

Economic Structure, Economic Density, and Pay in the Pacific Northwest

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by

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1. Introduction

Outside of the largest metropolitan areas of the Pacific Northwest and Mountain West, average income and pay are relatively low compared to national averages and compared to the income and pay levels in those large regional metropolitan areas. This has led to discussions of “the other Washington” or “the other Oregon,” the large parts of both states that have income levels significantly below those found in the Puget Sound or Portland areas. Other less metropolitan states like Idaho, Montana, Wyoming, and New Mexico appear to also have drifted permanently away from national pay and income levels and are often assumed to be economically distressed.¹

Since the late 1970s, these pay and income gaps relative to national averages have widened significantly. Although there was some modest narrowing of these gaps during the second half of the 1990s, significant gaps remain. The primary explanation offered for the opening of these pay and income gaps is that the structure of employment opportunities in these areas deteriorated significantly after the late 1970s. In particular, relatively well-paid jobs in the natural resource sectors (forest products, mining, metal smelting) were lost at the same time that jobs expanded in the relatively low paid retail trade and service sectors. The fact that relative pay deteriorated simultaneously with these shifts in industrial structure appears to lend support an assumed causal connection between deteriorating industrial structure and deteriorating real pay. See Figures 1a and 2a.

This characterization of the economic problems faced by rural and small urban areas has important public policy implications. If declines in the natural resource sectors have impoverished large parts of the Pacific Northwest and the Mountain West, public policies to reverse these trends and reinvigorate the natural resource sectors offer these regions a potential solution. State governments in many of these states as well as the new Bush Administration have adopted such policies: reducing environmental regulations on the natural resource industries, actively promoting the expansion of extractive activities, cutting taxes on these sectors, etc.

The rationality of these policies and their likely effectiveness at least partially depends on the initial diagnosis: that it was deterioration in the structure of employment opportunities that explains the relative declines in pay and that restoring a “good” industrial structure will reverse these trends. This paper will show that neither of these assumptions appears to be correct. Changes in industrial structure explain little of the pay and income gaps. Dramatic changes in the structure of employment will not close those gaps. The pay and income gaps appear to be tied to the density of economic activity. Most low-income regions are also very lightly settled areas with only small urban centers. These areas, like similar areas around the nation, have lower pay in almost all sectors, “high-wage” as well as “low-wage” sectors. For that reason,

¹ Montana during the late 1990s was dead last among states ranked by pay per job. Idaho and Wyoming were in the lowest ten states in terms of average annual pay per job. Montana, Idaho, New Mexico, and Utah were in the lowest eleven states in terms of per capita income.

changing the structure of employment is unlikely to eliminate the relatively low pay in these areas.

Figure 1a: Declining Pay and Employment in the Natural Resource Industries and Declining Real Pay per Job in the Overall Montana Economy

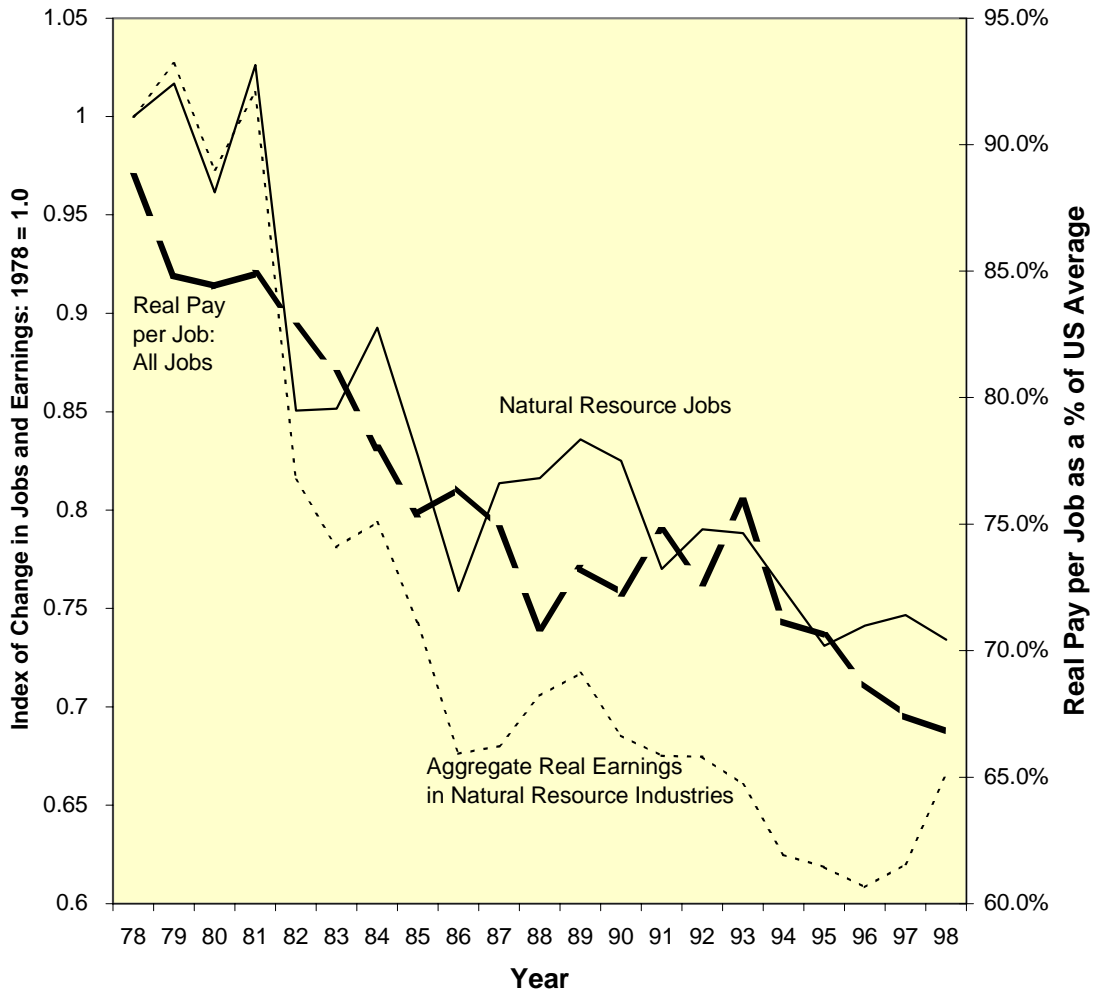
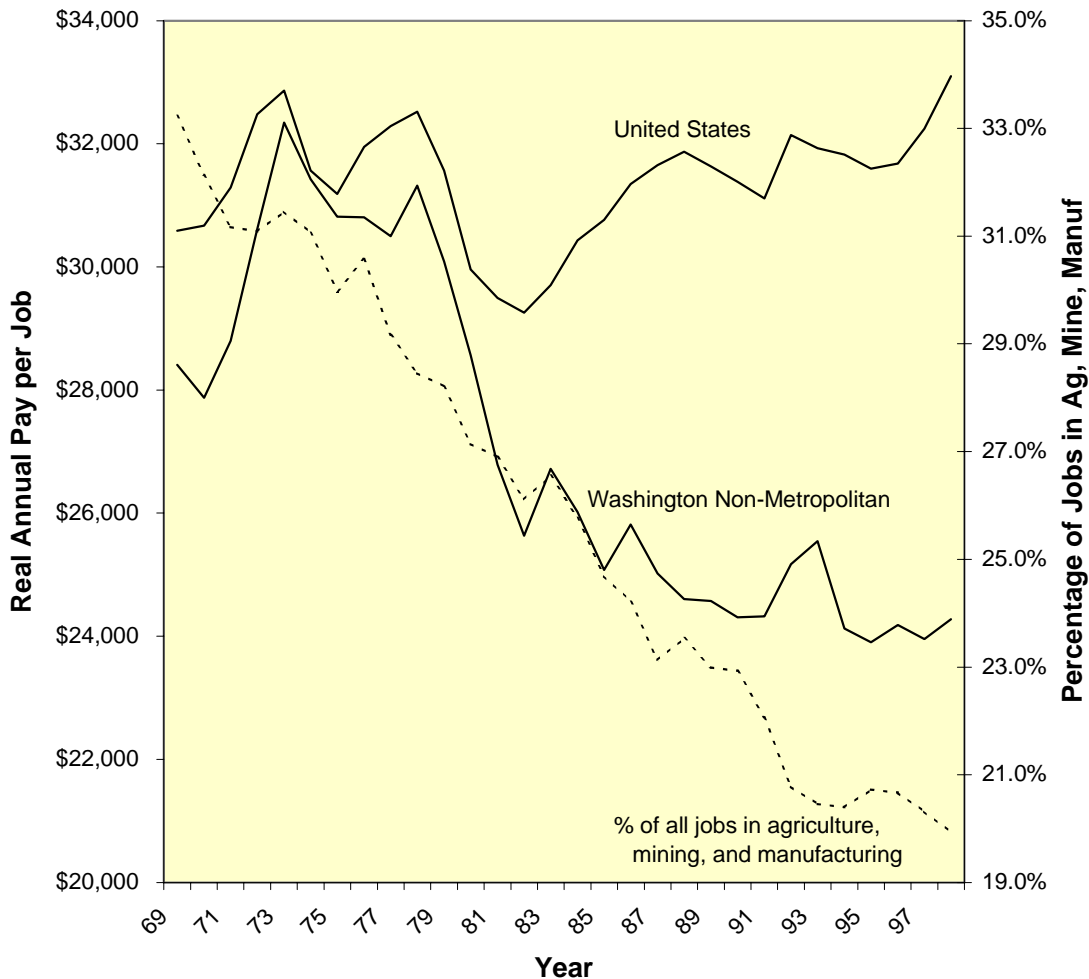


Figure 2a: Average Real Pay in Non-Metro Washington Compared to the US



2. The Impact of the Industrial Structure of Employment on Average Pay²

We analyze the role changes in the industrial structure of employment through a series of “thought experiments” that impose “superior” industrial structures on local economies. We then calculate average pay.³ “Industrial structure of employment” is used here to

² The analysis that follows was suggested by an article in a publication of the Federal Reserve Bank of Minneapolis, *The Region* 14(4):15, December 2000, by Ronald A. Wirtz, “Putting a Finger on the Grand (Income)Canyon.”

