

RECENT EMPLOYMENT CHANGE IN THE U.S. CENSUS DIVISIONS

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Abstract. From 1982 to 2005 the United States experienced strong economic growth interrupted by two brief recessions; job growth, however, was not evenly distributed throughout the country. By employing dynamic rather than static shift-share decomposition, and by displaying shift-share analysis through graphical techniques based on shift-share components, we highlight varying job growth experience at the census division level through two complete expansions and into the latest upswing. We look at annual differences over the years covered and additively consider longer term performance. Furthermore, we consider industry contribution to area employment growth over these periods at the 1-digit SIC/NAICS Supersector levels.

JEL classification: O18, O47, O51, R11

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1. Introduction

In this paper we employ a graphical dynamic shift-share analysis to look at employment change in the nine census divisions from 1982 to 2005. While traditional shift-share analysis has been practiced for some time in the regional sciences,² the dynamic

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² See Richardson (1978) and Esteban-Marquillas (1972) for explanation and examples of the traditional national growth rate form of shift-share methodology. The methods employed here are extensions of that static form.

version, due to Barff and Knight (1988) and Arcelus (1984), has been less frequently used despite a number of desirable properties not present in the static version. The dynamic method is extended in this paper to a graphical version that greatly facilitates comparisons of the employment growth experiences across areas over the period of interest. The graphs highlight the capability of dynamic shift-share to provide annual information on differences in performance, and also present decomposition into the separate causes of these differences in terms of the shift-share components. In addition, further graphical analysis allows us to look more closely at the industry contributions to employment growth in each year.

The period considered covers two distinct business cycle expansions, the first beginning in November 1982 and ending July 1990, and the second beginning in March 1991 and ending in March 2001³. We also consider the four years following the 2001 recession—by definition a period of recovery. We look not only at changes in overall nonfarm employment for these periods, but also consider industry contributions at the 1-digit SIC and NAICS supersector level within the census divisions;⁴ in addition, we report how employment growth has changed through the subsequent economic peaks and troughs. Figure 1, in the Annex, shows the grouping of states that make up the nine census divisions.

The paper proceeds as follows: first the employment growth performance of the nation as a whole is discussed and used as background against which to build the regional analysis; next, the dynamic shift-share methodology is presented and a numerical comparison to static shift-share is given; following that, the components of the dynamic shift-share decomposition for each area are used to construct the graphs deployed in the subsequent analysis. The analysis is broken into two sections: first we consider each

³ These are the dates of the business cycle troughs and peaks determined by the Business Cycle Dating Committee of the National Bureau of Economic Research (NBER).

⁴ Throughout the paper we use annual average employment data from the Current Employment Statistics (CES) program of the Bureau of Labor Statistics.

census division in turn and, making reference to the graphical aids, discuss growth performance within each of the sub periods, highlighting any significant industry contributions along the way. Second, we consider employment growth over each sub period as a whole, summing over the annual shift-share contributions to determine net effects. In both cases, industry contributions are described based on graphical representations. Finally, the paper concludes with a discussion of the usefulness of the graphical dynamic approach to shift-share for comparisons across regions.

2. Employment Change at the Census Division Level: National Overview

Before focusing on the census divisions, it is useful to consider the employment experience of the nation over the periods being studied. Figure 2 shows total nonfarm employment and its annual growth rate for the United States over the period of the study. Total nonfarm employment in the U.S. grew 48.8 percent from 1982 to 2005, from an average 89,677,000 jobs at the beginning of the period to 133,463,000 jobs in 2005. Overall job growth was very similar over both complete business cycle expansions that took place in this period, with nonfarm employment growing 22.1 percent from 1982 to 1990 and 21.6 percent over the 1991 to 2001 expansion. However, employment growth in the earlier period was stronger, as it took place over a shorter period of time, resulting in an average annual growth rate⁵ of 2.53 percent.

Over the 1990s expansion nonfarm employment grew 1.98 percent per year, on average.⁶ In contrast, in the current expansion

⁵ Average annual growth rates are calculated as the annualized growth rate that would yield the overall percentage change in employment for the given period.

⁶ One explanation for the disparity in growth rates between the two expansions may be that there was more room for employment growth in the earlier period. The annual average unemployment rate for the U.S. was 9.7 percent in 1982. This fell to 5.6 percent in 1990, the final year of the expansion. The annual average unemployment rate for 1991 was 6.8 percent and, after falling to a low of only 4.0 percent in 2000, was 4.7 percent in 2001. The tight labor markets of the later nineties often made it difficult for employers to find qualified personnel, and hence growth in

the annual average has been a much slower 1.32 percent since the 2003 low point in employment.

Over the two completed expansions presented in Figure 2, employment growth for the nation closely followed the business cycle pattern delineated by the NBER dating for the periods studied, although in the current recovery employment lagged growth in other indicators rather substantially. This was not necessarily the case in the census divisions. Figure 3 indicates the pattern of nonfarm employment growth in each division over the 1982 to 2005 period. It is clear from the figure that for a number of areas the employment experience was quite different from that of the nation as a whole. This was particularly true in the earlier expansion and into the 1991 recession.⁷ Most notably:

- Following the end of the recession in 1982, employment continued to decline into 1983 in both the East North Central and West South Central divisions.

- The West South Central Division experienced declining employment from 1985 to 1987, while the rest of the country continued expanding.

- While employment fell in five of the nine areas during the early 1991 recession, it continued to grow in the East South Central, West South Central, West North Central, and Mountain Divisions.

- New England and the Middle Atlantic divisions experienced falling employment in 1989, entering recession a year earlier than the rest of the country. Employment didn't begin to grow again in these divisions until 1992, a year after the recession ended for most of the rest of the country.

employment likely was slower in this period due to labor shortages in some areas. As an aside, while employment growth was stronger in the earlier expansion, this is not necessarily an indication that overall economic growth was stronger in that period. The high productivity gains seen over the expansion of the 1990s meant that more was being produced despite slower employment growth.

⁷ For a good discussion of the events shaping these patterns within each census division through the 1980s and early 1990s, see Dzialo *et al.* (1993).

- The Pacific division continued to experience declining employment into 1993 following the 1990s recession.
- The Middle Atlantic, East South Central, East North Central, and West North Central divisions were the only divisions to experience declines in average annual employment over 2001, the official year of both the peak and trough of the recession. All divisions experienced employment declines in 2002.
- Five of the nine divisions continued to experience declining employment in 2003, two years after the official end of the recession.

