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LOCATION-SPECIFIC HUMAN CAPITAL, MIGRATION AND AMENITIES

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Introduction.

People move for many reasons. Certainly life-cycle considerations and regional income differences have substantial effects on human migration, but a host of finer considerations influences individuals' decisions to relocate perhaps as much.[1] Specifically, spatial differences in the returns to a person's human capital will influence a population's spatial distribution at the aggregate and people's location/migration decisions at the individual level. Intuitively, such differences should play an important role in determining people's migration decisions by affecting their relative real income in various places. The loss of returns on locally effective human capital at original locations probably constitutes an important part of the costs of human migration.

This paper uses the concept of location-specific human capital to build on previous work on amenities, human capital, migration, and regional labor market dynamics to develop a simple model of people's migration behavior. After reviewing the literature, Section II advances a model in which attainable utility levels vary over space because of differences in labor market conditions and in technologies available for generating the household commodities from which people derive utility. These technological differences are interpreted as arising from differences in area characteristics (amenities), which reward certain kinds of knowledge more than others. People can migrate to arbitrage away the utility differentials, but only after a period of forced residence in the area to which they were randomly assigned. This random assignment is interpreted as birth, and the period of forced residence is interpreted as a person's childhood and early adolescence, a time during which people must take their location as given. Whatever a

person's tastes or natural abilities, this period of forced residence makes the acquisition of at least some locally-favored human capital optimal, even if the person plans to move to another area once the period of forced residence is over.

The theoretical model shows that the specificity induced by area heterogeneity combined with the period of forced residence makes increased investments in such knowledge optimal. These increased investments in locally favored forms of human capital in turn increase the opportunity cost of migrating to dissimilar areas, thus diminishing the flow of migrants and retarding the equalization of attainable utility across areas (labor market equilibrium).

Section III outlines the strategy for an empirical test of the theory advanced in the second section. Specifically, the prediction that people will attempt to keep the characteristics of their environment stable and similar to those they grew accustomed to when they came of age will be tested against the prediction of a standard model of amenity valuation where amenities are simply valued for their own sake, and not through their effects on household production. The prediction of the standard model is simply that, for normal goods, people with greater command of resources will demand more public goods than poorer people.

The test of these conflicting theories is carried out in Section IV using confidential geocoded data from the National Longitudinal Survey of Youth, 1979 cohort. By merging county characteristics to the youths' records, we can directly test the implication that people attempt to stay in places similar to ones in which they have experience and whether income is a significant predictor of amenity demand. The dataset at hand thus allows for an empirical test that discriminates between the new and the standard theories. The results – presented in Section IV – are very favorable: prior exposure is the primary determinant of amenity demand. A brief fifth section concludes.

I. Literature Review.

The literature on migration is extensive. Sjaasted [1962] was the first to bring migration into the theoretical framework of investments in human capital, but it has always been clear that migration is driven by economic forces. Tolley [1974] and Rosen [1974] offer models which include such forces, but also allowed for amenities, or local public goods, to play a part in the reaching of regional equilibrium. Roback [1982] applied hedonic analysis to cities and a series of attempts to develop all-inclusive quality-of-life indexes for cities or metropolitan areas followed. This literature is reviewed by Gyourko *et al.* [1997]. They reach the conclusion that such attempts face serious difficulties in the absence of much better data.

Another branch of this literature concerns the effect of amenities on migration *per se*. Graves [1979] and Graves *et al.* [1979, 1982] show evidence that amenities effect people's location decisions. Some authors [Florida 2000a, b, c, Clark 2002] have focused on urban and cultural amenities as driving regional growth. Such a conclusion suggests that amenities have not yet been fully capitalized into wages or rents. Greenwood *et al.* [1991] allow for such disequilibrium forces in computing state-level compensating differentials. Using better data, however, Greenwood *et al.* [1989] show that amenities perform relatively poorly compared to more standard labor-market variables in predicting migration flows.

The realization that such compensating differentials must come from varying returns to human capital investments was apparent from the beginning, as all the above authors make clear and as acknowledged by Cragg and Kahn [1997], who explicitly allow returns to human capital to vary across states. But a complete understanding of inter-regional wage differentials must also be based on an understanding of inter-regional differences in the distribution and type of

human capital. The point of departure in this paper is to acknowledge the existence of types of human capital whose returns are location-specific. The idea of location-specificity in human capital is not new. Sjaasted [1962], Becker [1964, p. 50], and Davanzo [1982] all use or acknowledge its existence.

Many other types of specificity have been proposed. Becker, Michael and Landes [1977] propose spouse-specific human capital as a tempering factor in divorce. Neal [1995, 1999] uses industry-specificity, which is not quite as specific as firm-specific, but not quite general. All of these types of capital, however, can have significant spatial implications. Industry-specific human capital, for example, will be location-specific if industries are non-uniformly distributed. Spouse-specific knowledge is location-specific as well, if the spouse does not wish to move. Mincer [1978] and Graves and Linneman [1979] show that marital status has significant effects on the propensity of people to migrate. Large amounts of firm-specific human capital would likely have a similar effect, as shown by Bartel [1979] (one of the motivating factors in Zax [1994]). Most of the concept of social capital (at least as described in Putnam [2000]) also manifests itself as location-specific human capital.

This paper attempts to systematize the concept of location-specific human capital referred to in the above papers, and advance on a relatively newer line of the amenity literature. Hsu [1995] posits the existence of unobserved amenities for which time-intensive investments are required to develop a taste. His empirical results are suggestive. Taking the next logical step, Tolley, Rudzitis and Baden [1999] formalize Hsu's familiarity amenity. They develop an extensive model, allowing for investments in this amenity, and provide evidence suggesting that it could be an important factor in the migration decision of certain subsets of the population. This paper takes the Tolley *et al.* analysis one step further by separating sense of place from the

standard amenities and treating it purely as an investment in location-specific human capital.

II. Model.

In this section, a formal model is developed capturing the following essential elements: exogenous origin, availability of investments of variable geographic specificity, the possibility of migration and inter-regional wage differentials. Subsection A describes the assumptions of model and subsection B draws several results. These results are compared with those of the previous literature in Section III.

II.A. Location-specific Human Capital.

By assumption there are two periods (1, 2) and two locations (*A, B*). Individuals are assigned randomly at the beginning of the first period to the first of the two locations with probability $\pi \in [0, 1]$, so that a π proportion of the population lives in location *A* at the beginning of the first period and a $(1-\pi)$ proportion live in location *B*. Individuals are stuck at their assigned location for the first period, but have the option of switching locations (migrating) between periods.

