

The Pennsylvania Economy Since 1970

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Abstract

The history of the Pennsylvania economy since 1970 can be summarized in 3 propositions. First, while the state has experienced significant economic growth over the period at a rate close to that of the national economy, Pennsylvania has experienced a decline relative to neighboring states. This relative decline is due to the state's unfavorable wage structure. Second, per capita incomes have diverged across Pennsylvania counties. The handful of high-income counties in Pennsylvania have favorable wages while the counties with incomes below the state average, although they have employment mixes comparable to the overall state mix, tend to have workers who receive low wages relative to the state industry average. And third, the state's economy has become less diversified and more like the national economy.

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I. Relative External Decline

Gross state product per capita in Pennsylvania grew from \$21,900 in 1969-71 to \$31,723 in 1996-98, an annual growth rate of 1.4 percent.¹ The state experienced a very slight improvement relative to national per capita GDP: Pennsylvania per capita gross state product was 93.3 percent of the national average in 1969-71 and 93.8 percent in 1996-98. Kim (1998) argues that there are two sources of income differences in regional economies linked by trade: differences in industrial structures and differences in earnings within industries. A procedure developed by Hanna (1951) can be utilized to separate income differences into these two components. The procedure involves constructing two counterfactual incomes for each region.

“One hypothetical income is based on the assumption that all regions have identical industrial-mixes and identical wages in each of the industries. In this instance, all regional incomes per capita would be identical to the overall national average. The second hypothetical income per capita is based on the assumption that regions have different industrial structures but identical incomes per capita at the industry level. The industry income per capita for all regions is set equal to the national industry income per capita. The two hypothetical incomes per capita and

¹ All dollar amounts in this paper are in 2001 dollars.

the actual income per capita are then used to estimate industry-mix and wage effects. The difference between the two hypothetical incomes – industry-mix income and the overall national average – provides a measure of the income differences due to the divergence of regional industrial structures. The difference between the actual income per capita and the hypothetical industry-mix income provides a measure of the income differences due to divergence in wages” (Kim 1998, p. 671).

In order to determine whether low wages or low-wage jobs are the source of Pennsylvania’s relative income disadvantage, I calculate the industry mix based on employment in 11 industries: farming, forestry and fishing, mining, construction, manufacturing, transportation, wholesale trade, retail trade, finance, services, and government. The industry mix is each industry’s share of total employment. Industry earnings per worker are calculated by dividing total earnings in the industry by total employment in the industry. Tables 1, 2 and 3 summarize the statewide, national, and regional data on industry mix and industry income per worker for the study periods: 1969-71 and 1996-98. A three-year average of the data is utilized to mitigate the effects of the business cycle. Data for total earnings and employment by industry are taken from the Regional Economic Information System web page.²

The percentage difference between Pennsylvania income per capita and the national average attributable to the state’s industry mix is calculated by taking the difference between the log of the hypothetical industry-mix income per worker and the log of national aggregate income per worker. The percentage difference attributable to wages is found by taking the difference in logs between actual state income per worker and the hypothetical industry-mix income per worker.

This decomposition procedure is not unique; La Croix (1999) demonstrates that a “wages” decomposition in which the second hypothetical income per capita is constructed under the assumption that regions have different per capita wages but identical industrial-mixes can produce different conclusions than the “industry-mix” decomposition described above.

Table 4 presents the results of the two decomposition procedures. Under either procedure, the source of Pennsylvania’s income disadvantage in 1969-71 was unfavorable wages. Per capita income

² <<http://fisher.lib.virginia.edu/reis>>. The Bureau of Economic Analysis produces the REIS database.

was low in Pennsylvania because workers in the state were paid less than workers in the same industries elsewhere in the country. By 1996-98, both the state's industry mix and wage structure were favorable relative to the national average, with each accounting for about half, $[0.6/(0.6 + 0.6)]$, of the difference between the state and national per capita earnings.

While the Pennsylvania economy showed a slight improvement relative to the nation as a whole, the state experienced a decline relative to neighboring states. Pennsylvania ranked 16th in gross state product per capita in 1969-71; in 1996-98, Pennsylvania ranked 27th among all states. The state's GSP was 79 percent that of the highest state in 1969-71 and just 68 percent that of the highest state in 1996-98. Gross state product per capita in Pennsylvania has fallen relative to New York, New Jersey, Delaware, and Maryland since 1970 while rising compared to West Virginia and Ohio.

Table 5 applies the two decomposition procedures to examine the reasons for Pennsylvania's economic decline relative to its regional neighbors. While an unfavorable industry mix contributes to the state's income disadvantage, low wages play a far more important role. Low wages account for 91.5 percent $[-15.0/(-1.4 - 15.0)]$ of the difference between state income per worker and regional income per worker. Furthermore, Pennsylvania's wage disadvantage relative to its neighbors has increased since 1970.

A less educated work force is a likely contributor to the state's unfavorable wage structure. Of the six neighboring states, only Delaware and West Virginia have a smaller fraction of persons 25 years and over with a college degree (U.S. Census Bureau 2000).

II. Internal Divergence

The neoclassical growth model predicts convergence: poor regions will grow faster than rich regions so that living standards across all regions will eventually be the same, even though some may start out way behind. However, the experience of the economies of the 67 Pennsylvania counties has been divergence. Workers in the relatively rich counties earn a higher average income than workers in the relatively poor counties and this income gap is widening. Total earnings per worker in the poorest

Pennsylvania county in 1969-71, Sullivan, was 59 percent of total earnings per worker in the richest county, Philadelphia. By 1996-98, total earnings per worker in the poorest county, still Sullivan, was just 48 percent that of the richest county, now Montgomery, a suburb of Philadelphia. For 1969-71, the standard deviation of real total earnings per capita across Pennsylvania counties was \$3,757; in 1996-98, it was \$5,036. Barro and Sala-i-Martin (1995, p. 383) call this σ -divergence. Has county income diverged because workers in the high-income counties are paid increasingly higher wages for the same jobs than are workers in the low-income counties or because they are employed in higher paying jobs? To answer this question, I employ the same decomposition procedures utilized in the previous section.

