

WASHINGTON TIME SERIES MODEL I
Enrollment Level as Dependent Variable

Regression Estimates: Washington Enrollment (headcount), 1965-97*

	Public 4-Year	Community/Technical Colleges	Private 4-Year
Constant	15786.9	-687462.5	
WA population, age 17-22	0.1501		0.0241
WA population, age 17-29		0.2241	
Average tuition, WA, public 4-year			3.3968
US avg. wages of high school grad., age 18-24 (2-year)	-2.0179		
WA unemployment rate (in hundredths)	887.7		
WA traded-sector employment (1,000)	56.71		40.083
WA total non-ag. employment (1,000; 1-year lag)		164.3	
WA state expenditures on 4-year institutions	0.00003		
WA state expenditures on 2-year institutions (1-year lag)		0.00014	
Capping effect (Dummy variable)	-6859.5	-45780.1	
Vietnam War effect (Dummy variable)	3713.9		
Recession years (Dummy variable)		-5679.9	
Share of WA population in counties with CC's		711581.4	
AR(1)			0.55
MA(1)			0.47
Adjusted R-squared	0.97	0.98	0.98
Durbin-Watson statistics	2.30	2.66	1.81

* All estimates are significant at 5 percent level

Factor Effects on Enrollment Level

	1997 Level	1% Increase	Enrollment Effect (Headcount)	
			Public 4-Year	Private 4-Year
WA population, age 17-22	432860	4328.6	650	104
WA population, age 17-29	954529	9545.3		2139
Average tuition, WA, public 4-year	2889	28.9		98
US avg. wages of high school grad., age 18-24	11221	112.2	-226	
WA unemployment rate (in hundredths)	4.75	1.0	888	
WA traded-sector employment (1,000)	441.3	4.4	250	177
WA total non-ag. employment (1,000)	2515.4	25.2		4132
WA state expenditures on 4-year institutions	565653000	5656530	195	
WA state expenditures on 2-year institutions	364755000	3647550		511
Capping effect (Dummy variable)	0.33	0.003	-23	-151
Share of WA population in counties with CC's	0.91	0.009		6475

Enrollment Forecast (Time Series Model I)

	Enrollment (State-funded, FTE)		
	Public 4-Year	CC/TC	Private 4-Year
2000	85,399	115,794	36,778
2005	96,749	125,097	39,566
2010	107,022	145,768	42,556
2015	108,812	153,549	43,780
2020	109,597	155,778	44,780

Forecasting assumptions:

1. OFM population forecast (by age) for the state of Washington
2. Average cost (tuition-grants) in constant dollars remains the same as the 1997 level
3. OFM long-term forecast of Washington unemployment rate
4. OFM long-term forecast of Washington traded sector employment
5. OFM long-term forecast of Washington non-agriculture employment
6. Average state higher education expenditure grows at 4.95 percent per year, which is a combined rate of the projected population and personal income growth, and a long-term inflation rate of 3 percent
7. Share of Washington population in counties with CC's unchanged from the 1997 level

High and Low Enrollment Forecasts (Time Series Model I)

Public 4-Year Enrollment					
FY	Baseline	High	Diff. from base	Low	Diff. from base
2000	85,399	92,120	7.9%	80,969	-5.2%
2005	96,749	104,819	8.3%	90,526	-6.4%
2010	107,022	116,749	9.1%	98,806	-7.7%
2015	108,812	120,423	10.7%	98,526	-9.5%
2020	109,597	123,364	12.6%	97,150	-11.4%

	Year 2020
<i>Baseline Enrollment</i>	<u>109,597</u>
<i>High assumptions:</i>	
Annual growth in the traded sector employment is 1 percentage point above that in the baseline forecast	5,067
US. average wage of high school graduates aged 18-24, in constant dollars, is 20% above the 1997 level	4,563
The state higher education expenditure, in constant dollars, will grow along with the population 17-22	2,663
Unrestricted state higher education enrollment policies	<u>1,474</u>
<i>High enrollment:</i>	<u>123,364</u>
<i>Low assumptions:</i>	
Annual growth in the traded sector employment is 1 percentage point below that in the baseline forecast	(4,093)
US. average wage of high school graduates aged 18-24, in constant dollars, is 20% above the 1997 level	(4,590)
The state higher education expenditure will grow at a rate 95% of increase in per capita income	(3,052)
More restricted state higher education enrollment policies	<u>(712)</u>
<i>Low enrollment:</i>	<u>97,150</u>

CC/TC Enrollment					
	Baseline	High	Diff. from base	Low	Diff. from base
2000	115,794	130,052	12.3%	113,014	-2.4%
2005	125,097	139,958	11.9%	120,700	-3.5%
2010	145,768	161,242	10.6%	140,024	-3.9%
2015	153,549	169,501	10.4%	146,569	-4.5%
2020	155,778	172,258	10.6%	147,679	-5.2%

