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Is Mississippi Really the Worst Place to Live?: A Spatial Equilibrium Approach to Ranking Livable States

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Overview

This edition of *The MURC Digest* considers a recent ranking of the 50 states which found Mississippi to have almost the worst quality of life. To the extent that such rankings are taken seriously by policy makers, state residents and potential migrants to Mississippi — both individuals and business establishments — it is important that the rankings are informed by good social science with a solid foundation in theory and measurement so as to represent a reasonable and unbiased measure of the quality of life enjoyed by Mississippi's residents. As part of its urban/regional research agenda, the Mississippi Urban Research Center is interested in the quality of life enjoyed by Mississippians, both absolutely and relative to other states. However, while popular press accounts of how states rank in terms of quality of life and/or livability are potentially useful and informative, the value of such rankings as inputs into public and private policy considerations is contingent upon the rankings being valid and consistent with a sensible theory of how individuals choose to reside in the locales in which we observe them.

Table 1 reproduces a 2006 ranking of the states according to their livability produced by Morgan Quitno Press (hereafter MQ rankings). Each state's rank is determined by its weighted score based on 44 factors presumed to be important for an individual's quality of life.[1] If it were not for Louisiana's 50th ranking, Mississippi, ranked 49th, would have the distinction of being the least livable state in the United States. The status of Mississippi as being one of the least livable states also appears to be persistent. In annual rankings produced by Morgan Quitno Press each year between 1991–2006, the highest ranking realized by Mississippi was in 1991, when it ranked 45th among all states.[2] While such rankings raise many questions as indicated by recent media coverage of Mississippi's relative ranking (Pettus, 2006), two fundamental questions are: 1) Is Mississippi really the worst place to live?, and 2) Given that Mississippi ranks low and/or near the bottom year after year, why do people live in Mississippi? We pursue both of these questions below, and provide alternative rankings of the states based on a different, but, in our view, more compelling approach to a state's quality of life, and hence its livability.

We argue that the MQ rankings are based on a methodology that is arbitrary and biased in its approach to accounting for what individuals value as contributing to their physical and material comfort/well-being — or so-called amenities — in the places they live. An alternative approach to assessing the quality of life for individuals in particular locations is to recognize that a significant amount of what individuals value in the places they live is unobservable, but is reflected in the difference between what they actually pay to live in a particular place and the quality of life or amenity-adjusted incomes earned. This follows from the idea that the location where an individual resides represents a spatial equilibrium, in which all decisions about where to live are an ideal solution where unobserved individual tastes for particular amenities — things that are valued as components of a "good life" — are matched with the location in which we observe them living. We implement a ranking scheme consistent with this notion, and find that Mississippi is not one of the worst places to live, but instead one of the best.

Mississippi: Heaven or Hell?

If one takes the MQ rankings seriously, and view them as representing some hierarchical ranking of the states in terms of good and evil places to live, heaven would be New Hampshire, and Mississippi would be just about hell. The fact that we observe people living in Mississippi raises the question, at least metaphorically, why would one voluntarily choose to live in hell? The methodology underlying the MQ rankings does not provide an answer to this question, as it merely accounts for what some second party, perhaps a policymaker, regards interpersonally as to what heaven should look like in terms of having desirable pecuniary and nonpecuniary attributes — or amenities. For example, one of the components of the MQ rankings is the percent of the eligible population that votes. As this measure increases, the more livable a state. Or course, this presumes that an individual values high eligible voter participation in elections in the state in which he lives. Surely this seems plausible, but it is conceivable that some individuals resent voter participation as a result of having a distaste for politics and/or political participation.

