

**DECOMPOSITION AND SYNTHESIS OF ARKANSAS PERSONAL INCOME
2000-2007: A SHIFT-SHARE APPROACH**

Philip F. Rice
Professor of Business Administration
Frank D. Hickingbotham School of Business
Ouachita Baptist University

Marshall J. Horton
Chair, Department of Business Administration
Regions Bank Chair of Economics and Finance
Frank D. Hickingbotham School of Business
Ouachita Baptist University

Abstract

This paper provides an analysis of changes in personal income of Arkansas compared to the personal income changes in the United States and the Southeast Region. Shift-share is used to decompose personal income changes into three components: (1) overall-growth share, (2) differential-composition share, and (3) sector-competitive share. Arkansas personal income trends and potential of specific sectors using these three components are discussed.

Introduction

Shift-share analysis has a long history in regional studies (see Brown (1969) and Buck (1970) for early examples of the technique's use). The original development and use of shift-share analysis was to analyze regional growth, particularly employment growth. Gross domestic product and/or personal income for states and/or regions also lend themselves to shift-share decomposition.¹ The general idea is to identify two entities: (1) the whole and (2) a part of the whole where the whole is generally a country or a region and a part of the whole can be a region or a state.

Once the whole and the part are identified, the goal is to analyze changes in the part of the whole, for example Arkansas as a part of the United States, as in Philpot and Rice (1996). The procedure is to partition the total change (TC) of the part into three components on a sector by sector basis. We refer to the three components as: (1) overall-growth share (OGS), (2) differential-compositional share (DCS), and (3) sector-competitive share (SCS). Thus

$$TC(\text{sector}) = OGS + DCS + SCS$$

$$TC(\text{part}) = \Sigma[OGS] + \Sigma[DCS] + \Sigma[SCS]$$

The first term, overall-growth share (OGS), is determined by calculating the amount of the change in the part (by sector), assuming that each sector has changed by the same percentage rate as the change of the whole (using the overall percentage change). The second term, differential-compositional share (DCS), is the change in each sector attributable to the difference between the overall sector performance rate and general overall performance rate. A positive DCS identifies a sector as fast-growth, and a negative DCS identifies a sector as slow-growth. The third component, sector-competitive share (SCS), is the change in each sector attributable to the difference between the sector performance rate of the part and the sector performance rate of the whole. A positive SCS indicates a sector of the part that is increasing at a faster rate than the corresponding overall sector. A negative SCS indicates that the sector of the part is not keeping pace with the growth rate of the corresponding sector of the whole.

Analysis

Aggregate change

The analysis of personal income changes for 2000-2007 is composed of three comparisons. The comparisons are: (1) the United States versus the Southeast Region of the United States, (2) the United States versus Arkansas, and (3) the Southeast Region of the United States versus Arkansas.

Table 1 presents the percentage change in total personal income for 2000-2007.

Table 1
Percentage Change in Personal Income
2000-2007

	Personal Income (millions of dollars)		Percentage Change
	2000	2007	
United States	8,422,074	11,645,882	38.28
Southeast Region	1,840,460	2,640,290	43.46
Arkansas	58,726	85,214	45.10

Source: Personal Income Data for Tables 1, 2, 3, 4, and 5 obtained from “Regional Economic Accounts,” Bureau of Economic Analysis: <http://www.bea.gov/regional>. All computations in tables are the authors’.

From Table 1, it can be seen that Arkansas personal income (for period, 2000-2007) had a percentage increase (45.10%) that exceeded both the United States (38.28%) and the Southeast Region (43.46%). The fact that Arkansas experienced a greater percentage increase in personal income between the years 2000 and 2007 than either the United States or the Southeast Region indicates that Arkansas has some sectors of its economy that are behaving differently from those of the nation and region.

The shift-share analysis results are presented in Table 2 (Arkansas versus the United States), Table 3 (Arkansas versus the Southeast Region), and Table 4 (The Southeast Region versus the United States). Beginning with Table 2 (Arkansas versus the United States) and examining the totals row (bottom row), the change in Arkansas personal income is seen to be \$26,488 million (\$85,214 - \$58,726). Moving over to the column headed “Overall-Growth,” the total of that column, \$22,479 million, represents the personal income growth that Arkansas would have experienced had Arkansas personal income grown at the exact same percentage as the overall percentage change of the United States personal income. However, Arkansas personal income increased by the amount of \$26,488 million, which is \$4,009 (\$26,488 - \$22,479) million more than the growth that would have occurred had Arkansas personal income growth matched the United States percentage change. This difference, \$4,009 million, is divided into two components: (1) differential-composition (\$49 million) in column 8 and (2) sector-competitive (\$3,960 million) in column 9. These results indicate that Arkansas’ industry mix is composed of some fast-growth and some slow-growth sectors such that the net differential-compositional effect (\$49 million) is rather small. Conversely, the sector-competitive effect (\$3,960 million) indicates that in the aggregate, several sectors in Arkansas grew at a faster rate than the corresponding United States sectors.

