



# Working Paper Series

## “Do We Really Understand Home Ownership Rates? An International Study”

Carl R. Gwin  
Economics Department  
[Carl\\_Gwin@baylor.edu](mailto:Carl_Gwin@baylor.edu)

Seow-Eng Ong  
National University of Singapore

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UNIVERSITY

# **Do We Really Understand Homeownership Rates? An International Study**

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Carl R. Gwin  
Department of Economics  
Baylor University

and

Seow-Eng Ong  
Department of Real Estate  
National University of Singapore

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Corresponding author: Carl R. Gwin, Associate Professor of Economics, Department of Economics, Baylor University, PO Box 98003, Waco, TX, 76798-8003. Phone: 254-710-6251.

# Do We Really Understand Homeownership Rates? An International Study

## Abstract:

This paper attempts to fill two gaps in the homeownership literature identified by Dietz and Haurin (2003): homeownership in less developed countries and the effects of race, ethnicity and income on tenure choice. We use United Nations data from 1993 and 1998 to offer a cross-country analysis of the determinants of homeownership rates. Consistent with the previous literature, this study confirms that 1. The price-to-rent ratio is an important factor in tenure choice and 2. Increases in income are associated with increases in the percentage of consumers who choose to own. However, these relationships seem to hold generally only for higher income developed countries. In contrast to the previous literature that finds race and ethnicity account for a significant portion of the differences in U.S. homeownership rates, this study finds no evidence that these determinants account for differences across countries. We investigate the rule of law and find it is closely correlated with income measures which may indicate that countries with stronger laws encourage higher homeownership rates. Finally, capitalist / (formerly) communist regime differences do not appear to explain cross country differences in homeownership rates. The paper offers insights from the international evidence for the potential of selected policies to increase domestic homeownership rates and identifies several avenues for future international homeownership research.

Keywords: Homeownership Rates, Tenure Choice

# 1 Introduction

Increases in homeownership rates have been touted to lead to a host of socio-economic benefits ranging from making people better citizens to improving the overall economy. A host of studies over the past few decades have attempted to better understand determinants of homeownership and evaluate housing policies. Homeownership is a key aspect of the current US administration's domestic policies and recent research has been carried out to evaluate these new policies. However, there is a paucity of cross-country comparison of homeownership in the literature. As Dietz and Haurin (2003) note, "the impact of homeownership has been analyzed only in developed economies." They further identified another important gap in that "studies of homeownership's impact have rarely measured the effects by race and ethnicity or income."

This study attempts to fill these gaps by utilizing panel data from the UN-HABITAT and World Bank databases that provide information about formal ownership rates, house rents and prices, and other aggregate data for the years 1993 and 1998. The main contribution of this paper is in offering a cross-country analysis of the determinants of homeownership rates. We attempt to estimate the long term relationships between homeownership rates and pertinent variables such as relative cost of ownership, credit availability, interest rates and aggregate household characteristics. An international comparison could contribute unique perspectives on domestic policies given that most of the cities included in this study are from third world developing countries, and to the extent that the focus of President Bush's housing policy is on improving homeownership for minority groups.

Interestingly, this study shows that much of what we do understand about homeownership is confined to higher income, developed countries. First, the international evidence provides support for theory that predicts that homeownership is sensitive to the price of

ownership relative to rental cost. Second, this paper demonstrates that increases in income are associated with increases in the percentage of consumers who choose to own. However, these relationships are not evident in lower income and less developed countries.

We explore whether the effect of race and ethnicity on homeownership rates may be accounted for by country of origin effects and find no evidence supporting this idea. We also investigate the legal framework (rule of law) and capitalist / formerly communist regimes as potential institutional differences to evaluate the differences across countries. We find that the rule of law is very highly positively correlated with income measures. This finding implies that a stronger rule of law should lead to increases in income that should in turn lead to higher homeownership rates. Our last result is that differences in the capitalist / (formerly) communist status of a country do not explain cross country differences in homeownership rates. We use our finding from the international evidence to provide insights into the potential of selected policies to increase the domestic homeownership rate.

