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Gayborhoods: Economic Development and the Concentration of Same-sex Couples in Neighborhoods Within Large American Cities

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Abstract

This paper uses census tract data from the 2000 U.S. Census and the 2005-2009 American Community Survey to examine the locations of gay male and lesbian partnerships in 38 large U. S. cities. Surprisingly, both the extent and the regional patterns of residential segregation of gays are similar to those for African Americans. There is little evidence, however, to support the common assertions that gays concentrate in more racially and ethnically diverse neighborhoods. Evidence for the popular notion that concentrations of gays lead to more rapid development of central city neighborhoods is mixed. Census tracts that start the decade with more gay men experience significantly greater growth in household incomes (and, therefore, presumably housing prices) and, for the Northeastern and Western cities, also greater population growth over the next decade than those census tracts with fewer gay men. Census tracts with more lesbians at the start of the decade see no difference in population or income growth.

Many researchers have claimed that same sex partnerships locate differently than two sex partnerships. Most studies, however, have little data on which to base this claim. A few studies have analyzed location empirically. Black et. al. (2002) show that gay men and lesbians are more likely than heterosexual couples to locate in higher amenity cities. They argue that this is the case because gays are less likely to have children, allowing more of their incomes to be spent on the amenities of a residential location than on its square footage or on other expenditures. They show that amenities, more than "gay-friendliness," attract gays to concentrate in particular cities, such as San Francisco. Black et al explore intercity locations, but do not address the location, or concentration, of gays within cities. Gates and Ost (2004) have created an atlas of maps showing the locations in 2000 of gay partners by state, city, zip code and urban place within metropolitan areas. They provide maps and charts showing that, while there are differences in where gay men and lesbians locate, their locations are correlated with one another and differ from those of heterosexual partners at the state, city, urban place, and zip code levels. The Gates and Ost study does not analyze the causes or effects of differences in the intra-city locations of gays, nor do they provide any summary data or statistically based comparisons.

There is a less empirically oriented literature that identifies (or maybe speculates on) both the causes and effects of the intra-city concentration of gays. The claim that gays are the "pioneers" who move to declining central city neighborhoods and reverse their fortunes is common. Collins (2004) traces the development of a gay enclave in Soho London. More generally, he argues that once neighborhoods reach a critical mass of gay representation, the representation accelerates. In line with the pioneer viewpoint, Collins contends that it is not

amenity value, but rather cheap land values and access to night life and services, occurring in areas with extensive physical decay and vacancies that attracts the first gay "pioneers," who subsequently attract more gays generating the renaissance of the neighborhood. (He also argues that in many cases the initial settlement of gays in a neighborhood is an "accident" that subsequently attracts more gays, more services for gays, and then yet more gays.) Ruting (2008) argues that gays are attracted to high vacancy neighborhoods. Gates and Ost (2004) argue that gays are more open to diverse neighborhoods.

The only statistical study of intra-city locations that we have found is by Hayslett and Kane (2011). They have empirically investigated the correlation between the neighborhood concentrations of lesbian and gay households in Columbus, Ohio in 2000 and the characteristics of the neighborhoods in the same year. They find evidence that lesbians are less spatially concentrated than gay men, although there is statistically significant positive spatial autocorrelation in their locations. They find that gay men are concentrated in neighborhoods with fewer family households and college graduates and with more renters. They find that lesbian households are concentrated in neighborhoods with more foreign born residents and more family households. Both gay men and lesbians are more concentrated in neighborhoods with newer housing, and more multi-family units. Because this analysis is based on only one city and uses only the problematic 2000 Census data to identify gay spatial concentrations (see below), the results cannot be generalized.

Using 2000 and 2005-2009 US Census/American Community Survey data on census tracts, this paper provides the first statistical analysis and evidence on the causes and effects of the concentration of gays by gender in the neighborhoods of the largest U.S. cities. The next

section discusses the data and the specification of the dependent variable, the census tract shares of the city's gay partnerships. The third section presents residential segregation indices for gay men and lesbians, followed by a section discussing the characteristics of census tracts that correlate with having more gay residents. The next section examines how growth in population and income (as an index of housing prices) over a decade is associated with gay representation in the census tract at the start of the decade. Conclusions are presented in the final section.

Data and Methods

We study 38 large central cities that are located in 35 metropolitan areas (See Table 1 for a list of cities by metropolitan area). We examine segregation of gays by gender, how characteristics of a neighborhood in 2000 are related to shifts of gay households and of all households between census tracts within the city over the subsequent decade, and how gay presence in 2000 within census tracts is related to population and income of residents in 2009. To study how neighborhoods are changing, it is critical to use neighborhoods that have the same boundaries over time. When boundaries shift over time, changes in household composition may be an artifact of boundary shifts and not of any change in where people live. We use the GeoLytics Neighborhood Change Database (NCDB) for 2000 and the American Community Survey (ACS) for 2005-2009. Both use the 2000 census tract definitions.[1] Tracts are considered part of the central city if at least 50% of the tract population resides within the city, or if the tract is fully enclosed by the city.

[1] The 1990 Census was the first to identify homosexual partnerships. Because these data have not been tabulated by the Census at the census tract level, we have no data for 1990 to compare with 2000 and 2009.

We measure representation of households or other groups within a census tract by the *proportion of the city's population of the household type or other group residing in the census tract*.[2] By construction, these proportions sum to one for each group in each city in each year. Also, the mean value of this proportion for the census tracts in each city will be the same for each household group (because the proportions for each group must sum to one for the entire city, the mean proportion for each group within a city is one divided by the number of census tracts, which is the same for each group in the city.) We *do not* use the more common measure of the proportion of households in the census tract that is gay. We use the proportion of the city population of the group residing in the census tract for the same reasons that these proportions are used for segregation indices. The city proportion measure is sensitive to relative differences in spatial concentration, *but is not sensitive to relative population sizes*. Therefore, the city proportion measure easily compares groups with very different sizes, allowing standardized comparisons across cities, time periods, and groups. Also, the city proportion measure "removes" or "standardizes" for swings in the population of a group due to secular economic changes in things such as revealing sexual orientation or migration within a city.

