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Blueprint Mississippi Reconsidered

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Overview

This inaugural issue of the *MURC Digest* provides an overview of the Mississippi Urban Research Center's (MURC) "Research Report Series 05-01" (Price and Mozee, 2005) that explores the possible economic effects of particular policy recommendations contained in Blueprint Mississippi – a private sector initiative creating a business-driven vision for moving Mississippi's economy forward. The purpose of this and future issues of the *MURC Digest* is to provide non-technical overviews of technical research reports published by MURC. *MURC Digest* overviews provide a narrow, non-technical account of research methodology. While it is necessary to include some discussion of the research methodology employed, the abridged discussion provided here should not be viewed as being indicative of the scientific rigor demonstrated in the actual research report. Readers interested in a full exposition of the research methodology should read the actual research report, which is available upon request. The intended audience for the *MURC Digest* includes private citizens, public policy-makers, economic and community developers, and related development practitioners.

The central aim of "Research Report Series 05-01" is to explore the economic consequences of implementing a particular policy recommendation of Blueprint Mississippi that calls for increasing the share of jobs in the high-technology sector. The research explores this by considering the following question: Will the proposed employment growth in Mississippi's high technology industry, along with its process of skill-biased techno-logical change, trigger, if any, earnings and income inequality? More specifically, the research examines employment shares in Mississippi's current information technology sector – a particular segment of the high-technology industry –and the effects it has on household income inequality and income growth at the county level. A measure of income inequality is deployed that constitutes a way of identifying unequal gains (or losses) from the distribution of growth in the economy between high-income, middle-income and low-income families. While the causes of income inequality are numerous (e.g., differences in skill-levels, work experiences, educational backgrounds, family status, etc.), the effects of income inequality can have widespread social, political, and economic consequences. Therefore, any proposed public or private sector initiatives will need to be cognizant of the negative potential these initiatives could have when trying to bring about economic growth in the state of Mississippi.

The findings of "Research Report 05-01" reveal that employment growth in the information technology sector increases household income inequality for urban and Delta region counties. The increases in household income inequality engendered by job growth in the information technology sector also reduce the growth rate of county income. As such, the results suggest that in the absence of human capital policies that remedy labor force skill deficits, successful implementation of Blueprint Mississippi policy recommendations for increasing the employment share of high technology in the state will have, at least in the short run, adverse effects on urban and Delta region counties.

Pursuing the New Economy in Mississippi

Blueprint Mississippi provides a set of policy recommendations that would enable the development of the Mississippi regional economy toward a so-called "New Economy." As Atkinson and Court (1998) describe it, a "New Economy" is a knowledge- and idea based economy where innovative ideas, knowledge and technology drive job creation and higher living standards. The policy framework articulated by Blueprint Mississippi could not be more relevant, timely or urgent, as Mississippi ranks last overall in a ranking of states based on criteria that characterize the extent to which a given state economy is a "New Economy" (Atkinson, Court, and Ward; 1999).

Of the more than 50 recommendations provided by Blueprint Mississippi, one particular New Economy-type goal is to diversify and improve the economic base of Mississippi by increasing the percentage of employees in high-technology industries. One of the characteristics of the so-called "New Economy" is that from the mid-1990s, economic growth has been accompanied by substantial investments and innovations in computer technology. Gordon (2000) for example, reports that more than half of the surge in labor productivity in the late 1990s had its origin in the production of computer hardware, peripherals, and telecommunications equipment – information technology –with some spillover to the small

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segment of the economy producing durable goods. This suggests that the engine of productivity growth in the so-called high-technology industry has been the information technology sector. In general, the productivity increases emanating from the high-technology industry appears to have its source in that sector responsible for the production of so-called information technology.

To the extent that productivity increases in a particular sector characterize a process of skill-biased technological change, increases in the productivity of workers in information technology would increase their earnings relative to workers in other sectors. As such, the productivity increases witnessed in the production of information technology could be a causal factor underlying earnings inequality in the U.S. economy. The economics literature has produced many analyses of earnings/income inequality, however, most of these studies are at the national level, and seem to have ignored the consequences of the productivity revival in the information technology sector. The general conclusion of much of this literature is that at least since the 1980s, the U.S. economy has seen the earnings of those at the top end of the skill distribution increase, relative to those at the bottom of the skill distribution.

