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THE INFLUENCE OF JOHN KAIN

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John F. Kain died in Dallas, Texas on August 21, 2003 at the age of 67. A previous version of this paper was discussed at a special session honoring his memory at the annual meetings of the Association for Public Policy and Management, November 6, 2003. The views expressed herein are those of the authors and not necessarily those of the National Bureau of Economic Research.

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ABSTRACT

Today, no economist studying the spatial economy of urban areas would ignore the effects of race on housing markets and labor market opportunities, but this was not always the case. Through what can be seen as a consistent and integrated research plan, John Kain developed many central ideas of urban economics but, more importantly, legitimized and encouraged scholarly consideration of the geography of racial opportunities. His provocative (and prescient) study of the linkage between housing segregation and the labor market opportunities of Blacks was a natural outgrowth of his prior work on employment decentralization and housing constraints on Black households. His more recent program of research on school outcomes employing detailed administrative data was an extension of the same empirical interest in how the economic opportunities of minority households vary with location. This paper identifies the influence of John Kain's ideas on different areas of research and suggests that his scientific work was thoroughly interrelated.

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I. Introduction

Today, economists routinely analyze the impact of place-based externalities on behavior and outcomes. Few studies of central cities, regardless of focus, can ignore the overlay of race and the effects of race on economic outcomes. Few doubt that race powerfully influences private markets in cities as well as urban politics, policy and education. Yet the perspective that understands the importance of race, and particularly racial location patterns, has not always been found among economists. In many ways, John Kain is the scholar who made economists understand the central role of race in America's cities.

This paper sketches how Kain's varied writings have helped provide the dominant framework for urban analysis. His early residential location and transportation studies offer an essential background. But Kain's early innovation was recognizing that the simple theoretical models and the rudimentary empirical analyses of the 1960s failed to capture essential features of the urban landscape. This spawned two related developments related directly to market heterogeneity. First, he moved beyond simple models with direct analytical solutions to simulation models that emphasized market heterogeneity in many dimensions. Second, he delved into the unique aspects of racial location and market outcomes, introducing analysis of the clearest form of heterogeneity that is observed in cities.

These developments underscore Kain's most significant impact – understanding how race and location affect economic opportunities. This path was evident in his most recent line of research into educational opportunities. The genesis of the Texas Schools Project at the University of Texas at Dallas was an interest in understanding whether the

suburbanization of the Black population in Texas expanded the educational opportunities for Black students. The analytical aspects that most interested Kain dealt directly with race, schooling and location.

To frame the discussion (in a way that would appeal to John Kain's empirical focus), Table 1 lists his ten most cited works. The way in which these works developed and fit together is remarkable.

II. Housing, Transportation, Residential Location

The problem of residential location and the tradeoffs households make between housing and space consumption on the one hand, and commuting expenses on the other hand, was developed in the early 1960s in John Kain's Berkeley dissertation and in roughly contemporaneous dissertations at Harvard by William Alonso (published in book form in 1964) and at Chicago by Richard Muth (ultimately published in 1968). Kain's work on residential location, published in 1962, was both more practically relevant and less elegantly general than the Alonso-Muth models. Kain's model of residential location explicitly recognized the reality of noncentral work places in urban areas and the differing commuting costs of households of varying demographic characteristics. Kain's model made a large number of predictions – that centrally employed workers would commute longer distances than workers employed at noncentral locations; that higher income workers would commute longer distances; that multiple worker households would locate closer to workplaces; that larger-sized households would choose longer commutes, etc. These predictions organized a series of empirical applications – tests and

extensions of the theory that occupied Kain and his associates throughout the decade of the 1960s and beyond.

