The Structure of Employment and Unemployment in a Declining Rural Community

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Recent multidisciplinary research, concentrating on small rural communities, has posited a theory of "social marginalization" whereby economic, institutional and cultural forces combine to select certain people out of mainstream economic society; that is, certain people become socially marginal (see Western Rural Development Center Discussion Paper Series No. 1 through 8). A portion of this theory involves the transformation of human capital through a stage referred to as the "set-up." "The set-up is the preparation of certain mainstream jobholders for marginal society. Sometimes preparation begins with job displacement and continued underemployment or unemployment as the job applicant is rejected by potential employers. Set-up continues as the elements of a person's environment (family, social network, church, etc.) make human capital investments in the person which suit him more for the demand of job markets in marginal society (such as crime or welfare) than for a job in mainstream society." [Ayer, et al., 1975].

Researchers in Arizona have selected the historic town of Bisbee as their geographic area of focus, in an attempt to describe empirically a marginalization process as one test of the theory. This paper reports preliminary results as to the structure of employment and unemployment in that community. Cluster analysis [Tryon and Bailey, 1970] is the empirical technique used to sort through the mass of socioeconomic data associated with the people involved. Additional details on this research are reported in Martin, et al. [1976].

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The Setting

Bisbee is a small town of about 8,600 residents located in the Mule Mountains of Southeastern Arizona. The town began as a mining camp in 1878 and copper mining remained its major reason to be until late 1974. The town evolved into essentially a single company town with some 1,200 persons on the payroll of the Phelps-Dodge Corporation.

A cycle of rapid economic growth, economic maturation, and ultimate economic decline are expected phenomena where an economy is based on the exploitation of a single natural resource such as copper. But, for many years, while rumors of mine shut-down were rampant and discouraged further capital development in this company town, the threatened shut-down did not occur. Finally, in November 1974, the combined forces of low copper prices and the low grade of the remaining ore began a long expected, but largely unplanned for, series of major reductions in work force.

In the two months following the announced mine shut-down, almost one-third of the 1,200 man work force was laid-off. Six months later the final two-thirds were let go, leaving only a skeleton force of less than 100 persons working with the corporation in Bisbee today. The authors hypothesize that such drastic job displacement may begin the set-up process for many of the former workers in this community.

Table 1. Six structural dimensions and their reliability developed from the 68 variable sample

Dimension and Description	Defining Variables	Cumulative Proportion of Communality Exhausted	Cumulative Proportion of Mean Square of Correlation Matrix Exhausted	Reliability Coefficient
1 Spouse has service job	Spouse is working, Spouse working in service job	0.1430	0.0553	0.7789
2 Mexican-American	Is a Mexican-American, Is bilingual	0.3053	0.1756	0.9401
3 Truck driver	Wants work as a driver, has truck driver license, was a truck driver at the mine, belongs to Teamsters	0.4962	0.2933	0.8724
4 Retired	Retired, 70/80 retirement, months of service with the mine, age	0.7484	0.5403	0.8800
5 Mechanic	Wants work as a mechanic, has special skill as a mechanic, belongs to Machinist Union, was Technician at the mine	0.8986	0.6062	0.7653
6 Construction	Has special skill in construction, wants work in construction	1.0000	0.6340	0.8336

The Cluster Analysis

This analysis is based on a sample of 289 individuals who filed with the Employment Security Commission Office in Bisbee during the period from December 9, 1974 (when the massive layoffs first began) through May 9, 1975. The basic data are the information contained on application form ES-511 that a recently unemployed person must file when applying for unemployment compensation. Sixty-eight variables are measured for each individual.

Cluster analysis is appropriate where one wishes to reduce the phenomena in a large domain into a relatively small number of dimensions. It allows the discovery of interrelationships among variables without any assumptions as to how they relate to each other. Thus, the procedure is hypothesis generating. The clusters extracted give insights into the credentials and characteristics of the various groups of individuals that have found themselves unemployed and are leaving the community for other jobs, or who found themselves unemployed and are attempting to adapt to the declining community.

The results of this first stage are presented in table 1. From the original 68 variables, six structural dimensions are defined, explaining 63 percent of the mean square of the correlational matrix and all of the estimated communality. Only 19 of the 68 variables are used to define the six dimensions.