³ We call these “thought experiments” because we do not actually model labor supply and demand and the resulting wage levels. Rather, we impose different labor structures or different pay structures and simply proceed to calculate average pay. The implicit economic assumption being made is that the particular local economy we are analyzing is an open economy subject to free in and out migration. In that setting overall local wage levels will be affected by locally specific qualities such as cost of living and

refer to the percentage of jobs found in each one or two digit industry. We use Montana, the state with the lowest average pay in the nation, as a case study. We also carry out the same analysis for “the other Washington,” the non-metropolitan parts of that state.⁴

a. Re-Establishing the Industrial Structure of 1978

The wage gap relative to the national average grew dramatically after 1978 as the back-to-back recessions of the late-Carter and early-Reagan years hit rural areas particularly hard. The natural resource sectors, including mining, metal processing, and forest products were especially hard hit. One way to get at the role of industrial structure in determining average pay is to freeze the structure of employment as it existed in 1978 but allow the pay associated with various industries to change as it actually did.⁵

“Freezing” the industrial structure means holding the percentage of all jobs found in each particular two digit industry at its 1978 level. Since the economy has expanded considerably since then, this means that the number of jobs in each industry is allowed to expand at the same rate as total employment. For the natural resource sectors that experienced declines in employment since 1978, this involves a dramatic reversal relative to what actually happened. With a frozen 1978 industrial structure, those natural resource jobs would have expand briskly. In Montana, for instance, about 50,000 relatively high paid jobs in mining, wood products, metal smelting, railroads, and federal government would have been created while a similar number of jobs in retail trade, accommodations, tourism, and other services would not have been created. In the popular jargon, there would be fewer “lousy” jobs and more “good” jobs. In non-

the value of amenities and the compensating adjustments in pay they trigger, but the local structure of wages will not be primarily determined by local forces. That structure of wages will be determined by national labor market patterns and conditions. Since we are analyzing local economies that have seen high levels of in- and out-migration over relatively long periods of time (20 years), this appears to be an appropriate assumption. Previous analysis of who in Montana sacrifices the most pay by working in Montana rather than elsewhere showed that it was more mobile workers (higher income, higher levels of education) who faced a higher percentage loss. The least educated were found to be making no sacrifice in pay at all by working in Montana. This suggests that the low pay is not due to workers being “trapped” in Montana by immobility. Barrett, Richard. 1999. “The Montana Discount: Analyzing the Sources of the State’s Hourly Wage Gap.” Department of Economics. University of Montana. Paper presented at the Pacific Northwest Regional Economic Conference, Boise, Idaho.

⁴ This is not the usual definition of the “other Washington” since it excludes the metropolitan areas east of the Cascades such as Spokane and the Tri-Cities area. Later in this paper we will shift to a definition that focuses on the Puget Sound area compared to the rest of the state.

⁵ For Montana, two digit industrial data was available and used. For non-metropolitan Washington, one digit industrial data was used. Thus for Montana manufacturing was broken down into its many different components while for the non-metro Washington analysis manufacturing is treated as a single industry. In previous work, we showed that analysis at a more detailed industrial classification (i.e. 2 versus 1 digit) increased role that industrial structure played in explaining changes in average pay. When Montana average pay was analyzed at the one digit level, less than 10 percent of the changes in average pay were explained by changes in industrial structure, but when 2 digit classification was used, 20 percent of the change in average pay was associated with changes in industrial structure. That would suggest that using only one digit classification for the industrial structure in non-metropolitan Washington understates the role of industrial structure in explaining changes in average pay. However, many of the changes in industrial structure revealed by the use of two digit classification, do not match the popular descriptions of the changes in industrial structure as shifts from natural resource sectors to service sectors.

metropolitan Washington, there would have been about 30,000 more manufacturing jobs that would have displaced a similar number of jobs in service-producing sectors. Tables 1 and 2 show where some of the gains and losses in jobs would be relative to the actual structure of employment in 1998.

Table 1: Job Gains and Losses from Freezing the Structure of the Montana Economy at 1978 Percentages		
Industry	Change in 1999 Jobs Compared to Actuals	% Increase over 1999
Mining	3,996	94%
Construction	2,583	13%
Wood Products	7,371	100%
Metal Smelting	3,296	319%
Food Processing	2,846	109%
Wholesale Trade	3,578	19%
Railroad	6,258	209%
Communications	2,159	52%
Electric and NG Utilities	993	26%
Federal Government	11,172	53%
State and Local Government	4,214	7%
Sub-Total	48,465	
Retail Trade	-7,739	-9%
Finance & Real Estate	-519	-3%
Hotels	-883	-9%
Business Services	-10,332	-67%
Health Services	-11,471	-32%
Tourist, Amusement	-5,160	-71%
Other Services	-19,118	-33%
Sub-Total	-55,222	

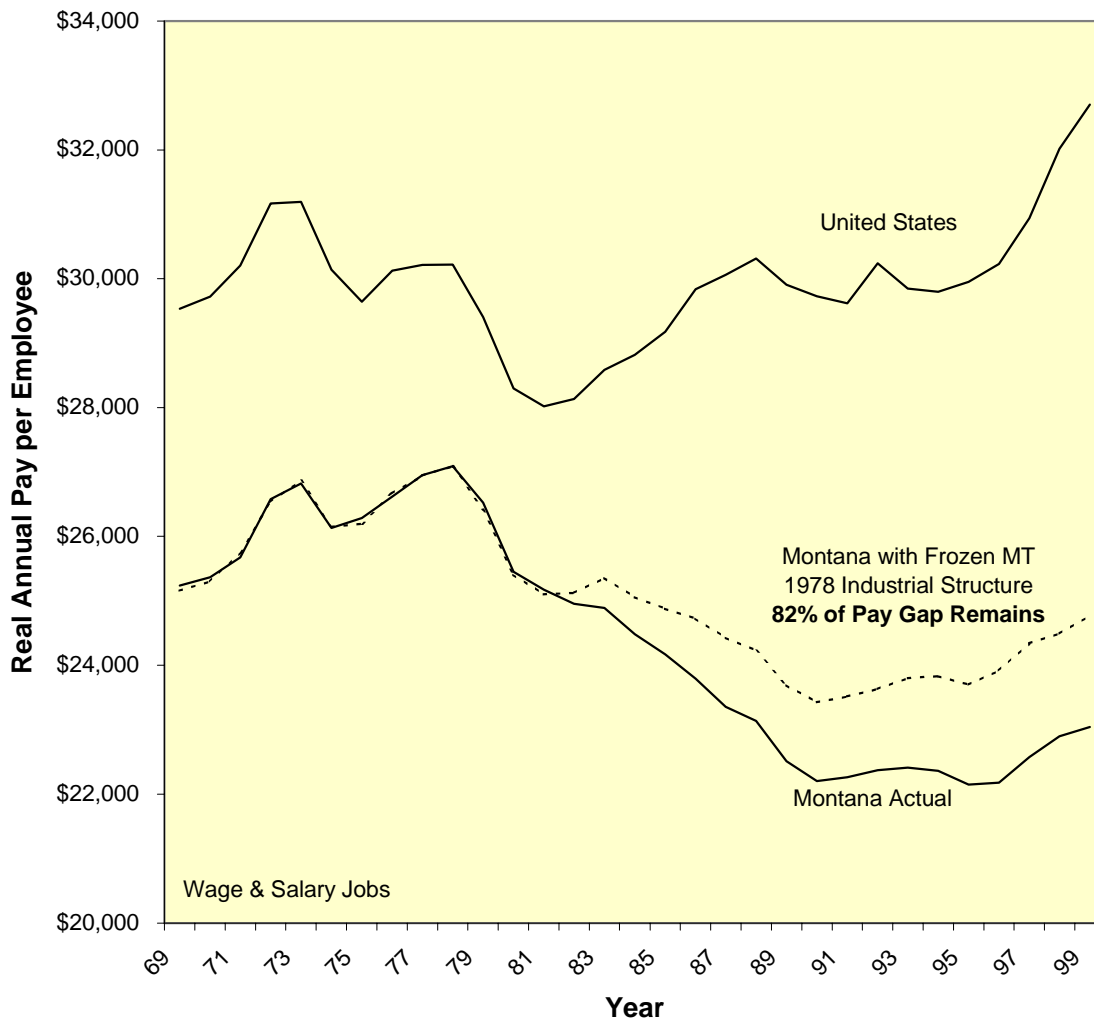
Author's calculations from BEA REIS data
 MT&US W&S Pay per Job.xls, Jobs, bb244

Table 2: The Effect on the Structure of Employment of Freezing Non-Metro WA Employment Shares at 1978 Levels			
Economic Sector	Actual Change 1978-1998	Change If Jobs Frozen at 1978 Percentage of Jobs	Difference in the 1998 Job Structure
Manufacturing	-4,174	25,749	29,923
Service	53,151	25,955	-27,196