Understanding the polycentric nature of U.S. metropolitan areas led to a line of research documenting the extent of worksite dispersion and employment decentralization in metropolitan America. In the most widely cited of these papers, “The Distribution and Movement of Jobs and Industry,” Kain documented that the postwar decentralization of employment was actually in full force, though somewhat disguised, during World War II, and was evident in data as early as the 1920s. In the *Urban Transportation Problem*, Kain and his collaborators documented the dispersion of employment within the borders of central cities, from the CBD to the periphery of the city.

This preoccupation with workplace and residence location led quite naturally to the study of transportation systems linking these origins and destinations. Kain’s first book, *The Urban Transportation Problem*, written with John Meyer and Martin Wohl was a tour de force, analyzing the difficult choices faced by transit agencies and highway authorities, and the regulation of the automobile. Somewhat controversially, the authors stressed the limitations on publicly provided transport which were imposed by the increased incomes of consumers and their resulting demands for low density living conditions. The Meyer-Kain-Wohl analysis (Kain’s second most cited work) provided sobering reading for advocates of large investments in fixed-rail transit systems. The heterogeneity of origins and destinations and the value of commuters’ time meant that these large scale investments could almost never be an efficient use of public resources.¹

¹ The clear cut analytical case for lower cost, flexible transit systems and the preferences of planners and politicians for expensive, inflexible systems stimulated a series of policy-oriented papers by Kain arguing the economic case in its particulars. For example, the provocatively titled paper, “How to Improve Urban Transportation at Practically No Cost,” analyzed the economic potential for reversible lanes on urban

In the original Kain model, by incorporating the realism of polycentric workplaces, it became impossible to solve for the equilibrium pattern of housing prices by then-standard “back of the envelope” calculations. This led to early work in numerical simulation. The simulation model ultimately developed by Gregory Ingram, Royce Ginn, and John Kain (in collaboration with a large number of others) contained several highly creative features which gave the model more realism and which permitted its application to policy analysis in a more transparent way. The principal innovation in the volume² concerned the demand side of the housing market and the time path of housing prices. The demand side of this disaggregated housing model considered the choices by households of given incomes and worksites about the type of housing to consume and its location in space. For a metropolitan area, space was represented by a series of residential zones. Households chose a type of housing and a zone. The attractiveness of each zone to any household depended upon housing prices in that zone and the commuting costs from that zone to the household’s workplace. For a given set of demand parameters, housing prices and transport costs, it was possible to allocate households to their preferred residential zones. Excess demand in any zone provided a signal to raise housing prices in that zone, and the pattern of excess demand provided a signal to housing suppliers and developers to build new dwellings and to convert among housing types at different locations.

The economic model solved iteratively for a spatial pattern of housing prices and housing supplier activity in response to a demand shock – the opening of new businesses

arterials, priority bus lanes on limited access freeways, congestion pricing, and the substitution of smaller transit vehicles for large busses.

² Ingram, Gregory K., John F. Kain, and J. Royce Ginn, *The Detroit Prototype of the NBER Simulation Model*, New York, NY: National Bureau of Economic Research, 1972.

in one of the workplace zones, for example. The iterations were given a temporal interpretation, and the time pattern of price and quantity adjustment over space was simulated. The innovations in this model stimulated a large volume of subsequent research on housing demand, the substitutability of housing components in consumer demand, and the role of economic geography in affecting the choices of housing consumers.

Kain's long term interest in practical policy meant that these models would be used to illuminate important policy issues. These models were used by Kain and others to analyze the spatial implications of housing subsidy programs and shelter allowances, the abandonment of housing and the decline of central city neighborhoods, and urban gentrification, for example.

III. Economic Opportunity and Race

Table 1 also quantifies the central fact of John Kain's legacy—he is the father of modern economic research on minorities in American cities. To a remarkable degree, Kain ultimately used his work on micro economic problems as tools for his work on race.

John Kain is responsible for two big ideas in the economics of race. First, he is the father of the spatial mismatch hypothesis, which argues that housing market discrimination leads to segregation which hurts Black labor market outcomes – simply because segregation creates distance between Black workers and available jobs. Second, Kain began the empirical literature on discrimination against minorities in housing markets.

