

**A GIS Analysis of Undergraduate
Market Share among Missouri Counties
Fall 2001-Fall 2005**

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Executive Summary

This report examines undergraduate market share by Missouri county in the years 2001-2005 using geographic information system (GIS) software to map values onto specific counties. Market share is defined as the percentage of the undergraduate students from a specific Missouri county enrolled in an institutional group including the University of Missouri System, other 4-year Missouri public universities, 4-year private universities and colleges, and 2-year universities and colleges. Market share data are presented in two ways. Fall 2005 market share is reported first to provide a current view of market shares and changes in market shares occurring between fall 2001 and fall 2005 is reported to highlight trends. To avoid misinterpretation, this data should not be used to make inferences about specific counties as most counties have a small number of students relative to the state's total undergraduate population. This report is organized into five sections:

- I. Missouri's Undergraduate Enrollment Population
- II. Overview of Statewide Market Shares
- III. Market Share of University of Missouri System vs. Market Share of Missouri 4-year Public Universities.
- IV. Market Share of Missouri 4-year Public Institutions vs. Market Share of 4-year Private Institutions.
- V. Market Share of Missouri 4-year Institutions vs. Market Share of Missouri 2-year Institutions
- VI. Conclusion
- VII. Data, Methods and Caveats

Report Highlights

- The vast majority of Missouri counties experienced growth in the number of students attending a 4-year or 2-year postsecondary institution in the state of Missouri between 2001 and 2005 (see Figure 2).
- The market share of the University of Missouri System did not fluctuate greatly among Missouri counties in 2001-2005. Other 4-year Missouri public universities experienced a widespread decline in their market share at the county level during the same period (see Figures 5 & 6).

Report Highlights (cont.)

- The market share of all 4-year Missouri public institutions declined in many counties particularly in the north between 2001 and 2005. 4-year private institutions, on the other hand, gained considerable county-level market share in the northeastern quadrant of the state (see Figures 9 & 10).
- 4-year institutions' market share in 2005 reached over 80% in counties in the center and northwestern portions of the state. Accordingly, 2-year institutions market share was generally weak in the same counties (see Figures 11 & 12).
- The county-level market shares of both 4-year and 2-year institutions remained relatively balanced between 2001 and 2005 with approximately the same number of counties with declines as with increases. 2-year institutions had modest increases in market share generally in the southwestern and northern portions of the state (see Figures 13 & 14).

Section I: Missouri's Undergraduate Enrollment Population

- The state's undergraduate population is concentrated in several metropolitan areas including St. Louis, Kansas City, Springfield, and Columbia-Jefferson City (Figure 1). Most counties have a relatively small number of undergraduate students.
- Most counties in Missouri experienced significant growth in their undergraduate population between 2001 and 2005 (Figure 2). The only counties with large declines in their undergraduate population are in the northern portion of the state.

The initial section of this analysis plots the geographic origins of Missouri's undergraduate population by county which provides a crucial backdrop for the conclusions made in this study. The state's undergraduate population is far from evenly distributed at the county level. Not surprisingly, Figure 1 shows that the origins of this population closely follow the broader population patterns in Missouri. The counties providing the largest number of undergraduate students are located in metropolitan areas including St. Louis, Kansas City, Springfield, and Columbia-Jefferson City. The remaining counties have a much smaller number of students attending institutions of higher learning, which is important to keep in mind when looking at the proceeding market share maps.

Changes in the origins of Missouri undergraduate students between 2001 and 2005 exhibit several notable trends. Clearly most counties experienced significant growth in their undergraduate population. By and large, the few counties with steep declines are found in the northern portion of the state. These findings suggest there is a healthy expansion in the number of undergraduate students in Missouri and that it is more or less evenly distributed across the state.

Figure 1: Undergraduate Enrollment by County, Fall 2005

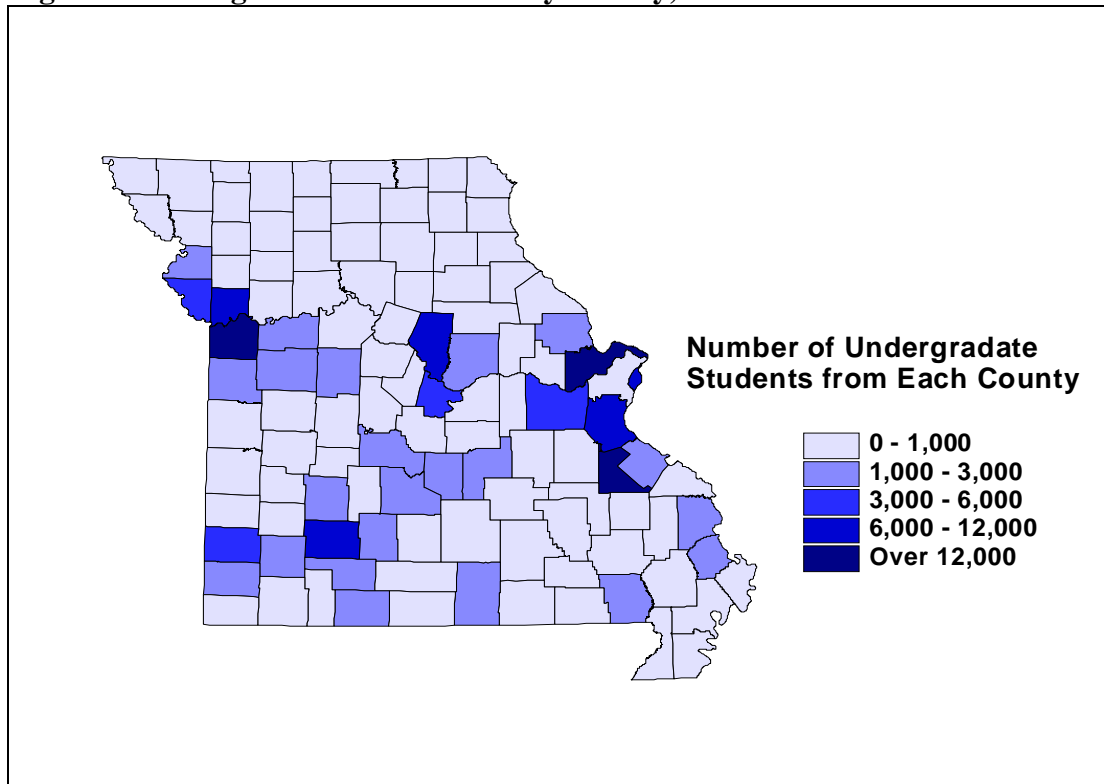
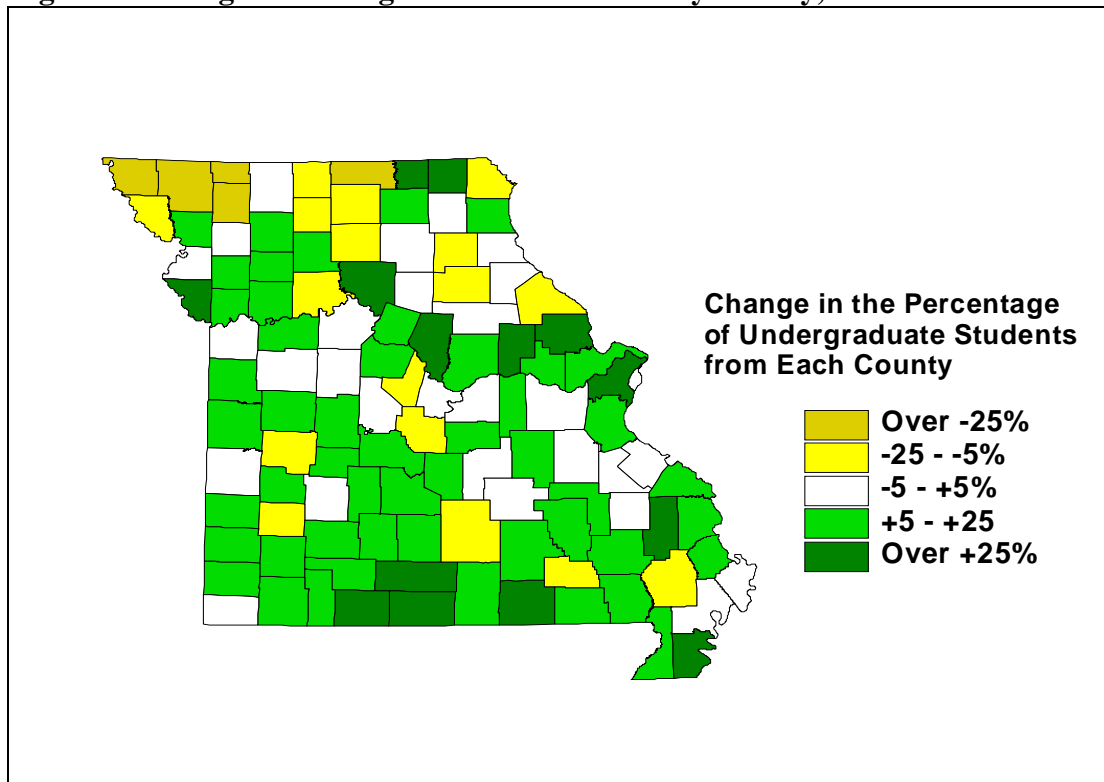