This paper's interest is in determining the sources of the divergence of income from economic activity within the Pennsylvania counties, but the appropriate income measure is not available: a county-level version of gross state product. Personal income data is available on a county basis. But use of personal income is problematic if people work in one county and live in another or if people tend to own capital in other counties because the personal income accounts reported by the Commerce Department's Bureau of Economic Analysis assign income to the county in which the owner of the inputs resides not to the county in which the income was earned. For instance, Lackawanna County received 7,033 commuters, amounting to 6 percent of the county work force, from Luzerne County in 1990 while sending there 5,175 commuters, and nearly 60,000 Delaware County residents worked in Philadelphia County with an even larger number of Philadelphia commuters coming from out of state (Pennsylvania State Data Center web site). Also, personal income includes transfer payments. So, personal income is not a good measure of county economic activity because it includes both unearned income and income earned outside the county.

The Bureau of Economic Analysis also tracks "total earnings by place of work". I use this as the measure of county income because it attributes income to the county in which it was earned. Total earnings include wages and salaries, other labor income, contributions for social insurance, and

proprietors' income. It excludes dividends, interest, rent, and transfer payments. Total earnings divided by total full and part-time employment yields total earnings per worker.

Table 6 summarizes the results of both decomposition procedures for 1969-71 and 1996-98. Column (1) provides each county's actual total earnings per worker in 2001 dollars. Counties are ordered by actual per worker earnings. The county "industry mix" income in column (2) is calculated by assuming all counties earn identical earnings equal to the state industry average. So, while actual earnings per worker in Montgomery County in 1996-98 were \$44,262, county income would have been \$35,647 if its industry earnings structure had been the same as the state's. The "wages" income in column (5) is calculated assuming all counties have an employment mix identical to the state industry mix. The result measures earnings per worker if the county industry mix had been identical to the state mix, given the county wage structure. This hypothetical income was \$43,121 for Montgomery County in 1996-98. Columns (3) and (4) and (6) and (7) provide the results of the two decomposition procedures. The figures are the percentage difference between actual county earnings per worker and the statewide average attributable to the county employment mix and to its wage structure. According to the industry mix decomposition 0.7 percentage points of the difference between Montgomery County's actual income and the state average is due to the county's industry mix; 21.6 percentage points is due to its wages. Under this decomposition, high wages account for 97 percent $[21.6/(21.6 + 0.7)]$ of the difference between Montgomery County's income per worker and the state average.

The two decomposition procedures differ slightly on the details but offer up the same conclusions. First, counties with incomes per worker above the state average mostly have favorable wage structures. Workers in these high-income counties earn more for the same job than do workers in the low-income counties. For example, in 1996-98, high wages accounted for at least 88 percent $[19.8/(2.6 + 19.8)]$ of Montgomery County's income differential. Of the 26 observations on counties with above-average incomes at least 21 had favorable wage structures, with high wages definitely accounting for 100 percent of the income differential for 12 of them.

A second firm conclusion is that Pennsylvania counties with below average incomes are relatively poor not because of unfavorable industrial structures consisting of low paying jobs but because of low wages. For the 1996-98 period, every county with an income below the state average had an unfavorable wage structure. Just one low-income county had favorable wages under both decomposition procedures in any study period. Low wages account for an increasing proportion of the typical county's income differential. The unfavorable wage gap for the typical low-income county has grown from 15.3 percentage points in 1969-71 to 25 percentage points in 1996-98. According to the industry mix decomposition, low wages accounted for 102 percent $[-25.0/(0.6 - 25.0)]$ of the difference between earnings per worker in the typical low-income county and the state average in 1996-98 compared to 97 percent $[-15.3/(-0.4 - 15.3)]$ for 1969-71.

Wages are also the key to the divergence of county incomes. The wage advantage relative to the state average of the high-income counties has been growing: from 6.5 percentage points in 1969-71 to 21.6 percentage points in 1996-98 for Montgomery County and from 11.0 to 22.6 percentage points for Philadelphia over the same period using the industry mix decomposition. The wage disadvantage of the lowest-income counties has also grown: from being responsible for 39.6 percentage points of Sullivan County's income differential in 1969-71 to 46.7 percentage points in 1996-98.

The "wages" income in Column (5), derived assuming that counties have identical industry mixes, measures differences in county income due solely to relative county wages. The standard deviation of the wages income across Pennsylvania counties has risen from \$3,987 for 1969-71 to \$5,243 in 1996-98. As county earnings structures have become more dissimilar over time county employment mixes are also becoming less alike. The standard deviation of the industry mix incomes in Column (2), which assumes identical county industry earnings per worker, was \$1,061 in 1969-71 and \$1,413 in 1996-98.

The importance of wages rather than jobs in the evolution of county incomes is evident in the cases of the eight counties that moved above or below the state average income over the entire study

period. Three counties moved from below to above the state average income: Lehigh, Montour, and Dauphin Counties. More high paying jobs is the source of Dauphin County's improvement while higher wages are the reason for the other two counties' relative rise. All five counties that dropped below the state income average suffered steep reversals in their wage structures. Low wages account for 56 to 100 percent of the difference between these counties' income per capita and the state average in 1996-98.

The handful of Pennsylvania counties with earnings per worker above the state average mostly have favorable wages. The counties with incomes below the state average, although they have employment mixes comparable to the overall state mix, tend to have workers who receive low wages relative to the state industry average. The growing divergence between the incomes of the high and low-income counties is a result of a sharp decline in the relative wages earned by workers in the low-income counties. Table 7 shows the changes between 1969-71 and 1996-98 in the county industry wage relative to the state industry wage for the four largest sectors for the six poorest counties. This is calculated by taking the county industry wage and dividing by the state industry wage, which gives the county wage as a percentage of state industry earnings. The figures provided in the table are the percentage point change in the county wage as a percentage of state industry earnings between 1969-71 and 1996-98. A negative number indicates that county industry earnings have deteriorated relative to the state industry wage. These counties have seen especially steep drops in relative per worker earnings in the retail trade and service sectors.