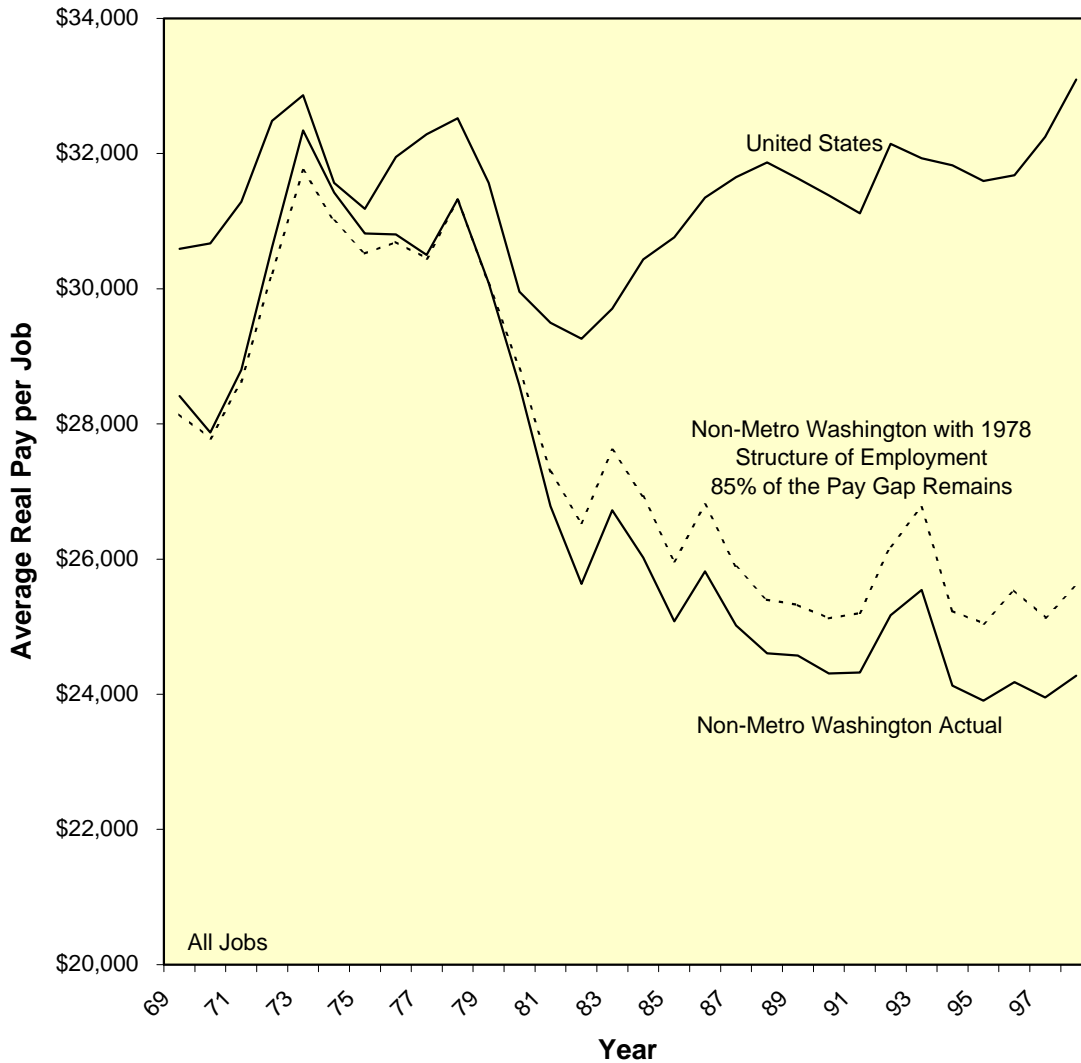
Source: BEA REIS-CD ROM
 WA non-metro structure.xls, emp, A118

With these dramatic gains in employment in these relatively high paid sectors, the economy would look more like the “ideal” structure advocated by those who have criticized the “deterioration” of the structure of employment and pushed for expansion in the natural resource sectors. The impact of this on average pay per job is shown in Figures 1 and 2. Despite this dramatic expansion of employment in the high paid sectors, most the pay gap relative to the nation in 1998, 82 percent of the gap in Montana and 85 percent of the gap in non-metropolitan Washington, remains.

**Figure 1: Average Real Pay in Montana:
Employment Structure Frozen in 1978 Compared to US**



**Figure 2: Average Real Pay in Washington Non-Metro Areas:
Employment Structure Frozen in 1978 Compared to US**



b. Adopting the National Structure of Employment

It is possible that average pay in a region is low relative to the nation not because the areas were unable to hang on to their unique employment structures but because their employment structures were inferior to those found elsewhere in the nation. If we impose the structure of employment found in the nation as a whole in 1998 on the local economies, we can test that hypothesis.

Adopting the national structure of employment would, of course, lead some sectors to be much larger and others to be much smaller. Some of the specialized industries such

as mining in Montana and agriculture in non-metro Washington, would be much smaller. On the other hand, the manufacturing sector in Montana would be 30,000 larger and there would be 13,000 more business service jobs; offsetting those gains would be 20,000 fewer government jobs and 24,000 fewer jobs in retail trade and other services. Such shifts away from retail trade and service-producing jobs towards manufacturing is often been described by critics of the changes that have taken place in industrial structure as an obvious improvement. Tables 3 and 4 show these shifts in employment.

Table 3: Job Gains and Losses from Montana Adopting the US Industrial Structure		
Industry	Change in 1999 Jobs	% Increase over 1999
Durable Manufacturing	17,695	113%
Non-Durable Manuf	13,234	145%
Finance and Real Est.	4,917	27%
Business Services	12,842	84%
Wholesale Trade	2,014	11%
Sub-Total	50,701	
Mining	-2,994	-70%
Retail Trade	-14,276	-17%
Other Services	-10,235	-10%
Federal Government	-8,425	-40%
State and Local Govt.	-10,890	-17%
Farm Workers	-3,269	-54%
Sub-Total	-50,090	

Author's calculations using BEA REIS data
MT&US W&S Pay per Job.xls, jobs, at242

Table 4: Job Gains and Losses from Non-Metro Washington Adopting the US Industrial Structure		
Industry	Change in 1998 Jobs	% Change Relative to Actuals
Gains in Employment		
Manufacturing	4,625	8%
Transportation & Pub.Util	6,123	35%
Wholesale Trade	6,088	37%
Finance, RE, Insur.	11,218	43%
Services	39,346	35%
Federal Government	4,237	39%
Sub-Total of Gains	71,636	30%
Losses in Employment		
Farm	-30,718	-76%
Agricultural Services	-9,874	-61%
Retail Trade	-6,613	-8%
State & Local Govt.	-24,113	-32%
Sub-Total of Losses	-71,317	-32%

Author's calculations using BEA REIS data
WA non-metro structure, emp, AR18

In non-metropolitan Washington, where manufacturing is already close to the national average, the gains in manufacturing jobs of adopting the US structure of employment would be much smaller. Non-metropolitan Washington, however, has under-developed service sectors and would see gains primarily there if it had the US industrial structure of employment.

Imposing the national structure of employment on the regional economies would have almost no impact on average pay. Average pay in Montana and non-metro Washington with the new industrial structure would be almost identical to what it currently is. Clearly the source of low average pay is not the regions' deviations from the national industrial structure. Figures 3 and 4 show these results. Changing the industrial structure in this manner has no impact on the calculated average pay.

Figure 3: Average Real Pay in Montana with 1999 US Employment Structure

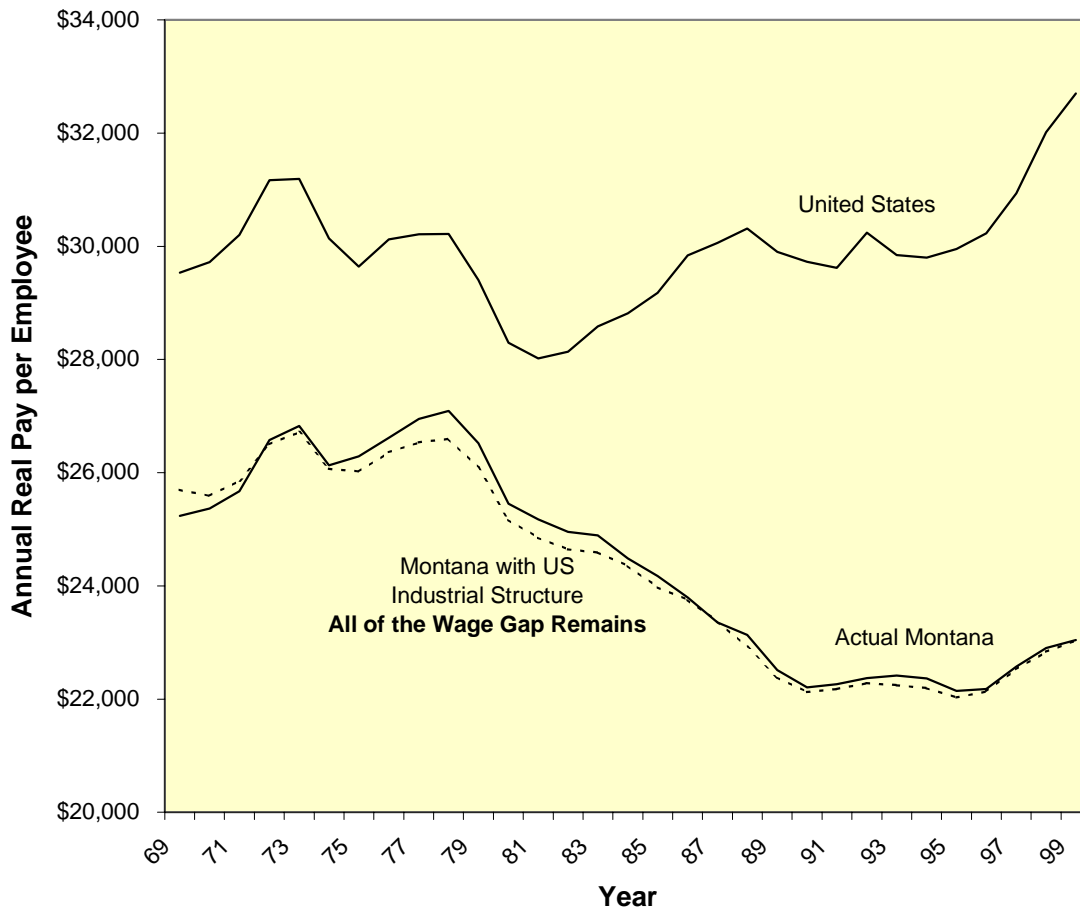
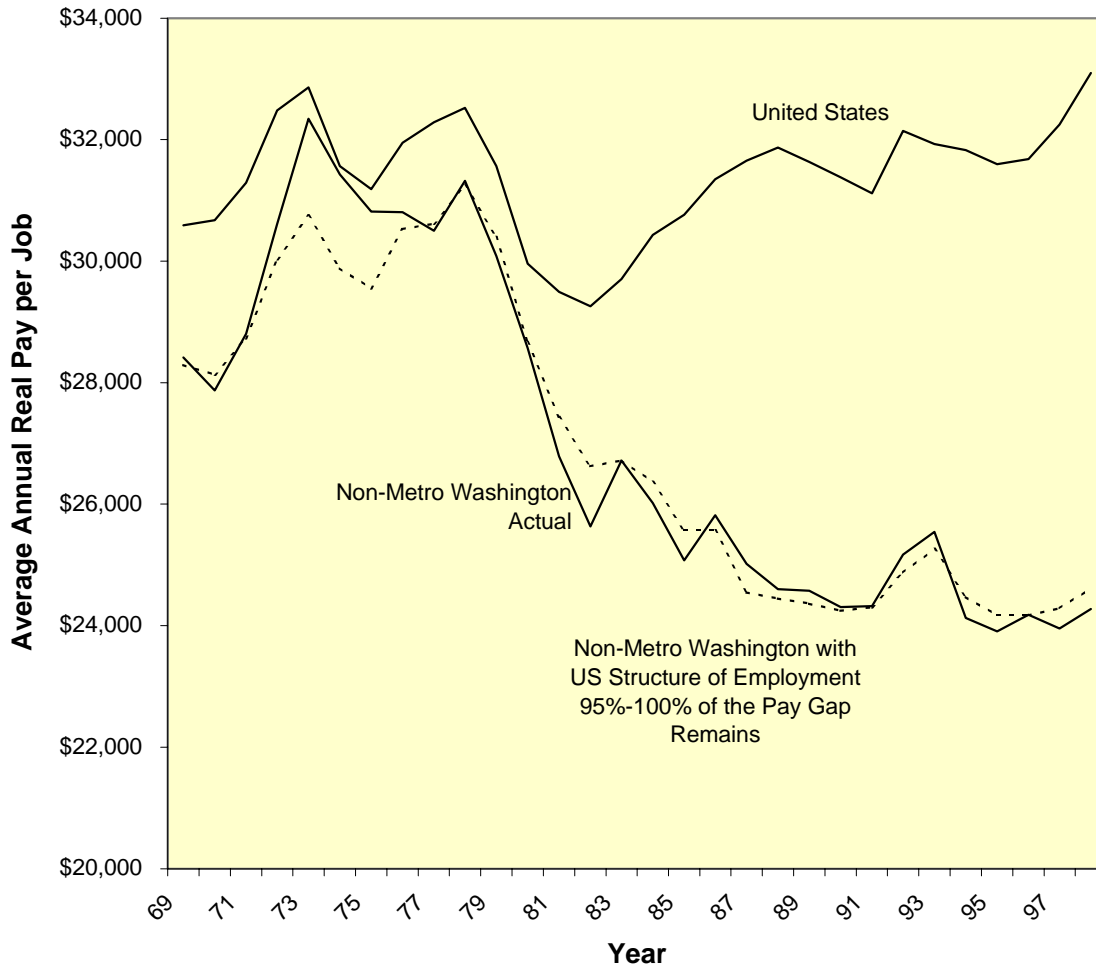