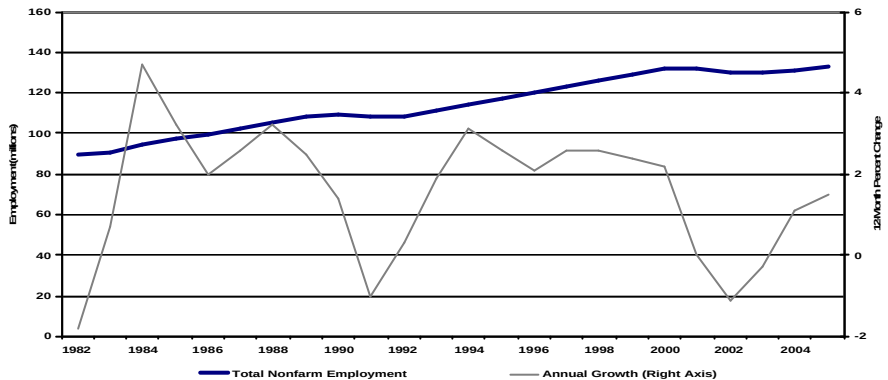


Figure 1. Nonfarm Employment in the United States 1982 to 2005

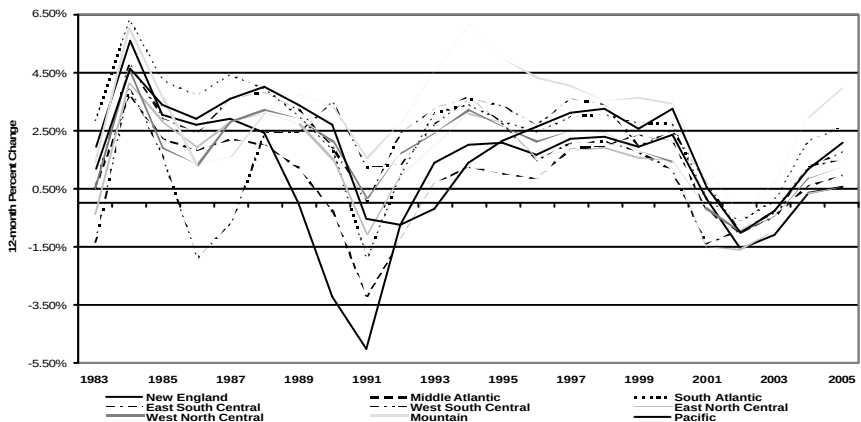


Figure 2. Nonfarm Employment in the Census Divisions, 1983 to 2005

These differences present some difficulty in assessing the relative performance of the census divisions over the periods of interest. National employment grew continuously over the two expansionary periods, but this was clearly not the case for many of the census divisions. It follows that direct comparisons based only on differences in employment at the beginning and end of each period are therefore somewhat misleading as to the actual employment experience over time. What is required, then, is a more dynamic analysis of employment change in the census divisions.

3. Dynamic Shift-Share

Much previous work has employed static shift-share analysis, based on the beginning and end points of a study period spanning several years.⁸ While useful, the comparative static approach provides only part of the picture and tends to distort the analysis.⁹ We choose instead to conduct a dynamic shift-share analysis of employment change in the census divisions. This gives a more complete picture of how employment has fared in each division and also allows for ease of comparison on a year-by-year basis.

Shift-share analysis combines growth rates with initial period employment to effect a decomposition of employment change within an area. Shift-share also decomposes those changes due to national trends and those that can be attributed to industry characteristics peculiar to each region. This is done by first applying the growth rate for nonfarm employment in the nation to initial period employment in each industry in each census division.¹⁰ Summing these across the eight one-digit industries for an area gives

⁸ See, for example, Deming (1996) and Rones (1986).

⁹ For a critique of the comparative static approach to shift-share analysis, as well as details on the dynamic approach to be used here, see Barff and Knight (1988).

¹⁰ Industry data at the state level is only available from 1990 on for many NAICS supersectors, so we use the previously available Standard Industrial Classification (SIC) for state level (and therefore census division) calculations through 1990 in what follows. Furthermore, BLS procedures do not ensure that state level data will aggregate to national estimates, so total nonfarm employment is recalculated as state level aggregates over all states for the decompositions into shift-share components.

a “predicted” change in nonfarm employment for that area, or the change which would have come about had industry employment in the area grown at the same rate as national employment. A comparison of the actual change to the predicted change identifies which census divisions have grown faster or slower than the U.S. average, with a larger predicted change indicating weaker growth. In addition, the difference can further be broken out into two sources: 1) that due to changes in industry employment across the nation, the industry shift effect (IS), and 2) that due to industry performance within each particular area, the regional share effect (RS). The sum of the national growth effect (NG), the shift effect, and the share effect will equal the actual change in the area's employment over the period. The breakdown of employment changes in this fashion allows a determination of each area's relative strengths and weaknesses in terms of industry mix and industry performance. The calculation of these components of employment growth is

$$AC_i = NG_i + IS_i + RS_i \quad (1)$$

$$NG_i = \sum_j G_* \cdot E_{ij}^t = G_* \cdot E_i^t \quad (2)$$

$$IS_i = \sum_j (G_j - G_*) \cdot E_{ij}^t \quad (3)$$

$$RS_i = \sum_j (G_{ij} - G_j) \cdot E_{ij}^t \quad (4)$$

where AC_i is the actual change in census division i employment over some period; G_* is the percentage growth in nonfarm employment nationally for the period; G_j is the percentage growth in industry j employment nationally; G_{ij} is the growth in industry j employment in census division i ; and E_{ij}^t denotes beginning of period industry j employment in census division i .

Using annual average employment, dynamic shift-share analysis involves calculating the above components of employment change over each year of the study, so the growth rates employed in each calculation are the annual percent changes in employment for each industry and area. This contrasts with a comparative static approach, which would calculate the components based only on the beginning and end points of some longer period of employment

change. The dynamic method also accounts for changes in the distribution of employment across industries each year, as E_{ij} is updated annually. Table 1 gives a numerical example to illustrate the difference between dynamic and static shift-share calculations for the period 2001 to 2005. A single industry and area is used for the example.

Table 1. Dynamic and Static Shift-share for New England Services 2000-2005

		2000	2001	2002	2003	2004	2005	2001 - 2005	
Nonfarm Employment	Aggregate (Thousands)	131736.2	131582.6	130239.9	129756.6	131309.4	133523.6	Dynamic	Static
	G_*		-0.12%	-1.02%	-0.37%	1.20%	1.69%		1.36%
Professional & Business Services	Aggregate (Thousands)	16541.6	16310.5	15933.9	15836.1	16298	16888.8		
	G_j		-1.40%	-2.31%	-0.61%	2.92%	3.62%		2.10%
	New England (Thousands)	890.8	875.1	830.5	812.8	830	846.7		
	AC_i		-15.7	-44.6	-17.7	17.2	16.7	-44.1	-44.1
	$G_{\bar{j}}$		-1.76%	-5.10%	-2.13%	2.12%	2.01%		-4.95%
	NG		-1.0	-8.9	-3.1	9.7	14.0	10.7	12.1
	IS		-11.4	-11.3	-2.0	14.0	16.1	5.4	6.6
	RS		-3.3	-24.4	-12.6	-6.5	-13.4	-60.1	-62.8

For static shift-share (SS), G_* is calculated once over the whole period and then is used to get the NG contribution for each industry and area. In the table the growth rate of 1.36% is applied to initial New England employment in Professional and Business Services of 890,800 to get the NG contribution to overall growth in this industry over the period. In contrast, in dynamic SS G_* is calculated for each year of the span and then applied to the previous year's industry employment to get NG for each year. This is then summed over the whole period to get the total industry contribution to NG for 2001 to 2005. Notice there is a difference of 1300 jobs attributed to this component depending on method. This is again due to static SS not

accounting for changes in industry size in the interim. There is similar disparity in the calculation of the remaining components. Additionally, the dynamic character of employment growth is obscured by the static method; the positive G_j from the static calculation gives no indication that the annual G_j is negative for three of the five years and similarly for the negative G_{ij} over the whole period, which is positive in the last two years of annual calculations.