## **2 Literature Review**

Coulson (2002a) provides a nice summary of current housing policy in the United States and research that documents the socio-economic benefits of homeownership. In a similar vein, an earlier study by Megbolugbe and Linneman (1993) expounds on the benefits of ownership. Coulson (2002b) describes three aspects of consumer behavior that may make ownership more socially beneficial than renting. Owners may be better than renters at maintaining property [see DiPasquale and Glaeser (1999) and Harding, Miceli, and Sirmans (2000)], rearing children [see Haurin, Parcel, and Haurin (2002), Aaronson (2000), Currie and Yelowitz (2000), Boehm and Schlottmann (1999), and Green and White (1997)], and being good citizens [see DiPasquale and Glaeser (1999) and Rossi and Weber (1996)]. While this paper does not directly address the

benefits of homeownership, it does investigate the determinants of tenure choice in an international setting with the aim of gauging which policies may be best for achieving said benefits.

The previous literature has addressed the determinants of tenure choice in terms of affordability issues and/or differences between consumer segments. Affordability is usually posed as the relative cost of owning to renting. Cross-sectional differences can be classified into three general categories: demographic, geographic, and psychographic. Interestingly, these same categories are used in marketing to segment consumers into groups that have homogeneous tastes and preferences within the segment and are heterogeneous across segments. Segmentation dimensions can be found in almost every standard marketing textbook. Geographic segmentation dimensions include world region or country, country region, city or metro size, density, and climate. Demographic dimensions include age, gender, family size, family life cycle, income, occupation, education, religion, race, generation, and nationality. Psychographic dimensions include social class, lifestyle, and personality. The study of tenure choice has included almost all of marketing's segmentation dimensions. A marketing strategy is often targeted at one or more segments. This suggests a role for targeting policies at specific segments of potential housing consumers, a suggestion that seems consistent with President Bush's policy to promote homeownership to minorities. An important question is then whether this targeted policy will work or not.

Let  $HO_i$  represent the homeownership rate in country  $i$ ,  $CO_i$  be the cost of owning in country  $i$ ,  $CR_i$  be the cost of renting in country  $i$ ,  $Y_i$  be aggregate income in country  $i$ , and  $X_i$  be a vector of other demographic, geographic, and psychographic variables in country  $i$ . The homeownership rate can then be expressed as  $HO_i = f(CO_i / CR_i, Y_i, X_i)$ . Individual tenure

choice can be viewed in much the same way and was modeled by Green and Vandell (1999) as  $P(Own) = F(CO/CR, Y, X)$  where  $P(Own)$  is the probability of the choice to own and  $F$  is some cumulative distribution function. Henderson and Ioannides (1983) and Fu (1991) provide theoretical support for their model. Several papers have investigated these models and found varying assortments of the determinants to be significant to the tenure choice decision. Papers that make general investigations into tenure choice include Chevan (1989), Jones, (1989), Pollakowski et al (1991), Hughes (1996), Gyourko and Linneman (1996, 1997), Green (1996), Segal and Sullivan (1998), Painter and Redfean (2002), and Coulson (2002a). Papers that focus on race, ethnicity, and/or immigration status include Wachter and Megbolugbe (1992); Long and Caudill (1992); Buist, Megbolugbe, and Trent (1994); Coulson (1999); Gyourko, Linneman, and Wachter (1999); Painter, Gabriel, and Myers (2001); and Borjas (2002). Papers that examine some variation of the general tenure choice model in countries other than the United States include Kemeny (1978) for Sweden; Lim, Follain, and Renaud (1980) for Korea; Bourassa (1994, 1996) for Australia; Werczberger (1997) for Switzerland; Arimah (1997) for Nigeria; Chen and Wu (1997) for Taiwan; Ford and Wilcox (1998) for Britain; Mulder and Wagner (1998) for West Germany and the Netherlands; Bourassa (2000) for New Zealand; Yates (2000) for Australia; and Fu and Tse (2000) for China. Except for a few countries, most of the literature focused on developed countries.

The above review focuses primarily on the economic aspects of housing. For a more focused review of the issues in affordable housing in the US, please see Sirmans and Macpherson (2003). We also note that there is a paucity of research on international homeownership rates, although Malpezzi (1999) provides an excellent review of housing markets in developing and transition economies. A recent paper by Proxenos (2002) provides a

global perspective on homeownership rates and notes that comparison across countries may be difficult in view of differences in definitions, legal systems and tenure laws, housing policies and quality. Unfortunately, the study did not provide an empirical test of the determinants of homeownership rates. The work most closely related to ours is Fisher and Jaffe (2002). Fisher and Jaffe use the same 1993 data (but not 1998) that we do in a cross-sectional study of the determinants of homeownership rates. We confirm some of their findings and significantly expand the scope of the investigation into the driving forces behind homeownership rates. A very interesting exercise in Fisher and Jaffe (2002) is their attempt to partially explain homeownership rates based upon each country's legal system.