There are three possible explanations for these growing wage differences. First, the use of broad industrial sectors may attribute greater importance to wages in explaining county income differences than is warranted. Differences in county industry earnings per capita may be due to differences in county industrial structures at a finer industry level.

Second, labor productivity in the relatively poor counties may have fallen relative to the state as a whole because these counties have had less investment in physical capital. Investment per worker is estimated for each county by dividing new capital expenditures for various years by manufacturing

employment. Capital expenditures for each county are found in various editions of the *Pennsylvania Statistical Abstract* and the Census Bureau's *Economic Census*. The six poorest counties, Sullivan, Perry, Juniata, Pike, Susquehanna, and Forest, are among the bottom ten counties in average annual investment per worker. Statewide investment per worker averaged \$3,376. Perry County, at \$1,160, had the highest investment per worker among the six poor counties. The correlation between average annual investment per worker and county per capita income is 0.42.

Third, labor productivity in the relatively poor counties may have fallen relative to the state as a whole because workers in these counties have relatively less human capital. The proportion of the county population of persons 25 years and over who have a bachelor's degree or higher is used as a proxy for the rate of accumulation of human capital. The correlation between this measure of human capital and per capita county income is 0.72. Sullivan and Juniata Counties are among the five counties with the smallest proportion of college graduates. The proportion of college graduates in each of the eight relatively rich counties is above the statewide average.

Furthermore, these county income differences are likely permanent. I perform a panel estimate of

$$(1) \quad g_{nt+1,t} = \alpha_n + \beta y_{n0} + \gamma x_{nt} + e_{nt},$$

where $g_{nt+1,t}$ is the average rate of growth of income per capita for economy n between periods t and $t+1$, y_{n0} is the natural logarithm of income per capita for economy n in period 0, x_n is a vector of variables that control for cross-economy heterogeneity in steady-state income levels, α and β are parameters, γ is a vector of parameters, and e_n is an error term. I utilize five variables in vector x which are robustly correlated in the sense of Sala-i-Martin (1997) with county economic growth in Pennsylvania: (1) the fraction of adults with a college degree (positively related to growth), (2) the growth rate of county population (negatively related to growth), (3) the fraction of total earnings in agriculture (positively related to growth), (4) the fraction of voters registered Democratic (negatively related to growth), and (5) the percentage of the county population living in urban areas (positively related to growth). Values of the

independent variables are taken from the beginning of each five-year interval: 1972, 1977, 1982, 1987, and 1992.

Caselli, Esquivel, and Lefort (1996) advocate use of a generalized method of moments (GMM) estimator to simultaneously address the problems of correlated individual effects and endogeneity. Their estimator takes all variables as deviations from period means. Taking deviations from period means reduces any bias generated by the business cycle. The growth model is first differenced to remove the individual effects, and then all of the past values of the explanatory variables are used as instruments to alleviate the endogeneity bias. Table 8 provides the results of a GMM estimation of equation (1) employing the Caselli, Esquivel, and Lefort (1996) procedure. The coefficient on the log of initial income is significantly less than zero. The implied speed of convergence is 0.35. The typical Pennsylvania county covers 35 percent of the distance between its current and steady state income levels in one year. The rapid rate of convergence implies that Pennsylvania county economies are usually very near to their steady states. This means that differences in income per capita are attributable to differences in steady-state levels of income.

III. Decreasing Diversification of Industry

At the broad sector level, two industries experienced significant changes in their importance to the Pennsylvania economy since 1970. As a percentage of total state employment, manufacturing employment dropped by half while employment in the services sector almost doubled. In 1970 at the two-digit level, no single industry in Pennsylvania accounted for more than 10 percent of total earnings across all industries in the state. The most important sector, state and local government, was 9.2 percent of statewide earnings. In contrast, health services and state and local government each accounted for more than 10 percent of industry earnings in Pennsylvania in 1996-98. In 1969-71, the top five industries, state and local government, wholesale trade, health services, electronics, and machinery, accounted for 26.6 percent of total state earnings. The earnings generated by the five largest industries in

1996-98, health services, state and local government, wholesale trade, business services, and special construction, amounted to 34.9 percent of total earnings. There has been an increasing concentration of industry in Pennsylvania. In order to demonstrate this I calculate a concentration index for the state's economy at the two-digit industry level.

Earnings by two-digit industry are taken from the REIS web page. The index is a measure of concentration, the degree to which a few industries dominate the state's economy:

$$(2) \quad H = S_1^2 + S_2^2 + \dots + S_n^2,$$

where S is the share of total earnings industry i and n is number of industries. The higher H is, the more concentrated and the less diversified is the state's industrial structure.

Panel A in Figure 1 plots a three-year moving average of the index since 1970. There is a clear trend towards increasing concentration and decreasing diversification of the state's economy. However, as Panel B indicates, Pennsylvania's economy is no less diversified than the national economy. The state and national indices move together. Both the Pennsylvania and national economies experienced a sharp decrease in diversification during the 1980's.³

In order to examine just how similar the Pennsylvania, regional, and national economies are, I calculate an index of industrial specialization. This index captures differences in industrial structures (Kim 1998):

$$(3) \quad SI = \sum \left| (E_{ij}/E_j) - (E_{ik}/E_k) \right|,$$

where E_{ij} is the level of earnings in industry i for region j and E_j is total earnings for region j and similarly for region k . The closer the index is to zero, the more similar are the industrial structures of the two regions.

Figure 2 plots the indices of industrial specialization at the two-digit level for the Pennsylvania and national economies and for the Pennsylvania and Mideast region economies. Clearly, the

³ Pennsylvania's economy is more diversified than the regional economy. The 1997 concentration indices are 394 for Pennsylvania and 452 for the Mideast region.

Pennsylvania economy is far more like the national economy and this similarity has increased since 1970. At the same time, the Pennsylvania and regional economies are becoming increasingly dissimilar.