Figure 2: Change in Undergraduate Enrollment by County, Fall 2001- Fall 2005



Section II: Overview of Statewide Market Shares

- The University of Missouri System and 4-year private institutions expanded their statewide market shares between 3%-4% during 2001-2005 (Table 1).
- Other Missouri 4-year public universities experienced approximately a 4% decline in market share in the state between 2001 and 2005 (Table 1).
- 2-year institutions in Missouri have only experienced a slight 1% decline in market share in the state during 2001-2005 (Table 1).

Market share can also be viewed at the state level which provides an overall picture of changes in market share among the institutional groups examined in this study. The county-level data reported in the following sections help explain the many facets of these statewide market share trends. Table 1 presents the market share for all institutional groups for 2001-2005 as well as the total change in market share during this time period. First, the University of Missouri System realized the largest percentage increase in market share (3.7%) among all institutional groups. Other 4-year public universities in Missouri experienced a sharp downturn in market share (-3.8%). Second, 4-year private universities and colleges increased their market share approximately at the same rate (3.5%) as the University of Missouri System. Finally, two-year institutions, in the aggregate, maintained a relatively steady market share over the past five years losing only 1% market share.

Table 1: State Market Share by Institutional Groups, Fall 2001-Fall 2005

	2001	2002	2003	2004	2005	+/- in Market Share	% Change
UM SYSTEM							
Total Market Share	17.33%	17.74%	17.88%	18.17%	17.97%	0.64%	3.7%
Total UG Enrollment	36,370	38,287	39,194	39,449	39,939		
OTHER PUBLIC UNIVERSITIES¹							
Total Market Share	24.0%	23.4%	22.9%	23.1%	23.1%	-0.91%	-3.8%
Total UG Enrollment	50,454	50,394	50,250	50,152	51,395		
PRIVATE UNIVERSITIES²							
Total Market Share	20.18%	20.14%	20.15%	20.00%	20.87%	0.70%	3.5%
Total UG Enrollment	42,340	43,464	44,183	43,410	46,384		
TWO-YEAR INSTITUTIONS³							
Total Market Share	38.45%	38.77%	39.04%	38.73%	38.02%	-0.42%	-1.1%
Total UG Enrollment	80,679	83,662	85,590	84,062	84,489		
Total Missouri Enrollment	209,843	215,807	219,217	217,073	222,207	-	5.89%

¹ This includes Central Missouri University, Harris-Stowe State University, Lincoln University of Missouri, Missouri Southern State University, Missouri Western State University, Missouri State University, Northwest Missouri State University, Southeast Missouri State University and Truman State University.

² This includes Avila University, Central Methodist University, College of the Ozarks, Columbia College, Culver Stockton College, Drury University, Evangel University, Fontbonne University, Hanibal LaGrange College, Lindenwood University, Maryville University, Park University, Rockhurst University, Saint Louis University, Southwest Baptist University, Stephens College, Washington University, Webster University, Westminster College, William Jewel College and William Woods College.

³ This includes Crowder College, East Central College, Jefferson College, Linn State Technical College, Metropolitan Community College-Blue River, Metropolitan Community College-Business and Technology, Metropolitan Community College-Longview, Metropolitan Community College-Maple Woods, Metropolitan Community College-Penn Valley, Mineral Area College, Moberly Community College, Missouri State University-West Plains, North Central Missouri College, Ozarks Tech Community College, State Fair Community College, St. Charles Community College, St. Louis Community College-Florissant Valley, St. Louis Community College-Forest Park, St. Louis Community College-Meramec and Three Rivers Community College.

Section III: University of Missouri System vs. Missouri 4-Year Public Universities

- The University of Missouri System enrolls a higher concentration of undergraduate students from the northern region of the state (Figure 3). Other Missouri 4-year public universities' market share is highest in the western and southeast regions of the state (Figure 4).
- The county-level market share of the University of Missouri System has been relatively stable between 2001 and 2005 (Figure 5). Other Missouri 4-year public universities have lost county market share throughout most of the state during 2001-2005 (Figure 6).

An examination of the market share of the University of Missouri System by county in 2005 reveals it is consistently higher in the northern portion of the state (Figure 3). In addition, there are a few counties with a University of Missouri market share approaching 30% of their respective undergraduate population. Furthermore, these counties are largely found in urban areas. Figure 4 displays the 2005 county market share for other Missouri 4-year public universities. This group's market share on a county by county basis is clustered in the western side and southeast corner of the state. Many counties in these areas have over 40% of their undergraduates attending these schools.

As Figure 5 illustrates, University of Missouri's market share by county has not significantly changed over the past five years. Most counties have realized only minor changes (-5% to +5) in this type of market share. Thus, the market share of the University of Missouri System has been relatively stable throughout much of the state. This further indicates the growth in statewide market share the University of Missouri System has experienced recently is likely a result of smaller changes in the aggregate rather than major changes occurring among a particular group of counties or one region.

