

MM

4-15-77

CL re: an analysis of the
"Allen-John" model of fair share
housing calculations (by P_s)

pgs. 13

MM 000083L

MASON, GRIFFIN & PIERSON
COUNSELLORS AT LAW

P. O. BOX 391

201 NASSAU STREET

PRINCETON, NEW JERSEY

08540

RALPH S. MASON
GORDON D. GRIFFIN
KESTER R. PIERSON
RUSSELL W. ANNICH, JR.
HENRY A. HILL, JR.
G. THOMAS REYNOLDS, JR.
JOHN A. HARTMANN, III
RICHARD M. ALTMAN
JOHN A. MCKINNEY, JR.
CRAIG H. DAVIS
BARBARA ULRICHSEN
BENJAMIN N. CITTADINO
ALAN G. KELLEY

TELEPHONE
921-6543
587-2224
AREA CODE 609

April 15, 1977

Mr. Alan Mallach
Alan Mallach Associates
108 West State Street
Trenton, New Jersey 08608

Re: Allen-JORD Model

Dear Alan:

I asked Martin Kahn, a paralegal employed by this office, to read over the various materials on the Allen-JORD Model and try to pull his objections to it together.

I would appreciate it if you would read the enclosed analysis prepared by him and give me your thoughts on it.

Martin recently graduated from the University of Pennsylvania where he majored in Economics and therefore, has some background in the area.

Very truly yours,

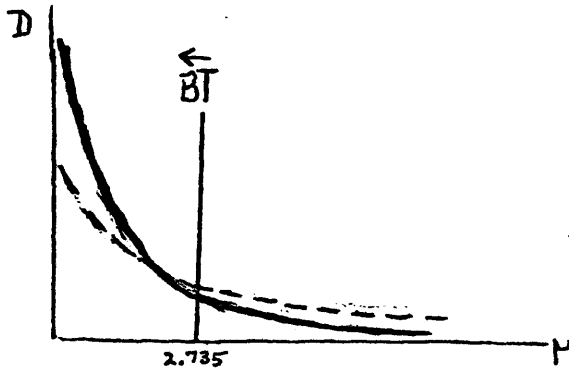


Henry A. Hill, Jr.

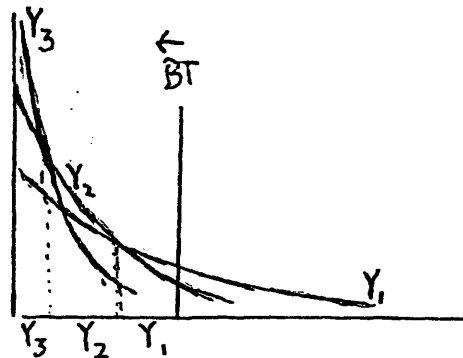
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Enclosure

OVER VIEW

- I. Section One argues that the JORD Model (with $R50=10$, $E=1.4$) leads to a pattern of general overdispersal across most income groups, reflecting past suburban zoning practices. Depicted graphically the JORD is represented by the dotted line, while a different formula generates the heavy line:



- II. Section II argues that the characteristics of the population differ by income groups, and that it is not only desirable, but moreover historical, that those with lower incomes should have lower commutes. Graphically depicted where Y_1 is high income, Y_2 is moderate, and Y_3 is low:



Since zoning is only to regulate and not prohibit market solutions, near employment sites the proportion of L&M income groups should exceed the areas overall proportion of L&M.

- III. Section three argues that Allen has not sufficiently included the characteristics of lower income counties such as Essex or Union.
- IV. Section IV argues that Allen has underestimated present need by discounting present housing needs based on financial need, claiming that this is not a zoning problem when it in fact usually is.

I

RECOURSE to observed travel times in order to estimate statistically the length (by the mean or median travel time) of a reasonable commute, or the portion of workers who found housing within that commute, necessarily involves the use of current work and residence patterns which are already seriously distorted by past exclusionary zoning practice.