We assume that individuals maximize their expected real income (W) over the two periods by making investments in two types of human capital: H_A and H_B. Both forms of human capital exhibit declining marginal returns. The income in any period and at any location is assumed to be declining in the proportion of people living at that location in that period (a simple representation of the effects of labor supply)[2], and increasing in human capital investments. For tractibility, it is assumed that the effects of the two types of human capital are additively separable, and that income is made of a systematic and idiosyncratic component. A simple, tractable functional form that embodies these assumptions is:[3]

$$(1) \qquad W_A\left(H_A, H_{B,}; \pi, \alpha\right) = \frac{\alpha \ln H_A + (1-\alpha)\ln H_B}{\pi} + e_a$$

$$(2) \qquad W_B\left(H_A, H_{B,}; \pi, \beta\right) = \frac{(1-\beta)\ln H_A + \beta \ln H_B}{(1-\pi)} + e_b,$$

where $e_a, e_b \sim N(0, \sigma_e)$, $E(e_a e_b) = 0$, $\pi \in [0,1]$, and $\alpha, \beta \in [1/2, 1]$. The random errors (e_a, e_b) represent the idiosyncratic match individuals find in their respective locations and corresponds to the income residual controlling perfectly for human capital inputs, or un-modeled taste for the area. These idiosyncratic components of wage are assumed independent for simplicity, but all the results of the model hold when they are correlated, either positively or negatively. It is assumed that individuals know their random component of income at their origin location at the beginning of the first period, but do not know their random component in the other location. The only way individuals can get a new draw on this component is by moving from one location to another. *Alpha* and *Beta* are the level of specificity that the human capital technology exhibits. If *Alpha* and *Beta* are one, human capital is useless outside of its region (it has no effect on income in the other region). If *Alpha* and *Beta* are ½, both types of capital are equally useful in both locations. The populations of each area (π and 1-π) enter into the income functions to allow for inter-area income differences and incentives for migration.

Given the above technology, individuals maximize their two-period income over the two human capital choice variables and the decision of whether or not to migrate. Assuming no capital constraints, a discount rate of δ,[4] capital shadow prices of p_a and p_b, respectively for H_A and H_B, the optimal levels of human capital investment will depend upon whether the individual chooses to move or not. Because income levels depend upon the size of the population, optimal investment in human capital will also depend upon the amount of people living at locations *A* and *B* in the second period (π' and 1-π', respectively), after migration decisions have been made.

An individual planning to stay (represented by super-script *S*) both periods at location *A* will optimally acquire $[H_A^S, H_B^S]$ levels of human capital, while individuals planning to move will wish to invest $[H_A^M, H_B^M]$. These investment levels are functions of the period one and two populations, prices and the human capital specificity parameters (α and β). Unsurprisingly,

people in a region with high-returns (π <½) will be more educated than people in a low-returns region (π >½) and that optimal levels of investments are inversely related to the price of the investments.

Whether an individual at location A is a stayer or a mover depends on whether his net expected income (present value of income minus capital expenses) as a mover is greater than or less than his expected income as a stayer. That is, it will depend on whether the *Net Income of Staying* at location A (NW_S^A) is greater or less than zero.

$$NW_S^A = Net\,Income_S - Net\,Income_M =$$

$$(3) \quad \left[(1+\delta)W_A\left(H_A^S, H_B^S\right) - p_a H_A^S - p_b H_B^S + (1+\delta)e_a\right]$$

$$-\left[W_A\left(H_A^M, H_B^M\right) + \delta W_B\left(H_A^M, H_B^M\right) - p_a H_A^M - p_b H_B^M + e_a + \delta e_b\right]$$

If this term is positive, the net income of staying is higher than the net income of moving, and the individual will decide to stay in location A. Otherwise, the individual moves from location A to location B between periods. The condition for individuals whose origin is at location B is similar. Even in this simple construction it is apparent that the human capital investments people make (whether they choose to invest $[H_A^S, H_B^S]$ or $[H_A^M, H_B^M]$) depend upon the sign of this difference, but that the sign of the difference depends upon the optimal investment levels. This codependence raises econometric issues which are discussed in Krupka [2002] using a similar model.

II.B. Theoretical Results.

The primary result derived from the model is that when returns to human capital are location-specific, first and second period residence will be correlated, even when moving costs are zero. With no location specificity ($\alpha = \beta = ½$), no migration costs ($E(e_b) = 0$), and equal first period populations ($\pi = ½$), exactly half the population migrates out of each area, and first and second period residence are not correlated. Location-specificity ($\alpha = \beta > ½$) decreases the

incentive to migrate, lowering migration flows and making people more likely to stay in their "home" area. We arrive at this result by plugging the optimal investment levels into the NW_S^A condition, setting $\alpha = \beta$ for convenience, and differentiating with respect to α. This yields equation 4:

$$\frac{\partial NW_{S\alpha}^{A}}{\partial \alpha} = \left[\frac{1}{\pi} + \frac{\delta}{\pi'}\right]\left[\ln\left(\frac{\alpha}{\pi} + \delta\frac{\alpha}{\pi'}\right) - \ln\left(\frac{(1-\alpha)}{\pi} + \delta\frac{(1-\alpha)}{\pi'}\right)\right]$$

$$+\left[\frac{1}{\pi} - \frac{\delta}{(1-\pi')}\right]\left[\ln\left(\frac{(1-\alpha)}{\pi} + \delta\frac{\alpha}{(1-\pi')}\right) - \ln\left(\frac{\alpha}{\pi} + \delta\frac{(1-\alpha)}{(1-\pi')}\right)\right] \quad (4)$$

$$+\left[\frac{\delta}{(1-\pi')} + \frac{\delta}{\pi'}\right](\ln p_b - \ln p_a).$$

Equation 4 is positive whenever α>½, and $p_b \geq p_a$. This means that location-specificity (increasing α) reduces the incentives to migrate because the acquisition of human capital specific to the individual's location increases the opportunity cost of migrating. In effect, the necessity of living in an exogenously determined location in the first period makes some acquisition of human capital specific to that region optimal. The acquisition of this knowledge makes the move to the other location relatively less attractive.

We obtain this result analytically by assuming $\pi = \pi' = ½$ (and then checking that this assumption is consistent with the result). The general case (where $\pi = \pi' = ½$ does not hold) is much more interesting, since it implies that regional wage differentials could be persistent. The proof offered here relies on relationships not worked out analytically for the functional forms assumed in the rest of the paper, but which nonetheless must hold. The two relationships are the

period-two population's relationship with the flow of migrants ($\pi'(flow)$) and the flow of migrants' relationship to the second period population ($flow(\pi')$), where *flow* is defined as the net out-flow of migrants from area *A*.

The functional form of $\pi'(flow)$ is easily derived, for the relationship is simply mathematical: $\pi'(flow) = \pi - flow$. The migrant flow's relationship to π' is more complex, because flow depends upon the decisions of rational agents in both areas:

$$(5) \qquad flow(\pi') = flow_{AB}(\pi') - flow_{BA}(\pi') = \pi\, pr\left(NW_S(\pi') < 0\right) - \left(1-\pi\right) pr\left(NW_S(1-\pi') < 0\right).$$

The gross flows from *A* to *B* (and vice versa) will be the proportion of the population who will find it optimal to migrate weighted by the region's first-period population share. The *Net Wage of Staying* (NW_S) functions are identical in each area. The observed second period population in and flow from area *A* will be *flow* and π' such that:

$$(6) \qquad \pi'(flow^*) = flow(\pi'^*).$$

The case of $\pi = \pi' = ½$, which was shown analytically above, can thus be shown graphically as in Figure I. The curvature on the *flow(π')* function insures a stable equilibrium, and is a result of migration dissipating gains to migration as π' approaches ½, thus discouraging further migration. The case shown above is a special case, when flows from each region exactly offset each other because $\pi = ½$.

If moving costs are zero, then migrants will arbitrage away any regional wage differentials. The no-moving-cost scenario is analogous in the model to $\alpha = \beta = ½$ and a zero expectation on the destination area's error term, and the efficient migration result is analogous in the model to $\pi' = ½$. In this scenario, $flow(\pi'=½) = \pi - ½$, no matter the value of π. This invariant outcome is shown for three values of π in Figure II.

