

“Homelessness and its causes: The housing market, perverse incentives, mental health care, and Memphis”

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Introduction

Is homelessness a housing problem, a mental health care problem, or a problem created by government policies gone awry? A number of economists have considered this question over the years, and the majority of them found that homelessness has its origins in the housing market. This paper revisits some earlier studies, and extends upon them by examining the effects of immigration, tourism, and by utilizing a more robust estimate of the homeless population. It finds that conditions in the housing market do contribute to homelessness, and that immigration and tourism also have significant effects.

After determining which variables are significant causal factors of homelessness in the nation, this study considers which of those factors are most likely to be causing homelessness in Memphis. This approach is useful for two reasons. Firstly, determining the causes of homelessness in general will allow further research into what measures are effective for combating homelessness. Secondly, by determining the specific causes of homelessness in Memphis, research may be done to determine what specific factors inside Memphis led to those causes, and what can be done in Memphis to address the origins of its homeless problem.

Lit Review

The majority of the economic literature on the topic attributes homelessness to

factors occurring inside the housing market. One theory, put forth by Brendan O’Flaherty, claims that new housing construction occurs above some quality threshold. Below that minimum, construction and maintenance costs exceed rents. Low-rent units become available only as the value of average-rent units (“middle class homes”) depreciates over time. As income inequality grows, the middle class shrinks, and fewer housing units become available to trickle down to the poor. High demand and low vacancy rates cause substandard housings rents to increase, driving some very poor individuals onto the streets (O’Flaherty, 1995, 1996; Quigley *et al* , 2000).

In O’Flaherty’s model, the poorest members of society must choose between paying a large part of their income on housing, or homelessness. It is important to note that homelessness in this model is not caused by some Bohemian preference for living free and on the street. Rather, it is the result of a rational decision made under extreme conditions of poverty. A large body of the literature supports and agrees with this theory (Quigley, *et al*, 2000; Troutman, *et al*, 1999; Park, 1998, O’Flaherty, 1996; Honig and Filer, 1993).

A decline in the availability of affordable housing has been well documented over the years. Wright, *et al* (1998) found that the number of “low income” housing units declined by over 30 percent in the 1970s, while poverty rates increased by 36 percent. A later report by Dolbeare (1996) documents a movement away from affordable (costing less than 30 percent of one’s household income) housing. Additionally, a more recent article by Quigley and Raphael finds that rental costs as a proportion of one’s household income have substantially increased over the past forty years (2000).

A number of researchers (especially ones studying homelessness in Europe) have

not accepted housing market theories of homelessness. Most prominently, Jencks (1994) argues that the decrease in low-rent households was actually in response to increased demand for higher quality housing. As well, Jencks casts doubts on the self-reported income data that go into many rent-burden calculations. In place of a housing market explanation of homelessness, Jencks (1994), Baum and Burns (1993), and others point to the deinstitutionalization of the mentally ill population and increased inner city drug use. Rates of mental disability among the homeless are substantially higher than the non-homeless population (Wright 1988; Rossi, 1989; Morrissey and Dennis, 1990, Wright and Rubin, 1991). And between 1955 and 1995, the number of patients staying in-state psychiatric facilities declined by more than 80 percent, from 500,000 to 90,000 (O'Flaherty, 1996).

In spite of this, however, the vast majority of state mental health patients were deinstitutionalized by 1975, roughly five years before increases in the homeless population became noticeable (O'Flaherty, 1996; Blau, 1992). More over, research indicates that many of the deinstitutionalized mentally ill may have been re-institutionalized in state prisons (Quigley, Raphael, and Smolensky, 2000; Liska et al, 1999; Hamburg and Hopper, 1992).

In a similar vein, the onset of the crack epidemic is dated to the mid-80's, roughly five years after homelessness became a noticeably increasing urban problem (Rueter, MacCoun, and Murphy, 1990). If either drugs or mental illness were driving homelessness, one would expect the timing of deinstitutionalization and the drug epidemic to be more closely related to the rise in urban homeless populations (O'Flaherty, 1996; Raphael, 2000; Mansur, *et al*, 2002). In reality, there was a

substantial time difference between these three events.

A few researchers have considered the effects that rent control may have on homelessness. The theory predicts that rent control causes vacancy rates to decrease as construction is impeded by a fear of rent regulation (Early and Olsen, 1998). The decline in vacancy rates leads to an increase in homelessness, according to the theory. Tucker found evidence to suggest that rent control is a major cause of homelessness (Tucker 1987, 1989, 1990, 1991). Employing a number of demographic and housing market variables, Tucker (1989) concluded that rent controls had a positive effect on homelessness, and suggested that rent controls be removed across the nation.

Tucker's results were substantiated by a more recent study from Grimes and Chressanthis (1997). Using a two-stage model to account for endogeneity, Grimes and Chressanthis found that rent control has a statistically significant effect on homelessness, albeit a very small one. In a later paper, Ekelund, Jackson, and Troutman (1999) likewise determined that rent control has a significant and positive effect on a city's homeless rates.

At the same time, a number of studies do not find evidence that rent control is a significant cause of homelessness (Bohanon 1991; Honig and Filer 1993; Applebaum, Dolny, Drier, and Gilderbaum 1991). A particular study by Quigley revisits Tucker's model and finds that Tucker's results are not sustained when additional controls for rent and income are added (Quigley 1990).