Figure 4, in panels 1 – 9, plots annual growth rates in nonfarm employment for each of the census divisions separately along with a shift-share decomposition into component contributions in each year. Aggregate national growth rates are included for ease of reference. Note: As elsewhere in this paper, the legend for figure 4 represents the national growth effect as NG, industry shift effect as IS, and regional share effect as RS.

From Equations 3 and 4, note that both IS and RS are affected by an area's initial distribution of employment across industries. For IS, the direction of impact on every area is the same for each industry. However, the overall impact of IS on an area's employment will depend on its industry distribution. IS will be positive for those census divisions which have a larger share of employment in high growth industries—those which grew faster than the national average for all industries, while a negative industry shift indicates that an area's initial employment mix was heavy in what turned out to be low growth or declining industries. For example, in Figure 4, panel 4 we see a relatively large negative impact from the IS component in the East South Central division in 2002. This is primarily due to the large share of total employment in the division's manufacturing industry, at 16.9% in 2001, versus a 12.5% industry share of the nation's employment. New England, (Figure 4, panel 1) on the other hand, had a positive overall IS contribution for 2002, despite having slightly greater than average share of employment in the declining manufacturing sector. This was due to relatively large shares of employment in the high-growth Government and Educational and Health Services sectors at the end of 2001. Although interesting, the IS contribution to employment growth in each region is relatively small, and therefore we focus on the RS contribution in the discussion that follows.

Figure 4, Panel 1: Growth Rate, Shift-Share Decomposition for New England, 1983 – 2005

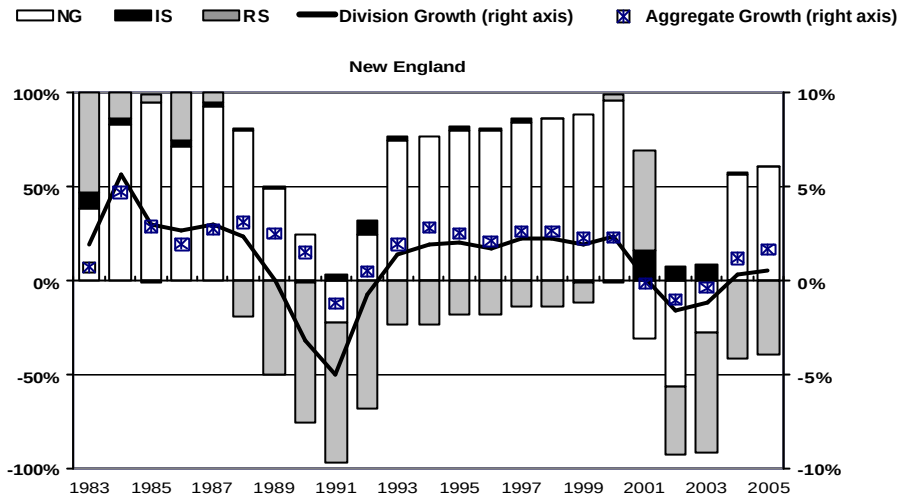


Figure 4, Panel 2: Growth Rate, Shift-Share: Middle Atlantic, 1983 - 2005

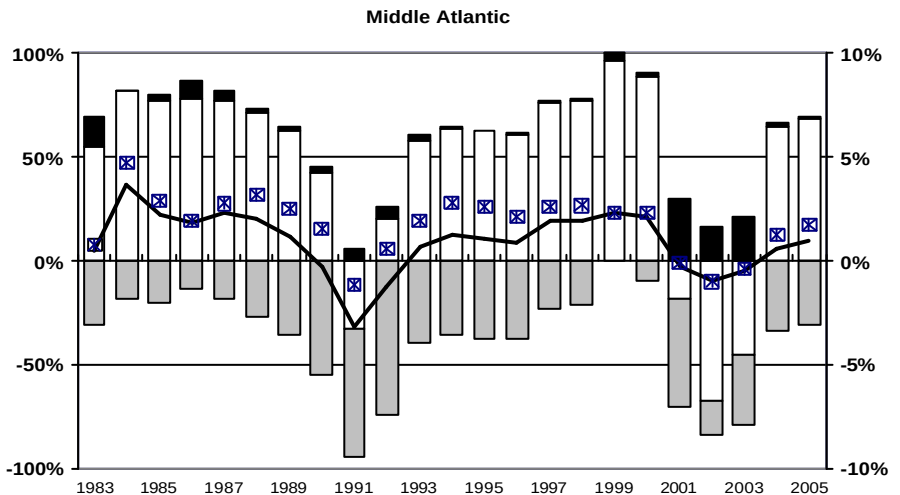


Figure 4, Panel 3: Growth Rate, Shift-Share: South Atlantic, 1983 – 2005

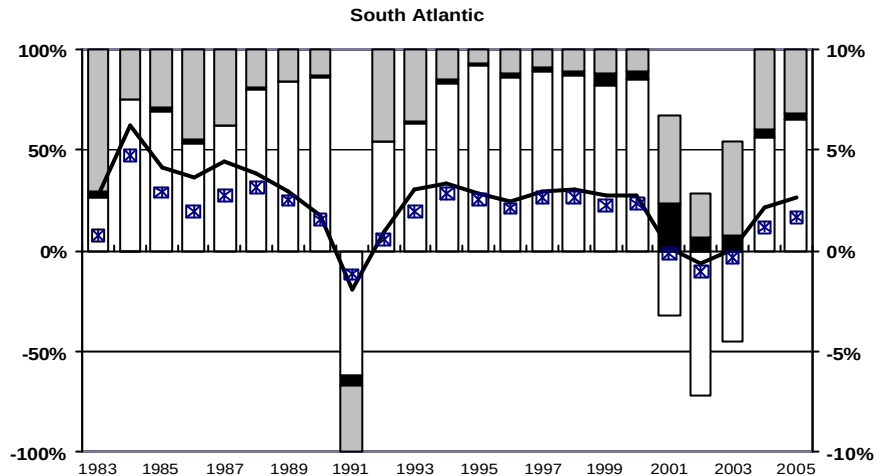


Figure 4, Panel 4: Growth Rate, Shift-Share Decomposition for East South Central, 1983 – 2005