After 35 years, it is clear that Kain was right that segregation harms minorities and that there is substantial discrimination against Blacks in the housing market. He was probably less right about the reason that segregation harms Blacks. It is not generally true that Blacks live further from jobs than Whites do, and it is hard to believe that the physical costs of getting to jobs are really responsible for the pathologies of the ghetto. But while Kain's emphasis on the distance between people and jobs may have been an inadequate explanation for the problems of the ghetto, it was absolutely the right theory for starting an economic literature on Black urban America. Few empirical economists in 1969 would have been comfortable studying the formation of norms in an urban neighborhood or human capital spillovers, but they would study transport cost problems. And, by focusing on transport costs, Kain made it respectable – indeed, quite exciting – for empirical mainstream economists to work on the problems of urban Black America. By doing so, he gained his critical place in the economics of race.

The antecedents of preoccupation with race and economic opportunity appear in Table 1. The natural corollary of Kain's thesis that job location influences housing choice is that, if housing choice is fixed, job choice will be influenced by the costs of commuting. This will push some people to work near to home and others to avoid employment all together. In "The Distribution of Jobs and Industry," Kain showed that jobs were suburbanizing. This fact later pushed him to realize that Black inner-city residences would be increasingly far from jobs. Kain's pioneering work on housing price hedonics, first published in the 1970 *Journal of the American Statistical Association (JASA)*, broke new ground in combining individual level data with a broad range of home-level and community-level attributes. It represented a significant leap forward in

the degree to which housing quality could be measured. This ultimately played a crucial role in helping Kain to establish that Blacks paid more for housing—a crucial test of housing market discrimination fully explicated in his subsequent book, *Housing Markets and Racial Discrimination: A Micro Economic Analysis*.

Stripped to its essentials, the Kain view of race in cities was that housing segregation hurts Black labor market outcomes. The Kain model – the beginning of economic analysis in the area – contains four essential elements that we list and then relate to the subsequent evidence. First, the housing choices of Blacks are constrained by discrimination; as a result, Blacks pay more for and consume less housing. Second, the constraints on Black housing choices lead Blacks to live far from White neighbors and more importantly, White employers. Third, because proximity matters, the distance between Black employees and White employers hurts Black labor market outcomes. Fourth, the decentralization of employment makes the problem worse over time. This view is detailed in his 1968 *Quarterly Journal of Economics (QJE)* paper, the most important single work in Kain’s career, but it is the research that was published in the 1970 *JASA* article, the 1972 *American Economic Review (AER)* article, and *Housing Markets and Racial Discrimination* that enabled Kain to make the empirical case that Black housing choices are constrained.³

The *QJE* article, building on sociological studies that had conclusively shown that Blacks and Whites were segregated far beyond the level predicted by income differences, introduced Kain’s own work on Chicago and Detroit, showing that these places were then (as now) among the most racially segregated cities in the country. But segregation does

³ The 1969 *Public Interest* paper, the last article on the “top ten” list, should be seen as detailing the appropriate public policy response to this worldview.

not prove discrimination or constraints on Black choices. Segregation could also occur if Whites had a taste for living with other Whites, and as a result Whites were willing to pay more to live in White communities than Blacks were willing to pay to live in White communities. David Cutler, Edward Glaeser and Jacob Vigdor have called these two opposing views centralized racism (racist Whites get together to restrict Black choices) and decentralized racism (racist Whites separately decide to pay more to live in White communities).

Kain's *QJE* paper does not present any statistical evidence to distinguish between the two theories, but he does point to the clear historical fact that Blacks have often faced explicit barriers to moving into White neighborhoods:

The means by which racial segregation in housing has been maintained are amply documented. They are both legal and extra-legal; for example: racial covenants; racial zoning; violence or threats of violence; preemptive purchase; various petty harassments; implicit or explicit collusion by realtors, banks, mortgage lenders, and other lending agencies; and, in the not-so-distant past, the Federal Housing Administration (FHA) and other Federal Agencies. (Kain, 1968, pp. 176-177).