We estimate segregation or spatial concentration of gay partnerships using the 2005-2009 ACS data, but do not present similar estimates for 2000. The reason lies in data issues in Census coding. In the 2000 Census data, when a person identified as a "spouse" was also the

[2] See Madden (2012) for a study of changes in the intra-metropolitan area spatial distribution of residents by race and income using the same measurement approach.

same sex as the household head,[3] the relationship was reclassified as an unmarried homosexual partnership. The coding error was assumed to be the relationship code, which is signified by the designation of one's partner as a spouse. In the 2005-9 ACS, in these same cases, the record was flagged and either the sex (in most cases) or the relationship variable was changed based on other data collected from the household. Gates and Steinberger (2009) use the 1990 and 2000 IPUMS and the U.S. American Community Survey data to show that the 2000 Census approach to recoding was likely to have incorrectly classified some two-sex couples as same-sex. Because the pool of gay partners accounts for less than five percent of all partnerships, any procedure that incorrectly allocates even a very small percentage of heterosexual partnerships to homosexual ones leads to substantially greater bias in estimates for homosexual partners than for heterosexual ones. We estimated segregation using the 2000 data (see appendix) and note that these data show substantially lower rates of segregation than in 2009. We believe this difference is entirely due to the inaccurate classification of many heterosexual partnerships as homosexual partnerships.

Are gays spatially concentrated in large U.S. cities?

Table 1 reports the results of two measures of segregation for lesbian households, and for gay male households, relative to all households, for large U.S. cities by region in 2009. The measure reported in the first two columns is the Duncan Index of Dissimilarity.[4] The Duncan

[3] In 2000, it was not possible for same sex couples to be legally married.

[4] The segregation index, the Duncan Index of Dissimilarity, is calculated:
$\frac{1}{2} \sum_i | P_i - nP_i |$
where P_i is the proportion of the city's gay male (lesbian) households in census tract i and nP_i is the proportion of the city's non-gay households in census tract i.

index is a commonly used measure of spatial concentration that indicates whether there are neighborhoods (census tracts) within cities that include relatively more gay households than other neighborhoods. The index indicates that segregation of gay partners into neighborhoods or census tracts is greatest in the Midwest and lowest in the West (as is the case for racial segregation Madden (2012)). Gay men are slightly less segregated than are lesbians from other households in the city. The levels of segregation are high, generally higher than the levels of racial segregation in these same areas for the same time period (see racial segregation indices in Madden (2012)). These indices are consistent with a spatial concentration of gay households within particular neighborhoods in large American cities.

The Duncan Index of Dissimilarity measures one dimension of segregation, specifically the "evenness" of the distribution of gay households within neighborhoods in the central city. It does not, however, account for the relative spatial position, or clustering, of the neighborhoods or census tracts with similar shares of gay households. In cities with high values of the Index of Dissimilarity, gay households are concentrated within specific tracts, but these highly concentrated tracts may be distributed across the city or they may be in the same sections of the city. The global Moran's I can be used to assess whether tracts with large (or small) shares of gay households are also clustered in space.[5]

The index takes on values between 0 and 1, where 0 indicates no segregation (partnerships of different sexual compositions are sorted identically across neighborhoods) and 1 indicates perfect segregation (gay partnership households and heterosexual partnership households live in completely different neighborhoods).

[5] Moran's I is calculated as:

$$I = \frac{N}{\sum_i \sum_j w_{ij}} \left(\frac{\sum_i \sum_j w_{ij}(X_i - \bar{X})(X_j - \bar{X})}{\sum_i (X_i - \bar{X})^2} \right) \qquad E(I) = \frac{-1}{N-1}$$

where X_i is the proportion of tract i 's households that are of a given type, X_j is the proportion of tract j ($\neq i$)'s households that are of this same type, $\bar{X}$ is the mean proportion of this household type over all tracts, w_{ij} is a matrix denoting the spatial relationship between all tracts i and j, and N is the total number of tracts.

The last two columns of Table 1 report the Moran's I values for gay male households and lesbians households within each city. Spatial clustering of tracts with similar gay male household shares is quite common, while clustering of tracts with similar lesbian household shares occurs in far fewer cities. The West region exhibits the most widespread clustering of gay male and lesbian neighborhoods. Nearly all cities in this region have a significant Moran's I value for gay male neighborhoods and many exhibit significant clustering of lesbian neighborhoods as well. There is also notable spatial clustering of gay male households in many Northeastern and Midwestern central cities. Most of the central cities that exhibit significant clustering of lesbian neighborhoods also exhibit significant clustering of gay male neighborhoods, although overall there is less clustering of lesbian neighborhoods in these cities. These differences in neighborhood clustering reflect differences in the residential patterns of lesbians and gay men, as discussed below.

Many of the central cities with greater indices of dissimilarity have insignificant Moran's I values. This is particularly the case in the highly segregated cities of Detroit, Cleveland, Pittsburgh, and Memphis. While gay male (and lesbian) households concentrate in a smaller set of neighborhoods in these central cities, these neighborhoods are not clustered together. On the other hand, cities with relatively more neighborhoods that include a more even distribution of same sex, two sex, and one member resident households (Denver, Portland, Seattle, Atlanta, Minneapolis, Boston and Washington) have clusters of neighborhoods with greater representations of gay households.

Moran's I varies between -1 and 1, with values increasing toward 1 indicative of higher levels of positive spatial autocorrelation and values decreasing toward -1 indicative of higher levels of negative spatial autocorrelation. A Moran's I equal to its expected value, which is approximately 0 in large samples, suggests that there is no spatial autocorrelation in the data.

"Causes" of gay concentration in neighborhoods

In order to explain these differences in residential location for heterosexual and homosexual households, we evaluate the characteristics associated with the 2009 concentration of gay male, lesbian, and all households given their 2000 levels of concentration. We measure how the census tract's median household income, age of housing, population density, share of the city's single family detached housing, and vacancy rates in 2000 are related to changes in the census tract's share of the city's gay male and lesbian partnership households in 2009. We also examine the relationships of the initial demographic characteristics of the neighborhood, including the census tract's share of the city's African American, Hispanic, gay male, lesbian, and non-family households in the census tract in 2000,[6] to changes in the census tract's share of the city's gay male and lesbian partnership households.

Specifically, we model the 2009 proportion of a city's total households in a given group (gay men, lesbian, all) resident in a census tract as a function of the time invariant and of the 2000 time variant characteristics:

$$s_{i,j,t+1} = \alpha + \beta s_{i,k,t} + \gamma X_{i,t} + \delta_i Z_i + \varepsilon_i \quad (1)$$

where $s_{i,j,t+1}$ is the city's proportion of household group *j* resident in census tract *i* in period t+1,[7] *k* indexes the various household and other resident groups, X_{it} is a vector of census tract *i*'s other time variant characteristics (such as vacancy rates and median household income relative

[6] Because, as described above, there is substantial error in the Census counts of gay male households and lesbian households by census tract, the effects of the 2000 locations of these groups are measured less precisely than those of other characteristics of census tracts.