One of the reasons why the effects of rent control have been difficult to determine relates to the quality of the homeless data used. Most studies of these studies have relied on HUD's highly suspicious 1984 estimates of the homeless population. The HUD

estimates were based on the opinions of local officials who, as Jencks, Rossi, and others have noted, would have an incentive to over-count their homeless population (Early and Olsen, 1998; Sommer, 2000; Jencks, 1994; Rossi, 1989). Jencks also notes that cities with rent control may be more sympathetic to the homeless, and are most likely to over report their homeless populations (Jencks, 1994). Later studies that have used the 1990 Census count of homelessness have found that rent control – if it does indeed impact homelessness – affects it in a relatively small way (Grimes and Chressanthis, 1997; Ekelund, Jackson, and Troutman, 1999).

Another reason why rent control may be producing such varied results pertains to the broad spectrum of rent control. Logic would dictate that price ceilings set substantially below the market price for rent would have a greater impact on the construction of new homes. But, given the quality of the available data, the extent and prevalence of rent control can be determined in only a handful of cities.

Ekelund, Troutman, and Jackson (1999) suggest that homelessness may be caused by perverse incentives created by government policy. In their model, poor individuals chose between private housing, subsidized housing, and homelessness. Perverse incentives are created when government policy decreases the benefits of being privately housed, or increases the benefits of being homeless. The latter could occur “if the homeless are given priority over the sheltered poor in the allocation of government subsidized units, or if the homeless are granted a substantially larger subsidy to their payment for shelter” (Ekelund, et al 1999; Filer 1990a, 1990b). The former might occur if, for example, a homeless shelter were built in the middle of a privately housed neighborhood.

Ekelund, Troutman, and Jackson find evidence to suggest that such perverse

incentives may exist. Using data on federal housing assistance grants to states and local governments, they estimate simultaneous equations, and determine that government housing subsidies have a statistically significant, positive effect on homelessness. Federal grants for alcohol, drug, and mental health care programs are found to reduce homelessness, with the same level of significance.

Data

Homeless data tend to be one of three types: point-estimates, prevalence counts, or turnaway counts. The first type – commonly called “point-estimates” or “point-in-time-estimates” – follow a census-like procedure. At a given time during the year, enumerators take to the streets and shelters and count the homeless people they see.

While point-estimates are useful, they are not without limitations. To begin, a point-estimate can tell you nothing about the duration of homelessness, or about the number of people who experience homelessness throughout the year.

Because the homeless population varies a great deal throughout the year – with many people experiencing short periods of homelessness – prevalence counts are often very useful. Prevalence counts are designed to track the number of individuals who experience homelessness over a given period of time, usually a year. Many of them also include detailed demographic statistics of the homeless population. The problem with prevalence counts is that their methodology and coverage often varies from year to year, making time-series studies of the homeless population difficult or impossible to perform.

Finally, some agencies report “turnaway” statistics that report the number of homeless persons who try to find shelter on a particular night, but are turned away. These data are useful in the sense that they provide a measure of the unmet needs of the

homeless population. Unfortunately, they also tend to be incomplete, with some inner city shelters gathering them and others not.

In Memphis, data on homelessness is available from the Partners for the Homeless, as a part of their Intake Database System (IDS). The IDS provide prevalence-count data from participating organizations in Memphis. Partners for the Homeless report unreplicated data on the homeless, so that the same homeless individual is not counted twice. Some characteristics about the homeless population in Memphis appear below in Table 1, along with the characteristics of the homeless throughout the nation.

Table 1: Characteristics of the homeless in Memphis and in the United States

	Memphis: adults with families; admitted to shelter	Memphis: adults with families, not admitted to shelter	Memphis: un- accompanied adults, admitted to shelter.	Memphis: adults turned away from shelter	National
Male	3.1%	4.6%	84.7%	70.5%	67.5%
Female	96.9%	95.4%	15.3%	29.5%	32.4%
black	83.4%	76.1%	61.9%	71.5%	40%
White	11.9%	6.1%	26.7%	20.3%	41%
High school	56.8%	57.8%	35%	50.9%	72%
Above HS	21.6%	12%	15%	19.6%	28%
Alcohol/Drug Abuse	25%	--	34.3%	63.2%	--
Disabilities not reported	65.20%	88.90%	55.5%	11.8%	--
Alcohol/drug abuse past month	--	--	--	--	66%
Mental illness, past month	--	--	--	--	39%
Alcohol/drug, lifetime	--	--	--	--	88%
Mental Health, lifetime	--	--	--	--	57%
Married	--	--	--	--	9%
Not married	--	--	--	--	91%

Burt et al, 1999, and Partners for the Homeless, 2004

While the IDS has received much acclaim (in 2002, the Urban Institute named it one of the eighth best homeless data systems in the nation), its limitations make it unusable for this study. Over the years coverage has varied, with some shelters deciding

to report their data for the first time, and others not reporting at all, or reporting incomplete data (PFTH, 2004). While Partners for the Homeless has certainly done a terrific job over the years counting the number of homeless in Memphis, inconsistencies in the IDS data make it difficult or impossible to use to determine the causes of homelessness in Memphis.

There are a number of counts of the homeless population, but only a few are worth mentioning. The economic literature on homelessness is biased in favor using cross-sectional data. In part, this is due to the fact that local agencies do not share a common definition of homelessness (Cordray and Pion, 1991; Chelimsky, 1991). Also, as noted earlier, researchers are often suspicious of local agencies that may have an incentive to over report their homeless populations.

