *op. cit.*; also, http://www.hope.gsfc.org/ and the editorial in *Postsecondary Education OPPORTUNITY,* No. 56 (February 1997). On the other hand, nearly 60 percent of the recipients fail to maintain a B average in college to keep their scholarships.

[16] Not all merit programs have the same reach and generosity. For instance, the 75,000 recipients of Georgia's HOPE scholarship comprised nearly 30 percent of all undergraduate students in Georgia's degree granting post-secondary institutions (based on fall 1998 enrollment data); by contrast, merit scholarship recipients comprised only about 2 percent, or less, of undergraduate enrollment in Alaska, Washington, and Mississippi. The average value of a scholarship in Georgia was about $3,000 in 2000, but less than $1,000 in Kentucky and Nevada.

used the variable, UNEMP, the state's unemployment rate, to capture potential differences in financial returns from going to school in states with different prospects of finding future employment. The relevant unemployment rates are the expected future unemployment rates in the home and destination states when the student finally enters the job market at the completion of schooling, say two to five years from initial entry into college.

Finally, we included separate dummy variables for Alaska and Hawai'i to capture the effects of distance and isolation experienced by residents of the two non-contiguous states. While distance may deter students from leaving their home states, students in Hawai'i and Alaska may feel a stronger urge to "experience" the rest of the country. The dummy variables may also capture any cultural effects on student mobility.

In sum, we posit the coefficients of *NUMEDU, HIED$* and *MERIT* < 0; those of *TUITION, Y* and *UNEMP* > 0; and we have no prior expectations on the signs of *ALASKA* and *HAWAII.*

Data

Emigration rates of college-bound freshmen in 1996 and 1998 were published in the April 1998 and January 2001 issues of *Postsecondary Education OPPORTUNITY* using student migration data from the U.S. Department of Education, National Center for Education Statistics, *Digest of Education Statistics*. Data on the number of degree granting institutions in each state came from the same source. Data on state per capita personal income and per capita state and local higher education expenditures were obtained from the U.S. Department of Commerce's Bureau of Economic Analysis and from the U.S. Census Bureau. Unemployment rates were obtained from the *Statistical*

Abstract of the United States (various years). Resident and non-resident tuition and fees data were kindly provided by the Washington State Higher Education Coordinating Board.[17] Information on the states with broad based merit scholarships and their initial dates of implementation were obtained from the January 19, 2001 issue of the *Chronicle of Higher Education*.

Empirical Results

We estimated two variants of the demand equation for out-of-state college enrollment by recent high school graduates for 1996 and 1998 using the method of ordinary least squares.[18] One variant employed the binary variable, *MERIT*, in the specification; the other used *YRSMERIT*. A battery of diagnostics indicated some evidence of heteroskedasticity[19], so the reported standard errors use White's heteroskedastic-consistent covariance matrix, even though our sample is somewhat small to invoke the asymptotic property of this correction[20]. Chow tests showed no structural difference between the two years, so we ran a third set of equations pooling the 1996 and

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[17] Each year, the Board publishes a state by state comparison of tuition and fees at public colleges and universities in the U.S. We appreciate the assistance of Kathy Raudenbush of the Board in obtaining these data. The numbers are available at www.hecb.wa.gov/paying/index.html.

[18] All OLS predicted emigration rates lie within the expected limits of 0 - 100% except for California, which was consistently slightly negative. To eliminate that problem we also estimated the two demand equations using TOBIT procedures. Since the results are quite similar, we chose to report the OLS estimates because the coefficients are more easily (i.e. directly) interpreted. The Tobit results are available from the authors by request.

[19] *SHAZAM* (2001, pp. 184-190.)

[20] See, e.g., Green (2000, p. 463.)

1998 data. The results are displayed in Table 1.[21]

Our results are quite robust, especially for a study using cross-section data. The estimated equations for the two years explain between 68 percent and 77 percent of the variation in emigration rates of college-bound freshmen among the 50 states. As predicted, states with more (fewer) degree-granting higher education institutions tend to have lower (higher) rates of college-bound freshmen enrolling in schools in other states. In both years, the average level of resident tuition and fees at "the State" universities was about 35% of out-of-state tuition and fees in other states. The states with the lowest relative tuition (around 20%) included Idaho, Nevada, Arizona and Florida, and the state with the highest relative tuition (over 75%) was Vermont. Not surprisingly, states with low in-state tuition and fees tend to retain a higher percentage of their own students.

As well, states with broad-based merit scholarship programs also tend to retain a significantly higher percentage of their high school graduates at home. The three states with broad-based merit scholarships in 1996 averaged 5.3% lower emigration rates than states without similar scholarship programs; for 1998, the average was 4.0%, though the coefficient of *MERIT* is not significantly different from zero. The equations with the *YRSMERIT* variable (variant 2 in Table 1) indicate that the retention effect of broad-based merit scholarships is significantly greater the longer the scholarship programs have been in effect. On average, each additional year the merit based scholarship is in effect results in about one percent lower emigration rate of college-bound freshmen. States with higher per capita state and local government expenditures on higher education also tend

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[21] We employ one-tailed tests on coefficients of all the variables with prior sign expectations, and two-tailed tests for HAWAII and ALASKA.

to retain a higher percentage of their students. As anticipated, our results confirm that higher income states tend to have higher student emigration rates.