[7] These are the census tract's population in the household or other demographic category divided by the city population in the same category.

to the city median) in period *t*, Z_i is a vector of the census tract *i*'s time invariant characteristics (such as its city and distance from the city center). And, α, β, γ and δ are parameters to be estimated, with ε_i as a random error term.

When analyzing spatial data, spatial dependence in the outcomes should be considered, as failure to appropriately account for a spatially dependent outcome may result in biased and/or inefficient coefficient estimates. Although Table 1 indicates spatial autocorrelation in the locations of gay and lesbian households, the need for spatially explicit estimation procedures is commonly assessed through analysis of the residuals from an ordinary least squares (OLS) regression.

We test the residuals of the OLS models for each household type (gay men, lesbian, and all households), nationally and within each region, using the simple Lagrange Multiplier (LM) statistics for spatial error dependence and spatial autoregressive dependence derived in Burridge (1980) and Anselin (1988), and the robust LM statistics for either type of dependence derived in Bera and Yoon (1993) and Anselin et al. (1996). The simple versions of these LM statistics test for the presence of spatial dependence in the form of a spatial autoregressive process or a spatial error process (assuming that neither is present), while the robust versions test for a spatial autoregressive process when the actual data generating process is a spatial error process, and vice versa. Based on the results described in Anselin et al. (1996), we first assess the significance of the simple LM statistics. When only one of the simple LM statistics is significant (either autoregressive or error), we proceed with estimation of that type of model. In cases where both simple LM statistics are significant, the robust LM statistics are used to

determine the appropriate model.[8] When neither of the simple LM statistics is significant, a spatial model is not appropriate.

We find evidence of spatially dependent residuals in each of the three models (gay men, lesbians, all households), nationally and within each region, with the LM statistics suggesting the presence of a spatial autoregressive process in census tract shares of the city's gay and lesbian households and a spatial error process in total household shares.[9] Therefore, the estimations of gay and lesbian household shares use a spatial autoregressive model, while the estimation of total household share uses a spatial error model.

The spatial autoregressive model used in the estimation of gay and lesbian household tract share includes a spatially lagged dependent variable as an additional covariate:

$$s_{i,j,t+1} = \alpha + \beta s_{i,k,t} + \gamma X_{i,t} + \delta_i Z_i + \rho W s_{n|i,j,t+1} + \varepsilon_i \quad (2)$$

where W is a row-standardized matrix which expresses the neighbor relationship between any two tracts *i* and *n*, and ρ measures the strength of the association between household share in tract *i* and its neighbors. Spatial autoregressive models are commonly used when the outcome of interest exhibits a diffusion or contagion process, such as households being attracted to those areas with similar households.

[8] When only one of the robust LM statistics was significant, that type of model was estimated. When both of the robust LM statistics were significant, the model with the larger test statistic was chosen.

[9] The only exception was for gay male and lesbian households in the Midwest. Midwestern residuals displayed no significant spatial dependence, indicating a lack of gay and lesbian household clustering in Midwestern cities, relative to other regions. The LM statistics from each of the OLS estimations are shown in Appendix Table 2.

The model of total household tract share is estimated using a spatial error, or "nuisance", model, in which the error terms of neighboring tracts are spatially interacted. The spatial error model is expressed as:

$$s_{i,j,t+1} = \alpha + \beta s_{i,k,t} + \gamma X_{i,t} + \delta_i Z_i + \varepsilon_i , \quad \text{where } \varepsilon_i = \lambda W \varepsilon_{n|i} + \mu_i \qquad (3)$$

where W is again a row-standardized matrix which expresses the neighbor relationship between any two tracts *i* and *n*, and λ measures the intensity of the relationship between the errors terms in tract *i* and *n*. The spatial error model indicates that the source of the spatial dependence is non-substantive, possibly the result of the clustering of unmeasured or unobserved neighborhood features.

In all of the models estimated here, the neighbor weight matrix used is a queen contiguity matrix, in which tracts which share any common point are considered neighbors.[10] We estimate both the spatial autoregressive and the spatial error models via maximum likelihood. All analyses are carried out using the *spdep* package in R.

Table 2 shows the results of these estimations. The table shows regressions of the census tract's 2009 share of the central city's gay population, by gender, on the characteristics of the tract for large central cities in the nation. There are also separate regional estimates for these cities, as grouped into four regions. In order to assess how the effects of various neighborhood characteristics differ for gay households, we also report parallel regression analyses for the census tracts' 2009 shares of all households in the central city.

[10] In this case, the W matrix is block diagonal, with the main diagonal blocks equal to the queen contiguity matrix within each city. The off-diagonal blocks are composed of zero matrices.

The results do not support all of the hypotheses asserted in the literature on the location of gay households in cities.

Diversity. Gates and Ost's contention that gays are attracted to more diverse neighborhoods is not confirmed by the patterns of shifts in gay locations between 2000 and 2009 in cities in any region of the country, at least to the extent that racial composition is used as a measure of diversity. Census tracts with greater shares of the central city's African American population in 2000 saw greater decreases in their share of the city's lesbian and of the gay male partnered population by 2009 than in their share of all households. This result holds for every region, with one exception. Lesbians in the Western cities disproportionately shifted toward census tracts with larger African American populations.[11]

If we measure diversity using Hispanic composition of neighborhoods, gay male partnership households are slightly more likely than all households to shift toward census tracts with more Hispanic households, but lesbian partnership households are slightly more likely to shift away from such census tracts. These patterns are evident for the nation and also within each of the regions.

Vacancies and older housing. Collins (2004) and Ruting (2008) contend that gays are attracted to neighborhoods with high vacancy rates and older housing stock. Although their discussion does not exclude lesbians explicitly, their examples apply to gay men. Table 2 provides some support for the hypothesis that gay men shift toward census tracts with higher vacancy rates in Southern cities and of being disproportionately in census tracts with older

[11] The coefficients on the race and ethnicity composition variables for lesbian partners in Western cities are not only uniquely positive, but they are also very large. Future research will focus on understanding the sources of these differences.

housing in Southern, Midwestern and Northeastern cities, relative to all households. The results do not contradict the hypothesis that gay men are attracted to high vacancy neighborhoods, especially given the imprecision in the measurement of gay male household location in 2000. Lesbians are also more attracted than all households to neighborhoods with older housing. But, they are also less likely to be attracted to high vacancy census tracts; they are significantly less likely than gay men, or than all households, to shift toward higher vacancy rate neighborhoods, in the Northeast and the South.