Figure 4: Average Real Pay in Non-Metro Washington with US Employment Structure



c. Imposing National Pay Levels on the Existing Structure of Employment

The results so far suggest that it is not the structure of employment that matters but the lower level of pay found in almost all jobs in the regions. This can be tested by accepting the actual structure of employment in the regions as that structure evolved between 1978 and 1998 but paying workers in those industries what workers in the same industries got paid across the nation. Average pay in each two-digit industry is calculated for the nation as a whole and this pay is assumed to be received by workers in the various jobs that actually existed in the regions. This eliminates the vast majority of the pay gap. In Montana in 1998, 84 percent of the pay gap disappears despite the “inferior” structure of employment Montana is assumed to have. In non-metro Washington, 76 percent of the pay gap is eliminated. See Figures 5 and 6

Figure 5: Montana Average Real Pay with Montana Employment Structure but US Pay

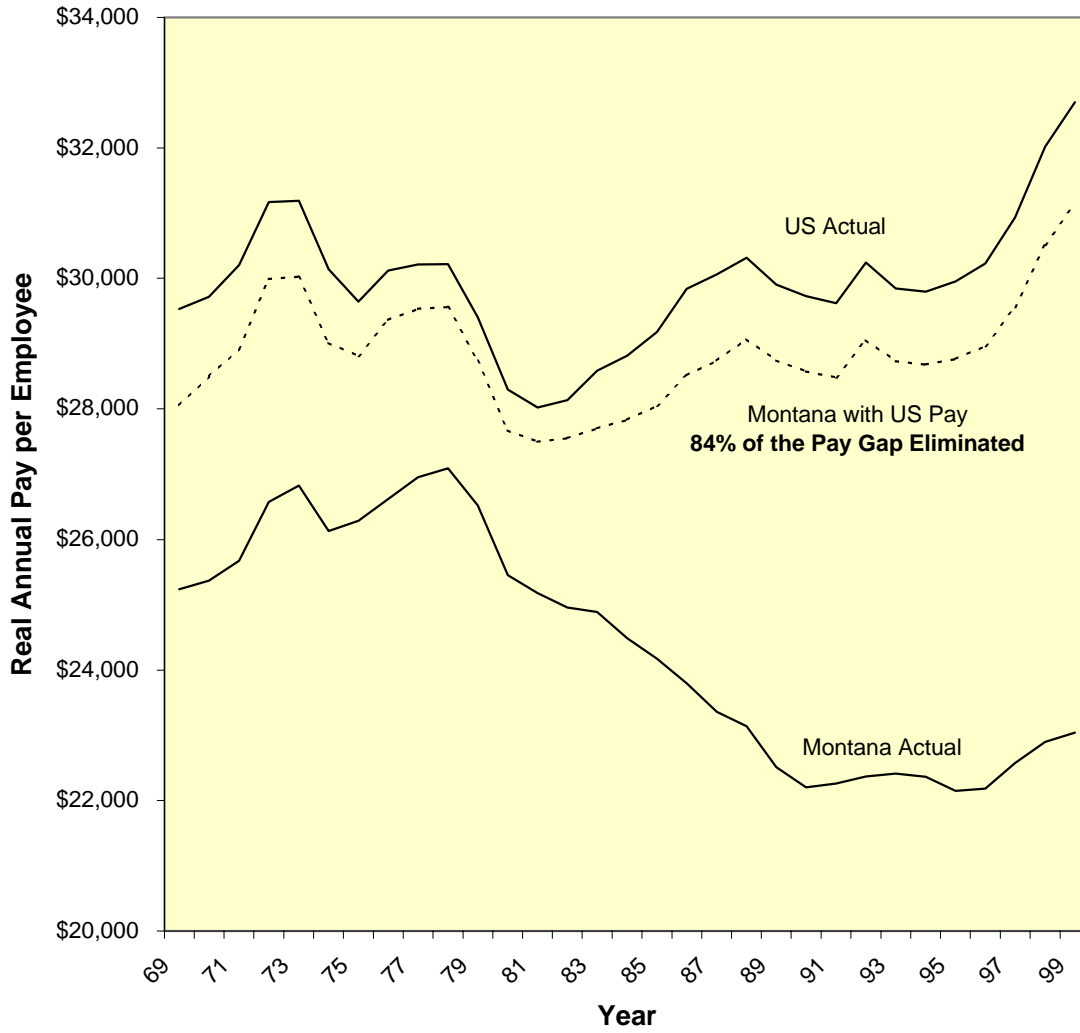
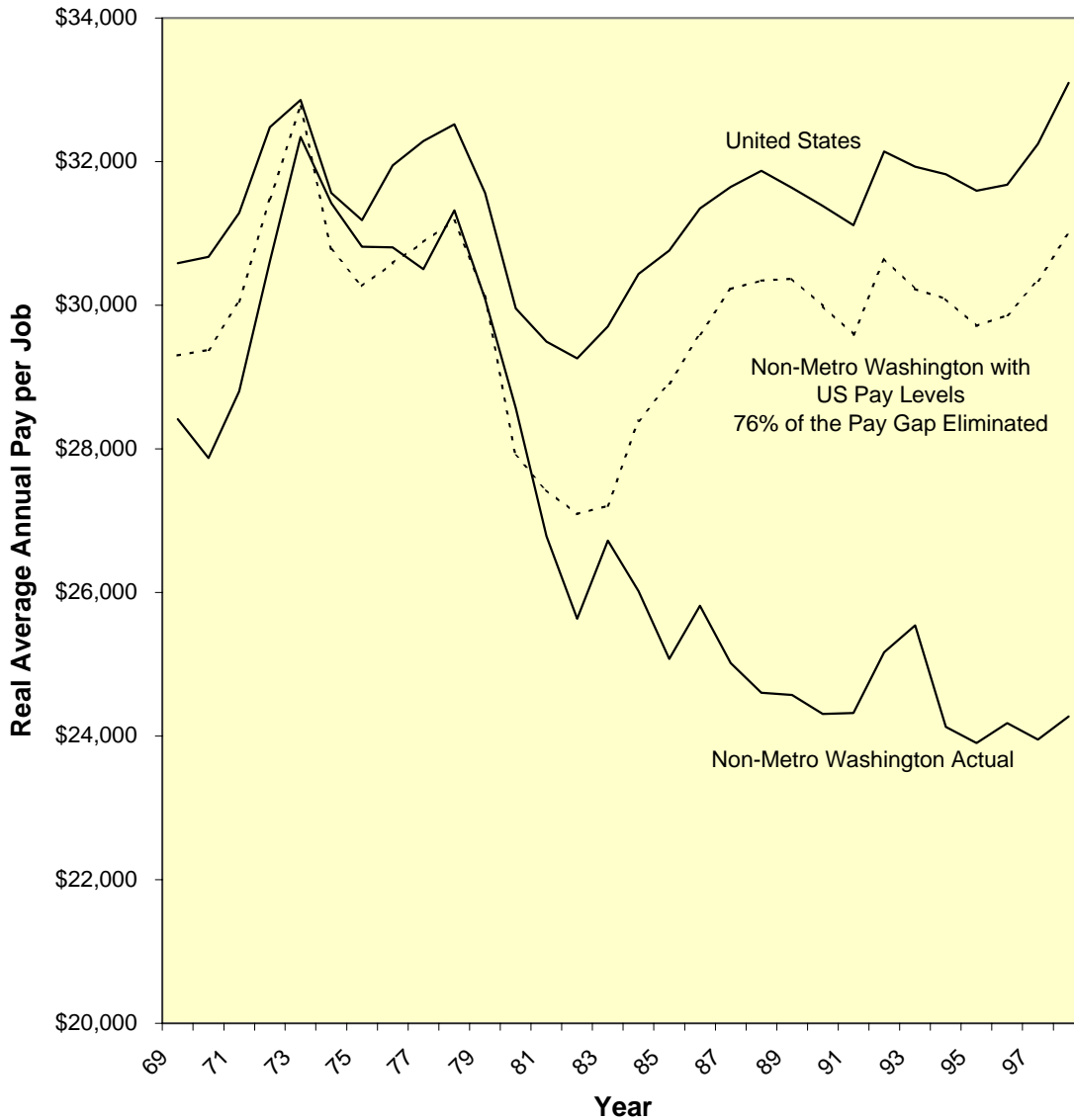


Figure 6: Non-Metro WA Average Real Pay with Non-Metro WA Employment Structure but US Pay



Clearly the “pay gap” is primarily associated with low pay levels across the board within these regions, not with the mix of the jobs found there. Pay in high wage jobs plunged during the 1980s just as it did elsewhere in the economy. See Figure 7.