Other Missouri 4-year public universities have not fared well between 2001 and 2005. Figure 6 shows these institutions have had considerable declines in market share in numerous counties. In addition, these counties are speckled across the state. The only region largely absent of these drops is the southeast part of the state. This finding matches statewide trends for this group of schools, who have lost close to 1% of their statewide 24% market share over the same five years. However, this analysis shows these decreases appear to be happening throughout the state and not isolated to one particular area or region.

Figure 3: University of Missouri System Market Share by County, Fall 2005

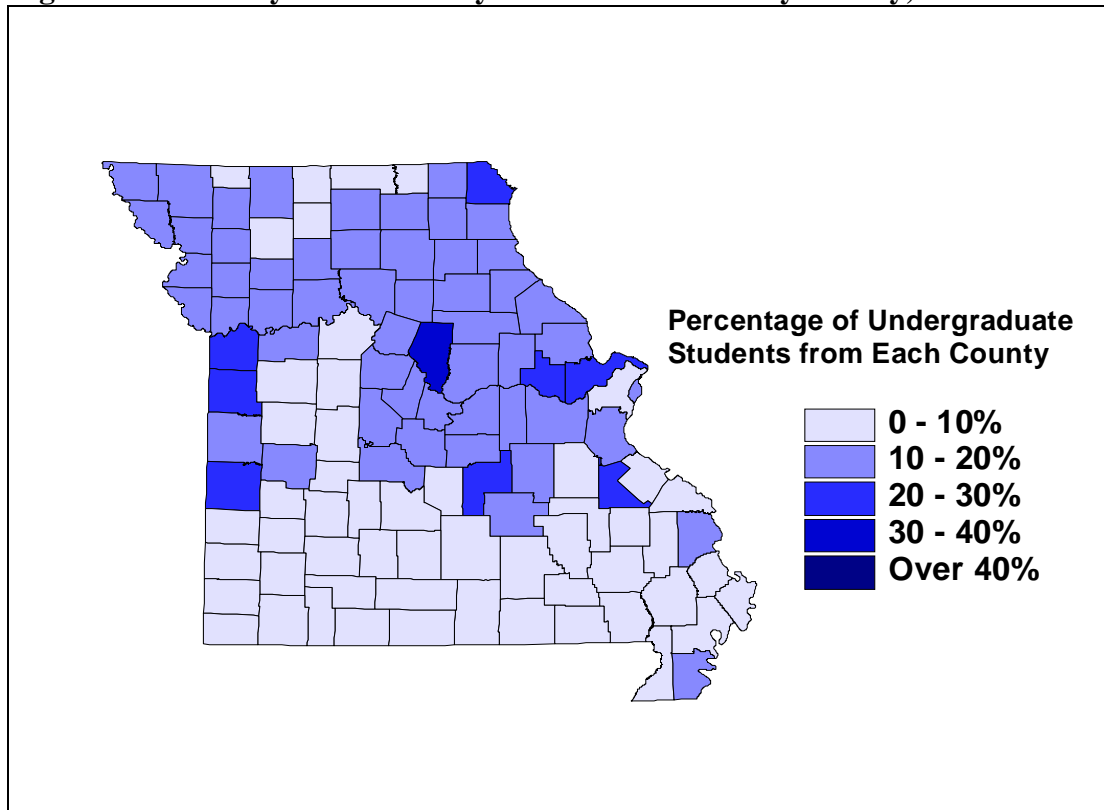


Figure 4: Other Missouri 4-Year Public Universities Market Share by County, Fall 2005

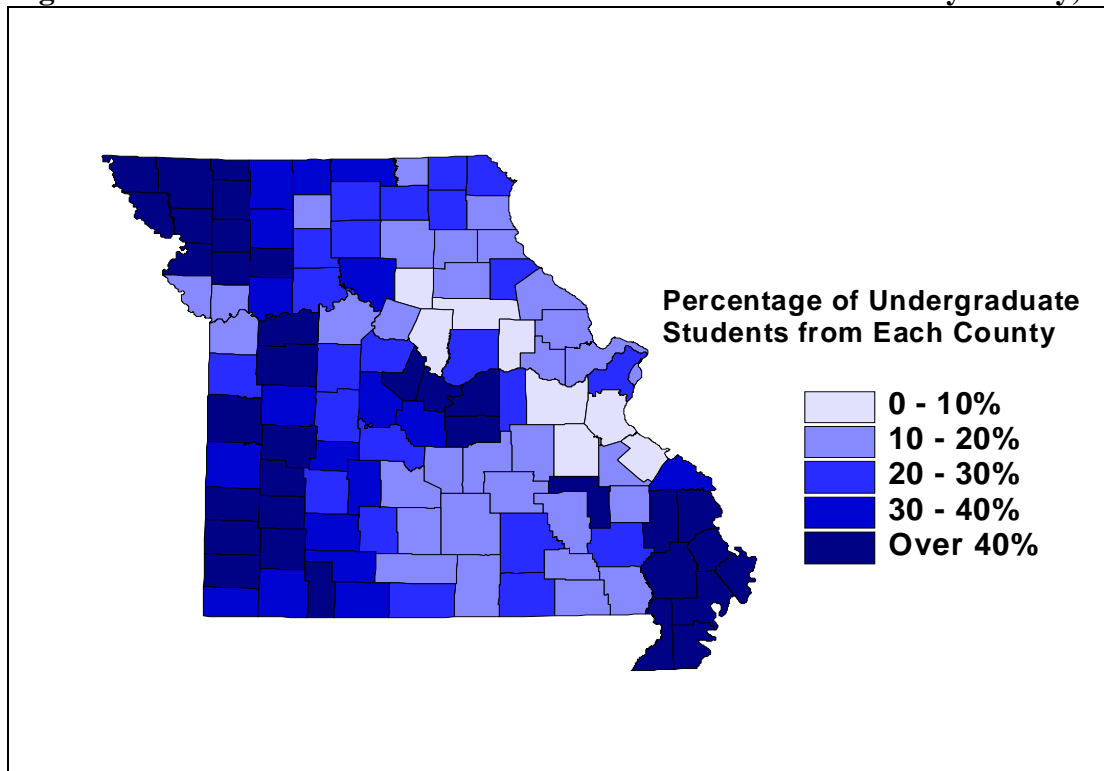


Figure 5: Change in University of Missouri System Market Share by County, Fall 2001-Fall 2005