### **3 Data and Methodology**

The hypothesized relationship between homeownership rates ( $HO_i$ ), the price-to-rent ratio ( $CO_i / CR_i$ ), income ( $Y_i$ ), and appropriate demographic variables ( $X_i$ ) will be formulated in the same way as the previous literature.

#### **3.1 The Data**

The dependent variable homeownership rate ( $HO_i$ ) was obtained from the database Global Urban Indicators Version 2 (Year of Reference – 1998) of the Global Urban Observatory (GUO) of the UN-HABITAT: United Nations Human Settlements Programme. The database contains observations for 237 cities in 111 countries from 1993 and 232 cities in 113 countries from 1998. The complete database and its description are available from the website of UN-HABITAT starting at <http://www.unhabitat.org/>.

The homeownership rate ( $HO_i$ ) data is labeled “Formal Ownership” in the 1998 database and includes homes that are owned or being purchased. The URBAN INDICATORS TOOL KIT GUIDE that accompanies the data describes: “Owned refers to households with a clear title or



ownership (formal housing) of the house and land they occupy, possibly through a company structure or as condominiums or strata title, or long leasehold of land. Purchasing refers to owner-occupiers in formal housing with a formal mortgage over the property.” The 1993 database lists owned and purchasing separately.

The data necessary to calculate the independent variable price-to-rent ratio ( $CO_i / CR_i$ ) was also obtained from the UN-HABITAT database. The database includes "House price-to-income ratio" and "Rent-to-income ratio." The "house price-to-income ratio" is defined as "ratio of the median free-market price of a dwelling unit and the median annual household income" and the "rent-to-income ratio" is defined as the ratio "of the median annual rent of a dwelling unit and the median annual household income of renters." The UN-HABITAT database does not report separate measures of median household income for owners and renters, thus we have to assume they are equal when we calculate a price-to-rent ratio. Note that the UN-HABITAT "rent-to-income ratio" is one annual rent and not the present value of a stream of future rent payments. Thus, using a price-to-rent ratio calculated directly from the UN-HABITAT data in a regression presumes that rents in all countries are discounted at the same rate. We relax this assumption by adjusting for differences in interest rates. Letting  $CR_i / r_i$  represent the current rent price, we calculate the present value of all future rent payments, i.e.

$$CR_i / r_i = \sum_{t=1}^{\infty} \frac{rent_i}{(1+r_i)^t} = \frac{rent_i}{r_i} .$$

A cross-country lending rate is available from the World

Development Indicators (WDI) 2002 database of The World Bank Group. A description of the WDI database is available from the website of The World Bank Group starting at

<http://www.worldbank.org/>. We then calculate an alternative price-to-rent ratio  $CO_i / (CR_i / r_i)$  as the price-to-income ratio divided by the present value of rent-to-income ratio.

Aggregate data clearly does not allow for controls based on individual race, ethnicity, and/or immigration status. Thus, these independent variables delineating demographics will be proxied by geographic variables. Dummy variables for geographic influence on homeownership rates are formulated in two ways. First, the UN-HABITAT database includes a region classification that will be represented by  $D_1$ . Regions include Africa, Arab States, Asia, Highly Industrialized, Latin America, and Transition. The second alternative is a dummy ( $D_2$ ) based on continent. The continents in 1998 include Africa, Asia, Europe, North America, and South America. The 1993 data also includes Oceania.

The remaining independent variables representing demographics for 1993 and 1998 were obtained from the WDI database. Alternative proxies for aggregate income are GDP per capita, household consumption, GDP per capita growth, and household consumption growth.<sup>1</sup> Factors that impact the ability of consumers to use future income for current consumption include the availability of credit and the lending rate. A house can also be viewed as an investment, thus the availability of substitute investments may be a factor in determining homeownership rates. Consumers may invest in financial assets rather than purchasing a home. A control for this possibility will be implemented using a measure of stocks trades as a percentage of GDP from the WDI data. A very important factor determining the net income available for purchasing a home is the tax rate. The WDI data included a category referred to as “Highest marginal tax rate, individual rate (%)” but, unfortunately, there was no data reported.

