BUREAU OF BUSINESS AND ECONOMIC RESEARCH
SCHOOL OF BUSINESS AND ECONOMICS
UNIVERSITY OF MINNESOTA-DULUTH

Working Paper No. 86-9

UNIVERSITY INFRASTRUCTURE AND ECONOMIC DEVELOPMENT IN THE SMALL CITY[+]

by

Donald N. Steinnes[*]

[+] This paper is to be presented at the Seventh Conference on the Small City and Regional Community, Stevens Point, Wisconsin, March 21, 1986. This research was supported in part by a grant from the University of Minnesota Computer Center. The able computational assistance of Marcia Houser was greatly appreciated.

[*] Professor of Economics and Director of the Bureau of Business and Economic Research, 155 SBE, University of Minnesota-Duluth, Duluth, MN 55812

I. INTRODUCTION

Many cities, states and regions have in recent years placed an ever increasing emphasis on economic development. Such efforts have been probably most intense in those areas which suffered the most in the economic recessions of the 1980's and that have been affected by structural changes in the economy (e.g., the decline of manufacturing relative to services and import substitution for basic industries like steel and autos). These problems, along with those of agriculture, have certainly affected the Upper Midwest region (Iowa, Minnesota, North Dakota, South Dakota and Wisconsin), which is the focus of this paper.

While, as will be explained later, economic analysis and empirical evidence have raised doubts as to the effectiveness of many economic development policies designed to attract jobs to an area, these efforts still continue. A more recent phenomenon is the entry into the economic development game of universities. Given the attribution of high-tech industrial growth in Silicon Valley (San Francisco, California) and along Route 101 (Boston, Massachusetts) to large universities in the area, many universities throughout the country, including the Upper Midwest, have, more or less, adopted economic development as part of their mission. As will be suggested in the next section, this move to a more explicit economic development policy may be, in part, a reaction to budget cuts that took place in recent years.

After suggesting the political economy of the universities' reasons for shifting from an implicit to more explicit stance on economic development, a model will be specified and estimated to determine, using multiple regression analysis, the relationship between university infrastructure and economic growth. Specifically, historical data for a sample of small cities in the Upper Midwest will be used to determine: (1) if the presence of a university and/or

those with certain characteristics are a catalyst for economic development (i.e., implicitly, or passively, they will lead to growth); (2) if the more recent explicit economic development efforts on the part of universities are any more or less effective. The methodology can be used to determine not only if, but to what extent, investment in university infrastructure leads to economic growth. While this is taken for granted based on ad hoc examples like Silicon Valley, this paper will examine the issue for small cities using a statistical methodology that could be applicable to similar policy evaluations.

II. THE POLITICAL ECONOMY OF UNIVERSITIES' EVOLVING ECONOMIC DEVELOPMENT POSITION

To understand the current explicit emphasis being placed on economic development by universities, it is necessary to consider both the traditional mission of the university and recent political and economic events. As will be explained, the shift to an explicit economic development position on the part of universities may be viewed, in part, as a reaction to the political economy of the 1980's.

A. Economic Development as a University Mission

Institutions of higher education have traditionally stated their mission to be teaching, research and service. For publicly funded colleges and universities there has always been a greater need to translate these ideals into more explicit benefits to the state or region in which they are located. The most obvious, and least questioned, aspect is the teaching mission in that it provides an educated population, which in economic development terms enhances the productivity of the work force and, indirectly, the economic viability of an area. However, such an argument may be more convincing for local secondary schools that educate residents than for the many colleges and universities whose students come from out of the area and are less likely to remain as members of the local, or state,

workforce after graduation. Nonetheless, state universities have been fairly successful in convincing legislatures as to the value of a more educated state population.

A greater problem in the political arena for state universities has been to demonstrate the value of university research in terms of economic development. Claims of basic, important or "world class" research have often brought forth questions from legislators, especially in recent sessions faced with budget deficits and cutting taxes, as to what these research efforts have done for the state. Seeing the necessity of being able to make the benefits of their institutions more obvious, administrators have adopted more explicit policies to relate economic development to the university.