IV. Conclusions

Since 1970 the Pennsylvania economy has experienced a decline relative to its regional neighbors. Increasingly unfavorable wages are the source of this relative decline. The Pennsylvania labor force lags behind its neighbors in terms of human capital. 24.3 percent of Pennsylvania workers have a college degree compared to 32.3 percent in Maryland and 30.1 percent in New Jersey (U.S. Census Bureau 2000).

Incomes have diverged across Pennsylvania counties. Low wages, not a concentration of low-paying jobs, is the problem facing low-income Pennsylvania counties. On average, low wages account for 90 percent of the income differential of the five lowest-income counties in 1996-98. Making the industry mix of these counties comparable to the state mix will raise county per capita income only slightly, 3.3 percent for Sullivan County. To achieve noticeable income gains, wages for all jobs in the low-income counties need to be improved. Instead, wages across Pennsylvania counties continue to diverge. The source of the growing wage divergence is investment in both physical and human capital. Relatively poor counties have invested less in new physical capital and have a small proportion of college graduates in the labor force.

Finally, the Pennsylvania economy has become less diversified since 1970. The health services, legal services, business services, and stock brokerage sectors have increased in importance by more than 100 percent. Most of the industrial concentration occurred during the 1980's as industries such as apparel, textiles, railroads, farming, and primary metals each decreased in relative importance by more than 60 percent. Furthermore, the state and national economies have become more similar since 1970, with more of the similarity occurring in the early 1980's.

Table 1 – Pennsylvania State Data Summary

	1996-98		1969-71	
	distribution of labor by industry (percentage)	industry earnings per worker (dollars per year)	distribution of labor by industry (percentage)	industry earnings per worker (dollars per year)
farming	1.2	10,216	1.8	19,719
forestry	0.9	18,592	0.3	27,968
mining	0.4	60,358	0.8	47,595
construction	5.1	38,280	4.8	46,592
manufacturing	14.5	50,969	29.4	39,617
transportation	4.8	50,065	5.6	44,713
wholesale	4.3	45,457	4.3	41,784
retail trade	17.2	18,181	15.0	23,188
finance	7.5	36,698	5.8	26,814
services	32.7	31,811	18.7	27,615
government	11.4	42,590	13.5	33,923
total	100.0	35,383	100.0	33,818

Notes: Dollar amounts are in 2001 dollars. The source for employment and earnings by industry is the Regional Economic Information System web page.

Table 2 – National Data Summary

	1996-98		1969-71	
	distribution of labor by industry (percentage)	industry earnings per worker (dollars per year)	distribution of labor by industry (percentage)	industry earnings per worker (dollars per year)
farming	2.0	16,404	4.3	21,571
forestry	1.3	17,538	0.6	26,180
mining	0.5	58,206	0.8	42,114
construction	5.4	36,401	4.9	44,420
manufacturing	12.4	48,029	21.6	40,717
transportation	4.8	49,669	5.3	44,764
wholesale	4.6	46,772	4.6	43,090
retail trade	16.8	18,381	15.0	24,008
finance	7.5	40,312	6.7	26,489
services	30.8	31,686	18.7	27,864
government	13.9	41,489	17.6	34,437
total	100.0	34,960	100.0	33,348

Notes: Dollar amounts are in 2001 dollars. The source for employment and earnings by industry is the Regional Economic Information System web page.

Table 3 – Regional Data Summary

	1996-98		1969-71	
	distribution of labor by industry (percentage)	industry earnings per worker (dollars per year)	distribution of labor by industry (percentage)	industry earnings per worker (dollars per year)
farming	0.7	11,679	1.2	23,564
forestry	0.8	25,673	0.4	29,209
mining	0.2	55,647	0.3	50,324
construction	4.5	39,577	4.5	48,124
manufacturing	10.8	54,884	23.5	42,206
transportation	5.1	55,237	5.9	46,965
wholesale	4.8	52,242	5.0	45,026
retail trade	15.7	19,815	14.5	24,970
finance	9.5	60,217	7.9	31,995
services	35.0	36,983	20.1	32,488
government	14.5	49,262	16.8	39,229
total	100.0	41,693	100.0	36,985

Notes: Dollar amounts are in 2001 dollars. The source for employment and earnings by industry is the Regional Economic Information System web page.

Table 4 – Decomposition of State and National Income Differences

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Actual Earnings per Worker (dollars per year)	“Industry Mix” Earnings per Worker (dollars per year)	Percentage Attributable to: <u>Industry Mix</u>	Difference to: <u>Wages</u>	“Wages” Earnings per Worker (dollars per year)	Percentage Attributable to: <u>Industry Mix</u>	Difference to: <u>Wages</u>
1996-98	35,383	35,093	0.4	0.8	35,171	0.6	0.6
1969-71	33,818	34,263	2.7	-1.3	32,890	2.8	-6.1

Notes: Dollar amounts are in 2001 dollars. The hypothetical “industry mix” income in column (2) is calculated by assuming Pennsylvania workers earn identical earnings equal to the national industry average. The percentage difference between the state income per worker and the national average attributable to the state’s industry mix in column (3) equals the difference between the log of the hypothetical “industry-mix” income per worker and the log of national aggregate income per worker. The percentage difference attributable to wages reported in column (4) is found by taking the difference in logs between the actual state income per worker and the hypothetical industry-mix income per worker. The hypothetical state “wages” income in column (5) is calculated assuming that Pennsylvania has an employment mix identical to the national industry mix. The percentage difference between state income per capita and the national average attributable to industry mix reported in column (6) is found by taking the difference in logs between actual Pennsylvania income per worker and the hypothetical “wages” income per worker. The percentage difference attributable to wages given in column (7) equals the difference between the log of the hypothetical “wages” income per worker and the log of national aggregate income per worker. The source for state and national earnings and employment by industry is the Regional Economic Information System web page.

