

Community Colleges and Local Economic Development

Terance J. Rephann
Regional Economist
Center for Economic and Policy Studies
Weldon Cooper Center for Public Service
University of Virginia
2400 Old Ivy Road
P.O. Box 400206
Charlottesville, VA 22904-4206
e-mail: trephann@virginia.edu

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Abstract: Community colleges are an important and growing segment of the U.S. higher education market. However, few ex post studies of their local economic development impacts are available. This paper presents a quasi-experimental control group analysis of a group of twenty-one counties where community colleges were established during the 1970s and 1980s. It shows that community college counties have a stimulating effect on the state and local government employment sector. However, it does not confirm the existence of more widespread earning and employment impacts.

1. Introduction

Community colleges are an important and growing segment of the U.S. higher education market. Increasing from 19 in 1915 to 1,077 in 1998, they number more than 1,100 today (Cohen and Brawer 2003). Still, they remain a somewhat misunderstood and understudied area within the social sciences generally (Cohen and Brawer 2003) and economics specifically (Kane and Rouse 1999). Educational resources and an educated workforce are key factors in regional growth and development and post-secondary education is recognized as key part of this equation (Bartik 2004; Mathur 1999). However, the bulk of research focuses on four-year colleges and universities, particularly research level universities.

There are good reasons to focus more attention on the local and regional economic impacts of community colleges. First, community colleges serve a majority of public undergraduate students and can be found in over one fourth of U.S. counties (Rephann 2007). Second, community colleges are said to provide important economic development resources for their communities, particularly rural areas that have deficits of “intellectual capital” (Young 1997). Third, community colleges have begun to tout their role in local economic growth in order to improve their prospects for state and local government funding (see, for example, Wedel 2003).

This paper is concerned with estimating the economic effects of community colleges on their host counties. For the purposes of this paper, a community college is defined as any public educational institution identified as a public two-year institution by the U.S. Department of Education. There are other sectors of the sub-baccalaureate

educational market including private junior colleges and technical schools that offer one-year certificates and associate degrees. Each of these kinds of institutions, however, is excluded from the analysis reported here because they play somewhat different roles in higher education and their communities than community colleges.

The paper uses a quasi-experimental control group method to measure economic effects. By “quasi-experimental” is meant a research design that has the features of an experiment such as a treatment, an outcome measure, and a control group whose performance forms the baseline that is used to assess the effects of the treatment. Unlike an experimental design, there is no random assignment of places to a treated group and untreated control group. Therefore, the control group must be chosen in a way that compensates for the lack of initial randomness in the treatment. This method provides a way of constructing a reasonable counterfactual that addresses recent pointed criticisms made of college impact studies by Siegfried et al. (2007).

The paper is divided into several sections. The next section reviews literature concerned with the local economic impacts of community colleges. The third section discusses the quasi-experimental control group method and the data sources for this study. The fourth section provides an analysis of the economic impacts of a group of twenty-one counties where community colleges were established during the 1970s and 1980s. The paper ends with a summary and conclusion.

2. Community Colleges and Economic Development

Colleges and universities, particularly research level universities, often serve as regional economic catalysts. There is evidence that colleges and universities affect regional development through a variety of channels, including: (1) the direct, indirect, and induced effects of college, faculty, student, and visitor expenditures (Knapp and Shobe 2007); (2) improvements to the productivity and earning capacity of graduates who remain in the area (Bartik 2004), (3) improvement of local innovative capacity and technology transfer (Knapp and Shobe 2007; Bartik 2004; Varga 1998), (4) stimulation of local entrepreneurship and business spin offs (Knapp and Shobe 2007; Bartik 2004), and (5) enhanced quality of life and improved social capital (Shapiro 2003).

