Heterogeneity in Convergence Rates and Income Determination across U.S. States: Evidence from County-Level Data[*]

Andrew T. Young[**]
Department of Economics
Emory University
Atlanta, GA 30322-2240
Atyoung@emory.edu
404-727-1022

Matthew J. Higgins
Department of Economics
Emory University
Atlanta, GA 30322
Matthew_Higgins@bus.emory.edu
404-385-1389

Daniel Levy
Department of Economics
Bar-Ilan University
Ramat Gan 52900, ISRAEL
Levyda@mail.biu.ac.il
972-3-531-8331

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Abstract

We utilize county-level data to explore growth determination in the U.S. and possible heterogeneity in growth determination across individual states. The data includes over 3,000 cross-sectional observations and 39 demographic control variables. We use a consistent two stage least squares estimation procedure. (We report OLS estimates as well.) The estimated convergence rate across the U.S. is about 7 percent per year – higher than the 2 percent normally found with OLS in cross-country, U.S. state, and European region samples. Estimated convergence rates for 32 individual states are above 2 percent with an average of 8.1 percent. For 29 states the convergence rate is above 2 percent with 95 percent confidence. For seven states the convergence rate can be rejected as identical to at least one other state's convergence rate with 95 percent confidence. In examining the determinants of balanced growth path heights, we find that government at all levels of decentralization is negatively correlated with economic growth. Educational attainment of a population has a non-linear relationship with economic growth according to our estimates: growth is positively related to high-school degree attainment, seemingly unrelated to obtaining some college education, and then positively related to four-year degree or more attainment. Also, finance, insurance and real estate industry and entertainment industry are positively correlated with growth, while education industry is negatively correlated with growth. Heterogeneity in the effects of balanced growth path determinants across individual states is much harder to detect (or dismiss) than in convergence rates.

1.   Introduction

"*Economies converge at a speed of about two percent per year.*" This is what Sala-i-Martin (1996, p. 1326) put forth as a "mnemonic rule" of economic growth empirics. He was referring to how quickly an economy will converge to its individual balanced growth path for per capita income. Results in line with this rule were first reported by Barro and Sala-i-Martin (1991, 1992) and Mankiw, Romer and Weil (1992).[1] Sala-i-Martin declared two percent a mnemonic rule because the result is found whether a researcher considers samples of countries, U.S. states, or European regions.

However, when any of these samples are used in growth regressions, researchers are implicitly imposing the assumption that all economies have identical growth processes and, therefore, it is meaningful to estimate a single rate of convergence. Evans (1998) and Brock and Durlauf (2001) have emphasized that this assumption is not plausible for most data sets. For example, Evans has noted that, "countries must surely have different technologies, preferences, institutions, market structures, government policies, and so forth"(p.296). These can represent important structural differences.

The primary contribution of this paper is the use of data from 3,058 counties representing the entire U.S. economy to examine heterogeneity in growth processes and convergence rates. This data includes per capita income and 39 demographic variables. The inclusion of these variables in the growth regressions is useful for assessing the empirical relevance of various determinants of balanced growth path positions. Using this data we are able to estimate parameters not only for the U.S., but also for 32 U.S. states as economies in and of themselves.[2] The many degrees of freedom allow us to identify state-specific convergence and balanced growth path parameters. State by state analysis admits heterogeneity in (i) convergence rates, (ii) balanced growth path affects, and (iii) balanced growth *rates* (the rate of exogenous technical progress). The heterogeneity (or homogeneity) of the within-state growth processes is explored along dimensions (i) and (ii) in this paper.

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[1] Quah (1997) and Sala-i-Martin (1996) surveyed some of the literature that followed these seminal studies and explored possible explanations to the uniform 2% convergence findings. For a more recent survey, see Brock and Durlauf (2001).

[2] The remaining states did not have enough counties for growth equations to be identified.

Evidence of heterogeneity in the structure of growth processes has been reported previously by Durlauf and Johnson (1995) and Lee, Pesaran and Smith (1997). Durlauf and Johnson (1995) examined data from 121 countries and rejected the single linear growth model in favor of a multiple regime alternative using regression tree analysis. Lee et al (1997) showed that deriving a growth equation from an explicitly stochastic Solow (1956) model reveals heterogeneity of balanced growth rates as a source of bias in convergence rate estimates.[3] Using a panel of 102 countries they found that heterogeneity produces an economically significant downward bias in convergence rate estimates.

Heterogeneity in growth processes has also been the focus of a literature examining the so-called "club convergence" hypothesis that nations are segregated into "clubs" according to important structural similarities and similar initial conditions. Convergence occurs within these clubs only. This hypothesis was borne of Quah's (1996, 1997) identification of an "emerging twin peaks" in the cross-sectional distribution of per capita incomes of 105 countries. Desdoigts (1999) used a non-parametric technique called exploratory projection pursuit (EPP) to determine which of a large number of economic variables cause clustering of economies into clubs. He found that, "[i]nstitutional (OECD versus non-OECD), cultural (Protestant versus Catholic), and geographical (continental) clubs of economies form endogenously on the basis of their economic structure"(p.323). The initial stocks of human capital, per capita income and technology were identified as the primary determinants of the emergent structure. Using a Bayesian variant of break point analysis, Canova (1999) also found evidence that initial conditions lead to clubs.[4]

The above studies of heterogeneity in growth processes are important contributions which this paper builds upon. Durlauf and Johnson's (1995) analysis was non-parametric and identified subsets of countries appearing to have markedly different production functions in the sense that "more developed countries have higher output-labour ratios than implied by their capital-labour ratios alone"(p.366). They concluded

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[3] The standard growth equation is derived from the deterministic Solow model, and then an error term is appended *ad hoc*.

[4] Canova's (1999) analysis, being Bayesian, posited that the structural parameters of economies in a given club are not identical, but rather that they have the same distribution. Canova notes that, therefore, in principle his analysis allowed for structural heterogeneity intra-clubs as well as inter-clubs.

that "the explanatory power of the Solow model may be enhanced with a theory of aggregate production function differences", but did not identify the determinants of the structural differences. Desdoigts' (1999) approach, similarly, identified differences in the average values of certain economic variables across the discovered clubs without identifying the determinants of the differences. Canova (1999) also identified clubs according to initial income and human capital levels, but not the determinants of the clubs. Lee et al's (1997) regressions only covered 1965-1989 so that the degrees of freedom needed to identify the important causes of structural differences were not available.[5]

The existing studies represent a range of ingenious techniques designed to cope with a limited amount of available observations (in terms of both cross-sectional units and time periods) to make meaningful statements concerning growth process heterogeneity. These papers primarily departed from the convergence literature, typified by Barro and Sala-i-Martin (1991, 1992) and Mankiw et al (1992), by innovating along the lines of econometric specification. The present paper uses new data as its primary innovation.

Besides the large amount of observations and conditioning variables, the county-level data offer numerous advantages in identifying growth processes. A single institution collects the data, ensuring considerable uniformity of variable definitions. There is no exchange rate variation between the counties and the price variation across counties is smaller than across countries. Also, U.S. counties are characterized by exceptional mobility of resources and factors.[6] Importantly, counties within a given state represent a sample with geographical homogeneity and a shared state government. To a great extent the states are ready-made "clubs" within which (if anywhere) we would expect convergence to occur. High degrees of freedom allow us to study inter-state heterogeneity, while the intra-state homogeneity gives as much assurance of a correct specification as can realistically be hoped for. Lastly of note is the relative homogeneity of U.S. counties as a whole. If we find economically important heterogeneity of growth

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[5] Country-specific intercepts were evoked to control for all differences in balanced growth paths.

[6] Many of these virtues are, of course, embodied in state-level data used by, e.g. Barro and Sala-i-Martin (1991) and Evans (1997a). However, state-level data sacrifices the large number of observations that we have. A full 29 of our states have counties numbering more than 50 (the number of U.S. states) each.

processes across states, then surely we can infer that as much, or (more likely) more, heterogeneity exists across countries.

Although we primarily address the question of heterogeneity with richer data, we also utilize a cross-sectional variant of a two stage least squares (2SLS) approach suggested recently by Evans (1997a, 1997b) for estimating growth equations. Evans (1997b) demonstrated that data must satisfy highly implausible conditions for ordinary least squares (OLS) estimators to be consistent. He proposed a 2SLS method that produces consistent estimators. He applied the method to a sample of 85 countries and reported convergence rates of between 8 and 9 percent. Evans (1997a) then adapted the method to panel data and studied both international data and state-level data from the U.S. He estimated rates of convergence of about 6 percent across countries and 16 percent across the U.S. If the bias of OLS estimates has caused underestimation of the speed of convergence, then this has important implications for how we view the plight of laggard economies. E.g., a convergence rate of 2 percent means that economies close the gap between their current position and their balanced growth path in approximately 34 years. However, if the actual convergence rate is 6 percent then the gap is closed in 11 years; if it is 16 percent the gap will be closed in 4 years. In Higgins, Levy and Young (2003) we showed that, for the entire U.S., the 2SLS procedure yielded a convergence rate estimate of just under 7 percent, while OLS yielded an estimate of just above 2 percent (the Sala-i-Martin (1996) mnemonic rule).[7] Here, as well as in the earlier paper, we report both 2SLS and conventional OLS estimates.

We find significant heterogeneity across within-state convergence rates. Across the 32 states for which we report results, 2SLS point estimates range from 3.8 percent (California) to 15.6 percent (Louisiana). The 95 percent confidence intervals associated with these estimates are precise enough so that the heterogeneity cannot be dismissed on grounds of uncertainty. Interestingly, using the consistent 2SLS estimation every intra-state convergence rate estimate is above the 2 percent mnemonic rule. Moreover, even the lower bounds of 95 percent confidence intervals only fall below 2 percent in 3 cases: California, Iowa and North Dakota (all 1.8 percent). Despite finding significant

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[7] In Higgins et al (2003) we reported estimates for metro and non-metro county sub-samples, and for five regional sub-samples, and found significant heterogeneity across those cases.

heterogeneity in convergence rates, we also find the vast majority to be homogenous in that they are higher than the mnemonic rule.

The paper is organized as follows. Section 2 discusses the econometric specification of the neoclassical growth regression and the 2SLS technique we employ. Section 3 decribes the county-level data. Section 4 explores heterogeneity in the conditional convergence rates, and a similar exploration of the findings regarding balanced growth path determinants is in section 5. Section 6 concludes.

2.   Econometric Model and 2SLS Estimation Procedure

The basic specification used here and in other cross-sectional growth regressions arises from the neoclassical growth model of Ramsey (1928), Solow (1956), Swan (1956), Cass (1965) and Koopmans (1965).[8] The growth model implies that,

(2.1) $$\hat{y}(t) = \hat{y}(0)e^{-Bt} + \hat{y}^{*}(1 - e^{-Bt})$$

where $\hat{y}$ is log of income per effective unit of labor (technology assumed to be labor augmenting), t is the time period (0 being the initial time period), and B is a nonlinear function of the economy's discount (average, subjective), population growth, and technological growth rates, as well as preference parameters. B governs the speed of adjustment to the steady state. The $\hat{y}^{*}$ is the economy's steady-state log level of income per effective unit of labor. From (2.1) it follows that the average growth rate of income per unit of labor between dates 0 and T is,

(2.2) $$\frac{1}{T}(y(T) - y(0)) = z + \left(\frac{1 - e^{-BT}}{T}\right)(\hat{y}^{*} - \hat{y}(0))$$

where z is the exogenous rate of technical progress and B represents the responsiveness of the average growth rate to the gap between the steady state of log income per effective unit of labor and the initial value. Since effective units of labor (L) are assumed to equal Le^{zt}, we have $\hat{y}(0) = y(0)$.

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[8] A derivation of the baseline specification from the growth model is provided by Barro and Sala-i-Martin (1992).

From this model, growth regressions are obtained by using OLS to fit cross-sectional data on economies $1, \ldots, N$ to the equation,

(2.3) $\qquad g_n = \alpha + \beta y_{n0} + \gamma' x_n + v_n .$

In (2.3), g_n is the average growth rate of per capita income for economy n between years 0 and T [i.e., $\frac{1}{T}(y(T) - y(0))$], α is a constant that is a function of z, $\beta = \left(\frac{1 - e^{-BT}}{T}\right)$, x_n is a vector of variables that control for cross-economy heterogeneity in determinants of the steady-state, $\hat{y}^*$, γ is a vector of coefficients on those variables, and v_n is the error term assumed to have zero mean and finite variance.

However, Evans (1997b) showed that OLS estimates will be consistent only when the data satisfy highly implausible conditions. Plausible departures from these conditions can produce large biases. Specifically, Evans demonstrated that unless (i) the dynamical structures of the economies examined have identical, first-order autoregressive representations, (ii) every economy affects every other economy symmetrically, and (iii) the set of conditioning variables controls for all permanent cross-economy differences, the OLS estimators of the speed of convergence are inconsistent. They are biased downwards, underestimating the speed of convergence.

Evans (1997b) proposed a 2SLS instrumental variables approach that consistently estimates the speed of convergence as well as the effects of conditioning variables. We use a cross-section variant of his method. The method consists of two stages. In the first stage we use instrumental variables to estimate the equation,

(2.4) $\qquad \Delta g_n = \omega + \beta \Delta y_{n0} + \eta_n ,$

where

$$\Delta g_n = \frac{(y_{n,T} - y_{n,0})}{T} - \frac{(y_{n,T-1} - y_{n,-1})}{T} ,$$

$\Delta y_{n0} = y_{n0} - y_{n,-1}$, y_n is the logarithm of per capita income for county n, ω and β are parameters, and η_n is the error term. We use the lagged (1969) values of all the independent variables as instruments, with the exception of Metro Area, Water Area, and Land Area.[9] Given the sample period we use here, we define,

$$\Delta g_n = \frac{(y_{n,1998} - y_{n,1970})}{T} - \frac{(y_{n,1997} - y_{n,1969})}{T}.$$

Next, define β^* as the estimator obtained from equation (2.4). In the second stage, we take the estimate for β^*, multiply it by y_{n0} and then subtract the product from g_n. This yields a variable,

(2.5) $\qquad \pi_n = g_n - \beta^* y_{n0}$,

which is then regressed (using OLS) on an intercept and the vector of variables, x_n, that are potential influences on balanced growth path levels. This second-stage regression is of the form,

(2.6) $\qquad \pi_n = \tau + \gamma x_n + \varepsilon_n$,

where τ and γ are parameters and ε_n is an error term. This regression yields a consistent estimator, γ^*. Also note that τ is the same, in principle, as the OLS α. It is an estimate of the exogenous rate of technical progress, z, or the balanced growth *rate*.

What this two stage procedure essentially does is, in the first stage, differences out any uncontrolled form of heterogeneity from the specification so that an omitted variable bias does not occur[10] and then, in the second stage, uses the resulting estimate of

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[9] See the data appendix for details.

[10] The derivation of this equation (see Evans (1997b)) depends on the assumption that the conditioning variables are (approximately) constant during the time frame considered, allowing them to be differenced out. We are indebted to Nazrul Islam for pointing out that, while this is a reasonable assumption for many conditioning variables in the literature (e.g., an index of democracy for an international sample over 15 years), many of our county-level conditioning variables potentially vary significantly (e.g., the percent of the population employed in the communications industry over 28 years). To make sure that this did not introduce significant omitted variable bias into our estimations we ran the three first stage regressions for

β to recreate the component of a standard growth regression that would be related to the set of conditioning variables. This component can then be regressed on a constant and the conditioning variables, in "un-differenced" form, to estimate the effects of conditioning variables on balanced growth paths. This procedure ensures that none of the information contained in the levels of the conditioning variables is lost.[11]

Besides reporting OLS results below, as well as 2SLS results, for comparison, we also use a Hausman test as an additional aid in the determination of the appropriateness of the instrumental variable approach for the full U.S. sample. Two separate tests were performed. The first test was run on the β values and yielded an *m* value of 134.6. The second test was run on the entire model and yielded an *m* value of 1236.6. Indeed, both tests reject the null hypothesis at the 1% level, thereby suggesting that the OLS estimates are inconsistent.

3.   U.S. County-Level Data

The data for this study were drawn from several different sources. The majority of the data, however, came from the Bureau of Economic Analysis Regional Economic Information System (BEA-REIS) and U.S. Census data sets.[12] The BEA-REIS data are largely based on the 1970, 1980 and 1990 decennial Census summary tape files, the 1972, 1977, 1982 and 1987 Census of Governments, the Census Bureau's City and County Book from various years. All dollar variables are expressed in constant 1992 prices. Natural logs were used throughout the project. We exclude military personnel from the measurements of both personal income and population.

Our entire data set includes 3,058 county-level observations.[13] We examine the full sample, as well as U.S. states as economic units in and of themselves. We report

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the full U.S. sample with differenced values of all conditioning variables included as regressors. All point estimates of β from the modified first stages fell within the 95 percent confidence intervals of the Evans method first stage estimates. As well, if the β estimates are not significantly affected then neither are the second stage results (see below).

[11] This is a point on which Barro (1997, p.37) has criticized panel data methods. As they rely on time series information, the conditioning variables are differenced. However, the conditioning variables often vary slowly over time such that the most important information is in the levels.

[12] We thank Jordan Rappaport for kindly sharing with us some of the data used in this study.

[13] The original data set contained 3,066 observations. Eight counties, however, were excluded from the data set for various reasons. Primarily, counties were excluded for lack of data. Examples of counties that fell into this category include counties in northern Alaska and some counties in Hawaii. Some data for

estimation results for 32 of the 50 states. The standard we used for inclusion was whether or not, in the first-stage regressions, the estimate for β was statistically different from zero.

The measure we use for personal income is that of the U.S. Bureau of Economic Analysis (BEA).[14] The definitions that are used for the components of personal income for the county estimates are essentially the same as those used for U.S. national estimates. For example, the BEA defines "personal income" as the sum of wage and salary disbursements, other labor income, proprietors' income (with inventory valuation and capital consumption adjustments), rental income (with capital consumption adjustment), personal dividend income and personal interest income. (BEA, 1994) "Wage and salary disbursements" are measurements of pre-tax income paid to employees. "Other labor income" consists of payments by employers to employee benefit plans. "Proprietors' income" is divided into two separate components—farm and non-farm. Per capita income for a county is defined as the ratio of this personal income measure for the county to the population of the county. We adjust the personal income measure to be net of government transfers and express the value in per capita 1992 dollars using the U.S. GDP deflator. Natural logs of the real per capita income measures are used in the analysis.[15]

In addition to the per capita income variable we also utilize 39 demographic conditioning variables. In **Table 1** we provide the complete list of the variables we use in this study along with their definitions. In the table we also provide the source of each series as well as the period it covers.[16] All 39 of these variables were used for estimation using the full sample. However, only 33 of these were used for the with-in state estimations to preserve degrees of freedom. Our standard for exclusion was that a conditioning variable, in the second-stage regression using the full sample, resulted in a coefficient estimate with zeros to at least the fourth decimal place (0.0000). The

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these counties were simply not recorded as far back as 1970. Furthermore, in Virginia, some cities are themselves independent counties. If the data for these independent cities were available we let them stand as their own county. However, if the data were not available, then we tried to incorporate the independent city into the surrounding county. If that was not feasible, it was then dropped from the data set.

[14] The data and their measurement methods are described in detail in "Local Area Personal Income, 1969–1992" published by the BEA under the Regional Accounts Data, February 2, 2001.

[15] See the Data Appendix at the end of this paper more detailed descriptions of the personal income measure.

[16] See the data appendix for the construction/definition of metro and non-metro counties and regions.

variables excluded from the within-state regressions were "land area," "water area,"
"education: public elementary," "education: public nursery," "education: private
elementary," and "education: private nursery."

## 4.	Analysis of Convergence Rate Estimates

The OLS and 2SLS estimates of β, the coefficient on the log of 1970 per capita
income, are presented in **Table 2** for the full U.S. sample and for 32 U.S. states. The
speed of conditional convergence can be inferred from β. Associated with these
estimates of β, **Table 3** reports the asymptotic (conditional) convergence rates and
associated 95 percent confidence intervals.[17]

For the full sample of 3,058 counties the 2SLS point estimate of the conditional
convergence rate is 6.82 percent and is significant at the 1 percent level. This is
compared to 2.37 percent using the inconsistent OLS method (also significant at the 1
percent level). The OLS 2.37 percent is similar to results reported by Barro and Sala-i-
Martin (1992), Mankiw et al (1992), and Sala-i-Martin (1996). The difference between
the OLS and 2SLS estimate is nearly 300 percent. This suggests that OLS introduces
substantial bias. The difference is economically large. A 2.37 percent convergence rate
implies the gap between a the present per capita income level and the balanced growth
path halves in 31 to 32 years, while a 6.82 percent rate implies the same in 12 to 13 years.