The MQ rankings are based on an arbitrary explicit "amenity" accounting method, where the amenities that are supposed to make a place livable are determined somewhat arbitrarily, and presuppose that outside observers can determine a priori, everything people "ought" to value in the places they live. This approach is popular in the economic science literature, where it has been utilized to examine the extent to which individual valuations of what are ostensibly amenities (e.g., clean air, parks, museums, desirable climate) are capitalized into housing prices (Glaeser, Kolko, and Saiz, 2001), rents (Shultz and King, 2001), wages/incomes (Ezzet-Loftstrom, 2004), and whether or not they matter for the location decision of business establishments (Blomquist and Granger, 1999). The idea being that if individuals prefer living in a place with say a mild climate, then they should be willing to pay higher housing costs, and substitute lower incomes to live in a place that offers such an amenity — relative to some alternative place with an undesirable climate. For a set of amenities that one can explicitly itemize and account for, the results generally show that housing/rental costs increase and wages/incomes adjust appropriately across the spaces where individuals live. While these empirical findings are consistent with the idea of compensating differences/differentials, for things that people like and or dislike, it requires a leap of faith to believe that some itemized list of empirically significant amenities can account for everything that individuals value in a particular place.[3]

The physical location decision of the character Satan in John Milton's epic poem, *Paradise Lost,* provides a good example of what is fundamentally wrong with the explicit amenity accounting approach that motivates assessing the livability of where people choose to live as in the MQ rankings. Surely, relative to heaven, most would presume that hell is inferior. If one could itemize and

Continued on page 2

comparatively evaluate both heaven and hell in terms of the so-called amenities that inform the MQ rankings, no doubt heaven would be ranked at the top, and presumably no one would voluntarily choose to relocate and live in hell on the basis of such a ranking. Notwithstanding the lack of what many would consider the superior amenities of heaven, Satan, anticipating perhaps the theory of compensating differentials, chooses to reside in hell and all of its disamenities justifying this decision on the grounds that (Book i., line 261): "Here we may reign secure, and in my choice to reign is worth ambition, though in hell. Better to reign in hell than serve in heaven." Apparently for Satan, hell is more livable than heaven, as he values freedom — at least in the sense of not being a servant — more than the other amenities heaven offers. Of course an economist constructing a livability index for heaven and hell based on the explicit amenity accounting approach of the MQ rankings would in all likelihood end up replicating Milton with a ranking scheme in which hell, like Mississippi, would rank last.

To the extent that there is no accounting for tastes, accounting for all relevant amenities is an impossible exercise, and rankings of places where individuals live on the basis of explicit amenity accounting methods is likely to result in biased rankings. The MQ rankings could therefore have a "Miltonesque" bias in that like hell, Mississippi has an inferior ranking relative to a heaven like New Hampshire, simply because of a bias introduced by omitting some unobserved and unaccounted for potential amenity valued by individuals. Capturing the value of unobserved amenities is possible if we view residential location decisions as representing a spatial equilibrium as in Roback (1982). A spatial equilibrium is a solution to a problem where for a given location with particular stock amenities individuals and firms are making optimal choices about the consumption and production of commodities, housing, and amenities. The solution to this problem generates an equilibrium in which, conditional on location, the valuation that individuals place on the amenities in their location is equal to the difference between the amenity-adjusted housing price and the amenity-adjusted wage.[4] Thus, whatever amenities an individual values in a particular location, in equilibrium the residual between the amenity-adjusted housing price and the amenity-adjusted wage reflects the value the individual places on living in that location—for all relevant amenities.

Given unobserved preferences for amenities, a spatial equilibrium approach to valuing the livability of a location seems more compelling than the explicit amenity accounting approach that informs ranking the livability of locations as in the MQ rankings in Table 1. Unless one is willing to concede that Mississippi, like hell, deserves to be ranked last in a hierarchical ranking of places based on what we conventionally think are attributes of a good location like the heaven of New Hampshire, regardless of what sovereign individuals prefer, a spatial equilibrium approach that recognizes the inherent unobservability of all amenities that individuals prefer, some which may be decisive for particular individuals, is a more attractive basis for ranking the livability of the locations in which we observe individuals residing.