	Year 2020
<i>Baseline Enrollment</i>	<u>155,778</u>
<i>High assumptions:</i>	
Annual growth in the traded sector employment is 1 percentage point above that in the baseline forecast	4,054
The state higher education expenditure, in constant dollars, will grow along with the population 17-22	4,869
Unrestricted state higher education enrollment policies	<u>7,557</u>
<i>High enrollment:</i>	<u>172,258</u>
<i>Low assumptions:</i>	
Annual growth in the traded sector employment is 1 percentage point below that in the baseline foreca	(3,355)
The state higher education expenditure will grow at a rate 95% of increase in per capita income	(8)
More restricted state higher education enrollment policies	<u>(4,735)</u>
<i>Low enrollment:</i>	<u>147,679</u>

50 State Cross Sectional Model

Regression Estimates: 1995 Enrollment (Fall, headcount)

Variable	Public 4-Year (Log.)	Public 2-Year (Log.)	Private 4-Year (Log.)	Private 2-Year (Log.)
Constant		-11.422 **	-11.626 **	
State population, age 17-22 (Log.)	0.801 **			
State population, age 17-24 (Log.)			0.109 *	
State population, age 17-29 (Log.)		0.815 **		0.403 **
Per capita personal income (Log.)		1.155 **	1.533 **	
Average tuition, public 2-year (Log.)		-0.503 **		
Average tuition, private 4-year (Log.)			-0.771 **	
Total state appropriations to public 2-year institutions (Log.)		0.226 **		
Total state appropriations to public 4-year institutions (Log.)	0.087 **			
Total scholarship awarded, private 4-year (Log.)			0.553 **	
Total scholarship awarded, private 2-year (Log.)				0.136 **
State unemployment rate	-0.048 **	-0.135 **		
Number of institutions, private 4-year			0.003 **	
Number of institutions, private 2-year				0.043 **
4-year student immigrants--freshmen (Log.)			0.287 **	
State of Alaska (dummy variable)		-1.468 **	-0.829 **	
Ratio: public 2-year enrollment/population age 17+	-10.180 **			
Adjusted R-squared	0.96	0.95	0.97	0.70

* Significant at 10 percent level

** Significant at 5 percent level

Factor Effects on Enrollment Level

	1995 Level (Washington)	1% Increase	Enrollment Effect (headcount)			
			Public 4-Year	Public 2-Year	Private 4-Year	Private 2-Year
State population, age 17-22	434,350	4,344	684			
State population, age 17-24	578,684	5,787			32	
State population, age 17-29	958,224	9,582		376		7
Per capita personal income	23,974	240		554	470	
Average tuition, public 2-year	1,370	14		-213		
Average tuition, private 4-year	13,147	131			-1053	
Total state appropriations, public 2-year	421,167,389	4,211,674		165		
Total state appropriations, public 4-year	586,443,554	5,864,436	62			
Amount of scholarship given by private 2-year institutions	967,618	9,676				1
Amount of scholarship given by private 4-year institutions	79,441,023	794,410			93	
State unemployment rate	6.4	0.06	-48	-74		
Number of freshmen from out-of-state (newly graduated)	3,340	33			52	

Direct Enrollment Impact When Factor Values change to US levels (50-State Mod)

	1995 Value	Enrollment Impact (headcount)		
		Public 4-year	Public 2-year	Private 4-year
1995 WA Enrollment (fall, headcount)		86,080	160,555	36,950
Public 2-year enrollment/Population 17+				
WA (4th)	0.029			
US Median	0.017	11,891		
State appropriations per capita 17+, public 2-year				
WA (47th)	\$103			
US 10 percentile	\$15		-56,394	
US 90 percentile	\$101		-542	
State appropriations per capita 17+, public 4-year				
WA (10th)	\$143			
US 10 percentile	\$122	-1,166		
US 90 percentile	\$280	5,187		
Average tuition, public 2-year				
WA (23rd)	\$1,370			
US 10 percentile	\$974		30,045	
US 90 percentile	\$1,928		-25,318	
Average tuition, private 4-year				
WA (37th)	\$13,147			
US 10 percentile	\$7,020			22,998
US 90 percentile	\$14,965			-3,513

Washington Time Series model II

Participation Rate by Age Group as Dependent Variable

Regression Estimates -- Participation Rate, 1975-96

	Public 4-Year (State-funded, headcount)		
	Age 17-22	Age 23-29	Age 30+
Constant	7.231 **		
Ratio: WA population 25-29/ population 23-29		-0.119 **	
Ratio: WA population 45+/ population 17+			-0.009 **
Total state appropriations to public 4-year institutions (mil\$)	0.008 **		
Total state appropriations to public 4-year institutions (Log.)			0.170 **
Total loans and workstudy subsidies per person 17-24	0.002 **		
Total loans and workstudy subsidies per person 17-24 (Lag 1 year)		0.002 **	
Average wages of 18-24 workers with some college (Log., lag 2 years)		1.337 **	
Diff. in avg. earnings: some college vs. HS graduates (Lag 2 years)	0.0002 **		
WA unemployment rate	0.077 **		-0.009 **
Difference in unemployment rates: WA vs. US		0.066 **	
WA total nonagricultural employment (Log.)			-0.314 **
Capping effect (dummy variable)		-0.769 **	-0.035 **
Vietnam War effect (dummy variable)	0.377 **		
MA(1)		-0.990 **	
Adjusted R-squared	0.93	0.96	0.92
Durbin-Watson statistics	2.31	1.81	2.17