The basic finding that conditional convergence rates are higher than the 2 percent
"mnemonic rule" of Sala-i-Martin (1996) holds when examining 32 states as economies
in and of themselves. (The remaining states did not include enough county observations
to be identified.) **Figure 1** presents confidence intervals as vertical bars (that include the
point estimates). The 2 percent rule is represented by a horizontal line. Every point
estimate is above 2 percent, and the average point estimate is 8.1 percent. For one fourth

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[17] Following Evans (1997b, footnote 17, p.16), we use $c = 1 - (1 + T\beta)^{\frac{1}{T}}$ to compute the asymptotic rate
of convergence. The confidence intervals (in parentheses) are obtained in two steps. First, we obtain end
points of the β confidence intervals by computing $\beta \pm (1.96 \times s.e.)$, where *s.e.* is the standard error
associated with the β estimate. Next, these endpoints are plugged into $c = 1 - (1 + T\beta)^{\frac{1}{T}}$. If the low
value of the confidence interval is less than $-T^{-1}$, the higher value is equated to unity. It is clear from the
above that the confidence intervals computed this way may be asymmetric around the point estimates. As
Figure 1 indicates, this is indeed the case in our data.

(8) of the states the point estimate is above 10 percent. (A 10 percent convergence rate implies that the distance from the balanced growth path is halved within 10 years.) Considering the 95 percent confidence intervals, for only 3 states is the lower bound of the confidence interval not greater than 2 percent (California, Iowa, and South Dakota all bottom out at 1.8 percent). These results are encouraging for laggard economies in the limited sense that, *given proper policies/conditions to induce and support balanced growth paths similar to industrial leaders*, the laggard economies can approach those balanced growth paths quickly relative to what previous research has suggested.

There is considerable heterogeneity in the estimated convergence rates. The standard deviation of the point estimates is 3.0 percent. Furthermore, **Figure 1** suggests that confidence intervals do not overlap enough to dismiss heterogeneity. The pair wise absences of overlap in confidence intervals can be interpreted as statistical rejection of convergence rate homogeneity at the 95 percent level for given pairs of states. We can consider a given state and ask for how many other states can its convergence rate be rejected as the identical. For 7 states there is at least one other state for which their two convergence rates can be rejected as identical.

The full picture that one gets from **Table 3** and **Figure 1** is a group of economies with high rates of convergence relative to the 2 percent suggested by previous OLS-based empirics, but significant heterogeneity above that mark. This heterogeneity should not be surprising. The convergence rate in the neoclassical growth model is a function of the technology growth, population growth, and depreciations rates, as well as the parameters of the aggregate technology and the representative preferences on time and consumption.[18] So differences in what particular industries predominate in an economy, cultural characteristics, and institutions can all translate into different convergence rates. Diminishing returns is always the general driving force, but the particulars vary.

5.   Analysis of Balanced Growth Path Determinants

Just as there may be heterogeneity in the rates of convergence towards balanced growth paths, there may also be heterogeneity in the balance growth paths themselves. In particular, there can be heterogeneity in the height of the balanced growth path and/or the

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[18] See Barro and Sala-i-Martin (1992) for details.

slope of the path (the balanced growth rate). In this section we consider a selection of conditioning variables and their estimated coefficients. In our regressions, these coefficients indicate the effect of these variables on the average growth rate of per capita income indirectly via the height of the balanced growth paths. Given the height of a balanced growth path, the average growth rate increases (if the balanced growth path is higher) or decreases (if the balanced growth path is lower) as a result of the distance of per capita income from the balanced growth path and the convergence effect towards that path.[19]

The variables we focus on here are grouped into public sector size variables, educational attainment variables, and industry composition variables. (Again, **table 1** gives descriptions and sources of these and all other conditioning variables.) In each case we focus on 2SLS estimates.[20] We discuss the results for the entire sample and we examine the results for states as individual economic units to address potential heterogeneity.

i.   *Size of the Public Sector*

Does "big government" foster or hinder economic growth? This query expresses a fundamental concern about the proper extent of the public sector in economic life. A large literature has explored this question.[21] In a cross section of countries, Barro (1991) found that a large public sector is growth hindering. Easterly and Rebelo (1993), also in a cross section of countries, found that public investment in transportation and communication are associated positively with economic growth, but that any links between growth and other fiscal variables are fragile. Evans and Karras (1994) reported

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[19] If conditional convergence were to be rejected, then these coefficients would be interpreted as influences on economies' balanced growth *rates*. However, since we report results only for states where 2SLS convergence rates were statistically different than zero, conditioning variable coefficient estimates can be interpreted as effects on the height of balanced growth paths throughout this paper.

[20] Full results for all conditioning variables using both OLS and 2SLS are included in the referees appendix.

[21] The empirical framework used in this paper relates variables to the economic growth rate of economies. Many studies have, instead, focused on the *level* of income rather than its growth rate. Slemrod (1995) provided a review of these studies and their relation to growth rate studies. He noted that, "level studies primarily try to explain G [the extent of government] and include Y [income] as one explanatory variable; that G might affect Y is ignored [while] the growth studies try to explain the growth rate of Y . . . and often include G as one of the explanatory variables"(p.399). The simultaneity problem must be noted. However, to keep discussion in this paper focused we refer only to the growth rate studies and, in particular, those based on the neoclassical growth model. For other approaches see Gramlich (1994) and Slemrod (1995).

that government activities, with the exception of expenditures on education services, are either unproductive or affect growth negatively. More recently, Folster and Henrekson (2001) studied a panel of wealthy nations and concluded that there is a strong negative relationship between public expenditures and economic growth.[22]

All of the above studies used various government expenditure variables to capture the size and scope of government activities. We, in contrast, use the percent of a county's population employed by the federal, state and local governments. These variables offer several advantages over expenditure variables. First, separate measures for federal, state and local government allow us to explore how the relationship between extent of the public sector and growth differs at three levels of decentralization. Second, the three separate measures can help to alleviate problems of interpreting coefficients when externalities exist across economies. At least the local government variable should be nearly immune to spill-over effects.

Our government employment variables are also complementary to the expenditure variables of previous studies. First, the employment variables can be interpreted as a stock of government activities/roles producing a flow of services, while government expenditures are the flow of services itself. Second, while previous studies directly account for government expenditure, our employment variables directly account for the extent to which government is *involved*, i.e. the percent of labor force activities directed by government.[23] Third, while expenditure measures can often provide useful differentiation of roles of government (e.g. education versus other roles (Evans and Karras, 1994)), our employment variables provide another differentiation of roles (i.e. those associated with federal government versus those of state and local governments).

Table 4 summarizes the results for the full sample and for the same states reported for section 4. In the full sample, we find a negative relationship between the

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[22] An important paper by Levine and Renelt (1992) demonstrated that conclusions from cross-country regressions may not be robust to small changes in the set of conditioning variables. In particular, "a broad array of fiscal-expenditure variables [that have been] considered by the profession, are not robustly correlated with growth"(p.943). Of note, the 2SLS approach theoretically yields consistent estimators for conditioning variable coefficients regardless of the specific set included. As well, our set of conditioning variables is large (even in the individual state regressions (33)) and, therefore, minimizes omitted variable bias in practice.
[23] Of course, expenditure and involvement are not mutually exclusive. Government *expends* wages so that labor is *involved* in government activities.

percent of the population employed by government and the rate of economic growth. The effect is negative and statistically significant regardless of whether one considers federal, state or local government. Furthermore, there is no clear pattern of the public sector having less of a negative effect at increasingly more decentralized levels. The coefficients for the federal, state and local variables are –0.0222, –0.0163, and –0.0204 respectively (all significant at the 1 percent level).[24]

Considering each state separately, there are numerous cases of significant coefficients on the government employment variables. In 9 out of 25 states examined, the federal government coefficient is significant at the 10 percent level or better; 8 out of 25 for the state government coefficients; 5 out of 25 for the local government coefficients. All but 2 of these 22 of these significant coefficient estimates are of negative sign. Interestingly, the only 2 positive coefficients are both for the state of North Dakota (the federal and local government employment variables) and are large (0.2289 and 0.2417 respectively). Aside from this outlier state, the results are qualitatively homogenous across states: government at all levels is negatively correlated with economic growth paths.

For individual state coefficients on the federal, state and local government variables there exists considerable overlap of the confidence intervals. In fact, using a 95 percent confidence standard, for the federal government coefficients no two can be rejected as identical. Similarly for the state variable coefficients. The only exception is the local government coefficient for North Dakota which is large, positive and significant at the 5 percent level. However, that North Dakota is an outlier in the analysis has already been noted. Setting that state aside, the overall picture that emerges is one where government at all levels hinders economic growth, and one where discernable differences between "good" versus "bad" government across states cannot be detected.

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[24] While these findings suggest that an increased public sector hinders economic growth via distortion of incentives and diversion of resources, another possible interpretation is that non-government wage growth simply outpaces government wage growth. In Higgins et al (2003) we assembled government and non-government wage data for the 1970-1998 period. At the state and federal level, non-government wages outpaced government wages in only just above half of U.S. counties (55 percent), and at the local level, government wages grew faster in 70 percent of counties. So for federal and state levels, the story does not seem economically important enough to account for the estimated result, and at the local level it would work against a negative effect appearing.

ii.   *Educational Attainment*

As **Table 1** indicates, our data include eight different variables measuring educational attainment within U.S. counties. We focus on four of these variables: the percent of the population with (a) 9-11 years of education, (b) a high school diploma and no more, (c) some college education but less than a bachelor degree, and (d) a bachelor degree and/or higher degrees.[25] **Table 5** reports the 2SLS coefficient estimates for the select educational attainment variables for the full sample and within-state samples.

We first consider the percent of the population with at least 9 years of education, but less than a high school (or its equivalent) degree. For the full sample the coefficient is –0.0221 and is significant at the 1 percent level. This seems sensible. It implies that the greater percentage of an economy's population without the remedial mathematics, writing and communications skills – as well as the minimum personal discipline and social behavior – necessary to obtain a high school diploma, the lower the economy's balanced growth path. Passing that threshold, the coefficient for the population achieving, but not surpassing, a high school diploma has a point estimate of 0.0097 (significant at the 1 percent level).

More surprisingly, for the full sample the coefficient for the percent of the population with some college education but not enough for a bachelor degree is negative and insignificant. Compare this to the coefficient on the percent of the population with a bachelor degree or more: 0.0732 and significant at the 1 percent level. A possible interpretation of this result concerns the opportunity cost of education. College education ostensibly involves a benefit in the form of increased skills/productivity for the individual, but it also involves a cost in the form of foregone wages. The results may imply that college education of at least 4 years represents (on average) a positive net return to individuals, while the net return on a 2-year degree is questionable.[26]

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[25] The remaining four variables (for public and private elementary schools and nurseries) we get mixed results in the full sample in terms of statistical significance. Although two of them have statistically significant estimated coefficient values, none of the coefficients represent economically significant effects. The point estimates of all coefficients for the full sample are zero up to four decimals.

[26] Kane and Rouse (1995) and Surette (1997) reported that the estimated return to 2-year degrees is positive and equals about 4-6 percent and 7-10 percent, respectively. Neither of these studies uses county-level data. In addition, these studies do not take into account the *social* return, rather than the private return to individuals, as our results presumably do. Both Kane and Rouse and Surette's studies looked at individuals' costs (tuition, wages forgone, experience forgone, etc.) and benefits (wage premiums) while we consider the effect of educational attainment on the average growth of an economy over a 30-year

In all four of these categories we can detect some heterogeneity across states. In the case of the less than high school degree attainment variable, there are 6 statistically significant (10 percent level or better) within-state coefficient estimates. They range from –0.0904 (South Dakota; 1 percent level) to 0.1171 (Colorado; 5 percent level). This result is puzzling. Why would there be some individual states where having a larger percent of the population without a high school diploma be conducive to economic growth? One potential explanation concerns compulsory education laws. The variable may include many people who would have had a high school education given their druthers, and benefited their economy by being forced to. On the other hand, there is an opportunity cost forced on rather-be-truant individuals and a direct cost on school system to deal with them as well. If individuals pushed through the school system while not receiving/accepting the benefits of education, they also forego the productive opportunities available meanwhile. However, the data is silent. Each of the 6 states has roughly similar age spans of compulsion – 7 to 16 (Alabama, Colorado, Illinois and North Carolina), 6 to 16 (South Dakota), or 6 to 18 (Texas) years old[27] – and there is no apparent correlation between these small differences and the coefficient estimates.

Some heterogeneity also is detected across the significant high school diploma variable coefficients. Of the 8 coefficient estimates significant at the 10 percent level or better, 2 of them are negative (Mississippi and Ohio) and 1 has a 95 percent confidence interval entirely in the negative range (Mississippi). However, among the 6 coefficients with positive point estimates there is no statistically significant difference between them. One straightforward explanation for the detected heterogeneity is simply that schools are better in some states than others. This hypothesis can be informally tested by comparing average scholastic aptitude test (SAT) scores from the states with negative coefficient estimates to those with positive coefficient estimates. Indeed, Ohio has both the lowest

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period. What we might be detecting in our results, therefore, is a questionable social return to associate degrees. This is a potentially important finding for policy-makers. As Kane and Rouse (1995, p.600n) noted, "Twenty percent of Federal Pell Grants, 10 percent of Guaranteed Student Loans, and over 20 percent of state expenditures for postsecondary education, go to community colleges."

[27] These laws are from a report by the U.S. Department of Education (2001a), except for the Colorado law, which comes from the Colorado Department of Education.

math and verbal average scores. However, Mississippi has SAT average scores neither exceptionally high nor low relative to the other seven states.[28]

No statistically significant heterogeneity can be detected among coefficients for the some college variable. Still, it should be noted that every statistically significant coefficient is positive. We cannot detect heterogeneity for the bachelor degree or more variable either.

iii.   *Industry Composition Effects*

Our data include 16 industry-level variables, each measuring the percent of the population employed in the given industry. **Table 1** includes the full list. Here we focus on three industry categories that are of *a priori* interest and had significant estimated effects for the full sample: (a) finance, insurance and real estate, (b) educational services, and (c) entertainment and recreational services. The coefficients estimates for these variables for the full sample and individual state samples are summarized in **Table 6**.

a.   *Finance, Insurance and Real Estate Services*

We find a significant, positive correlation between the percent of the population employed in finance, insurance and real estate services and economic growth in the full sample. The point coefficient estimate is 0.0777 and is significant at the 1 percent level. A possible reason for the correlation is a link between financial intermediation and economic growth. Rousseau and Wachtel (1998) use data from 1870 to 1920 to document quantitatively important links between financial intensity and per capita output levels in five OECD countries. Furthermore, Greenwood and Jovanovic (1990) and King and Levine (1993) provided theoretical models rationalizing this link. In the Greenwood and Jovanovic model, as financial intermediation becomes more prevalent, agents gain confidence in intermediaries' ability to allocate funds profitably. This leads to better matching of funds to productive investments and, consequently, to greater growth. In King and Levine's model, greater intermediation enhances information gathering potential and allows for funding of productive investment by less-well-established firms that otherwise would remain un-funded.

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[28] The SAT score test of the hypothesis, however, relies on an assumption that the predominant portion of the population with high school degrees obtained their high school degrees in the considered state. For entire states, this seems *a priori* plausible but not certain.

We find qualitative, as well as quantitative, heterogeneity across within state coefficients. For 7 states coefficient estimates are significant at the 10 percent level or better. For 2 states (Idaho and Louisiana) the estimates are negative. For each of the 7 states, the coefficient is statistically different (at the 95 percent level) from the coefficient of at least one other state. We find this interesting because, as Wachtel (2003, p.34) states, "Economists now take it for granted that a well-developed, market oriented financial sector contributes to economic growth." The significant negative correlations in 2 states begs the question of what forces are there thwarting the conventional wisdom. Unfortunately, an answer is beyond the scope of the present work.

b.   Educational Services

Unlike educational attainment levels, the percent of the population providing education services is negatively correlated with economic growth in the full sample (point estimate –0.0334 and significant at the 1 percent level). Furthermore, no significant heterogeneity is detected across states. For the 6 states with coefficient estimates significant at the 10 percent level or better, each and every point estimate is negative. As well, only 1 state's coefficient estimate is significant at better than the 10 percent level (Indiana;1 percent level). Therefore none of the coefficients are statistically different from another at the 5 percent level.

Why a negative correlation between the percent of the population providing educational services and economic growth? Perhaps the benefits of education provided in a county are not entirely internalized by the county itself. We report a positive correlation between human capital and economic growth (section 5.ii.), but the correlation is silent as to where the stock is accumulated. For example, individuals may attend college or university where human capital is relatively easy to accumulate, and then move to other counties as they join the workforce.[29] [30]

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[29] In Higgins et al (2003) we found that the negative association is particularly strong in metro counties. This is consistent with an externality argument in that a large proportion of colleges and universities are in metro areas, but many students leave the metro areas upon graduation. The effect in a sample of only non-metro counties, as a matter of fact, was not statistically significant.

[30] Another explanation for the negative relationship is bureaucratic over-expansion of the public school systems. This hypothesis is frequently entertained in the popular media and was explored by Marlow (2001) in the California primary and secondary school districts. However, Marlow found that an increase in the number of teachers has no statistically significant effect on SAT scores or dropout rates, and an increase in the size of administrative staff *increases* the SAT scores and *decreases* dropout rates.

c.   *Entertainment and Recreational Services*

         The estimated effect of the percent of the population employed in entertainment and recreation industries is positive and significant (1 percent level) in the full sample (point estimate 0.0477). This effect may be an important one. First, to put it in perspective, the estimated partial correlation is larger (in absolute value) than that for any of the public sector extent variables. Second, Costa (1997, Table 1) has reported that, as a percent of U.S. households' budgets, recreation expenditures rose from 1.9 percent around 1890, to 4.5 percent in 1950, and then 5.6 percent in 1991. Thus entertainment and recreation services comprise an increasingly large segment of the U.S. economy.

         Within states, 6 had estimated coefficients significant at the 10 percent level or better. All of them are positive. There are only two coefficients estimates (California and Mississippi) that are statistically different from one another at the 5 percent level.[31]

         The positive correlation between recreation and entertainment industry with economic growth might be capturing the attraction of economic activity to counties where gambling casinos and professional sports teams are located. Siegfried and Zimbalist (2000, p.114) reported that by 2005 there will be 95 professional sports stadiums having been constructed since 1990, and more than $27.1 billion will be spent on these stadiums.[32] Eadington (1999, p.173) reported that gross gaming revenues reached $540 billion in 1997. In addition, Walker and Jackson (1998) documented economic growth being stimulated by the introduction of casino industries. The within-state results can offer little insight into the above hypothesis. California, Georgia and New York all have at least one professional team in the NHL, NBA, MLB and NFL. However, Indiana has only an NBA team, and Louisiana and Mississippi have no teams in any of these major professional sports leagues. Likewise, Indiana, Louisiana and Mississippi allow for casinos, while California, Georgia and New York do not.

6.   Conclusions

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[31] Interestingly, of the 7 coefficient estimates, California has the lowest point estimate. It is still positive and significant but "common knowledge" might suggest that the home of Hollywood would be one where entertainment industry fostered economic growth.

[32] "Professional sport" refers to the NHL, the MLB, the NFL and the NBA.

We utilize a county-level data set to explore growth determination in the U.S. and possible heterogeneity in the determination process across individual states. The data set includes over 3,000 cross-sectional observations and 39 demographic conditioning variables to control for variation in the balanced growth paths. Combined with this data we exploit a consistent two stage least squares estimation procedure that does not bias convergence rate estimates downward (as does conventional OLS). However, we report OLS estimates as well.

Convergence across the U.S. averages nearly 7 percent per year – higher than the 2 percent normally found with OLS in cross-country and U.S. state samples. Across individual states, estimated convergence rates for 32 states are above 2 percent with an average of 8.1 percent. For 29 states the convergence rate is above 2 percent with 95 percent confidence. We find substantial heterogeneity in individual state convergence rates. For 7 states the convergence rate can be rejected as identical to at least one other state's convergence rate with 95 percent confidence. The high convergence rates are encouraging in the sense that, given proper policies to induce and support balanced growth paths similar to leader economies, laggard economies can close the gap relatively quickly to what previous research has suggested. However, there is a grain of salt. If significant heterogeneity exists in convergence rates across U.S. states, as the county-level data indicates, the heterogeneity across different nations could be greater, and convergence rates could well be lower for certain economies.

In examining the determinants of balanced growth path heights, we find that government at all levels of decentralization is negatively correlated with economic growth. Educational attainment of a population has a non-linear relationship with economic growth according to our estimates: growth is positively related to high-school degree attainment, seemingly unrelated to obtaining some college education, and then positively related to four-year or more degree attainment. Also, finance, insurance and real estate industry and entertainment industry are positively correlated with growth, while education industry is negatively correlated with growth. Heterogeneity in the effects of balanced growth path determinants across individual states is much harder to detect or dismiss than heterogeneity of convergence rates.