Table 5 – Decomposition of State and Regional Income Differences

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Actual Earnings per Worker (dollars per year)	“Industry Mix” Earnings per Worker (dollars per year)	Percentage Attributable to: <u>Industry Mix</u>	Difference to: <u>Wages</u>	“Wages” Earnings per Worker (dollars per year)	Percentage Attributable to: <u>Industry Mix</u>	Difference to: <u>Wages</u>
1996-98	35,383	41,113	-1.4	-15.0	35,911	-1.5	-14.9
1969-71	33,818	37,213	0.6	-9.6	33,325	1.5	-10.4

Notes: Dollar amounts are in 2001 dollars. The hypothetical “industry mix” income in column (2) is calculated by assuming Pennsylvania workers earn identical earnings equal to the Mideast regional industry average. The percentage difference between the state income per worker and the regional average attributable to the state’s industry mix in column (3) equals the difference between the log of the hypothetical “industry-mix” income per worker and the log of regional aggregate income per worker. The percentage difference attributable to wages reported in column (4) is found by taking the difference in logs between the actual state income per worker and the hypothetical industry-mix income per worker. The hypothetical state “wages” income in column (5) is calculated assuming that Pennsylvania has an employment mix identical to the regional industry mix. The percentage difference between state income per capita and the regional average attributable to industry mix reported in column (6) is found by taking the difference in logs between actual Pennsylvania income per worker and the hypothetical “wages” income per worker. The percentage difference attributable to wages given in column (7) equals the difference between the log of the hypothetical “wages” income per worker and the log of regional aggregate income per worker. The source for state and regional earnings and employment by industry is the Regional Economic Information System web page.

Table 6 – Decomposition of County Income Differences

	1996-98						
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Actual Earnings per Worker (dollars per year)	“Industry Mix” Earnings per Worker (dollars per year)	Percentage Attributable <u>Industry Mix</u>	Difference to: <u>Wages</u>	“Wages” Earnings per Worker (dollars per year)	Percentage Attributable <u>Industry Mix</u>	Difference to: <u>Wages</u>
Montgomery	44,262	35,647	0.7	21.6	43,121	2.6	19.8
Philadelphia	44,125	35,212	-0.5	22.6	43,043	2.5	19.6
Chester	43,003	34,947	-1.2	20.7	43,126	-0.3	19.8
Allegheny	39,851	34,589	-2.3	14.2	42,035	-5.3	17.2
Delaware	38,447	34,399	-2.8	11.1	40,740	-5.8	14.1
Montour	38,276	33,122	-6.6	14.5	34,166	11.4	-3.5
Lehigh	37,990	36,065	1.9	5.2	37,030	2.6	4.5
Dauphin	35,444	36,715	3.7	-3.5	33,939	4.3	-4.2
state average	35,383						
Berks	34,625	36,057	1.9	-4.1	34,101	1.5	-3.7
Cumberland	33,961	35,107	-0.8	-3.3	33,694	0.8	-4.9
Bucks	33,845	34,700	-1.9	-2.5	34,377	-1.6	-2.9
York	32,725	36,367	2.7	-10.6	31,051	5.3	-13.1
Lancaster	31,506	35,776	1.1	-12.7	30,741	2.5	-14.1
Northampton	31,480	35,858	1.3	-13.0	31,004	1.5	-13.2
Wyoming	31,312	36,432	2.9	-15.1	27,832	11.8	-24.0
Greene	31,290	37,960	7.0	-19.3	23,915	26.9	-39.2
Washington	31,255	35,411	0.1	-12.5	30,811	1.4	-13.8
Erie	31,065	36,047	1.9	-14.9	30,218	2.8	-15.8
Elk	30,902	40,160	12.7	-26.2	25,457	19.4	-32.9
Beaver	30,550	35,546	0.5	-15.1	29,466	3.6	-18.3
Indiana	30,421	35,612	0.6	-15.8	27,378	10.5	-25.6
Luzerne	30,399	35,920	1.5	-16.7	29,803	2.0	-17.2
Butler	30,225	36,079	1.9	-17.7	28,918	4.4	-20.2
Union	29,823	35,317	-0.2	-16.9	28,279	5.3	-22.4
Lackawanna	29,773	35,456	0.2	-17.5	29,713	0.2	-17.5
Westmoreland	29,768	35,318	-0.2	-17.1	29,464	1.0	-18.3
Blair	29,474	35,527	0.4	-18.7	28,950	1.8	-20.1
McKean	29,368	37,677	6.3	-24.9	26,505	10.3	-28.9
Fulton	29,348	36,439	2.9	-21.6	24,915	16.4	-35.1
Warren	28,709	35,761	1.1	-22.0	27,530	4.2	-25.1
Centre	28,540	36,257	2.4	-23.9	28,371	0.6	-22.1
Lycoming	28,384	35,723	1.0	-23.0	28,415	-0.1	-21.9
Schuylkill	28,330	37,229	5.1	-27.3	26,920	5.1	-27.3