We lack information on how students form expectations about future employment prospects. Rational expectations would suggest that experience or knowledge of past unemployment rates plays a central role. Hence we examined two alternative measures of past unemployment. For one, we used the 1995 and 1997 statewide unemployment rates for high school graduates applying for college admission in 1996 and 1998 respectively. In the other, we tried an average of unemployment rates for the five years prior to enrollment. The former yields a significant coefficient from the 1998 and pooled samples, but not with the 1996 data. The five-year average unemployment rate was never significant.[22] This weak result may not be surprising. Schwartz (1976) argues that migration is not necessarily a response to general measures of economic differences but a response to personal opportunities. He notes that, for any two regions in the U.S., migration is observed in both directions, and that the net flow is small even in the presence of large regional differences.

Finally, all else being equal, Alaska, but not Hawai‘i, residents have significantly higher propensity to leave their home state for higher education.

Conclusion

In this brief paper, we examined the economic determinants of interstate migration of college-bound freshmen in 1996 and 1998. We focused on only one aspect

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[22]Results are not shown in Table 1. On the possibility that the appropriate variable is prospective economic growth, rather than unemployment, we tried the five-year average growth rate of real gross state product. This too failed significance tests.

of freshmen migration: the differences in out-migration rates of college-bound freshmen among the states. We did not examine the differences in the in-migration of college-bound freshmen. Our analysis provides a richer explanation of why there are such large differences among the states in the percentage of college-bound freshmen leaving their home states to enroll in schools in other states. The reasons are not particularly surprising. States that provide more educational choices to potential college freshmen tend to retain their students. Likewise, states that financially support their public institutions generously tend to provide higher quality, and perhaps also relatively lower priced, higher education services and thus are more likely to keep their college-bound students at home. Lower in-state tuition and fees and broad-based merit scholarships are shown to have significant positive impacts on student retention. We find that the effect of merit scholarships on student retention is greater the longer a scholarship program has been in existence. By contrast, high income states tend to see a higher percentage of their students leave their states to go to school elsewhere. We find little empirical evidence to indicate that differences in unemployment rates among the states offer a good explanation of differences in the emigration rates of college-bound freshmen.

On the policy front, the study sheds insights into what states can do to induce a higher percentage of their college-bound students to stay home. There is a good reason why economists and policy makers interested in regional growth issues should be concerned with where college students decide to acquire their higher education, given evidence (see, for example, McCann and Sheppard) linking college location choice to where students eventually choose to live and work. Encouraging more of the state's college bound students to study at home may encourage local human capital

accumulation and local economic growth. This study, however, cannot answer the more important questions of what are the benefits and costs of keeping a higher percentage of college-bound students at home, and what are the most efficient and equitable ways of achieving higher student retention. For instance, in spite of their growing political popularity, broad-based merit scholarships have come under increasing criticism by education policy analysts as bad public policy because they are economically inefficient and inequitable.

Of course, individual prospective students will consider more factors in choosing an institution of higher education than those we have used in our model. Some are specific to the individual (for example, family background, marital status, high school quality, regional preferences); some to the institutions (financial aid, academic and other reputations, recruiting effort and acceptance rates, extra-curricular offerings); and some to the state or locality in which the school is located (living costs, weather, opportunities for employment during and after completion of the degree). Although further study of these factors would require a detailed survey of individual students, such information would enlighten college and university administrators in formulating recruitment and retention policies as well as inform policy makers on matters relating to higher education funding.