One of the first cross-sectional counts of homelessness occurred in 1984. The count was produced from the estimates and opinions of local officials, and was later aggregated and released by the Department of Housing and Urban Development. Widely criticized as inaccurate, most scholars are now suspicious of these data. Rossi (1989) has shown that few of the local officials had substantive grounds for their estimates, and all would have had an incentive to over report their numbers.

A number of studies also refer to the so called “Burt Count” released by the Urban Institute in 1990. The Burt Count enumerated the number of shelter beds in approximately 150 of America’s largest cities. The data were gathered with a great deal of consistency across cities. Nevertheless, as countless authors have noted, there is hardly a one-to-one relationship between shelter beds and the homeless. The availability of shelter beds is essentially determined by the public policy response to homelessness.

So there is no reason to suspect that the ratio of homeless to shelter beds is consistent across cities (Quigley, *et al*, 2000).

Lately, a number of authors have used the so-called “S-night” (Street and Shelter night) count of homelessness that was released as a part of the 1990 Decennial Census. This survey was not intended to provide a definitive count of the nation’s homeless; rather, this was the Census Bureau’s first attempt to enumerate those living in unconventional dwellings. There were three components to this survey. Between 6 P.M and 12 P.M., census takers counted the number of persons staying in local shelters. Later, between 2 A.M. and 4 A.M., enumerators visited outdoor locations where the homeless were known to congregate. In the morning, individuals leaving abandoned buildings were added to the count (Martin, 1992).

Like all point-in-time counts, the “S-Night” survey is universally believed to have undercounted the homeless population. Survey takers reported having difficulty locating the addresses they were supposed to identify. Also, instructions for counting were poorly conveyed or misunderstood by enumerators, which resulted in a lack of consistency between cities (Quigley, *et al*, 2001; Stevens, 1991).

Undercounting would not be a problem if the degree of undercounting were consistent throughout cities. There is substantial evidence to suggest, however, that the undercount was not consistent (Stevens, 1991; Martin, 1992). Homeless “decoys” were hired in five of the 269 cities surveyed to determine how effectively designated street and shelter locations were being counted. The Census found that, in New Orleans, as many as 84 percent of the decoys were counted; in New York, 66 percent; 55 percent in Phoenix; 39 percent in Los Angeles; and only 25 percent in Chicago (Martin, 1992).

In 2000, the Census Bureau conducted its second street and shelter count. The count took place on March 27-29, and was similar in format to the 1990 S-Night survey. Greater care was taken to ensure that enumerators understood the survey procedure, and there is no indication that this procedure was violated.¹ Mistakes were made, and there were inefficiencies. But, according to a Congressional statement by J. Christopher Mihm on behalf of the General Accounting Office, these errors were minor in scope, and were entirely to be expected of such a large and complex operation.²

The GAO report on the Census 2000 count of transitionally housed persons noted that training materials arrived late in Los Angeles, San Francisco and Tulsa, causing trainers to speed up the training of enumerators. In Los Angeles, the police had chased away a number of homeless persons the night before the Census enumeration began. In Alexandria, Census enumerators reported that clients of a local church program to feed the homeless were wary of being enumerated, and many of them left. As well, a tornado the night before in Plano caused a few downtown homeless shelters to be evacuated.

In spite of these difficulties, the GAO concluded that “Operations were appropriately staffed. Bureau enumerators came prepared in proper numbers to conduct enumeration.” Furthermore, “Enumerators generally obtained cooperation from {homeless} service providers.” While, “no doubt some individuals were missed” by the

¹ There is, however, a complaint that the Census Bureau did not always convey its data-release plans to other government agencies. This was the topic of a report from the GAO. But, again, there is nothing to suggest that the enumerators did not follow survey instructions. (GAO, 2003)

² In his statement, Mihm concludes “As I noted, while these problems may have affected the quality and completeness of the count, and therefore should not be minimized, it is not surprising that they occurred in an operation as large and complex as the Bureau’s attempt to count persons without a usual residence.”(Mihm, 2000)

census takers, the enumeration process was not nearly as flawed as in 1990, and, overall, the enumeration process “went well” (Mihm, 2000).

Like the 1990 Survey, the *Emergency and Transitional Shelter Population: 2000* report is not intended as a definitive count of the homeless population. Unlike the 1990 count, there is no indication of an inconsistent undercount of the homeless population (with the possible exception of the five cities mentioned earlier).

It is expected (and almost certain) that an undercount was present in the Census 2000 enumeration, however. The 2000 count employed the so-called “Service-Based Estimation” (SBE) operation. The SBE sought to determine the number of persons using emergency shelters intended for people without conventional housing; shelters with temporary lodging for neglected and runaway children; transitional shelters; hotels and motels providing shelter to those without conventional housing; soup kitchens and food vans operating on a regular schedule; and targeted outdoor locations where the homeless were known to congregate.

Due to privacy issues, the 2000 survey did not enumerate individuals inside of health care facilities, shelters for abused women, or shelters against domestic violence. The report also warns that homeless persons may have avoided shelters out of a preference against being enumerated, as occurred in Alexandria. But so long as one can assume that shelters were avoided in a random manner across cities, the Census 2000 data can be used to provide qualitative information about the occurrence of homelessness.