Edward M. Bergman:
Eliminating exclusionary zoning:
Reconciling Workplace and Residence
in Suburban Areas p. 38

I

In a general sense what Allen has done is to derive a formula which would have substantially aided developing municipalities in the past (when BT was not developing) to provide sufficient housing, had the development followed the JORD* formula (which it did not), and apply it to the future now that BT is developing---i. e. shifting the housing burden to others. Thus, had JORD been followed from day one there would be 31,000** residents in BT today, "about double the present number." Apparently recognizing that BT's housing "debit" (16,000) is somebody else's "credit", Allen however maintains that it is not necessary to account for municipalities that presently house more than their fair share (as derived by JORD) in determining^{for} future fair share since again according to Allen there is no obligation to redress alleged past sins. Whether or not BT has any responsibility to redress the results of past exclusionary zoning will not be treated here, since it is an area calling for a legal conclusion. What is treated here is the reliability of the Allen Methodology---

Section I of this critique implicitly maintains that only part of the 16,000 people who according to JORD should hypothetically live in BT (but don't) may be attributed to "the great planner in the sky and his assistants down here", and that a large part will be seen as due to Allen's oversubscribing housing responsibilities (esp. L&M, sec. II) to non-developing communities. While many criteria are available such as aggregate personal income wealth, land availability, fiscal suitability (where the greater the non-residential ratable growth (eg AT&T) the greater is the ability to absorb new housing growth) the sole suitability factor used by Allen is employment growth. But since the Allen choice of values for JORD were derived from an RCA facility top heavy***in high^{paid} balanced professionals, located in suburban Bridgewater Township (w/restricted central housing densities) the median commute of 10 air miles, is larger and the household dispersal, due to the low E value, is sparser than the average values, (absent exclusionary zoning), in the region and especially in those areas which historically have harbored the preponderance of the areas employment sites.

UNLESS otherwise noted the parameters of

*The JORD formula $F = \frac{1}{BR50} E$ are $R50=10$, $E=1.4$

**This does not reflect Lyons Hospital employees, otherwise it would be still higher.

***"The headquarters is top heavy with the division management financial people". Allen's dep.

That these chosen values are incompatible with respect to explaining the past, ^{development} i.e., the regions present characteristics, has already been noted. When these values ($R50=10$, $E=1.4$)* are substituted for the JORD variables a residential pattern is determined whereby a municipality need only house a small portion of those who in the future will work within it while the surrounding municipalities must absorb the preponderant share--eg the municipalities in the region surrounding BT are responsible for housing 89.41% of those working in BT. Thus when applied to BT's future fair share as a developing municipality the resulting allocation is a serious understatement running contrary to the belief that people prefer to live closer rather than farther from where they work.

Below is a table describing 10 concentric rings in which each provides housing for 10% of employees living (M) miles away from the employment site as derived by Allen's Fig. I.

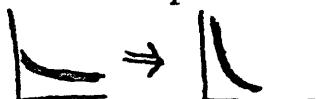
<u>TABLE I</u>	
<u>FRACTION OF POP</u>	<u>WITHIN A RADIUS OF (M) MILES</u>
.1	2.5
.2	4.5
.3	6.5
.4	8
.5	10
.6	12
.7	15
.8	18
.9	24

The progression in Column II is almost linear for the 60% living within 12 miles (452 square miles). The relatively flat slope reflects an affluent suburban growth pattern where central densities are restricted by zoning and thus lead to a large dispersal and a high median commute. For L&M groups this is neither an appropriate ^{an} or historically natural dispersal pattern. (see Sec. II)

TRANSLATING Allen's "concentric ring" figures into densities/mile for 1000 employees has been done to form Column II of Table II and the dotted line in Fig. I. Column III is taken from the curve marked Y_1 in Figure I,

*In reference to the ten mile commute, while Allen allows that "There was also some evidence that this median value would be less if population density increased," his median commute is not a function of a changing pop. density, which will be increasing in BT in the future.

i.e. as the slope of the density gradient becomes steeper



the R50

value falls while the E value rises.

which was derived using a standard density function relating to previously developed areas in a non-suburban context; population density decreases exponentially as distance increases. "Exponential functions have been used in many applied studies of urban population growth and have been found to fit data very well."* The density function used to generate the three curves Y1, Y2, Y3, of median commutes 10, 5, 3, respectively is:

$$D(M) = D_0 e^{-BM} \quad \text{where} \quad D(M) = D_0 e^{-BM}$$

M = Miles
 e = Base of \ln
 B = % rate of decrease in density
 D_0 = a constant equal to max. density.

