

# WORKSHOP IN POLITICAL THEORY & POLICY ANALYSIS

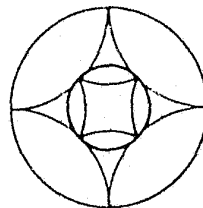
## Police Services Study Technical Report

T-15

MEASURES OF METROPOLITAN POLICE INDUSTRY STRUCTURE -  
SERVICE STRUCTURE MATRICES FOR THE ALBANY GEORGIA SMSA

by

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Public service industries, such as police, have often been described as "fragmented," containing little "coordination" between numerous "autonomous" agencies. Yet adequate discussion and empirical analysis of the operation of public service industries requires concise definition of the terms used to describe interorganizational arrangements. Such definition requires a procedure for measurement. Standardized definitions and operationalizations permit comparisons between metropolitan areas.

In Chapter 3, "Service Delivery Patterns" of Patterns of Metropolitan Policing, we propose definitions and a procedure for measuring the structure of organizational arrangements for policing in metropolitan areas.<sup>1</sup> In this report, service structure matrices for the Albany/Georgia SMSA illustrate the computation of the measures of metropolitan structure used during Phase I of our research.<sup>2</sup>

For each of 10 police services, half of which we have classified as "direct" and half as "auxiliary," we have arrayed the consumers and producers on a matrix. The former occupy the columns and the latter the rows. For the direct services, columns in the matrix will be the organized consumption units within the metropolitan area. For the auxiliary services, the matrix columns are these producers of direct services which are now consumers of the auxiliary service in question. These will include agencies

which receive services from internal units (e.g., a municipal police department with its own dispatcher) as well as agencies receiving the service from another agency (e.g., a municipal department which relies upon the county sheriff for detention service). Each cell in a matrix identifies a dyadic relationship between one producer and one consumer for a particular service. Thus, the entire matrix for a service will define all relationships between consumers and producers within a metropolitan area for that service. The general form of a service structure matrix is shown in Fig. 1.

Within each cell of a matrix as many as six code letters, referred to as Service Code Indicators in Fig. 1, may appear to describe relationship between a producer and a consumer. Of primary importance is the first letter which describes the provision of police services by the producer to the consumer as irregular (I), regular (R), coordinated (C) or alternated (A).<sup>4</sup> The second code describes the relationship as written (W), unwritten (U), or own (O). The third code indicates whether or not the service is produced for a fee (F = fee, N = no fee) or if it is produced by own (O). The last three codes are used only to describe "alternate" relationships. The fourth code describes whether or not the alternate producer serves the consumer exclusively (E) or non-exclusively (N). This code is used to identify service duplication by alternate producers. Does this producer alternate with another in Time (T), Space (S) or Clientele (C)? The fifth code permits identification of type of alternate production of service. A final code indicates the location of alternate service provision. This code describes a restricted clientele or geographic area. (The sixth code will appear in the fourth position and may be used only after the five other codes.)

Figure 1. General Form of a Service Structure Matrix

Service K

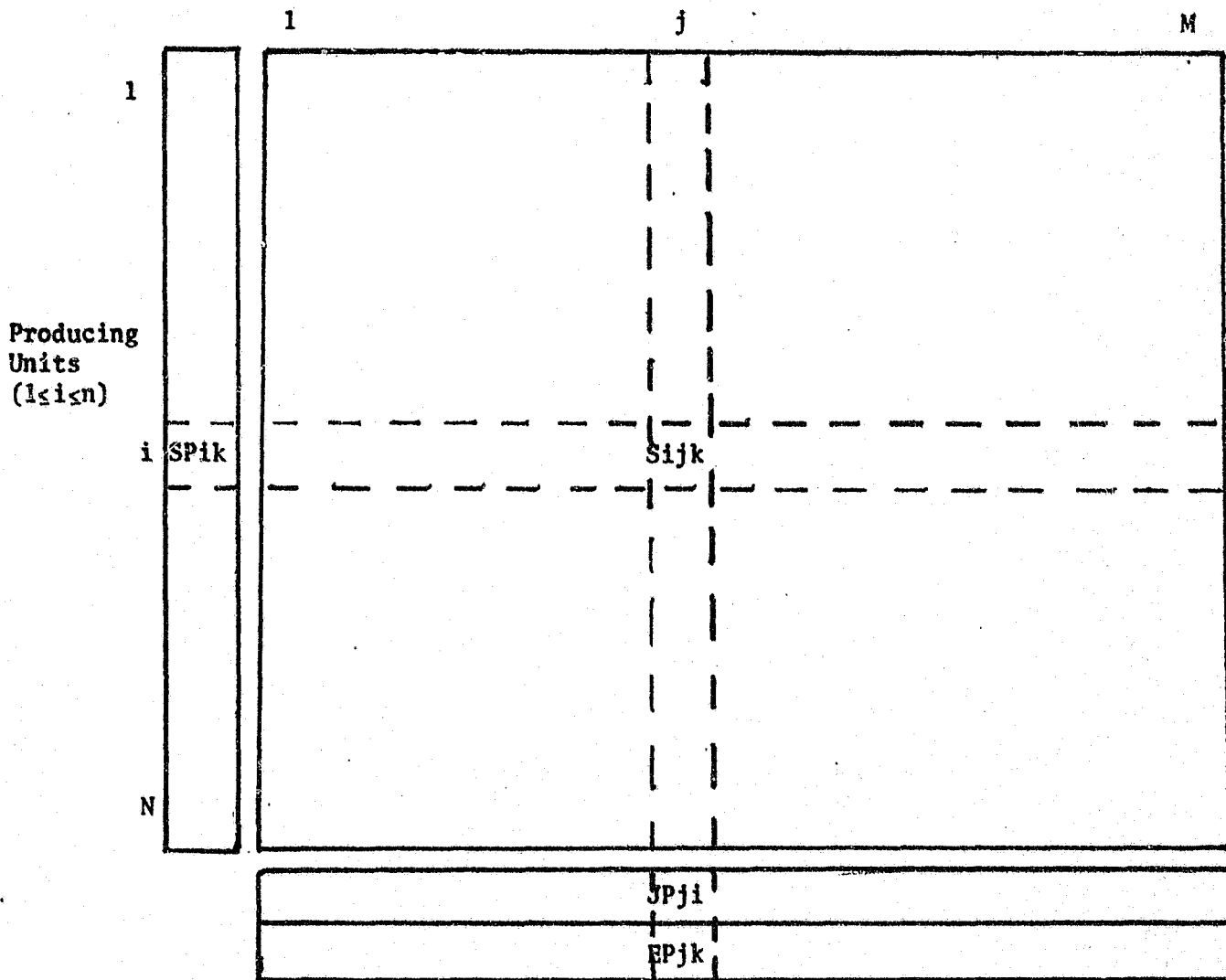
Consuming Units<sup>a</sup> $(1 \leq j \leq m)$ 