Other demographic factors commonly included in tenure choice studies include number of children in the home, education, and population distribution. In fact, these socioeconomic variables may also be tied to permanent income as in Goodman (1988). The other demographic

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<sup>1</sup> An interesting point to note is that most studies on tenure choice estimates household permanent income (see Goodman, 1988). We did not do this as we expect that differences over households would even out in the aggregate.

factors are classified as  $X_i$  in this study but could also be viewed as  $Y_i$ . Table 1 specifies the proxies for these factors.

Finally, we include control variables for the rule of law and formerly communist countries. As we stated in the literature review section, work by Fisher and Jaffe (2002) attempts to gauge the effect of a country's legal system on its homeownerships. Fisher and Jaffe use dummy variables for the origin of each country's legal system. Dummy variables such as these obviously can lead to imprecise estimates and Fisher and Jaffe have only limited findings. We hoped to improve this methodology by following Berkowitz, Pistor, and Richard (2001) and formulating a continuous index of the rule of law in a selection of the countries in our data. The work by Berkowitz, Pistor, and Richard (2001) is based on data from La Porta, Lopez-de-Silanes, Shleifer, and Vishny (1998) who provide a rating of five areas of the rule of law on a scale of 0 to 10 for 49 countries. We implement factor analysis in the same manner as Berkowitz, Pistor, and Richard (2003) to create a legal index ( $Law_i$ ). We control for formerly communists regime with the use of a dummy variable ( $D_{Communist}$ ).

A summary of the variables, variable descriptions, and sources that will be used in this study is provided in Table 1. Summary statistics of the 1998 data are provided in Table 2. Note that  $N$  represents the number of observations. The variable  $D_I$  is never significant in any of the tests that follow and is thus not reported.

An important issue with both the UN-HABITAT and WDI databases is missing data. For example, the combined databases contain sufficient data to calculate only 58 measures of the price-to-rent ratio. Other than the measures of income and income growth, the WDI data varies greatly as far as coverage by country and by variable.

We also recognize the data does not provide information about types of leases, rent controls, government subsidies, housing policies, etc. These factors may influence the observed homeownership rates. In addition, definitions of formal ownership may differ across countries due to institutional, legal and cultural differences (Proxenos, 2002). Although we are unable to control for these omitted variable directly, we attempt to mitigate the influences these variables may have in the fixed effect panel regression that utilizes individual city dummy variables. In addition, Malpezzi (1999) notes that “housing market behavior is remarkably similar from place to place” and that “differences in institutions and constraints do not obscure regularities in behavior.”

### **3.2 Empirical Methodology**

The cross-sectional relationship is represented as

$$(1) \quad HO_i = f(CO_i / CR_i, Y_i, X_i).$$

Assuming equation (1) can be represented as a linear relationship, the empirical model is specified as

$$(2) \quad HO_i = \alpha + \beta_{CO/CR} CO_i / CR_i + \beta_Y Y_i + \beta_X X_i + \varepsilon_i,$$

where  $\varepsilon_i$  is a normally distributed error term. Equation (2) will be analyzed with an ordinary least squares model that uses a robust estimator of variance that allows for heteroscedasticity.<sup>2</sup>

While a cross-sectional analysis is informative, there is an opportunity to analyze variations over time in the factors that influence homeownership rates because UN-HABITAT provides surveys from both 1993 and 1998. The available empirical options include analyzing

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<sup>2</sup> It is recognized that there some endogeneity may exist between homeownership rates and the price-rent ratio at the aggregate level.

the differences in variables between 1993 and 1998 or employing panel techniques. As both methods yield very similar results, we report only the panel methodology and results.<sup>3</sup>

In addition, the panel regressions allow for city-specific effects (via the fixed and random effects) to mitigate the concern that this study does not specifically account for differences in definitions, legal systems and tenure laws, housing policies, quality, etc. (Proxenos, 2002).

In our empirical model, we estimate an equation similar to (2) but one that recognizes the panel structure of the data. With  $t$  representing time, our estimation equation is

$$(3) \quad HO_{it} = \alpha + \beta_{CO/CR} CO_{it} / CR_{it} + \beta_Y Y_{it} + \beta_X X_{it} + \mu_{it},$$

where  $\mu_{i,t}$  is an error term that varies across cities and time. Recognizing the potential that  $\text{cov}(\mu_{i,t}, \mu_{i,k}) \neq 0$  for  $t \neq k$ , and to control for the potential unobserved heterogeneity across countries, we rewrite (2) using error-components,  $\mu_{it} = v_i + \varepsilon_{it}$ , where the error term in (3) can be separated into a city-specific error term (fixed-effect),  $v_i$ , and an error term that varies by city and time,  $\varepsilon_{i,t}$ . We estimate equation (3) using a fixed effects specification. In our data with only two observations per country, a random effects specification yields the same results as a pooled OLS regression. Thus, we do not implement a random effects model.