To contrast the models in Table II, ^{I have} conformed with Allen and used 1000 employees and taken $R50=10$ to derive Y1, For lower $R50$ choices, see Fig. 1. (For $R50=5$, see column IV)

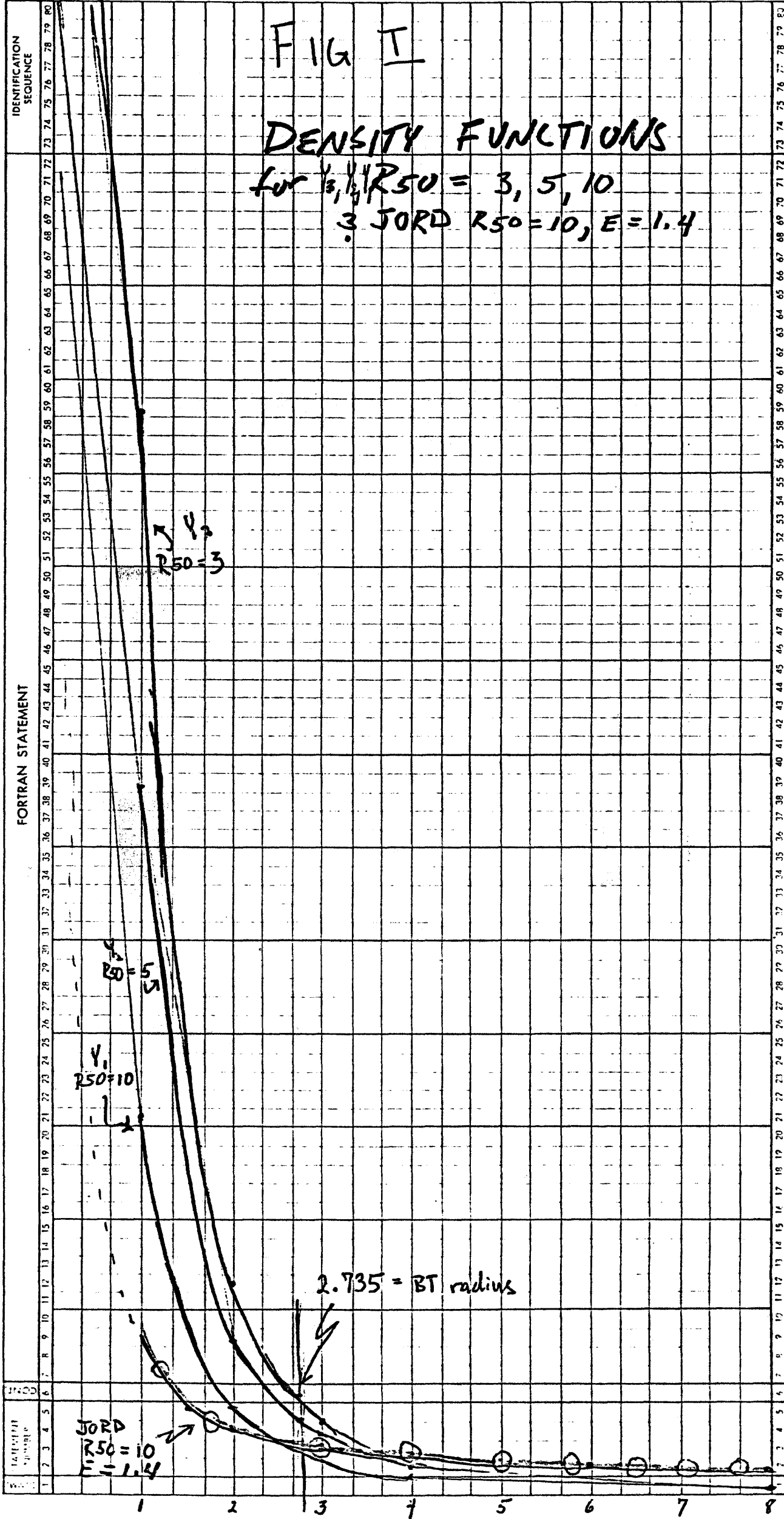
TABLE II

I	II	III	IV
M	JORD ($R50=10, E=1.4$)	Y1 $R50=10$	Y2, $R50=5$
1	$M=1.4 \quad 4.8$	$M=1 \quad 20.58$	38.401
2	3.76	4.8	8.3592
2.735	2.975	2.4395	4.0371
3	2.8	1.9908	3.234
4	2.2	1.0448	1.583
8	1.05	.1979	.2274
12	.58	.0669	.0580
16	.3	.02843	.01876
20	.15	.01379	.00689

*Edwin Mills

Since BT's population is in the process of soaring (by Allen's est, (which is a gross understatement since it excludes both multipliers and normal trend growth), it will grow 308% between '76 and '82) the JORD formula produces an advantageous allocation of future housing responsibilities. From the geographic center of BT its radius in miles is 2.735 (using the simplifying assumption that its boundaries are circular). From Allen's calculations this ring of 2.735 miles (23.5 sq. miles) need only accommodate 10.67% of the BT future employment. Using an exponential density function, and depending on the choice of R50, the BT share could easily become a multiple of this amount. If this new formula was then applied from day one, ~~the~~ the BT present population would still fall somewhat short of the hypothetical result, but this difference (far less than 16,000) would be primarily due to past zoning practices, and at least future growth would be relatively free of artificial and self serving