Ranking Mississippi from a Spatial Equilibrium Perspective

The spatial equilibrium approach to amenities has been considered by Glaeser, Kolko, and Saiz (2001). While they do not consider ranking locations by quality of life, they do show that for urban metropolitan areas, the residual of an Ordinary Least Squares (OLS) regression of median housing price on median income is correlated positively with population growth — the same relationship one would expect between location-specific amenities as amenity maximizing individuals are inclined to migrate to locations with high levels of preferred amenities. This OLS residual is an approximate spatial equilibrium "amenity index." As an econometric specification, the OLS provides parameter estimates of the effect of amenity-adjusted income on amenity-adjusted housing prices in a location. As the equilibrium relationship is: amenity-adjusted housing price = amenity-adjusted income + demand/value of amenities, OLS parameter estimates of this specification with omitted amenities generates an error that contains the value of amenities.[5] It approximately captures the value of unobserved amenities/quality of life in a given location as the difference between the amenity- adjusted cost of housing and amenity-adjusted wages/ income.

We implement this spatial equilibrium approach to estimating the value of amenities with census data on state-level median housing prices and income.[6] The residuals from a misspecified OLS regression of the log of state median housing prices on the log of state median income is our measure of the value of amenities in a given state, for which we then rank. Table 2 reports the ranking of the states based on our spatial equilibrium approach. Based on our measure of livability, California is the most livable state, in contrast to its MQ rank of being in the bottom half of all states. For Mississippi, the contrast with its standing in the MQ rankings is even more dramatic. Rather than being next to last, when the quality of life is measured by the value of amenities in a spatial equilibrium, the state of Mississippi has a rank of 18, and is in the top half of all states in terms of livability. New Hampshire falls to 29th, and in contrast to the MQ rankings where only one southern state makes the top 25, ranking livability on the basis of our spatial equilibrium approach results in a top 25 that includes 10 southern states. In general, our livability ranking lifts all but the southern states of Alabama and Maryland from the bottom half of the MQ rankings.

What explains the dramatic differences between the MQ rankings and the one that results from our spatial equilibrium approach? Our approach recognizes that in a spatial equilibrium, the quality of life in a location is determined by the difference between the amenity-adjusted housing premium and the amenity-adjusted /income wage premium. If many of the amenities that individuals value in a location are unproductive in the sense that they are costly for firms to produce (Roback, 1982), then in equilibrium, wage/incomes vary inversely with amenities. Our results are perhaps reflecting this, as southern states, which have low wages/incomes relative to northern states, move up significantly in our rankings. In general, our spatial amenity-ranking approach suggests that one reason wages/incomes are relatively lower in southern states is because amenities are relatively higher. This also suggests that the MQ rankings, based on an approach that attempts to explicitly identify all relevant amenities, omit a large portion of unproductive amenities that individuals value resulting in biased measures of a state's quality of life. We suspect that unlike the explicit amenity account approaches that inform the MQ rankings, our spatial equilibrium approach captures all relevant observable and unobservable location-specific amenities as capitalized in housing prices and wages/ incomes — and wages/incomes adjust downward for those amenities that are unproductive for profit-maximizing firms but valued by individuals.

Similar to the approach of the MQ rankings, our results in Table 2 ignore heterogeneity in the valuation and supply of amenities across the 50 states. Of course this need not be the case, as the rate at which individuals are willing to exchange a unit reduction in wages for a unit of clean air —conditional on all other amenities — may be a function of wealth and/or income. For example, if the demand for an unproductive amenity like clean air is income and wealth elastic, its valuation and demand will be higher in wealthier and/or high income states. If this is the case, the rankings in Table 2 may be biased. We address this possibility by generating the value of amenities in a state from residuals of quantile regression parameter estimates of the log of median housing price on median income. Quantile regression allows one to condition parameter estimates on the position a dependent variable occupies in a distribution (e.g., percentiles).[7] This allows for differences in how the dependent variable is affected by the independent variable — parameter heterogeneity. In the case of amenities across the 50 states, a quantile regression will permit a determination as to how wealth/income matters — as captured through the distribution of housing prices across the states —for the valuation of amenities.