The comparison of Arkansas and the Southeast Region (see Table 3) yields a different picture of the distribution of Arkansas personal incomes. The Arkansas personal income increase of \$26,488 (\$85,214 - \$58,726) million is composed of: (1) overall-growth (\$25,521 million), (2) differential-composition (-\$702 million), and (3) sector-competitive (\$1,669 million). The negative differential-composition factor offsets 42 percent of the increase attributed to the sector-competitive factor and indicates that Arkansas has far more sectors in the state that are increasing at a lesser rate than the overall regional change. Thus, Arkansas personal income is being provided by a mix of slow-growth industries whereas the positive sector-competitive factor (\$1,669 million) is indicative of some Arkansas sector growth rates being greater than the corresponding regional growth rate.

Table 4 provides information on the comparison of the Southeast Region and the United States. The total growth in personal income (\$799,830 million) is composed of the three components: (1) overall growth (\$704,493 million), (2) differential-composition (\$7,756 million), and (3) sector-competitive (\$87,581 million). The fact that both the differential-composition and sector-competitive components are both positive is indicative of a strong economic growth pattern for the Southeast Region. The positive differential-composition component indicates that the

Table 2
Personal Income by Industry Group: U.S. (US) versus Arkansas (AR)
(Millions of current dollars)

	1	2	3	4
	US	US	AR	AR
	2000	2007	2000	2007
Farm earnings	44,482	50,725	1,218	1,529
Forestry, fishing, related activities	25,342	29,378	453	545
Mining	55,811	121,084	327	750
Utilities	63,889	91,330	460	676
Construction	388,686	550,107	2,288	3,257
Durable goods manufacturing	634,589	688,686	4,914	5,222
Nondurables manufacturing	325,742	393,354	3,682	4,337
Wholesale trade	349,973	470,760	2,015	3,064
Retail trade	440,246	549,817	3,074	3,989
Transportation and warehousing	222,559	295,407	2,466	3,409
Information	280,332	309,673	1,181	1,714
Finance and insurance	473,357	698,960	1,621	2,379
Real estate and rental and leasing	147,009	197,194	664	875
Prof. and tech. services	630,394	870,906	1,935	3,104
Mgt. of companies/enterprises	137,902	207,490	1,443	2,122
Admin. and waste services	235,167	336,787	1,125	1,548
Educational services	74,277	120,270	218	377
Health care and social assistance	549,433	839,209	4,246	6,320
Arts, entertainment, and recreation	66,583	92,742	265	304
Accommodation and food services	174,216	249,381	955	1,408
Other services, except public administration	189,097	254,832	1,269	1,712
Government and government enterprises	995,592	1,456,890	7,251	11,198
plus: Adjust. for residence	-1,060	-1,388	-346	-351
plus: Dividends, interest, and rent	1,536,284	2,017,801	10,411	14,674
plus: Transfer receipts	1,083,821	1,731,963	10,656	18,089
less: Contributions for government social insurance	-701,650	-977,476	-5,065	-7,037
Total	8,422,074	11,645,882	58,726	85,214

Table 2 (continued)
Personal Income by Industry Group: U.S. (US) versus Arkansas (AR)
Percentage, Overall-Growth, and Differential-Composition