Any assessment of the economic impacts of community colleges must recognize that many of the elements of four-year colleges and universities are missing. First, community colleges are typically smaller than four-year colleges and universities and have smaller budgets both because of lower overhead and personnel costs and the preponderance of part-time students. Second, since most students who attend community colleges are drawn from the local area, student college expenditures are reallocated from other local spending and do not have an additional stimulating effect (Manning and Viscek 1977). Third, although community college students are much more likely to remain in a locality than students who attend four year colleges and universities with larger service areas, the wage and salary increments for associate degrees are much lower than for bachelor degrees (Grubb 2002; Kane and Rouse 1999; Surette 1997). Fourth, community colleges are primarily teaching institutions and do not usually engage in

specialized research and technology transfer activities made possible by graduate and professional programs, large endowments, and professional grantsmanship. Therefore, they are unlikely to result in the kinds of research and development business spin offs found near universities. For these reasons, one would expect community colleges to have fewer linkages with the local economy and much smaller economic impacts.

The primary advantage of community colleges is in extending educational access. They provide geographical and financial access to higher education to residents who would otherwise be unable to undertake study and improve their earning capabilities. Evidence suggests that geographic access is an important determinant of college attendance (Frenette 2006). To the extent that a community college attracts new state and federal funds that would not otherwise be available, new expenditures are introduced into the community that provide a local economic stimulus (Manning and Vicek 1977).

Community colleges offer other potential economic benefits. They can provide community economic development leadership in settings which have “few resources exist for promoting economic development” (Young 1997). While community colleges are not a significant source of research and development activities, some community colleges are deeply involved in technology transfer and entrepreneurship training programs (Liston and Swanson 2001; Rosenfeld 2001) that rival programs found at universities. Moreover, community colleges often provide contract training for regional firms.

Economic impact studies of community colleges are plentiful. Unfortunately, the vast majority of studies use ex-ante methodologies. One research firm, EMSI/ccBenefits, has conducted over four hundred such studies to date. The economic impacts are estimated using input-output and social cost-benefit methodologies which measure the

multiplier effects of college expenditures, estimate improved productivity and wages for the local workforce, and quantify various non-market benefits that derive from reduced crime and improved health (Christophersen and Robison 2003). This author could identify only one ex post study, which examined the economic development effect of the North Carolina Community College System (Pennington, Pittman, and Casey 2001). The study estimated that 8%-11% of county economic development as measured by retail sales could be attributed to the presence of a community college, but it made only limited effort to control for other confounding regional growth factors. Compared to the breadth and quality of research available on the economic impacts of four-year colleges and universities, the literature is quite limited.

3. Quasi-experimental Control Group Method

Quasi-experimental control group methods have been used repeatedly in the geographical and regional science literature to measure the effects of economic development investments and policies (see, for example, Isserman and Rephann 1995 and Rephann and Isserman 1994). The method uses a control group of counties that is selected to resemble the counties which receive a particular policy stimulus. In the case of community colleges, the stimulus is the establishment of a community college. The control group serves as a baseline for measuring the effects of the treatment.

For this application, a treatment or study group was selected with the assistance of the Integrated Postsecondary Educational Data System or IPEDS for short (U.S. Department of Education, 2003).¹ The file contains information on every public and private one-year, two-year, and four-year college and university in the United States,

including enrollment and location. The data used here reflect fall 2001 institutional characteristics. The data are compiled from individual reports submitted to the Department of Education by higher education providers. The reports are mandated in order for institutions to qualify for title IV student financial aid programs, but, many non-title IV institutions respond to the survey as well. IPEDS data have been shown to be more accurate than a leading proprietary source of higher education data (Jackson et al., 2005). However, one critical variable needed for this study, the year of the college establishment, was not available from IPEDS. This supplementary information was obtained from the *Higher Education Directory* (2004).

A group of study counties² was selected using several criteria. First, the county must have a community college that was established during the period 1973-1989.³ This condition was imposed in order to construct an income and employment series described below which is available for the period 1969-2000. Since most community colleges were built in the 1960s, this severely constrained the list of county candidates. Second, each community college must have an enrollment of at least 300 credit students. Third, each county could have no other higher education institutions within its boundaries. These criteria resulted in the list of twenty-one counties described in table 1.