Increasing concentration or acceleration. Collins 2004 and Ruting 2008 contend that gays are attracted to neighborhoods with initially higher settlements of gays, prompting an "acceleration" of their representation. Table 2 does not provide much support for an acceleration of representation. While census tracts with more gay male, or lesbian, households in 2000 have more such households in 2009, there are no coefficients for the 2000 census tract shares of the population of gay men or lesbians greater than one, while the coefficient for the 2000 census tract shares of the population of all households is greater than one for the nation and for each region. Although Table 1 shows slightly greater segregation of lesbians than of gay men, the regression analyses in Table 2 consistently show greater dispersion (relative to 2000 locations) of lesbians; the coefficient of the census tract's 2000 share of own group is less for lesbians than for gay men in every case, and by fairly large margins, for every region but the Northeast.

Closer to downtown. With fewer children and greater demand for night life (Collins (2004)), gay men and lesbians are expected to be more centrally located, in more densely populated neighborhoods, than other households. Once again, this hypothesized difference in

location behavior for gay partnerships is not clearly evident in all the relevant measures. On the one hand, Table 2 shows gay male households, other than in the South, locating closer to the downtown, relative to both lesbian and all households. And, unlike all households, gay male and lesbian households do not shift away from census tracts with greater population density. On the other hand, relative to all households, gay male and lesbian partnership households shift toward census tracts with more single family detached homes, albeit with greater population densities.

Co-location of gay men and lesbians. Gates and Ost (2004) indicate that locations for gay men and lesbians, while different, are more correlated with each other than with other household types. We do not find strong support for this hypothesis. Nationally, and in each region, gay men co-locate more with all non-family households than they do with lesbian households. Lesbians shift more toward census tracts with greater relative representation of gay male partners and away from those with more non-family households in the Midwest and Northeast. In the South and West, however, lesbian partnerships shift toward non-family households and toward gay male partnership households. Lesbians also shift toward census tracts with greater numbers of all households, as opposed to nonfamily households or to gay male households, in every region but the West. In the West, shifts in non-family households attract more shifts in lesbian households.

As expected from the analysis of spatial dependence in the OLS residuals, the spatial lag terms for gay and lesbian household locations in the Midwest are not significant. The rest of the spatial lag terms are significant and positive, as are the spatial error terms for all households. The spatial lag coefficient for gay households in the West region is notably larger

than in other regions, likely the result of relatively high central city clustering of gay households in Los Angeles, San Diego, and San Francisco.

Finally, the results in Table 2 show some interesting differences between lesbian and gay male households. Because lesbian households are four times more likely to have children, and also average 20 percent lower household income than those of gay men (Kyei and Madden (2012)), children and income are likely explanations for these gender differences in the central city locations of gay partnered households.

"Effects" of gay concentration on economic development of neighborhoods

Planners and geographers have suggested that concentrations of gay households in a neighborhood lead to urban revitalization (Forsyth (2001); Lauria and Knopp (1985)). We consider how greater concentrations of gays in a neighborhood are related to the subsequent course of economic development by examining how a census tract's population and relative income in 2009 is related to its 2000 shares of the city's gay male and lesbian households, given its population and relative income in 2000.

Collins (2004) argues that young urban professionals move into gay enclaves, leading to new construction and growth in, and change in the composition of, the neighborhood population. Florida and Mellander's (2010) study of housing prices in 331 metropolitan areas shows that gays and lesbians are associated with higher average housing prices in metropolitan areas. They argue that this is due to increasing amenities in the region when gays (and bohemians) migrate there and also due to a tolerance premium. Christafore and Leguizamon (2012) extend the Florida and Mellander study by looking at housing prices across

neighborhoods in Columbus OH and controlling for tolerance (using voting records on the Defense of Marriage Act in Ohio) and gay presence. They find a housing premium in "tolerant" areas and a penalty in "non-tolerant" areas.

We find support for the hypotheses that increasing representations of gay men in a census tract lead to increases in population for central cities in the Northeast and West, and to increases in household income in all regions. Because households residing in the neighborhood must be capable of paying any increasing housing prices, neighborhood median household income relative to the city median must rise when housing prices increase. Tables 3 and 4 provide evidence on how the census tract's proportion of the city's gay partners are related to the rate of relative increase in the population of the census tract between 2000 and 2009 and to the rate of increase in the ratio of median census tract household income to the city median in the same period, after controlling for the same physical structure measures as included in Table 2.[12]

There is a positive relationship between a concentration of gay male households in 2000 and population growth for 2000 to 2009 for the Northeast and West. In contrast, the share of lesbian households has no effect on population growth (and a negative effect in the West) or income growth, which is consistent with the hypothesis that their greater likelihood of having children and their lower incomes lead to intra-city locations different from those of gay men, and also has different implications for neighborhood economic development.

[12] As in Table 2, OLS estimation is performed to test for spatial dependence in the residuals and to choose the appropriate spatial model specification. For the population growth equation a spatial error model is estimated. For the income growth equation a spatial autoregressive model is used. The LM statistics from the OLS estimations are displayed in Appendix Table 2.

Household income growth generally decreases, however, with the census tract's share of non-family households in 2000. Non-family households include single persons (the main component), as well as adults not related by blood or marriage who share housing. We control for non-family households in these analyses because, as indicated in Table 2, there is a strong positive correlation between the presence of gay male households and nonfamily households in census tracts, and the explanations as to why a spatial concentration of gay households might lead to greater income or population growth seemingly apply to spatial concentrations of single people as well (see Collins (2004)). In fact, Tables 3 and 4 indicate that the census tracts with more non-family households experience less income (and implicitly housing price) and population growth over the following decade. Although non-family households include gay households, gay households are a trivial share of non-family households (less than 3% of non-family households in these cities in 2000, for example). The correlations between population or income and non-family household shares in Tables 3 and 4 reflect the relationship of population or income growth to concentrations of single person households.

Conclusions, qualifications, and next steps

This first attempt to analyze the locations of gay male and lesbian households in large cities in the U.S. has several rather surprising results.

First, gay men and lesbians are segregated within cities both at the same levels as, and in similar patterns to, African Americans. Gays are most spatially concentrated within Midwestern cities, closely followed by Northeastern cities; they are most spatially dispersed within Western cities. While many of the reasons for racial segregation are very different from

those for sexual orientation segregation, the fact that central cities in regions with the highest racial segregation also have the highest sexual orientation segregation suggest the possibility of some common structural bases.