Data Appendix: Measurement of Per Capita Income

Because of the critical importance of the income variable for the study of growth and convergence, we want to address its measurement in some detail. Two options were available to us for the construction of the county-level per capita income variable: (1) Census Bureau database, and (2) BEA-REIS database.

Income information collected by the Census Bureau for states and counties is prepared decennially from the "long-form" sample conducted as part of the overall population census (BEA, 1994). This money income information is based on the self-reported values by Census Survey respondents. An advantage of the Census Bureau's data is that they are reported and recorded by place of residence. These data, however, are available only for the "benchmark" years, i.e., the years in which the decennial Census survey is conducted.

The second source for this data, and the one chosen for this project, is personal income as measured by the Bureau of Economic Analysis (BEA).[33] The definitions that are used for the components of personal income for the county estimates are essentially the same as those used for the national estimates. For example, the BEA defines "personal income" as the sum of wage and salary disbursements, other labor income, proprietors' income (with inventory valuation and capital consumption adjustments), rental income (with capital consumption adjustment), personal dividend income and personal interest income. (BEA, 1994) "Wage and salary disbursements' are measurements of pre-tax income paid to employees. "Other labor income" consists of payments by employers to employee benefit plans. "Proprietors' income" is divided into two separate components—farm and non-farm. Per capita income is defined as the ratio of this personal income measure to the population of an area.

The BEA's estimates of personal income reflect the revised national estimates of personal income that resulted from the 1991 comprehensive revision and the 1992 and 1993 annual revisions of the national income and product accounts. The revised national estimates were incorporated into the local area estimates of personal income as part of a

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[33] The data and their measurement methods are described in detail in "Local Area Personal Income, 1969–1992" published by the BEA under the Regional Accounts Data, February 2, 2001.

comprehensive revision in May 1993. In addition, the estimates incorporate source data that were not available in time to be used in the comprehensive revisions.[34]

The BEA compiles data from several different sources in order to derive this personal income measure. Some of the data used to prepare the components of personal income are reported and recorded by place of work rather than place of residence. Therefore, the initial estimates of these components are on a place-of-work basis. Consequently, these initial place-of-work estimates are adjusted so that they will be on a place-of-residence basis and so that the income of the recipients whose place of residence differs from their place of work will be correctly assigned to their county of residence.

As a result, a place of residence adjustment is made to the data. This adjustment is made for inter-county commuters and border workers utilizing journey-to-work (JTW) data collected by Census. For the county estimates, the income of individuals who commute between counties is important in every multi-county metropolitan area and in many non-metropolitan areas. The residence adjustment estimate for a county is calculated as the total inflows of the income subject to adjustment to county i from county j minus the total outflows of the income subject to adjustment from county i to county j. The estimates of the inflow and outflow data are prepared at the Standard Industrial Classification (SIC) level and are calculated from the JTW data on the number of wage and salary workers and on their average wages by county of work for each county of residence from the Population Census.

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[34] For details of these revisions, see "Local Area Personal Income: Estimates for 1990–92 and Revisions to the Estimates for 1981–91," *Survey of Current Business* 74 (April 1994), 127–129.

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Table 1: Variable Definitions and their Source

Variable	Definition	Period	Source
Income	Per Capita Personal Income (excluding transfer payments)	1969–1998	BEA[35]
Land Area	Land Area in km^2	1970-1990	Census[36]
Water Area	Water Area in km^2	1970-1990	Census
Age: 5-13 years	Percent of 5–13 year olds in the population	1970-1990	Census
Age: 14-17 years	Percent of 14–17 year olds in the population	1970-1990	Census
Age: 18-64 years	Percent of 18–64 year olds in the population	1970-1990	Census
Age: 65+	Percent of 65+ olds	1970-1990	Census
Blacks	Percent of Blacks	1970-1990	Census
Hispanic	Percent of Hispanics	1970-1990	Census
Education: 9-11 years	Percent of population with 11 years education or less	1970-1990	Census
Education: H.S. diploma	Percent of population with high school diploma	1970-1990	Census
Education: Some college	Percent of population with some college education	1970-1990	Census
Education: Bachelor +	Percent of population with bachelor degree or above	1970-1990	Census
Education: Public elementary	Number of students enrolled in public elementary schools	1970-1990	Census
Education: Public nursery	Number of students enrolled in public nurseries	1970-1990	Census
Education: Private elementary	Number of students enrolled in private elementary schools	1970-1990	Census
Education: Private nursery	Number of students enrolled in private nurseries	1970-1990	Census
Housing	Median house value	1970-1990	Census
Federal government employment	Percent of population employed by the federal government in the county	1969-1998	BEA
State government employment	Percent of population employed by the state government in the county	1969-1998	BEA
Local government employment	Percent of population employed by the local government in the county	1969-1998	BEA
Self-employment	Percent of population self-employed	1970-1990	Census
Agriculture	Percent of population employed in agriculture	1970-1990	Census
Communications	Percent of population employed in communications	1970-1990	Census
Construction	Percent of population employed in construction	1970-1990	Census
Finance, insurance & real estate	Percent of population employed in finance, insurance, and real estate	1970-1990	Census
Manufacturing: durables	Percent of population employed in Manufacturing of durables	1970-1990	Census
Manufacturing: non-durables	Percent of population employed in manufacturing of non-durables	1970-1990	Census
Mining	Percent of population employed in mining	1970-1990	Census
Retail	Percent of population employed in retail trade	1970-1990	Census
Business & repair services	Percent of population employed in business and repair services	1970-1990	Census
Educational services	Percent of population employed in education services	1970-1990	Census
Professional related services	Percent of population employed in professional services	1970-1990	Census
Health services	Percent of population employed in health services	1970-1990	Census

[35] All BEA variables are available for each year from 1969-1998.
[36] Note, all Census variables are gathered from the 1970, 1980 & 1990 Census tapes. Values for 1969 were obtained via the interpolation method as discussed in the data section.

Table 1: Variable Definitions and their Sources (Cont.)

Personal services	Percent of population employed in personal services	1970-1990	Census
Entertainment & recreational services	Percent of population employed in entertainment and recreational services	1970-1990	Census
Transportation	Percent of population employed in transportation	1970-1990	Census
Wholesale trade	Percent of population employed in wholesale trade	1970-1990	Census
Poverty	Percent of the population living at or below the poverty level	1970-1990	Census
Metro area, 1970	Dummy Variable: 1 if the county was in a metro area in 1970, and 0 otherwise	1970	Census

Table 2: Analysis of Beta Values

State	Number of Counties	Unconditional	OLS	2SLS
United States[37]	3,058	-0.0068 (15.88)*	-0.0174 (22.15)*	-0.0345 (24.19)*
Alabama	67	-0.0039 (1.56)	-0.0251 (2.38)**	-0.0334 (20.49)*
Arkansas	74	-0.0086 (3.20)*	-0.0267 (4.48)*	-0.0384 (22.08)*
California	58	0.0218 (3.99)*	-0.0261 (2.50)**	-0.0235 (4.87)*
Colorado	63	-0.0041 (1.26)	-0.0134 (2.53)**	-0.0318 (13.41)*
Florida	67	0.0026 (0.81)	-0.0190 (2.06)**	-0.0319 (14.98)*
Georgia	159	-0.0065 (3.09)*	-0.0171 (4.33)*	-0.0367 (36.46)*
Idaho	44	-0.0182 (3.66)*	-0.0403 (2.23)**	-0.0406 (10.03)*
Illinois	102	-0.0030 (1.41)	-0.0255 (5.46)*	-0.0281 (9.07)*
Indiana	92	0.0004 (0.11)	-0.0061 (1.02)	-0.0299 (9.25)*
Iowa	99	-0.0069 (1.85)***	-0.0288 (5.65)*	-0.0289 (4.75)*
Kansas	106	-0.0163 (7.84)*	-0.0286 (9.76)*	-0.0301 (12.18)*
Kentucky	120	-0.0043 (2.85)*	-0.0253 (6.11)*	-0.0354 (19.74)*
Louisiana	64	-0.0032 (1.22)	-0.0222 (3.83)*	-0.0413 (13.83)*
Michigan	83	0.0056 (2.14)**	-0.0104 (1.36)	-0.0387 (16.52)*
Minnesota	87	-0.0056 (2.44)**	-0.0156 (2.85)*	-0.0260 (9.34)*
Mississippi	82	0.0012 (0.43)	-0.0182 (2.05)**	-0.0448 (13.43)*
Missouri	115	-0.0038 (2.34)**	-0.0171 (3.78)*	-0.0455 (10.74)*
Montana	56	-0.0244 (5.31)*	-0.0229 (3.31)*	-0.0328 (9.14)*
New York	62	0.0120 (4.45)*	0.0129 (1.24)	-0.0264 (7.78)*
North Carolina	100	-0.0033 (1.47)	-0.0171 (3.32)*	-0.0467 (7.11)*
North Dakota	53	-0.0119 (1.85)***	-0.0279 (3.29)*	-0.0594 (4.79)*
Ohio	88	0.0047 (1.83)***	-0.0136 (1.87)***	-0.0274 (7.68)*
Oklahoma	77	-0.0123 (6.49)*	-0.0248 (3.95)*	-0.0387 (22.11)*
Pennsylvania	67	0.0038 (1.31)	-0.0176 (2.53)**	-0.0312 (9.01)*
South Carolina	46	0.0014 (0.53)	-0.0118 (0.62)	-0.0336 (5.97)*
South Dakota	66	0.0003 (0.06)	-0.0193 (2.39)**	-0.0265 (4.77)*
Tennessee	97	-0.0002 (0.07)	-0.0199 (3.55)*	-0.0392 (15.21)*
Texas	254	-0.0086 (5.09)*	-0.0211 (8.10)*	-0.0356 (15.18)*
Virginia	84	0.0016 (0.62)	-0.0045 (0.69)	-0.0348 (15.81)*
Washington	39	-0.0129 (1.96)**	-0.0349 (1.09)	-0.0327 (9.29)*
West Virginia	55	-0.0053 (1.81)***	0.0043 (0.43)	-0.0336 (15.49)*
Wisconsin	70	-0.0009 (0.37)	-0.0191 (3.08)*	-0.0240 (6.83)*

t-statistics are reported in parentheses

*   significant at 1% level
**   significant at 5% level
***   significant at 10% level

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[37] See Higgins, Levy and Young (2002).

Table 3 Asymptotic Convergence Rates – Point Estimates & 95% Confidence Intervals

State	Number of Counties	OLS Estimates & 95% C.I. [38]	2SLS Estimates & C.I.
United States[39]	3,058	0.0237 (0.0208, 0.0267)	0.0682 (0.0544, 0.0911)
Alabama	67	0.0424 (0.0036, 0.1080)	0.0931 (0.0492, 0.1466)
Arkansas	74	0.0479 (0.0166, 0.1098)	0.0738 (0.0570, 0.1363)
California	58	0.0457 (0.0046, 0.1249)	0.0375 (0.0178, 0.0868)
Colorado	63	0.0166 (0.0031, 0.0384)	0.0759 (0.0426, 0.1009)
Florida	67	0.0268 (0.0010, 0.1109)	0.0767 (0.0480, 0.1174)
Georgia	159	0.0230 (0.0109, 0.0413)	0.1043 (0.0699, 0.1142)
Idaho	44	0.0892 (0.0021, 0.1566)	0.0913 (0.0471, 0.1145)
Illinois	102	0.0434 (0.0213, 0.1168)	0.0537 (0.0337, 0.1062)
Indiana	92	0.0067 (-0.0054, 0.0245)	0.0622 (0.0354, 0.1221)
Iowa	99	0.0570 (0.0224, 0.1176)	0.0574 (0.0175, 0.0954)
Kansas	106	0.0560 (0.0360, 0.1086)	0.0639 (0.0434, 0.1228)
Kentucky	120	0.0431 (0.0233, 0.0922)	0.1054 (0.0561, 0.1160)
Louisiana	64	0.0341 (0.0128, 0.0955)	0.1555 (0.0989, 0.1940)
Michigan	83	0.0121 (-0.0043, 0.0427)	0.1152 (0.0536, 0.1659)
Minnesota	87	0.0202 (0.0053, 0.0459)	0.0454 (0.0305, 0.0719)
Mississippi	82	0.0249 (0.0009, 0.1509)	0.1405 (0.0455, 0.1923)
Missouri	115	0.0230 (0.0094, 0.0452)	0.0817 (0.0387, 0.1132)
Montana	56	0.0359 (0.0099, 0.0996)	0.0865 (0.0367, 0.1566)
New York	62	0.0111 (-0.0238, 0.0284)	0.0465 (0.0285, 0.0853)
North Carolina	100	0.0228 (0.0078, 0.0491)	0.1302 (0.0966, 0.1574)
North Dakota	53	0.0528 (0.0103, 0.1247)	0.0761 (0.0353, 0.1102)
Ohio	88	0.0170 (-0.0005, 0.0520)	0.0503 (0.0299, 0.1059)
Oklahoma	77	0.0415 (0.0139, 0.1136)	0.1152 (0.0574, 0.1437)
Pennsylvania	67	0.0240 (0.0043, 0.0707)	0.0705 (0.0291, 0.1099)
South Carolina	46	0.0142 (-0.0147, 0.1259)	0.0960 (0.0243, 0.1315)
South Dakota	66	0.0274 (0.0036, 0.1391)	0.0406 (0.0184, 0.1144)
Tennessee	97	0.0287 (0.0102, 0.0689)	0.0681 (0.0488, 0.1168)
Texas	254	0.0312 (0.0208, 0.0458)	0.1170 (0.0675, 0.1564)
Virginia	84	0.0047 (-0.0074, 0.0227)	0.0703 (0.0500, 0.1271)
Washington	39	0.0518 (-.0119, 0.0971)	0.0845 (0.0448, 0.1449)
West Virginia	55	0.0040 (-0.0184, 0.0199)	0.0634 (0.0466, 0.0972)
Wisconsin	70	0.0270 (0.0077, 0.0716)	0.0390 (0.0231, 0.0688)

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[38] Asymptotic convergence rates and 95% confidence intervals in parentheses reflect observations whose beta values, in *Table 1*, are not significant.

[39] See Higgins, Levy and Young (2002) for full set of results for the United States.

Table 4: Analysis of Select Government Variables

Region	Number of Counties	Federal Government Employment 2SLS	95% C.I.	State Government Employment 2SLS	95% C.I.	Local Government Employment 2SLS	95% C.I.
United States	3,058	-0.0222 (4.26)*	(-0.0119,-0.0324)	-0.0163 (4.07)*	(-0.0085, -0.0242)	-0.0204 (3.91)*	(-0.0101, -0.0305)
Alabama	67	0.0391 (0.72)	(-0.0714, 0.1497)	-0.0131 (0.27)	(-0.1112, 0.0851)	0.0379 (0.71)	(-0.0712, 0.1472)
Arkansas	74	-0.0142 (0.29)	(-0.1138, 0.0854)	-0.0408 (1.13)	(-0.1135, 0.0319)	-0.0392 (0.90)	(-0.1277, 0.0491)
California	58	0.0352 (1.23)	(-0.0239, 0.0944)	0.0331 (0.84)	(-0.0477, 0.1140)	0.0462 (0.72)	(-0.0856, 0.1782)
Colorado	63	-0.0609 (1.69)***	(-0.1384, 0.0165)	-0.0605 (1.66)***	(-0.1452, 0.0240)	-0.0215 (0.61)	(-0.0941, 0.0511)
Florida	67	0.0280 (0.38)	(-0.1214, 0.1775)	0.0049 (0.09)	(-0.1082, 0.1181)	-0.0244 (0.28)	(-0.1997, 0.1508)
Georgia	159	-0.0100 (0.28)	(-0.0802, 0.0601)	0.0035 (0.15)	(-0.0432, 0.0503)	0.0144 (0.48)	(-0.0455, 0.0745)
Idaho	44	-0.1102 (1.94)***	(-0.2367, 0.0162)	0.0364 (1.10)	(-0.0371, 0.1098)	0.0280 (0.41)	(-0.1239, 0.1801)
Illinois	102	0.0405 (1.24)	(-0.0247, 0.1058)	-0.0095 (0.51)	(-0.0473, 0.0281)	-0.0009 (0.04)	(-0.0485, 0.0467)
Indiana	92	-0.0968 (2.03)**	(-0.1654, 0.0438)	-0.0043 (0.18)	(-0.0528, 0.0442)	-0.0319 (0.87)	(-0.1059, 0.0419)
Iowa	99	0.0541 (1.43)	(-0.0212, 0.1294)	-0.0457 (2.32)**	(-0.0849, -0.0064)	0.0135 (0.51)	(-0.0400, 0.0671)
Kansas	106	0.0253 (0.64)	(-0.0535, 0.1042)	0.0108 (0.67)	(-0.0213, 0.0431)	0.0179 (1.07)	(-0.0154, 0.0513)
Kentucky	120	-0.0192 (1.85)***	(-0.0644, 0.0258)	-0.0041 (0.20)	(-0.0440, 0.0358)	-0.0078 (0.30)	(-0.0599, 0.0442)
Louisiana	64	-0.0252 (1.73)***	(-0.0957, 0.0451)	-0.0160 (0.49)	(-0.0832. 0.0511)	-0.1652 (2.85)*	(-0.2836, -0.0467)
Michigan	83	0.0716 (1.45)	(-0.0273, 0.1706)	-0.0631 (2.33)**	(-0.1174, -0.0087)	-0.0332 (0.97)	(-0.1021, 0.0355)
Minnesota	87	-0.0371 (0.61)	(-0.1588, 0.0845)	-0.0108 (0.47)	(-0.0577, 0.0360)	-0.0246 (1.03)	(-0.0725, 0.0232)
Mississippi	82	0.0127 (0.21)	(-0.1092, 0.1347)	-0.0396 (0.84)	(-0.1341, 0.0548)	-0.1485 (2.51)**	(-0.2673, -0.0297)
Missouri	115	-0.0917 (2.94)*	(-0.1539, -0.0295)	-0.0655 (2.77)*	(-0.1125, -0.0184)	-0.0205 (0.70)	(-0.0783, 0.0373)
Montana	56	-0.0854 (1.37)	(-0.2149, 0.0441)	-0.0057 (0.14)	(-0.0911, 0.0797)	-0.0132 (0.32)	(-0.0995, 0.0731)
New York	62	0.0966 (0.80)	(-0.1519, 0.3452)	0.0531 (1.19)	(-0.0382, 0.1446)	0.0072 (0.11)	(-0.1321, 0.1466)
North Carolina	100	-0.1674 (3.06)*	(-0.2767, -0.0582)	-0.0432 (1.78)***	(-0.0919, 0.0053)	-0.0038 (0.07)	(-0.1112, 0.1034)
North Dakota	53	0.2289 (2.00)***	(-0.0095, 0.4274)	0.1278 (1.55)	(-0.0445, 0.3001)	0.2417 (2.55)**	(0.0439, 0.4349)
Ohio	88	-0.0232 (0.41)	(-0.1375, 0.0910)	-0.0318 (1.35)	(-0.0792, 0.0154)	-0.0202 (0.43)	(-0.1146, 0.0741)
Oklahoma	77	-0.1022 (1.95)***	(-0.2078, 0.0034)	-0.0642 (1.84)***	(-0.1346, 0.0061)	-0.0902 (2.46)**	(-0.1641, -0.0163)
Pennsylvania	67	0.0167 (0.27)	(-0.1101, 0.1435)	0.0252 (0.96)	(-0.0282, 0.0786)	-0.1365 (2.22)**	(-0.2616, -0.0113)
South Carolina	46	-0.0164 (0.20)	(-0.1920, 0.1591)	-0.0734 (1.76)***	(-0.2846, 0.1376)	-0.0184 (0.17)	(-0.2544, 0.2174)
South Dakota	66	-0.0488 (1.05)	(-0.1433, 0.0455)	-0.0014 (0.04)	(-0.0719, 0.0691)	-0.0544 (1.23)	(-0.1449, 0.0359)
Tennessee	97	-0.0032 (0.10)	(-0.0703, 0.0638)	-0.0615 (1.83)***	(-0.1288, 0.0057)	0.0067 (0.19)	(-0.0658, 0.0794)
Texas	254	-0.0307 (0.96)	(-0.0938, 0.0323)	-0.0021 (0.11)	(-0.0385, 0.0343)	-0.0306 (1.35)	(-0.0755, 0.0141)
Virginia	84	-0.0166 (0.42)	(-0.0975, 0.0642)	-0.0122 (0.29)	(-0.0964, 0.0718)	0.0234 (0.44)	(-0.0826, 0.1295)
Washington	39	-0.0268 (0.42)	(-0.1930, 0.1392)	-0.0691 (0.57)	(-0.3816, 0.2434)	-0.1572 (0.69)	(-0.7462, 0.4316)
West Virginia	55	0.0862 (1.20)	(-0.0631, 0.2356)	0.0147 (0.41)	(-0.0591, 0.0885)	-0.0250 (0.31)	(-0.1939, 0.1438)
Wisconsin	70	0.0147 (0.45)	(-0.0522, 0.0818)	-0.0208 (0.68)	(-0.0835, 0.0417)	0.0459 (1.33)	(-0.0242, 0.1162)

t-statistics are reported in parentheses
*   significant at 1% level
**   significant at 5% level
*** significant at 10% level