restraints. In essence JORD in its present form is clearly invalid--when applied to the past it assumes a large number of people are already located in a particular area (which they are not) and thereby when projected into the future precludes their arrival from ever becoming a reality.

PROGRAM	DATE	PUNCHING INSTRUCTIONS	GRAPHIC PUNCH	PAGE OF	CARD ELECTRO NUMBER*
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II

"I don't believe there is a consensus in our society to reduce the commute."

William Allen

"In any case, a family should have the choice of living as close as possible to the breadwinner's place of employment."

Presidents Committee on
URBAN HOUSING "A Decent House"

For all N.J. residents in 1973, 57.2% of those living in single family homes commuted over 10 miles to work while for Garden Apartments the figure is only 32.2%, absent exclusionary zoning found in many suburban communities which have recently attracted industries the difference would be greater.

Figures from George Steinlieb
Housing Development and Municipal Costs. P. 74

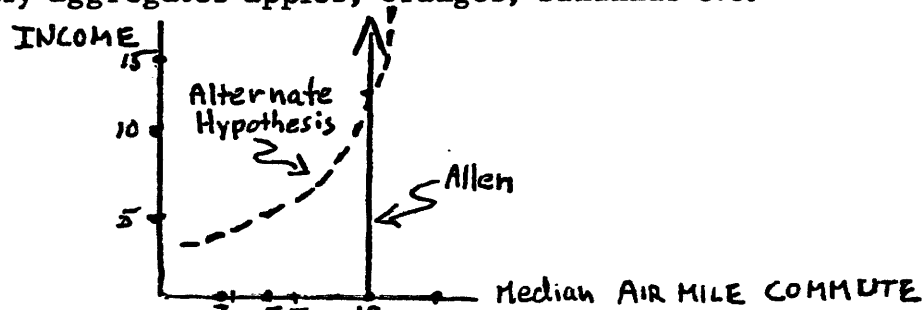
"Even if there is an arbitrary large number of income groups, if all satisfy the conditions of the theorem,* their residences will be ranked by distance from the city center inversely to their rank by income. That is, the lowest income group will be closest in, the next lowest will be next closest, and so on. This is a remarkably realistic result, and it mirrors closely the pre-dominant pattern in U.S. urban areas."