We find little empirical support for many of the hypotheses about the characteristics of the neighborhoods that attract more gay couples, as advanced in case studies and more qualitatively oriented research. Relative to other city residents, gay men and lesbians do not shift toward more racially diverse neighborhoods and there is little difference in their shifts to more ethnically diverse neighborhoods. While there is some positive correlation in locations of gay men and lesbians, it is small. Gay men are somewhat more likely to reside in higher vacancy neighborhoods, but there is no evidence that is the case for lesbians. There is evidence that more centrally located neighborhoods are relatively more attractive to gay male partners in every region but the South. Both lesbians and gay men are less likely to shift out of densely populated neighborhoods than other households.

Census tracts that start the decade with more gay men experience significantly greater growth in household incomes (and, therefore, presumably housing prices) over the next decade. In the Western and the Northeastern large central cities, census tracts that start the decade with more gay men experience significantly greater population growth. In the South and the Midwest, however, population growth is insignificantly negative as the relative representation of gay male partnerships increase.

There is little evidence that concentrations of lesbian households are associated with future population or income growth in the neighborhood. Census tracts with relatively more

lesbians at the start of the decade generally see no differences in either population or income growth from those with fewer lesbians.

There are data issues to address in future research. The biggest qualification of these results is that they rely on only one decade's data, and a potentially anomalous decade in which the U.S. experienced its most severe recession since the Great Depression. Furthermore, the measure of gay presence is complicated by the U.S. Census's erroneous recoding of the 2000 data so that all partnerships reporting as married and same sex are coded as unmarried same sex partnerships. A more precisely measured group of gay partners and a less anomalous decade may give different results.

Table 1

Measures of Segregation and Spatial Clustering within Central City of Gay Partners, by Gender, 2009

		Duncan Index of Dissimilarity		Moran's I	
Region	**Central City**	**Male Gays**	**Lesbians**	**Male Gays**	**Lesbians**
West	Denver	0.50	0.54	0.26 *	0.01
	Los Angeles	0.61	0.67	0.28 *	-0.02
	Phoenix	0.56	0.63	0.10 *	0.01
	Portland	0.47	0.43	0.05	0.20*
	San Diego	0.58	0.58	0.41 *	0.14*
	San Francisco-Oakland-San Jose	0.54	0.56	0.60 *	0.23*
	Seattle	0.38	0.38	0.35 *	0.14*
	Mean for West	**0.52**	**0.54**		
South	Atlanta	0.51	0.70	0.48 *	0.06
	Austin	0.61	0.58	-0.01	0.15*
	Charlotte	0.51	0.64	0.05	-0.12*
	Dallas-Fort Worth	0.61	0.67	0.19 *	0.03
	El Paso	0.67	0.67	-0.04	0.13*
	Houston	0.62	0.69	0.21 *	0.07*
	Jacksonville	0.59	0.53	-0.01	0.05
	Memphis	0.73	0.71	0.03	0.03
	Miami	0.66	0.71	0.06	0.16*
	Nashville	0.52	0.67	0.05	0.07
	New Orleans	0.72	0.83	0.19 *	0.02
	Oklahoma City	0.66	0.67	0.13 *	0.01
	San Antonio	0.62	0.60	0.01	-0.03
	Mean for South	**0.62**	**0.67**		
Midwest	Chicago	0.64	0.69	0.23 *	0.00
	Cleveland	0.79	0.82	0.09 *	-0.01
	Columbus	0.63	0.56	0.25 *	0.03
	Detroit	0.88	0.92	-0.04	-0.02
	Indianapolis	0.57	0.61	0.14 *	-0.04
	Kansas City	0.60	0.67	0.19 *	0.10*
	Milwaukee	0.73	0.75	-0.02	0.15*
	Minneapolis	0.50	0.52	0.21 *	0.13*
	St. Louis	0.57	0.71	0.18 *	0.01
	Mean for Midwest	**0.66**	**0.69**		
Northeast	Baltimore	0.70	0.70	0.03	0.05
	Boston	0.57	0.60	0.19 *	0.24*
	New York	0.65	0.69	0.18 *	0.04*
	Philadelphia	0.74	0.66	0.19 *	0.01
	Pittsburgh	0.75	0.75	-0.04	0.03
	Washington	0.51	0.66	0.33 *	0.06
	Mean for Northeast	**0.65**	**0.68**		

*** p<0.05 that gay/lesbian households are not spatially clustered within census tracts.**

Table 2: Correlates of Physical and Socio-demographic Characteristics on within City Locations of Gay Couples (by Gender) and All Households, 2009
(Dependent Variable: Census tract proportion of city's gay male or lesbian or total households, 2009)

(z-score for each coefficient listed in parenthesis)