In an effort to construct a control group with similar growth dynamics to this treatment group, it is important to control for various potential causes of growth disparities. For this study, the control variables selected were informed by various theories of regional economic growth, including reduced form equations of regional economic growth used by Richardson (1973) and von Böventer (1975). These theories highlight the influence of spatial context, prior economic growth, the cost of labor and

capital, and industrial structure in regional economic growth. Variables that attempt to measure these factors are listed in table 2. They are used as selection variables in choosing the control group.

Control counties meet four conditions. First, they contain no higher education institutions of any kind as reported by IPEDS, be it four-year, two-year, or one-year, public or private. Second, they must be located at least 60 miles away from a treatment county with a college in order to protect against spatial interdependencies. Third, they have no suppressed data for variables used in the control group selection process. Fourth, they are similar to the community college counties in terms of the control group selection variables. A similarity index based on the Mahalanobis metric is computed for each potential treatment-control match. Unique control county matches for each community college county are then assigned using a network flow optimization procedure to maximize the fit of the group taken as a whole. Table 3 contains the list of control counties selected in this manner.

After a control group has been selected, an additional evaluative check of the fit of the control group is made by examining the results of a statistical pre-test using a conventional difference of means t-test. In the pre-test, the growth rates of the community college counties are compared to the group of pair-wise matches in the period before the community colleges are established and before any construction was likely to have commenced.

Economic impacts are measured using personal income and employment data obtained from the Regional Economic Information System (REIS) (U.S. Department of Commerce, Bureau of Economic Analysis, 2005). Since the Bureau of Economic

Analysis changed its industrial classification system from the Standard Industrial Classification (SIC) to the North American Industrial Classification System (NAICS) in the past seven years, a continuous data series that includes more recent years (2001-2006) is not available. However, the older series containing data for the period 1969-2000 should be adequate for making inferences about the impact of community colleges constructed during the 1970s and 1980s. The REIS data measures employment and earnings at the sectoral level and includes industries such as services, retail trade, and state and local government. In addition, the REIS personal income series contains data for population, per capita income, residential adjustment (a measure of net earnings leakages paid to nonresidents), transfer payments, and dividends, interest, and rent.

Cumulative growth rate differences by sector serve as the basis for impact measurement. Growth rates were calculated with respect to the base year of 1969. The period 1970-2000 is broken into two periods for analysis. 1969-1970 serves as a pre-test period during which one can verify that the counties followed similar growth trajectories. The years thereafter are used to assess the impacts of the community colleges.

4. The Effects of Community Colleges on Local Growth and Development

The pre-test provides a way of assessing the suitability of the control group. Its null hypothesis is that there is no difference between the growth rates of the community college counties and the control group counties before the community colleges were established. Table 3 shows the pre-results. There are no statistically significant

differences between the community college group and control group for personal income or employment sectors examined here. Therefore, subsequent growth rate differentials can plausibly be attributed to the community colleges.

Results for the entire study period are presented in Figures 1 and 2 for selected economic and demographic variables. Statistically significant years for each sector are identified in the legend. The results show some rather dramatic differences in employment growth rates for construction, services, and state and local government. However, only the state and local government differences are statistically significant by the end of the study period. This finding is not altogether surprising since public college employee employment would be assigned to this sector. Population grows about 10 percent faster and per capita income is 25 percent larger but neither result is statistically significant. Moreover, none of the earning categories that are not pictured were statistically significant.

Altogether the findings are suggestive that community colleges do not provide an economic stimulus to counties where they are established. However, these colleges do provide a clear boost to the state and local government sector.

The sparse findings may be attributable to limitations of the research design. Among these research design characteristics are the relatively small size of the study sample, the staggered dates of opening which dilute the intensity of the impact in earlier post-test period years, the limited number of post-test period years, and the unavailability of a purer control group. It is possible that a larger sample with aligned opening dates occurring during an earlier period that permitted a longer post-test period might have yielded more statistically significant results. Moreover, because of the rapid growth of

community colleges, remote sites, and distance education, it is unlikely that many control counties are totally unserved by community colleges. However, it was not possible to construct a better treatment or control group with the types of data available.