Figure 7: Montana Pay per Job Relative to US: Shrinking High Wage Sectors and the Rest of the Economy



These results are similar to ones we reported earlier⁶. In that earlier analysis, a formal decomposition process was used to break the changes in average pay after the late 1970s into that part associated with changes in the structure of employment, that associated with changes in the level of pay, and that associated with the interaction between those two. That decomposition of the change in average pay was carried out for various dichotomous divisions of the economy: goods versus non-goods industries, natural resource versus other industries, and services versus the rest of the economy. In all cases 90 to 95 percent of the change in average pay was not associated with

⁶T.M. Power and R.N. Barrett, "Converting 'Good' to 'Lousy' Jobs: The Impact of Changes in Industrial Structure on Pay in the Inland West, the Pacific Northwest, and Montana," Pacific Northwest Regional Economic Conference, May, 1999. Summarized in *Post-Cowboy Economics: Pay and Prosperity in the New American West*, Chapter 4, Washington DC: Island Press, 2001.

changes in industrial structure. In addition, since there were many shifts in employment within each of these broad categories of jobs that could be characterized as shifts from high pay to low pay, we also carried out the same decomposition for the economy divided into the same two digit industries we have used in the analysis in this paper. For that more disaggregated decomposition analysis, over 80 percent of the change in average pay could not be associated with changes in industrial structure.⁷ That is consistent with the results reported here.

3. An Alternative Explanation of Low Pay: Low Economic Density

It is clear from these results that the industrial structure of employment is not the primary determinant of the wage gap that is found in Montana and the “other Washington.” The problem is that jobs in these regions pay less in almost all industries. We now turn to an explanation for this that does not focus on industrial structure.

Economists have long believed that more densely settled areas had higher levels of productivity. The ability of larger urban areas to attract workers and firms from surrounding rural areas and small towns could be explained in no other way. Until the 1970s, metropolitan areas in the US had been gaining population at the expense of non-metropolitan areas for over a century. Economists have explained this phenomenon in terms of “agglomeration economies”: The more densely settled an area was, the lower were the communication and transportation costs, the larger was the pool that firms could draw on for specialized labor and business services, the larger and more compact were the markets for their products, etc. All of these tended to lower firms’ per unit costs.

If there were just higher productivity with higher densities, the more densely settled areas would become “black holes” drawing more and more economic activity to them and enjoying higher and higher productivity. There have to be offsetting forces to explain why population and economic activity remain distributed across a variety of differently sized places from rural areas to small cities.

Dense settlement increases the demand for land in the central core. This leads land costs to rise. The rising cost of land and the other cost increases it triggers are part of those offsetting economic forces. Density not only provides economic benefits, it also generates economic costs. Those firms that do not particularly benefit from density’s impact on productivity will find densely settled area too costly and will locate somewhere else. In addition, if workers do not find high-density urban areas particularly attractive, they will also be repelled by the higher cost of living and demand higher wages to compensate for the higher cost of living. If workers actually find the characteristics

⁷There were other differences between the two types of analyses. The previous analysis focused on the change in average pay between two dates. The analysis here focuses on the level of average pay for all years of the analysis period. In addition, in this analysis of Montana (but not non-metro Washington) we have used wage and salary employment rather than total employment. The difference between the two employment series is self-employment, for which the data on employment and pay is less reliable. In addition, these jobs appear to be dominated by part-time employment. Finally, wage and salary data is available in a more timely fashion than the total employment data.

associated with very densely settled areas unattractive because the congestion, pollution, crime, commuting costs, etc. outweigh the benefits of a wider array of economic opportunities, greater diversity, cosmopolitan atmosphere, wider cultural opportunities, etc., firms will also have to compensate workers for those other negative aspects or workers will choose not to settle there. This will raise costs to firms that choose to locate in dense settings even more.

Firms will weigh the productivity advantages of locating in densely settle areas against the costs associated with such dense settlements. Workers will do the same. They will compare the higher wages offered them to the higher costs they will face in terms of cost of living and their evaluation of the amenities and disamenities of living in more densely settled urban areas. Each firm and each individual will make different judgments. That mix of judgments will lead to a particular geographic distribution of firms and workers. All will not be drawn to the same location. The result will be geographic differences in pay but those pay differences will not represent real differences in well-being for workers at different geographic locations or real differences in unit costs to firms.⁸

A. Measuring Economic Density

We have followed other analysts⁹ and measured “economic density” by worker density, the number of workers per acre at the county level. This measure of economic density was then aggregated to the state level by weighting county worker density by the percentage of the state’s total employment found in that county. Under this approach the density of areas containing a larger percentage of the total workforce have a greater impact on the aggregate state measure of density than thinly populated areas that have very few workers. Great open spaces with little economic activity have little impact on this aggregate state measure of economic density. The density index is aggregated to the state level because reliable measures of total economic output (gross product) are only available at the state level.

Since we are interested in exploring the role of geographic concentrations (density) of economic activity on labor productivity across the nation, it may be appropriate to exclude economic activity that is associated with the special productive characteristics of certain land such as mining and agriculture. Such considerations led previous analysts to excluded mining and agriculture from both the employment and output measures. The idea was to attempt to focus, in some sense, on pure density where the characteristics of the land can be assumed to be irrelevant. Of course, following the same logic, one could make the case for removing logging, fishing, crossroads, deep-water ports, etc. too.

⁸ This is true, of course, only at the margin for some firms and individuals. Other, infra-marginal firms and residents will enjoy net benefits from the location they chose; they will not be on the verge of indifference.

⁹ Antonio Ciccone and Robert E. Hall, 1996, “Productivity and the Density of Economic Activity,” *American Economic Review*, 86(1):54-70.

Excluding agriculture (including agricultural services) and mining does not affect the economic density measure significantly. State density measures are changed at most by one-tenth of one percent by the inclusion or exclusion of agriculture and mining. The measure of labor productivity, however, is significantly affected by the inclusion or exclusion of mining in those states, such as Wyoming and Alaska, that specialize in mineral extraction. Wyoming's output per worker rises 50 percent if mining is included and Alaska's rises 33 percent compared to a measure of worker productivity that excluded both mining's contribution to GSP and mining workers. Since much of that mining GSP is associated with the productivity of the land (the mineral resource) rather than the workforce, one would expect that pay would not fully track this high mineral GSP per worker.

Because of the arbitrariness of excluding only on the agriculture and mining sectors and because there are disclosure problems that prevent accurate exclusion of mining and agricultural services employment and earnings from county level data, we have chosen to use total employment, GSP, and earnings in our analysis. The results from taking this approach are very similar to those obtained by excluding agriculture and mining but are, we feel, more transparent. We handle the problem of specialized mining state by excluding as outliers two of those states from the regression analysis.

We have analyzed employment density in all 3,133 counties in 1998.¹⁰ Economic density was calculated for each county and aggregated to the state level by weighting county density by the percentage of the state's total employment that was found there.

Using 1990 data Ciccone and Hall estimated the elasticity of labor productivity with respect to economic density, e , as 1.058 (p. 62).¹¹ They showed that the appropriate aggregation of county level density to the state level requires county density to be raised to power [$e-1$] (p. 59, equation 23). We have created a state index of economic density by raising our state aggregate measure of labor density to the power 0.058. Labor productivity was measured by GSP per worker. The resulting indices of economic density are shown in Table 5.

¹⁰ Bureau of Economic Analysis, Regional Economic Information System CD-ROM.

¹¹ Ciccone and Hall (1996) modeled the relationship between labor productivity at the state level and economic density at the county level in the following manner:

$$Q_s/L_s = r T_s^w D_s(e,n)$$

$$D_s(e,n) = \sum (L_c/L_s) (L_c/A_c)^{e-1} E_c^{ne}$$

where Q_s/L_s is GSP per worker at the state level, D_s is the measure of economic density at the state level, r is a constant that depends on the interest rate, T_s is a fixed technology multiplier for the state, w is the elasticity of the technology multiplier, L_c/A_c is employment per acre at the county level, e is the elasticity of productivity with respect to density, E_c is the educational attainment of county employees, and n is the elasticity of education.

Table 5

Index of Economic Density, 1998			
State	Density Index	State	Density Index
DC	1.723	NC	1.360
NY	1.591	WA	1.354
NJ	1.503	LA	1.354
MA	1.496	KY	1.345
IL	1.474	OK	1.328
MD	1.465	NH	1.328
RI	1.453	OR	1.325
CT	1.449	SC	1.322
CA	1.444	SC	1.322
VA	1.435	NE	1.320
OH	1.426	KS	1.307
HI	1.424	AL	1.305
PA	1.422	AZ	1.295
DE	1.421	IA	1.282
MI	1.406	WV	1.277
FL	1.405	ME	1.268
US Wt Avg	1.405	VT	1.268
TX	1.400	AR	1.267
GA	1.399	NV	1.265
MN	1.386	MS	1.261
MO	1.384	NM	1.244
IN	1.372	ID	1.229
TN	1.367	SD	1.192
CO	1.365	ND	1.167
UT	1.364	AK	1.156
WI	1.361	MT	1.138
		WY	1.093

98 emp density2.xls, AR9

Montana has the second lowest index of economic density, second only to Wyoming. Other low income Mountain West states, Idaho, New Mexico and Nevada, join Montana and Wyoming among the ten least dense states. Arizona is fifteenth lowest. Thus, six of the eight Mountain West states are in the lowest fifteen states ranked by density. Only Utah and Colorado escape that group, but they are also below the national average.