	National			West			South			Midwest			Northeast		
Independent Variables	**Gay**	**Lesbian**	**Total**	**Gay**	**Lesbian**	**Total**	**Gay**	**Lesbian**	**Total**	**Gay**	**Lesbian**	**Total**	**Gay**	**Lesbian**	**Total**
Physical Structure															
Distance from Center (x100)	-0.0188	-0.0003	-0.0009	-0.0163	0.0037	-0.0017	0.0196	0.0324	0.0055	-0.0316	0.0007	-0.0138	-0.0420	-0.0092	-0.0033
	(-2.93)	*(-0.04)*	*(-0.73)*	*(-2.18)*	*(0.43)*	*(-1.17)*	*(0.90)*	*(1.28)*	*(1.17)*	*(-1.43)*	*(0.03)*	*(-5.66)*	*(-3.54)*	*(-0.74)*	*(-2.85)*
Distance squared (x10000)	0.0706	0.0012	0.0070	0.0537	-0.0116	0.0080	-0.0930	-0.1039	0.0171	0.2109	-0.0339	0.0935	0.2380	0.0447	0.0161
	(2.21)	*(0.03)*	*(1.11)*	*(1.77)*	*(-0.34)*	*(1.37)*	*(-0.76)*	*(-0.72)*	*(0.61)*	*(1.31)*	*(-0.18)*	*(5.16)*	*(3.29)*	*(0.59)*	*(2.24)*
% Built before 1939 (in 2000)	0.0021	0.0027	-0.0002	0.0000	0.0012	-0.0003	0.0064	0.0080	0.0008	0.0049	0.0029	-0.0004	0.0009	0.0012	-0.0001
	(4.45)	*(5.02)*	*(-3.42)*	*(0.00)*	*(1.61)*	*(-2.40)*	*(3.19)*	*(3.44)*	*(2.69)*	*(5.05)*	*(2.54)*	*(-4.18)*	*(1.58)*	*(2.07)*	*(-3.00)*
Population Density 2000 (x100000)	0.0002	-0.0001	-0.0001	-0.0002	-0.0007	-0.0005	0.0065	-0.0039	-0.0067	-0.0012	-0.0024	-0.0010	0.0002	0.0003	0.0000
	(0.54)	*(-0.14)*	*(-2.14)*	*(-0.18)*	*(-0.56)*	*(-2.44)*	*(0.98)*	*(-0.51)*	*(-7.19)*	*(-0.50)*	*(-0.82)*	*(-4.47)*	*(0.66)*	*(0.88)*	*(-1.21)*
% Vacant (2000)	0.0032	-0.0018	0.0015	0.0049	-0.0018	0.0045	0.0091	0.0038	0.0031	0.0049	-0.0034	0.0006	-0.0001	-0.0010	0.0002
	(2.31)	*(-1.16)*	*(8.75)*	*(1.79)*	*(-0.57)*	*(9.58)*	*(2.15)*	*(0.77)*	*(5.47)*	*(1.71)*	*(-1.00)*	*(2.29)*	*(-0.05)*	*(-0.58)*	*(1.43)*
Prop City SFH Detached 2000	0.1374	0.2534	0.0113	0.1730	0.4169	-0.0152	0.4579	0.4281	0.0033	-0.0394	0.1783	-0.0120	0.0880	0.1379	0.0076
	(4.25)	*(6.82)*	*(2.56)*	*(2.21)*	*(4.68)*	*(-1.10)*	*(4.67)*	*(3.74)*	*(0.25)*	*(-0.37)*	*(1.40)*	*(-1.17)*	*(2.62)*	*(3.88)*	*(2.97)*
Sociodemographic Structure															
Prop City Gay Male HHs 2000	0.3544	0.1025	0.0034	0.3914	0.1760	0.0080	0.4209	0.0217	0.0008	0.1913	0.2022	0.0050	0.2766	0.0589	-0.0012
	(27.61)	*(6.98)*	*(2.27)*	*(17.09)*	*(6.84)*	*(2.08)*	*(15.48)*	*(0.68)*	*(0.24)*	*(6.85)*	*(6.16)*	*(2.12)*	*(12.46)*	*(2.53)*	*(-0.82)*
Prop City Lesbian HHs 2000	0.1700	0.1244	0.0005	0.1288	0.1111	-0.0159	0.1853	0.1074	0.0047	0.1193	0.0601	0.0009	0.2043	0.2816	0.0009
	(12.37)	*(7.90)*	*(0.35)*	*(5.03)*	*(3.83)*	*(-3.71)*	*(6.51)*	*(3.23)*	*(1.33)*	*(4.16)*	*(1.78)*	*(0.40)*	*(8.29)*	*(10.82)*	*(0.59)*
Prop City Non-Family HHs 2000	0.5272	0.0210	-0.0421	0.3168	0.3162	-0.0825	0.6127	0.2031	-0.0470	0.6761	-0.4289	-0.0869	0.9477	-0.1766	-0.0229
	(9.01)	*(0.31)*	*(-5.32)*	*(2.63)*	*(2.33)*	*(-3.88)*	*(4.78)*	*(1.37)*	*(-2.52)*	*(4.23)*	*(-2.28)*	*(-5.70)*	*(7.69)*	*(-1.38)*	*(-2.53)*
Prop City Total HHs 2000	-0.0677	0.4983	1.0799	-0.1138	-0.0817	1.0844	-0.4310	0.2145	1.1338	0.3192	1.4579	1.1575	-0.7353	0.6176	1.0317
	(-0.70)	*(4.51)*	*(82.70)*	*(-0.54)*	*(-0.34)*	*(29.38)*	*(-1.88)*	*(0.80)*	*(34.79)*	*(1.15)*	*(4.45)*	*(43.16)*	*(-3.87)*	*(3.10)*	*(74.79)*
Prop City Black Population 2000	-0.0615	-0.0373	-0.0267	-0.0060	0.1309	0.0070	-0.0903	-0.0199	-0.0293	-0.0682	-0.3533	-0.0566	-0.0670	-0.2544	-0.0420
	(-3.83)	*(-2.02)*	*(-11.10)*	*(-0.33)*	*(6.35)*	*(2.10)*	*(-2.68)*	*(-0.51)*	*(-5.23)*	*(-1.44)*	*(-6.26)*	*(-11.80)*	*(-1.74)*	*(-6.19)*	*(-13.66)*
Prop City Hispanic Population 2000	0.0122	-0.0243	-0.0093	0.0082	0.0737	-0.0185	0.0019	-0.0334	-0.0136	0.0206	-0.0632	-0.0053	0.0143	-0.0558	-0.0033
	(0.83)	*(-1.44)*	*(-4.57)*	*(0.24)*	*(1.90)*	*(-2.99)*	*(0.06)*	*(-0.84)*	*(-2.83)*	*(0.73)*	*(-1.90)*	*(-1.93)*	*(0.56)*	*(-2.06)*	*(-1.69)*
Ratio Tract Med Income/City Med Income	0.0011	0.0002	0.0002	0.0004	0.0000	0.0001	0.0016	0.0001	0.0003	0.0024	-0.0004	0.0002	0.0003	0.0002	0.0001
	(6.30)	*(1.20)*	*(9.02)*	*(1.41)*	*(0.10)*	*(1.41)*	*(3.27)*	*(0.19)*	*(3.77)*	*(4.55)*	*(-0.64)*	*(-5.10)*	*(1.11)*	*(0.62)*	*(3.05)*
Constant	-0.0028	-0.0008	-0.0004	-0.0019	-0.0022	0.0000	-0.0061	-0.0031	-0.0009	-0.0038	0.0000	0.0005	0.0008	0.0012	0.0002
	(-3.40)	*(-0.82)*	*(-2.31)*	*(-2.50)*	*(-2.60)*	*-0.1000*	*(-3.90)*	*(-1.70)*	*(-2.70)*	*(-3.18)*	*(0.02)*	*(3.88)*	*(0.97)*	*(1.47)*	*(2.99)*
Spatial Lag (Prop Gay Male HHs 2009)	0.1073	--	--	0.3139	--	--	0.0514	--	--	0.0241	--	--	0.1636	--	--
	(7.47)			*(11.89)*			*(1.73)*			*(0.77)*			*(6.45)*		
Spatial Lag (Prop Lesbian HHs 2009)	--	0.1031	--	--	0.1038	--	--	0.1502	--	--	-0.0332	--	--	0.0932	--
		(6.73)			*(3.28)*			*(4.83)*			*(-1.00)*			*(3.39)*	
Lambda (Spatial Error Coefficient)	--	--	0.4716	--	--	0.1587	--	--	0.5578	--	--	0.3182	--	--	0.3972
			(38.81)			*(4.85)*			*(24.68)*			*(11.08)*			*(16.91)*
City Dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Pseudo R-squared	0.303	0.154	0.921	0.473	0.281	0.926	0.307	0.120	0.918	0.222	0.138	0.952	0.334	0.216	0.983
N	10,450	10,450	10,450	2,290	2,290	2,290	2,444	2,444	2,444	2,524	2,524	2,524	3,192	3,192	3,192

