REGULAR ARTICLE

White flight or flight from poverty?

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Abstract The phenomenon of White flight is often illustrated by the case of Detroit whose population dropped from 1.80 to 0.95 million between 1950 and 2000 while at the same time its Black and Hispanic component grew from 30 to 85%. But is this case really representative? The present paper shows that the phenomenon of White flight is in fact essentially a flight from poverty. As a confirmation, we show that the changes in White or Black populations are highly correlated which means that White flight is always paralleled by Black flight (and Hispanic flight as well). This broader interpretation of White flight accounts not only for the case of northern cities such as Cincinnati, Cleveland or Detroit, but for all population changes at county level, provided the population density is higher than a threshold of about $50\,km^2$ which corresponds to moderately urbanized areas (as can be found in states like Indiana or Virginia for instance).

1 Introduction

Many "theories" have been proposed to "explain" White flight. One can mention for instance the works of Castells (1983), Schelling (1971, 1978) or Smith (1987). However, as often occurs in the social sciences, the theories were proposed almost independently of actual observations. Two reasons may help to understand why observation lagged behind. First, in order to be meaningful, the study of White flight must be carried out at the level of counties or even the more detailed description level of city-blocks. The fact that there are about

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5,000 counties in the United States may explain why before the Internet revolution data at county level were not easily available. The second difficulty is the fact that one needs data for different population groups. The very definition of these groups involves conceptual difficulties[1]. There are only few countries whose statistical yearbooks provide data about population components. The United States is probably the country which publishes the most detailed statistics in this respect. This is why the study of White flight has largely been confined to this country. Probably the phenomenon also exists elsewhere as suggested by the few data which are available for Toronto or London, but until more detailed data become available for other countries, studies of White flight will have to focus on the case of the United States.

The study proceeds in five steps.

(1) First, by taking the specific example of the highly urbanized state of New Jersey we explain how the phenomenon of White flight can be estimated statistically.
(2) Then, we show that the observations made for New Jersey can be extended to other states as well provided one focuses on counties whose population density is above a given threshold.
(3) We show that White flight is almost as strongly correlated with poverty as with percentage of minority populations.
(4) As poverty is a notion which extends beyond ethnic division lines, it is natural to wonder whether or not different populations groups have the same behavior with respect to poverty stricken areas. The evidence shows that the migration pattern observed for white populations is in fact paralleled by similar patterns for Blacks or Hispanics. White flight, Black flight and Hispanic flight go hand in hand. Accordingly, White flight appears a rather misleading denomination; a more appropriate one would indeed be flight from poverty.
(5) In the last section of the paper, we suggest that this broader interpretation of White flight can also account for the standard cases of White flight observed in Cincinnati , Cleveland or Detroit in the 1950s and 1960s.

Before considering the phenomenon at county level it is natural to ask whether or not it exists at state level. The answer is no. More precisely, if one estimates White flight at state level by using the statistical procedure that we use at county level, one finds a (non-significant) correlation of -0.15 as compared to correlations between -0.75 and -0.93 at county level. In other words, at state level the effect is so weak that it is completely hidden by the "noise" due to other shocks and migration factors.

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[1] It must be emphasized that there can be no scientific definition of a White, Black or Hispanic person. Throughout this paper, we rely on the statistical definition used by the U.S. Bureau of the Census which is based on a self-identification procedure. For the sake of brevity and uniformity, we use systematically the term "Black" in preference to other equivalent terms such as "Afro-American or "colored".

2 White flight in New Jersey

New Jersey is a convenient laboratory for the study of White flight because it is a highly urbanized state with a large population. As we will see later on, population density is a crucial parameter in the study of white flight. The statistical procedure that we use in order to measure the intensity of White flight is based on the following steps.

For each of the 21 counties of New Jersey we consider the following variables:

(a) Total population in 1990: P
(b) White non-Hispanic (WnH) population in 1990: W_1
(c) White non-Hispanic population in 1996: W_2

From these population variables we compute two ratios that we express as percentages:

- Percentage of the population that is not WnH in 1990:

$$x = 100(1 - W_1/P).$$

- Relative percentage annual change in WnH population 1990–1996:

$$y = 100 \left(\frac{1}{6}\right) \frac{W_2 - W_1}{W_1}.$$

The resulting scatter plot is shown in Fig. 1. There is a strong relationship between x and y; the coefficient of correlation is -0.93 with a 95% likelihood confidence interval $(-0.97, -0.85)$ and the slope of the regression line is: -0.68 ± 0.11. One may wonder if this result is specific to the time interval under consideration. The answer is that fairly similar results hold for previous decades as well: see Table 1.