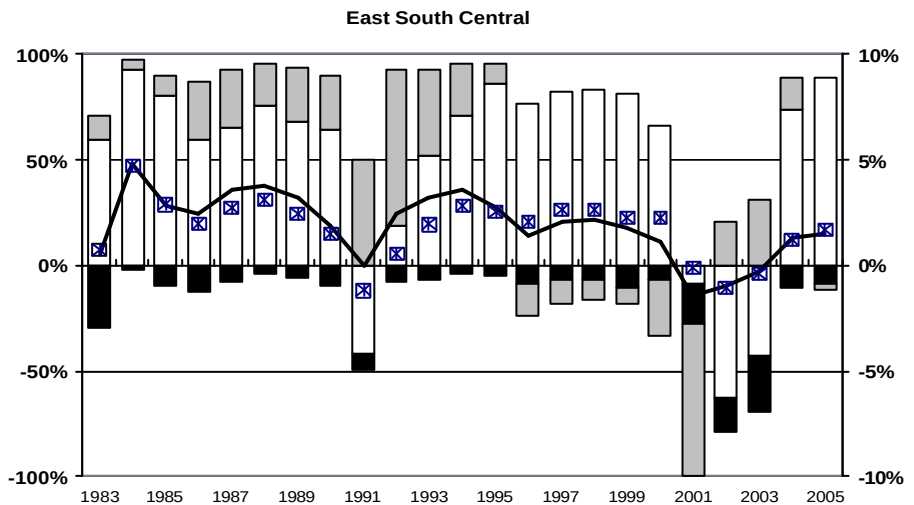


Figure 4, Panel 5: Growth Rate, Shift-Share Decomposition for West South Central, 1983 – 2005

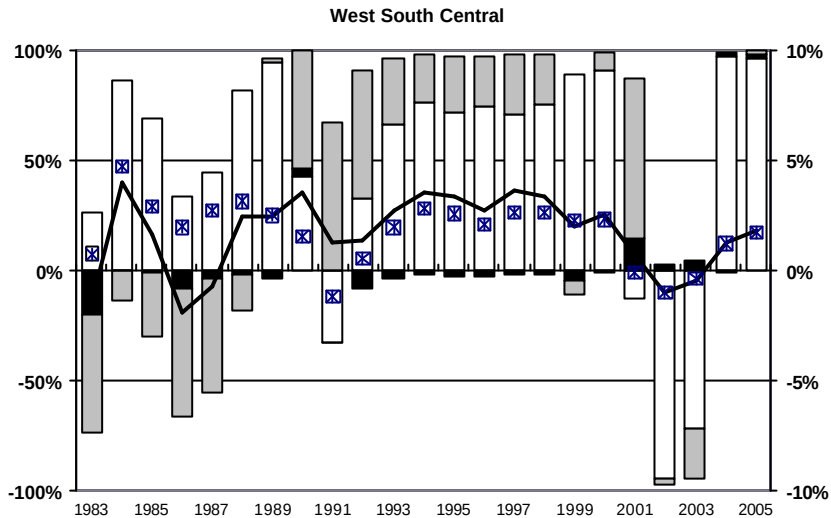


Figure 4, Panel 6: Growth Rate, Shift-Share Decomposition for East North Central, 1983 – 2005