There are 59 matches between the cities in 48 countries listed in the 1993 and 1998 UN-HABITAT databases. The reduction in the number of cities and the problem with missing data on the independent variables further restricts the number of variables that can be included in the statistical analysis.

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<sup>3</sup> Since we have only data from two time periods (panels), the panel approach is equivalent to the difference approach.

## **4 Results**

### **4.1 Cross-Continent Comparisons of Means**

A cross-continent comparison of the variables is presented in Table 3. Table 3 shows some initial interesting points. First, homeownership rates are higher in Asia and South America than in North America even though their measures of income are substantially lower. This result is consistent with the survey of homeownership rates by Proxenos (2002) using country-specific data. Second, homeownership rates are relatively close across continents even though all of the proxies for aggregate income vary greatly.

Table 4 shows the mean homeownership rates by continent in comparison to a breakdown of the 2002 U.S. homeownership rates by race. Countries in Africa, Asia, and South America have significantly higher homeownership rates than the corresponding racial groups in the U.S. In contrast, whites in the U.S. have higher homeownership rates than countries in Europe. This may imply that families that leave countries in Africa, Asia, and South America to immigrate to the U.S. are less likely to own a home when they arrive in the U.S. Given that the U.S. received an influx of 9 million foreign-born immigrants in the past decade (Proxenos, 2002), the implication may be far-reaching. As such, President Bush's policy to promote homeownership to minorities and immigrants with an emphasis on education emphasizing the benefits of homeownership seems appropriate for addressing this issue.

### **4.2 Factor Analysis**

Table 3 shows and correlation analysis confirms that GDP per capita, household consumption, credit provided to the private sector, stocks traded as a percent of GDP, age dependency ratio, illiteracy, percent of population over 65, and the rule of law index are significantly correlated. Stronger economies are associated with higher household income and

consumption, more available credit, more investment opportunities, lower fertility rates, lower illiteracy rates, higher life expectancies, and stronger rules of law. Additionally, income growth and consumption growth are significantly correlated as would be expected. The only two independent variables that are not significantly correlated with income or growth are  $CO_i / CR_i$  and  $r_i$ , although these variables appear to be somewhat correlated with each other. We choose to address the multicollinearity problem in our regressions by narrowing the field of independent variables with factor analysis. An initial factor analysis of all of the independent variables shows that neither  $CO_i / CR_i$  nor  $r_i$  has a high loading on any factors which suggests these two variables should be treated as independent regressors. Factor analysis on the remaining independent variables  $y$ ,  $yg$ ,  $c$ ,  $cg$ ,  $CRD_i$ ,  $STK_i$ ,  $DEP_i$ ,  $ILT_i$ ,  $POP65_i$ , and  $Law_i$  leads to the emergence of two factors that explain 79.4% of the variance in these variables.

Unfortunately, the rule of law variable is available for only 57 of the 138 cities in the data. The rule of law has a rotated load factor of 0.94 on the first factor. The main point of Berkowitz, Pistor, and Richard (2001) is that country incomes are higher if the rule of law is stronger. With the limitations of aggregated data, it is unlikely that the affects of income can be disentangled from those of the rule of law. Given the high loading of the rule of law and the advantages of maintaining as many countries as possible in the data, we drop the rule of law from our analysis that follows.

For  $y$ ,  $yg$ ,  $c$ ,  $cg$ ,  $CRD_i$ ,  $STK_i$ ,  $DEP_i$ ,  $ILT_i$ , and  $POP65_i$ , Table 5 details the rotated factor loadings from a varimax rotation of a factor analysis based on principal-component factors. Factor 1, which we will refer to as an income index, exhibits the strong correlation between  $y$ ,  $c$ ,  $CRD_i$ ,  $STK_i$ ,  $DEP_i$ ,  $ILT_i$ , and  $POP65_i$ . Factor 2 accounts for the very high correlation of  $yg$  and  $cg$  and thus we will refer to it as a growth index.

### 4.3 Regression Analysis

The results of a cross-country analysis of equation (2) and implemented with OLS for the 1998 data are reported in columns (1) and (2) of Table 6. The results using the 1993 data are similar and thus are not reported.