Theory, variable list, and model

In line with previous studies, this one looks at three broad categories of variables that may be influencing homelessness. The first category includes demographic and

socioeconomic variables, such as poverty rates, and unemployment. Variables from the housing market category are also included, and finally those that pertain to federal assistance.

If conditions in the housing market are driving homelessness, it is presumed that higher vacancy rates should be associated with less homelessness. One would expect higher rents, meanwhile, to increase homelessness, especially as rents increase relative to income. Because the housing market theory of homelessness relies on individuals at the lowest tail of the income distribution making the rational decision to become homeless, it is important to focus these variables (as much as possible) to conditions in the sub-standard housing market.

Unlike previous studies, this one includes data on the non-citizen immigrant population. There is no evidence that immigrants constitute a large portion of the homeless demographic. But there are at least three potential reasons for including them in this study.

Firstly, illegal immigrants will, in many cases, earn a living that is more in line with the bottom tail of the income distribution. A larger immigrant population may, therefore, translate into higher demand for low-quality housing. As vacancy rates are only measured as a percentage of the entire housing market, this effect would not necessarily appear in a city's vacancy rate measure.

Additionally, the non-citizen population tends to acquire jobs in the unskilled labor sector. It could be argued that homeless persons are, in some sense, unskilled laborers who are outbid by low-cost substitutes. While possible, the evidence does not suggest this. The correlation coefficient between the percentage of the population who

are immigrants and the unemployment rate is approximately 0.23. The correlation between the percentage of immigrants and the percentage who are not in the labor force is less than 0.11.

A third possibility is that the unmeasured services available to the non-citizen immigrant population would be correlated with the unmeasured services available to homeless. In this case, as in all of them, immigration would be expected to have a positive relationship with homelessness; but here, that relationship would not imply any causation.

This study also looks at the effects that tourism may have on homelessness. If the homeless are largely rational, they will have become homeless when the benefits of doing so exceed the benefits of remaining housed. Tourism – as it would provide a degree of anonymity and a greater supply of people with cash in their pockets – may increase the benefits of being homeless, and therefore increase the prevalence of homelessness.

Socio-economically, one would expect higher unemployment and poverty to increase inner city homelessness. As socioeconomic conditions are often highly correlated with measures of race, additional controls for race have been added.

Finally, this study looks at the way in which government policies may affect homelessness. If government policy is creating perverse incentives, prior studies along these lines suggest that federal grants for housing assistance may increase homelessness (by increasing the benefits of being homeless, or decreasing the benefits of being privately housed), while grants for drug and mental health programs should decrease or fail to affect homelessness.

Figure 1: Variable list

MSA SPECIFIC

homeless	Proportion of homeless persons. Census, 2000.
UN	Unemployment rate. Census, 2000.
black	Proportion of black persons. Census, 2000
notcit	Proportion of foreign born, non-citizens. Census, 2000
pov	Poverty rate. Census, 2000
vac	Vacancy rate, as a percentage of all housing units. Census, 2000.
rentperforty	Percentage of households paying 40 percent or more of their household income on housing. Census, 2000.

STATE SPECIFIC

STtourism	Domestic travel expenditures by state, divided by the state population. Reported in Statistical Abstract of the United States:, using estimates from <i>Impact of Travel on State's Economies: 2000</i> by the Travel Industry Association of America.
STtothsgrant	Combined federal and state grants for housing assistance. Statistical Abstract of the United States.
STsamhsa	Combined federal grants to states from the Substance Abuse and Mental Health Services Administration. Consolidated Federal Funds Report. United States Government Printing Office.
STunemploy	State unemployment rate. Census 2000.
STtermyears	Aggregate number of terms served by a state's members of congress.
STcrime	Crimes per 100,000. Federal Bureau of Investigation.
STmdnhomval	State median home value. Census, 2000.
STmdnrnt	State median contract rent. Census, 2000.
STmedicaid	Proportion of the population eligible for Medicaid. Center for Medicaid and Medicare Services.

As in earlier studies, this study employs instrumental variables to control for simultaneity. This is necessary because federal grants for (say) housing assistance may be positively correlated with homelessness because (1) they create perverse incentives to become homeless or (2) they are given to areas that have an existing homeless problem. By estimating the model with instrumental variables, this study is able to account for any

endogeneity of federal grants, and explicitly determine what effect these grants have upon the homeless population.

A complete list of variables appears above, in Figure I. It is important to realize that the Census 2000 data were gathered for all 280 Metropolitan Statistical Areas (MSAs) in the United States. The homeless data are censored below 100, so that any MSA with fewer than 100 persons counted living in emergency or transitional housing is not reported.