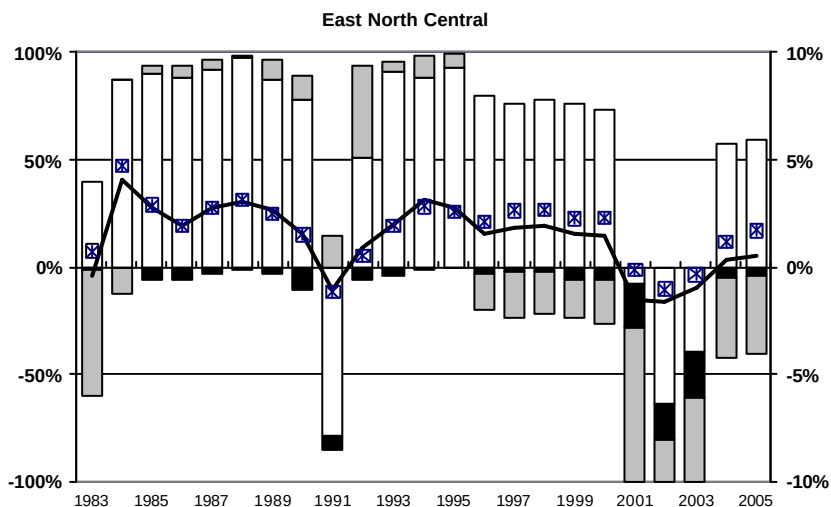


Figure 4, Panel 7: Growth Rate, Shift-Share: West North Central, 1983 – 2005

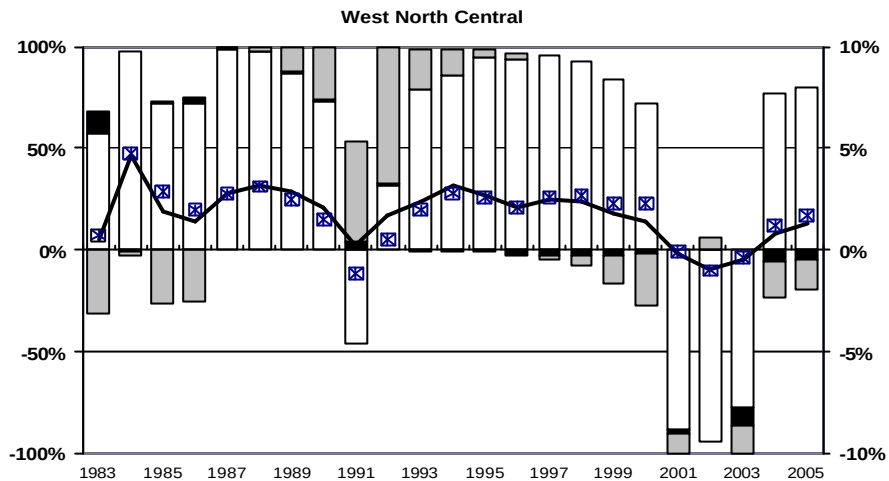


Figure 4, Panel 8: Growth Rate, Shift-Share: Mountain, 1983 – 2005

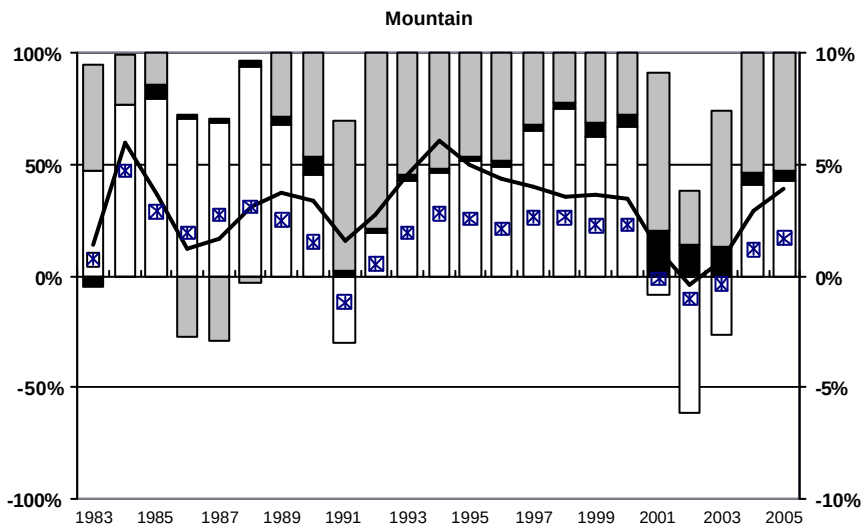
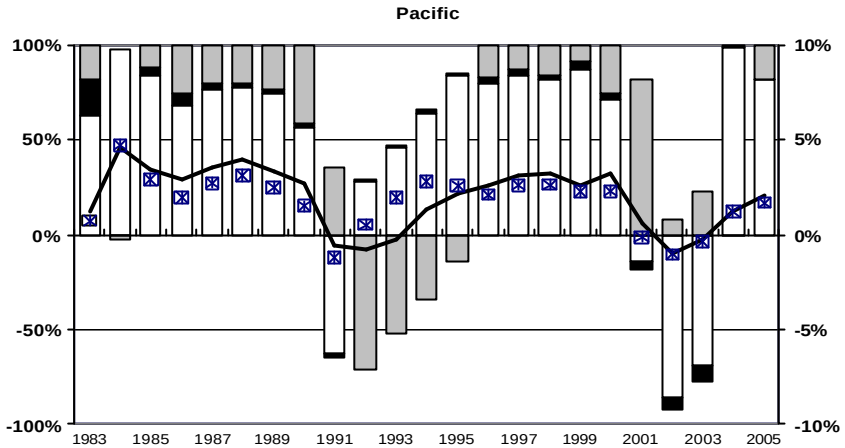


Figure 4, Panel 9: Growth Rate, Shift-Share Decomposition for Pacific, 1983 – 2005



The direction of impact from industry performance on the RS contribution to growth within each area will differ according to its performance relative to the same industry in the nation as a whole. An area with many of its industries outperforming the industry average for the nation is considered to have had a competitive advantage over those areas which do not have such high performing industries, and thus will have a positive regional share. This makes RS the primary determinant of differences in growth rates across areas. The RS contribution for each year in Figure 4 can be further broken out into each industry's contribution within each census division. An example is given in Figure 5.¹¹

Here we see each industry's contribution in each year to the RS for the West North Central division.¹² This in conjunction with Figure 4, panel 7, gives a more complete picture of the industry

¹¹ In the interest of space, the graphic is not repeated here for each of the census divisions. Color graphics for all divisions and for all shift-share and regional share details are available in the Annex to the online version of this article at <http://www.usc.es/economet/rses.htm>.

¹² This figure shows only those years in which the NAICS coded data was used in Figure 4.

performance underlying the overall employment growth within the division.

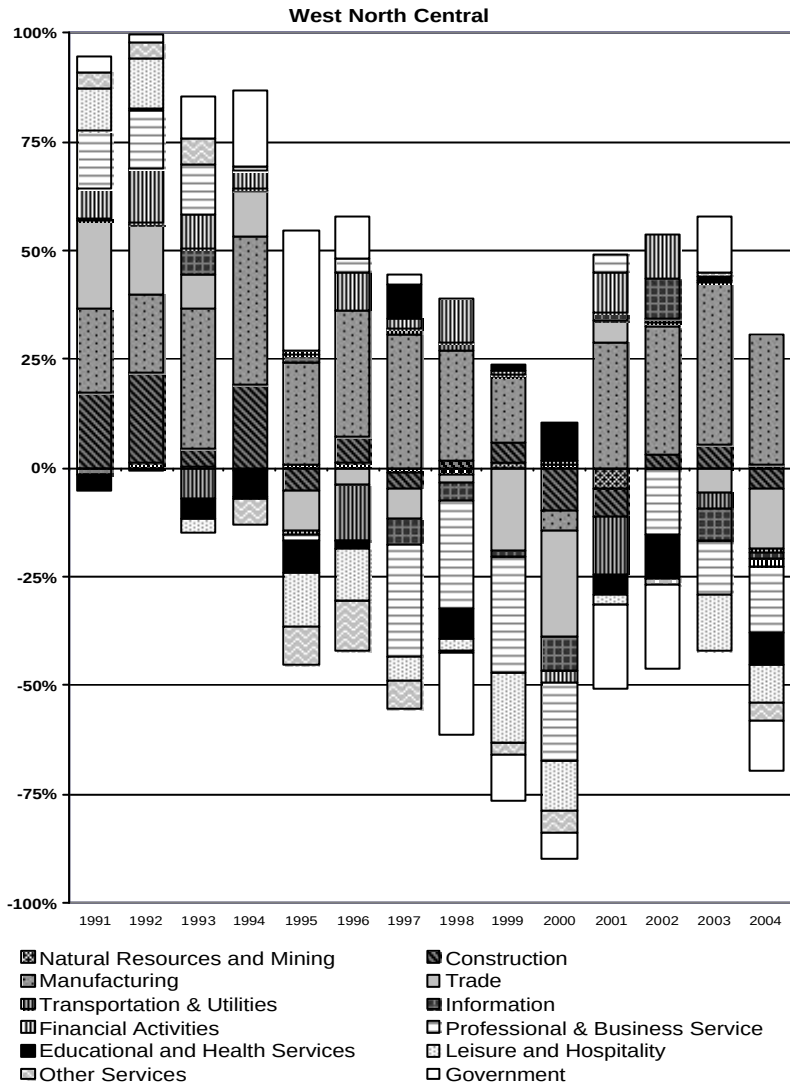


Figure 5. West North Central Regional Share Detail 1991-2004

For years in which industries with positive impacts outweigh those with negative, the overall RS will be positive. In Figure 5 we see large positive contributions from RS over the period 1991 to 1994 in the West North Central division; and we also see that this was due to the majority of the area's industries outperforming industry averages in these years. In addition, it is easy to determine which industries provided the greatest boost. Unfortunately, this can be somewhat misleading: although Figure 5 shows 10 of the 12 industries contributing positively to RS in 1991, only five of 12 actually experienced employment growth.

The other positive contributions were a result of industry decline being relatively slower for this division than the average. For instance, we see a relatively large positive contribution to RS from manufacturing, while in fact the area lost nearly 26,000 manufacturing jobs that year. That happens to be a smaller proportionate loss than most of the other divisions experienced in this industry, hence the positive impact on RS. From 1995 to 1997, the positive and negative impacts of the different industries nearly canceled, resulting in little overall contribution from RS in these years, while the negatives outweighed the positives in the following three years.

With this type of industry breakout underlying the discussion, we next consider the employment experience of each division separately in the context of Figure 4.

4. Annual Shift-Share Decomposition and Growth by Census Division through Two Business Cycles and the Upswing to 2005

In this section we briefly point out the main characteristics of each census division's employment experience over the time period in question, including major deviations from national averages, both in overall growth and in those industries that are the primary contributors to the deviation. As noted above, we focus here on regional share (RS). Table 2 lists the SIC major industry divisions and NAICS supersectors.