Edwin Mills.

*This is the Wicksteed-Wicksell theorem--

In essence the remuneration to land must equal the value of its marginal product for all uses.

Unlike the JORD which viewed the composition of the regions population to be virtually as homogeneous as is the townships presently, here income ~~lived level~~ in conjunction with distance from the center is treated as a determining factor in revealing natural residential locations. As distances become longer they are more burdensome to lower wage earners because travel costs rise more quickly relative to earnings and because travel times and costs increase more precipitously due to a greater likelihood of time consuming transfers or larger capital outlays (eg an automobile). Thus what is a reasonable or proper commute for one income group is not necessarily appropriate for another; by condensing all income groups into a single $R50=10$ and $E=1.4$ grouping JORD effectively aggregates apples, oranges, bananas etc.



By determining the expected income groupings comprising future employment growth one can more equitably determine what housing regulations must allow and provide the opportunity for.

Example of a Hypothetical Distribution:

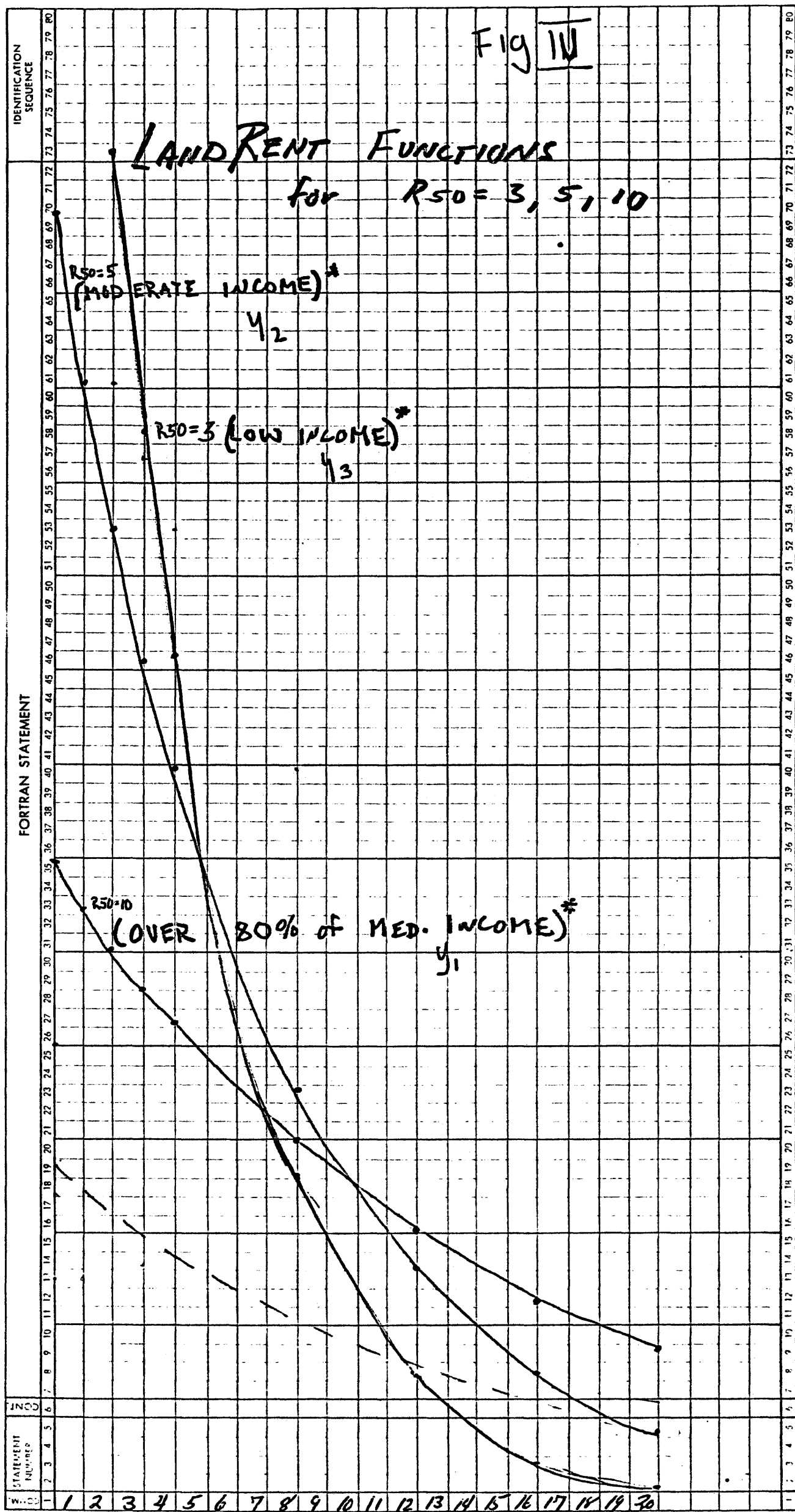
eg. Y3 .2..... $R50_3=3$
Y2 .4..... $R50_2=5$
Y1 .4..... $R50_1=10$