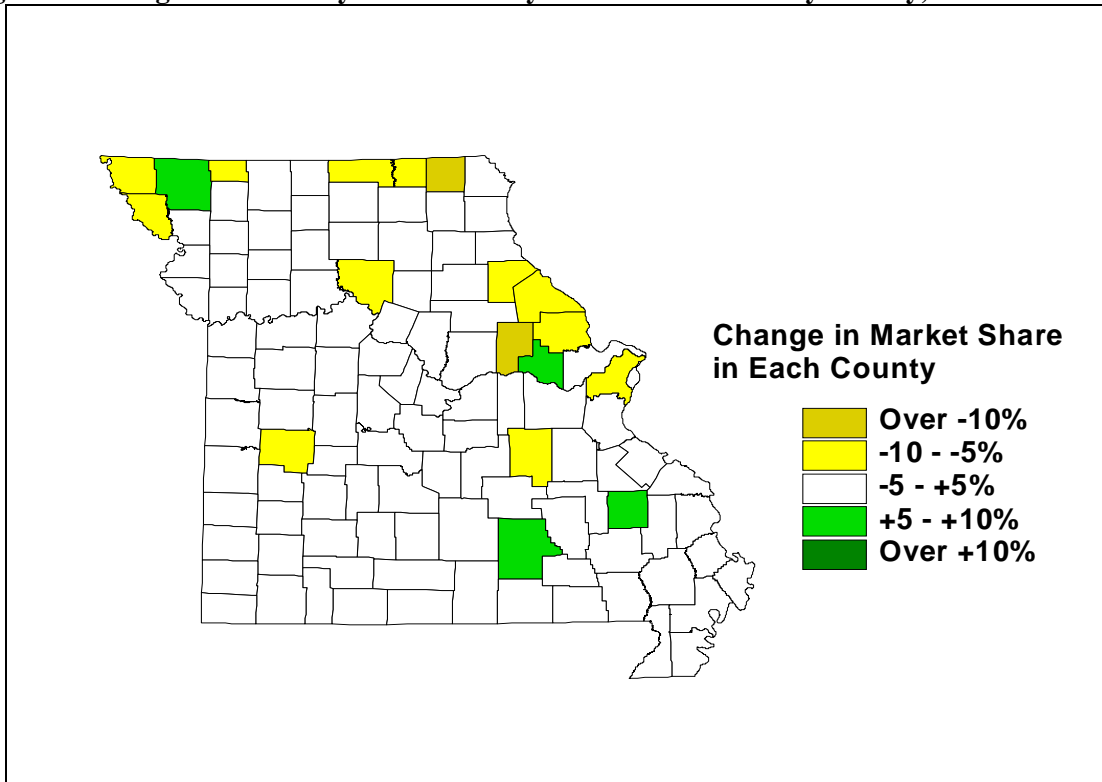
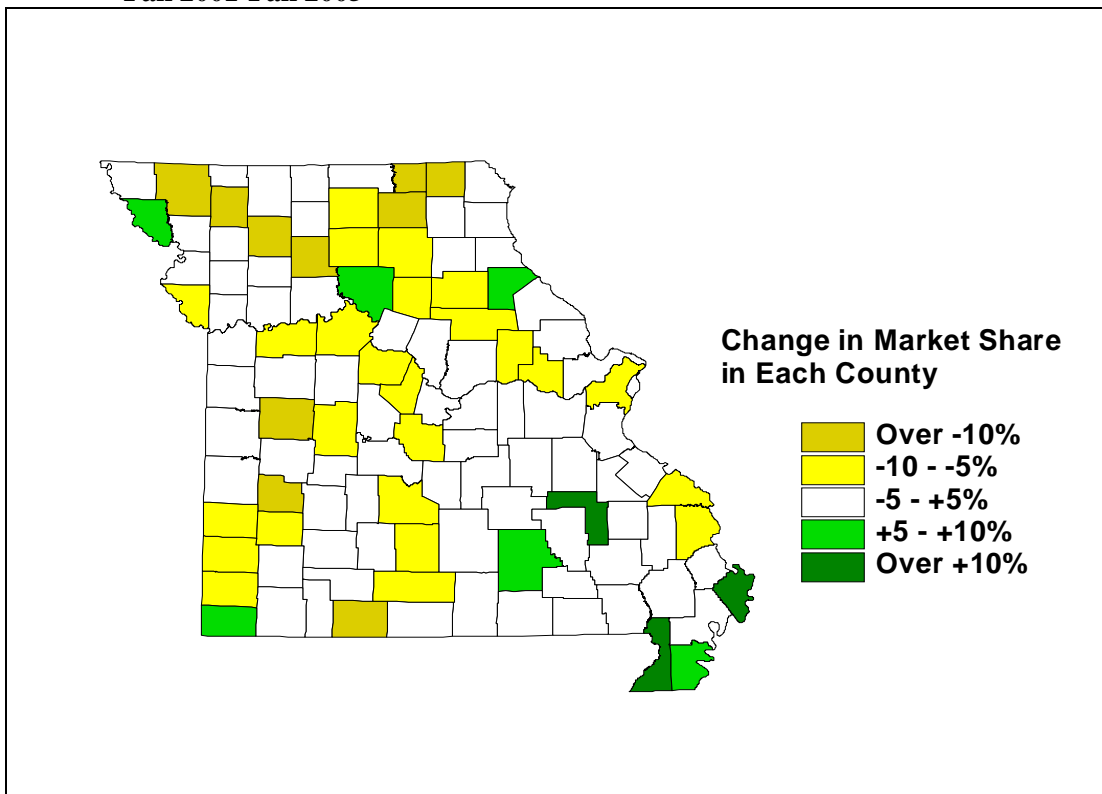


Figure 6: Change in Other Missouri 4-Year Public Universities Market Share by County, Fall 2001-Fall 2005



Section IV: Total Missouri 4-Year Public Institutions vs. Total Missouri 4-Year Private Institutions

- Missouri 4-year public institutions have strong market share throughout the state, particularly in the western, center, and southeast portions of the state (Figure 7). Missouri 4-year private institutions' market presence is concentrated in the center band and northeastern portions of the state (Figure 8).
- The market share of Missouri 4-year public institutions declined in many counties between 2001 and 2005 (Figure 10). Missouri 4-year private institutions gained market share in the northeast quadrant of the state during the same period (Figure 11). Thus, the growth among private institutions is not entirely due to satellite programs enrolling out-of-state students.

A comparison of Missouri 4-year public institution market share and Missouri 4-year private institution market share confirms that public universities dominate the undergraduate market throughout much of the state. As Figure 7 demonstrates, public institutions have the heaviest market share (above 40%) in the western side, center portion and southeast corner of the state. Alternatively, private institutions perform particularly well in the center band and the northeastern quadrant of the state (Figure 8). As expected, these two types of market shares are distinct when viewed at the county level.

Turning to changes in market share between these two types of education institutions (see Figures 9 and 10), there appears to be two somewhat interrelated developments occurring between 2001 and 2005. First, there is a general downward trend in total public institution market share in many counties across the state (which cannot be attributed to the University of Missouri System as figures 5 and 6 demonstrate). The only exception to this trend is in the southeast quadrant of the state, which experienced some growth in public university enrollment. Thus, the statewide decline in public institution market share is occurring broadly across the state.

Second, private institutions have increased their market share in many counties mostly residing in the northeast quadrant of the state, an area now important to their overall state market share. Just as there are only a few counties with gains in total public enrollment, there are only a few counties with reductions in total private enrollment. This analysis corroborates, to some degree, the assertion that statewide growth in private university market share is in fact real and not an artifact of online degree programs or satellite campuses that typically enrolls out-of-state students.