Figure 1 continued

Definitions of Matrix Terminology

$S_{ijk}$  -- Service Flow Indicator with the following possible values:

- R = Producing unit i regularly provides service k to consuming unit j without coordination or alternation.
- I = Producing unit i irregularly provides service k to consuming unit j.
- C = Producing unit i regularly provides service k to consuming unit j in coordination with some other producing unit for service k.
- A = Producing unit i regularly provides a portion of service k to consuming unit j, that is, unit i is an alternate provider (in terms of either time, space, or clientele) of service k to consuming unit j.
- = a blank indicated that producing unit i is not involved (even irregularly) in providing service k to consuming unit j.

$SP_{ik}$  -- Serviced population for producing unit i and service k. This is the sum of  $p_j$  over row i for columns where  $s_{ijk}$  is equal to R, C, or A. (for direct services only).

$JP_{jk}$  -- Population of consuming unit j of service k (for direct services only).

$EP_{jk}$  -- Population of consuming unit j excluding all enclaves within its boundaries (for direct services only).

Letter AbbreviationType of Place

A	Airport
B	Bus Station
C	Non-Residential College
D	Park
E	Shopping Center
F	Freeways, Interstate, or other Limited Access Roads
G	State Capitol District
H	Hospital
I	Harbor or Port
M	Military Base
O	Other Roads
P	Prison
R	Railroad Station
S	School Police Force
T	Toll Roads

For each service 23 structural measures will appear below the matrix in addition to two SMSA population figures -- SMSA POP and SMSA P1. (The latter is simply the SMSA population divided by 100,000. SMSA P1 is used in computing several of the "relative" measures to prevent extreme variations in orders of magnitude between measures.) However, all 23 have meaning only with respect to direct services. Only 12 of these measures are meaningful for the auxiliary services. The reason for this difference between direct and auxiliary services centers on the question - "who are the consumers." For each of the direct services, the consumer may be conceptualized as the service area or the individual citizen within that unit. As a result we compute two numbers for most of the structural measures with the first using the number of service areas as the denominator and the second -- termed a "relative" measure -- using the sum of the number of citizens within each service area. For auxiliary services, the conceptualization of "consumer" is the police agency which uses services produced by itself or another agency. Therefore, none of the

"relative" measures, except "REL MUL 2" is valid. These relative measures should be equal to .0000 for all auxiliary services.

The distinction between auxiliary and direct services in terms of the conceptualization of "consumer" is also manifest in the service matrices. Each of the direct service matrices contains information regarding the population of the consuming units; auxiliary service matrices contain no such information. In dealing with the notion of consumer population we have found it useful to make several distinctions. Two rows of population figures appear at the bottom of the matrix and refer to each column or organized consuming unit. "Total pop" is the 1970 census population of the consuming unit. "Exclusive Total pop" is a proper subset of "Total pop." It is an enumeration of the population of the unit which does not overlap with the enclaves (municipalities, townships, campuses, etc.) within its boundaries. Referring to the "Burglary" matrix (Table 1) of the Albany, Georgia SMSA, the 1970 population for each of the four consuming units is listed in the first row under the matrix. The city of Albany, the Marine Corps Center, and Albany State College are all located within Dougherty County. Subtracting their population from the county population leaves an exclusive population of 13,394 for Dougherty County. The third population total appears directly under the name of each producer. This "Total pop" is the total population which the police agency serves and is equal to the sum of the exclusive populations of each of the agency's service areas. For example, again referring to the burglary matrix, the Dougherty County Police Department serves both Dougherty County and the Albany State College campus. The sum of their exclusive populations,



13,394 and 1,803, equals the total population the Dougherty County Police Department serves, 15,197.

The methodology for computing the population served by each producer and the exclusive population of each consuming unit is completely general.<sup>5</sup> Characteristics of each consumer can be identified. With this information it is possible to describe the characteristics of the serviced populations. As examples, we have also calculated the following characteristics of each serviced population from census data: racial composition, percent below the poverty line, age composition, and median value of housing.

A final note before discussing the service structure of the Albany/Georgia SMSA. In the computation of all structural measures, the I's (cell entries denoting "irregular producer") have been excluded for the current analysis. As a result, those rows and columns which exist solely due to "I" entries are ignored. Future analyses of our service charts including "I" entries may facilitate understanding of police backup capabilities.