Then assuming .81345* households per job, sufficient land must be zoned at appropriate densities/acre to enable the market solution to occur. As implied in Fig. II, high density zoning to accomodate low and moderate income households should be centrally located, and Allen's concentric rings should reflect a diminishing proportion of L&M households for each succeeding ring as distance increases. Again, as argued in Sec. I, using Bridgewater Township or similar statistical bases will yield commuting distances which are far from appropriate for any study purporting to determine fair share. As observed by Mallach the median commute for blacks working at RCA was 14.2 miles as opposed to the overall median of 10.2. Assuming these blacks were somewhat representative of black income groups, this is contrary to the belief (shared by Agle) that those with the least resources should not be forced to expend the greatest amount (even in relative, let alone in absolute amounts) in commuting costs. That the lower paid employees at RCA must live further away is a direct result of the exclusionary zoning in Bridgewater Township and the surrounding municipalities

*Richard Reading & Associates

(eg BT) which forbid lower cost higher density accommodations. That application of data from RCA is preverse, is made clear in this context where applying this status quo distribution of commuting ~~by income level~~ would assure that many of the poor would be located furthest from employment sites. The JORD while implicitly accounting for most L&M households (see Section III) allocates them in line with pre-existing densities, while a better fair share method would allocate them inversely to the densities of L&M housing already provided, (One of four criteria used in the N. J. State Study). Thus BT should not force LM households to disperse at a higher rate than upper income households (by not permitting high density) but rather must provide for them in accordance with the Mt. Laurel mandate, "Certainly when a municipality zones for industry and commerce for local ~~tax~~ benefit purposes, it without question must zone to permit adequate housing within the means of the employees involved in such uses".* This will serve to increase BT fair share of LM housing employees substantially (especially when multiplier effects are included in employment growth) from the 10% it presently concedes to perhaps 50% or more.

*NJSA 40:55-30 to 51; Const. 1947 Art I, Par. I.



* INCOME GROUPS ARE ESTIMATES

III

"The cost of housing will (also) restrict mobility in household relocation which will tend to lengthen commutation with changes in employment. "

Somerset County
Housing and Employment Survey
1970

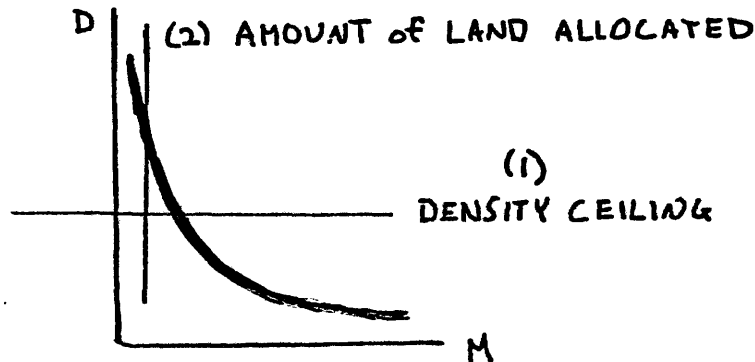
It does not make sense to designate a fair share region containing only affluent communities which is what the Allen Methodology leads to by placing preponderant weight on the present population distribution of BT's neighboring developing communities and little or zeroweight on nearby urban areas experiencing employment decline and presently housing people who will soon be forced to relocate elsewhere to find employment. Rather, what must be done for a legitimate allocation, proper weight should be placed on the population characteristics of the sending areas, i. e. those containing heavy concentration of low and moderate income residents to be housed and employed by developing communities.

