

Institute for Public Policy  
and Economic Analysis

**Spatial Income Inequality  
in the Pacific Northwest,  
1970 – 2010**

By:  
Justin R. Bucciferro, Ph.D.

May, 2014

**Spatial Income Inequality in the  
Pacific Northwest,  
1970 – 2010**

By

**Justin R. Bucciferro, Ph.D.**  
Department of Economics  
Eastern Washington University  
[jbucciferro@ewu.edu](mailto:jbucciferro@ewu.edu)

May, 2014

FOR  
THE INSTITUTE FOR PUBLIC POLICY AND ECONOMIC ANALYSIS  
EASTERN WASHINGTON UNIVERSITY



With this latest monograph from the Institute for Public Policy & Economic Analysis, I welcome you to Eastern Washington University. I hope this research will inform your knowledge of the Inland Northwest. Efforts like this Institute monograph series are manifestations of this University's commitment to serve the region. I applaud the initiative of Eastern's Board of Trustees to launch this Institute.

Teaching remains our core mission at Eastern Washington University. Increasingly, teaching and research are interwoven. Our faculty members stay professionally current when publishing in peer-reviewed journals. These achievements, in turn, allow them to better convey the evolving knowledge base of our academic disciplines.

Our students receive an enhanced education if their classroom experience is informed by the content and enthusiasm of their professor's research. Increasingly, we ask students to conduct research projects of their own. Whether conducting their own projects or assisting professors, our students acquire a richer learning experience through research.

Research for academic journals is not the only area our faculty members target, however. Our University also asks its faculty to engage the communities and region from which we draw our students. This research provides a greater sense of place and a commitment by our faculty to it. It also translates academic methods and findings into a broader, and ultimately more relevant, arena: the lives of the residents of the Inland Northwest.

The overarching goal of the Institute for Public Policy & Economic Analysis is to serve the region by translating knowledge. It does this through a variety of activities, including this series, annual economic forecasts, contract research and the Community Indicators Initiative. I invite you to explore its web site ([www.ewu.edu/policyinstitute](http://www.ewu.edu/policyinstitute)) to learn more.

I have tremendous optimism that by collaborating with EWU's faculty, staff and partners, I will continue to ensure our institution will be anchored into the daily course of life throughout the Inland Northwest. During these difficult economic times, our collective future depends on an educated and informed citizenry. Helping our region reach higher levels of knowledge is something this University can and will do.

My office and that of the Institute director welcome all comments on how we might better serve.

A handwritten signature in black ink that reads "Rodolfo Arévalo". The signature is written in a cursive, flowing style.

Rodolfo Arévalo, PhD  
President

## Table of Contents

Executive Summary.....	1
Introduction.....	4
Income Inequality ca. 1970 to ca. 2010.....	12
Spatial Income Inequality .....	19
The Inequality-Growth Relationship .....	32
Conclusion .....	36
Appendix I – Measures of Inequality.....	37
Appendix II – Pacific NW County Income, Gini Coefficients, and Population in 2000 .....	40
Bibliography.....	44

## List of Figures

Figure 1: Area of Study	11
Figure 2: Household Income Inequality in the U.S., 1967-2010	12
Figure 3: Growth Paths of Mean and Median Household Income in the U.S., 1967-2010	13
Figure 4: Ratio of Top and Bottom Household Income Quintile in the U.S., 1967-2010	13
Figure 5: Household Income Shares by Quintile in the U.S., 1967-2010	14
Figure 6: Gini Concentration Ratio and per Capita Personal Income in Idaho Counties in 2000	15
Figure 7: Gini Concentration Ratio and per Capita Personal Income in Western Montana Counties in 2000	16
Figure 8: Gini Concentration Ratio and per Capita Personal Income in Oregon Counties in 2000	18
Figure 9: Gini Concentration Ratio and per Capita Personal Income in Washington Counties in 2000	19
Figure 10: Real per Capita Income Paths for Northwestern States	23
Figure 11: Inter-County Gini Coefficients, Pacific Northwest States (1970-2010)	31
Figure 12: Correlations between County Gini Concentration Ratio and per Capita Personal Income Levels for 48 States, 1970-2010	33