One approach has been to encourage faculty members to become entrepreneurs and develop private sector businesses, usually near campus. A recent article in the Wall Street Journal (Brock, 1985) cited statistics suggesting that such faculty entrepreneurs are concentrated in science and engineering and have tripled in number since the late 1970's. The success of universities in associating themselves with economic development through faculty entrepreneurship would seem to have been successful in Illinois since in this same article Governor James Thompson is quoted as saying, "One of the cornerstones of economic development in Illinois involves the colleges and universities and the products that have been developed on campus." While such faculty activities in the past might have been viewed as commercial and crass, many schools are now not only condoning such behavior, but encouraging it.

Probably more pervasive than the encouragement of faculty entrepreneurship, which is largely limited to science and engineering, are the efforts of institutions to provide services to the area they serve which are related to economic development. In most cases these operations are housed in a business school and

are viewed as part of the outreach, or service, mission of the institution. As opposed to efforts to convert faculty research into businesses, these service programs are intended to help people in the community with business problems. While many such programs are unique to a particular campus, there are several which are national in scope. It is these programs which will now be briefly discussed and later used in the statistical model as measures of explicit university economic development activity in a community.

The number of these programs in the Upper Midwest states and the rest of the country is indicated in Table 1. It might be noted that the Upper Midwest, and especially Minnesota, has a relatively larger number of the two small business related programs (SBDC and SBI) and a smaller number of the other two programs (EDA Centers and AUBER members) than other parts of the country.

The EDA University Centers are the most explicitly related to economic development in that they measure success, as do many state/local economic development programs, on the basis of jobs created or saved in the area. These centers, which receive federal funds, have as their objective to stimulate colleges and universities to mobolize more fully their resources to overcome economic development in the area or region they serve. The centers are selected on the basis of distress in their area and having developed a program consistent with other economic development organizations and strategies in the area.

While EDA centers are explicit university economic development organizations, the Small Business Administration (SBA) funds a much larger number of university programs across the country (See Table 1) which are designed to help small businesses and, consequently, stimulate local economic development. The Small Business Development Centers program, which began in 1980, is usually housed in a school of business and has a director and/or staff who work directly with small business clients, often those who are just starting a business.

TABLE 1

UNIVERSITY/COLLEGE BASED
NATIONAL PROGRAMS/ORGANIZATIONS
RELATED TO ECONOMIC DEVELOPMENT, 1985

PROGRAM/ORGANIZATION	UPPER MIDWEST STATES					OTHER STATES	U.S. TOTAL
	IA	MN	ND	SD	WS		
EDA University Centers[a]	1	0	1	0	0	39	41
Small Business Development Centers (SBDC)[b]	12	26	1	4	12	341	396
Small Business Institute (SBI) Directors[b]	7	10	3	2	3	284	309
AUBER Members[c]	0	3	1	1	5	150	160
Totals:	20	39	6	7	20	814	906

Sources: EDA University Centers 1984 Membership list, 1985 Membership List of SBDC's, 1985 Membership Directory of Small Business Institute Directors' Association, 1985 AUBER Membership Directory.

[a] This program is sponsored by the Economic Development Administration, U.S. Department of Commerce.

[b] These programs are sponsored by the Small Business Administration, U.S. Department of Commerce.

[c] These centers (often named Bureaus or Centers of Business and Economic Research) are funded by states directly and/or by university budgets and are members of the Association for University Business and Economic Research (AUBER), a national organization.

These centers also offer programs in the area for the same clientele. Another program sponsored by the SBA is called the Small Business Institute, which began in the late 1970's. The Institutes usually deal with established businesses having particular problems and have teams of college students work with the business to solve their problem as a classroom project or case. Both programs are underwritten by the SBA and services are provided to clients free of charge. Of the two, the SBI program is less explicitly involved in economic development in that the program's success is measured by the numbers of clients and students involved. On the other hand, the SBDCs began in 1984 to measure success, in part, on the basis of jobs created/saved, whereas, previously they had not. This shift again confirms the increasing emphasis placed on economic development in the 1980's.