From a public policy perspective, the existence of earnings inequality matters if economic growth itself depends upon earnings inequality. While there is evidence that inequality can be beneficial for economic growth (Li and Zou, 1998), the majority of the empirical evidence suggests that inequality is harmful for, and reduces economic growth (Aghion, Caroli, and Garcia-Penalosa, 1999). Thus, if economic growth is a policy goal, the existence of earnings inequality can constrain the welfare gains normally associated with higher per capita output, placing a given economy on a lower and suboptimal equilibrium growth path. In this context, active development policies that seek to foster growth through cultivating particular skill-intensive industries could actually lower growth as a result of such industries engendering levels of earnings inequality that reduce economic growth, unless adequate safeguards are put into place beforehand.

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Research Methodology

From an economic welfare standpoint, income inequality could matter for two basic reasons. Inequality could matter for the well-being of individuals if what matters to them is where they stand, in terms of income and wealth, relative to others (Cole, Mailath, and Postlewaite, 1995). Household income inequality could also affect the underlying saving/investment behaviors responsible for economic growth which determine how much income/wealth is available to a given individual. It is in this second context that the effects of inequality can be explored empirically, as the theory and empirics of economic growth easily lend themselves to a consideration of what impact, if any, income inequality has on the growth of income and output.

A cross-county approach is utilized to examine how sensitive household income inequality in Mississippi is to changes in the employment share of the information technology sector – a particular segment of the high technology industry that appears to be a major source of productivity gains for the industry as a whole. While there are many measures of income inequality, data limitations in Mississippi county-level economic data best permit a consideration of the ratio of median to average household income. Theoretical justifications for using the ratio of median to average household income as a measure of income inequality follow from Persson and Tabellini (1994) and Gloom (2004). The essential idea is that if income is distributed normally, that is being based upon some underlying normal distribution of ability/skills, the mean and median income would be identical. When ability/skills are not normally distributed or skewed, the mean departs from the median, and the underlying income distribution is skewed, or unequal. In general, the closer the ratio of median to mean household income is to unity, the more equal is the distribution of household income.

The effects of job growth in the information technology sector on inequality and income are examined within a cross-county Quantile regression framework. In contrast to Ordinary Least Squares, Quantile regression allows for parameter heterogeneity across observation – which could be important if counties in Mississippi differ in ways that are unobservable, but are of consequence. Following an approach developed by VanHoudt (2000), county-level inequality is specified as being a function of the employment shares in: (1) the information technology sector, (2) all other sectors, and (3) dummy variables for being an urban and/or Delta region county. As employment shares are more or less exact linear combinations of each other, parameter estimation is proceeded by replacing each employment share with its Gran-Schmidt orthogonalized value (Saville and Wood, 1991). A partial adjustment approach is utilized to examine how county-level inequality conditions income growth, where the determinants of the steady-state growth rate of income are: (1) initial income, (2) county-level inequality, and (3) dummy variables for being an urban and/or Delta region county.

Inequality in Mississippi

Given the measure of household income inequality – call it Ψ – for the 82 counties in Mississippi, DeSoto County has the most equal distribution of income by household, and Humphreys County has the least equal distribution. As a group, urban counties in Mississippi have higher income equality relative to all other counties in the state, as their group median Ψ exceeds that for the entire state. In general, Delta counties are below the county median value of Ψ – suggesting that counties located in the Mississippi Delta region are not particularly egalitarian places to live in – at least in terms of the distribution of household income. Nonetheless, if sensible measures of social welfare – a measure of average household well-being – are a function of the distribution of household income, households in the Mississippi Delta region counties are not as well-off relative to other Mississippi counties.

The range of Ψ is approximately 36 percent – which represents significant variation across the counties. To the extent that variation in Ψ is explained by county-level variations in the labor market skills of workers, the dispersion in Ψ across the counties could reflect differential demands for skilled workers in sectors where there is a skill premium. In this context, counties that rank low have labor markets characterized by a "dualism" in which there is a significant percentage of unskilled workers earning low wages, and a percentage, not necessarily significant, of skilled workers earning high wages. This is more generally viewed as inequality engendered by skill-biased technological change, and empirically has been associated with the growth of "New Economy" industries such as information technology. As Blueprint Mississippi provides policy recommendations that would induce growth in the information technology sector, it is conceivable that job growth in the information technology sector could engender income inequality. If inequality in turn is harmful for economic growth, job growth in skill-intensive sectors such as information technology would undermine policy goals oriented toward income growth.