Inter-area wage equalization is achieved no matter what the initial condition as long as moving costs are zero ($\pi' = ½$ regardless of π). However, if moving costs are not zero, this result will not hold. If $\alpha = \beta > ½$, flows to and from each area will be affected.

$$
\begin{aligned}
\frac{\partial flow(\pi')}{\partial(\alpha=\beta)} &= \frac{\partial}{\partial(\alpha=\beta)}\left(flow_{AB}\right) - \frac{\partial}{\partial(\alpha=\beta)}\left(flow_{BA}\right) \\
&= \pi\frac{\partial\left(pr\left(NW_S<0\right)\right)}{\partial(\alpha=\beta)} - (1-\pi)\frac{\partial\left(pr\left(NW_S<0\right)\right)}{\partial(\alpha=\beta)} \\
&= (2\pi-1)\frac{\partial pr\left(NW_S<0\right)}{\partial NW_S}\frac{\partial NW_S}{\partial(\alpha=\beta)}
\end{aligned}
\tag{7}
$$

$$
\frac{\partial flow(\pi')}{\partial(\alpha=\beta)}\begin{cases} >0 \Leftrightarrow \pi < 1/2 \\ =0 \Leftrightarrow \pi = 1/2 \\ <0 \Leftrightarrow \pi > 1/2 \end{cases}
$$

Thus, net flow out of area *A* will not necessarily equalize second period wages. The *flow(π′)* function shifts, the equilibrium locus moves along the *π′(flow)* line, the equilibrium amount of net migration decreases in magnitude from π - ½, and the equilibrium second-period population share moves away from ½ and towards the initial value of π. This situation is shown graphically in Figure III. The function *flow(α=β=½)* represents the case with no moving costs, while the *flow(α=β>½)* function represents the case where location-specific human capital reduces migration flows and prevents second-period wage equalization.

Since the empirical treatment below does not depend upon direct measurement of local human capital, some discussion of what H_A and H_B represent is in order. In the above analysis, people are assumed to maximize *real* income, which takes into account quality of life, and efficiency of household production. The higher real wage for which individuals strive in the model could come about either through higher returns on human capital in the labor market or

higher effectiveness of household-production-oriented human capital. In the above model, the negative relationship between each location's population and wage captures the effect of changing supply on the labor market.

On the other hand, the role played by specificity (α and β) in the labor market could come about because of geographical factors (location near a coast or raw material deposits), political factors (the location being a state or national capital, or offering a more favorable regulatory atmosphere) or historical factors (the location has historically been the center of some industry or another). While these factors are endogenous to a model of regional development, to the individual they are exogenous. To the extent that these factors influence human capital investment in the real-life equivalent of the first period with exogenous location, these geographic differences will have the effect described in the model. However, since most young people have the option of migrating before the beginning of their working life, such market-oriented factors of specificity might not be very important. Market-oriented human capital only effects wage in the second period, so investment in such human capital will be postponed until after migration: the effect through opportunity costs will not exist. In other words, childhood residence in coal mining country does not increase a person's efficiency at coal mining since people who want to mine other substances (or not mine at all) can move when they reach their majority.

Specificity will play a much stronger role through the household sector. Children cannot choose where they live, so the real-life equivalent of the exogenous location period for individuals is likely to be their childhood. Human capital acquired during this period of forced residence will have the qualities of H_A and H_B in the above model. The specificity of H_A and H_B will occur because a location's characteristics can make certain kinds of household production

more productive, while making other kinds less productive. For example higher returns on household-oriented capital could mean a better symphony orchestra for those who have invested heavily in an appreciation of classical music. It could mean proximity to good hunting areas for people who have invested heavily in outdoorsman skills. It could mean a collection of good microbreweries for those who have invested heavily in their liver, and appreciation of thick, pasty beers. These types of effects have traditionally been thought of as access amenities themselves, and thus enter the utility function directly, however here they are reinterpreted as returns to investments.[5]

This model is thus similar to that proposed by Becker and Stigler (1977) and summarized in Becker (1996), where personal capital effects utility by making household production more efficient. The step taken here is in allowing area characteristics to affect the returns to such capital. In the model presented here, there are only two kinds of human capital and the locations are characterized simply by an observable wage function. In the real world there are innumerable kinds of human capital and locations are characterized by an array of objective and subjective attributes which affect returns on human capital. At aggregated levels such as the population the various investment types will more or less cancel each other out, leaving amenity variables apparently unimportant at the aggregate, but possibly all-important at the individual level.

The investments in this model have a strong exogenous factor because people can't choose their childhood residence. Exogenous determinates of demand are used by Black *et al.* [2001] in modeling gay male residence patterns, but this model suggests a much broader set of exogenous demand shifters. While such considerations may not have significant effects on estimates of the demand for access to certain location characteristics (amenities), or on the effects of these characteristics on aggregate migration, they will help us better predict migration

flows *between specific locations*. The model also extends on the reservations raised in Gyourko *et al.* [1999] about quality of life indexes up to this point: the implicit price of an amenity (as estimated using hedonic analysis) is set by the marginal migrant, but this price may not reflect the experiences of the majority of people, most of whom are very far from the margin.

III. Empirical Strategy.

The above model offers an alternative interpretation of how amenities work. Instead of taking amenities as public goods that enter the utility function directly, they are here thought of as only increasing utility through their effect on household production. All amenities, in effect, are production amenities.

This difference in interpretation leads to a possible test. If amenities enter the utility function directly, as any consumer good does, then they should have income elasticities, just like any good. This income elasticity derives from the work of Rosen [1974], Tolley [1974], Roback [1982] and later authors. High-income families or individuals have the ability to purchase higher levels of amenities by locating in an area with high amenity levels and lower pay. If amenities enter the utility function directly, then richer families should be observed demanding more of them, assuming they are normal goods.

On the other hand, to the extent that amenities are used in household production, then most of the added "income" that they create will not be observed by the econometrician. Investments in location-specific human capital will increase utility (by making household production more efficient) but not increase take-home pay. Thus, if amenities are simply production-related, and not valued *per se*, then there is no reason to expect that richer families should demand more of them. Instead, prior exposure – which has led to increased appreciation

or ability to take advantage of the amenity – will be the primary predictor of the demand for the amenity.

The regressions that are run are of the form:

(8) $$A_T = \gamma_0 + \gamma_1 income + \gamma_2 A_0 + \gamma_3 X + \varepsilon_1,$$

where A_T is the level of amenity demand at the terminal date (2000, in our data set), A_0 is the level of amenity experienced at the original location (county of residence at age 14), and X is a vector of individual characteristics. Because amenities are theorized to affect wages through capitalization, we instrument for income using several background variables available in the National Longitudinal Survey of Youth, 1979 cohort. These include AFQT scores, occupational dummies for the individual, their spouse and their parents, education levels for the individual, spouse and the individual's parents, race/AFQT and race/education interactions, and some information about the kind of household the individual spent most of his childhood in. Summary statistics for these variables are available in Krupka [2004]. Individual characteristics that affect amenity demand (X) in equation 8 are education, the number of children and marital status.