## List of Maps

Map 1. Average Annual U.S. County Real Personal Income Growth, 1969-2011	21
Map 2. State Gini Coefficients (Personal Income across Counties), 1970-2010	22
Map 3. Cumulative per Capita Income Growth (%) – Pacific Northwest Counties, 1970-2010	27
Map 4. Annual Income Growth (%) in Pacific Northwest Counties, 1969-2011	28
Map 5. Gini Concentration Ratios – Pacific Northwest States, 1970-2010	29

## List of Tables

Table 1. Pacific NW Inter-County Measures of Real per Capita Income Inequality	25
Table 2. Income Inequality-Growth Correlation	34
Table 3. Income Inequality and Growth by Decade	35

## Executive Summary

**A**bsolute economic equality is neither possible nor desirable. Some inequality can be innocuous, as the wealth of one may pose no harm to another and actually serve to his or her benefit. Beyond some point, however, such inequality becomes undesirable on both moral and economic grounds. Scholars have found that inequality is associated with lower economic growth, poor institutions, and corruption, all of which makes the economy vulnerable to crises. In this monograph, I consider the history and geography of inequality in the Pacific Northwest and nation over the past forty five years, and provide a preliminary analysis of its implications for economic growth.

I define inequality measures and consider their properties; examine income inequality across households and individuals in the U.S. and Pacific Northwest; investigate spatial inequality across counties within the nation and region; and consider the inequality-growth relationship through the correlation of inequality and income growth for U.S. and Pacific Northwest states. I also consider the correlation of inequality at the beginning of each decade and ensuing growth.

Inequality exists in different forms – wages, income, wealth – and among various groups – population, labor force, households. Inequality also has a spatial dimension, which has received increasing interest: all else equal, one would expect regional incomes to converge over time as transportation and communication costs decline. Yet the agglomeration of economic activity is clearly visible, as is class segregation at the local level.

The drivers of the rise in U.S. inequality include: technological change, which has favored skilled workers; structural change, as the economy has

shifted away from manufacturing; de-unionization and deregulation, which have lowered protections for workers and their bargaining power; and a tax-and-transfer policy which has increasingly favored the wealthy. Social changes, such as the commonality of the one-parent family, are perhaps as much a symptom of inequality as its cause.

I consider four measures of income inequality: 1) the *coefficient of variation* is the standard deviation of income in a population divided by its mean. This is a measure which does not vary with the level of income (scale-independence) and is reduced by income transfers from rich to poor, and vice-versa (the transfer principle). 2) The *mean log deviation* and 3) the *standard deviation of logarithms* – the average and standard deviation, respectively, of log income from the log mean – are less sensitive to changes in the upper-tail of the income distribution and satisfy scale-independence and the welfare principle (transfers to the poor have a greater impact on reducing inequality); the former measure also satisfies the transfer principle. Finally, 4) the *Gini concentration ratio* captures the proportional deviation of a group's income distribution from the benchmark of perfect equality, and satisfies the transfer principle and scale-independence. It ranges from zero (perfect equality) to one (perfect inequality), although country-level Gini values typically fall between 0.30 and 0.50.

For the U.S., I conclude that household income inequality has been on an upward trend since 1968 according to the Gini concentration ratio, and at least 1974 based on the income ratio of the top-to-bottom quintiles. Over this period, the top quintile's share of national income has surpassed 50% while that of all four other quintiles declined, with the poorest fifth of households receiving just about 3% of total income.

For the 143 counties in the Pacific Northwest – here defined as Idaho, Oregon, Montana (west of 111°W longitude), and Washington – historical data on county inequality are sporadic, so I present a cross-section of average income, income inequality, and population at the county level as of 2000. Across all counties, Madison, ID had the lowest average income (\$16,021) and King, WA the highest (\$51,222); Clark, ID had the lowest Gini coefficient (0.35) and San Juan, WA the highest (0.52); Camas, ID had the smallest population at 968, and King, WA the largest at 1,739,009.