	5	6	7	8
	US %	AR%	Overall-Growth	Differential-Composition
Farm earnings	1.1404	1.2555	466	-295
Forestry, fishing, related activities	1.1593	1.2036	173	-101
Mining	2.1695	2.2952	125	257
Utilities	1.4295	1.4705	176	21
Construction	1.4153	1.4238	876	74
Durable goods manufacturing	1.0852	1.0626	1,881	-1,462
Nondurables manufacturing	1.2076	1.1779	1,410	-645
Wholesale trade	1.3451	1.5206	771	-76
Retail trade	1.2489	1.2977	1,177	-412
Transportation and warehousing	1.3273	1.3820	944	-137
Information	1.1047	1.4516	452	-328
Finance and insurance	1.4766	1.4675	621	152
Real estate and rental and leasing	1.3414	1.3185	254	-27
Prof. and tech. services	1.3815	1.6044	741	-2
Mgt. of companies/enterprises	1.5046	1.4700	552	176
Admin. and waste services	1.4321	1.3760	431	56
Educational services	1.6192	1.7307	83	51
Health care and social assistance	1.5274	1.4883	1,625	614
Arts, entertainment, and recreation	1.3929	1.1483	101	3
Accommodation and food services	1.4314	1.4739	366	46
Other services, except public administration	1.3476	1.3486	486	-45
Government and government enterprises	1.4633	1.5444	2,775	584
plus: Adjust. for residence	1.3095	1.0142	-133	25
plus: Dividends, interest, and rent	1.3134	1.4094	3,985	-722
plus: Transfer receipts	1.5980	1.6976	4,079	2,294
less: Contributions for	1.3931	1.3893	-1,939	-52
Total	1.3828	1.4510	22,479	49

Table 2 (continued)
Personal Income by Industry Group: U.S. (US) versus Arkansas (AR)
Sector-Competitive and Totals

	9	10
	Sector- Competitive	Totals
Farm earnings	140	311
Forestry, fishing, related	20	92
Mining	41	423
Utilities	19	216
Construction	19	970
Durable goods manufacturing	-111	308
Nondurables manufacturing	-109	655
Wholesale trade	353	1,049
Retail trade	150	915
Transportation and warehousing	135	942
Information	410	533
Finance and insurance	-15	758
Real estate and rental and leasing	-15	211
Prof. and tech. services	431	1,169
Mgt. of companies/enterprises	-50	678
Admin. and waste services	-63	423
Educational services	24	159
Health care and social assistance	-166	2,074
Arts, entertainment, and recreation	-65	39
Accommodation and food	41	453
Other services, except public administration	1	443
Government and government enterprises	588	3,947
plus: Adjust. for residence	102	-5
plus: Dividends, interest, and rent	999	4,262
plus: Transfer receipts	1,061	7,433
less: Contributions for government social insurance	19	-1,972
Total	3,960	26,488

Table 3
Personal Income by Industry Group: Southeast Region (SE) versus Arkansas (AR)
(Millions of current dollars)

	1	2	3	4
	SE	SE	AR	AR
	2000	2007	2000	2007
Farm earnings	12,238	11,100	1,218	1,529
Forestry, fishing, related activities	6,374	7,006	453	545
Mining	10,419	18,152	327	750
Utilities	12,328	16,927	460	676
Construction	86,477	128,396	2,288	3,257
Durable goods manufacturing	110,423	129,871	4,914	5,222
Nondurables manufacturing	83,354	91,653	3,682	4,337
Wholesale trade	73,040	103,429	2,015	3,064
Retail trade	101,925	132,406	3,074	3,989
Transportation and warehousing	54,043	73,051	2,466	3,409
Information	50,472	55,256	1,181	1,714
Finance and insurance	70,690	112,225	1,621	2,379
Real estate and rental and leasing	31,426	41,159	664	875
Prof. and tech. services	109,121	168,467	1,935	3,104
Mgt. of companies/enterprises	23,952	41,173	1,443	2,122
Admin. and waste services	56,287	83,814	1,125	1,548
Educational services	11,980	20,686	218	377
Health care and social assistance	117,094	181,603	4,246	6,320
Arts, entertainment, and recreation	15,033	20,210	265	304
Accommodation and food	39,683	59,316	955	1,408
Other services, except public administration	42,147	59,109	1,269	1,712
Government and government enterprises	241,244	363,043	7,251	11,198
plus: Adjust. for residence	8,106	11,513	-346	-351
plus: Dividends, interest, and rent	354,362	485,320	10,411	14,674
plus: Transfer receipts	266,993	439,852	10,656	18,089
less: Contributions for government social insurance	-148,752	-214,447	-5,065	-7,037
Total	1,840,460	2,640,290	58,726	85,214

Table 3 (continued)
Personal Income by Industry Group: Southeast Region (SE) versus Arkansas (AR)
Percentage, Overall-Growth, and Differential-Composition