3 White flight in other states than New Jersey

Is White flight specific to New Jersey? That would of course seem surprising. As a matter of fact, we find a similar effect in other states as well. Table 2 summarizes some of the data. The slopes of the regression lines are comprised between 0.13 and 0.52 (minus sign discarded) and their average is equal to 0.30. In words, the relationship $|\Delta y| = 0.30|\Delta x|$ means that, for instance, when in a given county the percentage of the minorities increases from 20 to 40%, then[2]:

$$|\Delta x| = 20\% \implies |\Delta y| = 6\%$$

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[2] In order to give it a more intuitive meaning, the statement is made in terms of temporal changes, whereas Fig. 1 refers to ensemble changes at county level. Although the equivalence of temporal and ensemble changes cannot be taken for granted, that assumption is made here as a working hypothesis.
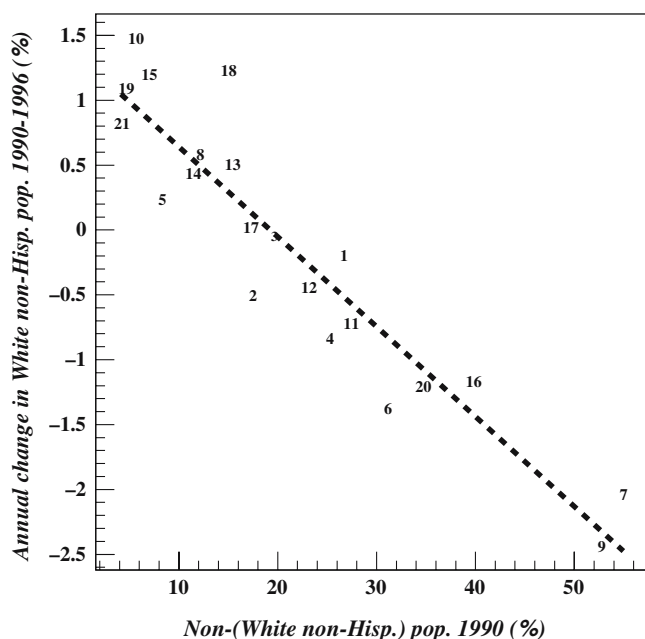
Fig. 1 White flight in New Jersey. Each number corresponds to one of the 21 counties (listed in alphabetical order). *Horizontal axis* percentage of minority populations in 1990; *vertical axis* relative percentage annual change in WnH population. The coefficient of correlation is −0.93. Source: USA Counties 1998 (http:// censtats.census.gov/usa/usa.shtml)

Table 1 Intensity of white flight in New Jersey, 1960–1996

	1960–1970	1970–1980	1980–1990	1990–1996
Correlation $x - y$	−0.58	−0.52	−0.71	−0.93
Slope a of regression line	-2.53 ± 1.6	-1.58 ± 1.17	0.77 ± 0.34	-0.68 ± 0.11

Notes 1960–1970, 1970–1980, 1980–1990: $x_1 = 100\%$ – percentage of White population in initial year, $y_1 =$ Relative percentage change in White population over one decade
1990–1996: $x_2 = 100\%$ – percentage of White non-Hispanic (WnH) population, $y_2 =$ Percentage change in WnH population over one decade
There are 21 counties in New Jersey; the scatter plot corresponding to the last time interval is shown in Fig. 1. Prior to 1990, the data for white populations also include Hispanics (data for WnH were not available). This is certainly why the last correlation is much higher than previous ones; indeed, if one replaces the "WnH" data by "White" data the correlation drops from −0.93 to −0.29. In 1980 the Hispanic population represented 6.1% as compared to 11% in 1996. The slopes a of the regression lines in the different time intervals were computed on a 10-year basis for all the intervals including the last one which therefore had to be renormalized by a factor 10/6. The fact that a decreases in the course of time suggests that the White flight effect has a tendency to become weaker
Source: USA Counties 1998 (http:// censtats.census.gov/usa/usa.shtml)

which means that the net change of the WnH population in this county shifts for instance from 8 to 2% (i.e. a slowdown in the increase) or from 3 to −3% (i.e. a shift from an inflow to an outflow).