Distance continues to matter for today's economy. I describe the pattern of spatial inequality by visually identifying differences in inflation-adjusted (real) personal income growth at the county level and Gini coefficients at the state level for both the Pacific Northwest and Continental U.S. over time. For the Pacific Northwest, I present and interpret the values of the four inequality indicators at the state- and region-level.

In the continental U.S., real per-capita income growth between 1969 and 2011 was greatest in the South, and in scattered pockets along the East Coast, Southwest, and Northern Plains. The fact that these areas had relatively low starting incomes indicates convergence across states. At the same time, income inequality across counties *within* each state has increased, and has been persistently high in the Southwest, New York, and Florida. California ranks among the most unequal states today, but this was not always true. Many states on the Great Lakes or Mississippi – and in New England – have notably low levels of spatial income inequality; in the Pacific Northwest it is relatively moderate.

Between 1969 and 2011, per-capita income in Washington was mostly above the national average, as was Oregon's prior to 1980; incomes in Montana and Idaho have lagged the nation. For all states in the region, average incomes roughly doubled in inflation-adjusted terms over this period, although the pace of income growth in Washington outstripped the others.

In the Pacific Northwest, county-level inequality changed in often opposing directions across states, although there was a clear pattern for the region. When viewed via the simple average (not weighted by population) of counties within each state, most of the Pacific Northwest states saw a decline in inter-county inequality during the 1970s/2000s and an increase in the 1980s, but were evenly split for the 1990s. Ignoring state boundaries, the region saw a rise in income inequality across counties during the 1970s, a fall in the 1980s, an increase for the 1990s, and a decrease over the last decade. Of the years considered, spatial inequality was greatest in 2000.

Per capita income growth was most concentrated to the eastern and western portions of the region from the 1970s through 1990s, although it was also robust along the Idaho-Washington border during the 1990s. In the 2000s, there was a noticeable shift, as the fastest-growing counties were those to the east of the Puget Sound. Overall, per capita personal income growth between 1969 and 2011 was largely limited to the coastal counties of Washington and Oregon, and to those stretching from the Rocky Mountains of Montana down through the Snake River Plain of Idaho; several border counties also fared well.

While many different perspectives exist on the acceptable level of income inequality, the issue also bears on an object dear to nearly everyone: economic growth. Does increasing income inequality portend lower economic growth? Across the 48 continental states from 1970 to 2010, my analysis shows that the correlation between the inter-county Gini concentration ratio and average real per capita income growth in the first year of each decade is 0.12 – a positive, but relatively weak association. In other words, an increase in the Gini measure (greater inequality) accompanies positive income growth, but without a strong effect.

The literature suggests that the inequality-growth relationship changes over time, however, so I consider the correlation between the inter-county Gini concentration ratio at the beginning of each decade and average income growth over the subsequent ten years for the Lower 48. The correlation changes notably by decade: from +0.43 in the 1970s, to -0.33 in the 1980s, -0.01 in the 1990s, and -0.11 in the 2000s. In other words, higher initial inequality levels were attendant to lower economic growth from the 1980s through 2000s. For U.S. states, measured at the county level, the overall inequality-growth relationship has weakened and become negative over time.

For the Pacific Northwest states, the correlation of inter-county income inequality, as measured by the Gini ratio, and real per capita income growth at the beginning of each decade was 0.32. Consistent with what was found for the nation overall, greater inequality across counties in the region was associated with higher rates of economic growth. This relationship also varies over time, with an inequality-growth correlation of -0.67 in the 1970s, -0.41 in the 1980s, +0.05 in the 1990s, and -0.36 in the 2000s.

In conclusion, while inequality may be a natural by-product of development it has increased to such a degree that it challenges our long-run prosperity. In recent experience, high inequality predated the largest economic contraction in at least a generation. Forebodingly, the negative relationship between inequality and subsequent growth might even be strengthening. Individuals and households throughout the nation are increasingly unequal, as are counties, states, and regions – trends which will not reverse themselves. The rising returns to high-skilled jobs make education and training of paramount importance; nonetheless, other public policies also have a critical role.