	5	6	7	8
	SE %	AR %	Overall-Growth	Differential-Composition
Farm earnings	0.9070	1.2555	529	-643
Forestry, fishing, related activities	1.0993	1.2036	197	-152
Mining	1.7422	2.2952	142	100
Utilities	1.3730	1.4705	200	-28
Construction	1.4847	1.4238	994	115
Durable goods manufacturing	1.1761	1.0626	2,136	-1,270
Nondurables manufacturing	1.0996	1.1779	1,600	-1,234
Wholesale trade	1.4161	1.5206	876	-37
Retail trade	1.2991	1.2977	1,336	-417
Transportation and warehousing	1.3517	1.3820	1,072	-204
Information	1.0948	1.4516	513	-401
Finance and insurance	1.5876	1.4675	704	248
Real estate and rental and leasing	1.3097	1.3185	288	-83
Prof. and tech. services	1.5439	1.6044	841	211
Mgt. of companies/enterprises	1.7189	1.4700	627	410
Admin. and waste services	1.4890	1.3760	489	61
Educational services	1.7267	1.7307	95	64
Health care and social assistance	1.5509	1.4883	1,845	494
Arts, entertainment, and recreation	1.3444	1.1483	115	-24
Accommodation and food services	1.4948	1.4739	415	57
Other services, except public administration	1.4025	1.3486	552	-41
Government and government enterprises	1.5049	1.5444	3,151	510
plus: Adjust. for residence	1.4203	1.0142	-150	5
plus: Dividends, interest, and rent	1.3696	1.4094	4,525	-677
plus: Transfer receipts	1.6474	1.6976	4,631	2,268
less: Contributions for government social insurance	1.4416	1.3893	-2,201	-36
Total	1.4346	1.4510	25,521	-702

Table 3 (continued)
Personal Income by Industry Group: Southeast Region (SE) versus Arkansas (AR)
Sector-Competitive and Totals

	9	10
	Sector- Competitive	Totals
Farm earnings	425	311
Forestry, fishing, related activities	47	92
Mining	181	423
Utilities	45	216
Construction	-139	970
Durable goods manufacturing	-558	308
Nondurables manufacturing	288	655
Wholesale trade	211	1,049
Retail trade	-4	915
Transportation and warehousing	75	942
Information	421	533
Finance and insurance	-195	758
Real estate and rental and leasing	6	211
Prof. and tech. services	117	1,169
Mgt. of companies/enterprises	-359	678
Admin. and waste services	-127	423
Educational services	1	159
Health care and social	-266	2,074
Arts, entertainment, and recreation	-52	39
Accommodation and food	-20	453
Other services, except public administration	-68	443
Government and government enterprises	287	3,947
plus: Adjust. for residence	141	-5
plus: Dividends, interest, and rent	415	4,262
plus: Transfer receipts	534	7,433
less: Contributions for government social insurance	265	-1,972
Total	1,669	26,488

Table 4
Personal Income by Industry Group: U.S. (US) versus Southeast Region (SE)
(Millions of current dollars)

	1	2	3	4
	US	US	SE	SE
	2000	2007	2000	2007
Farm earnings	44,482	50,725	12,238	11,100
Forestry, fishing, related activities	25,342	29,378	6,374	7,006
Mining	55,811	121,084	10,419	18,152
Utilities	63,889	91,330	12,328	16,927
Construction	388,686	550,107	86,477	128,396
Durable goods manufacturing	634,589	688,686	110,423	129,871
Nondurables manufacturing	325,742	393,354	83,354	91,653
Wholesale trade	349,973	470,760	73,040	103,429
Retail trade	440,246	549,817	101,925	132,406
Transportation and warehousing	222,559	295,407	54,043	73,051
Information	280,332	309,673	50,472	55,256
Finance and insurance	473,357	698,960	70,690	112,225
Real estate and rental and leasing	147,009	197,194	31,426	41,159
Prof. and tech. services	630,394	870,906	109,121	168,467
Mgt. of companies/enterprises	137,902	207,490	23,952	41,173
Admin. and waste services	235,167	336,787	56,287	83,814
Educational services	74,277	120,270	11,980	20,686
Health care and social assistance	549,433	839,209	117,094	181,603
Arts, entertainment, and recreation	66,583	92,742	15,033	20,210
Accommodation and food services	174,216	249,381	39,683	59,316
Other services, except public administration	189,097	254,832	42,147	59,109
Government and government enterprises	995,592	1,456,890	241,244	363,043
plus: Adjust. for residence	-1,060	-1,388	8,106	11,513
plus: Dividends, interest, and rent	1,536,284	2,017,801	354,362	485,320
plus: Transfer receipts	1,083,821	1,731,963	266,993	439,852
less: Contributions for government social insurance	-701,650	-977,476	-148,752	-214,447
Total	8,422,074	11,645,882	1,840,460	2,640,290

