

A light-colored dog is lying on its back on a light blue surface. The dog is holding a rectangular sign on a stick that says "CISOA AND RP GROUP" in hand-drawn letters. The background is a soft, light blue gradient.

CISOA AND
RP GROUP

Developing an Economic Service Area Index (ESAI) for California Community Colleges

Alice van Ommeren

Catharine Liddicoat

LeAnn Fong-Batkin



Goals of the Presentation

- Methodology of the ESAI
- Findings by College
- Limitations of the ESAI
- Utilization of the ESAI
- Resources and References



Definition of the ESAI

The Economic Service Area Index (ESAI) represents the economic conditions for the actual geographic areas served by a community college.



Background and Research

- Income is significant predictor of educational outcomes
- Colleges do not always serve the county population
- No income information in the CCC database system
- Linking student ZIP codes with Census income data



Data Sources

California Community College MIS

- Students in Fall 2000
- ZIP code of residence
- Community college attended

Census 2000

- ZCTA level income data (1999)
 - Median Household, Family, Nonfamily Household and Per Capita Income



Fall 2000 Enrollment Data

- Student and Enrollment data from the System Office MIS
- Limited to Fall 2000 Semester/Quarter
- Limited to students taking credit courses ("active")
- Requested College ID (CID), ZIP Code, Count of Student ID numbers



Student ZIP Code Data

	Number	Percent
Valid ZIP codes (CA, AZ, NV)	1,330,357	97.4%
Other ZIP codes (P.O. Box)	5,405	.4%
Missing ZIP codes (XXXXX)	29,454	2.2%
Total	1,365,216	100%

Census 2000 Data

Income Data (Summary File 3):

- Household Median Income
- Family Median Income
- Nonfamily Household Income
- Per Capita Income



ZIP Code Characteristics

- “Zone Improvement Plan” codes were established by the U.S. Postal Service
- Not spatial entities but categories for grouping mailing addresses
- Average population is 30,000, larger than Census block groups or tracts
- Discontinuation and addition of ZIP codes over time



ZCTA Characteristics

- “ZIP Code Tabulation Areas” developed by U.S. Census (2000)
- ZCTA represent the majority of ZIP codes in a Census block
- Most five-digit ZCTA codes equal five-digit ZIP codes
- Exclusions were ZIP codes for:
 - specific companies or organizations
 - P.O. Boxes and General Delivery
 - Only a few addresses



ZCTA Delineation

Census Tract 12 – Block 1102

Street Address	ZIP Code	ZCTA
1 Dee Street	22345	22345
3 Dee Street	22345	22345
9 Dee Street	22345	22345
10 Jullian Drive	22345	22345
105 May Road	22346	22345
Majority ZIP: 22345		

ZIP and ZCTA Differences

- “ZCTAs are close cousins of ZIP codes”
- ZIP codes change over time, ZCTAs do not change
- ZCTAs follow Census block boundaries and ZIP code serve addresses
- Therefore:
 - ZCTA can include several ZIP codes
 - ZIP code can include several ZCTAs



Methodology of the ESAI

- Determine the proportion of students in a college by ZIP code
- “Weighted Average” of the ZCTA income data for each ZIP code
- Summed to provided a weighted income index for each college
- Referred to as an Economic Service Area Index (ESAI)



College “X”

Student ZIP Codes (A)	Proportion of Students (B)	ZCTA Income (C)	Weighted Income (B x C)
95201	.40	\$30,000	\$12,000
95203	.30	\$35,000	\$10,500
95204	.15	\$25,000	\$3,750
95208	.10	\$20,000	\$2,000
95209	.05	\$45,000	\$2,250
Total	1.00		\$30,500

Statewide Average ESAI and County Income

	ESAI Average	County Average
Household Median Income	\$46,881	\$48,998
Family Median Income	\$52,777	\$55,319
Non-Family Median Income	\$30,239	\$32,587
Per Capita Income	\$21,473	\$23,142





ESAI and County Income

Correlations

Household Median Income, $r = 0.79^{**}$

Family Median Income, $r = 0.78^{**}$

Non-Family Median Income, $r = 0.83^{**}$

Per Capita Income, $r = 0.77^{**}$

*** Significant at the 0.01 level (2-tailed)*



ESAI and Outcome Variables

- Dependent/Outcome Variable
 - Student Progress Rate
 - Transfer Rate
- Independent/Predictor Variable
 - Student Academic Preparedness (SAAP)
 - Economic Service Area Index (ESAI)



Student Average Academic Preparation (SAAP)

- Developed by Bahr, Hom & Perry (2004)
- Public High School Students (1998-99)
- Stanford-9 → API (index)
- Match with Fall 2000 CCC students
- No SSN or Unique Identifiers
- “Fuzzy Match” process



The “Fuzzy Match” Process

- Combining variables to connect students across datasets.
- Gender, date of birth, race/ethnicity and high school of origin
- Match rate was 51.9%, average SAAP was 47.77
- College SAAP is the mean of the average test scores of the matched H.S. students.



Regression Model with ESAI

- Used SAAP and ESAI to examine effects of preparation and income on outcome variables:
 - Progress Rate
 - Transfer Rate
- Applied hierarchical multiple regression



Regression Concepts

- Outcome = Constant + Predictor₁ + Predictor₂ + Predictor_n
- Example: Transfer Rate = Constant + HS Preparedness + Income Index



Regression Model Results

- Progress Rate
 - SAAP, $R^2_{adj} = .337$
 - SAAP and ESAI, $R^2_{adj} = .443$
- Transfer Rate
 - SAAP, $R^2_{adj} = .309$
 - SAAP and ESAI, $R^2_{adj} = .447$



Regression Example

Transfer Rate for Community College "X" =
 $-10.756 + .576$ (SAAP Index for College X) +
 $.0002636$ (ESAI for College X)

Regression Model:

Constant = -10.756

Regression Coefficient for SAAP = .576

Regression Coefficient for ESAI = .0002636

Utilization of the ESAI

- Adjust for exogenous variables that affect college outcomes
- Peer group or clustering of colleges based on exogenous variables
- Other research studies that include economic condition of the college (fee impact, enrollment, etc.)



Other Considerations

- ESAI is an aggregate proxy for student income (element of bias)
- Additional variables to the economic index (housing, unemployment, etc.)
- Creating a socioeconomic Index (education, occupation, etc.)
- Caution related to Ecological Fallacy (conclusion about individuals based on group data)



Presentation Handouts

- Community College and ESAI
 - County Household Median Income
 - Difference between ESAI
 - Missing and Invalid ZIP codes
- Reference
 - Literature
 - Census Data



Thank You

Alice van Ommeren

avanommeren@ccco.edu

Catharine Liddicoat

cliddicoat@cccoco.edu

LeAnn Fong-Batkin

lfongbatkin@cccoco.edu