The final university economic development related program in Table 1 are members of the Association for University Business and Economic Research (AUBER). These organizations are usually called Bureaus or Centers of Business and Economic Research and are housed in business schools. Their primary activity is collecting and publishing economic information on the local area/state on a regular basis. Such information often provides the basis for evaluating economic conditions or development in the area over time and is utilized by many firms and government agencies. These Bureaus also may forecast economic conditions and do specific research studies that are often related to economic development. While the AUBER organization has been in existence for some time, the recent emphasis of members has been on economic development (e.g., one of the newest members, at the University of Wisconsin-Superior, is named the Center for Economic Development). The funding for these centers is not federal, as it is for EDA Centers, SBDCs and SBIs, but comes from state and/or university budgets.

In addition to the national programs/organizations in Table 1, numerous universities have in recent years created unique economic development offices/centers/institutes on their campus using state/local/university funds. For example, Southern Illinois University has a Business Development/Technology Commercialization Center which coordinates community access to university-based business expertise and serves as a liason to external economic development resources. A similar center exists at the University of Wisconsin-Milwaukee and at other institutions both in the Midwest and around the country. At the University of Minnesota-Duluth, the state legislature funded the Natural Resources Research Institute in 1983 with the explicit mission of fostering the commercialization of natural resources in Northeastern Minnesota, an iron ore (taconite) mining region that has suffered from economic decline in the 1980's.

One traditional source of resources for colleges and universities has been funds obtained from grants. In the 1980's such funds declined, in part, because of political/economic changes at both the state and federal level, as will be explained. In the meantime, many national (e.g., the Ford Foundation) and regional (e.g., the Northwest Area and Blandin Foundations based in Minnesota) foundations have made economic development a priority for future funding. Thus, universities faced with fewer grant funds available from traditional sources have further incentive to adopt economic development more explicitly as part of their mission.

B. The Political Economy of the 1980's

Having outlined, in somewhat general terms, how colleges and universities have evolved from their traditional mission (teaching, research and service), which had implicit positive implications for economic development, to more explicit economic development programs, the question remains as to why this shift has taken place. It will be suggested that political and economic changes

in the 1980's provide an explanation of the shift while in the next section a model will be offered and tested to determine if such explicit programs are any more effective in fostering economic development than the mere presence (infrastructure) of a university or college in a community.

Up through the 1970's education, along with other government services, grew in both absolute and relative terms. This can be seen in Table 2 which measures the size of state and local government in terms of employment per 10,000 population, a measure which is insensitive to inflation over the time period. However, by 1982 Table 2 shows the first declines in government employment in 25 years, which can be attributed, in part, to the election in 1980 of Ronald Reagan, who campaigned on a promise to cut the size of government.

Another Reagan promise was to cut tax rates, based on the supply-side economics notion that lower tax rates would stimulate incentives, cause economic growth, and, thus, generate tax revenues to offset the lower tax rates. This "have your cake and eat it, too" theory has, so far, resulted in deficits and not the expected additional revenues based on growth. In fact, since 1980 there have been two recessions, one the worst since the depression of the 1930's, and the Reagan policies, whether intended or not, have created considerable pressures, including the recent Gramm-Rudman Act, to cut the size of government.

For states, especially in the Midwest, the recessions of the early 1980's reduced tax revenues, created budget deficits, and forced the size of state and local governments to shrink. During this process education did not fare well (See Table 2) at all. Minnesota, which had been above the national average and most other Midwest States for 25 years in terms of its commitment to education, became the lowest Midwest State and below the U.S. average (See Table 2) by 1982. It can be inferred, at least for Minnesota, that education was less able to "sell" itself in the 1980's recessions than it had in previous recessions or