Venango	28,307	36,120	2.1	-24.4	26,893	5.1	-27.4
Lebanon	28,290	35,208	-0.5	-21.9	27,759	1.9	-24.3
Franklin	28,100	35,242	-0.4	-22.6	27,254	3.1	-26.1
Mercer	27,889	34,868	-1.5	-22.3	27,941	-0.2	-23.6
Potter	27,840	36,886	4.2	-28.1	23,924	15.2	-39.1
Lawrence	27,826	34,607	-2.2	-21.8	28,263	-1.6	-22.5
Crawford	27,792	35,874	1.4	-25.5	26,435	5.0	-29.2
Clarion	27,359	35,850	1.3	-27.0	25,409	7.4	-33.1
Bradford	27,247	35,124	-0.7	-25.4	27,012	0.9	-27.0
Clinton	27,228	36,076	1.9	-28.1	25,225	7.6	-33.8
Cambria	27,224	34,631	-2.1	-24.1	27,159	0.2	-26.5
Mifflin	27,177	36,040	1.8	-28.2	26,218	3.6	-30.0
Monroe	27,122	34,238	-3.3	-23.3	27,368	-0.9	-25.7
Northumberland	26,869	36,256	2.4	-30.0	25,351	5.8	-33.3
Jefferson	26,781	36,958	4.4	-32.2	24,784	7.7	-35.6
Cameron	26,768	41,589	16.2	-44.1	20,828	25.1	-53.0
Columbia	26,677	35,432	0.1	-28.4	26,715	-0.1	-28.1
Armstrong	26,584	35,068	-0.9	-27.7	25,327	4.8	-33.4
Clearfield	26,522	34,943	-1.3	-27.6	26,020	1.9	-30.7
Somerset	26,484	35,209	-0.5	-28.5	24,889	6.2	-35.2
Snyder	26,299	35,286	-0.3	-29.4	25,540	2.9	-32.6
Huntingdon	25,733	34,676	-2.0	-29.8	24,995	2.9	-34.8
Fayette	25,198	33,986	-4.0	-29.9	25,725	-2.1	-31.9
Adams	24,946	34,874	-1.4	-33.5	24,553	1.6	-36.5
Carbon	24,732	35,990	1.7	-37.5	24,219	2.1	-37.9
Tioga	24,465	35,192	-0.5	-36.4	23,448	4.2	-41.1
Wayne	24,004	33,093	-6.7	-32.1	24,759	-3.1	-35.7
Bedford	23,914	34,163	-3.5	-35.7	23,566	1.5	-40.6
Forest	23,407	36,722	3.7	-45.0	21,878	6.8	-48.1
Susquehanna	23,046	34,196	-3.4	-39.5	22,302	3.3	-46.2
Pike	22,227	32,733	-7.8	-38.7	24,759	-10.8	-35.7
Juniata	22,071	35,003	-1.1	-46.1	21,436	2.9	-50.1
Perry	21,999	32,673	-8.0	-39.6	22,034	-0.2	-47.4
Sullivan	21,457	34,240	-3.3	-46.7	21,975	-2.4	-47.6
average for counties below state average			0.6	-25.0		4.2	-28.5

1969-71

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Actual Earnings per Worker (dollars per year)	"Industry Mix" Earnings per Worker (dollars per year)	Percentage Attributable <u>Industry Mix</u>	Difference to: <u>Wages</u>	"Wages" Earnings per Worker (dollars per year)	Percentage Attributable <u>Industry Mix</u>	Difference to: <u>Wages</u>
Philadelphia	37,352	33,474	-0.9	11.0	45,738	-20.3	30.3
Allegheny	37,346	33,506	-0.8	10.9	41,775	-11.2	21.2
Beaver	36,540	35,381	4.6	3.2	36,358	0.5	7.4
Montgomery	36,106	33,847	0.2	6.5	39,466	-8.9	15.6
Delaware	34,518	33,088	-2.1	4.2	37,425	-8.1	10.2
Chester	34,367	33,335	-1.3	3.1	37,155	-7.8	9.5
Bucks	34,004	33,626	-0.5	1.1	34,454	-1.3	2.0
Northampton	33,868	35,362	4.6	-4.3	34,979	-3.2	3.5
Mercer	33,820	34,130	1.0	-0.9	34,489	-2.0	2.1
state average	33,818						
Lehigh	33,760	34,129	1.0	-1.1	37,648	-10.9	10.8
Butler	33,725	33,906	0.4	-0.5	35,320	-4.6	4.5
Dauphin	33,459	33,485	-0.9	-0.1	36,089	-7.6	6.6
Westmoreland	33,450	34,100	0.9	-1.9	36,033	-7.4	6.5
Venango	33,029	34,349	1.7	-3.9	33,758	-2.2	-0.1
York	33,004	34,604	2.4	-4.7	36,983	-11.4	9.1
Erie	32,959	34,086	0.9	-3.4	34,929	-5.8	3.3
Greene	32,637	35,548	5.1	-8.5	27,920	15.6	-19.1
Washington	32,634	34,306	1.5	-5.0	34,255	-4.8	1.4
Cambria	32,440	34,569	2.3	-6.4	33,743	-3.9	-0.1
Warren	32,348	33,287	-1.5	-2.9	34,144	-5.4	1.1
Elk	32,020	35,622	5.3	-10.7	31,317	2.2	-7.6
Lancaster	31,846	33,519	-0.8	-5.1	33,778	-5.9	0.0
Berks	31,258	34,235	1.3	-9.1	34,662	-10.3	2.6
Indiana	31,226	34,126	1.0	-8.9	35,587	-13.1	5.2
Clarion	31,106	34,286	1.5	-9.7	34,226	-9.6	1.3
Montour	30,885	33,331	-1.3	-7.6	29,632	4.1	-13.1
Armstrong	30,878	34,147	1.1	-10.1	31,995	-3.6	-5.4
Lawrence	30,790	33,424	-1.1	-8.2	33,734	-9.1	-0.1
Cumberland	30,729	33,178	-1.8	-7.7	31,602	-2.8	-6.7
Franklin	30,606	33,186	-1.8	-8.1	30,834	-0.7	-9.1
Blair	30,451	34,587	2.4	-12.7	31,456	-3.2	-7.1
Mifflin	30,364	34,170	1.1	-11.8	31,400	-3.4	-7.3
Cameron	30,229	35,915	6.1	-17.2	33,439	-10.1	-1.0
Clinton	30,007	34,085	0.9	-12.7	43,544	-37.2	25.4
Monroe	29,904	32,392	-4.2	-8.0	31,219	-4.3	-7.9
Lebanon	29,842	33,832	0.2	-12.5	29,888	-0.2	-12.2
Centre	29,764	33,118	-2.0	-10.7	34,517	-14.8	2.2