Table 4 (continued)
Personal Income by Industry Group: US versus Southeast Region
Overall-Growth and Differential-Composition

	5	6	7	8
	US %	SE %	Overall-Growth	Differential-Composition
Farm earnings	1.1404	0.9070	4,685	-2,967
Forestry, fishing, related activities	1.1593	1.0993	2,440	-1,425
Mining	2.1695	1.7422	3,988	8,197
Utilities	1.4295	1.3730	4,719	576
Construction	1.4153	1.4847	33,102	2,812
Durable goods manufacturing	1.0852	1.1761	42,268	-32,855
Nondurables manufacturing	1.2076	1.0996	31,906	-14,605
Wholesale trade	1.3451	1.4161	27,958	-2,750
Retail trade	1.2489	1.2991	39,015	-13,647
Transportation and warehousing	1.3273	1.3517	20,687	-2,997
Information	1.1047	1.0948	19,320	-14,037
Finance and insurance	1.4766	1.5876	27,059	6,632
Real estate and rental and leasing	1.3414	1.3097	12,029	-1,301
Prof. and tech. services	1.3815	1.5439	41,769	-137
Mgt. of companies/enterprises	1.5046	1.7189	9,169	2,918
Admin. and waste services	1.4321	1.4890	21,545	2,777
Educational services	1.6192	1.7267	4,586	2,832
Health care and social assistance	1.5274	1.5509	44,821	16,935
Arts, entertainment, and recreation	1.3929	1.3444	5,754	152
Accommodation and food services	1.4314	1.4948	15,190	1,931
Other services, except public administration	1.3476	1.4025	16,133	-1,482
Government and government enterprises	1.4633	1.5049	92,344	19,434
plus: Adjust. for residence	1.3095	1.4203	3,103	-594
plus: Dividends, interest, and rent	1.3134	1.3696	135,643	-24,575
plus: Transfer receipts	1.5980	1.6474	102,200	57,466
less: Contributions for government social insurance	1.3931	1.4416	-56,939	-1,536
Total	1.3828	1.4346	704,493	7,756

Table 4 (continued)
Personal Income by Industry Group: U.S. (US) versus Southeast Region (SE)
Sector-Competitive and Totals

	9	10
	Sector- Competitive	Totals
Farm earnings	-2,856	-1,138
Forestry, fishing, related activities	-382	633
Mining	-4,452	7,733
Utilities	-696	4,599
Construction	6,005	41,919
Durable goods manufacturing	10,034	19,447
Nondurables manufacturing	-9,002	8,299
Wholesale trade	5,180	30,389
Retail trade	5,113	30,481
Transportation and warehousing	1,319	19,008
Information	-499	4,784
Finance and insurance	7,844	41,535
Real estate and rental and leasing	-995	9,733
Prof. and tech. services	17,714	59,346
Mgt. of companies/enterprises	5,134	17,220
Admin. and waste services	3,204	27,527
Educational services	1,288	8,706
Health care and social assistance	2,752	64,508
Arts, entertainment, and recreation	-729	5,177
Accommodation and food	2,512	19,633
Other services, except public administration	2,311	16,962
Government and government enterprises	10,021	121,799
plus: Adjust. for residence	898	3,407
plus: Dividends, interest, and rent	19,890	130,958
plus: Transfer receipts	13,193	172,859
less: Contributions for government social insurance	-7,220	-65,696
Total	87,581	799,830

Southeast Region personal income is the result of an industry mix of fast-growth sectors. The positive sector-competitive component indicates that many sectors in the Southeast Region are providing personal income at a greater rate of increase than the corresponding United States sector.