Figure 7: Total Missouri 4-Year Public University Market Share by County, Fall 2005

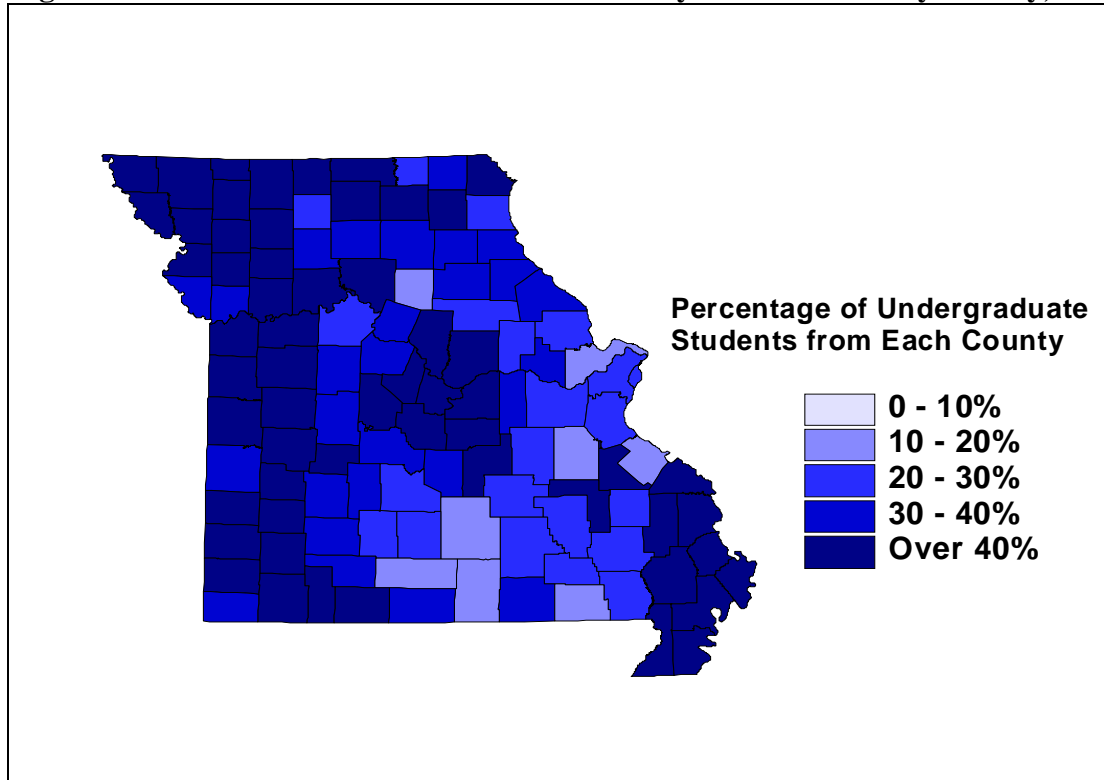


Figure 8: Total Missouri 4-Year Private University Market Share by County, Fall 2005

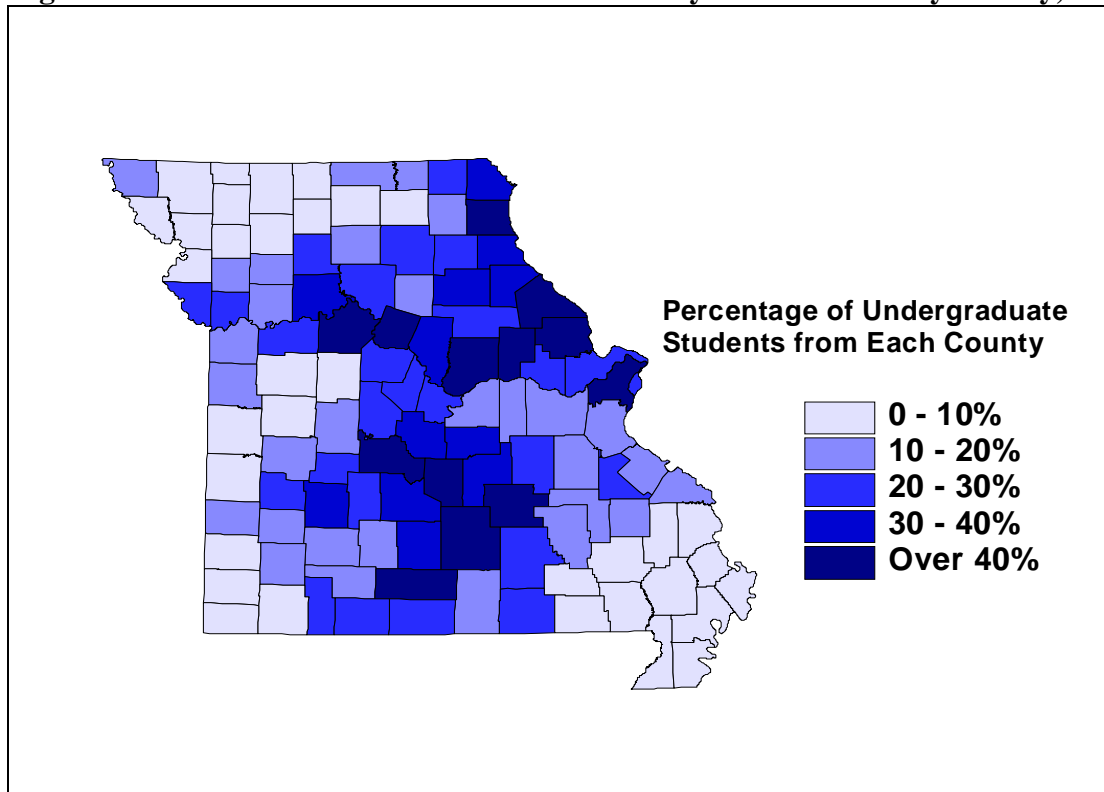


Figure 9: Change in Total Missouri 4-Year Public Institution Market Share by County, Fall 2001-Fall 2005