Table 2 White flight in various states 1990–1996

State	Slope of regression line	Coefficient of correlation
California	-0.23 ± 0.09	-0.55
Georgia	-0.50 ± 0.07	-0.71
Louisiana	-0.22 ± 0.08	-0.53
Maryland	-0.42 ± 0.17	-0.71
Massachusetts	-0.52 ± 0.37	-0.61
New Jersey	-0.41 ± 0.06	-0.93
New York	-0.18 ± 0.04	-0.70
South Carolina	-0.17 ± 0.06	-0.58
Texas	-0.17 ± 0.05	-0.34
Virginia	-0.13 ± 0.08	-0.28
Washington	-0.32 ± 0.24	-0.39
Average	-0.30 ± 0.04	

Notes $x = 100\%$ – percentage of White non-Hispanic (WnH) population in 1990, y = relative percentage change in WnH population, 1990–1996
In all the cases listed the negative correlation is significant. The regression slopes refer to the 6 year-long interval 1990–1996; in order to make them comparable to the slopes for the decade-long intervals in table 1, they must be multiplied by 10/6. For instance, the average would become $0.30 \times (10/6) = 0.50$
Source: USA Counties 1998 (http:// censtats.census.gov/usa/usa.shtml)

3.1 Apparent exceptions

In some cases there does not seem to be a clear relationship between x and y. An example is provided by Fig. 2a which shows the scatter plot for Ohio. However, it can be observed that the correlation increases when the scatter plot is restricted to the counties whose population density is higher than a given threshold. This density effect is documented for several states in Table 3.

The table shows that the correlation is increased for almost all states. However, the level of significance is increased only for states which contain a substantial number of high density counties. A corollary of this observation is the fact that White flight effect cannot be observed for states such as Arizona or New Mexico which have almost only low density counties.

4 Influence of poverty

What are the factors which rule domestic migrations in countries with an ethnically homogeneous population? One would expect that economic opportunities are an essential factor. As two extreme illustrations one can mention the gold rush toward Alaska after the discovery of gold in this region or the move of Irish people from rural counties in Ireland toward the industrialized areas of Britain
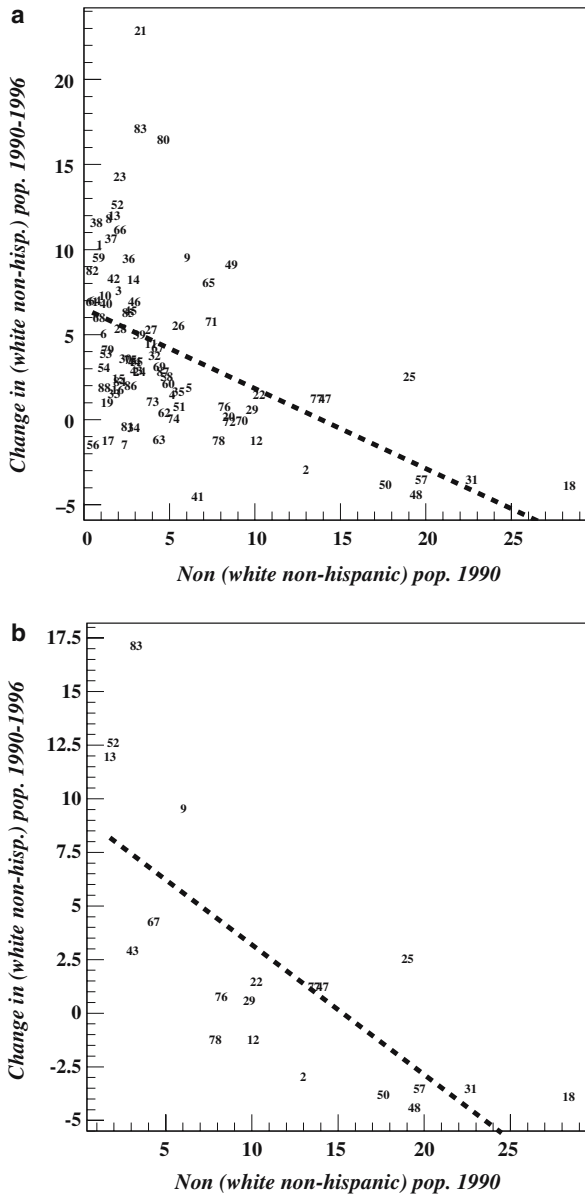
Fig. 2 White flight in Ohio **a** Each number corresponds to one of the 88 counties (listed in alphabetical order). In this graph the population density threshold is 0 which means that all counties are included. The x and y variables are the same as in Fig. 1. The coefficient of correlation is -0.49 (the 95% confidence interval is: $(-0.63, -0.31)$). Source: same as in Fig. 1. **b** In this graph the population density threshold is 100 people per square kilometer; there are 20 counties which qualify. The x and y variables are the same as in Fig. 1. The coefficient of correlation is -0.74 (the 95% confidence interval is: $(-0.89, -0.46)$). It is fairly apparent that the relationship between x and y is not linear but rather of the form: $y = a \ln x + b$; indeed, the coefficient of correlation of $\ln x$ and y is -0.83 [confidence interval $= (-0.93, -0.62)$]. Source: same as in Fig. 1