Sector Analysis

The sector analysis discussion will utilize columns 8, 9, and 10 from Tables 2 and 3 and information from Table 5. From Table 5, it is noted that six sectors [(1) transfer receipts, (2) dividends, interest, and rents, (3) government, (4) healthcare and social assistance, (5) durable goods manufacturing, and (6) nondurable goods manufacturing] provide 70.23 percent of Arkansas' 2007 personal income. Of these six sectors, two (transfer receipts and nondurable goods manufacturing) account for noticeably larger shares than do comparable measures for the United States and Southeast Region. Examination of column 8 in Tables 2 and 3 reveals that the differential-composition factor is negative in both tables for nondurable goods manufacturing which indicates this is a slow-growth sector in both the Southeast Region and the United States. This slow-growth contribution for personal income is consistent with the current out-sourcing of much of the labor-intensive nondurable manufacturing (such as garments) which was prevalent in Arkansas until the late 1990s. However, although nondurable manufacturing is a slow-growth sector, it should be noted that in the region (Table 3), the sector-competitive component is positive (\$288 million) indicating a strong position for Arkansas within the Southeast Region. Conversely, transfer receipts show a large, positive, value in column 8 of both tables. These positive differential-composition factors indicate this is a fast-growth sector in both the United States and Southeast Region. Transfer receipts include social security benefits, unemployment benefits, and other government assistance payments. The fact that the number of transfer recipients is continuing to grow is not news. However, given the high percentage (See Table 5) in Arkansas (21.23%) versus the Southeast Region (16.66%) and United States (14.87%), it is plausible that Arkansas has a positive migration of recipients to the state. Possibly, this migration is somewhat driven by a growing number of incoming retirees.

In Table 5, two sectors [(1) Transportation/warehousing (4.00%) and (2) Construction (3.82%)] differ noticeably in Arkansas from these same sectors in the United States (2.54% and 4.72%) and the Southeast Region (2.77% and 4.86%). In Arkansas, Transportation/warehousing is a more important sector than it is in the United States and Southeast Region. However, the Transportation/warehousing sector is a slow-growth sector in both the United States [differential-composition component (-\$137 million) in Table 2] and the Southeast Region [differential-composition component (-\$204 million) in Table 3]. Accordingly, although it is a strong sector for Arkansas, Transportation/warehousing is not a sector that is growing. On the other hand, the Construction sector is a fast-growth sector in the United States [differential-composition component (+\$74 million) in Table 2] and the Southeast Region [differential-composition component (+\$115 million) in Table 3]. Therefore, this is a sector that may hold future potential for personal income growth.

Two sectors ((1) Farm Earnings and (2) Forestry, Fisheries, and Related Activities) that have a strong historical importance for Arkansas continue to grow at a slow rate as depicted by the negative differential-composition components for both sectors in Tables 2 and 3. However, the

sector-competitive component is positive for both sectors in Tables 2 and 3. Consequently, Arkansas' personal income growth from these sectors continued to increase though at a slower rate than the overall growth rate of the United States and the Southeast Region. Additional evidence of decline in importance in these two sectors vis-à-vis their contributing to personal income is documented in the first two rows of Table 5 which shows the combined contribution to personal income in 2000 was 2.84% (2.07% + 0.77%) vs. 2.43% (1.79% + 0.64%) in 2007.

On the other hand, the Mining sector in Arkansas as well as in both the United States and Southeast Region is starting to grow (see row 3 of Table 5). In fact, the Arkansas increase from 0.56% in 2000 to 0.88% in 2007 is a 57.1% gain in the sector, which is consistent with the United States (57.6% increase) and exceeds the Southeast Region (21.1%) gain. Additionally, the differential composition component and the sector competitive component are both positive numbers in Table 2 (\$257 million and \$41 million) and 3 (\$100 million and \$181 million). The indication is that Mining is a fast-growth sector, both in the United States and the Southeast Region, and that Arkansas is very competitive relative to the nation and the region. This conclusion is verified by the growth in bromine, lignite, and natural gas production (including the Fayetteville shale formation mining) in the Southwest, Central, and Northwest parts of the state as documented in Hengel (2008) and Henry (2008).

Conclusion

The economy (as reflected by personal income) of Arkansas is changing as some sectors (in particular Farm Earnings and Nondurable Manufacturing) steadily decline in importance and other sectors (in particular Mining and Transfer Receipts) steadily grow in importance. Table 6 summarizes the sectors as fast-growth and slow-growth for the United States and for the Southeast Region.