If the same index of economic density is calculated for the Puget Sound and Portland-Salem areas¹² as well as for the rest of Washington and Oregon, one sees that the “other” Washington and Oregon have economic densities similar to those in Montana and Idaho, placing them in the same range as the six least dense states. See Table 6.

¹² Puget Sound consisted of King, Snohomish, Pierce, Thurston, Kitsap, Clark, and Island Counties. The Portland-Salem area included Multnomah, Clackamas, Washington, Yamhill, and Polk Counties.

Table 6: Economic Density in the Puget Sound and Portland Areas and the "Other" Washington and Oregon	
Area	Index of Economic Density
Puget Sound	1.41
The Rest of Washington	1.22
Portland-Salem	1.42
The Rest of Oregon	1.19
WA&OR Density.xls, S97	

B. The Relationship between Economic Density, Productivity, and Pay

There is a strong correlation between our index of economic spatial density and average labor productivity.¹³ The states with the lowest density also have the lowest labor productivity. The most productive areas are the most dense area. Alaska and Wyoming are clearly exceptions to this pattern, having very low density but very high GSP per worker. This, as discussed above, is due to the importance of mineral deposits to those states' economies. We have excluded them from the regression analysis for that reason.¹⁴ The adjusted R^2 is 0.68, and the t-statistic on the slope is 10.1. See Figure 8.

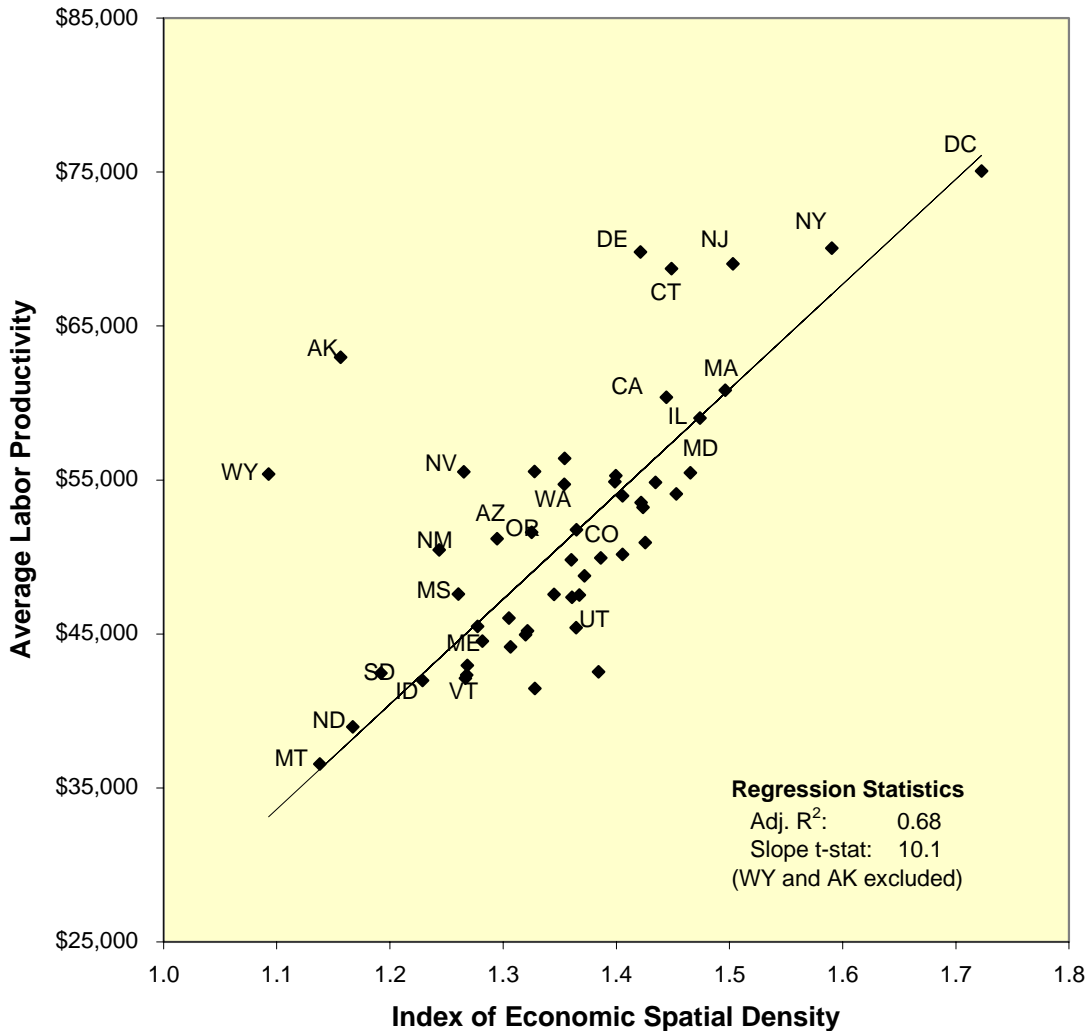
As one would expect, areas with lower labor productivity also tend to have lower average pay. As a result, there is also a strong correlation between our index of economic spatial density and average pay per job. Low density states like Montana (second lowest in the nation) have low average pay (lowest in the nation). The adjusted R^2 is 0.81, and the t-statistic on the slope is 14.3.¹⁵ See Figure 9.

¹³ This should not be surprising. The density index incorporates the results of previous statistical analysis that established the relationship between labor productivity and state economic density. (Antonio Ciccone and Robert E. Hall, 1996, "Productivity and the Density of Economic Activity," *American Economic Review*, 86(1):54-70.)

¹⁴ Ciccone and Hall excluded all states in which mineral production contributed more than 15 percent to the GSP. In addition to Wyoming and Alaska, they also excluded Louisiana, and West Virginia.

¹⁵ Wyoming and Alaska were, again, excluded from the regression.

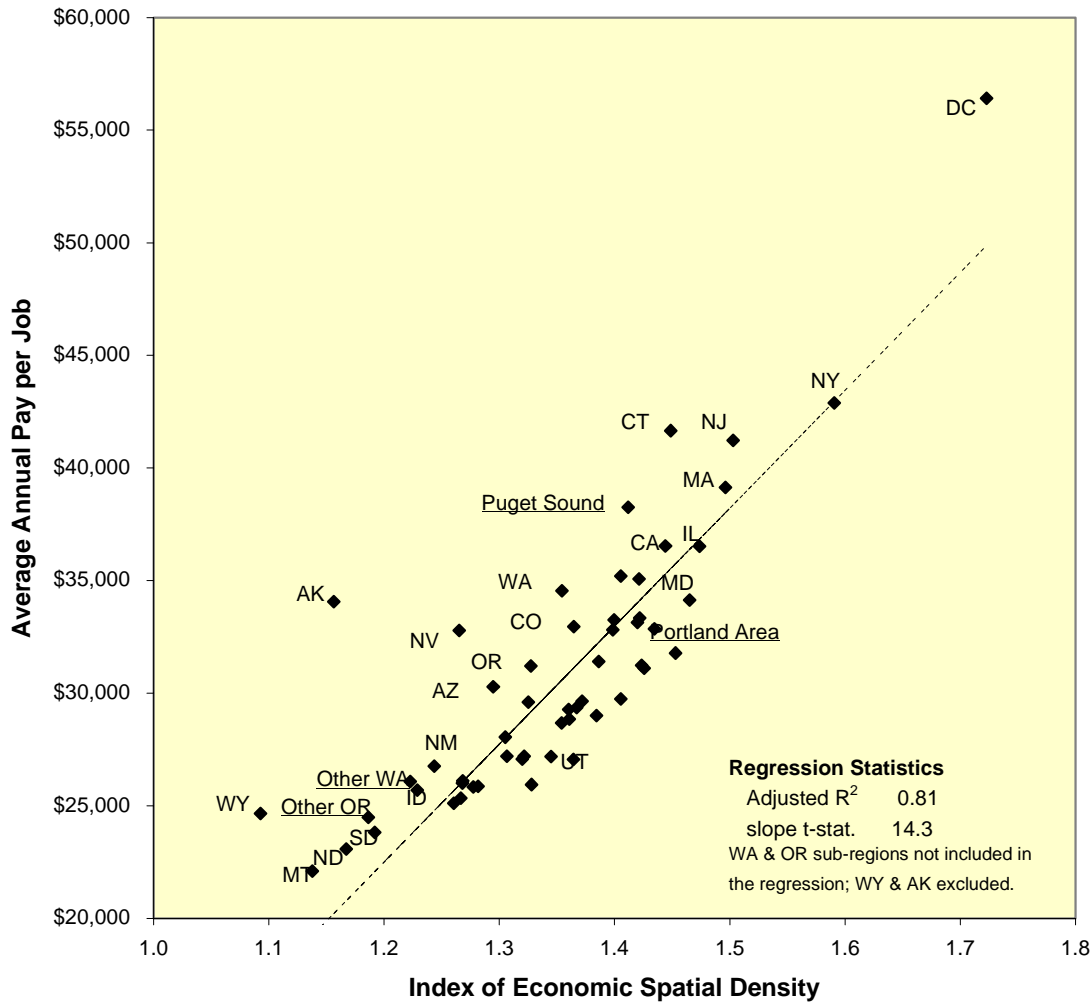
Figure 8: Economic Spatial Density and Average Labor Productivity by State: 1998



As low as Montana's average pay is, it would have been \$3,000 **lower** if the regression relationship between state economic density and average pay had dictated that pay level. When that regression relationship is applied to the "other" Washington and Oregon, it projects very low average pay in both areas, \$23,710 in Washington outside the Puget Sound area and \$21,804 in Oregon outside of the Portland-Salem area. These projected levels of average pay would be 72 and 66 percent of the national average of \$33,100 in 1998. The actual pay levels in these parts of Washington and Oregon were higher than these projected levels: \$26,076 in the "other" Washington and \$24,490 in the "other" Oregon, about 10 percent above the levels projected on the basis of density alone. The actual pay levels were 79 and 74 percent of national averages in the "other" Washington and Oregon, respectively. This single economic characteristic, spatial economic density, appears to explain most of the "pay gap" in these regions. On Figure 9 the economic density and average pay in the "other" Washington and Oregon

and the Puget Sound and Portland-Salem areas are indicated. Those data points fit the pattern established by the state-level data. The “other” Washington and Oregon have much lower economic densities than the Puget Sound and Portland-Salem areas and also have the significantly lower pay that goes with those lower densities and lower labor productivity.