Alternatively, these findings may reflect a reality that these institutions do not provide the same degree of economic stimulus as found in many studies of four-year colleges and universities. As discussed earlier, community colleges are typically smaller and have fewer economic assets than four-year colleges and universities. Also, they derive much of their funding from the local area. If expenditures are smaller and a large portion of it represents a reallocation of existing spending rather than an injection of new spending, we should anticipate few immediate positive economic impacts outside the state and local government sector. In addition, improvements in local labor earnings may not occur if, as argued by some economists, education plays primarily a sorting or screening rather than productivity-enhancing role. Moreover, if community college graduates are more likely to migrate, community colleges could contribute to a younger workforce exodus in less economically dynamic areas. Lastly, while community colleges provide valuable business assistance and training, some of these activities may displace local private sector educational and business services.

5. Summary and Conclusion

Many community colleges tout themselves as economic engines for their communities. For counties without easy access to other educational institutions, the community college can, theoretically at least, serve an important economic role, not only

by providing an injection of new expenditures and educating the local workforce but by serving as an information clearinghouse between government and business, stimulating business startups, and helping to facilitate community planning in areas with fewer intellectual resources. Unfortunately, few ex post studies exist to validate these conjectures.

This study has used a quasi-experimental matching method to examine the local economic effects of community colleges opened during the period 1973-1989 on twenty-one U.S. counties. The empirical work presented in this study shows very little evidence that the community colleges substantially stimulated their county economies. Although community college counties generally outpace control counties in per capita income, population, total employment, total employment, and a handful of industries during the period, only the state and local government sector result is statistically significant. This effect likely reflects the growth in state and local government hiring attributable to the establishment of the community college. The lack of more widespread statistically significant results may be attributed to research design limitations or the actual absence of definitive widespread economic effects.

These results suggest that caution should be used in interpreting studies that attribute large economic impacts to the presence of community colleges. There are characteristics of community colleges that make them quite different from four-year colleges and universities, particularly large research institutions where substantial economic impacts have been found. These characteristics may not be adequately captured in such studies. This assessment is not meant to belittle community colleges. They provide valuable services to their communities that likely improve the quality of

life and economic mobility of local residents. However, local economic growth may not be the most favorable metric for measuring their contributions.

Notes

¹ One might raise several objections with using IPEDS data. First, it sometimes excludes information about branch campuses, never includes information about other remote sites where courses could be offered, and neglects to consider the role of distance learning opportunities through television and the Internet. This limitation is likely to be less restrictive for community colleges than college/universities where branch campuses frequently cross county boundaries. Furthermore, the purpose of this analysis is to assess the effects of institutions which offer the full range of community college services. Branch campuses are often scaled down versions that offer only a small subset of the program opportunities available at the main campus and lack support services. Indeed, the rationale for branch campuses is often to offer basic level coursework and feed students into the main campus for more specialized programs.

² The analysis uses all 3,141 counties, parishes, independent cities, boroughs and other county-equivalents contained in the 2000 U.S. Census. The reason for using these units is mainly practical rather than conceptual. Main campus or host counties will admittedly not represent the entire market area of most community colleges but they generate the bulk of enrollment for most institutions. For instance, in the state of Maryland, which has three institutions with multi-county service regions, approximately 80% of statewide enrollment is derived from enrollment in counties where the main community college campus is located.

³ Community colleges were assigned to counties by using the IPEDS institutional address zip codes and a commercial zip code product, Ziplist5, that relates zip codes to county fips codes.

The Author

Terance Rephann is a Regional Economist with the Weldon Cooper Center for Public Service at the University of Virginia. He received his Ph.D. in economics from West Virginia University and a B.A. in economics and mathematics from Frostburg State University. Prior to his current position, he served as Director of Institutional Research at a community college, Allegany College of Maryland, located in Cumberland, Maryland.