TABLE 2

FULL-TIME EQUIVALENT EMPLOYMENT
OF STATE AND LOCAL GOVERNMENT
(per 10,000 population)
1957-1982

Year:	1957	1962	1967	1972	1977	1982
United States						
Education Employment	122.8	146.9	184.9	225.6	237.3	230.9
Total Employment	281.3	320.6	376.7	454.4	489.5	479.5
Iowa						
Education Employment	165.6	178.7	217.6	247.5	269.5	248.6
Total Employment	301.4	334.8	392.9	438.7	494.9	474.7
Minnesota						
Education Employment	139.1	166.4	204.4	255.2	257.0	228.9
Total Employment	289.3	325.4	385.3	465.1	493.2	463.2
North Dakota						
Education Employment	165.0	185.8	227.2	276.5	256.0	280.9
Total Employment	295.5	342.9	402.8	473.9	469.4	496.2
South Dakota						
Education Employment	168.2	173.7	228.9	266.1	271.4	257.0
Total Employment	311.9	329.5	427.2	474.8	507.2	475.1
Wisconsin						
Education Employment	110.7	143.6	185.2	239.8	248.6	244.5
Total Employment	258.2	317.7	374.5	450.6	467.7	472.1

Source: U.S. Government, Department of Commerce, Bureau of the Census. 1982 Census of Governments, Vol. 6, No. 4., Historical Statistics on Governmental Finances and Employment.

that its claim on tax revenues was less accepted in the new political environment.

Having lost ground during the recessions, state and local governments, including education, were unsuccessful after 1983 in securing restoration of programs and budgets cut during the budget crises (1981-82) such as occurred in Minnesota and Wisconsin. One reason is that throughout the early 1980's a variation on supply-side economics had been gaining strength in many states, including Minnesota and Wisconsin. Given budget surpluses after the recessions, there was growing sentiment to cut taxes and among the reasons for doing this was that it would improve the state "business climate", reflective of the increasing importance placed on economic development.

Most plans to improve the business climate are closely related to national supply-side policies. In both cases the position is that by cutting tax rates, especially for businesses, incentives will change, businesses will grow (or move into a state), and prosperity will follow. However, both theories, while plausible, are generally unproven[1]. If enacted they do have the initial effect of redistributing income from individuals to businesses either nationally (supply-side economics) or at the state level (business climate), though this is usually downplayed and emphasis is placed on the later promised effects of economic growth and prosperity. It well be recalled that David Stockman had his problems early in the Reagan administration when he referred to this supply-side theory, or promise, as "trickle-down" economics.

While improving the business climate in a state usually means reducing the tax burden on businesses relative to individuals, any tax cut means less revenue is available for government, including education. Consistent with the shifting of taxes away from business, a larger share of government expenditures have been used for economic development related programs, rather than education. For example, tax incentives (or subsidies) have been increasingly offered[2] by state

and local governments though they have been opposed on theoretical/equity grounds as a form of "welfare grant" to the business sector[3] and have not been shown to have any effect on economic development or growth.

To summarize, a case can be made that education, and particularly higher education, has lost ground in the 1980's. The changing political/economic climate, with its increased emphasis on business as the key to economic development, left universities with smaller budgets, in part, because they did not argue successfully or convincingly that they provided the infrastructure for economic growth. On one hand they failed to provide much more than ad hoc evidence as to the universities' importance in economic growth and, on the other hand, they failed to challenge the supply side/business climate claims that economic growth would follow from things like business tax incentives. Having lost the battle, in a way, universities moved toward more explicit economic development programs as outlined in the last section. In so doing, they have, implicitly, accepted the generally refuted economic development premise that incentives or subsidies to business are an effective means of achieving economic growth.

III. MEASURING THE IMPACT OF THE UNIVERSITY ON ECONOMIC DEVELOPMENT

Many economic development agencies and programs--federal, state, local and university--measure their success on the basis of the number of jobs created or saved. However, there usually is no systematic way of verifying these counts or determining if different agencies use the same procedures and, consequently, comparisons between different programs is difficult, if not impossible. Some of the claims tend to be exaggerated or involve more than one agency claiming credit for the same job created or saved. Any such method of self-counting by an interested party is prone to abuses and claims are apt to be considered suspect. One is reminded of an analagous situation during the Vietnam War when daily

claims of dead and injured gave military intelligence a bad name.