Table 5: Analysis of Select Education Variables

Region	Some High School Education 2SLS	95% C.I.	High School Diploma 2SLS	95% C.I.	Some College Education 2SLS	95% C.I.	Bachelor Degree or Higher 2SLS	95% C.I.
United States	-0.0221 (6.21)*	(-0.0292, -0.0152)	0.0097 (3.26)*	(0.0038, 0.0156)	-0.0025 (0.41)	(-0.0143, 0.0094)	0.0732 (12.01)*	(0.0613, 0.0852)
Alabama	0.0832 (2.07)**	(0.0015, 0.1649)	0.0832 (2.07)**	(0.0014, 0.1649)	0.1229 (1.41)	(-0.0538, 0.2997)	0.0448 (0.77)	(-0.0741, 0.1639)
Arkansas	-0.0223 (0.73)	(-0.0844, 0.0397)	0.0153 (0.49)	(-0.0478, 0.0786)	0.0492 (0.75)	(-0.0832, 0.1818)	0.1188 (1.56)	(-0.0346, 0.2723)
California	-0.0673 (1.02)	(-0.2041, 0.0694)	-0.0212 (0.60)	(-0.0941, 0.0515)	0.0513 (0.77)	(-0.0857, 0.1884)	0.1003 (2.36)*	(0.0126, 0.1880)
Colorado	0.1171 (2.44)**	(0.0191, 0.2151)	0.0654 (2.23)**	(0.0053, 0.1255)	0.0600 (0.90)	(-0.0769, 0.1969)	0.1178 (3.03)*	(0.0382, 0.1974)
Florida	-0.0045 (0.07)	(-0.1282, 0.1193)	0.0649 (0.95)	(-0.0750, 0.2048)	0.1813 (1.69)***	(-0.0372, 0.3998)	0.1094 (1.28)	(-0.0647, 0.2837)
Georgia	0.0087 (0.58)	(-0.0210, 0.0384)	0.0103 (0.60)	(-0.0240, 0.0447)	0.0715 (1.77)***	(-0.0084, 0.1515)	0.0279 (0.90)	(-0.0335, 0.0894)
Idaho	0.0612 (0.93)	(-0.0859, 0.2085)	0.0893 (2.31)**	(0.0031, 0.1755)	-0.0052 (0.11)	(-0.1135, 0.1030)	0.0656 (0.65)	(-0.1579, 0.2891)
Illinois	-0.0587 (3.22)*	(-0.0952, -0.0223)	-0.0149 (1.38)	(-0.0364, 0.0066)	0.0280 (0.89)	(-0.0345, 0.0907)	0.0495 (1.61)	(-0.0117, 0.1108)
Indiana	-0.0333 (1.31)	(-0.0842, 0.0175)	-0.0220 (1.37)	(-0.0542, 0.0102)	0.1129 (2.09)**	(0.0045, 0.2214)	0.0406 (0.82)	(-0.0584, 0.1396)
Iowa	-0.0314 (1.28)	(-0.0803, 0.0174)	-0.0003 (0.03)	(-0.0245, 0.0238)	0.0157 (0.58)	(-0.0383, 0.0698)	-0.0369 (1.20)	(-0.0983, 0.0244)
Kansas	-0.0281 (1.34)	(-0.0697, 0.0135)	0.0556 (4.49)*	(0.0309, 0.0804)	-0.0031 (0.16)	(-0.0414, 0.0351)	0.0403 (1.54)	(-0.0118, 0.0925)
Kentucky	0.0140 (0.51)	(-0.0410, 0.0692)	0.0562 (3.07)*	(0.0198, 0.0925)	0.0769 (1.77)***	(-0.0096, 0.1635)	0.0711 (1.55)	(-0.0202, 0.1625)
Louisiana	0.0188 (0.73)	(-0.0340, 0.0717)	-0.0178 (0.86)	(-0.0600, 0.0243)	0.0717 (1.19)	(-0.0509, 0.1943)	0.0707 (1.19)	(-0.0508, 0.1922)
Michigan	-0.0428 (1.34)	(-0.1067, 0.0211)	-0.0187 (0.77)	(-0.0677, 0.0302)	-0.0079 (0.15)	(-0.1131, 0.0972)	0.0873 (2.44)**	(0.0154, 0.1592)
Minnesota	-0.0142 (0.43)	(-0.0803, 0.0520)	0.0053 (0.31)	(-0.0290, 0.0396)	0.0441 (1.23)	(-0.0281, 0.1165)	0.0273 (0.64)	(-0.0578, 0.1126)
Mississippi	0.0095 (0.30)	(-0.0551, 0.0743)	-0.0950 (2.24)**	(-0.1804, -0.0095)	-0.0352 (0.57)	(-0.1595, 0.0891)	0.0182 (0.25)	(-0.1294, 0.1659)
Missouri	-0.0226 (0.83)	(-0.0773, 0.0319)	0.0187 (1.11)	(-0.0149, 0.0523)	-0.0271 (0.71)	(-0.1028, 0.0484)	0.1255 (3.50)*	(0.0542, 0.1969)
Montana	-0.1081 (1.54)	(-0.2529, 0.0368)	-0.0028 (0.07)	(-0.0856, 0.0799)	0.0100 (0.24)	(-0.0755, 0.0956)	0.0085 (0.17)	(-0.0983, 0.1154)
New York	0.0306 (0.68)	(-0.0616, 0.1229)	-0.0719 (1.51)	(-0.1697, 0.0258)	0.0193 (0.26)	(-0.1324, 0.1712)	0.1734 (3.31)*	(0.0661, 0.2807)
North Carolina	0.0395 (1.85)***	(-0.0031, 0.0821)	0.0223 (1.07)	(-0.0193, 0.0641)	-0.0162 (0.34)	(-0.1125, 0.0800)	0.1134 (3.02)*	(0.0384, 0.1883)
North Dakota	0.0309 (0.62)	(-0.0735, 0.1354)	-0.0729 (1.82)***	(-0.1568, 0.0108)	0.1838 (2.78)**	(0.0456, 0.3221)	0.1245 (1.35)	(-0.0677, 0.3167)
Ohio	0.0171 (0.60)	(-0.0400, 0.0742)	-0.0317 (1.87)***	(-0.0656, 0.0022)	0.1305 (2.62)*	(0.0305, 0.2306)	0.0691 (1.58)	(-0.0187, 0.1571)
Oklahoma	-0.0018 (0.05)	(-0.0769, 0.0732)	0.0556 (2.43)**	(0.0095, 0.1017)	0.0728 (1.54)	(-0.0226, 0.1683)	0.0230 (0.59)	(-0.0553, 0.1014)
Pennsylvania	-0.0021 (0.07)	(-0.0626, 0.0584)	-0.0331 (1.59)	(-0.0754, 0.0091)	0.0121 (0.20)	(-0.1105, 0.1348)	0.2049 (4.32)*	(0.1085, 0.3014)
South Carolina	-0.0098 (0.20)	(-0.1160, 0.0962)	-0.1084 (1.48)	(-0.2676, 0.0508)	0.1236 (0.66)	(-0.2876, 0.5355)	0.0301 (0.17)	(-0.3684, 0.4249)
South Dakota	-0.0904 (2.58)*	(-0.1621, -0.0186)	0.0181 (0.80)	(-0.0279, 0.0642)	0.0352 (0.72)	(-0.0647, 0.1353)	-0.0811 (1.39)	(-0.1999, 0.0376)
Tennessee	0.0093 (0.33)	(-0.0477, 0.0665)	0.0077 (0.26)	(-0.0511, 0.0666)	-0.0673 (1.10)	(-0.1897, 0.0549)	0.1732 (3.04)*	(0.0592, 0.2872)
Texas	-0.0594 (4.85)*	(-0.0836, -0.0353)	0.0061 (0.45)	(-0.0208, 0.0330)	0.0282 (1.28)	(-0.0153, 0.0717)	-0.0175 (0.70)	(-0.0667, 0.0315)
Virginia	0.0128 (0.48)	(-0.0412, 0.0668)	0.0157 (0.54)	(-0.0429, 0.0744)	-0.0211 (0.28)	(-0.1756, 0.1333)	0.0961 (1.68)***	(-0.0191, 0.2114)
Washington	0.0307 (0.21)	(-0.3521, 0.4135)	0.0146 (0.12)	(-0.2885, 0.3178)	0.0199 (0.28)	(-0.1656, 0.2055)	0.1531 (0.95)	(-0.2609, 0.5673)
West Virginia	0.0470 (0.81)	(-0.0733, 0.1674)	-0.0223 (0.50)	(-0.1146, 0.0700)	-0.0134 (0.15)	(-0.2037, 0.1768)	0.1089 (0.98)	(-0.1206, 0.3385)
Wisconsin	-0.0276 (0.95)	(-0.0855, 0.0308)	-0.0268 (1.62)	(-0.0605, 0.0067)	0.0229 (0.71)	(-0.0424, 0.0884)	0.0923 (2.56)**	(0.0195, 0.1652)

t-statistics are reported in parentheses

* significant at 1% level
** significant at 5% level
*** significant at 10% level

Table 6: Analysis of Select Industry Composition Variables

Region	Number of Counties	Finance, Insurance, Real Estate		Educational Services		Entertainment & Recreational Services	
		2SLS	95% C.I.	2SLS	95% C.I.	2SLS	95% C.I.
United States	3,058	0.0777 (6.16)*	(0.0529, 0.1024)	-0.0334 (3.90)*	(-0.0502, -0.0166)	0.0477 (2.89)*	(0.0153, 0.0800)
Alabama	67	0.2583 (1.80)***	(-0.0331, 0.5498)	-0.1639 (0.94)	(-0.5202, 0.1924)	-0.0954 (0.32)	(-0.7085, 0.5175)
Arkansas	74	0.0464 (0.43)	(-0.1728, 0.2657)	0.1168 (1.52)	(-0.0386, 0.2722)	-0.0676 (0.38)	(-0.4296, 0.2943)
California	58	0.0899 (1.10)	(-0.0792, 0.2591)	0.0332 (0.29)	(-0.2047, 0.2711)	0.1498 (2.31)**	(0.0161, 0.2836)
Colorado	63	0.1091 (1.08)	(-0.0972, 0.3154)	0.0650 (0.96)	(-0.0730, 0.2030)	0.0928 (0.96)	(-0.1057, 0.2914)
Florida	67	0.0561 (0.48)	(-0.1825, 0.2947)	-0.4116 (2.04)**	(-0.8220, -0.0012)	0.1004 (0.39)	(-0.4225, 0.6235)
Georgia	159	-0.0697 (0.90)	(-0.2224, 0.0829)	0.0588 (0.87)	(-0.0751, 0.1928)	0.2271 (1.69)***	(-0.0389, 0.4932)
Idaho	44	-0.3772 (2.34)**	(-0.7360, -0.0184)	-0.2396 (1.93)***	(-0.6175, 0.0522)	-0.2443 (0.79)	(-0.9308, 0.4421)
Illinois	102	0.1018 (2.21)**	(0.0100, 0.1935)	-0.1139 (1.68)***	(-0.2519, 0.0240)	0.3780 (2.29)**	(0.0481, 0.7080)
Indiana	92	-0.0022 (0.03)	(-0.1664, 0.1618)	-0.3293 (3.18)*	(-0.5362, -0.1223)	0.1604 (0.74)	(-0.2726, 0.5936)
Iowa	99	0.1754 (2.00)**	(0.0006, 0.3502)	-0.0233 (0.48)	(-0.1197, 0.0730)	0.2594 (1.46)	(-0.0948, 0.6137)
Kansas	106	0.0736 (1.21)	(-0.0475, 0.1948)	-0.0162 (0.43)	(-0.0923, 0.0597)	0.0679 (0.63)	(-0.1477, 0.2836)
Kentucky	120	-0.0762 (1.17)	(-0.2054, 0.0528)	0.0254 (0.39)	(-0.1036, 0.1544)	0.1347 (0.90)	(-0.1622, 0.4316)
Louisiana	64	-0.4473 (3.39)*	(-0.7167, -0.1778)	0.0084 (0.10)	(-0.1619, 0.1787)	0.4228 (1.86)***	(-0.0406, 0.8864)
Michigan	83	0.1029 (1.01)	(-0.1025, 0.3084)	-0.0243 (0.23)	(-0.2397, 0.1910)	-0.2559 (1.24)	(-0.6713, 0.1594)
Minnesota	87	0.0091 (0.10)	(-0.1653, 0.1835)	-0.0878 (1.40)	(-0.2139, 0.0382)	-0.0524 (0.29)	(-0.4202, 0.3153)
Mississippi	82	0.1244 (0.70)	(-0.2349, 0.4838)	-0.2426 (1.92)***	(-0.4973, 0.0119)	1.1467 (3.18)*	(0.4218, 1.8716)
Missouri	115	-0.0002 (0.01)	(-0.1286, 0.1282)	0.0243 (0.39)	(-0.1001, 0.1487)	-0.1223 (0.67)	(-0.4839, 0.2392)
Montana	56	0.1345 (1.13)	(-0.1123, 0.3813)	-0.0476 (0.66)	(-0.1962, 0.1009)	0.2268 (1.27)	(-0.1413, 0.5949)
New York	62	0.0759 (0.77)	(-0.1264, 0.2783)	-0.0830 (0.51)	(-0.4161, 0.2499)	0.7624 (2.40)**	(0.1129, 1.4120)
North Carolina	100	-0.0858 (0.79)	(-0.3040, 0.1322)	0.0923 (0.84)	(-0.1274, 0.3121)	0.1475 (0.81)	(-0.2159, 0.5108)
North Dakota	53	0.7250 (3.57)*	(0.3014, 1.1485)	0.0900 (0.60)	(-0.2223, 04023)	0.7627 (3.37)*	(0.2908, 1.2347)
Ohio	88	-0.0284 (0.28)	(-0.2324, 0.1756)	0.0345 (0.35)	(-0.1611, 0.2303)	0.2109 (0.98)	(-0.2194, 0.6413)
Oklahoma	77	-0.0913 (1.11)	(-0,2578, 0.0751)	0.0991 (1.24)	(-0.0618, 0.2601)	-0.2212 (1.01)	(-0.6624, 0.2199)
Pennsylvania	67	-0.0515 (0.53)	(-0.2506, 0.1476)	-0.1111 (0.86)	(-0.3736, 0.1513)	0.3957 (1.12)	(-0.3234, 1.1149)
South Carolina	46	-0.1886 (0.55)	(-0.9331, 0.5559)	0.1143 (0.32)	(-0.6737, 0.9023)	-0.2122 (0.45)	(-1.2037, 0.8063)
South Dakota	66	0.0758 (0.72)	(-0.1438, 0.3010)	0.0651 (0.86)	(-0.0887, 0.2189)	-0.1032 (0.56)	(-0.4789, 0.2724)
Tennessee	97	0.2628 (2.29)**	(0.0337, 0.4921)	0.0989 (0.99)	(-0.1007, 0.2986)	-0.3789 (1.20)	(-1.0087, 0.2509)
Texas	254	0.1834 (3.27)*	(0.0730, 0.2939)	-0.0347 (0.80)	(-0.1207, 0.0511)	0.0295 (0.23)	(-0.2228, 0.2821)
Virginia	84	0.1706 (1.39)	(-0.0761, 0.4174)	-0.1852 (1.73)***	(-0.4012, 0.0306)	0.0021 (0.01)	(-0.5651, 0.5694)
Washington	39	-0.0328 (0.12)	(-0.7212, 0.6555)	0.2860 (1.16)	(-0.3458, 0.9179)	-0.0475 (0.07)	(-1.8441, 1.7489)
West Virginia	55	0.1316 (0.85)	(-0.1904, 0.4537)	-0.0645 (0.47)	(-0.3495, 0.2203)	0.2850 (1.50)	(-0.1744, 0.3641)
Wisconsin	70	0.0355 (0.47)	(-0.1195, 0.1907)	-0.0511 (0.58)	(-0.2306, 0.1283)	0.0321 (0.15)	(-0.4187, 0.4835)

t-statistics are reported in parentheses

* significant at 1% level
** significant at 5% level
*** significant at 10% level

Figure 1:
95% Confidence Intervals and Point Estimates of Within-State Asymptotic Convergence Rates
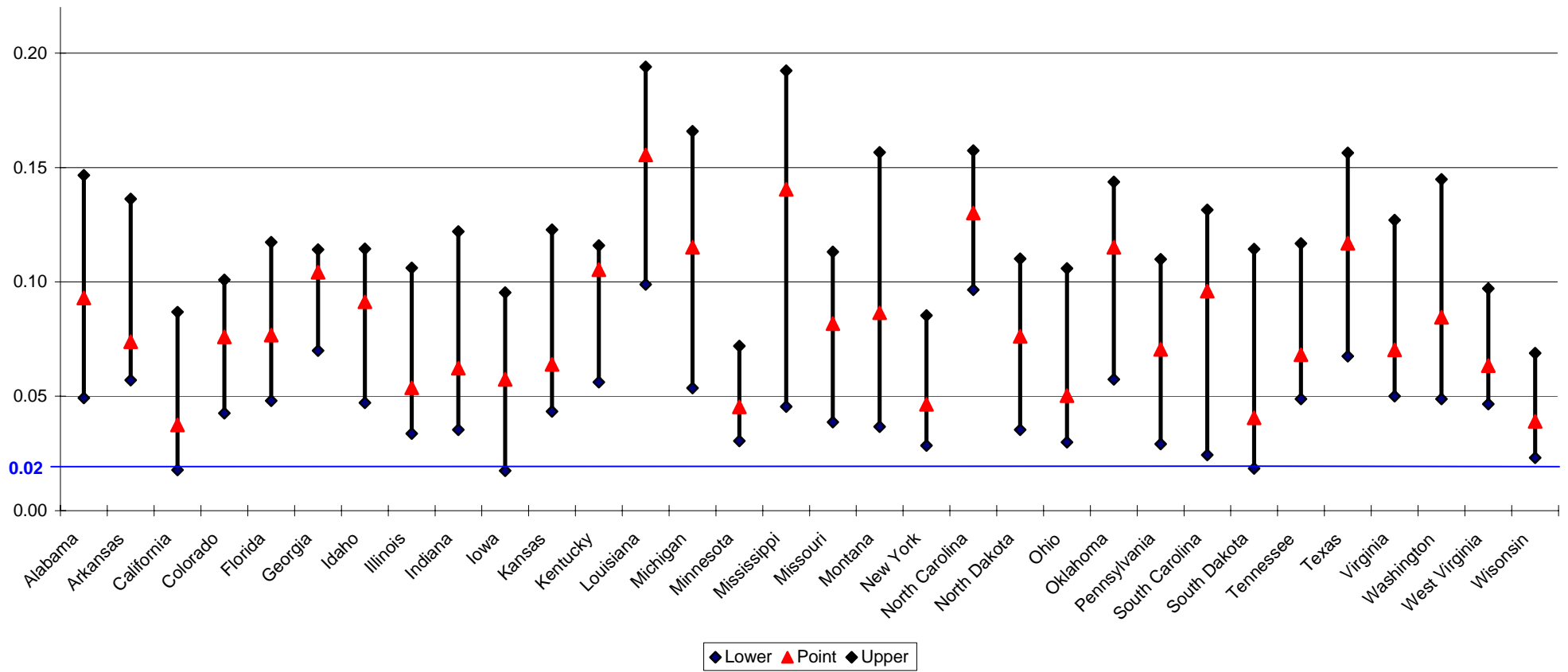
Referee's Appendix: Inconsistency of OLS Estimates

The method of ordinary least squares (OLS) could be used to infer the values of β and γ in equation (3). However, Evans (1997b) states that the OLS estimates obtained from (3) are unlikely to be consistent.[1] In order to demonstrate this inconsistency, Evans first specifies a general autoregressive moving average (ARMA) data-generating process for y_{nt}:

(1A)
$$y_{nt} - a_t = \delta_n + \lambda_n (y_{n,t-1} - a_{t-1}) + \sum_{i=1}^{q} \theta_{ni} \varepsilon_{n,t-i}$$

with

(2A)
$$\delta_n = \kappa + \xi'_n x_n + \omega_n$$

where ε_{nt} is a zero-mean, covariance stationary error process independently distributed over time and across economies. The error term, ε_{nt}, is uncorrelated with x_n, λ_n is an autoregressive parameter which lies on $(0,1]$, and $\theta_{n0}...\theta_{nq}$ satisfy the restriction $\theta_{n0} = 1$. As such, $y_{nt} - a_t$ will also have an autoregressive representation and will be covariance stationary if $\lambda_n < 1$ or difference stationary if $\lambda_n = 1$. The common time-specific effect experienced by every economy is represented by the term a_t. Evans assumes that Δa_t is covariance stationary and independent of ε_{nt}.