Table 3: Correlates of 2009 Census Tract Population Growth Since 2000
(Dependent Variable: Census tract proportion of city's 2009 total population)
(z-score for each coefficient listed in parenthesis)

Independent Variables	National	West	South	Midwest	Northeast
Distance from Center (x100)	0.0019 *(1.54)*	-0.0009 *(-0.54)*	0.0105 *(2.09)*	-0.0066 *(-2.67)*	-0.0010 *(-0.86)*
Distance squared (x10000)	-0.0050 *(-0.78)*	0.0028 *(0.43)*	-0.0014 *(-0.05)*	0.0507 *(2.74)*	0.0029 *(0.38)*
% Built before 1939 (in 2000)	-0.0002 *(-2.38)*	-0.0003 *(-2.45)*	0.0010 *(2.82)*	-0.0003 *(-3.24)*	-0.0002 *(-3.15)*
Population Density 2000 (x100000)	-0.0002 *(-2.45)*	-0.0006 *(-2.62)*	-0.0084 *(-7.88)*	-0.0012 *(-4.80)*	0.0000 *(-0.87)*
Prop City SFH Detached 2000	0.0367 *(7.81)*	0.0106 *(0.71)*	0.0523 *(3.74)*	0.0005 *(0.05)*	0.0150 *(5.01)*
Prop City Gay Male HHs 2000	0.0017 *(1.01)*	0.0092 *(2.01)*	-0.0039 *(-0.98)*	-0.0001 *(-0.02)*	0.0048 *(2.47)*
Prop City Lesbian HHs 2000	0.0018 *(1.02)*	-0.0177 *(-3.46)*	0.0058 *(1.43)*	0.0032 *(1.22)*	0.0005 *(0.25)*
Prop City Non-Family HHs 2000	0.0169 *(3.36)*	-0.0335 *(-2.73)*	0.0456 *(4.00)*	0.0057 *(0.68)*	-0.0249 *(-3.99)*
Prop City Black Population 2000	-0.0316 *(-11.41)*	0.0035 *(0.90)*	-0.0273 *(-4.17)*	-0.0740 *(-14.09)*	-0.0709 *(-18.98)*
Prop City Hispanic Population 2000	-0.0068 *(-2.80)*	-0.0471 *(-5.54)*	-0.0105 *(-1.83)*	-0.0023 *(-0.76)*	-0.0019 *(-0.74)*
Ratio Tract Med Income/City Med Income 2000	0.0002 *(6.66)*	0.0000 *(0.19)*	0.0001 *(1.38)*	0.0002 *(3.98)*	0.0000 *(1.34)*
Prop City Total HHs 2000	0.9950 *(97.45)*	1.0634 *(34.59)*	0.9897 *(39.21)*	1.0697 *(57.35)*	1.0376 *(89.45)*
Constant	-0.0002 *(-1.07)*	0.0001 *(0.81)*	-0.0004 *(-1.17)*	0.0003 *(2.81)*	0.0003 *(4.23)*
Lambda (Spatial Error Coefficient)	0.4007 *(30.78)*	0.1083 *(3.23)*	0.5253 *(22.30)*	0.2469 *(8.19)*	0.2292 *(8.63)*
City Dummies	Yes	Yes	Yes	Yes	Yes
Pseudo R-squared	0.943	0.895	0.890	0.938	0.969
N	10,450	2,290	2,444	2,524	3,192

Table 4: Correlates of 2009 Census Tract Income Growth Since 2000
(DV: Ratio of census tract median income to city median income, 2009)
(z-score for each coefficient listed in parenthesis)

Independent Variables	National	West	South	Midwest	Northeast
Distance from Center (x100)	-1.9289 *(-10.29)*	-0.4872 *(-1.72)*	-2.0251 *(-4.73)*	-2.8298 *(-4.42)*	0.7283 *(54.33)*
Distance squared (x10000)	6.8796 *(7.30)*	2.0286 *(1.77)*	4.6687 *(1.91)*	10.5954 *(2.23)*	-3.3746 *(-6.64)*
% Built before 1939 (in 2000)	0.0915 *(6.58)*	0.1305 *(5.17)*	0.1607 *(4.01)*	0.0555 *(1.93)*	16.9683 *(5.42)*
Population Density 2000 (x100000)	-0.0365 *(-2.82)*	-0.0906 *(-2.31)*	-0.2024 *(-1.53)*	-0.2199 *(-3.02)*	0.0997 *(4.17)*
Prop City SFH Detached 2000	4.2022 *(4.59)*	18.1375 *(6.55)*	-1.4120 *(-0.79)*	5.6415 *(1.95)*	-0.0404 *(-2.61)*
Prop City Gay Male HHs 2000	1.9761 *(5.15)*	3.8403 *(4.47)*	0.9278 *(1.69)*	1.9043 *(2.29)*	2.6315 *(2.71)*
Prop City Lesbian HHs 2000	0.5666 *(1.38)*	-0.2655 *(-0.27)*	0.4261 *(0.74)*	0.7996 *(0.94)*	1.0158 *(0.94)*
Prop City Non-Family HHs 2000	-2.5778 *(-2.51)*	-3.9195 *(-1.71)*	-3.7607 *(-2.63)*	-2.4146 *(-0.96)*	3.4148 *(1.11)*
Prop City Black Population 2000	-3.6198 *(-7.32)*	-1.8679 *(-2.68)*	-2.0484 *(-2.92)*	-6.2838 *(-4.29)*	-5.9142 *(-3.46)*
Prop City Hispanic Population 2000	-2.6440 *(-5.69)*	-6.8774 *(-4.43)*	-3.1784 *(-4.40)*	-2.4648 *(-2.83)*	-0.5595 *(-0.47)*
Ratio Tract Med Income/City Med Income 2000	0.8033 *(114.27)*	0.7448 *(56.66)*	0.8984 *(74.85)*	0.8186 *(45.91)*	4.5532 *(3.25)*
Prop City Total HHs 2000	-5.6694 *(-2.78)*	-16.9911 *(-2.99)*	2.9404 *(0.93)*	-6.2884 *(-1.16)*	-13.8505 *(-2.43)*
Constant	0.0428 *(1.78)*	0.1349 *(4.88)*	-0.0337 *(-1.17)*	0.1326 *(4.14)*	0.1205 *(3.96)*
Spatial Lag of Tract/City Income 2009	0.1996 *(23.80)*	0.1613 *(9.67)*	0.1786 *(12.08)*	0.2144 *(10.87)*	0.2177 *(13.56)*
City Dummies	Yes	Yes	Yes	Yes	Yes
Pseudo R-squared	0.800	0.875	0.866	0.709	0.759
N	10,450	2,290	2,444	2,524	3,192