To continue the analogy, it is reasonable to argue that the success of economic development efforts are better measured in terms of winning the war than claims of victory in a single battle. In order to do this in a systematic framework a model of policy evaluation must be developed that relates economic development success over a long period of time to specific economic development programs or efforts. Recently, the General Accounting Office (1984) created such a model to evaluate federal economic development programs in response to a request from the chairman of the House Subcommittee on Economic Development, James L. Oberstar (MN). The request was made because of a perceived need for a common methodology for evaluating the effets of federal economic development programs on job creation.

The model, which will be similar to the one to be estimated in this section, is derived from an economic model of the labor market in an area and can be expressed by the following general form[4]:

(1) $$e_i = f(F_i, Z_i)$$

where e_i = percentage change in employment

F_i = vector of federal assistance programs

Z_i = vector of other exogenous variables

and all variables are measured for a sample of i = 1...n geographic areas. Similar models have been developed by others from different theoretical bases but the equation estimated is similar to (1)[5].

Most estimation of models of this type involves collecting data for a cross section of areas (e.g., states, cities, or regions) and measuring employment growth over a several year span. While the independent variables should all be measured at the beginning of the time period, some, because of data availablity, are often collected for some time during the period.

In policy evaluation models of this type, which are primarily done to get estimates of the effect of the policy variable (e.g., F) on the target variable (e.g., e), it is important to control for the effects of exogenous, or non-policy, variables (Z), as well. For example, the models employed by GAO (1984) and Stutzer (1985) used socioeconomic variables that included unemployment rates, percentage urbanized, dummy variables for certain states, tax rates and climate. In the model which will be estimated for small cities similar non-policy variables will be used.

As stated, the focus of equation (1) is to derive estimates for the policy variables (F), which are assumed to have a positive coefficient or impact on e_i, the percentage change in employment. Such policy variables can be specified in a regression estimation as either dummy variables or by some magnitude or quantity. The dummy, or binary (0-1), variable approach is used to investigate what Folmer (1985) refers to as policy-on and policy-off situations. In the context of this paper this type of variable will be employed to measure the presence (policy-on) of the explicit university economic development programs listed in Table 1 in a small city. An alternative would be to measure the magnitude, or extent, of the policy. For example, in his study of industrial revenue bonds Stutzer (1985) measured the dollar amount of such bonding rather than the mere presence of such issuances in areas.

However the policy variables are specified, the coefficients are expected to be positive and significant. Furthermore, if different policy variables are specified, the coefficients can be used to compare, as in the GAO Report (1984), the cost effectiveness of different programs. The intent in this paper is to make such a comparison between what might be termed implicit university policy (IUP) variables (e.g., the presence of a university or the size as measured by enrollment) and the more explicit university policy (EUP) variables, as listed

in Table 1, to see which, if either, is more effective in determing economic development (ei). The exogenous variables (Z) included in the specification are city population, state dummy variables, and climate as measured by latitude (degrees north).

The sample for estimation of equation (1) consisted of 44 small (population in 1980 between 20,000 and 100,000) cities[6] in the Upper Midwest which are not suburbs of large (greater than 100,000) central cities. Employment growth (e_i) in manufacturing was determined for each city between 1962 and 1972 and between 1972 and 1982 and alternative estimates of equation (1) are found in Table 3. Because of missing information not all cities could be used in the estimation process for each time period as indicated by the sample size, N. The last column in Table 3 gives estimation results when the two cross-sections (1962-72 and 1972-82) are pooled whereas the results for each cross-section are given in the first three columns. Alternative results are given for 1962-72 using (column 2) and not using (column 1) the explicit university economic development policy (EUP) variables. Since the EUP variables (programs) did not exist until after 1972, these variables should not be significant for 1962-72, or at least less significant than for the later period, (1972-82 in column 3). Also, the pooling in column 4 was done assuming the EUP variables to be zero for all cities in the first (1962-72) cross-section (i.e., column 1 and column 3 specifications were pooled to get column 4 results).