Following the definition of the basic dimensions, all 289 observations are scored in terms of these dimensions. The procedure is to standardize all the basic variables to a common mean and standard deviation and determine the score on a dimension by summing the values of the definers of the dimension. Next, all scores are restandardized so that the mean score on a dimension is 50 with a standard deviation of 10. Thus, dimensions that have only two definers have equal weight with dimensions composed of several definers. The first step is to equalize the importance of each variable in defining a dimension. The second step is to equalize the scale of each dimension so that they may be compared.

Finally, groups of people with similar characteristics on the structural dimensions are distinguished. (See table 2.) These groups are labeled "worker types." To develop worker types, scores are computed for each person in the sample for each of the six dimensions. Envision plotting these scores in six dimensional space. Look in this space for concentrations of scores and draw a fence around these concentrations. People within a concentration are classified as a worker type. [See Tryon and Baily, 1970, Chapter 8.] If the boundary around the concentration of people is small, the people within this concentration are a homogeneous type—measured by the "overall homogeneity coefficient" (table 2, column 7). All people are not included in a type. These few individuals are unique and are shown as unclassified.

The 14 worker types distinguished are listed in table 2. The names assigned to each type are based on the scores within each dimension. For

Table 2. Worker types defined by mean dimension scores within a type[1]

Worker Type	Dimensions[2] 1	2	3	4	5	6	Overall Homo-geneity	No. in Type in Sample	% in Type in Sample
1. Limited skills (Anglo)	47	43*	46	45	46	46	.9510	56	19.4
2. Construction (Anglo)	47	44*	47	47	48	75*	.9128	16	5.5
3. Mechanic (Anglo)	49	43*	47	48	75*	46	.7908	19	6.6
4. Retired (Anglo)	48	42*	46	68*	47	46	.9555	36	12.5
5. Truck driver (young Anglo)	45	43*	71*	46	48	45	.8733	22	7.6
6. Multi-skill (Anglo)	46	42*	70*	50	50	66	.8133	7	2.4
7. Truck driver (old Anglo)	49	45*	74*	69*	46	45	.8296	7	2.4
8. Limited skills (Mex.-Am.)	46	63*	46	44	46	45	.9749	42	14.5
9. Construction (Mex.-Am.)	46	63*	46	44	46	71*	.9291	21	7.3
10. Mechanic (Mex.-Am.)	48	62*	48	46	69*	46	.8630	14	4.8
11. Retired (Mex.-Am.)	47	63*	47	67*	46	45	.9541	11	3.8
12. Truck driver (young Mex.-Am.)	48	63*	70*	46	45	45	.8852	7	2.4
13. Working wife (Anglo)	73*	42*	48	47	47	48	.7892	15	5.2
14. Working wife (young Mex.-Am.)	71*	62*	47	43*	46	47	.8187	10	3.5
Unclassified								6	2.1
Total								289	100.0

[1] All scores are standardized to mean of 50 and standard deviation of 10. Scores above 50 show higher than average correlation with the dimension. Scores below 50 are negatively correlated with the dimension.

[2] See table 1 for dimension descriptions.

*Used to define characterization of type.

example, persons within type 2 (construction/Anglo) have a mean score on the construction dimension of 75, 2.5 standard deviations away from the standardized mean of 50. Other scores within the construction/Anglo type are relatively close to the mean of 50 except for the score of 44 on the Mexican-American dimension. Because this score is considerably below 50, the type is subclassified as Anglo.

Each of the 14 types is subclassified by ethnicity since none of the types have a mean on the Mexican-American dimension that is close to the overall mean of 50. The other main classification of types turns out to be based on the workers' ages, aspirations, and special skills.

Evaluation

The objective of the analysis is to examine the structure of socioeconomic characteristics of the laid-off workers so as to gain insights about the relative employability of each type of worker within the setting of the community. For this purpose, the number and percentage of workers within each type are classified in table 3 by whether their unemployment file was active or inactive 22 weeks after the first major layoffs at the mine.

Of the total number of workers, almost exactly half still have active files. Of the half whose files are inactive, 45 percent were rehired in Morenci. Thus, about one-fourth of the workers were rehired, about one-fourth left town and/or found other jobs in the area, and about one-half of the workers remain unemployed in Bisbee. The data may be examined by worker type to see who did what. Details are included in Martin, et al. [1976].