The presence of data censoring suggests the use of a Tobit model. This study uses Joseph Harkness' "ivtobit" regression for Stata. The diagnostics of this regression are derived from Newey (1987). As well, following previous studies, all variables (except term years) are specified in logarithmic form. The four Puerto Rican MSAs were statistical outliers, and were removed. The basic model is

$$\begin{aligned}
 (1) \quad \ln(\textit{Homeless}) &= \alpha + \beta_1 \ln(\textit{UN}) + \beta_2 \ln(\textit{black}) + \beta_3 \ln(\textit{notcit}) + \beta_4 \ln(\textit{pov}) + \beta_5 \ln(\textit{vac}) \\
 &\quad + \beta_6 \ln(\textit{rentperforty}) + \beta_7 \ln(\textit{tourism}) + \beta_8 \ln(\textit{STsamhsa}) + \beta_9 \ln(\textit{STtothsgrant}) \\
 (2) \quad \ln(\textit{STsamhsa}), \ln(\textit{STtothsgrant}) &= \delta_0 + \delta_1 \ln(\textit{STunemploy}) + \delta_3 \ln(\textit{SThomeless}) + \delta_4 \textit{STtermyears} \\
 &\quad + \delta_5 \ln(\textit{STcrime}) + \delta_6 \ln(\textit{STmdnhomval}) + \delta_7 \ln(\textit{STmdnrent}) + \delta_8 (\textit{STmedicaid})
 \end{aligned}$$

The basic model is specified with and without dummy variables for the different regions of the United States. Regional definitions are taken from the Library of Congress' website. The logic behind including regional controls is that public policy, weather, housing and labor markets, homeless services, attitudes towards the homeless, and so on, may differ across regions of the United States. As these variables would affect homelessness – but would, in many cases, be difficult to measure – it is important to

control for them across regions.

Results:

Regression results are shown completely in Table 2. As Ekelund, Troutman, and Jackson suggest, federal grants for drug and mental health care have a negative coefficient, while housing grants have a positive one. But, contrary to Ekelund, Troutman, and Jackson, neither of these variables is statistically significant at any conventional significance level.

Vacancy rates are significant below the five-percent level, and have a negative effect on homelessness (as would be expected). The percentage of persons spending 40 percent or more of their income on housing is insignificant, surprisingly. The first of these results obviously lends support to the housing market theory of homelessness.

Demographic and socio-economic variables do not have much of an effect on homelessness. Unemployment and poverty rates are both insignificant, as is the percentage of the proportion that is black. When regional controls are added, however, the percentage of the population that is black barely falls outside of a ten-percent level of significance.

In both the regional and non-regional versions of the model, the percentage of non-citizens is statistically significant and has a positive effect on homelessness, as would be expected. As was noted earlier, the relationship between the non-citizen population and homelessness may be the result of some sort of some non-measurable correlation between homeless services and immigration services. Or perhaps it is capturing some unobserved characteristics of the housing market, such as substandard vacancy rates.

Either way, the result basically lends support to the housing market theory of homelessness. If non-citizens are decreasing the substandard vacancy rate, the argument is obvious. If the significance of the result is accorded to some correlation between homeless services and immigration services, it would seem to imply that individuals make a rational decision to become homeless as more services become available to them.

Tourism, meanwhile, does have a statistically significant effect on homelessness. The relationship is positive, as would be expected. The significance of this result is lessened in the model without regional controls. But even there, tourism falls just slightly outside of ten-percent level significance. Given that data sets this small in size do not often yield many significant variables, the effect of tourism on homelessness is worth consideration.

When regional controls are added, the significance of the other variables remains largely unchanged. As said earlier, the inclusion of region causes tourism to become statistically significant, and the percentage of the black population almost so.

As well, the percentage of persons spending more than 40 percent of their income on housing loses virtually all of the significance it had in the non-regional model, suggesting that the regional variables are picking up upon unobserved regional differences in the housing market. Other things being equal, the Northwest has the most homeless persons, the South the fewest, and the Northeast and the Southwest fall in between (in that order).

Interpretations, limitations, and predictive power:

These findings are most in line with the housing market theory of homelessness. In the non-regional model, vacancy rates and the percentage of non-citizens are the most

significant variables explaining homelessness. In the regional model, tourism also plays a statistically significant role in determining homelessness.

The significance of tourism and non-citizens suggest a slight revision to the standard housing market theory of homelessness. Perhaps it is the case that very low income individuals choose between housing that takes up a large part of their income (P) or homelessness (H). If the non-citizen population is correlated with services available to the homeless, it would make sense that the presence of non-citizens and tourism would increase H. That is, tourism and homeless services would increase the economic opportunities available to a homeless person.³ If the non-citizen population is uncorrelated with the presence of homeless services, the most likely explanation is that immigration decreases the sub-standard housing vacancy rate.

In terms of limitations, the most important limitation of these findings relate to the data that were used. These models deal with a point-in-time, cross-sectional estimate of the homeless population. This study can, therefore, be used to say something about how many homeless persons will be present in a city, relative to other cities. But it does not pretend to give an exact, numerical prediction. Neither can these results be used to explain the number of people who experience homelessness throughout the year, or why some of those individuals suffer long bouts of homelessness and some do not. These are important limitations, and must be noted carefully.

That being said, the model appears to have great predictive power. As Table 5 shows, the model correctly predicts the cities with the largest homeless populations, and

³ A similar possibility was noted by Early and Olsen (2002), who investigated whether or not homeless shelters were creating perverse incentives to become homeless. Perverse incentives seems like a strong statement for these results. More moderately, the presence of shelters, food kitchens, clothing banks and the like might lower the costs of being homeless.

predicts them in almost the exact order as the Census. These predicted values do, however, tend to fall short of the actual number of homeless persons counted by the Census.