Table 3 reports our ranking when the amenity values are generated by the residuals from quantile regression parameter estimates.[8] The state of West Virginia emerges as the most livable state, and Mississippi now ranks 2nd among all states in terms of livability. The rank of New Hampshire, the top-ranked state in the MQ rankings, is now 46th, with Maryland having the status as the least livable state. Similar to the rankings in Table 2, allowing for heterogeneity in amenities results in nine southern states ranking among the top 25 of all

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states — a contrast with the MQ rankings in Table 1. The effects of possible heterogeneity in the valuation of amenities are quite dramatic at the top of the ranking distribution. Of the top 10 ranked states in Table 2, only three remain in the top 10 in Table 3. The bottom of the distribution appears more stable, as eight of the bottom-ranked states in Table 2 remain so in Table 3. The possible importance of heterogeneity in the valuation and supply of amenities by individuals is illustrated by the dramatic change in rank of Mississippi, along with West Virginia, Arkansas and Oklahoma. All four of these states move up relative to their rank in Table 2, and move up substantially from their bottom 10 MQ rankings. In the case of Mississippi, heterogeneity in the valuation and supply of amenities suggests that whatever amenities are enjoyed by residents of the state, they are supplied and valued much higher than they are, or would be in 48 other states. Put another way, the supply of amenities in Mississippi is valued in such a way that residents have the second highest quality of living among residents of all states.

TABLE 1
QUALITY OF LIFE STATE RANKINGS
(Explicit Amenity Accounting Method)

STATE	RANK	STATE	RANK
New Hampshire	1	Rhode Island	26
Minnesota	2	Missouri	27
Iowa	3	Illinois	28
Vermont	4	Arizona	29
New Jersey	5	Pennsylvania	30
Wyoming	6	Florida	31
Massachusetts	7	New York	32
Virginia	8	Oregon	33
Nebraska	9	California	34
Connecticut	10	Michigan	35
Utah	11	Indiana	36
North Dakota	12	Ohio	37
South Dakota	13	Georgia	38
Wisconsin	14	Alabama	39
Kansas	15	North Carolina	40
Maryland	16	New Mexico	41
Maine	17	Texas	42
Delaware	18	Oklahoma	43
Idaho	19	West Virginia	44
Colorado	20	Tennessee	45
Montana	21	South Carolina	46
Hawaii	22	Kentucky	47
Alaska	23	Arkansas	48
Nevada	24	**Mississippi**	**49**
Washington	25	Louisiana	50

Source: State Rankings 2006, Morgan Quitno Press, Lawrence, KS

TABLE 2
QUALITY OF LIFE STATE RANKINGS
(Spatial Equilibrium Method)

STATE	RANK	STATE	RANK
California	1	New Jersey	26
Hawaii	2	Vermont	27
Massachusetts	3	Michigan	28
Oregon	4	New Hampshire	29
New York	5	Illinois	30
Nevada	6	Delaware	31
Colorado	7	Ohio	32
New Mexico	8	Minnesota	33
Rhode Island	9	Wisconsin	34
Washington	10	Oklahoma	35
Utah	11	Virginia	36
Arizona	12	Missouri	37
Montana	13	Alabama	38
Georgia	14	Connecticut	39
Florida	15	Texas	40
Idaho	16	Alaska	41
North Carolina	17	Indiana	42
Mississippi	**18**	Maryland	43
Arkansas	19	South Dakota	44
Louisiana	20	Pennsylvania	45
Maine	21	Wyoming	46
Kentucky	22	Nebraska	47
Tennessee	23	Kansas	48
South Carolina	24	Iowa	49
West Virginia	25	North Dakota	50

Note. Rankings are based on the equilibrium value of amenities as measured by the size of the residuals from an Ordinary Least Squares (OLS) Regression of the log of median home prices on the log of median income. The estimated regression model is:

$$\textit{log(median housing price)} = -9.05 + 1.916\ \textit{log(median income)}$$
$$(2.19) \quad (.201)$$
$$N = 50,\ R^2 = .646$$

where N is the number of observations, and R^2 is the coefficient of determination. The standard errors are in parentheses, and indicate statistical significance for each parameter.