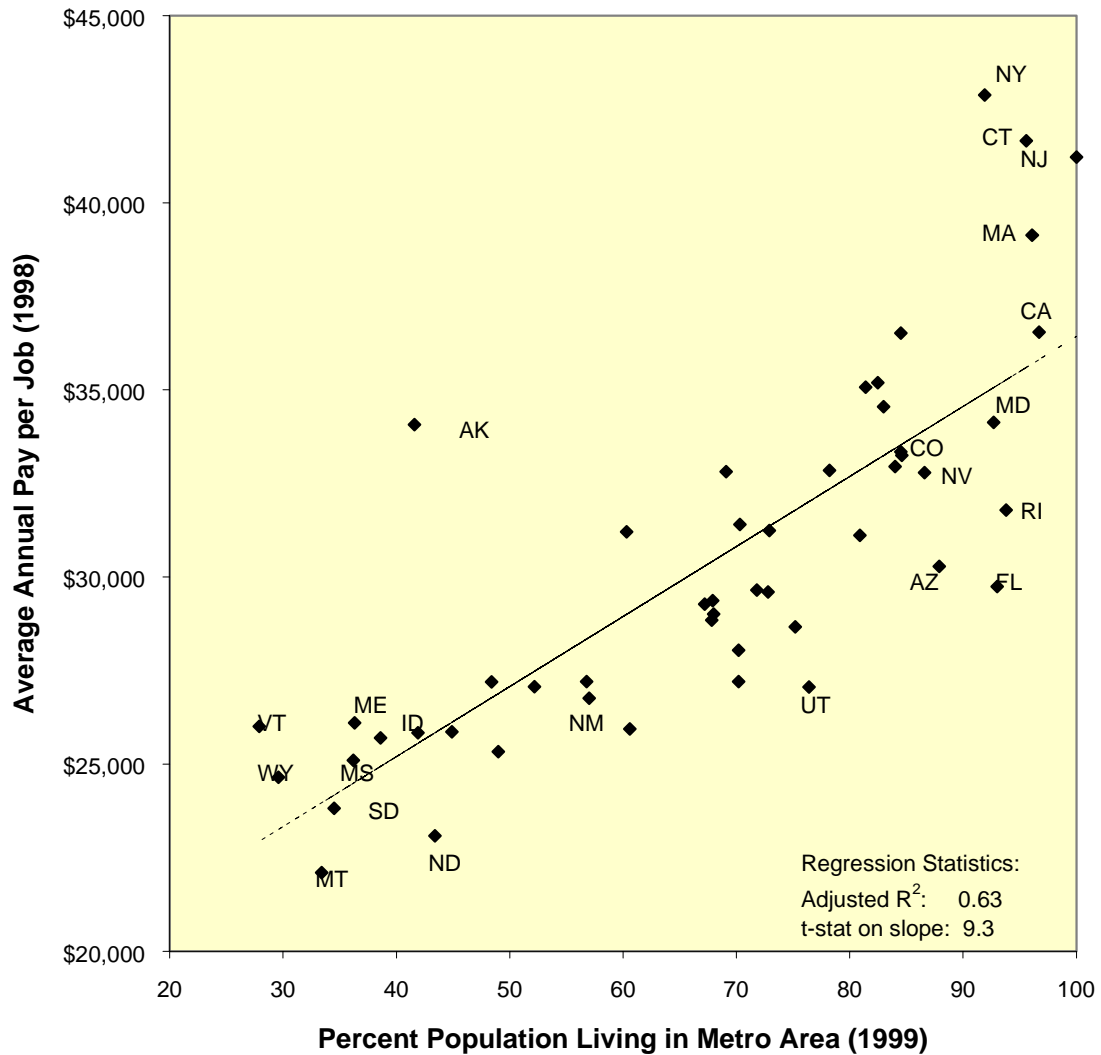
Figure 9: Average Pay and Economic Spatial Density by State: 1998



These results suggest that low average pay in states like Montana and Idaho and in large parts of Washington and Oregon are not tied to some inadequacy in the industrial structure of these regions or state and local economic policies but to the very nature of the settlement patterns: Small metropolitan areas, small non-metro urban areas, and rural settlement patterns lead to very low economic density, low economic productivity, and the resultant low pay and income. Our earlier findings that showed that average pay and income vary directly with the size of metropolitan areas reinforce these

conclusions.¹⁶ They are also reinforced by looking at how average pay by state varies with the percentage of the state's population that lives in metropolitan areas. An state like New Jersey that is 100 percent metropolitan has very high levels of pay while states like Montana and Idaho that have a minority of the population living in metropolitan areas have quite low average pay. See Figure 10.

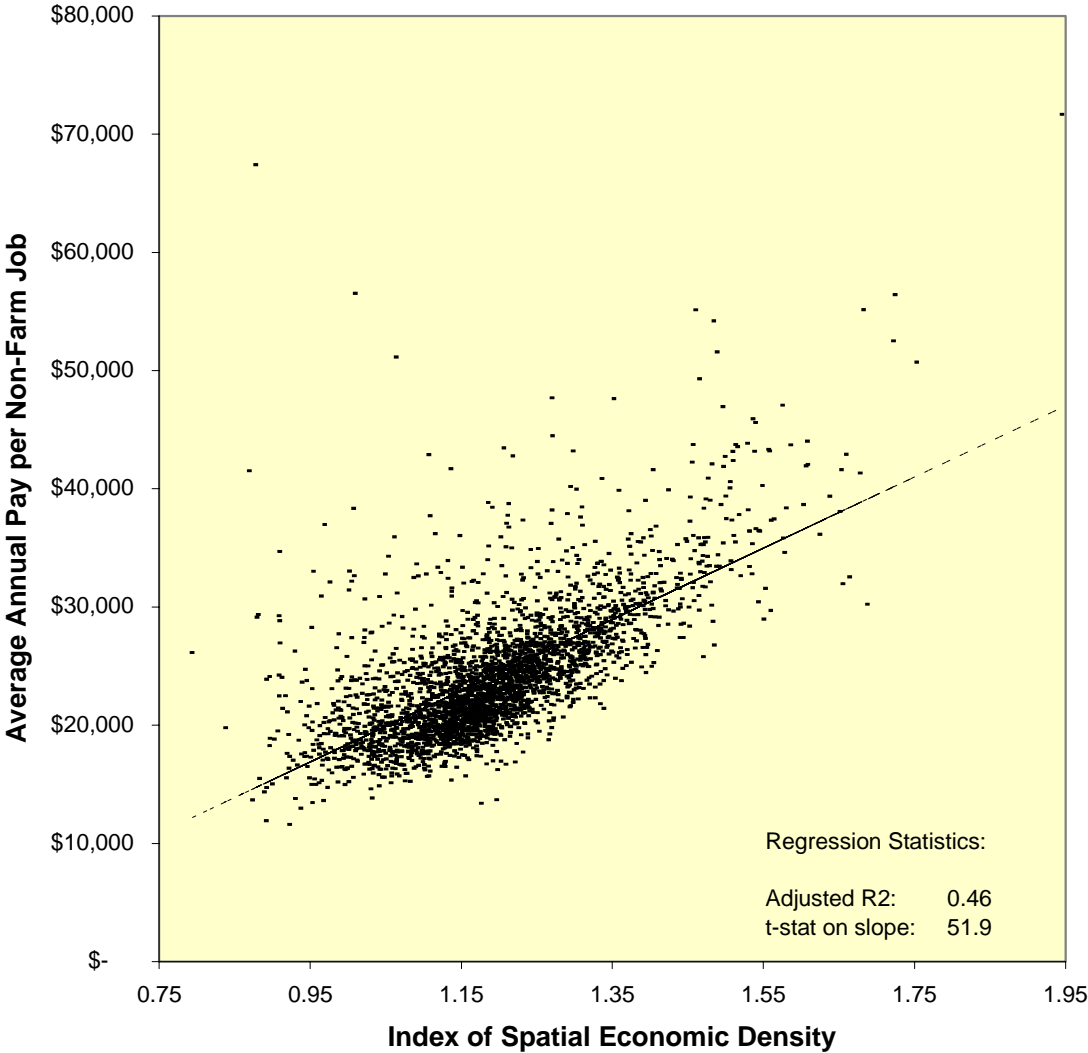
Figure 10: Percent of Population Living in Metro Areas and Average Pay per Job by State



¹⁶ "Are We Really Poor? Size of Place and Relative Pay and Income in the Small Cities and Non-Metropolitan Areas of the Pacific Northwest and Mountain West," a paper presented at the 34th Annual Pacific Northwest Regional Economic Conference Bellingham, Washington April 27-29, 2000, with Richard Barrett. Summarized in *Post-Cowboy Economics: Pay and Prosperity in the New American West*, Chapter 5, Washington DC: Island Press, 2001.

Although accurate measures of aggregate economic production are not available at the county level, average pay can be calculated at that level and related to our measure of economic density. The scatter of data point is significantly greater than what is observed when the county data is aggregated to the state level, but a strong relationship between average pay and economic density remains. The adjusted R^2 is 0.46, relatively high for cross-sectional data, and the t-statistic on the slope is 51.9. All of the nation's 3,000 plus counties are included in this analysis. See Figure 11.