Column (1) reports the results of a regression model that uses the most complete selection of independent variables. The sign of the coefficient on the price-to-rent ratio is negative as expected, but it is not significant. The sign on the growth index is positive and significant. As expected, countries with high growth rates have higher homeownership rates. The remaining independent variables are all insignificant. As observed in Table 4, differences in homeownership rates cannot be accounted for by differences in income in our data. We include continent dummy variables to control for possible structural differences across continents. The omitted continent for  $D_2$  is North America. None of the dummy variables are significant. There appear to be no significant structural differences across continents.<sup>4</sup> To the extent that continental dummy variables can be regarded as a proxy for culture (Asia versus Latin American versus European), the lack of significance for the continental dummy variables suggests that cultural differences may not be very important in explaining homeownership rates across cities/countries. The results are consistent with the finding by Malpezzi (1999) that differences in institutions and constraints do not obscure regularities in behavior.

Column (2) reports a second cross-country model that drops  $CO_i / CR_i$  and  $r_i$  (which both have a large number of missing data points) to verify the robustness of the results of Column 1. Dropping  $CO_i / CR_i$  and  $r_i$  increases the number of observations from 57 to 127. Results are substantively unchanged.

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<sup>4</sup> We did not include country dummy as the macro-economic variables are for all cities in any particular country are the same, leading to a multi-collinearity problem.



Column (3) reports our results that controls for effects of capitalist versus communist regimes on homeownership rates. Our analysis shows that formerly communist regimes do not significantly affect homeownership rates.

The results of panel analyses of equation (3) are reported in Columns (4) – (8) of Table 6. Column (4) reports results for the entire sample of countries. The growth index consistently has a small and insignificant coefficient, thus we drop it from the analyses. Dummy variables that do not change over time (including the continent and formerly communist dummies) are dropped from panel regressions. The only significant coefficient in Column (4) is on the income index and it is positive as theorized. This result seems to confirm the findings of the cross-sectional analyses that economic growth does lead to higher homeownership rates. Once again, the sign of the coefficient on the price-to-rent ratio is negative as expected, but it is not significant. This is a curious result because previous literature has consistently found the price-to-rent ratio to be a key determinant of homeownership rates. A potential issue is that most of the previous studies were conducted in developed countries that are characterized by above average income levels. We approach this issue by splitting the sample into high income countries, those with an income per capita higher than the total sample mean, and low income countries.

Columns (5) and (6) report results for high income countries. Several observations can be made. First,  $CO_i / CR_i$  from column (5) and  $CO_i / (CR_i / r_i)$  from column (6) are both negatively and significantly related to  $HO_i$  for the high income countries. Columns (5) and (6) both clearly show that economic progress in high income countries leads to higher homeownership rates. Finally, increases in interest rates lead to lower homeownership rates as expected. On the other hand, none of the coefficients on the independent variables are significant for the low income countries (Columns 7 and 8). The most striking difference between the results for the high

income countries and the low income countries are the values of the  $R^2$  statistics. The title of this paper posed the question: Do we really understand homeownership rates? In high income countries, the answer appears close to yes. However, our results for low income countries indicate we have a lot of work to do.

## 5 Conclusions

The empirical results have application in three major areas of research on homeownership. First, the international evidence provides support for theory that predicts that homeownership is sensitive to the price of ownership relative to rental cost. Second, this paper demonstrates that increases in wealth and income are associated with increases in the percentage of consumers who choose to own. Third, several papers have documented differences in U.S. homeownership rates based on race, ethnicity, and immigrant status. There is little if any evidence of differences in homeownership rates based on geographic proxies (continent) for race and ethnicity.

To the extent that homeownership rates are highly sensitive to the price-to-rent ratio, President Bush's policy of increasing the supply of affordable housing and providing downpayment assistance appears to be appropriate. In addition, the administration's program to improve mortgage availability to minority households to increase homeownership rates is also consistent with the international evidence. The results in this paper further suggest that greater focus could be on reducing the cost of ownership relative to rental.

One of the more interesting findings of this study is that people in low-income countries have relatively higher homeownership rates than people in high-income countries whereas previous research based on the United States found that low-income people have relatively lower homeownership rates than high-income people. Why is it different to be low income in a

low-income country than low income in a high-income country? Could this be due to the relatively higher cost of homeownership in high-income countries? The international evidence suggests otherwise, showing that the relative price-to-rent ratio for developing countries are generally higher than that for developed countries. Ostensibly the higher ownership rates in some countries could be attributed to government assistance programs, subsidies and differences in definitions of formal ownership.