TABLE 3
QUALITY OF LIFE STATE RANKINGS
(Spatial Equilibrium Method with Amenity Heterogeneity)

STATE	RANK	STATE	RANK
West Virginia	1	Rhode Island	26
Mississippi	**2**	Alabama	27
Arkansas	3	Minnesota	28
Nevada	4	South Carolina	29
Utah	5	Delaware	30
New Mexico	6	Michigan	31
Arizona	7	Massachusetts	32
Oklahoma	8	Texas	33
Montana	9	Virginia	34
Oregon	10	Ohio	35
Georgia	11	Wisconsin	36
Louisiana	12	South Dakota	37
Florida	13	Missouri	38
Kentucky	14	Nebraska	39
Idaho	15	North Dakota	40
New York	16	Kansas	41
North Carolina	17	Indiana	42
Maine	18	Iowa	43
Colorado	19	Pennsylvania	44
Tennessee	20	Wyoming	45
Illinois	21	New Hampshire	46
Washington	22	New Jersey	47
Hawaii	23	Connecticut	48
Vermont	24	Alaska	49
California	25	Maryland	50

Note. Rankings are based on the equilibrium value of amenities as measured by the size of the residual generated by the parameter estimates of a quantile regression specification of the log of median home prices on the log of median income.

Conclusions and Policy Implications

In contrast to the MQ rankings which find Mississippi to be one of the worst places to live in the United States, we find that if one takes seriously the economic theory of why people choose to live in a particular location, Mississippi is one of the best places to live. Our rankings of the states base livability on how individuals value all amenities that are important to their well-being, most of which are unobserved, and are not considered in the explicit amenity accounting approach that motivates the MQ rankings. Our results suggest that Mississippi is not quite the hell implied by the MQ rankings, and people choose to live in Mississippi because relative to other states, the supply of amenities is valued such that the quality of life enjoyed by residents is at least in the top half of all states. If there is heterogeneity in the valuation of amenities, Mississippians enjoyed the second highest quality of life among residents of all states.

The presence of Mississippi along with many other southern states in the top 25 of most livable states in our rankings is a stark contrast to the MQ rankings. However, we think they are quite sensible for several reasons. First, relative to the United States in general, wages/incomes and housing prices in southern states are lower. As our approach to accounting for the value of amenities measures it a as residual based on the difference between the amenity premium in housing and the amenity-adjusted wage, our results suggest that one reason why wages/incomes are lower in southern states, Mississippi included, is that more individuals are placing a higher valuation on amenities in southern states. In this context, relatively high wages in northern states suggest the valuation of amenities is lower than they are in the South. In general, the presence of southern states in the top half of our rankings suggests that as a region, the relatively low wages/incomes simply reflect the high quality of life, which is consistent with a spatial equilibrium framework in which individuals choose where to live on the basis of amenity-adjusted incomes and housing prices.

Of course, there are possible limitations of our approach to ranking the livability of states. One is that our assumption of a spatial equilibrium is possibly naïve. If our data do not reflect ideal choices, our results are simply irrelevant. We argue, however, that individuals do make free choices that are in their best interest. To argue otherwise is to suggest that if the MQ rankings are more compelling than ours, then Mississippians are simply irrational and prefer the low quality of life suggested by the MQ rankings. Economic theory suggests otherwise — that individuals are amenity optimizers, and apparently Mississippi provides a large supply of amenities to enjoy. Our results are also based on parameter estimates from a small sample of only 50 states at a point in time. As such, it is not clear whether or not we are capturing long-run equilibrium behavior. Future research could examine this by examining whether or not our residual amenity index explains migration between states. A finding that our residual amenity index does explain migration between the states would suggest that is a sensible measure of quality of life in a location.

Notwithstanding the possible limitations of our results, our findings have policy implications for the use of business incentives in Mississippi. *Blueprint Mississippi*, for example, is a comprehensive plan outlining the use of tax-subsidized incentives as a strategy to induce firms to locate to Mississippi.[9] Our rankings of states on the basis of their quality of life, in which Mississippi ranks as high as 2nd, suggest that Mississippi may be wastefully committing too many resources to business firm location incentives. In a spatial equilibrium, firms and individuals are making ideal choices based on the amenities in a particular location. For example, locations that have high stocks of unproductive amenities reduce production costs for firms. As Mississippi ranks as high as second in our rankings, this suggests that relative to other states, firms already have a powerful inducement to relocate here. In this context, the use of incentives in Mississippi may constitute an inefficient subsidy to firms that are not really needed to induce firms to relocate, and merely redistributes wealth from taxpayers to business firm shareholders.