Table 5
Percentage of Personal Income by Sector

	US		SE		AR	
	2000	2007	2000	2007	2000	2007
Personal Income						
Farm earnings	0.53	0.44	0.66	0.42	2.07	1.79
Forestry, fishing, related activities	0.30	0.25	0.35	0.27	0.77	0.64
Mining	0.66	1.04	0.57	0.69	0.56	0.88
Utilities	0.76	0.78	0.67	0.64	0.78	0.79
Construction	4.62	4.72	4.70	4.86	3.90	3.82
Durable goods manufacturing	7.53	5.91	6.00	4.92	8.37	6.13
Nondurables manufacturing	3.87	3.38	4.53	3.47	6.27	5.09
Wholesale trade	4.16	4.04	3.97	3.92	3.43	3.60
Retail trade	5.23	4.72	5.54	5.01	5.23	4.68
Transportation and warehousing	2.64	2.54	2.94	2.77	4.20	4.00
Information	3.33	2.66	2.74	2.09	2.01	2.01
Finance and insurance	5.62	6.00	3.84	4.25	2.76	2.79
Real estate and rental and leasing	1.75	1.69	1.71	1.56	1.13	1.03
Prof. and tech. services	7.49	7.48	5.93	6.38	3.29	3.64
Mgt. of companies/enterprises	1.64	1.78	1.30	1.56	2.46	2.49
Admin. and waste services	2.79	2.89	3.06	3.17	1.92	1.82
Educational services	0.88	1.03	0.65	0.78	0.37	0.44
Health care and social assistance	6.52	7.21	6.36	6.88	7.23	7.42
Arts, entertainment, and recreation	0.79	0.80	0.82	0.77	0.45	0.36
Accommodation and food	2.07	2.14	2.16	2.25	1.63	1.65
Other services, except public administration	2.25	2.19	2.29	2.24	2.16	2.01
Government and government enterprises	11.82	12.51	13.11	13.75	12.35	13.14
plus: Adjust. for residence	-0.01	-0.01	0.44	0.44	-0.59	-0.41
plus: Dividends, interest, and rent	18.24	17.33	19.25	18.38	17.73	17.22
plus: Transfer receipts	12.87	14.87	14.51	16.66	18.15	21.23
less: Contributions for government social insurance	-8.33	-8.39	-8.08	-8.12	-8.62	-8.26
Total	100	100	100	100	100	100

Table 6 presents the results in a hierarchical arrangement. For the United States, the fastest-growing personal income sector is Mining and the slowest-growing personal income sector is Durable Goods Manufacturing. Mining is also the fastest-growing sector in the Southeast Region while Farm Earnings is the slowest-growing sector.

Table 6
Personal Income Sectors: United States and Southeast Region: 2000 – 2007
Fast-Growth vs. Slow-Growth, Ranked: Fastest to Slowest

	United States	Southeast Region
Fast-Growth	Mining Educational Services Transfer Receipts Health Care / Social Assistance Management Companies / Enterprises Finance and Insurance Government / Government Services Administrative / Waste Services Accommodation / Food Service Utilities Construction Arts, Entertainment, Recreation	Mining Educational Services Management Companies / Enterprises Transfer Receipts Finance and Insurance Health Care / Social Assistance Professional / Technical Services Government / Government Services Accommodation / Food Service Administrative / Waste Services Construction
Slow-Growth	Professional / Technical Services Other Services / Non-public Wholesale Trade Real Estate, Rental / Leasing Transportation / Warehousing Dividends, Interest, Rent Retail Trade Nondurable Goods Manufacturing Forestry, Fishing, Related Activities Farm Earnings Information Durable Goods Manufacturing	Wholesale Trade Other Services / Non-public Utilities Dividends, Interest, Rent Transportation / Warehousing Arts, Entertainment, Recreation Real Estate, Rental / Leasing Retail Trade Durable Goods Manufacturing Nondurable Goods Manufacturing Forestry, Fishing, Related Activities Information Farm Earnings

Source: Tables 2 and 3.

In the context of job creation (thereby providing new personal income), the six fastest-growing sectors are the same for the United States and the Southeast Region (although not in the same order). These six sectors are: Mining, Educational Services, Transfer Receipts,

Healthcare/Social Assistance, Management Companies/Enterprise, and Finance and Insurance. Of those six, two sectors (Mining and Transfer Receipts) appear to be particularly important in Arkansas' future.

As examples of the importance and potential of these sectors in Arkansas, the lignite industry is important.² As far back as 1994, Kline and Wilson (1994) linked lignite and agriculture in claiming that lignite by-products could be used as an effective soil additive to improve the state's rice yield. Also, the previously mentioned Fayetteville shale is expected to have significant positive impacts on the Arkansas mining sector. This causes Referring again to Table 5, Transfer Receipts account for 21.23% of Arkansas personal income. Since this sector is fast-growth, the implication is that the Natural State appears to have a positive attraction for retirees and should capitalize on this opportunity.