As jobs fall by 30,808 (as projected by Allen) in Essex, Allen is correct in reducing BT's obligation to house people living in the 23.5 sq. miles of BT and working in Essex, by 10.59% based on the JORD density function. It is however clear that as jobs fall in Essex unemployment will ensue and those numbers of the labor force unemployed must search elsewhere for a livelihood, and the most socially desirable and natural (absent exclusionary zoning) of all movements is to areas of expanding employment opportunities. The movement of large employers such as AT&T from areas such as Newark in Essex to suburban communities such as BT in Somerset (which rezoned to make AT &T's more possible) has far from only diminished such suburban communities responsibilities to the urban unemployed as Allen would have us believe. By claiming it is not necessary to weigh the Essex population comprised of 43% of LM households in BT's future fair share due to erosion of employment in Essex, Allen has in effect suggested that this portion (10.59%) of Essex's present population will either vanish or assume through metamorphosis the characteristics pertaining predominantly to Morris and Somerset--i. e. a distribution of only 25.8% LM households. Admittedly some leakage from the housing region will occur while the rest of the displaced 10.59% are presumably to be found in Allen's various employment projections for growing municipalities such as BT or neighboring Bedminster--- suburban localities which have lured ratables away from urban areas such as Newark. Of these Essex County emigrants one may safely assume that at least 43% will be LM income households. In short the Allen Methodology is again blatantly one sided--deducting obligations and neglecting to subsequently add in the new responsibilities incurred when these deductions occur.

To correct this particular deficiency (as pertains to Essex) it is first necessary to determine what percent of the displaced population of Essex will find employment in each municipality within the BT housing region. Since these units have been implicitly included in the numerical employment projections, there will be no net increment in the regions absolute level of employment, but since at least 43% (vs. 25.8%) will be LM income, there will be a significant increase in the future need for LM housing units--- especially in communities with large primary and secondary employment potential such as BT. As was discussed in Sec II these LM workers should have the possibility of locating so as to allow for a minimal commute and not be spread randomly over the county side. (eg. R50=5)

IV

Where either (1) density ceilings are too low, or (2) given appropriate density ceilings not enough land has been so allocated, what is the result of underzoning for LM income housing units?



To the degree that LM income households are forced to pay either for the larger land consumption, (or alternatively they must live outside the municipality and pay for a longer commute*) the result may be a financial burden (i. e. rent > 25% of income or cost of houses > 250% of income**) and results in what the DCA report listed as the Financial need component in LM income housing. Thus municipalities must devise zoning ordinances in such a way that workers can afford the permitted housing and the profile of economic rents must correspond to workers income profiles. (Many of the secondary jobs (which Allen refuses to recognize) will almost certainly involve workers of lower and moderate income status.)

Allen's dismissal from present LM need of "financial need" housing as not being a zoning problem but rather an income problem is specious to say the least. Maintain^{ing} the remedy is higher earnings (or a subsidy which indirectly increases a householder's real income), this argument could be applied across the board with the result that no LM housing zoning is needed anywhere since the real problem is that these LM y hh don't earn enough. This is of course true -- if earners of LM wages had higher incomes they wouldn't be low and moderate.

and zoning which does not deprive them of affordable homes is a legal responsibility of B. T.

Unfortunately their incomes are low and moderate

*See Sec. II where the medium commute for blacks was 40% greater than for whites at RCA.

** This is simply a case of supply and demand in the case of insufficient land allocation -- when supply is artificially restricted rent rises.