Wyoming	29,480	34,085	0.9	-14.5	29,899	-1.4	-12.2
Clearfield	29,388	34,491	2.1	-16.0	33,663	-13.6	-0.4
Lycoming	29,310	34,338	1.6	-15.8	31,714	-7.9	-6.3
Crawford	29,273	33,100	-2.0	-12.3	31,380	-6.9	-7.4
Fayette	29,267	33,179	-1.8	-12.5	34,630	-16.8	2.5
Jefferson	28,731	34,345	1.7	-17.8	31,326	-8.6	-7.5
McKean	28,678	34,784	2.9	-19.3	31,509	-9.4	-7.0
Luzerne	28,281	34,627	2.5	-20.2	32,370	-13.5	-4.3
Lackawanna	28,166	34,076	0.9	-19.0	32,450	-14.2	-4.0
Union	28,085	32,316	-4.4	-14.0	30,465	-8.1	-10.3
Snyder	27,542	33,120	-2.0	-18.4	29,312	-6.2	-14.2
Tioga	27,476	31,944	-5.6	-15.1	30,729	-11.2	-9.5
Bradford	27,371	32,211	-4.8	-16.3	27,282	0.3	-21.4
Northumberland	26,963	34,553	2.3	-24.8	29,924	-10.4	-12.1
Schuykill	26,564	35,224	4.2	-28.2	30,125	-12.6	-11.5
Somerset	26,306	33,156	-1.9	-23.1	30,604	-15.1	-9.9
Forest	26,094	34,363	1.7	-27.5	24,233	7.4	-33.2
Columbia	26,016	34,423	1.9	-28.0	27,107	-4.1	-22.0
Bedford	25,536	32,245	-4.7	-23.3	29,142	-13.2	-14.8
Huntingdon	25,389	33,750	-0.1	-28.5	28,009	-9.8	-18.7
Pike	25,177	31,936	-5.6	-23.8	27,500	-8.8	-20.6
Adams	25,054	32,515	-3.8	-26.1	29,649	-16.8	-13.0
Carbon	24,657	34,791	2.9	-34.4	28,239	-13.6	-17.9
Potter	24,652	32,244	-4.7	-26.8	30,510	-21.3	-10.2
Wayne	24,274	31,835	-5.9	-27.1	27,412	-12.2	-20.9
Susquehanna	23,403	31,651	-6.5	-30.2	25,438	-8.3	-28.4
Perry	23,131	31,369	-7.4	-30.5	33,207	-36.2	-1.7
Fulton	22,875	31,707	-6.3	-32.7	31,750	-32.8	-6.2
Juniata	22,473	32,205	-4.8	-36.0	26,230	-15.5	-25.3
Sullivan	21,951	32,632	-3.5	-39.6	32,917	-40.5	-2.6
average for counties below state average			-0.4	-15.3		-9.5	-6.7

Notes: Dollar amounts are in 2001 dollars. The hypothetical county “industry mix” income in column (2) is calculated by assuming all counties earn identical earnings equal to the state industry average. The percentage difference between county income per capita and the state average attributable to county industry mix in column (3) equals the difference between the log of the hypothetical “industry-mix” income per worker and the log of state aggregate income per worker. The percentage difference attributable to wages reported in column (4) is found by taking the difference in logs between actual county income per worker and the hypothetical industry-mix income per worker. The hypothetical county “wages” income in column (5) is calculated assuming all counties have an employment mix identical to the state industry mix. The percentage difference between county income per capita and the state average attributable to industry mix reported in column (6) is found by taking the difference in logs between actual county income per worker and the hypothetical “wages” income per worker. The

percentage difference attributable to wages given in column (7) equals the difference between the log of the hypothetical “wages” income per worker and the log of state aggregate income per worker. The source for state and county earnings and employment by industry is the Regional Economic Information System web page.

Table 7 – Changes in county industry wage relative to the state industry wage for selected sectors, 1996-98 – 1969-71

	<u>manufacturing</u>	<u>retail trade</u>	<u>services</u>	<u>government</u>
Sullivan	-0.0	0.0	-7.4	8.0
Perry	8.0	-25.0	-30.7	5.6
Juniata	4.3	-15.7	-19	4.8
Pike	4.2	-7.4	-26.3	16.6
Susquehanna	-17.6	-19.1	-18.9	4.8
Forest	-12.4	-18.2	-9.9	8.1

Notes: The table shows the changes between 1969-71 and 1996-98 in the county industry wage relative to the state industry wage for the four largest sectors for the six poorest counties. This is calculated by taking the county industry wage and dividing by the state industry wage, giving the county wage as a percentage of state industry earnings. Numbers in the table are the percentage point change in the county wage as a percentage of state industry earnings between 1969-71 and 1996-98. A negative number indicates that county industry earnings have deteriorated relative to the state industry wage.

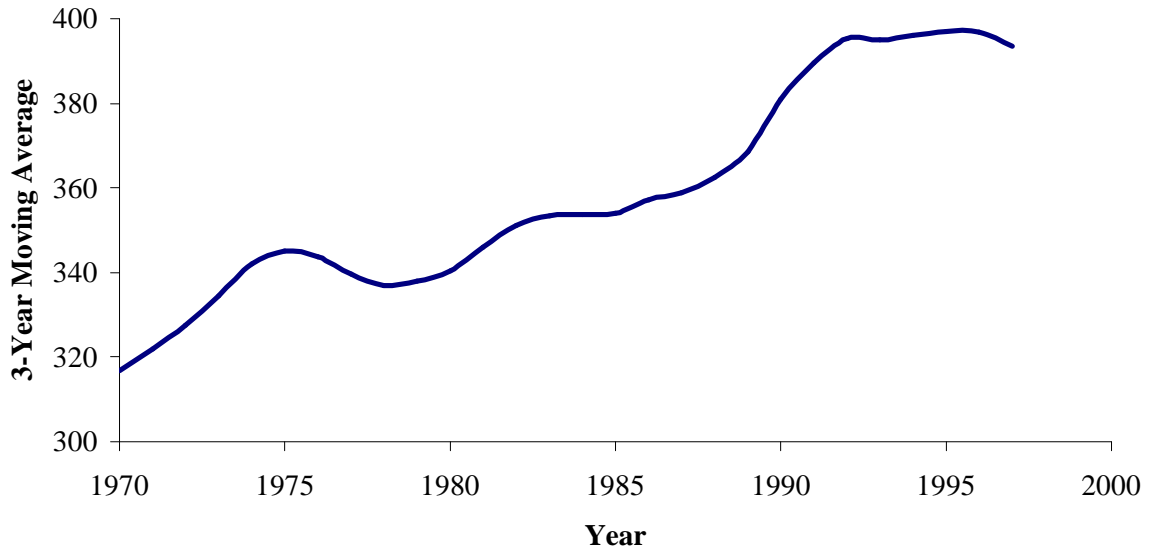
Table 8 - Test for Convergence Using Panel Data