Table 3 White flight in areas of low versus high population density

State	Number of counties $D>0$	Number of counties $D>100$	Corr. $D>0$	Corr. $D>100$	α $D>0$	α $D>100$
California	58	12	0.55	0.79	0.34	0.46
Georgia	159	16	0.71	0.87	0.63	0.66
Illinois	102	11	0.20	0.59	0.001	−0.01
Louisiana	64	5	0.53	0.84	0.33	0.13
Maryland	24	9	0.71	0.79	0.43	0.21
Massachusetts	14	10	0.61	0.90	0.13	0.63
New Jersey	21	17	0.93	0.92	0.85	0.80
New York	62	18	0.70	0.82	0.55	0.59
Ohio	88	20	0.49	0.74	0.31	0.46
South Carolina	46	4	0.58	0.73	0.35	−0.76
Texas	254	13	0.34	0.64	0.23	0.13
Virginia	135	46	0.28	0.30	0.11	0.01
Washington	39	5	0.39	0.90	0.09	0.10

Notes For the sake of eliminating negative signs, all numbers in columns 4 to 7 have been replaced by their opposites. The two columns labeled "Corr" give the coefficient of correlation for the counties with a population density D higher than 0 (i.e. all counties) and higher than $100 \, \text{km}^2$ respectively. Similarly, the two columns with the heading α give the bounds of the confidence intervals (at 95% likelihood) which are closest to 0; roughly speaking, the higher α, the more significant is the correlation. The coefficient of correlation for $D > 0$ is particularly low when there are many rural counties (e.g. Louisiana or Texas). The table shows that an increased density threshold almost always leads to a higher correlation but that α is improved only whenever the state has a substantial number of high density counties (e.g. Georgia, Massachusetts, New York or Ohio). Note that, for historical reasons, Virginia's county list contains 41 "cities", many of which are in fact small towns, e.g. Bedford City has a population of 6,073. The non-improvement of α in this case clearly shows that what matters is the "real" degree of urbanization
Source: USA Counties 1998 (http:// censtats.census.gov/usa/usa.shtml)

during the crisis of the second half of the nineteenth century[3] . It is natural to assume that this effect also exists in the Unites States. To test this hypothesis, we first consider the case of New Jersey. Figure 3a is similar to Fig. 1 except that the *x*-axis variable in Fig. 1 has been replaced by the percentage of the population below poverty as defined by the Census Bureau[4]. The coefficient of correlation is −0.81 which confirms that the poverty effect is almost as strong as the white flight effect considered in Fig. 1.

4.1 Generalization to other states

Can the results for New Jersey be extended to other states? Table 4 compares the correlation c_1 between changes in white population and minority percent-

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[3] In the eyes of people of this time, the Irish were in fact considered as a separate population group. Their poverty, drunkenness, red faces and miserable dwellings gave them an appearance akin to that of "savages" [in Tocqueville's words (1958)].

[4] The poverty index is based solely on money income and does not reflect non-cash benefits such as food stamps, Medicaid and public housing. The poverty threshold is updated every year to reflect changes in the Consumer Price Index (Statistical Abstract of the United States 2005, p. 424).