Table 2: SIC Major Industry Divisions (1982 - 1990) and NAICS Supersectors (1990 - 2005)

SIC Major Industry Divisions (1982 - 1990)	NAICS Supersectors (1990 - 2005)
Mining	Natural Resources and Mining
Construction	Construction
Manufacturing (Durables + Non-durables)	Manufacturing
Transportation and Public Utilities (TPU)	Trade, Transportation & Utilities
Trade (Wholesale + Retail)	Information
Finance, Insurance, and Real Estate (FIRE)	Financial Activities
Services	Professional & Business Services
Government	Educational and Health Services
	Leisure and Hospitality
	Other Services
	Government

Source: U.S. Department of Labor, Bureau of Labor Statistics

New England: As shown in Figure 4, panel 1, early in the 1980s expansion New England experienced strong growth with a large positive regional share component. This was driven primarily by the Trade and Construction sectors, but was short lived as the high share of employment in Manufacturing dragged overall growth in the division below the national average for the rest of the decade. The large negative regional share from 1989 to 1992 was due to virtually all of the division's industries underperforming relative to the rest of the nation. This caused New England to experience declining employment well ahead of the 1991 recession. Regional share continued to be strongly negative for the area throughout most of the remaining years of the study period, with continued reliance on the declining Manufacturing sector being bolstered by weak performance in most other sectors to keep overall employment growth below national rates. Slow growth in services overall, and especially in the increasingly important Professional and Business Services and Educational and Health Services sectors, has

contributed to New England's poor relative performance over much of the study period and the division has continued to lag the nation in recovering from the 2001 recession.

Middle Atlantic: As indicated in Figure 4, panel 2, the Middle Atlantic division has consistently underperformed the nation throughout the whole study period. Like New England, this division has also had a large share of employment in the declining Manufacturing sector. This along with poor growth in virtually every other industry has contributed to the large negative regional shares in all but a few years. Even in the financial services industry, for which the division has been historically strong, the Middle Atlantic has underperformed the rest of the country. Again like New England, this area has also lagged in recovering from the latest recession, with employment growth remaining well below the national average through 2005.

South Atlantic: In contrast to the previous two divisions, the South Atlantic outperformed the nation in nearly every industry sector throughout the two study periods and into the current upswing. Throughout the 1980s, Services, Trade, and Construction were the primary drivers of employment growth for the area, although even Manufacturing contributed positively to regional share in many years. In fact, the South Atlantic has experienced strong growth in every year except 1991 when, led by Construction, the division went more deeply into recession than the rest of nation. The area quickly recovered, however, with strong growth in Professional and Business Services and even Manufacturing helping to accelerate employment growth above national averages in the ensuing years. Throughout the 1990s the division continued to grow robustly, with strong performance in the Service sectors leading the way. Strong growth in nearly every industry sector over the last few years has helped the South Atlantic division to lead the recovery with above average growth.

East South Central: The East South Central detail of Figure 4, panel 4 shows this division outperformed the average through most of the 1980s and well into the 1990s expansion, with no decline in

employment even in the 1991 recession. This strong employment growth was led by Manufacturing, although most other industries also contributed positively to regional share over the period. Manufacturing boosted the economy through the 1980s and into the early 1990s, but poor growth in the sector after the mid-90s helped to slow overall employment growth in the division to below average levels through 2001. Slow growth in Business and Professional Services, Construction, and Educational and Health Services also contributed. Led by relatively strong growth in Manufacturing and in Business and Professional Services, the area has performed experienced employment growth close to the national average thus far in the current expansion.

West South Central: The West South Central division experienced very poor growth through much of the 1980s. Nearly every industry underperformed the nation through 1988 and overall employment even declined in 1986 and 1987 --- a period during which every other division was experiencing strong growth in the booming economy. This poor performance was in part due to a declining Mining industry, more important to this division than any other, but was primarily driven by declines in Construction, Trade, and Manufacturing. The negative situation began turning around in the late 80s, with strong growth in Manufacturing and Services leading the way to this division outperforming the nation throughout most of the 1990s, including fairly strong (1.2%) overall employment growth during the 1991 recession. In contrast with the area's 1980s experience, nearly every industry in the division outperformed the nation from 1990 to 1998. Within the Service sector, Education and Health Services was the strongest contributor to overall growth, with Professional and Business Services becoming more important toward the end of this period. Overall employment growth slowed to near the national average in 1999, led by poor growth in the Education and Health Services and Natural Resources and Mining sectors, and has remained there since.

East North Central: The East North Central division was slow to recover from the early 1980s recession. Strong growth in Manufacturing and Construction helped to move the area closer to

national growth rates in the middle of the decade, but slow growth in Services and other industries kept the division's regional share relatively small, indicating average growth close to that of the nation overall. Strong growth in Manufacturing and Professional and Business Services was offset by slow growth in a number of other sectors, keeping overall employment growth about average through the mid 1990s. From 1996 on, slowing growth in Professional and Business Services led poor performance in nearly all other sectors to keep overall employment growth in the division below the national average. The division was particularly hard hit in the 2001 recession, and followed with a relatively slow recovery, with poor performance in Trade leading slow growth in nearly every other industry throughout the rest of the study period.

West North Central: Aside from the few years surrounding the 1991 recession, the West North Central division experienced close to average growth in nearly every year of the study period. Through much of the 1980s, strong performance in Manufacturing was offset by slow growth in the Trade and Services sectors. From 1989 through 1994, however, Manufacturing and Trade employment led strong growth in nearly every other sector in driving the division's superior performance in these years. While Manufacturing has continued to be a strong point for the division, poor performance in Professional and Business Services, Trade, and most other sectors brought the division back in line with the national average through the slowdown at the beginning of the current cycle and below average for the last two years.

Mountain: Aside from a short period in the late 1980s, the Mountain division very strongly outperformed the nation in all years of the study. The large regional share contributions observed in Figure 4 reflect the strong relative performance of every industry sector in the division in nearly every year of the study. Slow growth in the Construction, Trade, and to a lesser extent Finance, Insurance, and Real Estate during 1986 and 1987 were the main cause of the underperformance in those years, but even these sectors quickly recovered to contribute positively to regional share in the years following. Exhibiting the strongest performance in the nation

throughout the study, this division remains strong in every industry sector.

Pacific: The Pacific division grew strongly through the 1980s expansion, outperforming the nation in all but 1984. The large regional shares indicated in Figure 4 for this period reflect strong relative growth in most industries, led by Manufacturing, Construction, and Trade. Despite faring better than average through the 1991 recession, the division was slow to recover in the ensuing years, with overall employment continuing to fall through 1993. Led by continuing declines in Construction and Manufacturing, slow relative growth in nearly every industry sector through 1995 resulted in the large negative contributions from the area's regional share component in these years. From the mid-90s onward the division performed strongly again, led by Manufacturing, Government, and Professional and Business Services. In the upswing to 2005 the division has somewhat matched the nation since the last recession, with slow steady growth, picking up through Construction and Trade in 2005.