In a summary analysis, one may conclude that the young truck driver types are a great deal more mobile than the other types and find it relatively easy to become reemployed; the Anglo construction type seems to have an advantage over his Mexican-American counterpart; and the Mexican-American with limited skills, especially the young man with a working wife, seems to be favored in jobs with the mine.

To focus on the ethnic issue, the types are condensed to "total Anglo" and "total Mexican-American" in the bottom rows of table 3. When the retired types are excluded, the percentages remaining on the active roles are almost equal between Anglos and Mexican-Americans. But the percentages rehired by the mines differ greatly. Only 30 percent of the inactive Anglos were rehired by the mines; 60 percent of the inactive Mexican-Americans were rehired. Thus, while equal percentages of the two ethnic groups are finding new jobs (assuming going "inactive" means a job rather than merely disappearing) the hiring practice of the mine is switching from favoring Anglos to favoring Mexican-Americans, and the Anglos are finding their jobs in the non-mine economy.

Table 3. Status of sample of workers who filed unemployment claims, 22 weeks after first block of claims was filed[1]

Worker Type	Unemployment File Is: Active[2] Number	Active % of Type	Inactive[3] Number	Inactive % of Type	Number of Active Files Transferred to Other Town[2]	Inactives Rehired in Morenci[3] Number	Inactives % of Inactives
1. Limited skills (Anglo)	31	55	25	45	3	10	40
2. Construction (Anglo)	4	25	12	75		7	58
3. Mechanic (Anglo)	10	53	9	47		6	67
4. Retired (Anglo)	32	89	4	11	1	0	0
5. Truck driver (young Anglo)	3	14	19	86		1	5
6. Multi-skilled (Anglo)	0	0	7	100		2	29
7. Truck driver (old Anglo)	5	71	2	29		0	0
8. Limited skills (Mex.-Am.)	17	40	25	60		13	52
9. Construction (Mex.-Am.)	11	52	10	48		6	60
10. Mechanic (Mex.-Am.)	8	57	6	43		4	67
11. Retired (Mex.-Am.)	9	82	2	18		0	0
12. Truck driver (young Mex.-Am.)	1	14	6	86		4	67
13. Working wife (Anglo)	9	60	6	40		5	83
14. Working wife (young Mex.-Am.)	3	30	7	70	1	5	71
Unclassified	3	50	3	50		2	67
Total	146	51	143	49	5	65	45
Total Anglo[4]	94	53	84	47	4	31	37
Total Mex.-Am.[4]	49	47	56	53	1	32	57
Total Anglo, excluding retired[4]	62	44	80	56		31	39
Total Mex.-Am., excluding retired[4]	40	43	54	57		32	60

[1] Worker may have been laid off and filled his claim at any time during the 22 week period.

[2] Active files indicate the worker is still unemployed and is keeping his file active. Entries in columns 1 and 2 include those active files transferred to other towns out of Bisbee.

[3] Inactive files indicate the worker either has found work or that he has left town with the Bisbee Unemployment Office being requested to transfer the files elsewhere. Entries to columns 3 and 4 include those workers who were rehired in Morenci (columns 6 and 7).

[4] Excluding unclassified.

Conclusions

Our analysis is as yet preliminary—further work will be done with the present cluster analysis and a new block of workers laid off at a later date will be added to the sample. It does, however, appear that a new trend toward favoring the large Mexican-American population of the area in the hiring practices of the major employer of the area is occurring. At the same time, younger employable Anglos are tending to leave the area and a new group of lesser employable Anglos seem determined to "stick it out" and try to support themselves in Bisbee. This latter group, 15 percent of the sample, is still in Bisbee 16 months later, drawing some form of public relief. It is these men and their families who may be entering the first stages of social marginalization.

References

Ayer, Harry, Edwin Carpenter, Dana Deeds and William E. Martin. "The Beginnings of Social Marginalization: An Arizona Example." WRDC Discussion Paper No. 6, May, 1975.

Martin, William E., Dana Deeds, Edwin Carpenter, Harry Ayer, Louise Arthur and Russell Gum. "Reduction in Force in a Single Company Town: Who is Selected and How Do They Adapt?" WRDC Discussion Paper No. 8, April, 1976.

Tryon, Robert C., and Daniel Bailey. *Cluster Analysis*, McGraw-Hill Book Company, New York, 1970.