#### Measures of Burglary Investigation (Table 1)

1. Fragmentation = Number of service areas (consuming units) for burglary
  - = Number of columns on the matrix having at least one R, A, or C
  - = 4.0 (all of the consumers in the SMSA for burglary -- Dougherty County, Albany, Marine Corps Center, Albany State College)

2. Relative Fragmentation = Number of service areas for burglary  
per 1,000 residents  
= Fragmentation divided by SMSAP1  
=  $4.0 / .89694 = 4.44623$
3. Multiplicity = Number of producers of burglary investigation  
services  
= Number of rows having at least one R, A, or C  
= 7.0 (of the 8 producers of burglary investigation, the Georgia Bureau of Investigation is not counted because it produces only irregularly for the consumers within the Albany SMSA)
4. Relative Multiplicity 1 = Number of producers of burglary investigation services per 100,000 residents  
= Multiplicity divided by SMSAP1  
=  $7.0 / .89694 = 7.8090$
5. Relative Multiplicity 2 = Number of producers of burglary investigation services per consuming unit  
= Multiplicity divided by fragmentation  
=  $7.0 / 4.0 = 1.750$
6. Independence = Number of service areas receiving burglary investigations services from their own producer divided by the total number of service areas  
= Number of columns having at least one RO, AO, or CO entry divided by fragmentation  
=  $4.0 / 4.0 = 1.000$   
(All four columns contain at least one entry RO, CO, and AO indicating service provision by their

"own" producer -- Dougherty County by the Dougherty Sheriff and an independent Dougherty County Police Department, Albany by the Albany Police Department, the Marine Corps Center by its own base security, and Albany State College by its own campus police force.)

7. Relative Independence = The proportion of the SMSA population served by their own producer

= Sum of the exclusive populations of the consuming units (columns) having at least one RO, AO, or CO entry divided by SMSAPOPOP

=  $(13,394 + 72,623 + 1,819 + 1,803)/89,639 = 1.00$

(As in the independence measure, all consumers have their own producer. Therefore, relative independence is computed as its highest value. All remaining "relative" measures will be computed in a similar manner, i.e. the sum of exclusive populations meeting certain criteria divided by SMSAPOPOP.

8. Exclusive Independence = Number of consuming units served by only their own producer on a regular basis

= Number of columns having an RO entry and no other divided by fragmentation

=  $1.0/4.0 = .250$  (The only relationship which fits the criteria for this measure is that between Albany and its own police agency.)

9. Relative Exclusive Independence =  $72,623/89,639 = .8102$

10. Nominal Duplication = Number of consuming units receiving service from more than one producer divided by the number of consuming units

= Number of columns with more than one R, A, or C divided by fragmentation

=  $3.0/4.0 = .750$  (Dougherty County is served by the coordinated production arrangements of the Dougherty Sheriff and the Dougherty County Police Department. The Marine Corps Center is served alternately by their base security, the FBI, and the Marine Corps Criminal Investigations Division. Burglary investigation services of the Albany State College campus are coordinated between the campus police and both county police agencies.)

11. Relative Nominal Duplication =  $(13,394 + 1,819 + 1,803)/89,639 = .1898$

12. Strict Duplication = Number of consuming units receiving regular service from more than one producer without coordination or exclusive alternation divided by the number of consuming units

= Number of columns having two or more R's divided by fragmentation

=  $0.0/4.0 = 0.00$

13. Relative Strict Duplication =  $0/89,639 = 0$

14. Strict Coordination = Number of consuming units receiving burglary investigations services from a coordinated arrangement between two or more producers divided by the total number of consuming units

= Number of columns with two or more C's divided by  
fragmentation

$$= 2.0/4.0 = .50$$

$$15. \text{ Relative Strict Coordination} = (13,394 + 1,803)/89,639 = .1695$$

16. Alternate Coordination = Number of consuming units receiving burglary

investigation service from a coordinated arrange-

ment between two producers or from an alternate

arrangement involving clientele coordination

(the CC relationship for the Marine Corps Center),

divided by the total number of consuming units

= Number of columns having two or more C's or AXX

CC's divided by fragmentation

$$= 3.0/4.0 = 0.75$$

$$17. \text{ Relative Alternate Coordination} = (13,394 + 1,819 + 1,803)/89,639$$

$$= .1898$$

18. Strict Alternation = Number of consuming units receiving service

from alternating producers in time, space, or clien-

tele divided by the total number of service areas

= Number of columns having one or more A's divided

by fragmentation

$$= 1.0/4.0 = .250 \quad (\text{The Marine Corps Center receives}$$

services from three agencies which alternate

services on the basis of clientele.)

$$19. \text{ Relative Strict Alternation} = 1,819/89,639 = .0203$$

20. Non-Coordinated Alternation = Number of consuming units receiving

service from alternating producers who do not

coordinate their alternation divided by the number  
of consuming units

= Number of columns with two or more AXX's but no CC's  
divided by fragmentation

$$= 0/4.0 = 0$$

21. Relative Non-Coordinated Alternation =  $0/89,639$

$$= 0$$

22. Dominance = Number of service areas receiving regular, alternate,  
or coordinated service from the producer with the  
largest serviced population divided by the total  
number of service areas

= Number of columns (excluding I's) served by the  
producer with the largest "Total pop" in its row  
divided by fragmentation

$$= 1.0/4.0 = .250$$

23. Relative Dominance =  $72,623/89,639 = .8102$

#### Measures of Homicide Investigation (Table 2)

The structure of the police industry providing homicide investigation services to the Albany/Georgia SMSA differs from the structure for burglary investigation. The primary difference is the change in the status of the Albany State College campus as a consuming unit -- it is not organized to receive homicide services and therefore becomes classified as part of the county -- and the loss of the Albany State College campus police which do not handle homicide investigations. These are handled by the two county agencies. The results of these changes are reflected in the measures below:

1. Fragmentation = 3.000

2. Relative Fragmentation =  $3.000/.8964 = 3.3468$

3. Multiplicity = 5.000
4. Relative Multiplicity 1 =  $5.000/.8964 = 5.5779$
5. Relative Multiplicity 2 =  $5.0/3.0 = 1.6667$
6. Independence =  $2.0/3.0 = .6667$
7. Relative Independence =  $(15,197 + 72,623)/89,639 = .9797$
8. Exclusive Independence =  $1.0/3.0 = .333$
9. Relative Exclusive Independence =  $72,623/89,639 = .8102$
10. Nominal Duplication =  $2.0/3.0 = .6667$
11. Relative Nominal Duplication =  $(15,197 + 1,819)/89,639 = .1898$
12. Strict Duplication =  $0.0/3.0 = 0.00$
13. Relative Strict Duplication =  $0/89,639 = 0$
14. Strict Coordination =  $1.0/3.0 = .333$
15. Relative Strict Coordination =  $15,197/89,639 = .1695$
16. Alternate Coordination =  $2.0/3.0 = .6667$
17. Relative Alternate Coordination =  $(15,197 + 1,819)/89,639 = .1898$
18. Strict Alternation =  $1.0/3.0 = .333$
19. Relative Strict Alternation =  $1,819/89,639 = .0203$
20. Non-Coordinated Alternation =  $0.0/3.0 = 0.00$
21. Relative Non-Coordinated Alternation =  $0/89,639 = 0$
22. Dominance =  $1.0/3.0 = .333$
23. Relative Dominance =  $72,623/89,639 = .8102$

Measures of Detention (Table 8)

An example of the relationships between police agencies in the pro-

duction and consumption of auxiliary services can be seen in the service matrix for detention. Here the producers of direct services are seen as the consumers of the auxiliary services produced by detention "specialists." (The definitions for auxiliary service structural measures can be made equivalent to the definitions for direct service structural measures by adding "police" to "consuming unit.") The computations for the detention measures are shown below: (As noted previously, all "relative" measures except "Relative Multiplicity 2" are not meaningful for auxiliary services and they appear as 0.000 on the computer printout.)

1. Fragmentation = 8.000 (This is the total of the seven regular producers seen in the burglary matrix with the addition of the Georgia State Patrol.)
2. Multiplicity = 2.000 (Dougherty County Sheriff and the Marine Detention Center produce detention service in the Albany SMSA.)
3. Relative Multiplicity 2 =  $2.00/8.00 = .250$
4. Independence =  $1.00/8.00 = .1250$
5. Exclusive Independence =  $1.00/8.00 = .1250$
6. Nominal Duplication =  $0/8.00 = .000$
7. Strict Duplication =  $0/8.00 = .000$
8. Strict Coordination =  $0/8.00 = .000$
9. Alternate Coordination =  $0/8.00 = .000$
10. Strict Alternation =  $0/8.00 = .000$
11. Non-Coordinated Alternation =  $0/8.00 = .000$
12. Dominance = Number of column served by the producer which serves



the largest number of columns divided by fragmentation  
 $= 6.00/8.00 = .750$

Table 1

ALBANY, GA  
7 PRODUCERS

4 CONSUMERS IN THIS SMSA

0120

SERVICE - BURGLARY

COUNTY - 095

75/12/02.

		DOUGHERTY	ALBANY	MARINE	ALBANY
		ERTY	Y	E COR	Y STA
				PS CE	TE CC
				ATER	LIEGE
		30 2	00 2	25 2	20 2
		0004	0002	0003	0005
ALBANY					
TOTALPOP -	50 1 0002	1001	ROO		
	72623				
MARINE CORPS CENTER					
TOTALPOP -	25 1 0003			ACC CC	
	1819				
DOUGHERTY					
TOTALPOP -	40 1 0004	COO			CUN
	15197				
ALBANY STATE COLLEGE					
SECURITY					
TOTALPOP -	20 1 0005				COO
	1803				
DOUGHERTY COUNTY PJL					
ICE DEPARTMENT					
TOTALPOP -	42 1 0006	COO			CUN
	15197				
GEORGIA BUREAU OF IN					
VESTIGATION					
TOTALPOP -	45 1 0010	IUN			
	0				
FED BUREAU OF INVEST					
IGATION					
TOTALPOP -	50 1 0015			AUN CC	
	1803				
MARINE CORPS CID					
TOTALPOP -	25 1 0017			AUN CC	
	1819				
TOTALPOP	59639	72623	1819	1803	
EXCLUSIVE TOTALPOP	13394	72623	1819	1803	

SMSAPLP- 39639.0 SMSAP1- .8984 FRAG- 4.0000 REL FRAG- 4.4623 MUL- 7.0000  
 REL MUL1- 7.8191 REL MUL2- 1.7500 INDEP- 1.0000 REL INDEP- 1.0000  
 EXCLU INDEP- .2500 REL EXCLU INDEP- .8102 NON DUP- .7500 REL NON DUP- .1898  
 STRICT COOR- .5000 REL STRICT COOR- .1695 ALTERNATE COOR- .7500 REL ALTERNATE COOR- .1898  
 NON-COOR ALTER- 0.0000 REL NON-COOR ALTER- 0.0000 STRICT ALTER- .2500 REL STRICT ALTER- .0203  
 STRICT DUP- 0.0000 REL DUP- 0.0000 DGM- .2500 REL DGM- .8102

Table 2

ALBANY, GA 0120 SERVICE - HOMICIDE COUNTY - 095 75/12/02.  
 5 PRODUCERS 3 CONSUMERS IN THIS SMSA

I	DOUGH	I	ALBAN	I	MARIN	I
I	FRY	I	Y	I	E COR	I
I		I		I	PS CE	I
I		I		I	NTER	I
I		I		I		I
I		I		I		I
I		I		I		I
I		I		I		I
I	30 2	I	00 2	I	25 2	I
I	0004	I	0002	I	0003	I
ALBANY						
00 1 0002	I IUN		I RDO			
TOTALPOP - 72623						
DOUGHERTY						
40 1 0004	I CDD					
TOTALPOP - 15197						
DOUGHERTY COUNTY POL						
ICE DEPARTMENT						
42 1 0006	I CCO					
TOTALPOP - 15197						
GEORGIA BUREAU OF IN						
VESTIGATION						
45 1 0010	I IUN					
TOTALPOP - 0						
FED BUREAU OF INVEST						
IGATION						
50 1 0015	I			I AUN CC		
TOTALPOP - 1819						
MARINE CORPS CID						
25 1 0017	I			I AUN CC		
TOTALPOP - 1819						
TOTALPOP	89639	72623	1819			
EXCLUSIVE TOTALPOP	15197	72623	1819			