Fig. 3 Flight from poverty of White people in New Jersey **a** Each number corresponds to one of the 21 counties (alphabetical order). The coefficient of correlation is −0.81. We used the poverty level in 1989 instead of 1990 because the later was not available on the County data base. Source: same as in Fig. 1. **b** Each number corresponds to one of the 21 counties (listed in alphabetical order). The coefficient of correlation is −0.76. Source: same as in Fig. 1. **c** Relationship between white non-hispanic flight and black flight in New Jersey. Each number corresponds to one of the 21 counties (alphabetical order). The coefficient of correlation is 0.95 and the slope of the regression line is 0.89 ± 0.12. Source: same as in Fig. 1
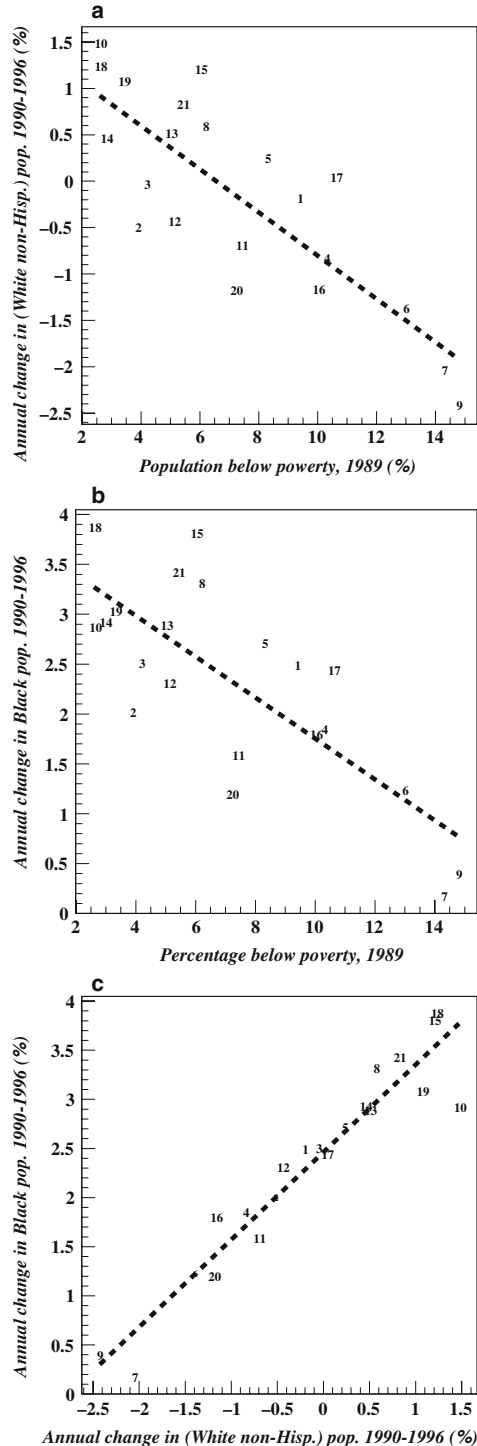
Table 4 Is White flight a flight from poverty?

State	Correlation with minority population	Correlation with population below poverty
	c_1	c_2
California	−0.55	−0.10
Georgia	−0.71	−0.66
Louisiana	−0.53	−0.19
Maryland	−0.71	−0.67
Massachusetts	−0.61	−0.61
New Jersey	−0.93	−0.81
New York	−0.70	−0.51
Washington	−0.39	−0.24
West Virginia	−0.28	−0.44
Average	−0.60	−0.47

Notes The c_1 column gives the correlation between the same variables as in Table 2. The c_2 column gives the correlation between x = Percentage of population below poverty and the same y variable as in Table 2. All the c_2 correlation coefficients are significant except those of California and Louisiana

Source: USA Counties 1998 (http:// censtats.census.gov/usa/usa.shtml)

age on the one hand to the correlation c_2 between the same changes in white population and percentage of population below poverty on the other hand. All the c_2 correlations are significant with the exception of California and Louisiana. The reasons behind these exceptions remain an open question. On average the c_2 correlations are only 22% smaller than the c_1 correlations.