References

- Brown, James. 1969. "Shift and Share Projections of Regional Economic Growth: An Empirical Test." *Journal of Regional Science* 9(1)(April): 1-17.
- Buck, T.W. 1970. "Shift and Share Analysis – A Guide to Regional Policy." *Regional Studies*. 4(6)(December): 445-450.
- Esteban, J. 2000. "Regional Convergence in Europe and the Industry Mix: a Shift-Share Analysis." *Regional Science and Urban Economics*. 30(3)(May): 353-364.
- Hengel, Mark. 2008. "South Arkansas Rich in Resources." *Arkansas Business* 26(32)(August 11-17): 1, 16-17.
- Henry, John. 2004. "Great Lakes Expands Bromine Production," *Arkansas Business* (November) (available at website: http://findarticles.com/p/articles/mi_hb5248/is_200411/ai_n2001077)
- Horton, Marshall, and Jay Robbins. 2007. "The Potential of the Arkansas Sweet Potato Industry: A Matter of Volatility," *The Journal of Business Administration Online*. 6(1)(Fall). (available at website: <http://jbao.atu.edu/Fall2007/HortonRobbinsJBAOFall2007.pdf>)
- Hughes, David W. 2003. "Policy Uses of Economic Multiplier and Impact Analysis." *Choices: The Magazine of Food, Farm, and Resources Issues*. 18(2) available at <http://www.choicesmagazine.org/2003-2/2003-2-06.htm>
- Kline, Stephen W. and Charles E. Wilson. 1994. *Proposal for Experimentation with Arkansas Lignite to Identify Organic Soil Supplements Suitable to Regional Agricultural Needs*. Arkansas Tech University Research Monograph (available at web address: http://www.humintech.com/001/articles/article_arkansas_tech_univeristy.html)
- Leontief, Wassily W. 1986. *Input-Output Economics*. 2nd ed., New York: Oxford University Press.

Mayor, Matias, Ana Jesus Lopez, and Rigoberto Perez. 2007. "Forecasting Regional Employment with Shift-Share and ARIMA Modeling." *Regional Studies*. 41(4)(June): 543-551/

Moritz, Gwen. 2008. "Arkoma Produced More Gas in 2007 Than Shale Did." *Arkansas Business* 26(32)(August 11-17): 1, 20.

Philpot, James and Philip F. Rice. 1996. "An Analysis of Changes in Arkansas Personal Income, 1989-1994." *Arkansas Business and Economic Review*. 29(1)(Spring): 17-25.

State of Arkansas 86th General Assembly Regular Session 2007 Act 641: *An Act to Develop and Energy Utilization Strategy for Lignite Production and Use; To Create the Arkansas Lignite Resources Pilot Program, etc.* (available at web address: <http://www.arkleg.state.ar.us/ftp/acts/2007/public/act641.pdf>) (hereafter cited as AR Act 641 (2007)).

Notes

¹ Enjoying a new round of applications (Esteban (2000), Mayor, et. al. (2007)), shift-share analysis is an application of the input/output analysis pioneered by Leontief (1986). See Hughes (2003) for an excellent summary of some of the pitfalls of calculating and interpreting multipliers and job growth estimates using input/output analysis. The current paper purposely avoids such issues by applying the techniques in more general terms.

² In 2007, the Arkansas Legislature enacted legislation to develop the Arkansas lignite industry and its potential for providing fuels, synthetic natural gas, and by-products. Specifically cited was Arkansas' entering the lignite industry as a late player, behind Texas, Mississippi, Louisiana, and North Dakota (AR Act 641 (2007)). According to Hengel (2008), Southern Arkansas University has used the state funding to establish a Lignite Research Institute. Moritz (2008) noted that the Fayetteville shale production of natural gas in Central Arkansas is expected to overtake the older Arkoma gas production in Northwest Arkansas. Henry (2008) documented efforts to expand bromine production in Southwest Arkansas (El Dorado, Magnolia), the richest source of bromine in the world. Horton and Robbins (2007) used USDA price data to evaluate the potential of a sweet potato processing and storage facility that was constructed with a \$500,000 grant from the U.S. Department of Commerce. Part of the funding was also used to develop market niches for Arkansas sweet potatoes.