SMSAPI- 89639.0 SNSAPI- .8964 FRAG- 3.0000 REL FRAG- 3.3468 MUL- 5.0000  
 REL MUL1- 5.5779 REL MUL2- 1.6667 INDEP- .6667 REL INDEP- .9797  
 EXCLU INDEP- .3333 REL EXCLU INDEP- .8102 NOM DUP- .6667 REL NOM DUP- .1898  
 STRICT COOR- .3333 REL STRICT COOR- .1695 ALTERNATE COOR- .6667 REL ALTERNATE COOR- .1898  
 NON-COOR ALTER- 0.0000 REL NON-COOR ALTER- 0.0000 STRICT ALTER- .3333 REL STRICT ALTER- .0203  
 STRICT DUP- 0.0000 REL DUP- 0.0000 DUM- .3333 REL DUM- .8102

Table 3

ALBANY, GA  
5 PRCDUERS

5 CONSUMERS IN THIS SMSA

0120

SERVICE - PATROL

COUNTY - 095

75/12/02.

	DOUGHERTY	ALBANY	MARINE CORPS CENTER	MARINE CORPS CENTER	ALBANY STATE COLLEGE SECURITY
	30 2	00 2	25 2	50 2	20 2
	0004	0002	0003	0012	0005
ALBANY					
TOTALPOP -	72623				
MARINE CORPS CENTER					
TOTALPOP -	1819				
DOUGHERTY					
TOTALPOP -	13394				
ALBANY STATE COLLEGE SECURITY					
TOTALPOP -	1803				
DOUGHERTY COUNTY POLICE DEPARTMENT					
TOTALPOP -	13394				

TOTALPOP 89639 72623 1819 0 1803

EXCLUSIVE TOTALPOP 13394 72623 1819 -9 1803

SMSAPOP- 89639.0 SMSAP1- .8964 FRAG- 5.0000 REL FRAG- 5.5779 MUL- 5.0000  
 REL MUL1- 5.5779 REL MUL2- 1.0000 INDEP- .8000 REL INDEP- 1.0000  
 EXCLU INDEP- .6000 REL EXCLU INDEP- .8506 NOM DUP- .2000 REL NOM DUP- .1494  
 STRICT COOR- .2000 REL STRICT COOR- .1494 ALTERNATE COOR- .2000 REL ALTERNATE COOR- .1494  
 NON-COOR ALTER- .2000 REL NON-COOR ALTER- .1494 STRICT ALTER- .2000 REL STRICT ALTER- .1494  
 STRICT DUP- 0.0000 REL DUP- 0.0000 DCM- .4000 REL DCM- .8102

### Table 4

ALBANY, GA  
5 PRODUCERS

5 CONSUMERS IN THIS SNEA

0120

SERVICE - TEAF PATRL

COUNTY - 095

75/12/02.

	ALBANY	MARINE CORPS CENTER	MARINE SECURITY VICE AREA	ALBANY STATE COLLEGE	DOUGHERTY COUNTY POLICE DEPARTMENT
	00 2 0002	25 2 0003	50 2 0012	20 2 0005	30 2 0004
ALBANY					
TOTAL POP - 00 1 0002	72623	ROO			
MARINE CORPS CENTER					
TOTAL POP - 25 1 0003	1819	ROO	RUN		
ALBANY STATE COLLEGE SECURITY					
TOTAL POP - 20 1 0005	1803			ROO	
DOUGHERTY COUNTY POLICE DEPARTMENT					
TOTAL POP - 42 1 0006	13394				ROO
GEORGIA STATE PATROL					
TOTAL POP - 45 1 0008	0				AOUND NS

TOTALPCP	72623	1819	0	1803	89639
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EXCLUSIVE TOTAL PJP	72623	1819	-9	1803	13394
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SMSAPDP-      89635.0 SMSAPI-      .8964 FRAG- 5.0200 REL FRAG- 5.5779 MUL- 5.0000
REL MUL1- 5.5779 REL MUL2- 1.0000 IND=P- .8000 REL INDEP- 1.0000
EXCLU INDEP- .6000 REL EXCLU INDEP- .8506 NCM DUP- .2000 REL NCM DUP- .1494
STRICT COOR- 0.0000 REL STRICT COOR- 0.0000 ALTERNATE COOR- 0.0000 REL ALTERNATE COOR- 0.0000
NCN-COOR ALTER- .2000 REL NCN-COOR ALTER- .1494 STRICT ALTER- .2000 REL STRICT ALTER- .1494
STRICT DUP- 0.0000 REL DUP- 0.0000 DOM- .2000 REL DOM- .8102

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Table 5

ALBANY, CA  
5 PRODUCERS

4 CONSUMERS IN THIS SMSA

0120

SERVICE - TRAF INVS

COUNTY - 095

75/12/02.