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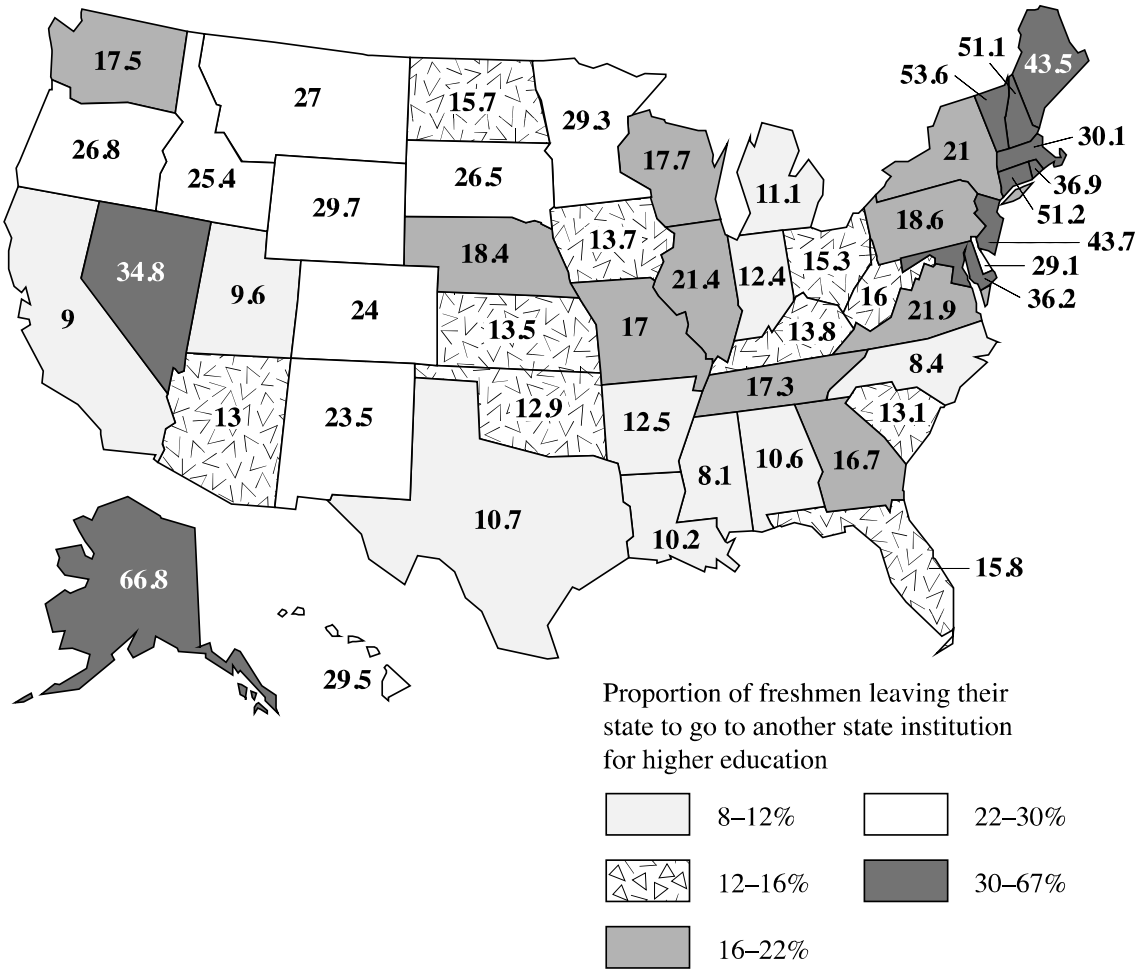

Figure 1. Percent of freshmen attending college out of their home state, 1998

Table 1. Freshman Outmigration
Dependent Variable: %OUT

Variable Name	1996		1998		1996 & 1998 (Pooled)	
	Coefficients Variant 1	Coefficients Variant 2	Coefficients Variant 1	Coefficients Variant 2	Coefficients Variant 1	Coefficients Variant 2
NUMEDU	-0.11317* (0.01559)	-0.11271* (0.01559)	-0.10121* (0.13091)	-0.10189* (0.01367)	-0.10659* (0.01024)	-0.10692* (0.01048)
HIED$	-0.02490* (0.01262)	-0.02441* (0.01285)	-0.01966 (0.01320)	-0.01897 (0.01193)	-0.02292* (0.00917)	-0.02269* (0.00881)
TUITION	40.098* (14.154)	39.981* (14.270)	41.471* (13.931)	42.333* (13.813)	40.499* (9.8593)	41.053* (9.8179)
MERIT	-5.3160* (2.5025)	--	-4.0820 (2.6187)	--	-4.4241* (2.0047)	--
YRSMERIT	--	-0.87599* (0.40637)	--	-0.92825* (0.40608)	--	-0.92892* (0.30968)
Y	0.00127* (0.00041)	0.00132* (0.00041)	0.00129* (0.00034)	0.00132* (0.00033)	0.00125* (0.00025)	0.00128* (0.00025)
UNEMP	1.1821 (0.90113)	1.1234 (0.9111)	2.3822* (0.9429)	2.3015* (0.92249)	1.6943* (0.67139)	1.6399* (0.66393)
ALASKA	35.747* (4.0858)	35.808* (4.1397)	31.499* (4.381)	31.937* (4.2813)	34.020* (3.0317)	34.316* (2.9931)
HAWAII	2.4912 (2.6769)	2.5322 (2.7015)	-0.93665 (2.7494)	-0.60366 (2.7042)	1.2574 (2.1333)	1.4830 (2.1135)
INTERCEPT	-8.1969	-9.4362	-18.724	-19.797	-12.247	-12.957
$\bar{R}^2$:	0.683	0.677	0.769	0.768	0.747	0.744

Standard errors appear in parentheses below each coefficient. An * indicates a coefficient with a p-value of 0.05 or less.