Tables I through VI list the amenity variables used in the analysis along with the average year 2000 values experienced by the sample of NLSY79 respondents with valid geographic data. The tables are broken into six categories of amenities in order of mutability: natural or immutable variables, social or economic outcomes, land-use patterns, retail leisure opportunities and cultural leisure opportunities, and the religious characteristics of the county.

The first table presents natural characteristics generously provided by MacGranahan. Policy-makers are not able to affect these county characteristics. They are all well-worn variables in the amenity literature. It is assumed that more sun, water, hills, trees, and "nicer" weather are uniformly attractive. The final combined score is a combination of the other

variables composed by MacGranahan [1999] based on just that assumption. The model proposed in this paper suggests that such constructions have little validity, but it is run with the other variables nonetheless. The model nuances our understanding of how these characteristics affect migration by taking into account the characteristics of the origin location of each respondent. The hypothesis is that hot Julys aren't as unattractive to people who are "used" to them, *etc.*

Most of the other variables are not as well studied in the context of people's migration decisions. This is an interesting gap in the literature, since they tend to be more malleable, and of more policy interest. Table II presents the county characteristics that are social or economic outcomes. They are culled from the NLSY79 Geocode files and the data provided by MacGranahan. These characteristics will only change very slowly, and only with immense and persistent government intervention.

Several different measures of a county's urbanicity are available. Krupka [2002] shows that inter-regional migrants tend to sort into areas of similar urbanicity using the General Social Survey. While the difference between urban and rural areas is easily observable, researchers have not known whether to consider the urban nature of an area an amenity (because of lower cost to many cultural goods) or a disamenity (congestion, crime *etc.*). This paper offers a more intuitive way of looking at the distinction, showing people prefer to stay where they have learned well how to live. People also care about the kinds of neighbors they keep. This has never been considered an amenity by researchers[6] looking at migration for the same reason as metropolitan status: there is no theoretical reason why the kinds of neighbors one has should be an amenity or a disamenity. The model in this paper suggests that people can get used to, and in essence develop a taste for certain kinds of neighborhoods: black, white, or racially diverse.

In addition, the disamenities of unemployment and crime are included. It is possible that

people develop coping strategies, or get used to high unemployment or high crime areas. Labor migration will tend to mute the effects predicted by the model in the case of unemployment, while Tiebout sorting within counties will make the county-level measure of crime rate only a proxy of the crime experienced by any individual. Nevertheless, these variables are run with the rest to see if people sort in the way predicted by the model.

A third type of variable examined below is more changeable: land-use patterns. While how land is used is presumably the result of it being turned to its highest-value use, government intervention in land markets through direct acquisition, zoning and targeted subsidies allow policy-makers to affect land-use patterns in their jurisdiction. Table III shows the land-use variables generated from data available on the United States Geological Survey website.[7]

The manner in which the land is used determines what is on the land, and thus what residents see as they move around in their daily life. The assumption in the amenity literature has been that people like trees. But beauty is truly in the eye of the beholder. The model presented in this paper allows people to differ systematically in their taste for scenery, based on what they came to enjoy as youths. These data are unfortunately not panel: counties are constrained to have the same percentages at age 14 as in the year 2000. For some variables this is a real limitation. Such detailed land-use information is not available for previous years, however, so the 2000 values will have to be taken as proxies for the late-70's values in the hope that they have not changed too drastically.

The fourth and fifth tables present data on private goods generously provided by Terry Clark.[8] While all of the objects represented in these variables are free to charge admission, in the absence of perfect price-discrimination, the consumer surplus they provide to their customers is a good that is not captured in the prices charged, so access to these enterprises will be desirable,

and non-priced. The availability of these retail opportunities are thus public goods in the sense of climate, views or crime. They are broken into two groups (retail and cultural) based on the judgment of Clark (2003), with which the author concurs. Table IV presents the retail-oriented leisure opportunities, while Table V presents the cultural amenities.

In contrast to Clark, the statistical treatment here will also examine the effects of the *per capita* levels of the retail amenities. There are two reasons why *per capita* levels may be better measures of actual amenity levels than absolute levels. First, crowding might drive down the consumer surplus of using an outlet and make it's existence less of an amenity (for those who wish to use it). On the other hand, if you assume that the owners or operators of the retail establishments are profit-maximizing business people, then the *per capita* quantity of stores in an area is a loose measure of the demand for such retail outlets by the average individual in the area. Thus, the presence of retail outlets signals the kind of neighbors one would have in an area.

Per capita figures were not computed for the cultural amenities, because crowding was not thought to be as much of a problem and because larger fixed costs were thought to prevent these institutions from reflecting accurately the *current* demand.

As is the case for the land-use data, these are not panel data. They represent the world as it was circa 2000. Because of higher fixed costs, this may be less of a problem for the cultural amenities, but the problem still remains. As with the land-use data, we must hope that the 2000 levels are reasonable proxies for the age 14 levels experienced by our sample of NLSY79 respondents. We must take the 2000 levels as indicators only of some unobserved "amenity-richness" which is persistent.

Table VI presents summary statistics for the final type of county characteristic this paper examines: the religious makeup and opportunities available. The religious makeup of an area

can be considered an amenity for several reasons. First, and most obviously, most religions require several adherents to be observed. But religious institutions do not merely provide worship opportunities (which are, in any case, only attractive to adherents). The religious character of an area affects all residents through religious observances, festivals and the character or behavior of the population. It may also be the case that areas with particularly rich mixes of religious opportunities are attractive in their own right. In all these ways, religion is or creates amenities which people can gain tastes for through childhood habituation or deliberate investment. The data are derived from data collected by the American Religion Data Archive.

We look first at three general measures of religious activity. The first is a religious diversity index composed by summing the squared proportions of religious adherents across 40 different religion *types*. The second is the number of the 256 possible different religions that maintain congregations in the county. Finally, the proportion of the county population that is not affiliated with any church is taken as a measure of the prevalence of more secularly oriented people in the county. The last two variables, *percent* Roman Catholic and *percent* Jewish, are self explanatory. Each of these measures is taken for the 2000 county of residence, and the 1980 levels of the same variables are applied to the county of residence at age 14.

IV. Core Results.

The NLSY79 includes 8033 individuals who were interviewed both in 1979 and in 2000. Aged 14-22 in 1979, these "youths" were between 36 and 44 in 2000. By this age most individuals have "settled down," so we can take their location in the 19th wave of this panel to represent their revealed preference, given everything else, for amenities.

The 2SLS regressions were run with all 67 environmental variables. To recap the

predictions of the two models briefly: Standard amenity theory posits that amenities enter the utility function directly. Thus, standard theory predicts that amenities should have income elasticities just like any other good that enters the utility function. The theory advanced here, in contrast, posits that amenities increase utility only through their effect on household production, and investments in location-specific human capital. In the absence of capital constraints, income effects should be insignificantly different from zero, while previous exposure to the amenity will be strongly and positively related to the amount of the amenity demanded because of investments made during the assumed period of forced, exogenous residence.

However, simply running the regression as presented in the empirical section will present upward biased coefficients on the effects of prior exposure if moving costs of any kind keep people from leaving their original area. Although such stayers are exhibiting precisely the kind of behavior the model predicts (staying in similar areas), they may be doing so for reasons unrelated to the habituation through investment in location-specific human capital dynamic advanced in the theoretical model. In an attempt to prevent such moving costs from contaminating our results, we restrict our sample only to people who have moved at least 500 kilometers from their county of residence at age 14 and who resided for at least five panels[9] in a county other than the one in which they lived at age 14, or who were residing at a different county in the 2000 wave.[10]

The rest of the section is split into sections focusing on the five variable types outlined in the previous section. The general results are extremely favorable: of the 67 exposure variables, 64 (two-tailed) or 65 (one-tailed) are significant at the .05 level, and the standardized effects of the exposure variables are on average seven times the standard effects of the next strongest variable.