	I	ALBAN	I	DOUGH	I	MARIN	I	ALBAN	I
	I	Y	I	FRY	I	E COR	I	Y STA	I
	I		I		I	PS CE	I	TE CO	I
	I		I		I	NTER	I	LLEGE	I
	I		I		I		I		I
	I		I		I		I		I
	I		I		I		I		I
	I		I		I		I		I
	I		I		I		I		I
	I	00 2	I	30 2	I	25 2	I	20 2	I
	I	0002	I	0004	I	0003	I	0005	I
ALBANY	I		I		I		I		I
	I		I		I		I		I
00 1 0002	I	ROO	I		I		I		I
TOTALPOP -	I	72623	I		I		I		I
MARINE CORPS CENTER	I		I		I		I		I
	I		I		I		I		I
25 1 0003	I	AUN EC	I	AUN EC	I	ROO	I		I
TOTALPOP -	I	87836	I		I		I		I
ALBANY STATE COLLEGE	I		I		I		I		I
SECURITY	I		I		I		I		I
20 1 0005	I		I		I		I	ROO	I
TOTALPOP -	I	1803	I		I		I		I
DOUGHERTY COUNTY POL	I		I		I		I		I
ICE DEPARTMENT	I		I		I		I		I
42 1 0006	I		I	ROO	I		I		I
TOTALPOP -	I	13394	I		I		I		I
GEORGIA STAT. PATROL	I		I		I		I		I
	I		I		I		I		I
45 1 0008	I		I	AUNF NS	I		I		I
TOTALPOP -	I	0	I		I		I		I

TOTALPOP 72623 89639 1819 1803

EXCLUSIVE TOTALPOP 72623 13394 1819 1803

SMSAPOP- 89639.0 SMSAP1- .8964 FRAG- 4.0000 REL FRAG- 4.4623 MUL- 5.0000  
 REL MUL1- 5.5779 REL MUL2- 1.2500 INDEP- 1.0000 REL INDEP- 1.0000  
 EXCLU INDEP- .5000 REL EXCLU INDEP- .0404 NOM DUP- .5000 REL NOM DUP- .9596  
 STRICT COOR- 0.0000 REL STRICT COOR- 0.0000 ALTERNATE COOR- 0.0000 REL ALTERNATE COOR- 0.0000  
 NON-COOR ALTER- .5000 REL NON-COOR ALTER- .9596 STRICT ALTER- .5000 REL STRICT ALTER- .9596  
 STRICT DUP- 0.0000 REL DUP- 0.0000 DOM- .7500 REL DOM- .9799

Table 6

ALBANY, GA  
6 PRODUCERS

6 CONSUMERS IN THIS SMSA

0120

SERVICE - DISPATCH

75/12/02.

	ALBAN	MARIN	DOUGH	ALBAN	DOUGH	GEORG
	Y	CCR	ERTY	Y STA	ERTY	IA ST
		PS CE		TE CO	COUNT	ATE P
		NTEF		LLIGE	Y POL	ATROL
				SECU	ICE D	
				RITY	EPART	
					MENT	
	00 1	25 1	40 1	20 1	42 1	45 1
	0002	0003	0004	0005	0006	0008
ALBANY						
00 1 0002	RDD					
MARINE CORPS CENTER						
25 1 0003		RDD				
DOUGHERTY						
40 1 0004			AOD ET			
ALBANY STATE COLLEGE						
SECURITY						
20 1 0005				RDD		
DOUGHERTY COUNTY POL						
ICE DEPARTMENT						
42 1 0006			AUN ET		RDD	
GEORGIA STATE PATROL						
45 1 0008						RDD

SMSAPOP- 0.0 SMSAP1- 0.0000 FRAG- 6.0000 REL FRAG- 0.0000 MUL- 6.0000  
 REL MUL1- 0.0000 REL MUL2- 1.0000 INDEP- 1.0000 REL INDEP- 0.0000  
 EXCLU INDEP- .8333 REL EXCLU INDEP- 0.0000 NCM DUP- .1667 REL NCM DUP- 0.0000  
 STRICT COOR- 0.0000 REL STRICT COOP- 0.0000 ALTERNATE COOR- 0.0000 REL ALTERNATE COOR- 0.0000  
 NON-COOR ALTER- .1667 REL NON-COOR ALTER- 0.0000 STRICT ALTER- .1667 REL STRICT ALTER- 0.0000  
 STRICT DUP- 0.0000 REL DUP- 0.0000 DJM- .3333 REL DJM- 0.0000

Table 7

ALBANY, GA  
7 PRODUCERS

8 CONSUMERS IN THIS SMSA

0120

SERVICE - TRAINING

75/12/02.

	ALBAN	DOUGH	ALBAN	GEORG	DOUGH	GEORG	FED B	MARIN
	Y	ERTY	Y STA	IA ST	ERTY	IA BU	URFAU	E CDR
			TE CO	ATE P	COUNT	REAU	OF I	PS CE
			LLEGE	ATROL	Y POL	OF IN	NVEST	INTER
			SECU		ICE D	VESTI	IGATI	
			RITY		LPART	GATIO	ON	
					MENT	N		
	00 1	40 1	20 1	45 1	42 1	45 1	60 1	25 1
	0002	0004	0005	0008	0006	0010	0015	0003
ALBANY								
00 1 0002	ROO	RUN	RUN					
GEORGIA STATE PATROL								
45 1 0008				COO				
ABRAHAM BALDWIN COLL								
EGE					RUF			
20 2 0009								
GEORGIA BUREAU OF IN								
VESTIGATION						ROO		
45 1 0010								
GEORGIA STATE POLICE								
ACADEMY								
45 2 0011		RUF	RUF	CUN	RUF			
FED BUREAU OF INVEST								
IGATION								
60 1 0015							ROO	
ARMY MP TRAINING SCH								
COL								
25 2 0016								RUF

SMSAPOP- 3.0 SMSAPI- 0.0000 FPAG- 8.0000 REL FPAG- 0.0000 MUL- 7.0000  
 REL MUL1- 0.0000 REL MUL2- .8750 INDEP- .5000 REL INDEP- 0.0000  
 EXCLU INDEP- .3750 REL EXCLU INDEP- 0.0000 NOM DUP- .5000 REL NOM DUP- 0.0000  
 STRICT COOR- .1250 REL STRICT COOR- 0.0000 ALTERNATE COOR- .1250 REL ALTERNATE COOR- 0.0000  
 NCN-COOR ALTER- 0.0000 REL NCN-COOR ALTER- 0.0000 STRICT ALTER- 0.0000 REL STRICT ALTER- 0.0000  
 STRICT DUP- .3750 REL DUP- 0.0000 DOM- .5000 REL DOM- 0.0000



Table 8

ALBANY, GA  
2 PRODUCERS0120  
8 CONSUMERS IN THIS SMSA

SERVICE - DETENTION

75/12/02.