Inequality and Information Technology Employment Shares

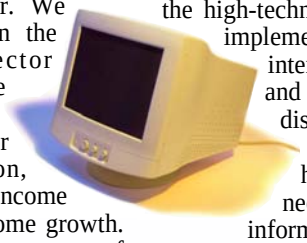
How sensitive is household income inequality with respect to job growth in the information technology sector? Quantile regression parameter estimates reveal that for a nontrivial proportion of the conditional distribution of household income inequality – some 20 quantiles, growth in information technology employment shares matters for inequality in Mississippi counties that are urban and/or located in the Delta region. Across the quantiles, the urban and Delta region effect is negative and significant in a sizable portion of the conditional distribution of household income inequality. For a majority of the quantiles, the sign on the information technology employment share is negative and significant, and has the largest magnitude for Mississippi counties in the 60th and 65th quantiles. While the singular effects of the employment shares are negative across a sizable portion of the conditional distribution of household income inequality – such effects are never significant. This suggests that in Mississippi, the causal nexus between household income inequality and skill-biased technological change manifests itself through higher earnings inequality in urban and Delta region counties.

Inequality and Growth in Mississippi

Given that job growth in the information technology sector engenders household earnings inequality in urban and Delta region counties, what effects does this inequality have on income growth? Is household income inequality beneficial or harmful for income growth in Mississippi? OLS and Quantile regression parameter estimates of a partial adjustment county income growth equation reveal that for urban and Delta region counties, household income inequality is harmful for income growth. The quantile parameter estimates reveal a pattern of sign and significance for a significant part of the entire conditional income growth distribution for Mississippi counties that is similar to the OLS estimates. The exception being that for five of the quantiles, being a Delta region county has a positive and significant effect on income growth. In terms of magnitude, income inequality is most beneficial for income growth for counties in the 95th quantile, most harmful for urban counties in the 30th quantile, and most harmful for Delta region counties in the 85th quantile. The similarity between the OLS and quantile parameter estimates of the income growth specification suggests that the effects of household income inequality on county income growth are well-identified, as the OLS parameter estimates are robust with respect to heteroskedasticity, and the Quantile regression parameter estimates are robust with respect to outliers.

Policy Implications

Our analysis of the determinants of household income inequality, and the effect of household income inequality on income growth in the state of Mississippi provide a *cautionary warning* for Blueprint Mississippi policy recommendations that if implemented, would presumably catalyze employment growth in the technology sector. We find that employment growth in the information technology sector increases household income inequality at the county level, and for counties that are urban and/or located in the Delta region, increasing levels of household income inequality can reduce overall income growth. To the extent that sensible measures of economic welfare include individual relative income shares, and income growth, Mississippi residents that live in urban and/or Delta region economies could be made worse off if the Blueprint Mississippi policy recommendations for catalyzing employment growth in the technology sector are successfully implemented without appropriate safeguards being put into place beforehand.



The explicit recommendations of Blueprint Mississippi establish technology sector employment share targets of 3.6 percent, and 4.5 percent in the years 2010 and 2015, respectively. In our sample of Mississippi counties, the average employment share in the information technology sector is 1.3 percent – significantly below the recommended targets. What would be the effect on household income inequality of increasing the employment share of information technology by approximately 177 percent, from 1.3 to 3.6 percent – the Blueprint Mississippi 2010 target? We benchmarked this by considering the effects for the quantile with the largest coefficient. With all other factors remaining the same, a 177 percent increase in the information technology employment share would increase household income inequality by approximately 29.5 percent for urban counties in the 90th percentile of the conditional household inequality distribution. For Delta region counties, the corresponding increase in household income inequality is approximately 24.1 percent for counties in the 35th quantile of the conditional household inequality distribution.