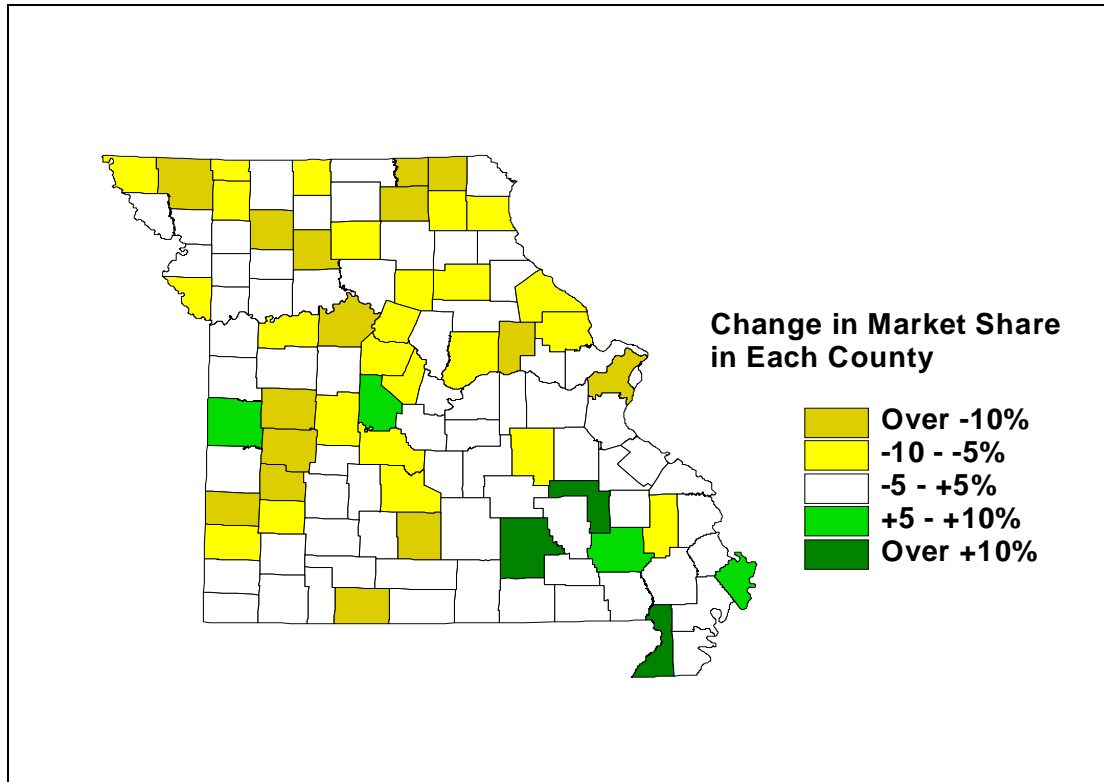
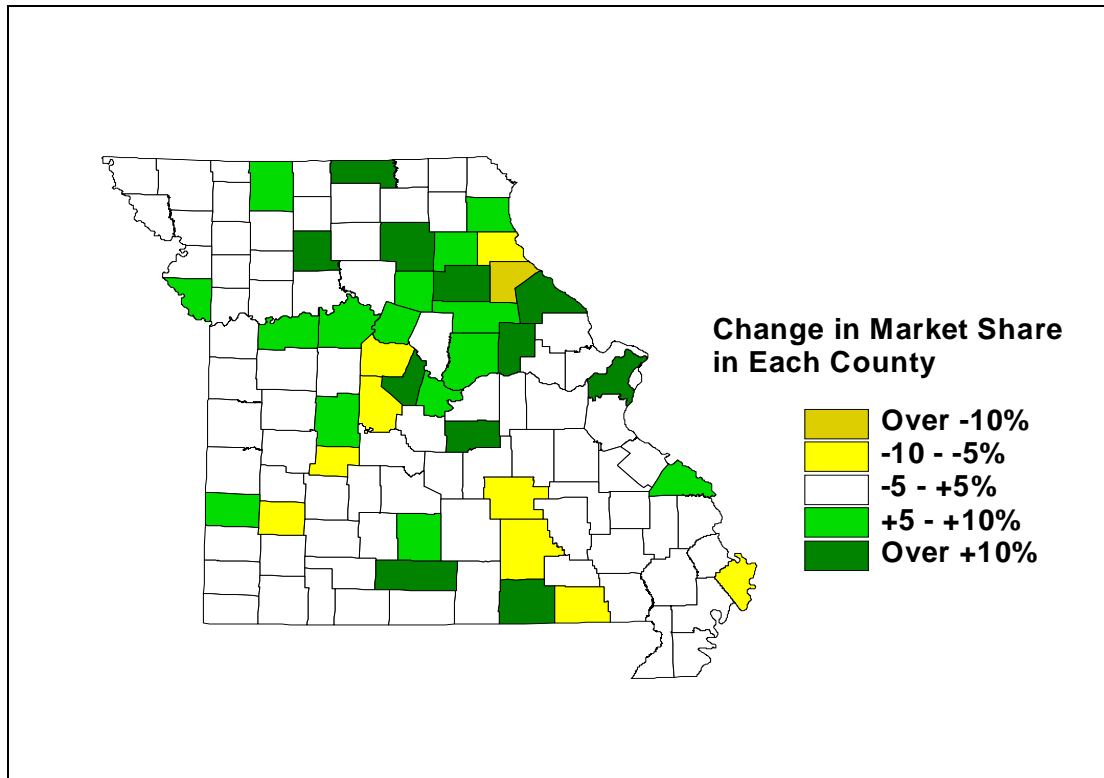


Figure 10: Change in Total Missouri 4-Year Private Institution Market Share by County, Fall 2001-Fall 2005



Section V: Total 4-Year Institutions vs. Total 2-Year Institutions

- Total 4-year institutions' market share is high across the state, particularly in the center and northwest portions of the state (Figure 11). Total 2-year institutions have a significant market share in the southeast portion of the state (Figure 12).
- Changes in market share of 4-year and 2-year institutions offset each other between 2001 and 2005. Decreases in one type of market share are associated with increases in the other type of market share (Figures 13 & 14).

The final section of this study compares 4-year institutions and 2-year institutions. The 4-year institutions category includes all public and private universities that have been previously listed in this study. The list of 2-year institutions is found on the bottom of page 7. As Figure 11 shows, total 4-year universities and colleges have a strong market share throughout most of the state with particularly high concentrations (over 80%) in counties located in the center and northwest part of the state. Total 2-year universities and colleges' market share is noticeably lacking in these same areas. The southeast section of the state is the only region in which 2-year institutions essentially lead the market having shares anywhere from 60% to 80% in some counties. The results suggest these two types of institutions have separate areas of market strength.

The respective county market shares of both total 4-year and total 2-year institutions have remained somewhat steady over 2001-2005 when seen in the aggregate (see Figures 13 and 14). Specifically, the declines in market share in some counties appear to be offset by increases in market share in other counties. This is also in line with statewide trends, which have both four-year and two-year universities basically flat over this period of time. However, there appears to be some important regional fluctuations. Total 4-year institutions have slumping market share in the southwest and northern portions of the state. These counties are precisely where 2-year institutions have picked up market share. Furthermore, the increases in market share of total 4-year universities and colleges in the central part of the state correspond to losses in market share by total 2-year universities and colleges. Again, this indicates that these two types of market shares are strongly and inversely related.