I	FED B	I	ALBAN	I	DOUGH	I	DOUGH	I	ALBAN	I	GEOG	I	MARIN	I	MARIN	I
I	UREAU	I	Y STA	I	ERTY	I	ERTY	I	Y	I	IA ST	I	E COR	I	E COR	I
I	DF I	I	TE CO	I		I	COUNT	I		I	ATE P	I	PS CE	I	PS CI	I
I	NVEST	I	LLEGE	I		I	Y POL	I		I	ATROL	I	NTER	I	D	I
I	IGATI	I	SECU	I		I	ICE D	I		I		I		I		I
I	ON	I	RITY	I		I	EPART	I		I		I		I		I
I		I		I		I	MENT	I		I		I		I		I
I		I		I		I		I		I		I		I		I
I		I		I		I		I		I		I		I		I
I		I		I		I		I		I		I		I		I
I	60 1	I	20 1	I	40 1	I	42 1	I	00 1	I	45 1	I	25 1	I	25 1	I
I	0015	I	0005	I	0004	I	0006	I	0002	I	0008	I	0003	I	0017	I
-----																
DOUGHERTY																
	40 1 0004	I	RUF	I	RUM	I	R00	I	RUN	I	RUF	I	RUN	I		
		I		I		I		I		I		I		I		
-----																
MARINE CENTER DETENT																
ION																
	25 1 0018	I		I		I		I		I		I	RUN	I	RUN	I
		I		I		I		I		I		I		I		
-----																

SMSADP- 0.0 SMSAP1- 0.0000 FRAG- 8.0000 REL FRAG- 0.0000 MUL- 2.0000  
 REL MUL1- 0.0000 REL MUL2- .2500 INDEP- .1250 REL INDEP- 0.0000  
 EXCLU INDEP- .1250 REL EXCLU INDEP- 0.0000 NOM DUP- 0.0000 REL NOM DUP- 0.0000  
 STRICT COOR- 0.0000 REL STRICT COOR- 0.0000 ALTERNATE COOR- 0.0000 REL ALTERNATE COOR- 0.0000  
 NON-COOR ALTER- 0.0000 REL NON-COOR ALTER- 0.0000 STRICT ALTER- 0.0000 REL STRICT ALTER- 0.0000  
 STRICT DUP- 0.0000 REL DUP- 0.0000 DDM- .7500 REL DDM- 0.0000

Table 9

ALBANY, GA  
3 PRODUCERS0120  
8 CONSUMERS IN THIS SMSA

SERVICE - CR LB-CHEM

75/12/02.

	I	MARTIN	I	MARIN	I	ALBAN	I	DOUGH	I	ALBAN	I	GEORG	I	DOUGH	I	FED B	I
	I	E COR	I	E COR	I	Y	I	ERTY	I	Y STA	I	IA ST	I	ERTY	I	UREAU	I
	I	PS CE	I	PS CT	I		I		I	TE CO	I	ATE P	I	COUNT	I	OF I	I
	I	NTER	I	D	I		I		I	LLEGE	I	ATROL	I	Y POL	I	NVEST	I
	I		I		I		I		I	SECU	I		I	ICE D	I	IGATI	I
	I		I		I		I		I	RITY	I		I	EPART	I	ON	I
	I		I		I		I		I		I		I	MENT	I		I
	I		I		I		I		I		I		I		I		I
	I	25 1	I	25 1	I	00 1	I	40 1	I	20 1	I	45 1	I	42 1	I	60 1	I
	I	0003	I	0017	I	0002	I	0004	I	0005	I	0008	I	0006	I	0015	I
FORT GORDON	I		I		I		I		I		I		I		I		I
25 2 0007	I	RUN	I	RUN	I		I		I		I		I		I		I
GEORGIA BUREAU OF INVESTIGATION	I		I		I		I		I		I		I		I		I
45 1 0010	I		I		I	RUN	I	RUN	I	RUN	I	RUN	I	RUN	I		I
FED BUREAU OF INVESTIGATION	I		I		I		I		I		I		I		I		I
60 1 0015	I		I		I		I		I		I		I		I	ROD	I

SMSAPIP- 0.0 SMSAPI- 0.0000 FRAG- 8.0000 REL FRAG- 0.0000 MUL- 3.0000  
 REL MUL1- 0.0000 REL MUL2- .3750 INDEP- .1250 REL INDEP- 0.0000  
 EXCLU INDEP- .1250 REL EXCLU INDEP- 0.0000 NOM DUP- 0.0000 REL NOM DUP- 0.0000  
 STRICT COOR- 0.0000 REL STRICT COOR- 0.0000 ALTERNATE COOR- 0.0000 REL ALTERNATE COOR- 0.0000  
 NON-COOR ALTER- 0.0000 REL NON-COOR ALTER- 0.0000 STRICT ALTER- 0.0000 REL STRICT ALTER- 0.0000  
 STRICT DUP- 0.0000 REL DUP- 0.0000 DOM- .6250 REL DOM- 0.0000

Table 10

ALBANY, GA  
3 PRODUCERS

8 CONSUMERS IN THIS SMSA 0120

SERVICE - CH LB NARC

75/12/02.