Considering first the exogenous, or non-policy, variables, the estimation results show the state dummy variables to be significant. This indicates differences in growth between states that may be related to differences in state taxes and/or government services. The negative result for LAT suggests less growth in the northern cities of the region and is comparable to results obtained by others who have examined national data and found greater growth in

TABLE 3
REGRESSION ESTIMATION RESULTS
MANUFACTURING EMPLOYMENT GROWTH

Time Period:	1962-72	1962-72	1972-82	1962-82
Independent Variables:	(t-values in parenthesis)			
Non-policy (exogenous) Variables				
POP (population, beginning of decade)	-.000003	-.000002	-.000003	-.000003
	(-1.14)	(-.77)	(-.95)	(-1.28)
IA (1 if Iowa; 0 otherwise)	-.63	-.42	-1.20	-.64
	(-2.37)	(-1.02)	(-2.72)	(-3.06)
MN (1 if Minnesota; 0 otherwise)	-.51	-.34	-.89	-.49
	(-2.25)	(-.85)	(-2.06)	(-2.57)
WI (1 if Wisconsin; 0 otherwise)	-.64	-.50	-.96	-.58
	(-2.88)	(-1.26)	(-2.29)	(-3.12)
LAT (latitude, in degrees)	-.0006	-.0003	-.0008	-.0004
	(-2.42)	(-.97)	(-2.14)	(-2.47)
TIME (1 if 1972-82; 0 if 1962-72)	--	--	--	-.18
	--	--	--	(-1.70)
(Constant)	4.44	3.22	5.55	3.85
	(3.83)	(1.82)	(2.93)	(4.27)
University Economic Development Policy Variables				
Implicit University Policies (IUP)				
UNIV (number of universities)	.11	.64	-1.35	-.06
	(.54)	(1.27)	(-2.50)	(-.37)
COLL (number of colleges)	.04	-.07	.08	-.01
	(.23)	(-.36)	(.38)	(-.08)
UENROLL (universities enrollment)	.000004	.00003	.000007	.00002
	(.30)	(1.33)	(.32)	(1.36)
CENROLL (colleges enrollment)	-.0002	-.00005	-.0002	-.00007
	(-1.04)	(-.25)	(-.83)	(-.58)
F-value (all IUP policies)	1.69	1.96	1.77	1.41
Explicit University Policies (EUP)				
EDA (number of EDA centers)		-.87	1.07	.27
		(-2.05)	(2.34)	(1.00)
SBDC (number of SBDC centers)		-.58	1.17	.15
		(-1.16)	(2.18)	(.93)
SBI (number of Small Business Institutes)		-.11	.11	-.20
		(-.07)	(.72)	(-2.01)
AUBER (number of AUBER members)		-.17	-.07	-.16
		(-.08)	(-.30)	(-.84)
F-value (all EUP policies)		1.26	2.92	2.87
R^2/N (Sample Size)	.49/32	.60/32	.62/32	.50/64

the Sun Belt than the Frost Belt. Finally, while generally insignificant, the population variable is negative suggesting less growth in larger cities.

As for the university economic development policy variables (IUP and EUP), which are the focus of this study, their relative importance can be measured by examining the t-values of each policy and the F-values calculated for the IUP and EUP policies together. Generally, the results in Table 3 give only partial confirmation of the policies and do not suggest that one is definitely stronger than the other. Both provide some evidence, as will be explained, that the university does act both implicitly and explicitly as a positive influence on economic development.