The common trend a_t for all the y variables will be the sole catalyst of economic growth in all economies if $\lambda_n < 1$. In this case, growth is exogenous and economies would follow a balanced-growth path. If $\lambda_n = 1$, on the other hand, then economy n will grow endogenously since y_{nt} diverges from a_t and the y variables of all remaining economies. The parameter δ_n controls for the relative height of economy n's balanced growth path if all the λs are less than one. If $\lambda_n = 1$, then δ_n controls for economy n's

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[1] This section borrows heavily from Evans (1997b), which can be consulted for further details.

relative growth rate. The error term ω_n measures the portion of δ_n that is not explained by x_n. This error term is assumed to be uncorrelated with x_n. The inequality $\lambda_n < 1$ will hold for an economy described by the neoclassical growth model.

Solving equation (1A) backward from year T to year 0, substituting from equation (2A), and rearranging produces

(3A)
$$g_n = \alpha_n + \beta_n y_{n0} + \gamma_n' x_n - \frac{\beta_n \omega_n}{1 - \gamma_n} + \frac{1}{T} \sum_{i=0}^{T-1} \lambda_n^i \left(\sum_{j=0}^{\min[i,q]} \lambda_n^{-j} \theta_{nj} \right) \varepsilon_{n,T-i}$$
$$+ \left(\frac{\lambda_n^T}{T} \right) \sum_{i=0}^{q-1} \lambda_n^i \left(\sum_{j=i+1}^{q} \lambda_n^{-j} \theta_{nj} \right) \varepsilon_{n,-i}$$

where $\beta_n = \dfrac{\lambda_n^T - 1}{T}$, $\gamma_n = \dfrac{-\beta_n \xi_n}{1 - \lambda_n}$, and $\alpha_n = \dfrac{a_T - a_0}{T - \beta_n \left(\dfrac{a_0 + \kappa}{1 - \lambda_n} \right)}$. If $\beta_n < 0$, then economy n grows exogenously $(\lambda_n < 1)$. On the other hand, if $\beta_n = 0$, then economy n grows endogenously $(\lambda_n = 1)$.

Now consider a special case in which every intercept δ_n is completely explained by the county characteristics included in x_n $(\omega_n = 0, \forall n)$ and every series $y_{nt} - a_t$ is a first-order auto-regression $(q = 0)$. Under these restrictions equation (3A) reduces to:

(4A)
$$g_n = \alpha_n + \beta_n y_{n0} + \gamma_n' x_n + \frac{1}{T} \sum_{i=0}^{T-1} \lambda_n^i \varepsilon_{n,T-i}$$

The estimator for $\hat{\beta}$ can then be obtained in two steps. First, regress y_{n0} on an intercept and x_n to obtain the residual r_n and then regress g_n on r_n. (This is simply the OLS estimator of β.) Each term in $\dfrac{1}{T} \sum_{i=0}^{T-1} \lambda_n^i \varepsilon_{n,T-i}$ is uncorrelated with the intercept, y_n, x_n and the residual r_n. As a result, one has

$$\text{(5A)} \quad p\lim_{N\to\infty}\hat{\beta} = \frac{p\lim_{N\to\infty}\dfrac{1}{N}\sum_{n=1}^{N}\alpha_n r_n + p\lim_{N\to\infty}\dfrac{1}{N}\sum_{n=1}^{N}\beta_n r_n y_n + p\lim_{N\to\infty}\dfrac{1}{N}\sum_{n=1}^{N}\gamma_n' r_n x_n}{p\lim_{N\to\infty}\dfrac{1}{N}\sum_{n=1}^{N}r_n^2}$$

Making further assumptions that α_n is uncorrelated with r_n, β_n is uncorrelated with $r_n y_n$, and γ_n is uncorrelated with $r_n x_n$, equation (5A) leads to

$$\text{(6A)} \qquad p\lim_{N\to\infty}\hat{\beta} = \frac{p\lim_{N\to\infty}\dfrac{1}{N}\sum_{n=1}^{N}\beta_n r_n^2}{p\lim_{N\to\infty}\dfrac{1}{N}\sum_{n=1}^{N}r_n^2}$$

The probability limit of the OLS estimator is then a weighted average of the economy specific β_ns. It is a consistent estimator of that weighted average.[2]

But what if the assumption that every intercept δ_n is completely explained by x_n and also the assumption that every series $y_{nt} - a_t$ is a first-order auto-regression, are relaxed? Relaxing these assumptions, and imposing the additional restriction that the λs and ξs and, as a result, the βs and γs are identical across all economies (for the simplicity of the exposition), (3A) can be re-written as

$$\text{(7A)} \quad
\begin{aligned}
g_n &= \alpha + \beta y_{n0} + \gamma' x_n - \frac{\beta\omega_n}{1-\gamma} + \frac{1}{T}\sum_{i=0}^{T-1}\lambda^i\left(\sum_{j=0}^{\min[i,q]}\lambda^{-j}\theta_{nj}\right)\varepsilon_{n,T-i} \\
&\quad + \left(\frac{\lambda^T}{T}\right)\sum_{i=0}^{q-1}\lambda^i\left(\sum_{j=i+1}^{q}\lambda^{-j}\theta_{nj}\right)\varepsilon_{n,-i}
\end{aligned}$$

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[2] Strictly speaking, even for this restrictive case, an OLS estimate less than unity does not mean that all the economies in the sample conform to the neoclassical growth model. Rather, it would mean that enough economies conform, so that the weighted average is less than unity. It would mean, therefore, that exogenous growth is the predominant case across the sample.

where $\beta = \dfrac{\lambda^T - 1}{T}$, $\gamma = \dfrac{-\beta\xi}{1-\lambda}$, and $\alpha = \dfrac{a_T - a_0}{T - \beta\left(\dfrac{a_0 + \kappa}{1-\lambda}\right)}$. Applying the same steps to

equation (6A) yields

(8A)
$$p\lim_{N\to\infty}\hat{\beta} = \beta + \frac{(\Phi + \Psi)}{p\lim\limits_{N\to\infty}\dfrac{1}{N}\sum\limits_{n=1}^{N}r_n^2}$$

where $\Phi = \dfrac{\lambda^T}{T}p\lim\limits_{N\to\infty}\dfrac{I}{N}\sum\limits_{n=1}^{N}\left[\sum\limits_{i=0}^{q-1}\lambda^i\left(\sum\lambda^{-j}\theta_{n,j+i+1}\right)r_n\varepsilon_{n,-i}\right]$ and $\Psi = -\dfrac{\beta}{1-\lambda}p\lim\limits_{N\to\infty}\dfrac{1}{N}\sum r_n\omega_n$.

As a result, equation (8A) implies that $p\lim\limits_{N\to\infty}\hat{\beta}$ differs from β if *either* $q > 0$ ($y_{nt} - a_t$ is not a first-order AR process) or the cross-sectional variance of ω_n is positive (not all cross-sectional heterogeneity is accounted for). In other words, the OLS estimator is inconsistent unless (a) the log of income per capita has an identical first-order AR representation across economies, and (b) all cross-section heterogeneity is controlled for.

Evans shows that the resulting bias from $q > 0$ is likely to be negligible in practice but the bias resulting from a positive cross-sectional variance for ω_n can be substantial. This is essentially an omitted variable bias. Evans demonstrates that

(9A)
$$p\lim_{N\to\infty}\hat{\beta} = \left[\frac{\operatorname{var}(y\mid x,\omega)}{\operatorname{var}(y\mid x)}\right]\beta$$

and

(10A)
$$p\lim_{N\to\infty}\hat{\gamma} = \left[\frac{\operatorname{var}(y\mid x,\omega)}{\operatorname{var}(y\mid x)}\right]\gamma.$$

The bracketed portions in equations (9A) and (10A) are the ratio of the cross-sectional variance of y_{n0} conditional on both x_n and ω_n to the cross-sectional variance of y_{n0} on

iv

x_n. As such, $\hat{\beta}$ and $\hat{\gamma}$ will be biased towards zero unless the xs are able to control for a large portion of the cross-economy variation in the ys.

The intuition here is that if a large portion of the growth of per capita income is explained by variables left out of the OLS regression, then the estimate of the convergence effect will be biased. In general, omitted variable bias can be either positive or negative. However, in this case, theoretically, the bias is negative. Evans (1997b, Tables on p. 11 and p. 15) estimates β for Mankiw, et al.'s (1992) international data using both the OLS, which yields inconsistent estimates, and the 2SLS approach (as outlined in section 2), which yields consistent estimates of both β and γ. He finds that the 2SLS estimate implies a conditional convergence rate between 4 to 5 times as large as the OLS estimate. The bias produced by the OLS in this case, therefore, is substantial.

Referee Appendix Table 1: Entire United States

RHS Variables[1]	Alabama OLS	Alabama 2SLS	Arkansas OLS	Arkansas 2SLS	California OLS	California 2SLS	Colorado OLS	Colorado 2SLS	Florida OLS	Florida 2SLS
Constant	0.0572	0.1399	0.0689	0.1255	0.0573	0.0449	0.1971	0.3827	0.0092	0.1625
	(0.31)	(0.92)	(0.48)	(0.86)	(0.25)	(0.21)	(1.74)***	(3.25)*	(0.04)	(0.74)
Log 1970 per capita income[2]	-0.0251	-0.0334	-0.0267	-0.0384	-0.0261	-0.0235	-0.0133	-0.0318	-0.0190	-0.0318
	(2.38)**	(20.49)*	(4.48)*	(22.08)*	(2.50)**	(4.87)*	(2.53)**	(13.41)*	(2.06)**	(14.98)*
Age: 5-13 years	0.2200	0.1991	0.2602	0.3321	0.1965	0.1819	-0.0602	-0.0538	0.0924	0.0723
	(1.03)	(0.95)	(1.33)	(1.67)***	(0.69)	(0.67)	(0.47)	(0.36)	(0.36)	(0.28)
Age: 14-17 years	-0.0369	-0.0617	0.1106	0.1081	0.1049	0.1002	-0.0111	-0.0387	0.1892	0.1257
	(0.17)	(0.29)	(0.81)	(0.77)	(0.42)	(0.41)	(0.11)	(0.33)	(0.80)	(0.53)
Age: 18-64 years	0.1144	0.0978	0.1522	0.1798	0.1497	0.1393	-0.1682	-0.1779	0.1105	0.0593
	(0.62)	(0.54)	(1.20)	(1.38)	(0.69)	(0.66)	(1.42)	(1.28)	(0.51)	(0.27)
Age: 65+	0.1441	0.1131	0.1571	0.1740	0.1762	0.1652	-0.0661	-0.0526	0.0873	0.0466
	(0.89)	(0.73)	(1.19)	(1.28)	(0.85)	(0.84)	(0.78)	(0.53)	(0.47)	(0.25)
Blacks	-0.0233	-0.0264	0.0006	0.0023	0.0035	0.0015	-0.1083	-0.1384	0.0189	0.0207
	(1.61)	(1.89)***	(0.07)	(0.27)	(0.11)	(0.05)	(0.94)	(1.03)	(1.17)	(1.26)
Hispanic	-0.0947	-0.2311	0.1775	0.1111	0.0191	0.0193	-0.0005	-0.0007	0.0315	0.0397
	(0.24)	(0.66)	(0.67)	(0.41)	(1.11)	(1.15)	(0.06)	(0.07)	(0.66)	(0.82)
Education: 9-11 years	0.0819	0.0832	-0.0188	-0.0223	-0.0676	-0.0673	0.1037	0.1171	-0.0211	-0.0045
	(2.03)**	(2.07)**	(0.63)	(0.73)	(1.00)	(1.02)	(2.53)**	(2.44)**	(0.35)	(0.07)
Education: H.S. diploma	0.0077	0.0832	0.0073	0.0153	-0.0217	-0.0212	0.0226	0.0654	0.0614	0.0649
	(0.16)	(2.07)**	(0.24)	(0.49)	(0.60)	(0.60)	(0.81)	(2.23)**	(0.91)	(0.95)
Education: Some college	0.0998	0.1229	0.0355	0.0492	0.0494	0.0513	0.1039	0.0600	0.1688	0.1813
	(1.08)	(1.41)	(0.56)	(0.75)	(0.72)	(0.77)	(1.78)***	(0.90)	(1.59)	(1.69)***
Education: Bachelor +	0.0415	0.0448	0.1025	0.1188	0.1063	0.1003	0.0621	0.1178	0.0534	0.1094
	(0.70)	(0.77)	(1.39)	(1.56)	(2.14)**	(2.36)**	(1.69)***	(3.03)*	(0.57)	(1.28)
Housing	0.0000	0.0000	0.0000	0.0000	-0.0000	-0.0000	0.0000	0.0000	-0.0000	0.0000
	(0.39)	(0.66)	(0.47)	(0.52)	(0.63)	(0.68)	(1.93)***	(2.06)**	(0.15)	(0.11)
Federal government employment	0.0232	0.0391	-0.0060	-0.0142	0.0357	0.0352	-0.0207	-0.0609	0.0471	0.0280
	(0.40)	(0.72)	(0.13)	(0.29)	(1.22)	(1.23)	(0.61)	(1.69)***	(0.64)	(0.38)
State government employment	-0.0129	-0.0131	-0.0220	-0.0408	0.0350	0.0331	-0.0223	-0.0605	0.0122	0.0049
	(0.27)	(0.27)	(0.61)	(1.13)	(0.86)	(0.84)	(0.60)	(1.66)***	(0.22)	(0.09)
Local government employment	0.0348	0.0379	-0.0443	-0.0392	0.0506	0.0462	-0.0043	-0.0215	-0.0438	-0.0244
	(0.64)	(0.71)	(1.05)	(0.90)	(0.75)	(0.72)	(0.14)	(0.61)	(0.51)	(0.28)
Self-employment	-0.0512	-0.0622	0.0045	0.0019	-0.0404	-0.0364	0.0286	-0.0032	0.0673	0.0721
	(1.11)	(1.43)	(0.16)	(0.07)	(0.66)	(0.63)	(0.93)	(0.09)	(1.43)	(1.51)
Agriculture	0.0725	0.0881	0.0285	0.0578	0.0350	0.0295	0.0001	0.0193	0.0431	0.0491
	(0.96)	(1.22)	(0.44)	(0.88)	(0.82)	(0.83)	(0.01)	(0.38)	(0.54)	(0.61)
Communications	-0.0803	-0.0846	-0.0022	0.0216	-0.0298	-0.0295	-0.1039	-0.1122	-0.1259	-0.1377
	(1.37)	(1.45)	(0.02)	(0.23)	(0.44)	(0.44)	(1.45)	(1.33)	(1.13)	(1.22)
Construction	0.0927	0.1140	0.0737	0.0924	0.1033	0.1032	-0.0091	-0.0268	0.0951	0.1095
	(1.17)	(1.54)	(1.22)	(1.50)	(2.28)**	(2.32)**	(0.22)	(0.57)	(1.38)	(1.85)***
Finance, insurance & real estate	0.2331	0.2583	0.0273	0.0464	0.0947	0.0899	0.1735	0.1091	0.0652	0.0561
	(1.58)	(1.80)***	(0.26)	(0.43)	(1.10)	(1.10)	(1.98)**	(2.08)**	(0.56)	(0.48)
Manufacturing – durables	0.0451	0.0551	0.0424	0.0607	0.0442	0.0426	0.0060	-0.0204	0.0647	0.0660
	(0.74)	(0.92)	(0.68)	(0.95)	(1.35)	(1.36)	(0.13)	(0.37)	(0.86)	(0.87)

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[1] All RHS variables are initial values from 1970.
[2] All dollar values are in real 1992 dollars.

RHS Variables[3]	Alabama		Arkansas		California		Colorado		Florida	
	OLS	2SLS	OLS	2SLS	OLS	2SLS	OLS	2SLS	OLS	2SLS
Manufacturing – nondurables	0.0477	0.0594	0.0445	0.0617	0.0851	0.0832	-0.0926	-0.0851	0.0697	0.0739
	(0.75)	(0.96)	(0.72)	(0.97)	(2.05)**	(2.08)**	(1.70)***	(1.33)	(0.98)	(1.02)
Mining	0.0945	0.1113	-0.0082	0.0177	0.0531	0.0540	-0.0027	-0.0318	0.0115	0.0105
	(0.92)	(1.12)	(0.11)	(0.22)	(0.88)	(0.91)	(0.07)	(0.70)	(0.12)	(0.11)
Retail	0.0161	0.0255	-0.0256	-0.0014	0.1063	0.1019	0.0072	-0.0202	-0.0001	-0.0241
	(0.19)	(0.31)	(0.37)	(0.02)	(1.68)***	(1.71)***	(0.119)	(0.46)	(0.001)	(0.25)
Business & repair services	0.0854	0.0831	0.2275	0.2698	0.0763	0.0651	-0.1038	-0.0687	-0.3463	-0.3845
	(0.50)	(0.49)	(2.28)**	(2.68)*	(0.46)	(0.41)	(1.10)	(0.62)	(2.11)**	(2.34)**
Educational services	-0.1244	-0.1639	0.1019	0.1168	0.0385	0.0332	0.0820	0.0650	-0.3053	-0.4116
	(0.68)	(0.94)	(1.37)	(1.52)	(0.32)	(0.29)	(1.42)	(0.96)	(1.44)	(2.04)**
Professional related services	0.1624	0.1957	-0.0747	-0.0745	-0.0648	-0.0572	-0.0135	-0.0169	0.2905	0.3612
	(0.94)	(1.17)	(0.93)	(0.90)	(0.58)	(0.55)	(0.22)	(0.23)	(1.61)	(2.05)**
Health services	-0.1808	-0.2076	0.1435	0.1639	0.1877	0.1793	0.0233	0.0409	-0.2749	-0.3446
	(1.03)	(1.21)	(1.78)***	(1.98)**	(1.52)	(1.54)	(0.42)	(0.64)	(1.34)	(1.70)***
Personal services	0.1529	0.1979	0.1047	0.1456	0.0296	0.0251	0.0734	0.0555	0.1202	0.1576
	(1.30)	(1.93)***	(1.44)	(2.02)**	(0.62)	(0.58)	(1.27)	(0.82)	(1.13)	(1.51)
Entertainment & recreational services	-0.0811	-0.0954	-0.1331	-0.0676	0.1523	0.1498	0.0301	0.0928	0.1176	0.1005
	(0.27)	(0.32)	(0.76)	(0.38)	(2.28)**	(2.31)**	(0.36)	(0.96)	(0.46)	(0.39)
Transportation	0.0508	0.0688	0.0529	0.0673	0.1377	0.1322	0.0421	-0.0082	0.1414	0.1635
	(0.66)	(0.94)	(0.76)	(0.94)	(2.32)**	(2.46)**	(0.73)	(0.12)	(1.36)	(1.57)
Wholesale trade	0.0089	0.0241	0.0729	0.0851	0.0831	0.0781	-0.0577	-0.1034	0.0357	0.0159
	(0.09)	(0.26)	(0.79)	(0.89)	(1.06)	(1.05)	(0.72)	(1.11)	(0.37)	(0.17)
Poverty	-0.0032	-0.0126	-0.0257	-0.0432	-0.0968	-0.0876	-0.0262	-0.0607	-0.0094	-0.0329
	(0.09)	(0.39)	(1.16)	(2.05)**	(1.41)	(1.55)	(1.13)	(2.45)**	(0.25)	(0.95)
Metro area, 1970	-0.0002	-0.0003	0.0013	0.0023	0.0011	0.0009	-0.0007	-0.0008	0.0059	0.0065
	(0.10)	(0.15)	(0.66)	(1.13)	(0.50)	(0.45)	(0.40)	(0.38)	(2.50)**	(2.78)*
Adjusted R^2	0.07	0.69	0.39	0.72	0.79	0.89	0.67	0.79	0.28	0.73
# Observations	64	64	74	74	58	58	63	63	67	67

t-statistics are reported in parentheses

* significant at 1% level
** significant at 5% level
*** significant at 10% level

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[3] All RHS variables are initial values from 1970.