I	MARIN	I	PARIN	I	ALBAN	I	DOUGH	I	ALBAN	I	GEORG	I	DOUGH	I	FED B	I
I	E CCR	I	E CCR	I	Y	I	ERTY	I	Y STA	I	IA ST	I	ERTY	I	UREAU	I
I	PS C2	I	PS C1	I		I		I	TE CC	I	ATE P	I	COUNT	I	'OF I	I
I	NTER	I	D	I		I		I	LLEGE	I	ATROL	I	Y POL	I	NVEST	I
I		I		I		I		I	SECU	I		I	ICE D	I	IGATI	I
I		I		I		I		I	RITY	I		I	EPART	I	ON	I
I		I		I		I		I		I		I	MENT	I		I
I		I		I		I		I		I		I		I		I
I		I		I		I		I		I		I		I		I
I	25 1	I	25 1	I	00 1	I	40 1	I	20 1	I	45 1	I	42 1	I	60 1	I
I	0003	I	0017	I	0002	I	0004	I	0005	I	0008	I	0006	I	0015	I
-----																
FORT GORDON																
I		I		I		I		I		I		I		I		I
I	25 2 0007	I	RUN	I	RUN	I		I		I		I		I		I
I		I		I		I		I		I		I		I		I
-----																
GEORGIA BUREAU OF INVESTIGATION																
I		I		I		I		I		I		I		I		I
I	45 1 0010	I		I	RUN	I	RUN	I	RUN	I	RUN	I	RUN	I		I
I		I		I		I		I		I		I		I		I
-----																
FED BUREAU OF INVESTIGATION																
I		I		I		I		I		I		I		I		I
I	60 1 0015	I		I		I		I		I		I		I	ROD	I
I		I		I		I		I		I		I		I		I
-----																

SMSAPUP- 0.0 SMSAPI- 0.0000 FRAG- 0.0000 REL FRAG- 0.0000 MUL- 3.0000  
 REL MUL1- 0.0000 REL MUL2- .3750 INDEP- .1250 REL INDEP- 0.0000  
 EXCLU INDEP- .1250 REL EXCLU INDEP- 0.0000 NOM DUP- 0.0000 REL NOM DUP- 0.0000  
 STRICT COOR- 0.0000 REL STRICT COOR- 0.0000 ALTERNATE COOR- 0.0000 REL ALTERNATE COOR- 0.0000  
 NON-COOR ALTER- 0.0000 REL NON-COOR ALTER- 0.0000 STRICT ALTER- 0.0000 REL STRICT ALTER- 0.0000  
 STRICT DUP- 0.0000 REL DUP- 0.0000 DOM- .6250 REL DOM- 0.0000

## Notes

<sup>1</sup> Elinor Ostrom, Roger B. Parks, and Gordon P. Whitaker, Patterns of Metropolitan Policing (Lexington, Kentucky: Lexington Books Inc.), forthcoming. An earlier discussion of these ideas appeared as Elinor Ostrom, Roger B. Parks, and Gordon P. Whitaker, "Defining and Measuring Structural Variations in Interorganizational Arrangements," Publius IV, No. 4, Fall 1974, 87-108.

<sup>2</sup> This form of representation draws on the work of Wassily M. Leontief in input-output analysis. (See Wassily M. Leontief, The Structure of American Economy, 1919-1939, Second Edition. Fair Lawn, N.J.: Oxford University Press, 1951.) Input-output analysis arrays producers and consumers of a service as we propose to do but fills in the cells with the amount of goods flowing from one to the other. Our entries will represent presence or absences of certain types of service relationships rather than flows of goods. A related tradition is the work of sociologists interested in the relationships among individuals in small groups represented by matrices or directed graphs. (See, for example, Frank Harary, Robert Z. Norman and Dorwin Cartwright, Structural Models: An Introduction to the Theory of Directed Graphs.) In a recent article, Paul Craven and Berry Wellman of the University of Toronto discuss the potential use of matrices (or networks) for describing the relationships among communities within a region. "Such matrices can be constructed for any type of relationship between communities. We should then be able to analyze, for example, information exchange among communities, comparing the process to commercial transactions, or to intercommunity friendship links." (See Paul Craven and Berry Wellman, "The Network City," Sociological Inquiry 43, 1973, pp. 57-88.

<sup>3</sup> These 10 services can be broken into two groups: direct services provided to consumers - general area patrol, traffic patrol, traffic investigation, burglary investigation, homicide auxiliary services provided to direct service producers - entry level training, chemical analysis, narcotics analysis, post-arraignment - pre-trial detention, dispatching.

<sup>4</sup> Irregular service provision means that the producer makes this service available to this particular OCU only in unusual circumstances. A County Sheriff, for example, who upon occasion patrols through a municipality (but the area of the municipality is not part of the regular beat structure of the Sheriff) would be providing patrol services on an irregular basis to that municipality. Likewise, if the County Sheriff upon occasion entered a criminal investigation case (not all homicides -- but only a few homicides) -- the service provision would be irregular.

Regular service provision means that the producer makes the service available to an organized consumption unit on a routine basis. A producer may provide regularly even if infrequently - if every time something happens, the producer provides the service.

Regular provision may be alternate provision. Alternation results when an agency serves a restricted clientele, geographic area or provides services during restricted periods of time. Military police frequently provide patrol service only for military personnel -- clientele alternation. State highway patrols frequently provide service only on inter-states -- geographic (space) alternation. Dispatchers upon occasion dispatch for another agency for one period and the agency itself dispatches for itself during another period -- time alternation.

Regular provision may also be coordinated provision. Coordinated production occurs when two or more regular producers interact in the planning of the day to day operation of service provision for the same organized consuming unit. Coordinated patrol, for example, exists when several police departments jointly provide organized surveillance within the boundaries of a single consumption unit through the use of a common communications network. Criminal laboratory facilities are used in a coordinated way when their activities are pooled in supporting a single criminal investigation.

<sup>5</sup>The computer programs used to construct matrices and calculate structural measures were written by Martha B. Vandivort, Systems Analyst, Workshop in Political Theory and Policy Analysis, Indiana University, Bloomington, Indiana. Questions regarding the programing of our structural matrices should be referred to Ms. Vandivort.



**END**