Figure 11: Total 4-Year Institution Market Share by County, Fall 2005

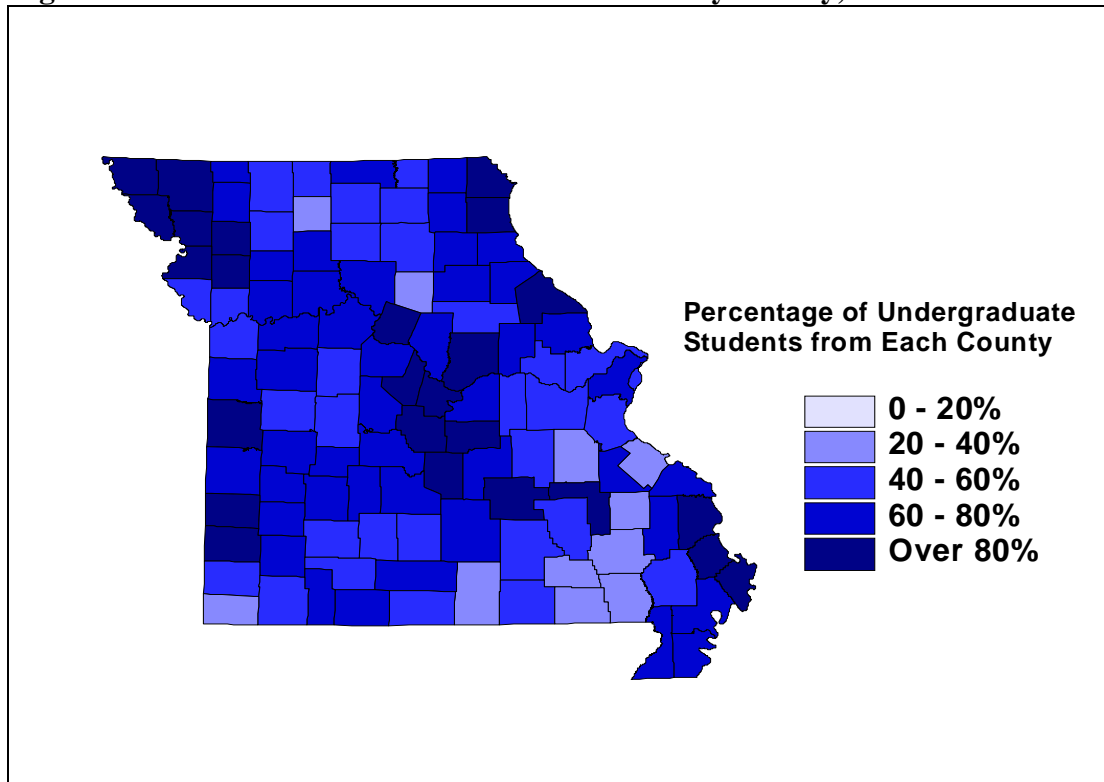


Figure 12: Total 2-Year Institution Market Share by County, Fall 2005

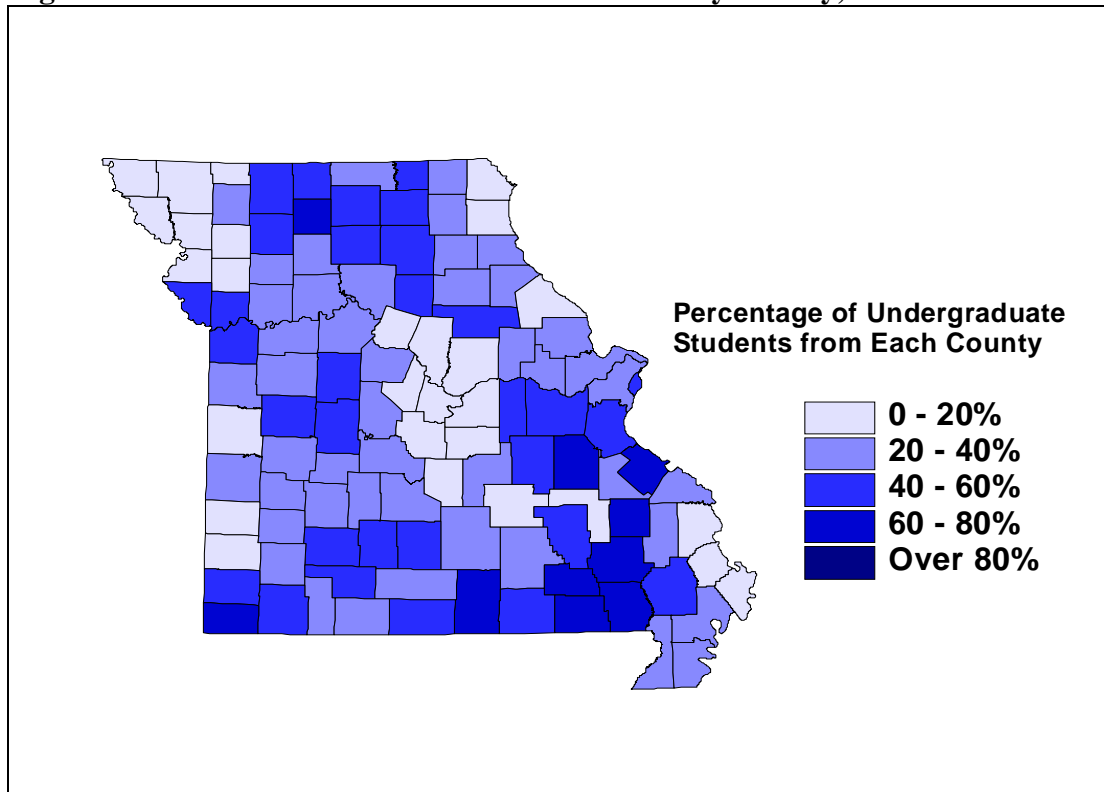


Figure 13: Change in Total 4-Year University Market Share by County, Fall 2001-Fall 2005