Another important finding is that there are little differences between homeownership rates in Africa, Asia, Europe, North America, and South America. It appears that people who leave countries in Africa, Asia, and South America to immigrate to Europe or North America are less likely to own a home in their new country. This finding is consistent with the previous literature on immigrants into the United States. As such, the stakeholder motivation that underpins President Bush's homeownership program has important political implications. Similar policies have been successfully implemented elsewhere (Chua, 2000).

This paper provides an initial empirical analysis on international homeownership in an attempt to fill gaps in the homeownership literature. Clearly, there is much room for future research. A deeper analysis of international homeownership rates to investigate country-specific factors that drive housing programs, identifying institutional characteristics, experiences of wars, housing policy, aggregate investment, etc, would be useful, and will be left for future research.

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<b>Table 1: Variables, Variable Descriptions, and Sources</b>		
<b>Variable</b>	<b>Variable Description</b>	<b>Source</b>
$HO_i$	Homeownership Rate	UN-HABITAT
Price-to-rent Ratio		
$CO_i/CR_i$	Price-to-rent Ratio	UN-HABITAT / WDI
Income Variables, $Y_i$		
$y_i$	GDP per capita, PPP (current international \$), thousands	WDI
$yg_i$	GDP per capita growth (annual %)	WDI
$c_i$	Household final consumption expenditure per capita (constant 1995 US\$), thousands	WDI
$cg_i$	Household final consumption expenditure per capita growth (annual %)	WDI
$CRD_i$	Credit to private sector (% of GDP)	WDI
$r_i$	Lending interest rate (%)	WDI
$STK_i$	Stocks traded, total value (% of GDP)*	WDI
Other Demographic and Geographic Variables, $X_i$		
$DEP_i$	Age dependency ratio (dependents to working-age population)	WDI
$ILT_i$	Illiteracy rate, adult total (% of people ages 15 and above)	WDI
$POP65_i$	Population ages 65 and above (% of total)	WDI
$D_1$	UN-HABITAT Region Dummy	UN-HABITAT
$D_2$	Continent Dummy	
$D_{Communist}$	Formerly Communist Dummy	
$Law_i$	Rule of Law Index	Berkowitz, Pistor, and Richard (2003)
*Note: We interpret missing values of $STK_i$ as meaning $STK_i$ is equal to zero.		



Variable	N	Mean	Std. Dev.	Min	Max
$HO_i$	138	61.58	20.87	9.00	97.50
$CO_i/CR_i$	67	0.64	0.83	0.07	5.22
$CO_i/(CR_i/r_i)$	58	14.80	17.40	0.58	74.63
$y_i$	127	8.23	9.07	0.58	30.66
$yg_i$	136	0.54	4.23	-14.53	8.92
$c_i$	123	4.07	6.28	0.08	20.22
$cg_i$	123	0.89	5.69	-12.58	14.97
$CRD_i$	127	42.54	43.42	0.01	155.83
$r_i$	114	24.01	16.29	6.50	86.36
$STK_i$	100	30.69	50.17	0.02	150.63
$DEP_i$	137	63.51	18.16	39.89	104.74
$ILT_i$	111	20.80	23.25	0.20	85.03
$POP65_i$	137	7.71	4.47	2.03	15.75
$D_2$ (Africa)	138	0.21	0.41	0	1
$D_2$ (Asia)	138	0.22	0.42	0	1
$D_2$ (Europe)	138	0.25	0.44	0	1
$D_2$ (North America)	138	0.09	0.29	0	1
$D_2$ (South America)	138	0.22	0.41	0	1
$D_{Communist}$	138	0.29	0.46	0	1
$Law_i$	57	-0.22	1.06	-1.64	1.28