IV.A: Natural/Immutable Characteristics.

Table VII presents the results for the county characteristics that cannot change with time. The table represents eight separate regressions. The effects shown are the standardized effects: the change in the dependent variable associated with a *one standard deviation change* in each column's independent variable. The t-statistics of each estimate are listed below the point estimate in a smaller font.

The results are very favorable. In every case, the exposure variable (shown in the "Amen" column) is highly significant. The standardized effects of the exposure variables are also larger than those of any other variable in every case. In the case of July humidity, the standardized effects of exposure are almost ten times the next strongest variable (income). Humidity is also the only variable even close to significant at any reasonable level in this model. This makes some intuitive sense, sense the rest of the county characteristics can impose some direct costs (through heating, cooling or transportation), while humidity is purely a matter of preference.

IV.B: Social/Economic Outcomes.

Table IX presents the results for the social and economic outcomes. These county characteristics are more malleable than climate or topography, but are still extremely difficult for policy makers to affect. Again, the results are favorable. In every case except population density, the exposure variable is significant. The standardized effects of prior exposure are not as strong relative to the other variables as they were in the above: it is strongest only for the racial characteristics, and is usually second largest.

The ways in which the exposure variable measures up to the other independent variables is instructive. Prior exposure is weakest in the population density regression: its effect is only

stronger than income's. This makes sense since within a county population density can vary wildly: county-level population density is a poor proxy for the density experienced by the youth, and the coefficient is thus biased downwards. Prior exposure also has small standardized effects in the other urban indicators, presumably for the same reason. The fact that prior exposure's standardized effect is smaller than those of family size for crime, education for *percent* college educated and income for unemployment also makes sense since these are outcomes particularly related to those variables.

IV.C: Land-use Patterns.

Only the results for the combined land-use variables are reported here.[11] These results are presented in Table X, which shows that for these aggregated measures the results are quite strong. The exposure variables are highly significant in all seven regressions. In each regression, the standardized effect of the exposure variable is the largest by a comfortable margin.

IV.D: Retail-oriented Amenities.

The results for the retail opportunities data are presented in two parts: absolute and *per capita* results. The absolute results are presented in the first panel of Table XI, while the *per capita* results are presented in the second panel.

Of the seven regressions represented in Table XI, the exposure variable is significant in all seven and exhibits the largest standardized effect in four of the seven. In the other three regressions (Starbucks, Brewpubs and Whole Foods stores), it exhibits the second largest standardized effect, and is of the same order of magnitude as the largest standardized effect. The only other variable that is significant is education, which is significant in all seven models, and has the largest standardized effect in the three models in which the exposure variable does not.

The *per capita* effects reported in the bottom panel of Table XI are weaker, but still strong. The exposure variable is significant in all but one regression (Whole Foods, where it is insignificantly *negative*). Prior exposure's standardized effects are largest in two cases, and either second or third in two cases. Only in the case of Whole Foods is the effect substantively small compared to the other variables.[12]

IV.E: Cultural Amenities.

The results for the five regressions on cultural amenities are presented in Table XII. Again, the results are strong. The exposure variable is significant in all five models. Only education achieves significance in all five models, while family size and marital status are significant only one time each, and income is not significantly different from zero even once.

The standardized effects are strong relative to the other variables, except education. In all but one model (rare book stores), the standardized effects of education exceed those of prior exposure, sometimes quite comfortably. This is similar to the case for the absolute retail variables, and is particularly interesting since prior exposure has been modeled, in some sense, as a taste shifter. These results suggest that education – particularly, one might expect, college education – may act in a similar fashion: increasing demand for cultural amenities through the acquisition of specialized human capital. Although the results are only suggestive because people are not randomly assigned education levels (as they are assigned childhood residence), the intuitive appeal of such a mechanism is considerable.

IV. F. Religious Characteristics.

Finally, in Table XV, we turn to the results of the five religion regressions. The results are as favorable as those for the other county characteristics. In each case the exposure variables are highly significant, and the standardized effects are either largest or nearly largest (after

education). Results not shown here show that most of this sorting is due to the approximately 85% of the sample who declared some religious affiliation. If we look only at the sample of about 250 people who declared no religious affiliation, both religious diversity variables become insignificant and the coefficients drop sharply. However, unaffiliated individuals exhibit stronger reactions to childhood exposure to areas with low affiliation rates than do religious individuals: the coefficient on the *percent* unaffiliated in the age-14 county of residence is over 50% greater than the same coefficient in a regression run on affiliated individuals.[13]

IV.G. Conclusion to the Section.

In general the basic results are extremely favorable: in 67 models, the exposure variable was positive and significant (as predicted in the model) in 64 cases. The standardized effects of the prior exposure are on average over seven times those of the next strongest variable. In 45 of the 67 models, the standardized effect of prior exposure is larger than all other variables, and it is second strongest in another sixteen models. On average, the magnitude of the standardized effects of prior exposure are seven times the magnitude of the standardized effects of the next most important variable. Some of the strength of these results is a result of return migration, however. When the sample is purged of return migrants, about forty percent of prior exposure's effect disappears,[14] although on average prior exposure's standardized effects are still over three times those of the next most important variable.

VII. Conclusion.

This paper has presented a model in which amenity valuation is contingent upon human capital investments and drawn out the implications for people's migration behavior. By showing that prior investments play a much more important role in determining a potential migrant's

demand for amenities than income (or education, fecundity and marital status), this paper offers a new perspective on amenities, and a challenge to the traditional theory of amenities. Past models offered no explanation for variability in the values people place on public goods. By placing amenities in the utility function, only un-modeled taste shocks could account for such variation. The mechanism proposed here, by allowing people to invest in types of human capital that will increase their appreciation of amenities, explains how some of this variation can exist in a world where people are free to choose amenity bundles through migration.

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Figure I
Migration with $\pi = ½$, no moving costs.