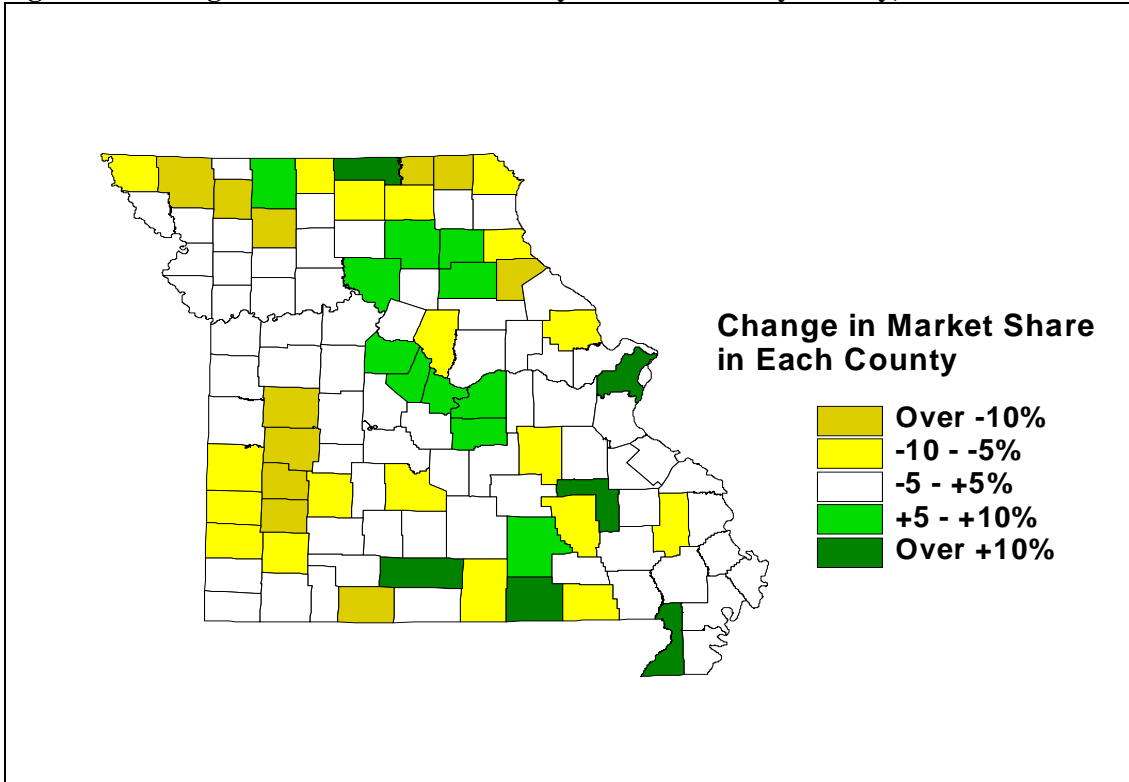
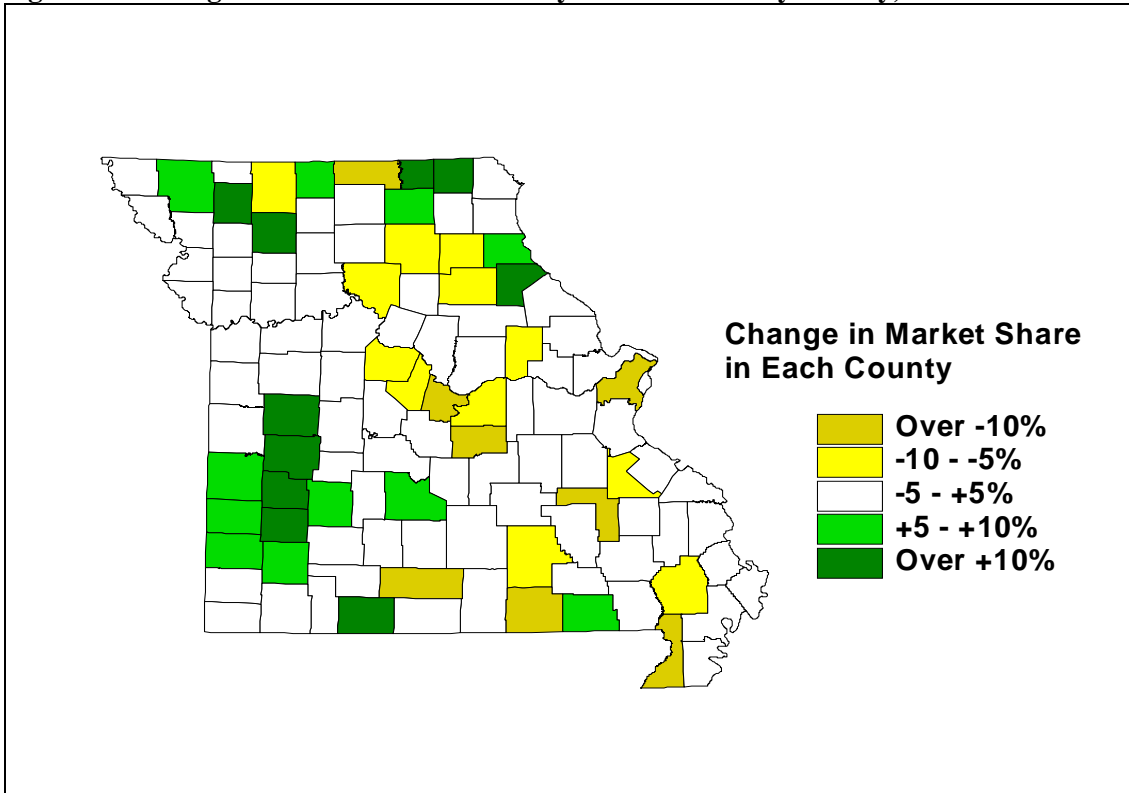


Figure 14: Change in Total 2-Year University Market Share by County, Fall 2001-Fall 2005



V. Conclusion

- Most counties have contributed to the significant increase in the state's undergraduate population during 2001-2005.
- The market share of each type of post-secondary institutions has a strong and unique regional component. Geographic considerations appear to be an important factor in undergraduate enrollment.
- This study observed clear trends in market share between 2001 and 2005. Four-year public universities apart from the University of Missouri System have lost substantial and widespread market share. Four-year private universities have gained market share in the northeast part of the state. The growth in the market share of the University of Missouri System appears to be evenly distributed across several counties.

This study demonstrates state-wide shifts in market share can be understood spatially, that is, these trends have a clear geographic component to them. One can certainly observe counties and corresponding regions with significant growth or declines in one type or market share or another that inform and highlight state-wide statistics. This affirms the use of GIS analysis for this particular topic and suggests that GIS analysis may be beneficial in answering other research questions relevant to state and county data.

In this particular study, GIS analysis uncovered three underlying trends in undergraduate market share. First, most counties throughout the state have contributed to the significant increase in the number of undergraduate students in the state between 2001 and 2005. This can be viewed positively as it indicates growth in educational opportunities does not appear to be confined to a specific region but enjoyed by almost every region in the state. This does not preclude other potential cleavages that cannot be viewed geographically, from restricting access to higher education among some within the state. However, one can say with some degree of certainty that geographical origins does not by and large hinder enrollment in higher education institutions.

Second, the market share of virtually every type of postsecondary institution has a clear regional component. The University of Missouri System has much higher concentrations of market share in the northern part of the state and in metropolitan areas. Other Missouri 4-year public universities recruit well in the west and the extreme southwest corner of the state. Four-year private

universities and colleges draw a large portion of their students from the center band and northeast corner of the state. Finally, 2-year institutions have some market share strength in the southeast section of the state. However, their market share is more defined by where it is weak, namely in the center and northwest corner of the state. Certainly the geographical proximity of educational institutions is one factor driving this regional characteristic. Future studies, beyond this one, will have to identify other potential factors at play.

Finally and perhaps most importantly, this study pointed out where increases and declines in market share have taken place. Total 4-year public institution market share has seen major declines (confined mostly to other public universities rather than the University of Missouri System) in many counties across the state between 2001 and 2005. At the same time, total 4-year private market share has grown particularly in the northwest quadrant of the state. This would seem to indicate that there is something systemic (and statewide) leading new undergraduate students away from other public universities and leading some toward enrolling in private universities and colleges. However, the exact cause of this movement is beyond the scope of this study.

Section VI: Data, Methods and Caveats

Using data collected by the Missouri Department of Higher Education between 2001 and 2005, this study summarizes the undergraduate market share of 2-year and 4-year postsecondary institutions in Missouri by the student's county of origin. This analysis is limited to students from Missouri counties because they comprise of the bulk of enrollment and are a clear, identifiable population. County market share is calculated by aggregating both part-time and full-time undergraduate enrollment originating from each Missouri county and then calculating the proportion of this population enrolled at each type of institution such as the University of Missouri System or private universities. Thus, if the University of Missouri System has 40% of all undergraduate students coming from Callaway County, for example, they would have a market share of 40% in this county relative to other types of postsecondary institutions in the state.

Due to the overwhelming number of counties with a small population of undergraduate students, this analysis should not be used solely to examine market shares in specific counties. Market share and changes in market share could be significant in many counties but may ultimately encompass a relatively small number of students from a statewide perspective. As Figure 1 shows a large proportion of Missouri's undergraduate population in 2005 came from a handful of counties; most

counties had a limited undergraduate population. To avoid this problem, the findings from this analysis look almost exclusively at regional statistics and trends. This approach provides more validity to any findings as multiple counties are surveyed. Furthermore, using this method, one can more easily identify and compare patterns among the maps in this study.