The predicted values of homelessness fall short of the actual values most often when the city's population is far above the mean. This suggests that heteroskedasticity ("Mixed scatter." The term is used when the errors vary across segments of the population) may be present. Alternatively, it may be that there is a quadratic relationship between the homeless population and the total population, so that homelessness increases with the population at an increasing rate. It would not be difficult to correct for heteroskedasticity, or to test for a quadratic relationship between homelessness and total population. Unfortunately, at the time of writing this paper, the author did not have access to the appropriate statistical tools to test for either of these possibilities. For now, it must suffice that the model is able to predict which cities have the most homeless persons, and in almost the same order as in the Census data. In light of the fact that the Census data are only useful for obtaining a relative measure of homelessness, this caveat should not be a tremendous problem.

In cities where the total population is closer to the mean value, the model is able to predict the actual number of homeless persons quite accurately. Table 6 shows all of the Metropolitan Statistical Areas in Tennessee, Mississippi, and Arkansas. As can be seen, the model exactly predicts which of these cities will have the fewest and the most homeless persons relative to one another. As well, it predicts the actual homeless values reported by the Census quite well. For example, the predicted number of homeless persons in Memphis, Johnston City, Nashville, and Little Rock are 570, 156, 617, and

266, respectively. The actual homeless values from the Census are 523, 165, 698, and 278.⁴

Memphis

As was stated, the model predicts the homeless population in Memphis quite well. And there is an interesting fact about this population. As Table 3 shows, Memphis has a lower percentage of homeless persons than average. This was somewhat surprising to the author. After all, the Memphis unemployment rate is slightly higher than average, as is the percentage of persons living in poverty; a larger than normal percentage of households spend 40 percent of their income or more on housing; Memphis' black population is roughly four times the national average; and the state of Tennessee spends less on housing assistance and mental health care than is ordinary.

But, as the results of this paper suggest, these variables are not significant causal factors of homelessness. It should not, therefore, be surprising that these conditions have not driven up the homeless population in Memphis. When talking about the significant variables affecting homelessness, it should be noted that Memphis has fewer immigrants than average for the nation or the south. This would (per the results of the model) imply that Memphis' homeless population would be smaller. Tennessee also receives less tourist revenue than is standard for other states, which again would imply a smaller homeless population. The vacancy rate in Memphis is much lower than in the nation or the south, which obviously would increase homelessness. As they are so much lower than normal, Memphis' vacancy rates may have a lot to do with where Memphis' homeless population comes from. .

⁴ In cities where there are fewer than one-hundred homeless persons counted by the Census, the "actual value" reported is one hundred. As can be seen in Table 6, the model predicts each of these censored observations will have a homeless population that is less than 100.

It is still somewhat surprising that Memphis' homeless population is as small as it is, relative to other metropolitan statistical areas in the Census count. Even for the South, where homelessness is less prevalent, Memphis' homeless population is relatively small.

The reason why Memphis' homeless population is relatively small may be that Memphis is somewhat of "spread out" city. The homeless tend to gather in urban areas. In fact, it would not be far off to say that homelessness is an urban phenomenon.

In Memphis, however, the urban area is rather small. A large portion of individuals included in the Memphis MSA are found in the suburbs and surrounding areas of Memphis, including areas in Mississippi and Arkansas. While no precise population density measure is available, one can infer from the average commuting time in Memphis that there is a great deal of spread (see Table 4).

More than 28 percent of Memphians spend between 30 and 59 minutes commuting to work everyday, according to the Census Bureau. For the south as a whole, an average of less than 21 percent do so. Memphians are also not nearly as likely as the rest of the south to spend less than 15 minutes commuting to work. Further details about the commuting tendencies of the nation, the south, and Memphis can be found in Table 4.

Regardless of what is causing Memphis to have a relatively low percentage of homeless persons – and, again, the author suspects that it may simply have to do with the broad spectrum of the persons included in the Memphis MSA⁵ – it is clear that Memphis should improve conditions in its housing market if it wishes to decrease its homeless population. It is beyond the scope of this study to determine what factors are contributing

⁵ It is worth noting that, if one considers the homeless population in Memphis as a percentage of Memphis proper, then 0.0648 percent of the Memphis population would be homeless. That is higher than the southern average, and slightly lower than the national one.

to low vacancy rates in Memphis, but research along those lines would certainly be welcomed.

Topics for Further Research, and Conclusion:

This study could be improved upon in a number of ways. It would, for example, be possible to correct for heteroskedasticity, look for a quadratic relationship between homeless and total population, and employ a more detailed measure of tourism. But, while technically possible, all of this proved to be beyond the budget of this project.

The relationship between homelessness and non-citizens is fascinating, and deserves further consideration. Perhaps the relationship is causal, in that non-citizens are actually causing homelessness (for example, through the substandard vacancy rate). Or, it may be that the relationship is associational, in that homeless services may be correlated with immigration services. As well, it would be worth considering the fact that government policy towards housing assistance and mental health care does not affect homelessness in any significant way. Why isn't government policy effective? How could it be made more so?

Finally, it is important to note that these results do not say anything about the different causal factors of short-term and long-term homelessness. This is a significant limitation, and must be kept in mind. There are almost certainly differences between the causes of long-term and short-term homelessness. Unfortunately, at the present, there is no good way to determine what these different causes are.

Despite what it cannot say, this study is able to explain the prevalence of homelessness inside of a city, relative to its prevalence inside other cities. It employs the most robust estimate of the homeless population available, and finds that (for the most

part) demographic conditions and government policy do not have a significant effect on homelessness. The presence of non-citizens, tourism, and vacancy rates do have a significant effect. Overall, these results are probably most in line with the housing market theory of homelessness (although they do suggest that a new theory of homelessness may be needed).