No one could argue that all of these things occurred, but Kain's intellectual opponents would have argued that these forces (centralized racism) were less important in creating segregation than the White taste for White communities (decentralized racism). Luckily, economic theory provides a clean test. If segregation is driven by White racist tastes, these tastes effectively constrain White choices and imply that Whites

should end up paying more for housing. Conversely, if segregation is driven by constraints on Black housing, Blacks will end up paying more for housing.

The extensive work based upon data collected by Kain and his collaborators in St. Louis directly addresses whether Blacks or Whites pay more. The 1970 *JASA* paper, using a large data set with better controls than previously available, documented that renters in Black neighborhoods of St. Louis paid more than renters in White neighborhoods of St. Louis. The *AER* article took a slightly different tack and established that Blacks are much less likely to be homeowners than Whites, and since homeownership is often associated with lower housing costs (in part because of the privileged tax treatment of homeownership), Blacks paid more for housing than Whites. The long book on *Housing Markets and Racial Discrimination* put these pieces of evidence together and made a strong case for the view that the costs of housing are indeed higher for Blacks than for Whites. This is still, perhaps, the best statistical (as opposed to historical) evidence to date that segregation stemmed from barriers to Black mobility rather than White preferences.

The subsequent literature on this question has been mixed, perhaps partly reflecting changes in the world since the 1960s: In the 1950s and still in the 1960s, the Kain emphasis on housing market discrimination was appropriate; by the 1980s and 1990s, the traditional barriers to Black mobility had fallen. Empirically, housing prices in Black areas have been plummeting over time and, even if race was positively associated with price in the immediate postwar period, today this is no longer true. As such, the Kain emphasis on housing market discrimination as the source of segregation may have been correct in its day, but may be less accurate today.

The second element of the spatial mismatch hypothesis is that segregation led to distance between Blacks and Whites and especially White employers. This claim, while not entirely central to the argument, appears to be contradicted by earlier analyses in Meyer, Kain and Wohl and by subsequent work that has tended to show that, while Blacks live in segregated communities, these segregated communities are not particularly far from employment centers.

The influential article on spatial mismatch, however, never directly addresses the view that discrimination increases physical distance between Blacks and jobs. Instead, the claim is shown indirectly as a result of Kain's work on the third aspect of the mismatch hypothesis: that distance between jobs and workers reduces employment. While this is almost surely true, subsequent work has not shown that eradicating segregation would increase employment.

The empirical heart of the paper is Kain's simulation showing that Black employment would rise with integration. This simulation involves first regressing Black employment on distance to the ghetto and showing that employment falls with distance from the ghetto. Kain then assumes that in an integrated world distance from the ghetto would be zero, and uses the estimated regression to simulate the counterfactual. He finds that Black employment would rise after integration. Of course, if Kain had instead regressed Black employment on proximity to the ghetto and assumed that proximity would equal zero after integration, then he would have found exactly the opposite result—segregation helps minority employment.

The final element in the Kain model of race is that suburbanization will hurt employment prospects for African-Americans. Here Kain is on solid ground. Jobs are

clearly decentralizing. His own data are convincing, and subsequent trends have reinforced this insight. Kain was also right that Black workers were centralized, and they have remained so. As the distance between the median Black resident and the median job has risen since 1968, Kain's analysis looks quite prescient.

Kain's work on race began three large academic literatures. First, he started the large and growing literature on the effects of segregation on minorities. Early results, prone to variety of analytical complications, found varying effects. The "Moving to Opportunity" experiment presented an important breakthrough in dealing with this problem because it features random assignment, enabling researchers to estimate real economic benefits for minorities who leave the ghetto. Moreover, while the correlation between segregation and minority outcomes was non-existent in 1970, it became enormously strong by the 1990s. Whatever the cause, Kain's emphasis on the costs of segregation looks prescient today as detrimental outcomes in segregated communities have mushroomed.