How are these two effects related? One can note that in the United States the income of Whites is higher than the income of Black or Hispanic minorities. In 1990, the median income of Whites was 1.7 times higher than the median income of Blacks and 1.4 times higher than the median income of Hispanics. Therefore one is not really surprised that the two effects seem to overlap. Naturally, one would like to understand better the relationship between these two effects and whether one is a consequence of the other. One way to explore this issue is to study the migrations of Black people. For the case of New Jersey this is done in Fig. 3b. We see that there is a significant Black flight. The correlation is −0.76 as compared to −0.93 in Fig. 1. As a matter of fact the two graphs are very similar. It is of interest to observe more closely the counties at the two opposite ends of the horizontal axis.

- The counties numbered 7 and 9 (i.e. Essex and Hudson respectively) have a high minority percentage but also a high poverty percentage. As a result, Whites have been leaving these counties at an annual rate of about 2.20%, whereas the Black population increased at an annual rate of only 0.28% as compared to 1.40% for the whole state of New Jersey. In short, there has

been a White flight as well as a Black flight away from Essex and Hudson counties[5] .

- At the other end of the income spectrum, the counties numbered 18 and 19 (i.e. Somerset and Sussex respectively) have a minority percentage of 10% and have less than 3% of their population under poverty level. Their White component has been increasing at an annual rate of about one percent and their Black component at an average rate of 3.5 %.

This suggests that the so-called White flight is not specific to Whites but is shared by other components of the population as well and that it has more to do with economic opportunities than with interactions between different communities. Further insight can be gained by discussing in more detail the case of West Virginia (mentioned in Table 4) which is of special interest. This state has few minority people: 3.1% Blacks, 0.6% Hispanics and 0.5% Asians. Therefore, one would not expect that the minorities are the force which drives the movements of the White population. This is indeed confirmed by the results in Table 4: the c_1 correlation is only -0.28 with a 95% confidence interval $(-0.51, -0.02)$ which shows that it is barely significant. On the other hand, with an average below poverty percentage of 20% (1990), West Virginia is one of the poorest American states. As a result, one is not surprised that it is poverty which is the driving force of the movements of the WnH population as confirmed by a c_2 correlation of -0.44 (i.e. 57% higher than the previous c_1 correlation of -0.28).

The fact that White flight is paralleled by Black and Hispanic flights is confirmed by examining the correlations between the population changes of these three population components. This is the purpose of the next section.

5 White flight, Black flight, Hispanic flight

Once again, we begin by examining the case of New Jersey. Figure 3c shows that the changes in Black and White non-Hispanic population changes are highly correlated. The coefficient of correlation c is equal to 0.95 and the slope of the regression line is: $a = 0.89 \pm 0.12$, which means that $\Delta y \sim \Delta x$. For the Hispanic and White non-Hispanic population changes the correlation is even higher with $c = 0.99$ and $a = 1.25 \pm 0.07$. The same findings hold for other states as well at least above a population density threshold of about $50 \, \text{km}^2$ (see Table 5).

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[5] In a general way, in the present study, we do not try to distinguish between the natural increase (due to the surplus of births over deaths) and migration balance. If we try to do it here, broadly speaking, this can be done on the basis that in New Jersey the annual natural increase 1990–1996 was 0.62% for the White population and 1.00% for the Black population. This means that for the White population migrations represented $-2.20\% - 0.62\% = -2.82\%$, whereas for the Black population they represented $0.28\% - 1.00\% = -0.72\%$. The figures show that there was indeed a Black flight which paralleled the White flight.

Table 5 White flight, Black flight and Hispanic flight, 1990–1996

State	WnH-B	WnH-H
California		
All counties	0.67	0.90
Counties for which D>50	0.85	0.96
Maryland		
All counties	0.90	0.90
Counties for which D>50	0.95	0.98
Massachusetts		
All counties	0.95	0.96
Counties for which D>50	0.93	0.97
New Jersey		
All counties	0.95	0.99
Counties for which D>50	0.95	0.99
Texas		
All counties	0.09	0.43
Counties for which D>50	0.85	0.98
D>50		
Average, all counties	0.71	0.84
Average, counties D>50	0.91	0.98