The first column in Table 3 covers growth between 1962 and 1972, before the EUP policies existed, and shows the IUP policies to be positive, as would be expected, but not very significant. In other columns some IUP variables are significant but more incorrect signs are found, especially for college IUP variables. Together, the results suggest growth is tied to the presence of universities, rather than colleges, in a city. Furthermore, the negative result for UNIV, along with positive coefficient for UENROLL, in columns 3 and 4 suggests that growth is greater when there are fewer large universities than a larger number of small universities. This would confirm, indirectly, that growth is tied to large universities, which are more likely to have science and engineering programs. It will be recalled that faculty entrepreneurs often are found in these programs and so growth may, in fact, be stimulated by the creation of businesses based on faculty research.

The explicit policies (EUP), or programs, are tested in columns 2-4 for different time periods. They are generally insignificant and have the wrong signs (-) for 1962-72 (column 2) but have the correct sign (+) and are more significant for 1972-82 (column 3). This is particularly true for EDA and SBDC,

the most explicit economic development programs. The positive coefficients for 1972-82 indicate that these programs have had the expected impact on growth during the period. It will be recalled that the EUP variables were measured as of 1985 but these programs began in the 1970's and have changed little since. Hence, growth can be seen as resulting from the policies. On the other hand, the growth in 1962-72 (column 2) should be insignificantly, if at all, related to these programs, which did not exist during that period. In fact, this is what occurs in column 2 and, furthermore, all the EUP variables have negative coefficients.

One explanation of the negative signs is that the EUP programs were created in cities that had experienced low growth in the 1962-72 period. That is, slow growth led to, or caused, the EUP policies to be put in place and there policies, subsequently, spurred economic growth in the later period. To firmly establish this sequence of events would require more information on growth and changes in EUP policies over time. If, and when, enough data becomes available, the interrelationship between growth and EUP could be investigated using time series causality methodology[7]. At this point, the results in column 3 do suggest that EUP policies, especially EDA and SBDC, are effective in spurring employment growth. Also, the F-value for EUP policies (2.92) is higher than for IUP policies (1.77), suggesting the former are somewhat more effective.

Finally, column 4 in Table 3 combines, or pools, the data for the two periods and similar results are obtained. The TIME variable introduced shows growth to be lower in the later period, which is reflective of different national conditions during the two periods. Given such differences, the pooling of the periods might be questioned and could explain the generally lower significance of IUP and EUP variables in column 4. The TIME variable is correlated with all EUP variables since they are all zero for the first time period and,

thus, some multicollinearity is present as evidenced by the reduced t-values of the EUP and TIME variables. Without going to greater lengths to account for differences between periods, the pooling should be viewed only as suggestive and providing confirmation for the results in columns 2 and 3.

IV. CONCLUSION

The premise of this paper is that universities in the 1980's have evolved into active players in the economic development game. As a result of recent politial/economic changes, universities have adopted more explicit economic development policies and programs rather than trying to argue that they provide an infrastructure which implicitly promotes economic growth. A policy evaluation model was specified and estimated for several small cities in the Upper Midwest to determine the effectiveness of the university in the economic development field. While not as significant as universities might hope, the results do suggest that both implicit and explicit policies have some positive influence on economic growth. In fact, the two most explicit programs (EDA Centers and SBDCs) show the strongest positive impact for the latter time period studied. As more data becomes available on growth since these programs have been initiated, it will be possible to more accurately measure the effectiveness of them in terms of economic development. Even at this point, however, estimating a model using several small cities provides a more objective measure of job creation for these programs than the self-counting approach now being used.

F O O T N O T E S

[1]Several empirical studies by economists in the past have found differences in taxes to be an insignificant or minor determinant of firms decisions to locate. Steinnes (1982) reviews many of these previous studies of the business climate and points out their theoretical or statistical flaws. Bartik (1985) in an even more recent study confirms again that state taxes, or the business climate, do not determine economic growth.

[2]Fox, Kidwell and Campbell (1984) indicate industrial revenue bond (IRB) financing increased from 5.7 to 28.4 billions of dollars between 1975 and 1985. They also point out that most of the increase has been in small-issue IRB's, which Stutzer (1985) found to have no effect on economic growth in Minnesota during the same period.