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Appendix Table 1

Duncan Segregation Indices within Central City of Gay Partners, by Gender, 2000

Region	City	Male Gays	Lesbians
West	Denver	0.41	0.40
	Los Angeles	0.48	0.47
	Phoenix	0.44	0.46
	Portland	0.39	0.40
	San Diego	0.47	0.51
	San Francisco-Oakland-San Jose	0.47	0.51
	Seattle	0.33	0.32
	Mean for West	**0.43**	**0.43**
South	Atlanta	0.49	0.54
	Austin	0.38	0.39
	Charlotte	0.43	0.46
	Dallas-Fort Worth	0.46	0.45
	El Paso	0.58	0.54
	Houston	0.46	0.48
	Jacksonville	0.43	0.46
	Memphis	0.52	0.52
	Miami	0.46	0.44
	Nashville	0.43	0.48
	New Orleans	0.57	0.52
	Oklahoma City	0.61	0.56
	San Antonio	0.46	0.47
	Mean for South	**0.48**	**0.49**
Midwest	Chicago	0.49	0.54
	Cleveland	0.65	0.63
	Columbus	0.50	0.42
	Detroit	0.64	0.63
	Indianapolis	0.54	0.50
	Kansas City	0.52	0.55
	Milwaukee	0.56	0.60
	Minneapolis	0.40	0.42
	St. Louis	0.44	0.53
	Mean for Midwest	**0.53**	**0.53**
Northeast	Baltimore	0.57	0.57
	Boston	0.44	0.43
	New York	0.50	0.53
	Philadelphia	0.52	0.49
	Pittsburgh	0.66	0.61
	Washington	0.48	0.49
	Mean for Northeast	**0.53**	**0.52**

Appendix Table 2

Lagrange Multiplier Statistics from OLS Regressions
(p-values in parentheses)

	National		West		South		Midwest		Northeast	
Gay Male HH Share										
LM Lag	67.0	*(0.00)*	144.6	*(0.00)*	3.6	*(0.06)*	0.6	*(0.42)*	50.6	*(0.00)*
LM Error	22.0	*(0.00)*	48.4	*(0.00)*	1.0	*(0.32)*	0.1	*(0.72)*	33.4	*(0.00)*
Robust LM Lag	89.0	*(0.00)*	151.7	*(0.00)*	NC		NC		20.6	*(0.00)*
Robust LM Error	44.0	*(0.00)*	55.5	*(0.00)*	NC		NC		3.5	*(0.06)*
Lesbian HH Share										
LM Lag	50.3	*(0.00)*	12.0	*(0.00)*	24.5	*(0.00)*	1.15	*(0.28)*	11.7	*(0.00)*
LM Error	36.1	*(0.00)*	3.4	*(0.07)*	22.3	*(0.00)*	1.74	*(0.19)*	5.5	*(0.02)*
Robust LM Lag	27.7	*(0.00)*	NC		2.5	*(0.11)*	NC		18.5	*(0.00)*
Robust LM Error	13.5	*(0.00)*	NC		0.3	*(0.57)*	NC		12.3	*(0.00)*
All HH Share										
LM Lag	628.2	*(0.00)*	24.6	*(0.00)*	214.4	*(0.00)*	30.2	*(0.00)*	0.01	*(0.92)*
LM Error	2278.7	*(0.00)*	90.9	*(0.00)*	583.0	*(0.00)*	164.4	*(0.00)*	304.1	*(0.00)*
Robust LM Lag	18.8	*(0.00)*	0.03	*(0.86)*	10.3	*(0.00)*	1.0	*(0.32)*	NC	
Robust LM Error	1669.3	*(0.00)*	66.3	*(0.00)*	378.9	*(0.00)*	135.2	*(0.00)*	NC	
Population Growth										
LM Lag	691.7	*(0.00)*	37.2	*(0.00)*	260.9	*(0.00)*	7.6	*(0.01)*	11.3	*(0.00)*
LM Error	1586.3	*(0.00)*	50.9	*(0.00)*	484.7	*(0.00)*	85.1	*(0.00)*	78.6	*(0.00)*
Robust LM Lag	50.9	*(0.00)*	4.9	*(0.03)*	22.3	*(0.00)*	1.1	*(0.31)*	0.00	*(0.99)*
Robust LM Error	945.5	*(0.00)*	18.6	*(0.00)*	246.1	*(0.00)*	78.6	*(0.00)*	67.2	*(0.00)*
Income Growth										
LM Lag	574.5	*(0.00)*	94.4	*(0.00)*	150.3	*(0.00)*	117.9	*(0.00)*	185.0	*(0.00)*
LM Error	273.4	*(0.00)*	39.9	*(0.00)*	41.2	*(0.00)*	83.7	*(0.00)*	40.7	*(0.00)*
Robust LM Lag	317.5	*(0.00)*	57.3	*(0.00)*	109.7	*(0.00)*	43.0	*(0.00)*	148.0	*(0.00)*
Robust LM Error	16.4	*(0.00)*	2.8	*(0.09)*	0.6	*(0.45)*	8.8	*(0.00)*	3.8	*(0.05)*

All Lagrange Multiplier statistics are distributed $\chi^2(1)$
NC = Not computed