RHS Variables[4]	Georgia		Idaho		Illinois		Indiana		Iowa	
	OLS	2SLS	OLS	2SLS	OLS	2SLS	OLS	2SLS	OLS	2SLS
Constant	0.0174	0.4666	0.4294	0.4303	0.2753	0.3083	0.1449	0.3661	0.0239	0.0247
	(2.11)**	(7.37)*	(2.41)**	(2.81)**	(2.62)**	(3.59)*	(1.18)	(3.00)*	(0.21)	(0.23)
Log 1970 per capita income[5]	-0.0171	-0.0367	-0.0403	-0.0405	-0.0255	-0.0281	-0.0061	-0.0299	-0.0288	-0.0289
	(4.33)*	(36.46)*	(2.23)**	(10.03)*	(5.46)*	(9.07)*	(1.02)	(9.25)*	(5.65)*	(4.75)*
Age: 5-13 years	-0.0867	-0.1559	0.1599	0.1614	0.0036	-0.0052	0.1574	0.0439	0.2522	0.2521
	(1.23)	(2.06)**	(0.73)	(0.93)	(0.03)	(0.04)	(1.22)	(0.31)	(1.95)***	(1.96)**
Age: 14-17 years	-0.0853	-0.1866	0.0131	0.0143	-0.0231	-0.0345	0.0671	0.0245	0.1254	0.1256
	(1.09)	(2.26)**	(0.06)	(0.08)	(0.26)	(0.41)	(0.59)	(0.19)	(1.24)	(1.25)
Age: 18-64 years	-0.0311	-0.1140	0.2249	0.2265	-0.0141	-0.0233	0.0302	-0.0353	0.1469	0.1469
	(0.56)	(1.98)**	(1.32)	(2.05)***	(0.15)	(0.26)	(0.32)	(0.34)	(1.69)***	(1.70)***
Age: 65+	0.0154	-0.0573	0.0900	0.0912	-0.0939	-0.1016	0.0689	-0.0281	0.1092	0.1091
	(0.30)	(1.08)	(0.59)	(0.79)	(1.12)	(1.23)	(0.78)	(0.30)	(1.19)	(1.20)
Blacks	-0.0020	-0.0055	-0.1843	-0.1828	-0.0054	-0.0057	-0.0300	-0.0288	-0.1568	-0.1571
	(0.38)	(1.03)	(0.70)	(0.83)	(0.38)	(0.41)	(0.80)	(0.69)	(1.97)***	(2.01)**
Hispanic	-0.0184	-0.1481	0.0102	0.0105	-0.0052	-0.0018	0.0201	0.0393	0.1651	0.1652
	(0.14)	(1.07)	(0.15)	(0.18)	(0.10)	(0.04)	(0.28)	(0.49)	(1.62)	(1.64)
Education: 9-11 years	-0.0094	0.0087	0.0609	0.0612	-0.0592	-0.0587	-0.0463	-0.0333	-0.0314	-0.0314
	(0.67)	(0.58)	(0.82)	(0.93)	(3.22)*	(3.22)*	(2.02)**	(1.31)	(1.26)	(1.28)
Education: H.S. diploma	0.0028	0.0103	0.0893	0.0893	-0.0166	-0.0149	-0.0441	-0.0220	-0.0003	-0.0003
	(0.18)	(0.60)	(2.16)***	(2.31)**	(1.47)	(1.38)	(2.85)*	(1.37)	(0.03)	(0.03)
Education: Some college	0.0793	0.0715	-0.0053	-0.0052	0.0255	0.0280	0.1167	0.1129	0.0155	0.0157
	(2.14)**	(1.77)***	(0.10)	(0.11)	(0.80)	(0.89)	(2.41)**	(2.09)**	(0.56)	(0.58)
Education: Bachelor +	0.0031	0.0279	0.0643	0.0656	0.0449	0.0495	-0.0369	0.0406	-0.0368	-0.0369
	(0.11)	(0.90)	(0.44)	(0.65)	(1.40)	(1.61)	(0.76)	(0.82)	(1.19)	(1.20)
Housing	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	-0.0000	-0.000	0.0000	0.0000
	(1.04)	(2.03)**	(0.35)	(0.37)	(0.17)	(0.24)	(0.78)	(0.52)	(2.52)**	(2.57)**
Federal government employment	0.0166	-0.0100	-0.1098	-0.1102	0.0409	0.0405	-0.0607	-0.0968	0.0540	0.0541
	(0.50)	(0.28)	(1.60)	(1.94)***	(1.24)	(1.24)	(1.16)	(2.03)**	(1.42)	(1.43)
State government employment	0.0197	0.0035	0.0360	0.0364	-0.0087	-0.0095	0.0239	-0.0043	0.0456	-0.0457
	(0.90)	(0.15)	(0.79)	(1.10)	(0.46)	(0.51)	(1.05)	(0.18)	(2.30)**	(2.32)**
Local government employment	0.0377	0.0144	0.0272	0.0280	-0.0047	-0.0009	-0.0474	-0.0319	0.0134	0.0135
	(1.34)	(0.48)	(0.28)	(0.41)	(0.02)	(0.04)	(1.43)	(0.87)	(0.49)	(0.51)
Self-employment	-0.0260	-0.0244	-0.0440	-0.0443	0.0161	0.0109	-0.0590	-0.0456	-0.0079	-0.0079
	(1.36)	(1.17)	(1.23)	(1.67)	(0.60)	(0.44)	(1.79)***	(1.24)	(0.37)	(0.38)
Agriculture	0.0618	0.0163	-0.2151	-0.2151	0.0122	0.0169	-0.0782	-0.0291	0.1196	0.1197
	(1.69)***	(0.42)	(1.96)***	(2.06)***	(0.31)	(0.44)	(1.45)	(0.49)	(1.89)***	(1.92)***
Communications	0.0277	0.0095	-0.0983	-0.1000	0.0355	0.0403	-0.1097	-0.0293	0.1784	0.1785
	(0.49)	(0.16)	(0.52)	(0.79)	(0.58)	(0.67)	(1.69)***	(0.43)	(2.12)**	(2.14)**
Construction	0.0839	0.0167	-0.3323	-0.3324	-0.0202	-0.0239	-0.1011	-0.0369	0.0659	0.0679
	(2.23)**	(0.44)	(2.58)**	(2.74)**	(0.50)	(0.60)	(1.51)	(0.51)	(0.95)	(0.98)
Finance, insurance & real estate	-0.0548	-0.0697	-0.3769	-0.3772	0.1020	0.1018	-0.0705	-0.0022	0.1752	0.1754
	(0.77)	(0.90)	(2.20)***	(2.34)**	(2.21)**	(2.21)**	(0.94)	(0.03)	(1.97)***	(2.00)**
Manufacturing – durables	0.0445	-0.0068	-0.2636	-0.2638	0.0088	0.0078	-0.1054	-0.0513	0.1265	0.1267
	(1.22)	(0.18)	(2.27)**	(2.42)**	(0.26)	(0.23)	(1.88)***	(0.85)	(2.03)**	(2.06)**

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[4] All RHS variables are initial values from 1970.
[5] All dollar values are in real 1992 dollars.

RHS Variables[6]	Georgia		Idaho		Illinois		Indiana		Iowa	
	OLS	2SLS	OLS	2SLS	OLS	2SLS	OLS	2SLS	OLS	2SLS
Manufacturing – nondurables	0.0315 (0.88)	-0.0102 (0.27)	-0.2664 (2.30)**	-0.2665 (2.44)**	0.0004 (0.14)	0.0036 (0.11)	-0.1024 (1.85)***	-0.0513 (0.85)	0.1105 (1.69)***	0.1107 (1.70)***
Mining	0.0510 (1.38)	0.0023 (0.06)	-0.2809 (2.38)**	-0.2812 (2.57)**	-0.0068 (0.19)	-0.0058 (0.16)	-0.0907 (1.36)	-0.0356 (0.49)	0.1775 (1.48)	0.1778 (1.50)
Retail	0.0325 (0.86)	-0.0210 (0.53)	-0.2952 (2.54)**	-0.2954 (2.71)**	-0.0042 (0.12)	-0.0072 (0.20)	-0.1465 (2.27)**	-0.0818 (1.17)	0.1393 (2.10)**	0.1395 (2.15)**
Business & repair services	0.2161 (2.94)*	0.1994 (2.49)**	-0.2389 (1.68)	-0.2396 (1.93)***	0.0724 (1.04)	0.0748 (1.08)	-0.2757 (2.34)**	-0.2109 (1.62)	0.0557 (0.60)	0.0554 (0.60)
Educational services	0.0562 (0.91)	0.0588 (0.87)	-0.2809 (1.35)	-0.2826 (1.88)***	-0.1155 (1.69)***	-0.1139 (1.70)***	-0.2513 (2.66)*	-0.3292 (3.18)*	-0.0233 (0.48)	-0.0233 (0.48)
Professional related services	-0.0525 (0.84)	-0.0942 (1.39)	-0.0891 (0.55)	-0.0889 (0.58)	0.0644 (0.81)	0.0589 (0.75)	0.1320 (1.24)	0.2176 (1.86)***	0.1294 (1.72)***	0.1295 (1.73)***
Health services	0.0587 (0.96)	0.0697 (1.04)	0.0856 (0.48)	0.0845 (0.56)	-0.1022 (1.39)	-0.0986 (1.36)	-0.2816 (2.98)*	-0.3060 (2.91)*	-0.0308 (0.58)	-0.0307 (0.58)
Personal services	0.0652 (1.44)	0.0293 (0.60)	-0.1934 (1.71)	-0.1936 (1.85)***	0.0641 (0.86)	0.0736 (1.02)	-0.0193 (0.30)	0.0278 (0.39)	0.1776 (2.06)**	0.1777 (2.08)**
Entertainment & recreational services	0.1824 (1.48)	0.2271 (1.69)***	-0.2449 (0.75)	-0.2443 (0.79)	0.3805 (2.29)**	0.3781 (2.29)**	0.0797 (0.41)	0.1604 (0.74)	0.2593 (1.45)	0.2594 (1.46)
Transportation	0.0222 (0.53)	-0.1591 (0.35)	-0.2889 (2.30)**	-0.2896 (2.65)**	-0.0339 (0.84)	-0.0352 (0.88)	-0.1411 (2.17)**	-0.0825 (1.16)	0.0548 (0.81)	0.0548 (0.81)
Wholesale trade	0.0878 (1.75)***	0.0376 (0.70)	-0.2639 (1.82)	-0.2638 (1.92)***	0.0060 (0.11)	0.0074 (0.14)	0.0271 (0.40)	0.0658 (0.89)	0.1139 (1.66)	0.1141 (1.69)***
Poverty	-0.0227 (1.78)***	-0.0364 (2.69)*	-0.0098 (0.14)	-0.0104 (0.21)	-0.0274 (1.36)	-0.0319 (1.73)***	-0.0252 (0.97)	-0.0341 (1.17)	-0.0444 (2.25)**	-0.0446 (2.64)**
Metro area, 1970	0.0028 (2.52)**	0.0038 (3.21)*	-0.0071 (1.42)	-0.0071 (1.59)	0.0013 (1.55)	0.0015 (1.75)***	0.0004 (0.48)	0.0005 (0.52)	0.0009 (0.79)	0.0009 (0.79)
R^2	0.50	0.72	0.94	0.94	0.72	0.88	0.73	0.80	0.65	0.73
Adjusted R^2	0.37	0.65	0.72	0.77	0.59	0.82	0.57	0.69	0.47	0.60
# Observations	160	160	44	44	102	102	92	92	99	99

* significant at 1% level
** significant at 5% level
*** significant at 10% level

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[6] All RHS variables are initial values from 1970.

RHS Variables[7]	Kansas		Kentucky		Louisiana		Michigan		Minnesota	
	OLS	2SLS	OLS	2SLS	OLS	2SLS	OLS	2SLS	OLS	2SLS
Constant	0.2203	0.2332	0.1237	0.2168	0.2631	0.3851	0.0441	0.3368	0.3382	0.3998
	(2.39)**	(2.66)**	(1.26)	(2.33)**	(3.10)*	(4.39)*	(0.31)	(2.89)*	(2.59)**	(3.09)*
Log 1970 per capita income[8]	-0.0286	-0.0301	-0.0253	-0.0354	-0.0222	-0.0413	-0.0104	-0.0387	-0.0156	-0.0260
	(9.76)*	(12.18)*	(6.11)*	(19.74)*	(3.83)*	(13.83)*	(1.36)	(16.52)*	(2.85)*	(9.34)*
Age: 5-13 years	0.0541	0.0547	0.2152	0.2404	0.3058	0.3645	0.0862	-0.0501	-0.1234	-0.1267
	(0.70)	(0.71)	(1.71)**	(1.86)***	(2.39)*	(2.50)**	(0.56)	(0.30)	(0.77)	(0.77)
Age: 14-17 years	0.0873	0.0887	0.0035	-0.0074	-0.1683	-0.1097	0.1633	0.1337	-0.0540	-0.0419
	(0.96)	(0.98)	(0.04)	(0.08)	(1.67)	(0.97)	(1.29)	(0.94)	(0.43)	(0.33)
Age: 18-64 years	0.0189	0.0186	0.0815	0.0919	0.0532	0.0831	0.0831	0.0101	-0.0683	-0.0843
	(0.28)	(0.27)	(0.97)	(1.06)	(0.70)	(0.96)	(0.77)	(0.09)	(0.61)	(0.74)
Age: 65+	0.0000	-0.0036	0.0908	0.1066	0.0651	0.1016	0.0564	-0.0492	-0.1243	-0.1259
	(0.01)	(0.06)	(1.09)	(1.25)	(0.86)	(1.17)	(0.50)	(0.40)	(1.20)	(1.19)
Blacks	-0.0528	-0.0527	-0.0061	-0.0058	-0.0007	0.0042	-0.0385	-0.0260	-0.1293	-0.0966
	(2.28)**	(2.29)**	(0.43)	(0.40)	(0.10)	(0.51)	(2.10)**	(1.29)	(0.57)	(0.42)
Hispanic	0.0082	0.0087	-0.1829	-0.1893	-0.0171	-0.0318	-0.0926	-0.0214	-0.2423	-0.2401
	(0.32)	(0.34)	(0.99)	(1.00)	(0.38)	(0.62)	(1.31)	(0.28)	(1.95)***	(1.89)***
Education: 9-11 years	-0.0295	-0.0281	0.0129	0.0140	0.0051	0.0188	-0.0456	-0.0428	-0.0037	-0.0142
	(1.39)	(1.34)	(0.48)	(0.51)	(0.22)	(0.73)	(1.61)	(1.34)	(0.11)	(0.43)
Education: H.S. diploma	0.0552	0.0556	0.0472	0.0562	-0.0198	-0.0178	-0.0283	-0.0187	0.0024	0.0053
	(4.42)*	(4.49)*	(2.60)**	(3.07)*	(1.11)	(0.86)	(1.30)	(0.77)	(0.14)	(0.31)
Education: Some college	-0.0061	-0.0031	0.0647	0.0769	0.0245	0.0717	-0.0338	-0.0079	00313	0.0441
	(0.30)	(0.16)	(1.52)	(1.77)**	(0.45)	(1.19)	(0.72)	(0.15)	(0.87)	(1.23)
Education: Bachelor +	0.0380	0.0403	0.0483	0.0711	0.0633	0.0707	0.0258	0.0873	0.02331	0.0273
	(1.42)	(1.54)	(1.06)	(1.55)	(1.22)	(1.19)	(0.72)	(2.44)**	(0.56)	(0.64)
Housing	0.0000	0.0000	0.0000	0.000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	(1.25)	(1.25)	(0.51)	(0.69)	(0.34)	(1.17)	(0.37)	(0.49)	(1.32)	(1.43)
Federal government employment	0.0256	0.0253	-0.0105	-0.0192	-0.0479	-0.0252	0.0389	0.0716	-0.0618	-0.0371
	(0.64)	(0.64)	(0.47)	(1.85)***	(1.56)	(1.73)***	(0.87)	(1.45)	(1.02)	(0.61)
State government employment	0.0116	0.0108	0.0058	-0.0041	-0.0073	-0.0160	-0.0299	-0.0631	0.0010	-0.0108
	(0.71)	(0.67)	(0.29)	(0.20)	(0.03)	(0.49)	(1.17)	(2.33)**	(0.04)	(0.47)
Local government employment	0.0169	0.0179	0.0001	-0.0078	-0.1306	-0.1652	-0.0062	-0.0332	-0.0253	-0.0246
	(1.00)	(1.07)	(0.01)	(0.30)	(2.53)**	(2.85)*	(0.20)	(0.97)	(1.09)	(1.03)
Self-employment	-0.0376	-0.0369	-0.0190	-0.0219	0.0587	0.0583	-0.0643	-0.0532	0.0224	0.0137
	(2.19)**	(2.17)**	(0.79)	(0.89)	(1.95)***	(1.68)	(1.42)	(1.05)	(0.92)	(0.56)
Agriculture	0.0461	0.0468	0.0291	0.0219	-0.1529	-0.1238	0.0617	0.0621	-0.1210	-0.0637
	(0.79)	(0.81)	(0.84)	(0.62)	(2.90)*	(2.07)**	(0.97)	(0.87)	(1.68)***	(0.95)
Communications	0.0204	0.0209	0.0224	0.0146	-0.0201	0.0576	0.0027	0.0159	-0.0950	-0.0767
	(0.38)	(0.39)	(0.54)	(0.34)	(0.29)	(0.77)	(0.04)	(0.19)	(1.24)	(0.99)
Construction	-0.0304	-0.0301	0.0248	0.0117	-0.1035	-0.0913	0.0357	0.0565	-0.0362	0.0075
	(0.58)	(0.60)	(0.72)	(0.34)	(1.88)***	(1.44)	(0.62)	(0.88)	(0.45)	(0.09)
Finance, insurance & real estate	0.0731	0.0736	-0.0642	-0.0762	-0.3863	-0.4473	0.0735	0.1029	-0.0721	0.0091
	(1.19)	(1.21)	(1.01)	(1.17)	(3.32)*	(3.39)*	(0.80)	(1.01)	(0.76)	(0.10)
Manufacturing – durables	0.0231	0.0226	0.0118	-0.0036	-0.1118	-0.0982	0.0126	0.0239	-0.0880	-0.0483
	(0.46)	(0.45)	(0.39)	(0.12)	(2.32)**	(1.78)***	(0.29)	(0.49)	(1.32)	(0.75)

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[7] All RHS variables are initial values from 1970.
[8] All dollar values are in real 1992 dollars.

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RHS Variables[9]	Kansas		Kentucky		Louisiana		Michigan		Minnesota	
	OLS	2SLS	OLS	2SLS	OLS	2SLS	OLS	2SLS	OLS	2SLS
Manufacturing – nondurables	0.0165	0.0165	0.0115	-0.0082	-0.1029	-0.0885	-0.0027	0.0015	-0.1100	-0.0640
	(0.29)	(0.29)	(0.37)	(0.26)	(2.11)**	(1.58)	(0.06)	(0.03)	(1.59)	(0.96)
Mining	-0.0047	-0.0051	0.0086	0.0019	-0.1459	-0.1385	-0.0202	-0.0139	-0.1111	-0.0692
	(0.08)	(0.09)	(0.29)	(0.06)	(2.68)**	(2.22)**	(0.45)	(0.27)	(1.61)	(1.03)
Retail	0.0268	0.0263	-0.0017	-0.0087	-0.1666	-0.1539	-0.0066	0.0101	-0.1072	-0.0613
	(0.45)	(0.44)	(0.04)	(0.22)	(3.00)*	(2.42)**	(0.13)	(0.18)	(1.38)	(0.81)
Business & repair services	-0.0171	-0.0131	0.0143	0.0082	-0.1088	-0.1464	0.2241	0.3661	-0.1243	-0.0854
	(0.21)	(0.16)	(0.19)	(0.11)	(1.12)	(1.32)	(1.63)	(2.47)**	(1.23)	(0.84)
Educational services	-0.0162	-0.0162	0.0528	0.0254	0.0856	0.0083	-0.0307	-0.0243	-0.0372	-0.0878
	(0.42)	(0.43)	(0.82)	(0.39)	(1.12)	(0.10)	(0.32)	(0.23)	(0.56)	(1.40)
Professional related services	0.0232	0.0218	-0.0444	-0.0443	-0.1746	-0.0861	0.0544	0.0353	-0.0873	0.0034
	(0.33)	(0.32)	(0.75)	(0.73)	(2.11)**	(0.96)	(0.59)	(0.34)	(0.91)	(0.04)
Health services	-0.0093	-0.0062	0.0931	0.0724	0.0766	-0.0051	-0.0245	0.0150	-0.0208	-0.0731
	(0.24)	(0.16)	(1.43)	(1.09)	(0.94)	(0.06)	(0.26)	(0.14)	(0.32)	(1.22)
Personal services	-0.0797	-0.0778	0.0741	0.0575	-0.0306	-0.0464	0.0471	0.0406	-0.1028	-0.0411
	(1.14)	(1.12)	(1.43)	(1.09)	(0.46)	(0.61)	(0.72)	(0.55)	(1.19)	(0.50)
Entertainment & recreational services	0.0745	0.0679	0.1546	0.1347	0.1707	0.4228	-0.2251	-0.2559	-0.0978	-0.0524
	(0.68)	(0.63)	(1.06)	(0.90)	(0.81)	(1.86)***	(1.22)	(1.24)	(0.54)	(0.29)
Transportation	0.0188	0.0193	0.0054	-0.0161	-0.1215	-0.0675	-0.0009	0.0047	-0.1254	-0.0836
	(0.30)	(0.31)	(0.15)	(0.45)	(1.83)***	(0.91)	(0.02)	(0.07)	(1.40)	(0.94)
Wholesale trade	0.0827	0.0821	0.0060	-0.0038	0.0400	0.0504	0.0398	0.0382	-0.1204	-0.0703
	(1.26)	(1.26)	(0.11)	(0.07)	(0.60)	(0.65)	(0.70)	(0.60)	(1.64)	(1.00)
Poverty	0.0072	0.0127	-0.0111	-0.0234	-0.0355	-0.0661	-0.0594	-0.0931	-0.0106	-0.0457
	(0.57)	(0.54)	(0.95)	(2.14)**	(2.02)***	(3.84)*	(1.58)	(2.27)**	(0.39)	(2.20)**
Metro area, 1970	0.0013	0.0013	0.0055	0.0057	0.0003	0.0008	0.0008	0.0011	-0.0001	-0.0003
	(1.00)	(0.98)	(3.28)*	(3.29)*	(0.34)	(0.76)	(0.48)	(0.57)	(0.10)	(0.27)
R^2	0.81	0.78	0.57	0.89	0.86	0.95	0.61	0.87	0.67	0.80
Adjusted R^2	0.72	0.69	0.40	0.85	0.70	0.90	0.34	0.81	0.46	0.68
# Observations	106	106	120	120	64	64	83	83	87	87

*   significant at 1% level
**   significant at 5% level
*** significant at 10% level

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[9] All RHS variables are initial values from 1970.