Notes WnH means White non-Hispanic, B means Black, H means Hispanic. The WnH-B column gives the correlations between x = change in WnH population, y_1 = change in B population. The WnH-H column gives the correlations between the same x variable and y_2 = Change in H population. D denotes the population density expressed in population per square kilometer. The low correlation in Texas which is obtained when all counties are included is due to the fact that Texas has a great number of rural counties with small populations and densities. Only 11% of the 254 counties have a population density over $50 \, km^2$. Naturally, counties with small populations can experience very large population changes. Thus, for instance, the county of Lasalle (total 1990 population of 5,254 and density=$1.4 \, km^2$) experienced a 845% increase in its black population which grew from 53 in 1990 to 501 in 1996. Such large changes result in a huge dispersion and thus in a low correlation. When these rural counties are left aside, the correlation becomes much higher Source: USA Counties 1998 (http:// censtats.census.gov/usa/usa.shtml)

6 Conclusion

At first sight the previous observation seems to be at variance with the standard mechanism of White flight. For cities such as Cleveland or Detroit, it is usually described as a three stage process. (1) Move of Blacks to northern industrial cities during World War II and concurrent move of White people to suburban areas[6] . These opposite flows of population resulted in the replacement of high or medium wage earners by low wage earners. (2) Fall in municipal revenue and accompanying decline in public services. (3) Decline in overall city population.

   This description is not consistent with the findings of this paper. Yet, as the evidence presented in this paper pertains to the period 1990–1996, it can be argued that it cannot shed new light on what happened in the 1950s. This is

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[6] This move was not entirely "spontaneous" but was encouraged by the availability of affordable mortgages for new homes in the suburbs and by the development of highways. It can be noted that both mortgages and highway constructions were subsidized by the federal government.

certainly true although it is tempting, at least as a working hypothesis, to posit that the movements of population are ruled by mechanisms which are fairly robust in the course of time.

Apart from Cleveland and Detroit, does the above mechanism apply to other cities? By considering other large cities, one comes to the conclusion that this mechanism does not have a broad validity. For instance, a growing minority population does not necessarily result in an overall population decline. Although this was indeed the case in Cincinnati, Cleveland or Detroit, it is by no means a general rule as shown by the following counter-examples:

- In New Orleans the Black population increased approximately in the same way as in Detroit, i.e. from about 33% in 1950 to about 60% in 1980. Yet, in contrast to Detroit where the total population fell by 35%, it remained almost unchanged in New Orleans.
- In Los Angeles, the share of the minority population increased from 16% in 1960 to about 60% in 2000; yet the total population increased by 48% instead of decreasing.
- In Boston, the minorities represented only 28% in 1980. Yet, from 1950 to 1980 the total population decreased by 30%, almost as rapidly as in Detroit. A similar but less known example is provided by the city of Charleston in West Virginia. With a population of only 53,000 in 2000 it is a small city yet the largest in the state. Its minority population represents 16% (15% Black and 1% Hispanic). Yet, between 1950 and 2000 its population dropped by 27%.

According to the observations made in this paper, *all* population components tend to converge toward places which offer adequate employment and to avoid places with little opportunities. As a matter of fact, this mechanism can also explain typical white flight cases such as Cleveland or Detroit. In the 1950s these cities suffered from several handicaps.

- In the U.S. as well as in European countries the second half of the twentieth century was marked by a migration trend toward sunny areas, for example toward the states of Arizona, California, Florida or Texas. As a consequence, the Midwest states lost their attractiveness unless they had specific assets.
- In a time of declining industrial activity, the Cleveland–Cincinnati–Detroit area had the misfortune that its economy was mainly based on shrinking industrial sectors.
- Moreover, these cities had no renowned universities and their centers had none of the assets of cities such as Boston, Manhattan or San Francisco.

In short, the decline of this region was probably inevitable even if the population had been mono-ethnic. As a matter of fact, similar declines were experienced in regions which had the same handicaps, for instance the Birmingham–Liverpool area in Britain or the regions devoted to heavy industry in the north and north-east of France.

In conclusion, the following picture emerges from this study. The different population components have basically the same behavior in the sense that they

are attracted by or kept away from the same areas. However, due to their higher income, White people have a greater *mobility*. They can afford a home in sub-urban areas as well as adequate means of transportation whereas Black people remain trapped in areas in which they arrived in a time of good opportunities but which they cannot leave as quickly as whites once these opportunities have vanished.

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