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Table 1. Community College Study Counties and Control Group Matches

Institution	County/Parish	State	Year	Enrollment	---- Matched County----	
					County/Parish	State
Chattahoochee Valley Community College	Russell	AL	1973	1,889	Catoosa	GA
Northland Pioneer College	Navajo	AZ	1973	5,084	Montrose	CO
North Arkansas College	Boone	AR	1974	1,889	Shenandoah	VA
Lake Tahoe Community College	El Dorado	CA	1975	3,305	Sutter	CA
Mendocino College	Mendocino	CA	1973	5,016	Tehama	CA
Heart of Georgia Technical College	Laurens	GA	1984	1,307	Elbert	GA
Southeastern Technical College	Toombs	GA	1989	1,278	Crisp	GA
Altamaha Technical College	Wayne	GA	1989	1,284	Hampton	SC
Frontier Community College	Wayne	IL	1976	1,913	Fulton	IN
Louisiana Technical College-Tallulah Campus	Madison	LA	1977	430	Chicot	AR
Louisiana Technical College-Lamar Salter Campus	Vernon	LA	1978	341	Dale	AL
Fond du Lac Tribal and Community College	Carlton	MN	1987	1,023	Roseau	MN
Minnesota West Community and Technical College	Yellow Medicine	MN	1985	3,155	Watonwan	MN

Table 1 Continued. Community College Study Counties

Institution	County/Parish	State	Year	Enrollment	---- Matched County----	
					County/Parish	State
Sussex County Community College	Sussex	NJ	1982	2,481	Calvert	MD
Mesalands Community College	Quay	NM	1980	474	Sevier	UT
University of New Mexico-Valencia County Branch	Valencia	NM	1981	1,466	Fayette	OH
Brunswick Community College	Brunswick	NC	1979	978	Putnam	WV
Southern State Community College	Highland	OH	1975	2,038	Decatur	IN
Collin County Community College-Central Park	Collin	TX	1985	14,497	Montgomery	TX
Northeast Texas Community College	Titus	TX	1984	2,212	Marion	MS
Lac Courte Preilles Ojibwa Community College	Sawyer	WI	1982	516	Benton	MO

Table 2. Variables used in selecting control-group counties***Industrial structure***

Farm earnings as share of total personal income, 1970

Mining earnings as share of total personal income, 1970

Manufacturing earnings as share of total person income, 1970

Federal government, civilian earnings as share of total personal income, 1970

Federal government, military earnings as share of total personal income, 1970

State and local government earnings per capita, 1970

Population, demand and spatial aspects

Log of population (based 10), 1970

Log of population potential for counties within 60 miles, 1970

Log of population potential for counties within 60-500 miles, 1970

Residential-adjustment income as share of total personal income, 1970

Transfer-payments income as share of total personal income, 1970

Dividends, interest, and rent income as share of total personal income, 1970

Per capita personal income, 1970

Population density, 1970

Distance to city with 25,000 or more residents, 1970

Distance to city with 100,000 or more residents, 1970

Distance to city with 250,000 or more residents, 1970

Distance to city with 500,000 or more residents, 1970

Distance to city with 1,000,000 or more residents, 1970

Table 2 continued. Variables used in selecting control-group counties***Growth***

Total person income growth rate, 1969-70

Population growth rate, 1969-70

Table 3. Pre-test results

Sector	% change
Total employment	-0.037
Wage and salary employment	-0.021
Proprietors employment	0.752
Farm proprietors employment	-0.264
Nonfarm proprietors employment	1.453
Farm employment	-0.517
Non-farm employment	0.162
Private employment	1.148
Agricultural services, forestry, and other	0.129
Mining employment	3.569
Construction employment	-6.194
Manufacturing employment	1.476
Transportation and public utilities employment	10.341
Wholesale trade employment	-5.579
Retail trade employment	0.991
Finance, insurance, and real estate employment	4.611
Services employment	2.821
Federal, civilian employment	-1.336
Military employment	-0.112
State and local government employment	0.237

Table 3 continued. Pre-test results

Sector	% change
Total personal income	0.982
Population	0.261
Per capita personal income	0.648