RHS Variables[10]	__Mississippi__		___Missouri___		__Montana__		___New York__		_North Carolina_	
	OLS	2SLS	OLS	2SLS	OLS	2SLS	OLS	2SLS	OLS	2SLS
Constant	0.3108	0.5456	0.1385	0.4189	0.0770	0.2209	0.0129	0.0716	0.3527	0.6585
	(1.82)***	(3.33)*	(1.60)	(4.66)*	(0.41)	(1.35)	(1.24)	(0.41)	(3.45)*	(6.16)*
Log 1970 per capita income[11]	-0.0182	-0.0448	-0.0171	-0.0455	-0.0229	-0.0328	0.0129	-0.0264	-0.0171	-0.0467
	(2.05)**	(13.49)*	(3.78)*	(10.74)*	(3.31)*	(9.14)*	(1.24)	(7.78)*	(3.32)*	(7.11)*
Age: 5-13 years	-0.1034	-0.0081	0.1141	0.1323	0.1859	0.1378	-0.0210	0.2068	-0.1296	-0.1172
	(0.62)	(0.05)	(1.09)	(1.04)	(1.09)	(0.80)	(0.08)	(0.69)	(1.26)	(0.93)
Age: 14-17 years	-0.1236	-0.1694	0.0695	0.1422	0.0185	-0.0352	-0.0669	0.0732	-0.2237	-0.2487
	(0.88)	(1.12)	(0.84)	(1.42)	(0.09)	(0.18)	(0.42)	(0.39)	(2.31)**	(2.11)**
Age: 18-64 years	-0.1050	-0.0491	0.0859	0.1029	0.1622	0.1079	-0.0683	0.1155	-0.0249	0.0062
	(1.00)	(0.44)	(1.12)	(1.10)	(0.85)	(0.57)	(0.44)	(0.65)	(0.32)	(0.07)
Age: 65+	-0.1743	-0.1724	0.0287	0.0133	0.1538	0.0914	-0.0793	0.1127	0.0087	0.0106
	(1.60)	(1.47)	(0.40)	(0.15)	(1.10)	(0.67)	(0.39)	(0.47)	(0.13)	(0.13)
Blacks	-0.0114	-0.0154	0.0057	0.0255	-0.1714	-0.2622	-0.0402	-0.0119	0.0041	0.0135
	(1.00)	(1.26)	(0.53)	(2.01)**	(0.37)	(0.56)	(0.84)	(0.21)	(0.68)	(1.91)***
Hispanic	-0.2929	-0.4960	-0.0826	-0.2560	-0.0150	0.0068	-0.0480	-0.0576	-0.0046	0.0725
	(1.07)	(1.73)***	(0.67)	(1.74)***	(0.11)	(0.05)	(1.11)	(1.10)	(0.03)	(0.38)
Education: 9-11 years	-0.000	0.0095	-0.0121	-0.0226	-0.1061	-0.1081	0.0273	0.0306	0.0220	0.0395
	(0.01)	(0.30)	(0.54)	(0.83)	(1.55)	(1.54)	(0.74)	(0.68)	(1.24)	(1.85)***
Education: H.S. diploma	-0.0779	-0.0950	-0.0143	0.0187	-0.0241	-0.0028	-0.0368	-0.0719	0.0077	0.0223
	(1.96)***	(2.24)**	(0.96)	(1.11)	(0.58)	(0.07)	(0.91)	(1.51)	(0.45)	(1.07)
Education: Some college	0.0255	-0.0352	-0.0082	-0.0271	-0.0011	0.0100	0.0129	0.0193	0.0213	-0.0162
	(0.42)	(0.57)	(0.26)	(0.71)	(0.03)	(0.24)	(0.21)	(0.26)	(0.53)	(0.34)
Education: Bachelor +	-0.0678	0.0182	0.0635	0.1255	-0.0061	0.0085	0.0735	0.1734	0.0449	0.1134
	(0.92)	(0.25)	(2.04)**	(3.50)*	(0.12)	(0.17)	(1.45)	(3.31)*	(1.36)	(3.02)*
Housing	-0.0000	-0.0000	0.0000	0.0000	0.0000	0.0000	-0.0000	-0.0000	-0.0000	0.0000
	(1.47)	(1.06)	(0.10)	(1.01)	(0.73)	(0.40)	(0.24)	(0.36)	(0.85)	(0.18)
Federal government employment	0.0427	0.0127	-0.0559	-0.0917	-0.0603	-0.0854	0.0442	0.0966	-0.0978	-0.1674
	(0.75)	(0.21)	(2.12)**	(2.94)*	(0.95)	(1.37)	(0.44)	(0.80)	(2.11)**	(3.06)*
State government Employment	0.0181	-0.0396	-0.0264	-0.0655	0.0254	-0.0057	0.0245	0.0531	-0.0154	-0.0432
	(0.38)	(0.84)	(1.29)	(2.77)*	(0.56)	(0.14)	(0.65)	(1.19)	(0.75)	(1.78)***
Local government employment	-0.0718	-0.1485	-0.0236	-0.0205	-0.0107	-0.0132	0.0022	0.0072	0.0148	-0.0038
	(1.19)	(2.51)**	(0.99)	(0.70)	(0.26)	(0.32)	(0.04)	(0.11)	(0.34)	(0.07)
Self-employment	0.0848	0.0851	-0.0031	-0.0218	0.0163	0.0132	0.0105	0.0009	-0.0103	-0.0172
	(2.51)**	(2.33)**	(0.17)	(1.00)	(0.50)	(0.39)	(0.21)	(0.01)	(0.37)	(0.51)
Agriculture	-0.0431	-0.0716	-0.0292	-0.0447	0.0023	-0.0027	-0.0075	0.0571	-0.1168	-0.1372
	(0.40)	(0.61)	(0.87)	(1.10)	(0.06)	(0.06)	(0.09)	(0.57)	(2.06)	(1.98)***
Communications	-0.1040	-0.1188	-0.1179	-0.1158	0.1099	0.0782	0.0168	0.0992	-0.0812	-0.1256
	(0.72)	(0.77)	(2.05)**	(1.65)***	(1.41)	(1.02)	(0.14)	(0.67)	(1.27)	(1.62)
Construction	-0.0063	-0.0109	-0.0074	-0.0254	0.0727	0.0611	0.0808	0.1264	-0.1420	-0.1908
	(0.06)	(0.10)	(0.20)	(0.57)	(1.46)	(1.22)	(1.03)	(1.34)	(2.68)*	(2.99)*
Finance, insurance & real estate	0.1737	0.1244	0.0005	-0.0001	0.1315	0.1345	0.0038	0.0759	-0.0386	-0.0858
	(1.05)	(0.70)	(0.01)	(0.01)	(1.13)	(1.13)	(0.05)	(0.77)	(0.43)	(0.79)
Manufacturing – durables	-0.0081	-0.0392	-0.0370	-0.0827	0.0328	0.0178	0.0164	0.0631	-0.1194	-0.1752
	(0.08)	(0.35)	(1.20)	(2.27)**	(0.77)	(0.42)	(0.27)	(0.87)	(2.31)**	(2.84)*

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[10] All RHS variables are initial values from 1970.
[11] All dollar values are in real 1992 dollars.

Referee Appendix Table 4: Entire United States

RHS Variables[12]	Mississippi OLS	Mississippi 2SLS	Missouri OLS	Missouri 2SLS	Montana OLS	Montana 2SLS	New York OLS	New York 2SLS	North Carolina OLS	North Carolina 2SLS
Manufacturing – nondurables	-0.0246 (0.23)	-0.0661 (0.59)	-0.0391 (1.26)	-0.0699 (1.88)***	-0.0120 (0.17)	-0.0155 (0.21)	0.0316 (0.49)	0.0778 (1.01)	-0.1416 (2.72)*	-0.1998 (3.21)*
Mining	0.0009 (0.01)	-0.0598 (0.53)	-0.0572 (1.79)***	-0.0705 (1.82)***	0.0254 (0.49)	0.0095 (0.18)	-0.0942 (0.99)	-0.0588 (0.51)	-0.1547 (2.01)**	-0.2081 (2.23)**
Retail	0.0001 (0.01)	-0.0274 (0.23)	-0.0384 (1.11)	-0.0801 (1.94)***	0.0381 (0.78)	0.0224 (0.46)	0.0182 (0.26)	0.0633 (0.75)	-0.1801 (3.24)*	-0.2204 (3.27)*
Business & repair services	-0.1410 (0.74)	-0.2227 (1.10)	-0.0277 (0.38)	-0.0951 (1.10)	-0.1562 (1.47)	-0.1282 (1.20)	0.1056 (0.63)	0.2947 (1.52)	-0.1992 (1.79)***	-0.3455 (2.61)**
Educational services	-0.2489 (2.12)**	-0.2426 (1.92)***	-0.0148 (0.29)	0.0243 (0.39)	-0.0632 (0.89)	-0.0476 (0.66)	-0.0468 (0.35)	-0.0830 (0.51)	0.0900 (1.00)	0.0923 (0.84)
Professional related services	0.2260 (1.49)	0.1967 (1.20)	-0.0340 (0.58)	-0.1245 (1.79)***	0.0621 (0.86)	0.0533 (0.72)	0.0558 (0.39)	0.0421 (0.24)	-0.2484 (2.53)**	-0.3286 (2.77)*
Health services	-0.2955 (2.31)**	-0.2399 (1.75)***	0.0047 (0.10)	0.0624 (1.07)	-0.0134 (0.17)	0.0223 (0.30)	-0.0077 (0.05)	0.0122 (0.07)	0.1273 (1.71)***	0.1582 (1.75)***
Personal services	0.0370 (0.35)	0.0567 (0.50)	-0.0031 (0.08)	0.0068 (0.14)	0.0282 (0.32)	0.0218 (0.24)	0.0028 (0.03)	0.0089 (0.09)	-0.1249 (1.83)***	-0.1732 (2.10)**
Entertainment & recreational services	1.0238 (3.05)*	1.1467 (3.18)*	-0.0605 (0.40)	-0.1223 (0.67)	0.2369 (1.36)	0.2268 (1.27)	0.3201 (1.12)	0.7624 (2.40)**	0.1819 (1.22)	0.1474 (0.81)
Transportation	-0.0308 (0.30)	-0.0415 (0.37)	-0.0292 (0.77)	-0.0770 (1.70)***	0.0065 (0.11)	-0.0142 (0.24)	0.0900 (0.97)	0.1087 (0.97)	-0.1160 (1.95)***	-0.1559 (2.15)**
Wholesale trade	0.1385 (1.16)	0.1419 (1.10)	0.0228 (0.43)	-0.0855 (1.38)	0.0107 (0.10)	0.0090 (0.08)	-0.0617 (0.55)	-0.0007 (0.01)	-0.0583 (0.85)	-0.1009 (1.21)
Poverty	-0.0210 (0.98)	-0.0452 (2.10)**	-0.0271 (2.05)**	-0.0853 (7.51)*	0.0302 (1.16)	0.0132 (0.56)	0.0941 (1.57)	-0.0132 (0.21)	0.0052 (0.28)	-0.0468 (2.32)**
Metro area, 1970	0.0068 (3.77)*	0.0076 (3.93)*	0.0011 (1.09)	0.0026 (2.09)**	0.0000 (0.00)	0.0000 (0.00)	0.0011 (0.54)	0.0014 (0.57)	0.0021 (2.06)**	0.0017 (1.39)
R^2	0.51	0.87	0.59	0.90	0.86	0.78	0.80	0.90	0.65	0.89
Adjusted R^2	0.54	0.78	0.41	0.86	0.65	0.48	0.55	0.80	0.47	0.83
# Observations	82	82	115	115	56	56	62	62	100	100

* significant at 1% level
** significant at 5% level
*** significant at 10% level

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[12] All RHS variables are initial values from 1970. Also, state dummies were employed in all regressions.

Referee Appendix Table 5: Entire United States

RHS Variables[13]	_North Dakota_ OLS	_North Dakota_ 2SLS	Ohio OLS	Ohio 2SLS	Oklahoma OLS	Oklahoma 2SLS	Pennsylvania OLS	Pennsylvania 2SLS	South Carolina OLS	South Carolina 2SLS
Constant	-0.4522 (1.96)***	-0.4216 (1.43)	-0.0094 (0.07)	0.1022 (0.86)	0.2289 (1.44)	0.3319 (2.10)**	-0.0613 (0.37)	0.1197 (0.84)	0.2060 (0.51)	0.4611 (1.35)
Log 1970 per capita income[14]	-0.0279 (3.29)*	-0.0594 (4.79)*	-0.0136 (1.87)***	-0.0274 (7.68)*	-0.0248 (3.95)*	-0.0387 (22.11)*	-0.0176 (2.53)**	-0.0312 (9.01)*	-0.0118 (0.62)	-0.0336 (5.97)*
Age: 5-13 years	0.5189 (1.94)***	0.6363 (1.87)***	0.3202 (2.03)**	0.3234 (2.01)**	0.1995 (1.02)	0.2122 (1.04)	0.4895 (2.61)**	0.4189 (2.18)**	0.0643 (0.19)	0.0653 (0.19)
Age: 14-17 years	0.4353 (2.28)**	0.6903 (3.03)*	0.2181 (2.08)**	0.1811 (1.72)***	-0.0382 (0.22)	0.0013 (0.01)	0.0179 (0.11)	-0.0096 (0.05)	0.2749 (0.77)	0.3078 (0.85)
Age: 18-64 years	0.5271 (2.48)**	0.7409 (2.83)*	0.1798 (1.69)***	0.1769 (1.62)	0.1244 (0.81)	0.1254 (0.78)	0.2585 (2.21)**	0.2224 (1.85)***	-0.0292 (0.10)	-0.0219 (0.07)
Age: 65+	0.3343 (1.89)***	0.4406 (1.97)***	0.1669 (1.55)	0.1748 (1.58)	0.0601 (0.46)	0.0613 (0.45)	0.1964 (1.56)	0.1433 (1.12)	0.1607 (0.57)	0.0658 (0.24)
Blacks	0.0451 (0.16)	0.0828 (0.24)	-0.0461 (1.91)***	-0.0345 (1.44)	0.0013 (0.11)	0.0008 (0.07)	-0.0172 (0.89)	-0.0134 (0.67)	-0.0112 (0.44)	-0.0053 (0.21)
Hispanic	-0.0493 (0.12)	-0.0278 (0.05)	-0.0123 (0.32)	-0.0174 (0.44)	0.0664 (1.73)***	0.0807 (2.04)**	0.0560 (0.27)	0.1219 (0.56)	0.4741 (0.71)	0.2112 (0.33)
Education: 9-11 years	-0.0456 (1.03)	0.0309 (0.62)	0.0251 (0.89)	0.0171 (0.60)	-0.0037 (0.11)	-0.0018 (0.05)	0.0001 (0.01)	-0.0021 (0.07)	-0.0157 (0.33)	-0.0098 (0.20)
Education: H.S. diploma	-0.0371 (1.13)	-0.0729 (1.82)***	-0.0332 (2.01)**	-0.0317 (1.87)***	0.0409 (1.79)***	0.0556 (2.43)**	-0.0233 (1.13)	-0.0033 (1.59)	-0.0831 (1.10)	-0.1084 (1.48)
Education: Some college	0.1252 (2.31)**	0.1838 (2.78)**	0.1058 (2.10)**	0.1305 (2.62)**	0.0302 (0.61)	0.0728 (1.54)	0.0041 (0.07)	0.0121 (0.20)	0.0561 (0.29)	0.1236 (0.66)
Education: Bachelor +	-0.0453 (0.53)	0.1245 (1.35)	0.0602 (1.40)	0.0691 (1.58)	0.0251 (0.67)	0.0230 (0.59)	0.1638 (3.27)*	0.2049 (4.32)*	-0.0493 (0.26)	0.0301 (0.17)
Housing	-0.0000 (0.07)	-0.0000 (0.69)	0.0000 (1.67)***	0.0000 (1.70)***	0.0000 (0.86)	0.0000 (1.07)	0.0000 (1.17)	0.0000 (1.12)	0.0000 (0.93)	0.0000 (1.35)
Federal government employment	0.1826 (2.02)***	0.2289 (2.00)***	-0.0303 (0.54)	-0.0232 (0.41)	-0.1119 (2.22)**	-0.1022 (1.95)***	0.0185 (0.31)	0.0167 (0.27)	-0.0208 (0.26)	-0.0164 (0.20)
State government employment	0.1464 (2.26)**	0.1278 (1.55)	-0.0195 (0.82)	-0.0318 (1.35)	-0.0514 (1.52)	-0.0642 (1.84)***	0.0251 (0.99)	0.0252 (0.96)	-0.0388 (0.39)	-0.0734 (1.76)***
Local government employment	0.2179 (2.93)*	0.2417 (2.55)**	-0.0414 (0.88)	-0.0202 (0.43)	-0.0882 (2.51)**	-0.0902 (2.46)**	-0.1254 (2.12)**	-0.1365 (2.22)**	-0.0224 (0.21)	-0.0184 (0.17)
Self-employment	0.0702 (1.30)	0.0334 (0.49)	0.0046 (0.11)	-0.0148 (0.34)	0.0716 (2.28)**	0.0622 (1.92)***	0.0103 (0.20)	0.0325 (0.61)	-0.0104 (0.09)	-0.0169 (0.15)
Agriculture	0.1938 (1.84)***	0.3063 (2.37)**	-0.0322 (0.39)	0.0085 (0.10)	-0.1672 (2.74)*	-0.1393 (2.24)**	-0.0197 (0.24)	-0.0474 (0.56)	-0.1160 (0.64)	-0.1625 (0.92)
Communications	0.3453 (3.03)*	0.4596 (3.28)*	-0.0814 (0.93)	-0.0735 (0.82)	-0.1286 (1.96)***	-0.1157 (1.69)***	0.0699 (0.72)	0.0819 (0.82)	0.0621 (0.23)	0.1133 (0.42)
Construction	0.2171 (2.45)**	0.2746 (2.46)**	-0.0134 (0.18)	0.0148 (0.20)	-0.0694 (1.31)	-0.0471 (0.86)	0.0297 (0.44)	0.0198 (0.28)	-0.1362 (0.75)	-0.1448 (0.79)
Finance, insurance & real estate	0.5413 (3.26)*	0.7250 (3.57)*	-0.0666 (0.66)	-0.0284 (0.28)	-0.1282 (1.59)	-0.0913 (1.11)	-0.0628 (0.67)	-0.0515 (0.53)	-0.0310 (0.09)	-0.1886 (0.55)
Manufacturing – durables	0.3316 (3.57)*	0.4189 (3.65)*	-0.0457 (0.69)	-0.0261 (0.39)	-0.0951 (1.82)***	-0.0836 (1.54)	-0.0016 (0.03)	-0.0092 (0.15)	-0.0899 (0.53)	-0.1359 (0.82)

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[13] All RHS variables are initial values from 1970.
[14] All dollar values are in real 1992 dollars.