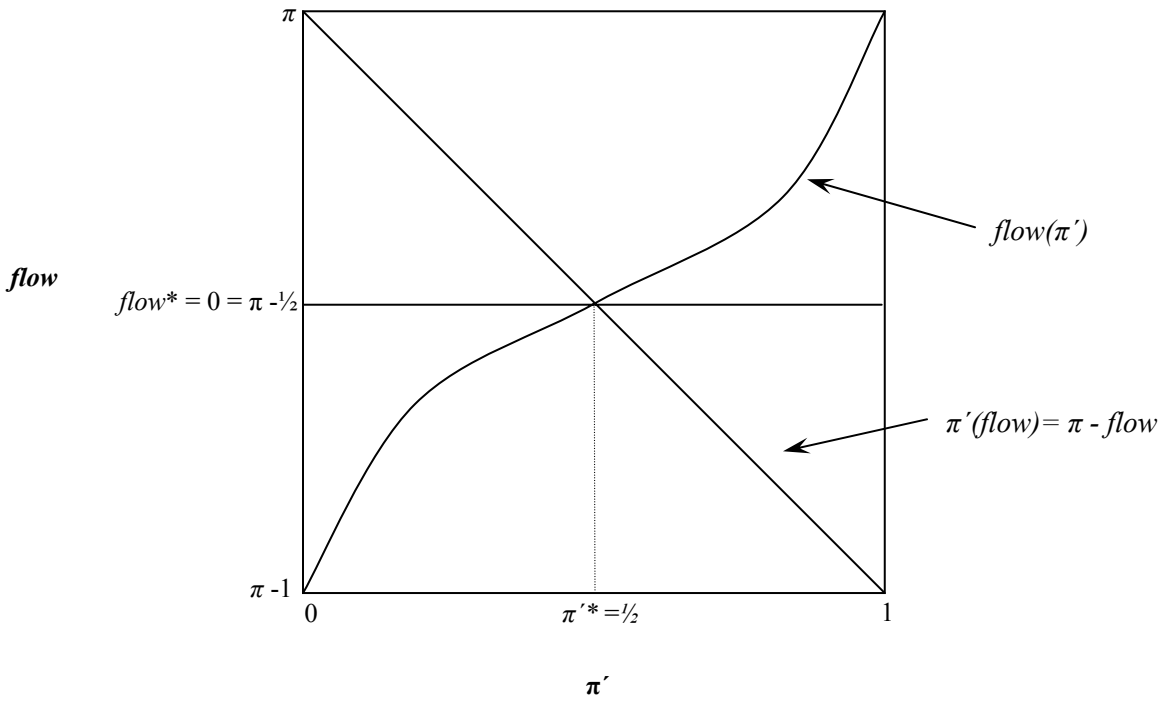

Figure II
Migration when π varies, no moving costs.

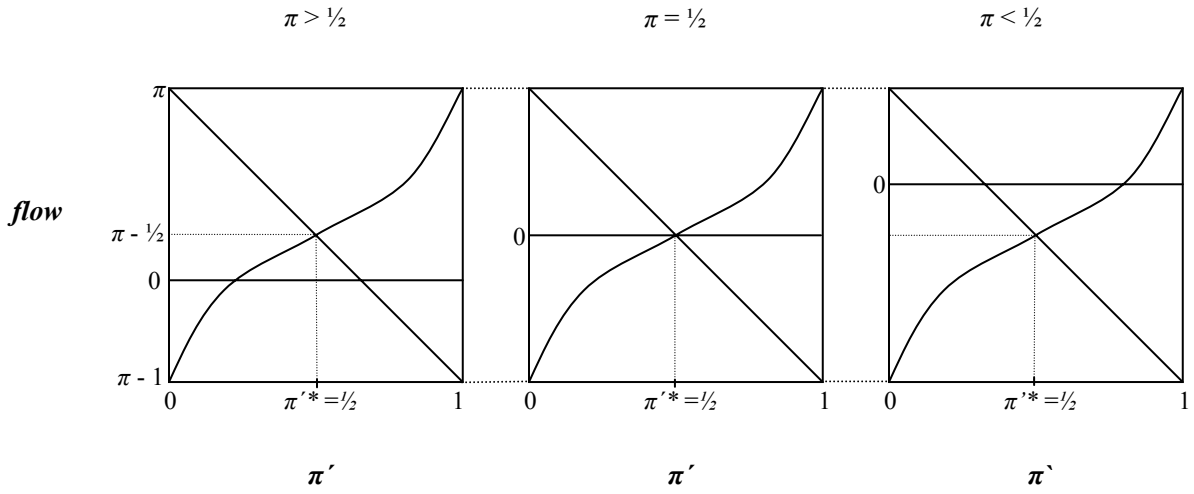

Figure III
Migration when π varies, with moving costs.

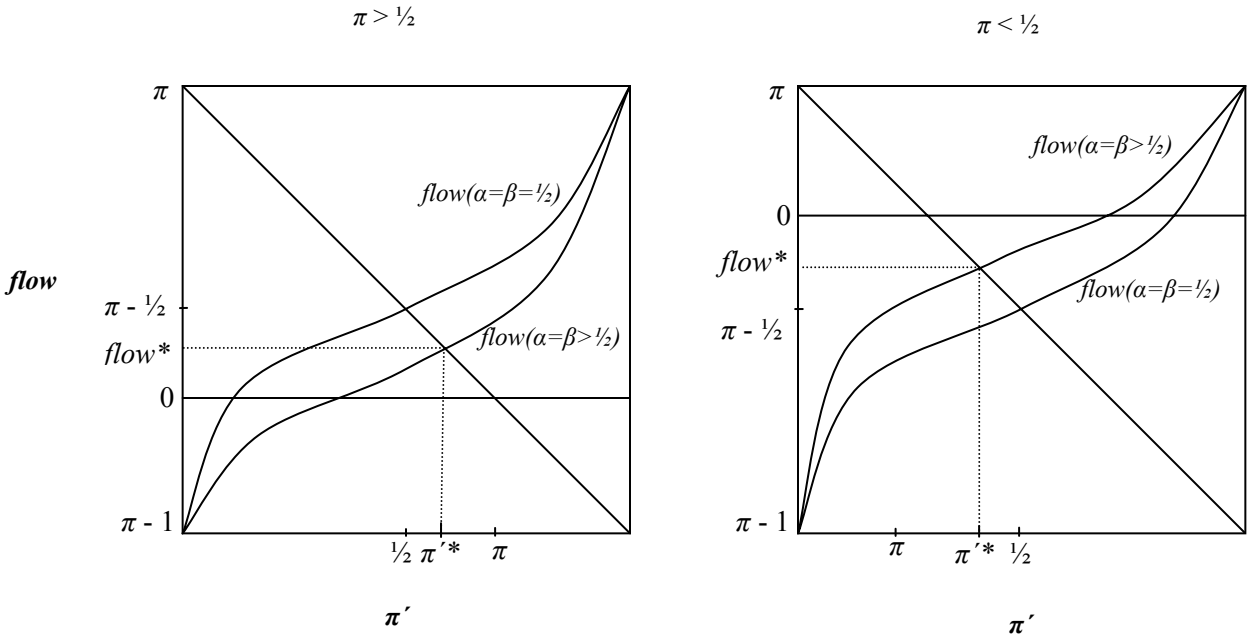

Table I
County Characteristics used in the Analysis: Natural/Immutable Characteristics.

Variable	Mean	StDev	Panel?
Avg. January Temp.	37.677	12.694	N/A
Avg. January Hours Sun	156.324	39.790	N/A
Avg. July Temp.	76.223	5.424	N/A
Avg. July Humidity	59.771	14.196	N/A
Topography Code	8.579	7.087	N/A
Percent Water	10.390	15.652	N/A
ln(Percent Water)	5.726	1.743	N/A
Combined Score (of above)	1.215	3.117	N/A

Note: mean and standard deviations are for the NLSY sample in 2000, not for the population of U.S. counties. Coding for topography can be found at http://www.ers.usda.gov/Data/NaturalAmenities/natamenf.txt.

Table II
Amenity variables used in analysis: Social/economic outcomes.