[3]Harrison and Kanter (1978) and Mulkey and Dillman (1976) have argued that such incentives are subsidies that cannot be justified on theoretical or equity grounds.

[4]In econometric terms, equation (1) is part of the reduced form, along with a similar equation that has wages (w) as the dependent variable, and is derived from a structural model of the labor market.

[5]For example, Stutzer (1985) estimates a similar equation with employment as the dependent variable while Cicchetti, Smith and Carson (1975) develop a model, based on the economic theory of production, which has the change in area income as the dependent variable. Theoretically, because in the latter model the dependent variable is income, which is the product of employment and wages, the estimates obtained can be interpreted, given certain assumptions, as the net effect of the independent variables on wages and employment. Put simply, using income as the measure of growth does not yield information as to the effect of federal assistance (F) on employment (e) and wages (w) separately. Given the emphasis on jobs created in the economic development field it follows that equation (1), with e as the dependent variable, is the most relevant specification.

[6]The cities included in the sample are: Ames, Burlington, Cedar Falls, Clinton, Dubuque, Fort Dodge, Iowa City, Marshalltown, Mason City, Muscatine, Ottumwa, Sioux City and Waterloo in Iowa; Austin, Duluth, Hibbing, Mankato, Moorhead, Rochester, St. Cloud, and Winona in Minnesota; Bismarck, Fargo, Grand Rapids and Minot in North Dakota; Aberdeen, Rapid City and Sioux Falls in South Dakota; and Appleton, Beloit, Eau Claire, Fond du Lac, Green Bay, Janesville, Kenosha, LaCrosse, Manitowac, Oshkosh, Racine, Sheboygan, Stevens Point, Superior, Wausau, and West Bend in Wisconsin.

[7]This method has been used by the author, Steinnes, (1977 and 1978) to investigate the interrelationships between population and employment growth both within and between cities. To use the approach in the present context would require that more data on growth be collected since the creation of EUP programs in the late 1970's.

REFERENCES

Bartik, T. 1985. "Business Location Decisions in the United States: Estimates of the Effects of Unionization, Taxes and Other Characteristics of States," Journal of Business and Economic Statistics. 3:14-22.

Brock, D. 1985. "Faculty Business: Professors' Push For Profit Spurs Growing Concern," Wall Street Journal. August 27:33.

Cicchetti, C., V. Smith and J. Carson. 1975. "An Economic Analysis of Water Resource Investments and Regional Economic Growth," Water Resources Research. 11:1-6.

Folmer, H. 1985. Measurement of Effects of Economic Policy. Dordrecht, the Netherlands: Martinas Nijhoff.

Fox, W., D. Kidwell and C. Campbell. 1984. Maximizing Economic Growth with Industrial Development Bonds. Knoxville, Tennessee: Center for Business and Economic Research, University of Tennessee.

Harrison, B. and S. Kanter. 1978. "The Political Economy of States' Job-Creation Business Incentives," American Institute of Planners Journal. 15:424-435.

Mulkey, D. and B. Dillman. 1976. "Location Effects of State and Local Industrial Development Subsidies," Growth and Change. 7:37-43.

Steinnes, D. 1977. "Causality and Intraurban Location," Journal of Urban Economics. 4:69-79.

_____. 1978. "Causality and Migration: A Statistical Resolution of the Chicken or Egg Fowl-Up," Southern Economic Journal. 45:218-226.

_____. 1984. "Business Climate, Tax Incentives, and Regional Economic Development," Growth and Change. 15:38-47.

Stutzer, M. 1985. "The Statewide Economic Impact of Small-Issue Industrial Revenue Bonds," Quarterly Review of Federal Reserve Bank of Minneapolis. 9:2-13.

U.S. Department of Commerce, Bureau of the Census. Various years. Censuses of Government, Manufacturing, Retail Trade and Services. Washington, D.C.: U.S. Government Printing Office.

U.S. General Account Office. 1984. Federal Economic Development Assistance Programs: An Econometric Analysis of Their Employment Effects, 1974-78. Washington, D.C.: U.S. Government Printing Office.