Variable	Africa		Asia		Europe		North America		South America	
	N	Mean	N	Mean	N	Mean	N	Mean	N	Mean
$HO_i$	29	50.46	31	65.18	35	61.75	13	62.59	30	67.98
$CO_i/CR_i$	8	0.69	16	0.79	26	0.81	10	0.09	7	0.36
$CO_i/(CR_i/r_i)$	3	29.79	12	17.04	26	18.02	10	0.73	7	12.65
$y_i$	27	1.53	29	4.22	34	10.02	13	30.22	24	6.19
$yg_i$	28	0.97	30	-1.41	35	1.21	13	3.07	30	0.23
$c_i$	26	0.36	26	1.47	34	4.19	13	19.59	24	2.32
$cg_i$	26	0.49	26	-2.07	34	3.05	13	3.32	24	0.14
$CRD_i$	27	16.21	30	44.02	33	36.27	13	127.84	24	32.73
$r_i$	18	23.50	26	22.63	33	22.93	13	8.22	24	35.94
$STK_i$	7	1.34	24	16.13	33	21.66	13	143.30	23	4.15
$DEP_i$	29	91.73	30	63.01	35	48.53	13	0.51	30	0.59
$ILT_i$	29	45.13	27	25.90	26	1.35	0	--	29	9.18
$POP65_i$	29	3.07	30	4.95	35	13.26	13	12.36	30	6.48
$D_{Communist}$	29	--	31	0.19	35	0.80	0	--	30	0.20
$Law_i$	5	-1.27	14	-0.84	7	1.10	13	1.11	18	-0.91

Continent	Mean Homeownership Rate	2002 U.S. Homeownership Rate <sup>1</sup>	
		Race	Rate
Africa	50.46	African- Americans	47.3
Asia	65.18	Asian-Americans	53.7
Europe	61.75	Non-Hispanic Whites	74.3
North America	62.59		
South America	67.98	Hispanic-Americans	47.6

1. Source: US Census Bureau, Housing Vacancies and Homeownership, Annual Statistics: 2002, Table 20. Homeownership Rates by Race and Ethnicity of Householder: 1994 to 2002

Variable	1 Income-Index	2 Growth-Index	Uniqueness
$y_i$	0.961	0.038	0.074
$yg_i$	-0.046	0.917	0.157
$c_i$	0.917	0.069	0.154
$cg_i$	0.064	0.878	0.224
$CRD_i$	0.847	-0.027	0.282
$STK_i$	0.766	0.141	0.393
$DEP_i$	-0.788	0.097	0.369
$ILT_i$	-0.760	0.188	0.386
$POP65_i$	0.848	-0.026	0.280

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	<b>OLS</b>	<b>OLS</b>	<b>OLS</b>	<b>FE</b>	<b>FE</b>	<b>FE</b>	<b>FE</b>	<b>FE</b>
	<b>1998</b>	<b>1998</b>	<b>1998</b>		$y_i \geq \bar{y}$	$y_i \geq \bar{y}$	$y_i < \bar{y}$	$y_i < \bar{y}$
$CO_i/CR_i$	-3.068 (0.75)	--	--	-0.280 (0.02)	<b>-82.673</b> <b>(1.96)</b>	--	2.740 (0.24)	--
$CO_i/(CR_i/r_i)$	--	--	--	--	--	<b>-7.036</b> <b>(2.98)</b>	--	0.092 (0.17)
<i>Income Index</i>	2.334 (0.41)	1.166 (0.31)	1.283 (0.93)	<b>29.991</b> <b>(2.09)</b>	<b>31.114</b> <b>(3.37)</b>	<b>23.674</b> <b>(2.89)</b>	-26.800 (0.41)	-23.729 (0.38)
<i>Growth Index</i>	<b>9.556</b> <b>(2.54)</b>	<b>6.728</b> <b>(2.96)</b>	<b>4.283</b> <b>(2.06)</b>	--	--	--	--	--
$r_i$	0.126 (0.62)	--	--	0.096 (0.25)	<b>-6.059</b> <b>(4.39)</b>	-0.445 (0.25)	0.115 (0.32)	0.075 (0.15)
<i>Africa</i>	-7.813 (0.35)	-3.097 (0.22)	--	--	--	--	--	--
<i>Asia</i>	29.247 (1.91)	13.928 (1.18)	--	--	--	--	--	--
<i>Europe</i>	6.226 (0.60)	5.420 (0.60)	--	--	--	--	--	--
<i>South America</i>	8.025 (0.60)	9.427 (0.84)	--	--	--	--	--	--
$D_{Communist}$	--	--	2.823 (0.60)	--	--	--	--	--
<i>Constant</i>	49.646 (3.03)	54.545 (5.25)	59.420 (29.75)	43.829 (2.94)	114.526 (2.83)	79.490 (4.18)	35.688 (1.10)	35.189 (0.91)
Observations	57	127	127	52	17	17	35	35
R-squared	0.25	0.12	0.04	0.25	0.89	0.94	0.08	0.08
Number of Individuals	--	--	--	36	10	10	26	26

Robust t statistics in parentheses