Variable	Mean	StDev	Panel?
Urban Dummy	0.767	0.423	Yes
Urban Influence (decreasing)	2.279	2.031	No
Rural/Urban Continuum (decreasing)	1.917	2.328	No
Population Density	1807.313	5225.238	Yes
Crime Rate per 100,000	5941.497	2932.850	Yes
Local Unemployment	4.501	2.510	Yes
Percent College educated	19.686	7.733	Yes
percent Black	0.154	0.150	Yes
percent White	0.669	0.216	Yes
Racial Diversity index	0.567	0.212	Yes

Note: Codiing for Urban Influence and Rural/Urban Codes can be found at http://www.ers.usda.gov/Data/NaturalAmenities/natamenf.txt. Crime rate is the 1991 crime rate of the year-2000 county of residence.

Table III
Amenity variables used in analysis: Land-use patterns.

Variable	Mean	StDev	Panel?
Percent Forests	0.275	0.272	No
Percent Wetlands	0.046	0.096	No
Percent Agricultural Uses	0.260	0.266	No
Percent Urban Uses	0.179	0.212	No
Percent Ugly Stuff	0.009	0.020	No
Percent Natural State	0.443	0.284	No
Percent Open	0.383	0.304	No

Note: these variables are sums of (unreported) raw variables as follows: ***Percent Forest****: sum of three forest types;* ***Percent Wetland****: sum of two wetland types;* ***Percent Agricultural:*** *sum of Orchards/Vineyards, Pasture/Hay, Row Crops, Small Grains and Fallow;* ***Percent Urban Uses:*** *sum of Urban grass, Low- and High-intensity Residential and Commercial/Industrial/Transport;* ***Percent Ugly Stuff****: sum of Bare Rock, Quarries/Mines and Transitional;* ***Percent Natural State****: sum of forest, wetlands, Shrublands, Grasslands, and snow/ice;* ***Percent Open****: sum of Shrublands, Grasslands, Bare Rock, Urban Grass and Agricultural (less Orchards/Vineyards).*

Table IV
Amenity variables used in analysis: Retail-oriented amenities.

Variable	Mean	StDev	Panel?
No. Starbucks Stores	6.25	16.48	No
Starbucks per Million	3.47	7.24	No
No. Brewpubs	3.63	5.27	No
Brewpubs per Million	5.46	9.76	No
No. Juicebars	5.41	19.34	No
Juicebars per Million	2.32	3.87	No
No. Whole Foods Stores	0.61	1.97	No
Whole Foods per Million	0.27	1.33	No
Sum of above Per Cap Z-scores	.00	2.35	No
No. Professional Sports Teams	1.80	2.60	Yes
No. Bike Events	4.35	7.67	No
Teams plus Bike Events	6.15	9.24	No

Table V
Amenity variables used in analysis: Cultural amenities.

Variable	Mean	StDev	Panel?
Number of Rare Book Stores	1.564	3.546	No
Number of Research Libraries	1.061	1.782	No
Number of Opera Companies	0.973	2.187	No
Number of Museums	1.448	2.060	No
Sum of Cultural Amenities	5.046	7.996	No

Table VI

Amenity Variables Used in Analysis: Religious Characteristics.

Variable	Mean	StDev	Panel?
Religious Diversity Index	.348	.140	Yes
Religions present	45.954	22.010	Yes
% unaffiliated	.498	.130	Yes
% Catholic	.215	.153	Yes
% Jewish	.020	.033	Yes

Note: Religious diviersity index is the sum of the squared prtoportions

Table VII

Results: Natural/immutable characteristics.

Dependent Variable	Inc	Amen	Edu	Kids	Marital
Avg. January Temp.	0.89	3.84	-0.33	-1.07	0.06
t-statistic	0.88	8.29	-0.75	-2.53	0.13
Avg. January Hours Sun	7.84	9.67	-1.27	-2.96	-3.05
t-statistic	1.88	6.45	-0.77	-2.06	-1.35
Avg. July Temp.	1.17	1.99	-0.71	0.03	-0.58
t-statistic	2.46	7.57	-3.58	0.15	-2.41
Avg. July Humidity	-0.64	6.26	0.30	0.08	0.87
t-statistic	-0.42	9.73	0.51	0.17	1.10
Topography Code	-0.70	1.85	0.59	-0.19	0.11
t-statistic	-1.12	6.21	2.35	-0.84	0.40
Percent Water	-0.49	1.60	0.71	-0.75	0.24
t-statistic	-0.42	2.46	1.23	-1.45	0.40
ln(Percent Water)	-0.14	0.31	0.12	-0.09	0.10
t-statistic	-0.84	6.43	1.67	-1.39	1.07
Combined Score	-0.08	0.85	0.22	-0.36	0.10
t-statistic	-0.36	9.10	2.27	-3.82	0.91

Note: effects are the standardized effects: the coefficient times the standard deviation of the independent variable. They represent the change in the dependent variable associated with a one standard deviation *change in each column's independent variable. The dependent variable is the year 2000 value of the variable listed in the "dependent variable" column. The amenity referred to in the "Amen" column is the value of each row's county characteristic in the county of residence at age 14.*

Table VIII
Results: Social/economic outcomes.

Dependent Variable	Inc	Amen	Edu	Kids	Marital
Urban Dummy	0.07	0.03	0.04	-0.01	-0.02
t-statistic	1.95	2.34	2.87	-1.00	-1.11
Urban Influence	-0.41	0.33	-0.20	0.06	0.14
t-statistic	-2.39	4.01	-3.35	0.86	1.70
Rur/Urb. Continuum	-0.39	0.36	-0.33	0.08	0.15
t-statistic	-2.09	4.34	-4.94	1.03	1.70
Population Density	-151.13	177.05	549.11	-261.22	-369.86
t-statistic	-0.54	1.39	3.96	-3.06	-2.10
Crimes/100,000	138.71	236.33	117.02	-298.78	-125.84
t-statistic	0.55	2.33	1.12	-2.71	-1.07
Local Unemployment	-0.40	0.23	-0.17	0.19	0.05
t-statistic	-2.76	3.97	-3.03	2.87	0.80
% College educated	0.93	1.67	2.77	-0.45	-0.40
t-statistic	1.28	6.04	9.31	-2.05	-1.34
percent Black	-0.01	0.04	0.00	0.00	0.00
t-statistic	-1.23	6.56	0.34	-0.89	-0.91
percent White	0.00	0.06	-0.02	0.01	0.01
t-statistic	0.23	8.81	-4.31	1.79	2.03
Racial Diversity index	-0.01	0.06	-0.03	0.01	0.01
t-statistic	-0.38	8.08	-4.57	2.01	1.88

Table IX
Results: Combined land-use patterns.

Dependent Variable	Inc	Amen	Edu	Kids	Marital
Percent Forest	-0.038	0.043	0.000	0.015	0.012
t-statistic	-1.48	4.05	-0.01	1.69	0.94
Percent Wetland	-0.006	0.021	-0.005	-0.007	0.005
t-statistic	-0.63	4.77	-1.51	-2.29	1.13
Percent Natural State	-0.004	0.067	-0.021	-0.006	0.004
t-statistic	-0.16	5.99	-2.13	-0.65	0.31
Percent Open	0.042	0.075	-0.026	0.009	0.001
t-statistic	1.33	6.37	-2.18	0.85	0.05
Percent Agricultural	0.001	0.073	-0.011	0.023	0.013
t-statistic	0.06	8.15	-1.31	3.21	1.41
Percent Urban Uses	0.008	0.035	0.028	-0.007	-0.019
t-statistic	0.62	7.55	5.52	-1.45	-3.16
Percent Ugly Stuff	0.002	0.003	-0.001	0.000	-0.001
t-statistic	1.31	2.86	-2.57	-0.55	-1.47

Table X
Results: Retail-oriented Amenities.