As well, this study is able to determine that low vacancy rates are probably one of the biggest contributors to homelessness in Memphis. Vacancy rates in Memphis are two percentage points below the national average, and nearly four percentage points below par for the South. As such low vacancy rates could be expected to increase homelessness and increase rents inside Memphis, further investigation into the cause of these low vacancy rates would be welcomed.

Appendix A: Tables

Table 2: Regression results			
	Regression 1		Regression 2
	No regional controls		regional controls
Unemployment rate	0.1355 (0.78)		-0.0299 (0.17)
Percentage black	-0.0308 (0.86)		0.0638 (1.63)
Percentage non-citizen	0.1307 (2.00)**		0.1326 (2.23)**
Poverty Rate	-0.0991 (0.53)		0.1043 (0.49)
Vacancy Rate	-0.3232 (3.09)**		-0.2332 (2.23)**
Percentage of householders spending 40% of income or more on rent	0.2554 (1.00)		-0.0275 (0.11)
Tourism (millions)	0.1977 (1.54)		0.2000 (1.73)*
Housing grants (millions)	0.0883 (0.41)		0.8693 (0.49)
SAMHSA (millions)	-0.2489 (0.86)		-0.2302 (0.96)
South			-0.2342 (2.16)**
SW			0.1352 (0.96)
NW			0.5491 (3.29)**
N = 276 N_{censored} = 114 N_{noncensored} = 162 <i>**significant at five-percent. *Significant at ten-percent T-stats in parenthesis.</i>			

Table 3: Summary statistics of homelessness in the nation, the south, and in Memphis.			
	National	South	Memphis
Percent homeless	0.07 <i>0.03</i>	0.06 <i>0.03</i>	0.05
Unemployment rate	5.83 <i>1.87</i>	5.96 <i>1.49</i>	6.36
Percent black	10.85 <i>11.13</i>	18.46 <i>12.57</i>	43.21
Percent non-citizens	3.86 <i>4.16</i>	3.57 <i>4.10</i>	2.21
Poverty rate	12.47 <i>4.24</i>	14.30 <i>4.54</i>	15.04
Vacancy Rate	8.56 <i>4.47</i>	10.24 <i>4.55</i>	6.67
Percent spending 40 percent or more of income on rent	21.61 <i>9.64</i>	19.68 <i>7.89</i>	30.62
Tourism	20107.66 <i>21294.40</i>	22598.13 <i>19859.43</i>	9420.00
Housing Grants	1881.69 <i>2031.61</i>	1438.03 <i>909.72</i>	855.41
SAMHSA	25.20 <i>21.10</i>	24.80 <i>16.10</i>	12.13
<i>Standard deviations reported in italics</i>			

Table 4:				
Commuting time for workers in the nation, the south, and in Memphis				
	Percentage less than 15 min	percentage 15-29 minutes	percentage 30-59 minutes	percentage >60 minutes
National	37.53	38.70	18.90	4.87
South	34.09	39.91	21.00	5.01
Memphis	24.54	42.48	28.66	4.33
Memphis has a relatively low percentage of homeless persons. As this table implies, perhaps the reason for this is because Memphis is more "spread out" than other cities				

Table 5: Predicted and actual homelessness, top 20 homeless cities						
	city	homeless	Predicted homeless	Rank: homeless	Rank: predicted homeless	Population
	New York--Northern New Jersey--Long Island, NY--NJ--CT--PA CMA	35,691	13,978	1	1	21,199,865
	Los Angeles--Riverside--Orange County, CA CMSA	13,103	10,475	2	2	16,373,645
	Sherman--Denison, TX MSA	7,774	5,939	3	7	3,554,760
	Santa Fe, NM MSA	6,761	5,145	4	4	7,039,362
	Chicago--Gary--Kenosha, IL--IN--WI CMSA	5,401	3,959	5	3	9,157,540
	Washington--Baltimore, DC--MD--VA--WV CMSA	5,275	3,570	6	5	7,608,070
	Philadelphia--Wilmington--Atlantic City, PA--NJ--DE--MD CMSA	4,861	2,969	7	8	6,188,463
	Boston--Worcester--Lawrence, MA--NH--ME--CT CMSA	4,732	2,755	8	6	5,819,101
	Atlanta, GA MSA	3,736	2,696	9	11	4,112,198
	Detroit--Ann Arbor--Flint, MI CMSA	3,096	2,691	10	9	5,456,428
	Miami--Fort Lauderdale, FL CMSA	2,630	2,419	11	15	3,876,380
	Cleveland--Akron, OH CMSA	2,419	2,363	12	19	2,945,831
	Dallas--Fort Worth, TX CMSA	2,278	2,327	13	10	5,221,801
	Portland--Salem, OR--WA CMSA	2,124	2,153	14	12	2,265,223
	Minneapolis--St. Paul, MN--WI MSA	2,113	1,980	15	14	2,968,806
	Santa Barbara--Santa Maria--Lompoc, CA MSA	1,999	1,771	16	17	2,813,833
	Houston--Galveston--Brazoria, TX CMSA	1,756	1,664	17	13	4,669,571
	Denver--Boulder--Greeley, CO CMSA	1,685	1,602	18	16	2,581,506
	Phoenix--Mesa, AZ MSA	1,591	1,441	19	18	3,251,876
	Las Vegas, NV--AZ MSA	1,344	1,286	20	20	1,563,282
Table 6: Predicted and actual homeless in TN, AR, and MS						
	City	Homeless	Predicted homeless	MSA population	Rank: Homeless	Rank: predicted homeless
	Biloxi--Gulfport--Pascagoula, MS MSA	104	155	363,988	7	7
	Hattiesburg, MS MSA	<100	52	111,674	8	8
	Jackson, MS MSA	230	195	440,801	5	5
	Jackson, TN MSA	<100	50	107,377	8	8
	Johnson City--Kingsport--Bristol, TN--VA MSA	165	156	480,091	6	6
	Jonesboro, AR MSA	<100	37	82,148	8	8
	Knoxville, TN MSA	242	254	687,249	4	4
	Little Rock--North Little Rock, AR MSA	278	266	583,845	3	3
	Memphis, TN--AR--MS MSA	523	570	1,135,614	2	2
	Nashville, TN MSA	698	618	1,231,311	1	1
	Pine Bluff, AR MSA	<100	36	84,278	8	8
	Texarkana, TX--Texarkana, AR MSA	100.00	37.80	129,749.00	8.00	8.00