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ENDNOTES

[1] The factors include for example the percent change in the number of crimes, highway fatality rate, and the percent of the eligible population that votes. An itemization of all 44 factors is available at: http:/www.morganquitno.com/sr06mlfac.htm

[2] MQ rankings for the years 1991 – 2006 are available at: http://www.morganquitno.com/srm191-06.htm

[3] The idea of compensating differentials being capitalized into wages was recognized as far back as 1776 by Adam Smith who argued in the *Wealth of Nations* (Book 1, chapter 10) that "the wages of labour vary with the ease or hardship, the cleanliness or dirtiness, the honourableness or dishonourableness of the employment."

[4] More formally, Roback (1982) assumes a world of identical individuals and firms across locations, with indirect individual utility given by $V(r,p,s)$, the cost function of firms producing housing and commodities under constant returns to scale, respectively $G(w,r,s)$ and $C(w,r,s)$, respectively, where p is the cost of housing (h), r is the rental cost of land, w is the wage rate, and s the quantity of some location-specific amenity. In a spatial equilibrium, for individual consumers, wages and rents equalize utility, and for firms, unit production costs equal the cost of producing land and housing. Let V_s be the partial derivative of indirect utility with respect to a change in location-specific amenity s ($V_s > 0$) and V_w be the partial derivative of indirect utility with respect to a change in the wage ($V_w > 0$), in equilibrium the demand, or how individuals value location-specific amenities is their demand for amenities p^*_s, which via Roy's identity is:

$$p^*_s \equiv V_s/V_w = h(dp/ds) - dw/ds$$

where $h\{dp/ds)$ is the housing premium induced by the location-specific amenities, and dw/ds is the wage premium induced by the location-specific amenities. Thus, in a spatial equilibrium, the value of all amenities for an individual in a given location is the difference between amenity-adjusted housing prices and amenity-adjusted wages/incomes.

[5] That the residual from a misspecified amenity-adjusted housing price model is a result from elementary econometrics. Suppose we specify:

$$housingprice^* = \beta_o + \beta_1 income^* + u \qquad (1)$$

where an asterisk denotes the variable is adjusted for amenities in a given location and u is a random error term. Let the true model be:

$$housingprice^* = \beta_o + \beta_1 income^* + \beta_2 locationamenity + v$$

where v is a random error term. The residual error from the OLS parameter estimates of (1) is:

$$u = \beta_2 locationamenity + v$$

If we assume that the expected value of v is zero ($E[v] = 0$), then the residual error from OLS parameter estimates of the misspecified model in (1) is an unbiased estimate of unobserved location-specific amenities.

[6] State median house price data are from the 2003 American Community Survey (U. S. Census Bureau). State median income data are from the 2004 American Community Survey (U. S. Census Bureau).

[7] For an introduction to quanitle regression, see Koenker and Hallock (2001). Mello and Perrelli (2003) provide a useful application of quantile regression when outcomes of interest are likely to be subject to parameter heterogeneity. Following Buchinksy (1998), the general quantile regression model can be specified as:

$$Y_i = \beta_\theta X_i + u_{\theta i}$$

where Y_i is the dependent variable, β_θ is a 1 x k vector of regression parameters associated with the θth percentile, X_i is a k x 1 vector of independent variables, and $u_{\theta i}$ is an error term. The parameter vector for the θth percentile is found by minimizing the absolute errors of a function of Y_i with weights that are symmetric for the median or 50th percentile and asymmetric otherwise.

[8] Our implementation of the quantile regressions proceeded first by identifying the percentile distribution of housing prices across the 50 states. We identified nine percentiles, and then proceeded to estimate quantile regressions for the 1st, 5th, 10th, 25th, 50th, 75th, 90th, 95th and 99th percentiles. The regression for each percentile resulted in significant parameters in every instance. The residual amenity index was then computed by using the parameter estimates corresponding to the median housing price percentile each state occupied.

[9] For an overview of *Blueprint Mississippi* and an analysis of its economic effects, see Price and Mozee (2005) available at http://murc.org/pub.htm.

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