5. Net Employment Growth and SS Contributions

As mentioned above, the components from the dynamic shift-share decomposition can be summed over their annual contributions to arrive at summaries for longer periods of any length. While this necessarily omits much of the detailed dynamics that took place within the different census divisions, it is a convenient means of comparing the overall employment growth of each census division through each individual business cycle expansion. By summing over the individual years, the dynamic shift-share used here is superior to static methods that span such periods, in that changing industry distribution within each area is automatically updated on a yearly basis. Figure 6 contains these summaries for the separate expansions of the 1980s and the 1990s and also the years since the last recession. Figure 7 indicates the industry contributions to the regional share components summed over these periods, with the smaller industry sectors for the NAICS data aggregated for ease of presentation.

In Figures 6 (Shift-share Components) and 7 (Regional Share Detail), in the Annex, we can easily compare and contrast each area's overall individual performance across expansionary phases and relative to other areas and also determine which industries contributed most to this performance. It is easy to see that New England and the Middle Atlantic states performed poorly overall in both expansions, with the extent of that poor performance being little changed between the two extended periods. The positive IS contribution in both panels indicates that the industry makeup was such that these areas were potentially poised to grow strongly in each decade, but their industries did not perform well relative to those in other areas of the country. Manufacturing provided the biggest drag on employment growth in both divisions, but nearly every industry had overall negative summed effect over all three periods. The poor performance in each of these divisions has continued into the current national expansion, with negative overall employment growth over the final years of the study, again despite a potentially favorable industry mix indicated by the IS.¹³

In contrast to the above, the East South Central division exhibited about average performance over the first two expansions despite having relatively large negative IS contributions in each. This area apparently offset its poor general distribution of employment across industries by having high performing industries within that mix, as is apparent in Figure 7. In the current phase (Figure 6, panel 3), the East South Central division is lagging the national average, with virtually no net employment growth following the last recession. So far, a negative overall RS has combined with a large negative IS to offset the few industries that have performed well within the division.

We saw above that both the South Atlantic and the Mountain divisions had strong employment growth in nearly every year studied, with all three shift-share components strongly positive on net in each of the sub periods shown here. In each period nearly all industry sectors in both census divisions outperformed industry averages. The exceptions, indicated in Figure 7, include a negative

¹³ Note that in Figure 6 the growth rate scale on the right axis differs in panel 3, since the period being shown is much shorter.

impact on RS from Trade in the Mountain division over the 1980s expansion and from Manufacturing in the South Atlantic over each of the following periods.

The West South Central, on the other hand, was the poorest performer over the earlier expansion, with strongly negative RS due to poor performance in all but the Government sector. Despite this, the division became one of the top three for employment growth in the 1990s expansion, with all industry sectors performing above average on net. In the current period this division has continued to experience employment growth above the national average, with even IS turning positive.

The Pacific division had the opposite experience over the two earlier expansions, with all industries contributing to relatively strong growth with positive net RS and IS in the 1980s, but then showing below average growth through the following period. Employment growth in the current period has been relatively strong, with Professional and Business Services and Educational and Health Services being the only underperforming sectors in the division thus far.

Finally, in the Midwest, the East and West North Central divisions both underperformed the nation over the 1980s expansion with strong relative growth in Manufacturing being offset by poor performance in most remaining sectors, resulting in overall negative RS for the period. Continued strong relative growth in Manufacturing helped move both divisions close to average growth over the 1990s expansion, although poor performance in every other sector kept the East North Central division in low growth territory overall. In the latest period through 2005 the East North Central division has fared worse than any other, with negative overall growth in employment due to poor relative growth in nearly all industries. The West North Central division has recovered more quickly and exhibits a low positive net employment growth for the period, with above average growth in Manufacturing employment offsetting much of the negative impact from other industries on net RS.

5. Conclusion

In this paper we have sought to highlight dynamic shift-share analysis through graphical presentations of the decompositions that

result. Graphical techniques were employed to facilitate quick comparisons across areas with respect to overall growth and also the component contributions to that growth. The graphical dynamic shift-share allows these comparisons to be made quickly over any preferred time-period of analysis, restricted only by the form of and availability of the data. In addition to overall employment growth within each division, industry contributions to that performance are also easily compared over any desired period of analysis. The color graphs are available at the article's online site.

In applying the technique, we see that the employment experience of the census divisions has varied widely over the periods considered. The clear divergence in performance from national averages at different times for most areas highlights the value of a focused regional analysis when considering economic performance measures. The additional ability to closely consider industry contributions on an annual basis is also a useful tool. These techniques are applicable for smaller regions of analysis as well, and could be useful in tracking industry and economic trends and formulating policy, at even a local level, provided data were available.

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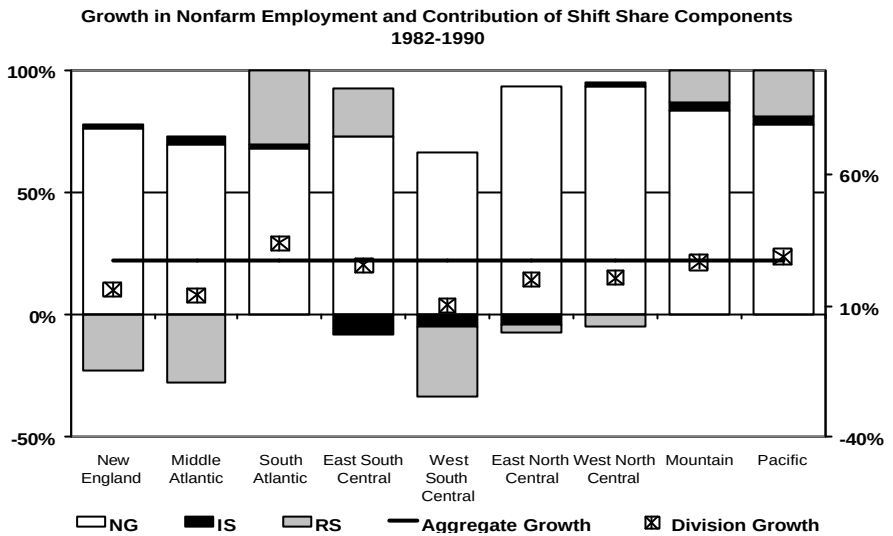


Figure 6, panel 1. Growth in Nonfarm Employment and Contribution of Shift-share Components 1982-1990

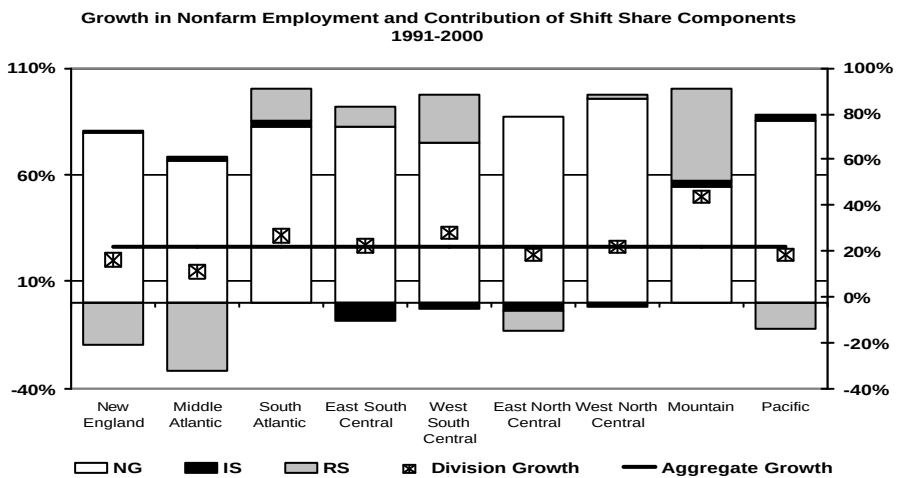


Figure 6, panel 2. Growth in Nonfarm Employment and Contribution of Shift-share Components 1991-2000