What would be the effect of increasing the employment share of information technology by 177 percent on county income growth? A 29.5 percent increase in household income inequality would reduce income growth by approximately 25 percent for urban counties in the 30th quantile of the conditional income growth distribution. For counties in the Delta region, a 24.1 percent increase in household income inequality would reduce income growth by approximately 5.4 percent for Delta region counties in the 85th quantile of the conditional income growth distribution.[7]

Our illustrative benchmark estimates of the effects of increasing the employment shares in information technology across Mississippi are instructive. They suggest that urban and Delta region counties would fare poorly if the recommendations of Blueprint Mississippi advocating employment growth in the high-technology sector were successfully implemented without other appropriate interventions. Apparently, in urban and Delta region counties, the distribution of household income is particularly sensitive to the household distribution of skills necessary for employment in the information technology sector. *The sensitivity of income to the distribution of skills probably underscores a significant mismatch between the actual endowment of household skills, and those skill endowments required for employment in the information technology sector.* Such skill mismatches are characteristic of labor markets experiencing skill- biased technological change. In this context, our findings that Blueprint Mississippi's policy recommendations for encouraging employment growth in the high technology sector are not entirely pessimistic. *To the extent that skill mismatches in urban and Delta region economies can be remedied with appropriate human capital policies, growth in information technology employment shares need not have deleterious effects on household income inequality and income growth.*

Of course, Blueprint Mississippi does indeed make human capital policy recommendations that, if implemented, could possibly address the skill disparities that engender household income inequality. These recommendations include policy interventions that would increase participation in lifelong learning, retrain dislocated workers, increase the percentage of children enrolled in pre-kindergarten, increase per-pupil expenditures, and increase the number of certified teachers. Such human capital policy interventions take time to be implemented and made effective. In contrast, the use of tax and infrastructure subsidies to attract firms can be implemented and made effective in a much shorter period of time. Given such policy effectiveness lags, it is likely that at least in the short run, urban and Delta region counties will fare poorly if Blueprint Mississippi policy recommendations for increasing the share of employment in the high- technology sector are successfully implemented. If in the long run, Blueprint Mississippi human capital policy recommendations are implemented successfully so as to eliminate the skill disparities that engender household income inequality, urban and Delta region counties need not fare poorly as Mississippi increases employment shares in high- technology sectors such as information technology.

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Conclusions

Our analysis suggests that successful implementation of Blueprint Mississippi policy recommendations for increasing the high-technology industry employment share in the state would likely have, at least in the short run, an adverse effect on urban and Delta region counties in the absence of appropriate human capital development interventions. This conclusion follows from a consideration of the effects of increases in the employment share of the information technology sector – a particular segment of the high-technology industry – on household income inequality at the county level in Mississippi. Increases in household income inequality were also found to reduce income growth for urban and Delta region counties. From an economic well-being perspective, our results suggest that increases in the employment share of the high-technology industry would render urban and Delta region economies worse, as employment growth in the information technology sector would lower the relative income status and growth of income for Urban and Delta region households.

As a policy recommendation, the notion that Mississippi should increase the share of state employment in the high-technology industry is not in itself inconsistent with improving household well-being through higher and growing incomes. Our analysis suggests that such a policy will not improve the economic well-being of Mississippians in urban and Delta regions in the absence of human capital policies that remedy any labor force skill deficits needed for employment in the high-technology industry. If the human capital policy recommendations of Blueprint Mississippi are implemented effectively so as to endow all, or a sizable fraction of the labor force in urban and Delta region counties with the skills requisite for employment in the high-technology industry, there need not be any significant income inequality or less than optimal income growth associated with employment growth in the high-technology industry.

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ENDNOTES

[1] Blueprint Mississippi is a private sector sponsored strategic plan for economic development in the state of Mississippi. It includes more that 50 policy recommendations that range from expanding and improving pre-kindergarten education to improving the state's highway, rail, air and seaport capabilities. A copy of the report can be obtained from the Mississippi Economic Council at http://ww.msmed.com/mechw

[2] Empirical analyses of earnings/income inequality include those by Card and Dinardo (2000), Galor and Moav (2000), and Johnson (1997).

[3] Other measures of income inequality include the Gini coefficient (Deininger and Squire, 1996), the income shares accruing to select quintiles in a distribution of income (Persson and Tabellini, 1994).

[4] The partial adjustment framework is a popular method for empirically estimating the parameters of neoclassical growth models. For an example, see Mankiw, Romer and Weil (1992).

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