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Referee Appendix Table 5: Entire United States

RHS Variables[15]	North Dakota OLS	North Dakota 2SLS	Ohio OLS	Ohio 2SLS	Oklahoma OLS	Oklahoma 2SLS	Pennsylvania OLS	Pennsylvania 2SLS	South Carolina OLS	South Carolina 2SLS
Manufacturing – nondurables	0.4186 (3.03)*	0.5928 (3.57)*	-0.0538 (0.86)	-0.0341 (0.54)	-0.1051 (2.13)**	-0.0902 (1.77)***	0.0011 (0.02)	-0.0118 (0.20)	-0.1061 (0.62)	-0.1642 (1.00)
Mining	0.2029 (2.00)***	0.3108 (2.50)**	-0.0693 (1.03)	-0.0474 (0.70)	-0.1035 (1.86)***	-0.0794 (1.39)	0.0275 (0.42)	0.0133 (0.19)	-0.1625 (0.33)	-0.2692 (0.55)
Retail	0.2733 (2.73)**	0.3688 (2.98)*	-0.0727 (1.05)	-0.0475 (0.69)	-0.1534 (2.66)**	-0.1521 (2.52)**	-0.0387 (0.62)	-0.0528 (0.82)	-0.0314 (0.17)	-0.0868 (0.47)
Business & repair services	0.2177 (1.59)	0.1469 (0.85)	-0.1216 (0.94)	-0.0871 (0.67)	-0.1544 (1.42)	-0.1851 (1.65)	-0.0039 (0.03)	-0.0182 (0.15)	0.3402 (0.82)	0.2742 (0.66)
Educational services	0.0470 (0.40)	0.0900 (0.60)	0.0362 (0.38)	0.0345 (0.35)	0.1086 (1.42)	0.0991 (1.24)	-0.1538 (1.22)	-0.1111 (0.86)	0.1611 (0.45)	0.1143 (0.32)
Professional related services	0.0462 (0.37)	-0.0381 (0.24)	-0.0705 (0.69)	-0.0583 (0.56)	-0.1505 (1.85)***	-0.1237 (1.48)	0.0284 (0.18)	-0.0526 (0.33)	-0.1690 (0.48)	-0.2403 (0.68)
Health services	0.1797 (1.32)	0.3786 (2.36)**	0.0055 (0.06)	0.0115 (0.12)	0.0751 (1.06)	0.0833 (1.13)	-0.0043 (0.03)	0.0623 (0.49)	-0.0615 (0.14)	-0.0945 (0.22)
Personal services	0.3575 (2.76)**	0.4887 (3.07)*	0.1178 (1.28)	0.1560 (1.69)***	-0.1594 (2.09)**	-0.1709 (2.15)**	-0.0788 (0.88)	-0.0864 (0.93)	-0.0612 (0.29)	-0.1066 (0.50)
Entertainment & recreational services	0.5566 (3.00)*	0.7627 (3.37)*	0.2041 (0.97)	0.2109 (0.98)	-0.2447 (1.17)	-0.2212 (1.01)	0.3019 (0.88)	0.3957 (1.12)	-0.2259 (0.49)	-0.2122 (0.45)
Transportation	0.2914 (2.59)**	0.3771 (2.67)**	-0.0695 (0.96)	-0.0479 (0.66)	-0.0831 (1.11)	-0.0808 (1.03)	0.0452 (0.67)	0.0288 (0.41)	-0.1319 (0.61)	-0.2140 (1.04)
Wholesale trade	0.1758 (1.58)	0.2107 (1.49)	0.0445 (0.52)	0.0580 (0.67)	-0.0351 (0.39)	-0.0143 (0.15)	-0.0249 (0.27)	-0.0055 (0.06)	-0.2581 (0.87)	-0.3619 (1.27)
Poverty	-0.0083 (0.26)	0.0011 (0.03)	-0.0220 (0.77)	-0.0578 (2.65)**	0.0075 (0.38)	-0.0122 (0.67)	0.0010 (0.03)	-0.0280 (0.83)	-0.0487 (0.75)	-0.0903 (1.66)
Metro area, 1970	0.0000 (0.00)	0.0000 (0.00)	0.0012 (1.18)	0.0015 (1.46)	-0.0012 (0.90)	-0.0009 (0.63)	-0.0000 (0.07)	-0.0001 (0.11)	0.0002 (0.08)	0.4611 (1.35)
R^2	0.90	0.91	0.74	0.89	0.78	0.89	67	67	46	46
Adjusted R^2	0.73	0.78	0.57	0.83	0.61	0.81	0.81	0.93	072	0.92
# Observations	53	53	88	88	77	77	0.61	0.86	0.70	0.73

* significant at 1% level
** significant at 5% level
*** significant at 10% level

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[15] All RHS variables are initial values from 1970.

RHS Variables[16]	South Dakota OLS	South Dakota 2SLS	Tennessee OLS	Tennessee 2SLS	Texas OLS	Texas 2SLS	Virginia OLS	Virginia 2SLS	Washington OLS	Washington 2SLS
Constant	-0.0361 (0.23)	0.0112 (0.08)	0.0310 (0.24)	0.1737 (1.31)	0.2637 (4.04)*	0.3720 (5.60)*	0.0922 (0.85)	0.3519 (3.12)*	0.0743 (0.11)	0.0594 (0.10)
Log 1970 per capita income[17]	-0.0193 (2.39)**	-0.0265 (4.77)*	-0.0199 (3.55)*	-0.0391 (15.21)*	-0.0211 (8.10)*	-0.0356 (15.18)	-0.0045 (0.69)	-0.0348 (15.81)*	-0.0349 (1.09)	-0.0327 (9.29)*
Age: 5-13 years	0.4792 (2.62)**	0.5227 (2.98)*	0.1158 (0.80)	0.1347 (0.86)	-0.0577 (0.88)	-0.0224 (0.32)	0.0098 (0.08)	0.0688 (0.49)	0.4242 (0.42)	0.4183 (0.47)
Age: 14-17 years	0.2482 (1.67)	0.2632 (1.79)***	0.0766 (0.63)	0.1122 (0.86)	-0.0136 (0.22)	-0.0134 (0.21)	-0.0104 (0.10)	0.0346 (0.27)	0.2212 (0.29)	0.2310 (0.34)
Age: 18-64 years	0.2601 (1.72)***	0.2906 (1.98)***	0.0391 (0.34)	0.0795 (0.63)	-0.0209 (0.40)	-0.0245 (0.44)	-0.0315 (0.33)	-0.0257 (0.23)	0.3787 (0.48)	0.3784 (0.53)
Age: 65+	0.3072 (2.59)**	0.3334 (2.91)*	0.1121 (1.07)	0.1437 (1.27)	-0.0408 (0.93)	-0.0672 (1.44)	-0.0139 (0.17)	0.0026 (0.03)	0.3521 (0.44)	0.3390 (0.49)
Blacks	-0.1415 (0.61)	-0.1344 (0.58)	0.0125 (1.28)	0.0137 (1.30)	0.0006 (0.09)	-0.0038 (0.51)	-0.0005 (0.08)	0.0012 (0.16)	-0.0935 (0.42)	-0.0984 (0.53)
Hispanic	-0.0963 (0.61)	-0.1177 (0.76)	0.6294 (2.29)**	0.6146 (2.06)**	-0.0106 (1.72)***	-0.0174 (2.71)*	0.0615 (0.30)	0.0112 (0.05)	0.0907 (0.77)	0.0886 (0.88)
Education: 9-11 years	-0.0949 (2.66)**	-0.0903 (2.57)**	-0.0098 (0.36)	0.0093 (0.33)	-0.0497 (4.28)*	-0.0594 (4.85)*	0.0141 (0.64)	0.0128 (0.48)	0.0354 (0.20)	0.0307 (0.21)
Education: H.S. diploma	0.0127 (0.54)	0.0181 (0.80)	0.0063 (0.24)	0.0077 (0.26)	0.0102 (0.80)	0.0061 (0.45)	0.0024 (0.10)	0.0157 (0.54)	0.0203 (0.13)	0.0146 (0.12)
Education: Some college	0.0305 (0.62)	0.0352 (0.72)	-0.0626 (1.11)	-0.0673 (1.10)	0.0292 (1.41)	0.0282 (1.28)	-0.0136 (0.21)	-0.0211 (0.28)	0.0247 (0.23)	0.0199 (0.28)
Education: Bachelor +	-0.0904 (1.52)	-0.0811 (1.39)	0.1161 (2.11)**	0.1732 (3.04)*	-0.0396 (1.67)***	-0.0175 (0.70)	0.0283 (0.57)	0.0961 (1.68)*	0.1527 (0.85)	0.1531 (0.95)
Housing	0.0000 (0.10)	0.0000 (0.15)	-0.0000 (1.05)	-0.0000 (0.63)	0.0000 (1.09)	0.0000 (0.70)	-0.0000 (1.69)***	-0.0000 (0.93)	0.0000 (0.90)	0.0000 (1.26)
Federal government employment	-0.0341 (0.69)	-0.0488 (1.05)	-0.0013 (0.04)	-0.0032 (0.10)	-0.0497 (1.65)	-0.0307 (0.96)	-0.0255 (0.76)	-0.0166 (0.42)	-0.0259 (0.35)	-0.0268 (0.42)
State government employment	0.0069 (0.19)	-0.0014 (0.04)	-0.0323 (1.01)	-0.0615 (1.83)***	0.0058 (0.34)	-0.0021 (0.11)	0.0115 (0.33)	-0.0122 (0.29)	-0.0701 (0.51)	-0.0691 (0.57)
Local government employment	-0.0441 (0.96)	-0.0544 (1.23)	0.0056 (0.17)	0.0067 (0.19)	-0.0277 (1.30)	-0.0306 (1.35)	0.0458 (1.04)	0.0234 (0.44)	-0.1603 (0.62)	-0.1572 (0.69)
Self-employment	0.0433 (1.59)	0.0372 (1.42)	0.0246 (0.72)	0.0126 (0.34)	-0.0102 (0.78)	-0.0009 (0.07)	0.0146 (0.44)	-0.0126 (0.32)	0.0021 (0.02)	0.0015 (0.02)
Agriculture	-0.1012 (1.56)	-0.1072 (1.67)	0.0707 (1.09)	0.0930 (1.33)	0.0006 (0.02)	0.0329 (0.92)	0.0018 (0.03)	0.0051 (0.08)	-0.0914 (0.70)	-0.0938 (0.83)
Communications	-0.2021 (1.57)	-0.1912 (1.49)	0.0479 (0.82)	0.0729 (1.15)	-0.1123 (2.47)**	-0.0893 (1.85)***	-0.0719 (0.97)	-0.0744 (0.84)	0.0475 (0.31)	0.0490 (0.36)
Construction	-0.0505 (0.57)	-0.0561 (0.64)	0.1412 (2.31)**	0.1380 (2.08)**	0.0164 (0.44)	0.0471 (1.21)	0.0307 (0.68)	0.0389 (0.72)	0.0244 (0.12)	0.0205 (0.12)
Finance, insurance & real estate	0.0807 (0.74)	0.0785 (0.72)	0.2709 (2.56)**	0.2628 (2.29)**	0.1241 (2.31)**	0.1834 (3.27)*	0.0282 (0.27)	0.1706 (1.39)	-0.0384 (0.12)	-0.0328 (0.12)
Manufacturing – durables	0.0102 (0.14)	0.0046 (0.07)	0.1112 (1.93)***	0.1060 (1.69)***	0.0075 (0.22)	0.0324 (0.91)	-0.0236 (0.59)	-0.0306 (0.64)	-0.0803 (0.54)	-0.0801 (0.60)

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[16] All RHS variables are initial values from 1970.
[17] All dollar values are in real 1992 dollars.

Referee Appendix Table 6: Entire United States

RHS Variables[18]	South Dakota		Tennessee		Texas		Virginia		Washington	
	OLS	2SLS	OLS	2SLS	OLS	2SLS	OLS	2SLS	OLS	2SLS
Manufacturing – nondurables	-0.0821 (0.85)	-0.1054 (1.13)	0.0941 (1.62)	0.0870 (1.38)	-0.0229 (0.68)	-0.0011 (0.03)	-0.0313 (0.76)	-0.0319 (0.65)	-0.0937 (0.52)	-0.0969 (0.62)
Mining	-0.0544 (0.79)	-0.0683 (1.02)	0.0565 (0.91)	0.0521 (0.78)	-0.0205 (0.60)	0.0066 (0.18)	-0.0216 (0.49)	-0.0173 (0.32)	0.0229 (0.18)	0.0249 (0.23)
Retail	-0.0504 (0.65)	-0.0630 (0.83)	0.1449 (2.12)**	0.1581 (2.14)**	-0.0374 (1.04)	-0.0161 (0.42)	-0.0855 (1.84)***	-0.0893 (1.59)	-0.1136 (0.61)	-0.1112 (0.68)
Business & repair services	0.1221 (1.01)	0.1090 (0.92)	0.0947 (1.55)	0.0977 (1.47)	0.0530 (0.94)	0.1079 (1.83)***	0.0165 (0.13)	-0.0314 (0.21)	-0.0946 (0.42)	-0.0943 (0.47)
Educational services	0.0649 (0.86)	0.0651 (0.86)	0.1237 (1.34)	0.0989 (0.99)	0.0061 (0.15)	-0.0347 (0.80)	-0.1828 (2.05)**	-0.1852 (1.73)***	0.2693 (0.72)	0.2860 (1.16)
Professional related services	-0.0298 (0.29)	-0.0434 (0.44)	0.0067 (0.07)	0.0126 (0.12)	-0.0363 (0.72)	0.0179 (0.34)	0.1071 (1.29)	0.0931 (0.93)	-0.3770 (0.88)	-0.3947 (1.31)
Health services	0.0056 (0.29)	0.0115 (0.16)	0.1044 (1.37)	0.0787 (0.96)	0.0443 (1.05)	0.0364 (0.81)	-0.1005 (1.15)	-0.0846 (0.80)	0.4003 (0.76)	0.4279 (1.49)
Personal services	0.0059 (0.08)	-0.0206 (0.23)	0.0624 (0.78)	0.0495 (0.57)	0.0388 (0.98)	0.0919 (2.25)**	0.0147 (0.35)	0.0233 (0.46)	-0.2745 (1.25)	-0.2739 (1.39)
Entertainment & recreational services	-0.0856 (0.46)	-0.1032 (0.56)	-0.4711 (1.62)	-0.3789 (1.20)	0.0251 (0.21)	0.0295 (0.23)	-0.0453 (0.19)	0.0022 (0.01)	-0.0226 (0.03)	-0.0475 (0.07)
Transportation	0.0505 (0.45)	0.0448 (0.40)	0.1087 (1.53)	0.0979 (1.27)	-0.0474 (1.20)	-0.0107 (0.26)	-0.0214 (0.39)	-0.0325 (0.49)	-0.0049 (0.03)	-0.0022 (0.02)
Wholesale trade	-0.1189 (1.06)	-0.1473 (1.38)	0.1988 (2.17)**	0.2004 (2.02)**	0.0111 (0.26)	0.0238 (0.52)	0.0512 (0.81)	0.0139 (0.18)	-0.2369 (0.74)	-0.2399 (0.85)
Poverty	-0.0414 (1.67)	-0.0448 (1.84)***	-0.0257 (1.55)	-0.0492 (2.99)*	-0.0312 (2.80)*	-0.0525 (4.70)*	-0.0194 (1.06)	-0.0465 (2.21)**	-0.0383 (0.29)	-0.0318 (0.41)
Metro area, 1970	0.0052 (1.63)	0.0050 (1.57)	0.0035 (2.93)*	0.0038 (2.95)*	0.0012 (1.51)	0.0017 (1.95)**	0.0010 (0.43)	-0.0000 (0.01)	0.0019 (0.66)	0.0018 (0.80)
R²	0.83	0.87	97	97	254	254	84	84	39	39
Adjusted R²	0.65	0.74	0.68	0.88	0.53	0.71	0.62	0.83	0.96	0.96
# Observations	66	66	0.51	0.82	0.46	0.66	0.34	0.72	0.66	0.76

* significant at 1% level
** significant at 5% level
*** significant at 10% level

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[18] All RHS variables are initial values from 1970.

RHS Variables[19]	_West Virginia_		__Wisconsin__	
	OLS	2SLS	OLS	2SLS
Constant	-0.0132	0.1587	0.2621	0.3286
	(0.07)	(0.65)	(1.99)***	(3.28)*
Log 1970 per capita income[20]	0.0043	-0.0336	-0.0191	-0.0240
	(0.43)	(15.49)*	(3.08)*	(6.83)*
Age: 5-13 years	0.0763	0.0178	-0.1476	-0.1801
	(0.29)	(0.05)	(1.09)	(1.40)
Age: 14-17 years	0.1165	0.0999	-0.0529	-0.1002
	(0.71)	(0.48)	(0.37)	(078)
Age: 18-64 years	0.0115	0.0185	-0.1169	-0.1455
	(0.07)	(0.09)	(1.12)	(1.50)
Age: 65+	0.0152	-0.0558	-0.1883	-0.2164
	(0.09)	(0.25)	(1.86)***	(2.30)**
Blacks	-0.0391	-0.0428	-0.0286	-0.0274
	(1.46)	(1.26)	(0.41)	(0.39)
Hispanic	0.0315	-0.1564	-0.0318	-0.0232
	(0.10)	(0.39)	(0.27)	(0.20)
Education: 9-11 years	0.0072	0.0470	-0.0313	-0.0273
	(0.15)	(0.81)	(1.07)	(0.95)
Education: H.S. diploma	-0.0774	-0.0223	-0.0311	-0.0268
	(2.04)***	(0.50)	(1.78)***	(1.62)
Education: Some college	0.0197	-0.0134	0.0129	0.0229
	(0.27)	(0.15)	(0.37)	(0.71)
Education: Bachelor +	-0.0005	0.1089	0.0767	0.0923
	(0.01)	(0.98)	(1.86)***	(2.57)**
Housing	0.0000	0.0000	-0.0000	-0.0000
	(0.14)	(1.28)	(0.46)	(0.35)
Federal government employment	0.0606	0.0862	0.0121	0.0147
	(1.06)	(1.20)	(0.36)	(0.45)
State government employment	0.0128	0.0147	-0.0238	-0.0208
	(0.46)	(0.41)	(0.76)	(0.68)
Local government employment	-0.0773	-0.0250	0.0438	0.0459
	(1.18)	(0.31)	(1.26)	(1.33)
Self-employment	0.0245	-0.0084	0.0004	0.0022
	(0.36)	(0.10)	(0.02)	(0.09)
Agriculture	-0.0106	0.1886	0.0321	0.0401
	(0.09)	(1.38)	(0.55)	(0.70)
Communications	0.0269	0.1785	0.1230	0.1164
	(0.25)	(1.41)	(1.21)	(1.15)
Construction	-0.0309	0.1389	0.0912	0.0912
	(0.32)	(1.26)	(1.62)	(1.63)
Finance, insurance & real estate	0.0515	0.1316	0.0395	0.0355
	(0.41)	(0.85)	(0.51)	(0.47)
Manufacturing – durables	-0.0374	0.1254	0.0570	0.0614
	(0.38)	(1.13)	(1.00)	(1.09)

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[19] All RHS variables are initial values from 1970.
[20] All dollar values are in real 1992 dollars.

RHS Variables[21]	West Virginia		Wisconsin	
	OLS	2SLS	OLS	2SLS
Manufacturing – nondurables	-0.0258 (0.25)	0.1439 (1.22)	0.0508 (0.89)	0.0551 (0.97)
Mining	-0.0608 (0.59)	0.1140 (0.98)	0.0795 (1.10)	0.0778 (1.08)
Retail	0.0388 (0.29)	0.2805 (1.86)***	0.0552 (0.82)	0.0687 (1.06)
Business & repair services	0.1994 (1.47)	0.0557 (0.34)	0.2319 (1.90)***	0.2284 (1.88)***
Educational services	0.0516 (0.46)	-0.0645 (0.47)	-0.0483 (0.54)	-0.0511 (0.58)
Professional related services	-0.0726 (0.50)	0.1359 (0.80)	0.0613 (0.74)	0.0551 (0.67)
Health services	0.0212 (0.19)	-0.0128 (0.09)	0.0144 (0.18)	0.0192 (0.24)
Personal services	-0.0188 (0.17)	0.1509 (1.15)	0.0537 (0.65)	0.0493 (0.60)
Entertainment & recreational services	0.0342 (0.21)	0.2851 (1.50)	0.0225 (0.10)	0.0324 (0.15)
Transportation	-0.0506 (0.46)	0.0948 (0.73)	0.0207 (0.31)	0.0249 (0.38)
Wholesale trade	-0.1665 (1.14)	0.0401 (0.23)	0.0865 (1.31)	0.0922 (1.41)
Poverty	-0.0182 (0.77)	-0.0417 (1.44)	-0.0129 (0.45)	-0.0241 (0.97)
Metro area, 1970	0.0000 (0.01)	0.0000 (0.01)	0.0001 (0.07)	0.0001 (0.13)
R^2	0.80	0.87	0.74	0.89
Adjusted R^2	0.50	0.68	0.50	0.79
# Observations	55	55	70	70

*   significant at 1% level
**   significant at 5% level
*** significant at 10% level

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[21] All RHS variables are initial values from 1970.

Bar-Ilan University
Department of Economics
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