Absolute					
Dependent Variable	Inc	Amen	Edu	Kids	Marital
No. Starbucks Stores	-0.263	1.660	1.821	-0.355	-0.342
t-statistic	-0.40	5.06	5.08	-1.01	-1.04
No. Brewpubs	0.498	0.655	0.827	-0.323	-0.215
t-statistic	1.24	2.48	4.55	-1.53	-1.00
No. Juicebars	0.500	1.953	0.928	-0.313	-0.342
t-statistic	0.69	14.40	2.37	-0.78	-0.83
No. Whole Foods Stores	-0.016	0.136	0.193	-0.032	-0.007
t-statistic	-0.18	4.87	4.61	-0.67	-0.17
No. Prof. Sports Teams	0.105	0.366	0.356	-0.048	-0.097
t-statistic	0.67	5.32	5.03	-0.82	-1.28
No. Bike Events	0.711	0.914	0.615	-0.343	-0.260
t-statistic	1.26	6.25	2.46	-1.50	-0.84
Teams plus Bike Events	0.938	1.291	0.962	-0.407	-0.348
t-statistic	1.48	7.44	3.43	-1.61	-1.05
Per Capita					
Dependent Variable	Inc	Amen	Edu	Kids	Marital
Starbucks per Million	-0.059	0.520	1.366	-0.110	-0.186
t-statistic	-0.13	2.25	4.99	-0.58	-0.85
Brewpubs per Million	0.957	1.533	1.231	-0.250	-0.290
t-statistic	0.98	2.88	2.55	-0.48	-0.62
Juicebars per Million	0.873	0.932	0.299	-0.367	-0.333
t-statistic	2.43	3.50	1.90	-2.60	-1.87
Whole Foods per Million	0.169	-0.015	0.091	0.012	-0.032
t-statistic	0.78	-0.50	0.83	0.17	-0.85
Sum of Per Cap Z-scores	0.433	0.348	0.459	-0.129	-0.163
t-statistic	1.89	2.87	3.73	-1.29	-1.74

Table XI
Results: Cultural amenities.

Dependent Variable	Inc	Amen	Edu	Kids	Marital
No. Rare Book Stores	0.067	0.352	0.314	-0.068	-0.075
t-statistic	0.45	6.24	4.21	-0.81	-0.93
No. Research Libraries	0.085	0.123	0.201	-0.033	-0.074
t-statistic	0.85	3.18	4.43	-0.70	-1.65
No. Opera Companies	-0.006	0.193	0.229	-0.048	-0.085
t-statistic	-0.05	2.81	5.27	-1.07	-1.58
No. Museums	0.022	0.133	0.211	-0.118	-0.183
t-statistic	0.13	2.10	3.27	-2.04	-1.78
Sum of Cultural Amenities	0.172	0.676	0.953	-0.269	-0.416
t-statistic	0.45	4.48	5.48	-1.36	-2.04

Table XII
Results: Religious Characterisitcs.

Dependent Variable	Inc	Amen	Edu	Kids	Marital	obs.	r-sq
Religious Diversity	0.005	0.025	0.003	0.008	0.005	1656	0.042
t	0.49	4.90	0.75	1.66	-1.91		
Religions Present	1.643	2.508	3.280	-1.505	1.643	1656	0.042
t	0.99	4.24	5.03	-2.40	-1.68		
% unaffiliated	0.001	0.032	-0.006	-0.008	0.005	1656	0.068
t	0.12	6.07	-1.61	-2.06	1.12		
% Catholic	-0.004	0.034	0.017	0.001	-0.007	1656	0.080
t	-0.38	4.89	4.27	0.37	-1.35		
% Jewish	0.000	0.004	0.005	-0.002	-0.002	1656	0.059
t	-0.14	3.01	5.15	-3.28	-2.00		

End Notes:

[1] Graves [1979], Grave & Linemman [1979], Graves & Regulska [1982], Tolley [1974], Tolley, Rudzitis and Baden [1999], Mincer [1978], Greenwood *et. al.* [1991], DaVanzo [1983] and Dynarski [1981] are all examples from the migration literature that look at other factors of migration besides price-adjusted income.

[2] Since the model is not intended to describe or predict regional growth, this unrealistic representation of the local labor market effects is not problematic. The proportion of population (π), as it enters in this model, provides the following essential features to the analysis: it allows for inter-area differences in the returns to human capital; as a result, it gives an incentive to migrate from one area to another; finally, it also provides an equilibriating mechanism – through migration – by which it is not optimal for the whole population of one area to migrate to the other.

[3] The model is presented here using a specific functional form. Results of the same model with a more general functional form (which are qualitatively similar, but not as strong) are available in Krupka [2004].

[4] δ need not be less than one: if the second period is much longer than the first, δ could be greater than one.

[5] Thus, amenities are assumed to affect utility only through the household production function, not directly through the utility function as in Diamond and Tolley [1982], Tolley [1974] or Rosen [1974]. The heterogeneity of people's investments could go a long way towards explaining why the geographic amenities perform so poorly in Graves and Regulska [1982], and why even the results for the climate variables in Graves [1979] are called into question by Greenwood and Hunt [1989], who find that employment variables out-perform amenity variables in explaining aggregate migration behavior: an unsurprising result given that employment is an amenity almost everyone appreciates, while scenic views, white Christmases and national parks are only valued by smaller subsets of the population.

[6] An exception is Noonan (2002).

[7] Special thanks are due to Jessica Brown of the USGS and Douglas Noonan for helping with data processing. These seven variables were generated by summing subsets of twenty more specific variables.

[8] A more extensive description of the data can be found in Clark (2003).

[9] Each wave is one year up until 1994, at which time the "youths" are interviewed only every other year.

[10] By looking only at individuals who have gone through the trouble of undertaking long-

distance moves, we rule out the possibility that simple moving costs are driving the results. By focusing on individuals who remained away for at least five waves, we purge out people who left home for college, but returned home immediately after college without ever undertaking the high-cost migration we are assuming is concurrent with the 500km move.

[11] The results on the twenty raw land-use variables are also strong. The exposure variable is significant at the .05 level in nineteen of twenty regressions (two-tailed) and all twenty regressions (one-tailed). None of the other variables achieve significance more than six times. Exposure's standardized effects are the largest in seventeen of the twenty regressions, and is very close to the largest effect in the other three regressions (shrublands, low-intensity residential and quarries/mines). These results are available from the author.

[12] It is possible that these partial correlations are being driven by the omitted variables of urban status, as these retail outlets have good, profit-maximizing reasons to locate only in larger urbanized areas. This is also a possible explanation for several of the social/economic variables above, and for the cultural and religious variables below. (Thanks to Lowell Taylor for bringing up this point). To test for this possibility, models were run for 28 "urban" type variables controlling for urbanicity of each respondent's residence. In most cases, neither the significance, nor the magnitude of the exposure effect were reduced by the inclusion of the various controls for urbanicity.

[13] For *percent* Catholic and Jewish, additional regressions were run controlling for the individual's religious affiliation, with no effect on the significance or strength of the exposure variables.

[14] About 60% of the total reported effects disappear when people moving *near* their original locations (within 100km.) are excluded from the sample.