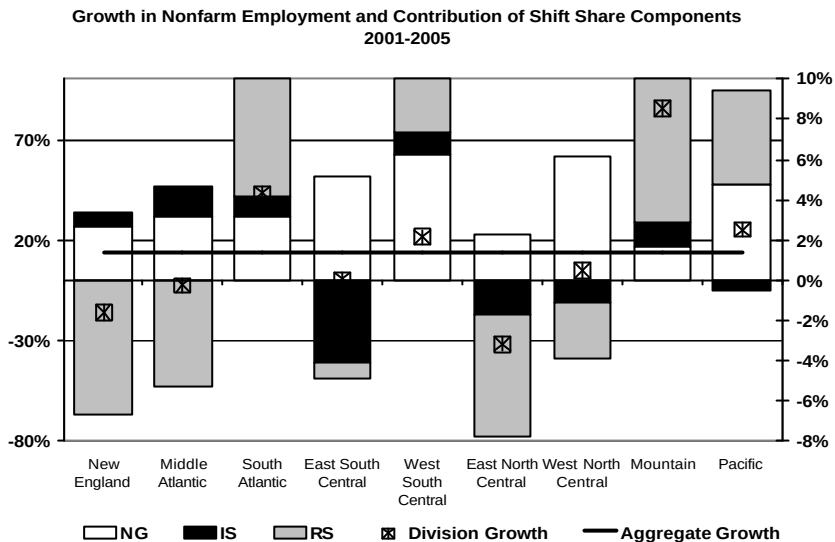


Figure 6, panel 3. Growth in Nonfarm Employment and Contribution of Shift-share Components 2001-2005

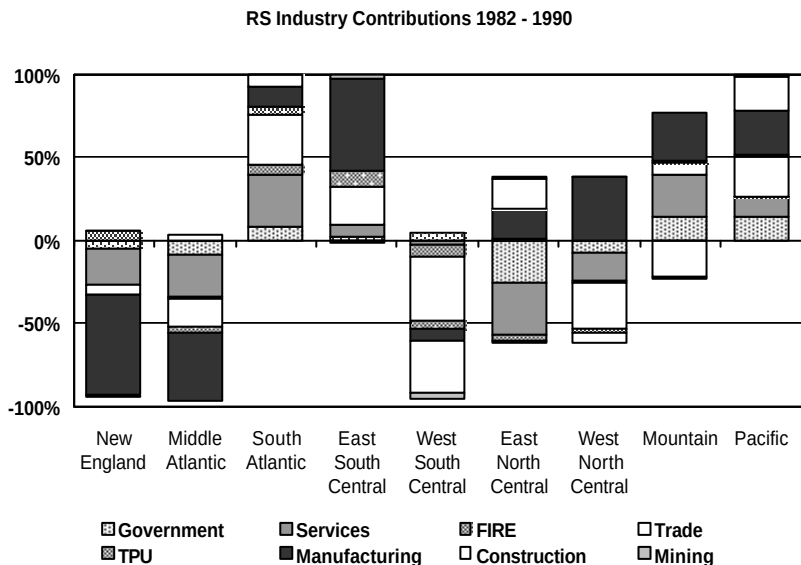


Figure 7, panel 1. Regional Share Industry Contribution Detail 1982-1990.

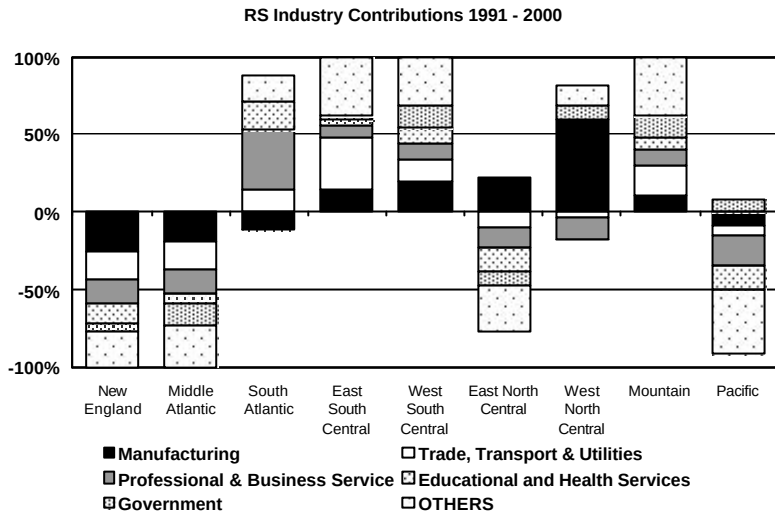


Figure 7, panel 2. Regional Share Industry Contribution Detail 1991-2000.

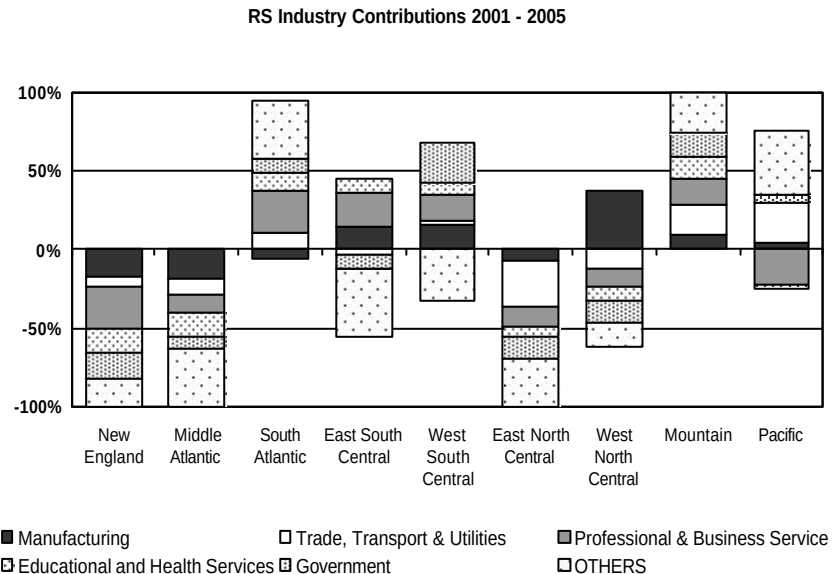


Figure 7, panel 3. Regional Share Industry Contribution Detail 2001-2005.