A second, somewhat smaller set of papers have focused on some of the specifics of the Spatial Mismatch Hypothesis; in particular, the idea that proximity from jobs deters employment. Evidence has varied across study and location, and the jury is clearly still out on the extent to which distance between homes and jobs deters employment.

The third important literature evaluates the impact of discrimination towards minorities in the housing market. The focus of this literature has generally changed. In the early 1970s, much of this literature was focused on barriers to Black renters wanting to live in White areas. By the 1980s and 1990s, the literature focused much more on barriers to Black homeownership and barriers to Blacks owning homes in White areas.

The literature has generally found that it is easier for a White to get a mortgage than a comparable Black.

John Kain's work on race was pioneering; in many ways time has only served to emphasize the accuracy of Kain's vision. Modern research has increasingly shown support for a connection between housing market segregation and labor market outcomes. Discrimination in housing markets, even if it is primarily statistical in origin, is real and continues to impose real costs on minorities. Employment has continued to suburbanize and this has created an increasing spatial mismatch between inner city minorities and suburban jobs. To the extent that there is still dispute about Kain's work, this dispute centers on whether central city segregation really increased the distance between Black workers and jobs and the extent to which this distance really deters employment. These controversies remain, but they are minor relative to the more important things that John Kain clearly got right.

IV. Education and Opportunity

Table 1 chronicles the immense influence of John Kain in modeling spatial issues and particularly the influence of race. Kain's involvement in educational policy debates do not appear in this table, although they plausibly will have greater long run payoffs.

Kain's earliest attention to education analysis and policy grew out of the massive government report *Equality of Educational Opportunity* (the "Coleman Report"), a U.S. government publication that appeared in 1966. The specific focus of the Coleman Report, mandated by the Civil Rights Act of 1964, was the extent of racial discrimination and the inequality of opportunity in U.S. public schools. Two aspects led to the broad

attention given to it and contributed to the controversy that has followed. First, the report took the position that the central focus of attention should be equality of student outcomes, not equality of government inputs to schools. Second, the report was widely interpreted to imply that “schools are not important.”

The Coleman Report was required by Congress to evaluate the extent of racial discrimination in the public provision of schooling. To accomplish this, a measure of the relative importance of inputs to the schooling process was needed. This requirement led the researchers to measure student performance and to relate various inputs directly to these outcomes. This focus, which had not been applied very broadly in education or in other areas of government-provided services, dramatically changed the basic form of analysis.

Kain heavily criticized the Coleman Report on methodological grounds. The most serious issue was the use of an analysis of variance procedure that biased the findings against the importance of school inputs and towards the importance of family factors. More significantly, however, this study also confused the measurability of inputs with the importance of teachers and schools.

The controversy surrounding the Coleman Report conclusions led to a large volume of other work on the performance of schools. While this subsequent analysis helped to pinpoint the issues and to clarify some aspects of schools, it has not been conclusive. The subsequent studies built upon better data – such as longitudinal information on student performance or more detailed measures of characteristics of schools and teachers. Yet subsequent studies never matched the rich body of data analyzed in the Coleman Report. The original survey work behind *Equality of*

Educational Opportunity included testing over 600,000 students spread across five different grades and some 3,000 schools. Subsequent analyses relied on hundreds of students and often lacked variation across very different schooling circumstances.

For two decades after his original involvement in considering the Coleman Report, Kain's research concentrated on the issues noted in Table 1. However, in the early 1990s, he began to see how educational research could take a quantum leap forward.