Log of initial year income	-0.165 (27.223)
fraction of population with a college degree	0.039 (3.542)
population growth rate	-0.106 (3.127)
farm income as a fraction of total earnings	42.235 (1.967)
fraction of voters registered Democratic	0.017 (3.850)
percent urban population	0.217 (7.058)
p- value of Sargan test statistic of overidentifying restrictions	0.24
Observations	335
Implied Speed of Convergence	0.351

Notes: Absolute values of t-statistics are in parentheses. The dependent variable is the average annual growth rate of total earnings per capita. Growth rates are over 5-year intervals: 1972-77, 1977-82, 1982-87, 1987-92, and 1992-97. Values of the explanatory variables are for the beginning of each interval.

Figure 1 - Industry Concentration Indices

Panel A - Pennsylvania State Industrial Concentration Index



Panel B - State and National Industrial Concentration Indices

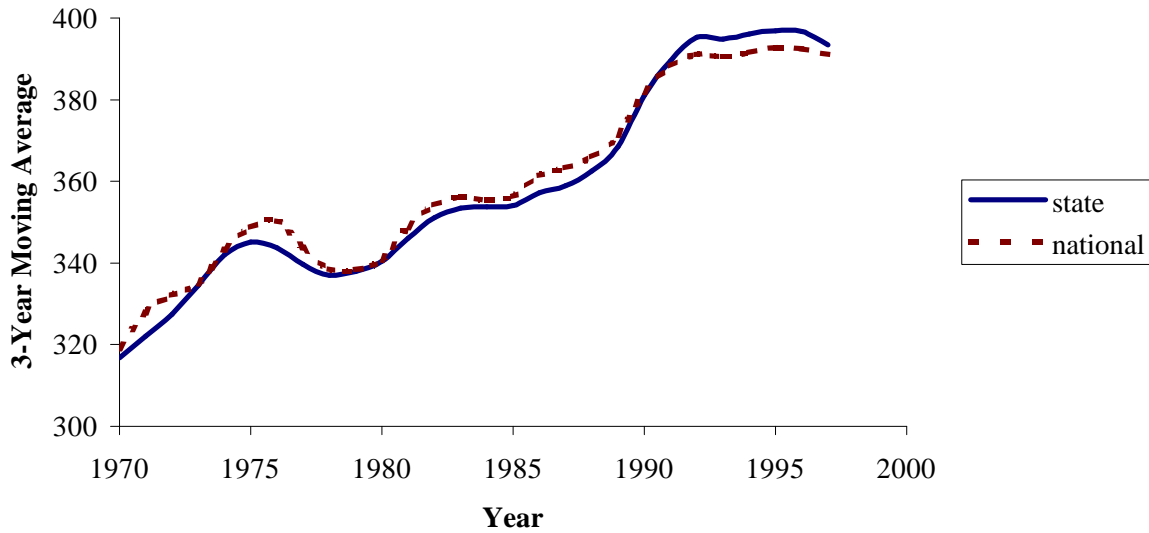
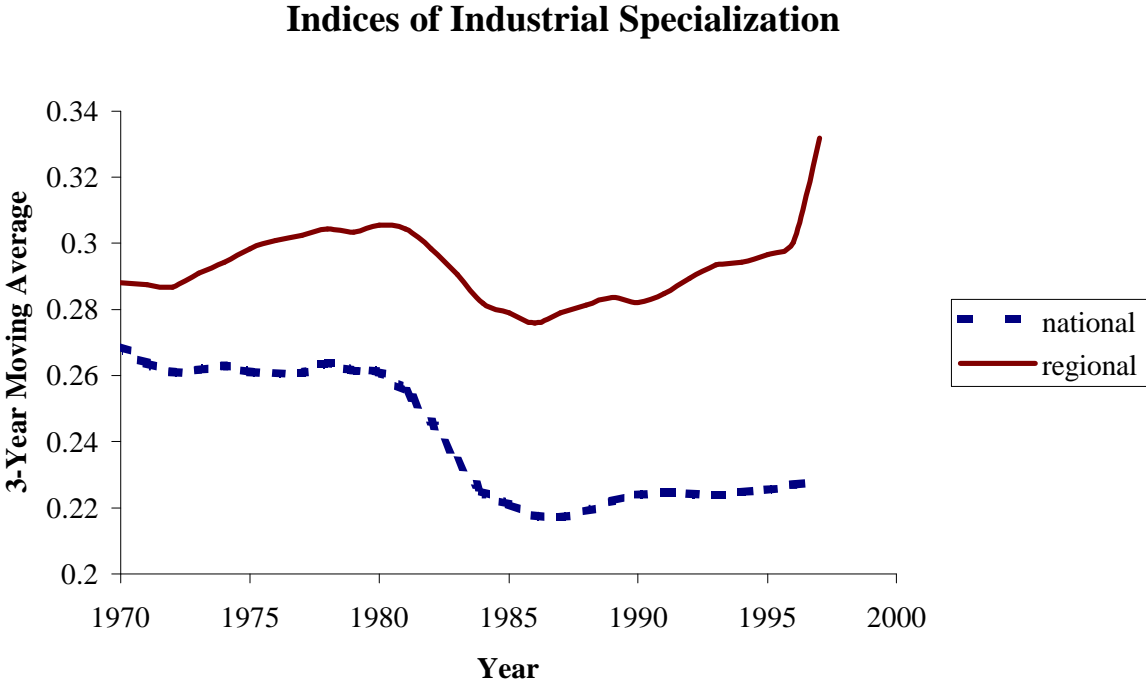


Figure 2 - Indices of Industrial Specialization



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