**Figure 11: Non-Farm Average Pay and Economic Density:
All US Counties, 1998**



Non-farm pay per job was used because in the least dense counties some of the dispersion in average pay is tied to the sensitivity of county earnings to the net farm income of farm proprietors. When particular agricultural commodity prices are low, net farm income per farm worker can be very low, even negative.¹⁷

4. The Declines in Average Pay during the 1980s

Average pay per job declined dramatically during the 1980s in Montana, non-metropolitan Washington, and most other non-metropolitan areas in the region and nation. Even if the low level of pay can be explained in terms of low density, those declines in pay cannot be explained in the same terms since economic density did not change dramatically during that time period. The question of why average pay deteriorated during the 1980s lies beyond the scope of this paper. What is relevant to this paper is that although average pay in Montana, Idaho, and the “other” Washington and Oregon had declined to quite low levels by 1990 and largely remained there, these areas saw significant net in-migration during the 1990s. In fact, net in-migration between 1990 and 1999 was higher in the “other” Oregon than it was to the Portland – Salem area, 11.7 versus 10.4 percent.¹⁸ In the “other Washington” net in-migration was as high as it was in the Puget Sound area, 12 percent. Western Montana and Idaho also saw substantial in-migration despite have relatively low average pay.¹⁹ Clearly the in-migrants saw something about these areas that compensated them for the low pay.

This ongoing net in-migration despite low pay levels maintained downward pressure on wages. Workers were clearly willing to move to these areas despite the low pay, relieving firms of the need to raise pay to attract or hold on to the workers they needed. This behavior and result could be describe in terms of a upward shift in the demand for the social and natural amenities that these less dense areas provide to residents.

The dramatic declines in average pay beginning in the late 1970s appear to have been tied to the impact of the back-to-back national recessions at the beginning of that decade.²⁰ Those national economic declines hit non-metropolitan areas particularly hard. The dramatic declines in energy and other commodity prices that took place at about the same time brought serious economic disruption to areas that specialized in natural resource production. The downturn in many of these areas extended through most of the 1980s. As recovery began, net in-migration grew too, providing a workforce that was willing to accept the new low wage levels established during the earlier economic downturn. As a result, the recovery was not accompanied by upward

¹⁷ Although the scatter visually appears tighter when using non-farm pay per job, including farm earnings and workers does not change the regression statistics significantly. Using all jobs, the adjusted R^2 was 0.45 and the t-statistic on the slope was 51.9 .

¹⁸ Population Estimates Program, Population Division, U.S. Census Bureau, Washington, DC 20233.

¹⁹ The population increases were not sufficient to change significantly the measured economic density. It remained among the lowest in the nation.

²⁰ As Figures 11 and 12 indicate, there were downward pressures on average pay before 1978, but pay then stabilized and recovered somewhat. After 1978 there was an almost decade-long decline.

pressure on pay and average pay remained at its new low level. See Figures 12 and 13.

Figure 12: Real Pay per Job in Montana Relative to the US

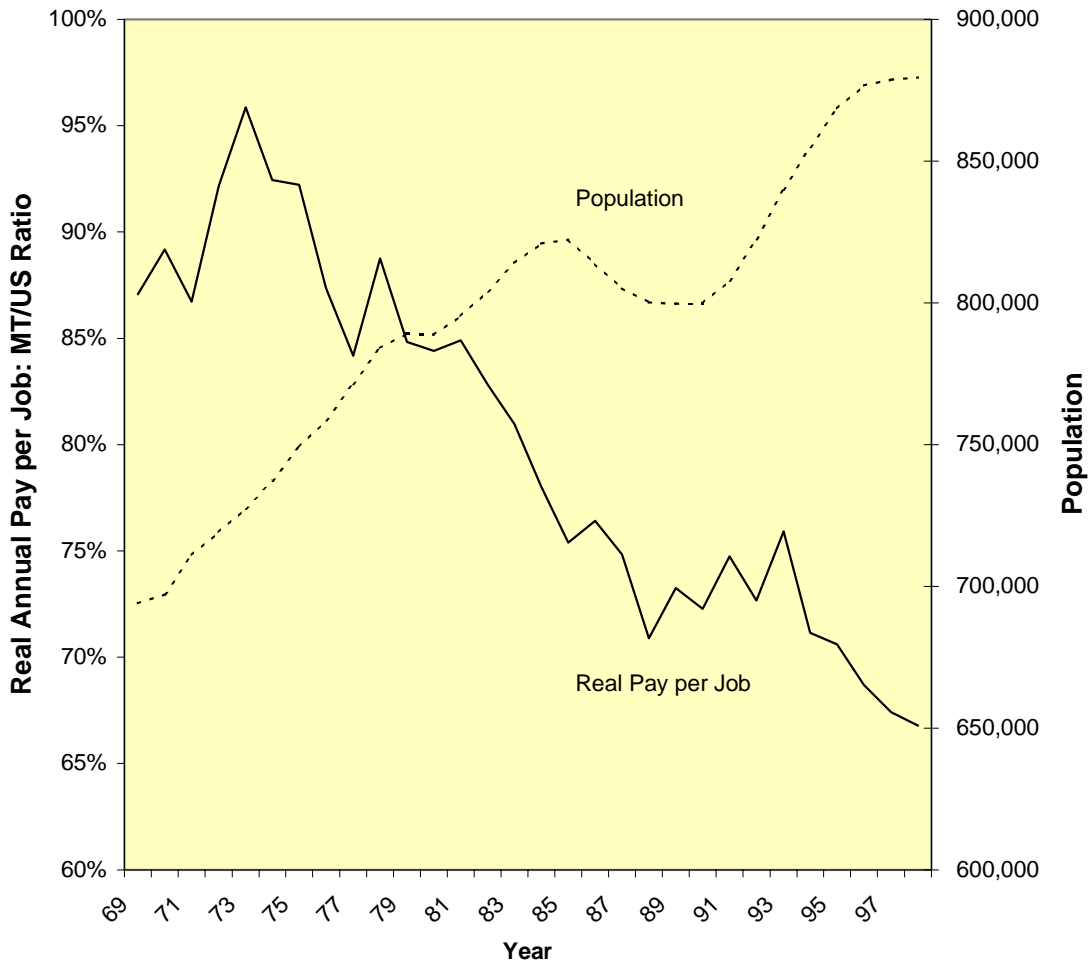


Figure 13: Population Growth and Real Pay Declines in Non-Metropolitan Washington



5. The Policy Implications of the Economic Density-Pay Link

If it is the spatial pattern of settlement in large parts of the nation that explain why pay and income are relatively high in some areas and relatively low in others, many of the more familiar public policy proposals that aim at dealing with these disparities do not make much sense. Attempts to change the structure of employment opportunities to either match some “golden age” of the past or to match some national “ideal,” will not, as shown above, have much impact.

If one imagines a very direct attack on the source of the this low income problem, the weakness of the standard interpretation of the relatively low pay found in large parts of the Mountain West and the Pacific Northwest becomes obvious. If the problem is that

people live in patterns that are not dense enough to support high productivity and pay, a direct solution would be to force people to live in more dense settlements. For instance, a governor, acting as a benevolent dictator, could use the state's National Guard to drive all residents into a very few urban settlements. The average income of people living in metropolitan areas of about a million matches the national average income. Our benevolent dictator could act to force all residents into a city of this size. The result that one would expect from our statistical results would be that this would raise average pay and income close to the national average. The pay and income gap would be closed. In a state like Montana, every man, woman, and child would have to be driven into a single city since the total population of Montana is less than a million. In the "other" Washington and Oregon, all citizens living outside of the Puget Sound or Portland areas would have to be forced to either move into one of these areas or into one of two other large urban areas in each state. The "other" Washington has about two million people in it; the "other Oregon" as about 1.5 million. If "density is economic destiny," then all of these people would have to be resettled in cities of 750,000 to 1,000,000. Living in a size-of-place this large, they could, on average, expect national level pay and income.

Simply speculating about this "solution" suggests a major flaw in the way in which low average pay and income have been approached in the public policy dialogue. Clearly, most people who are currently living outside of the region's largest urban areas are unlikely to look favorably upon National Guard troops trying to move them to the large cities in which they had previously chosen not to live. One would expect significant political, even physical, resistance. That raises the question of why, if high-density living is economically superior, all citizens have not chosen to live in one of a handful of very dense urban belts? Why are people and economic activity spread out across the landscape in a variety of different densities and sizes-of-place? We explained this at the very start: There are significant economic costs associated with dense urban settlements that for some citizens and firms are not fully compensated for by the higher pay and productivity. Put more simply, some citizens and firms judge themselves to be better off living outside to those dense urban settlements. They accept the lower pay and lower productivity in exchange for lower costs of production, lower costs of living, and higher valued social and natural amenities. Elsewhere we have tried to empirically document the economic logic of these location choices.²¹

Of course, it is possibly that some people would prefer to move from these less dense and low pay areas but are, in some sense, trapped in those areas by lack of financial resources and information to support a move. For them, assistance in moving to another area, might well improve their economic position. If one can trust the migration patterns of those who are mobile to indicate whether the lower pay in less densely settled areas is compensated for by local social and natural amenities, evidence of

²¹ Are We Really Poor? Size of Place and Relative Pay and Income in the Small Cities and Non-Metropolitan Areas of the Pacific Northwest and Mountain West, a paper presented at the 34th Annual Pacific Northwest Regional Economic Conference Bellingham, Washington April 27-29, 2000, with Richard Barrett. Summarized in *Post-Cowboy Economics: Pay and Prosperity in the New American West*, Chapter 5, Washington DC: Island Press, 2001.

ongoing net out-migration from less densely settled areas would provide evidence of such disequilibria. On the other hand, if low pay areas are experiencing ongoing net in-migration, there is evidence that some local characteristics are compensating for the low pay. Net out-migration from the rural Great Plains may fit the former pattern; net in-migration to Western Montana and Idaho despite the low pay may indicate the latter pattern.

Where residents have made a choice to live in a low pay area, it is not clear that they are worse off than residents of “high pay” large metropolitan areas. The pay differences are compensating in character rather than indicating different levels of economic well-being. Residents cannot both enjoy small city and rural lifestyles and receive “big city” wages. Markets just do not work that way. Density, the costs of density, productivity, amenities, and pay interact in complex ways as economic actors make residential and business location choices. From this economic interaction and economic choices flow a particular geographic pattern of location and pay. Pay, density, productivity, and amenities will differ from one location to another. Public economic policy cannot vary any one of these very much without also causing the others to change in compensating ways. Local economic policy in small cities and rural areas probably cannot affect pay, density, and productivity much in any case. Such policies can, however, pointlessly damage local amenities, leaving almost everyone worse off.