The specific innovation lay in formulating a plan for conducting research on factors affecting student outcomes using the administrative records normally maintained by schools. More specifically, while visiting Texas, he became aware of the state's accountability system that required annual testing in core subjects of all public school students in the state. He began a series of discussions with the Texas Education Agency, the owners of the data, to use the data for research purposes while simultaneously ensuring confidentiality and protecting the privacy of the individuals involved. The result today is a functioning prototype of ways to further our knowledge about schools and their influence. It seems quite possible that this line of activity will have the largest impact on future research and policy of any of his work.

Kain's Texas Schools Project has established a database about school performance that is unequalled in the world. The central element is information on state tests in core subjects for *each of the four million students in Texas public schools*. Second, students can be followed over time. This aspect of the data immediately catapults the research potential of the database far beyond any other existing database. Third, students can be linked to other aspects of the environment and of their outcomes.

As students leave the K-12 public schools they can be traced into college, into work, or into jail.

The immediate motivation for developing this research structure is completely consistent with Kain's primary intellectual interests. The project that launched the Texas Schools Project merged the life-long interests of Kain in understanding place and race. Specifically, building on the observation that Blacks were rapidly moving into a wide variety of suburban school districts, Kain and Daniel O'Brien pursued issues of the changed opportunities of Blacks and the impact of that on Black achievement. This work concentrated on characterizing the quality of schools in different locations.

A different trajectory indicating the possibilities for expansion of the analytical perspective is contained in work on the "ten percent plan." With court limitations on any affirmative action in higher education, the State of Texas developed a plan of automatic admission at a University of Texas school of any student in the top ten percent of his or her high school graduation class. This plan is easily seen as an extension of the issues of race and location, because the probabilities of accepting Black students are related to the level of school segregation. But the work also demonstrates his interest in the ultimate effects of local schools by assessing the college and work experiences of different racial and ethnic groups in Texas.

In a series of other papers, Kain delved into such issues as teacher quality and special education. Nonetheless, the topics that held his largest personal interest were the ones related to race: the racial composition of schools, the mobility of students, and the mobility of teachers.

The topics that his investment in an analytical database have opened up for other researchers is much larger. As federal law under the *No Child Left Behind Act of 2001* expands the range of administrative data collected in all states, the Kain vision is likely to have broad ramifications for research throughout the country.

V. Conclusion

The impact of John Kain on the intellectual development of urban economics is unmistakable. The model provided by his choice of research topics and the legitimacy he provided to price theorists studying issues of race and opportunity has perhaps even larger ramifications. While we have yet to see the full impact of his visionary foray into educational analysis, the motion started in his analysis of Texas school performance will continue despite his untimely death.

Table 1
The Most Cited Works of John Kain

Title	Publication	Year	Approximate Citations
Housing Segregation, Negro Employment and Metropolitan Decentralization	<i>Quarterly Journal of Economics</i>	1968	350
The Urban Transportation Problem	Harvard University Press	1965	230
Housing Markets and Racial Discrimination	Columbia University Press for NBER	1975	200
Measuring Value of Housing Quality	<i>Journal of the American Statistical Association</i>	1970	180
The Spatial Mismatch Hypothesis: Thirty Years Later	<i>Housing Policy Debate</i>	1992	130
The Journey to Work as a Determinant of Residential Location	<i>Papers of the Regional Science Association</i>	1962	105
Housing Market Discrimination, Homeownership and Savings Behavior	<i>American Economic Review</i>	1972	90
The Distribution and Movement of Jobs and Industry	Chapter in <i>The Metropolitan Enigma</i> , Harvard University Press	1968	85
Cumulative Urban Growth and Urban Density Functions	<i>Journal of Urban Economics</i>	1974	60
Alternatives to the Gilded Ghetto	<i>Public Interest</i>	1969	55

Notes: Citations estimates are from the Social Science Citation Index as of October 30, 2003. This index measures only citations in a limited number of journals and as a result significantly underestimates the full impact of these works. Bibliographic information on these works appears in the references. A complete listing of Kain's publications appears at <http://utdallas.edu/~jkain>.

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