Figure 1. Employment Mean Growth Rate Differences

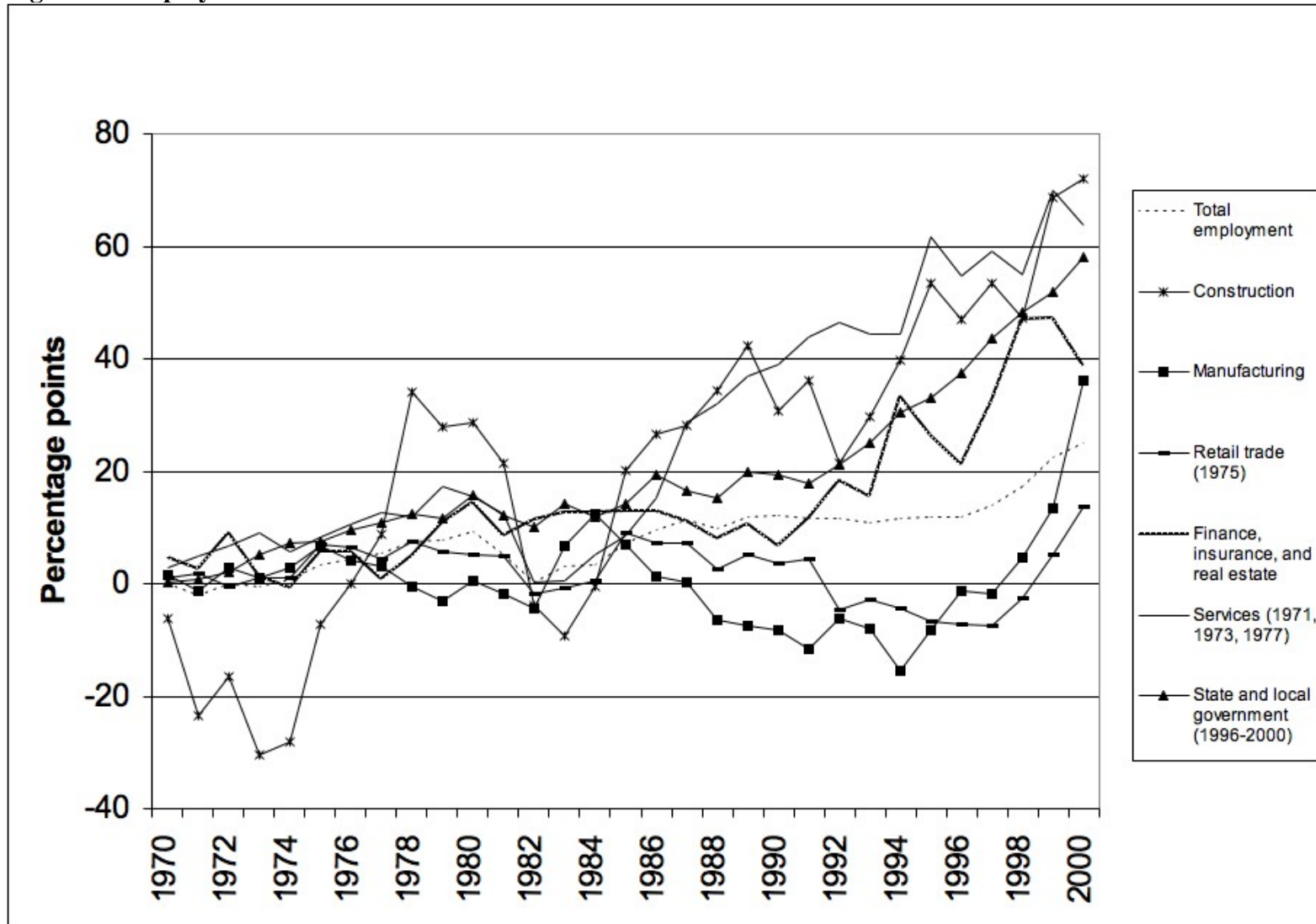


Figure 2. Total Employment, Population, and Per Capita Income Mean Growth Differences