Appendix B: Model specification

The data in this model were left-censored at 100. This suggests the use of Tobin's Probit ("Tobit") regression. In order to control for simultaneity of government funding for housing assistance and mental health care, an instrumental variable regression was needed. The estimates in this paper were produced by Joseph Harkness' "ivtobit" regression for Stata. The diagnostics of this regression are taken from Newey (1987).

It is desirable to consider the percentage of homeless persons in an area, rather than the raw number of them. Unfortunately, when the homeless population is divided by the total population, the censored values of the regression are interspersed with the non-censored ones. In other words, dividing by total population makes it impossible to determine a constant censoring value.

Previous studies have looked at the logarithm of the homeless population over the total population, predicted by the logarithms of a handful of independent variables. This specification allows one to look at the "elasticity effect" of independent variables (how a percentage change in X leads to a percentage change in Y).

Using the properties of logarithms, it was possible to estimate this model using a Tobit regression, a constant censoring value, and still use a percentage measure of homelessness. To do so, a Tobit regression was run with the following specification:

$$\begin{aligned}
 (1) \quad \ln\left(\frac{H}{TP}\right) &= \alpha + \beta_1 \ln(U) + \beta_2 \ln\left(\frac{B}{TP}\right) + \beta_3 \ln\left(\frac{NC}{TP}\right) + \beta_4 \ln\left(\frac{P}{TP}\right) + \beta_5 \ln(V) \\
 &\quad + \beta_6 \ln(P40) + \beta_7 \ln(stTR) + \beta_8 \ln(stSM) + \beta_9 \ln(stHA) + \varepsilon \\
 \Rightarrow \ln(H) - \ln(TP) &= \alpha + \beta_1 \ln(U) + \beta_2 (\ln(B) - \ln(TP)) + \beta_3 (\ln(NC) - \ln(TP)) + \beta_4 (\ln(P) - \ln(TP)) + \beta_5 \ln(V) \\
 &\quad + \beta_6 \ln(P40) + \beta_7 \ln(stTR) + \beta_8 \ln(stSM) + \beta_9 \ln(stHA) + \varepsilon \\
 \Rightarrow \ln(H) &= \alpha + \beta_1 \ln(U) + \beta_2 (\ln(B) - \ln(TP)) + \beta_3 (\ln(NC) - \ln(TP)) + \beta_4 (\ln(P) - \ln(TP)) + \beta_5 \ln(V) \\
 &\quad + \beta_6 \ln(P40) + \beta_7 \ln(stTR) + \beta_8 \ln(stSM) + \beta_9 \ln(stHA) + \ln(TP) + \varepsilon \\
 \Rightarrow \ln(H) &= \alpha + \beta_1 \ln(U) + \beta_2 \ln(B) + \beta_3 \ln(NC) + \beta_4 \ln(P) + \beta_5 \ln(vac) + \beta_5 \ln(V) \\
 &\quad + \beta_6 \ln(P40) + \beta_7 \ln(stTR) + \beta_8 \ln(stSM) + \beta_9 \ln(stHA) + (1 - \beta_2 - \beta_3 - \beta_4) \ln(TP) + \varepsilon \\
 (2) \quad \ln(stSM), \ln(stHA) &= \delta_0 + \delta_1 \ln(stUN) + \delta_3 \ln(stH) + \delta_4 stT + \delta_5 \ln(stCR) \\
 &\quad + \delta_6 \ln(stMV) + \delta_7 \ln(stMR) + \delta_8 (stMC) + u
 \end{aligned}$$

Where:

TP = total population inside of the MSA
H = total homeless population
B = total black population
NC = total non-citizen population
U = unemployment rate
P = total population below the poverty line
V = vacancy rate
P40 = percentage of households spending 40 percent or more of their income on housing

stHA = State and federal housing assistance grants for the state, millions
stTR = Tourism dollars per capita, millions
stSM = drug and mental health care grants for the state, millions
stUN = statewide unemployment rate
stH = total homeless population, state wide
stT = term years
stCR = crimes per 100,000, statewide
stMV = median home value, statewide
stMR = median rent, statewide
stMC = Medicaid eligibility as a percentage, statewide

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