	Community College (State-funded, FTE)		
	Age 17-22	Age 23-29	Age 30-44
Constant	-208.158 **	4.669 **	
Ratio: WA population 35-44/ population 17+			-0.068 **
Ratio: net cost (tuition-grants)/ per capita income		-28.410 *	
Total state appropriations to public 2-year institutions (Log.)			0.179 **
Diff. in avg. earnings: some college vs. HS graduates (Lag 2 years)	0.0002 **		
Share of WA pop. in counties with community colleges	234.426 **		
Public 4-year part. rate of age group 17-22 (Lag 1 year)	0.462 **		
Capping effect (dummy variable)	-1.267 **	-0.705 **	-0.266 **
AR(1)		0.781 **	
MA(1)	-0.931 **		
MA(2)			-0.980 **
Adjusted R-squared	0.89	0.92	0.87
Durbin-Watson statistics	1.81	1.79	2.38

* Significant at 10 percent level

** Significant at 5 percent level

Enrollment Forecasts (Time Series Model II)

Fiscal Year	Enrollment Forecast (State-funded FTE)	
	Public 4-year	Community College*
1995	77,614	97,700
2000	84,375	100,544
2010	104,284	123,999
2020	107,070	134,348

*The forecast here only covers community college enrollment, so they are lower than those presented in Section 1 of this report

Participation Rate Forecast

Fiscal Year	17-22	23-29	30+
<i>Public 4-Year (state-funded, headcount)</i>			
1995	11.61	4.19	0.49
2000	11.95	4.40	0.43
2010	12.51	4.51	0.35
2020	12.86	4.27	0.32
<i>Community colleges (state-funded, FTE)</i>			
1995	10.07	4.21	1.15
2000	9.76	3.95	1.05
2010	10.05	3.88	1.08
2020	10.21	3.90	1.10

Forecasting assumptions:

1. OFM population forecast (by age) for the state of Washington
2. Average cost (tuition-grants) in constant dollars remains the same as the 1997 level
3. OFM long-term forecast of Washington per capita income
4. Average wage rate, in constant dollars, of high school graduates in age group 18-24 remain the same as the 1997 level
5. Average state higher education expenditure grows at 4.95 percent per year, which is a combined rate of the projected population and personal income growth, and a long-term inflation rate of 3 percent
6. Loans and workstudy subsidies per capita 17-24, in constant dollars, remains the same as the 1997 level
7. OFM long-term forecast of Washington unemployment rate
8. Share of Washington population in counties with CC's unchanged from the 1997 level
9. OFM long-term forecast of Washington non-agriculture employment
10. CC participation rate of population age 45+ remains the same as the 1996 level

High and Low Enrollment Forecasts (Time Series Model II)

Public 4-Year Enrollment (State-funded, FTE)					
	Baseline	High	From Baseline	Low	From Baseline
1995	76,624				
2000	84,375	86,528	2.6%	80,439	-4.7%
2005	94,123	98,865	5.0%	91,397	-2.9%
2010	104,284	110,137	5.6%	101,280	-2.9%
2015	107,674	114,437	6.3%	104,099	-3.3%
2020	107,070	114,706	7.1%	103,369	-3.5%

Community College Enrollment (State-funded, FTE)					
	Baseline	High	From Baseline	Low	From Baseline
1995	97,580				
2000	100,544	104,968	4.4%	98,238	-2.3%
2005	111,061	120,083	8.1%	106,323	-4.3%
2010	123,999	133,935	8.0%	118,399	-4.5%
2015	130,619	140,697	7.7%	124,296	-4.8%
2020	134,348	144,536	7.6%	127,521	-5.1%

Factor Effect on Enrollment (Time Series Model II)

	1996/97 Level	1% Increase	Enrollment Impact	
			Public 4-Year (Headcount)	Community College (FTE)
Average wages of people with some college	\$9,126	\$91.26	69	
Total state appropriations to public 4-year institutions (mil\$)	\$347.0	\$3.47	175	
Total state appropriations to 2-year institutions	\$223.8	\$2.24		25
Total loans and workstudy subsidies per person 17-24	\$813.3	\$8.13	120	
WA non-agriculture employment	2,515.4	25.15	-100	
WA unemployment rate	4.8	1.0	55	
Net cost (tuition-grants)	304.0	3.04		-17
Share of WA pop. In counties with community colleges	0.912	0.009		9254